Yearly Assessment of the Core

College of Engineering, The University of Iowa

Associate Dean for Academic Programs
13 June 2002

Academic Year 2001-2002
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Appendix A. EASY System for Course-Goal Assessment 379
I. Background

An important component of the College of Engineering outcomes assessment process is assessment of achievement of course goals that, collectively and individually, support program outcomes.

The six programs build their curricula on the same foundational core courses. Therefore, assessment of these core courses is unified and managed by the Associate Dean for Academic Programs (ADAP).

Since the individual programs have articulated their own unique program outcomes in consultation with their particular constituents, the collegiate core-course assessment is conducted in the framework of the generic EC-2000 Criterion 3 outcomes (a-k). Each program then draws upon the collegiate core-course assessment to complement its own assessment of program courses in demonstrating achievement of its particular program outcomes.

For each academic year (summer-fall-spring), the ADAP prepares Yearly Assessment of the Core (YAC). This report is a resource for programs to draw upon as one component of their program outcomes assessment process. The report describes the processes and results of assessment of College of Engineering and Math/Chemistry/Physics/Statistics core courses, and the overall Rhetoric and Humanities/Social Sciences stems. The ADAP also maintains the course binders, including collected student material used in the assessment process, in a central location for programs to consult as needed.

This second YAC is for the Academic Year 2001-2002 and begins with Summer 2001 and includes Fall 2001 and Spring 2002.

II. Role of Core Curriculum in Criterion 3 Outcomes

As is described in Section IV below, the Course Outcomes Worksheet (COW) for each offering of a core course associates course-specific learning goals with substantial or moderate contribution to one or more EC-2000 Criterion 3 outcomes. Table II.1 is developed from the ensemble of these associations, indicating a mapping of the core-course contributions to the Criterion 3 outcomes.
Table II.1  Association of Criterion 3 Outcomes with Core Courses  
(Reflects latest COW’s for  2001-2002 Academic Year)

<table>
<thead>
<tr>
<th>Number</th>
<th>Course</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
<th>f</th>
<th>g(o)</th>
<th>g(w)</th>
<th>g(g)</th>
<th>h</th>
<th>i</th>
<th>j</th>
<th>k</th>
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</table>

? denotes moderate contribution to the outcome    ? denotes substantial contribution to the outcome
(o) = oral communication; (w) = written communication. (g) = graphical communication
III. Assessment of Rhetoric, Humanities, and Social Sciences

Given the broad range of humanities and social science courses taken by Engineering students, and the numerous rhetoric sections shared with the general University of Iowa student population, Engineering students are always a small fraction of the enrollment in any particular course or section. Therefore the rhetoric and humanities / social sciences stems are assessed not as individual courses, but rather as a total experience. This is done through an open-forum exit interview with graduating seniors from all engineering programs, at the end of each semester.

Fall ‘01: The inaugural open forum was held on 21 December 2001. All fall-semester graduating seniors were invited to join the Dean, Associate Dean, and an Associate Department Chair for a two-hour informal discussion of the humanities / social sciences experience. Although only four students participated (due to the relatively late notice and coincidence with the end-of-semester rush), they provided valuable assessment of this experience.

The students were asked to provide written and oral self-assessments directed to the following three outcomes and associated questions shown in Figure III.1, which also includes a composite summary of student oral and written responses.

Although the Fall ’01 sample size was small, this group of students on the average did not agree that the Rhetoric / Humanities / Social Science experience was contributing positively to Criterion 3 Outcomes (g), (h), and (j). However the students seemed to highly value, and be stimulated by, the opportunity to be in classes with non-engineering students.

Insofar as Outcome (g) (“ability to communicate effectively”) is concerned, the new College of Engineering Center for Technical Communication (CTC) has begun to provide a useful complement to the formal Rhetoric classroom work in supporting students’ development of effective communication skills. It is, in particular, in providing support for the writing exercises in Engineering courses, that the presence and efforts of the CTC should be particularly helpful.

For the global awareness and contemporary issues Outcomes (h) and (j), the message from this limited group of students appears to be clear: the Program Professional Seminars could and should play a strong role. Several of the Programs have already begun strengthening the role of their Professional Seminar in this regard. The concern of some students for the rigid constraints of the present Humanities / Social Science requirements (one lower and one upper level departmental sequence in both a humanities area and a social-science area) is relaxed somewhat in the new (Fall ‘2002) Engineering curriculum, albeit still requiring some depth in at least one area.

Spring ‘02: About 21 graduating seniors participated in a Rhetoric/Humanities/Social Sciences open forum on 26 March 2002. Associate Dean Holly and Professors Fischer
and Nixon engaged the students in a structured dialogue in a manner quite similar to the successful model of Fall '01. Figure III.2 below provides a transcript of student comments. The summaries below reflect both the written comments and the discussion in the open forum.

The students generally thought their Rhetoric experience was a positive one – not only for being in class with non-engineering students, but also for the experience in public speaking. The average response of 4.4 (between “agree” and “moderately agree”) confirms this. The writing exercises were not generally viewed as very helpful. Many students believe that there should be more writing exercises, including emphasis on nuts-and-bolts grammar, in engineering classes, with some uniformity of grading and expectations. Most students think a technical-writing tech elective course would be valuable, but do not support the idea of a required technical writing course. Support for the idea of a College-based Toastmasters Club seems to be lukewarm. There was a general feeling that development of graphical communications skills tends to happen on its own.

Students slightly disagreed (average score 3.3) that their Humanities/Social Sciences courses contributed to their understanding of the impact of engineering solutions in a global and societal context (Criterion 3 outcomes (h)) The survey question was probably not well constructed, since many students interpreted it to refer to Humanities/Social Sciences that have direct engineering relevance, rather than to their general education. Economics and Psychology courses seemed to be the most appreciated, and there is interest in having more business courses as part of the non-engineering requirements. Students felt that the lower-upper level structure of the current curriculum led to their having to take oft-meaningless lower-level courses, in large lecture classes. Upper level courses tend to be smaller classes and more meaningful. There was frequent sentiment for having more freedom in the choice of Humanities/Social Sciences courses, which is consistent with the guidelines of the new curriculum for students beginning in Fall '02. Most students agreed that their Hum/SS experiences were a nice break from the rigor of engineering courses.

The students also slightly disagreed, on the average, with the notion that their Hum/SS experience contributed to their awareness of the role of engineering in contemporary issues (Criterion 3 outcome (j)). Students agreed that the program Professional Seminars ought to be fulfilling this need, but the results are quite mixed. Students range from feeling there is too little professional seminar experience in one program, to too much repetition in others. There was a strong suggestion for including required non-engineering on-campus seminar attendance as part of the requirements (Chemical Engineering has begun this practice). The students have a genuine hunger to hear more outside speakers (and not recruiters or faculty) speaking on truly contemporary topics in their discipline. Students seem to highly appreciate instructors who bring contemporary issues directly into the classroom experience.

Only one of the students in the forum had taken advantage of a study-abroad experience, though half of the students wished they could have taken advantage of a study-abroad
experience; most did not because of the major perturbations to the their graduation plans, scheduling problems caused by the prerequisite structure, etc. Interestingly, fully half of the students said they would have taken advantage of the opportunity to pursue a Liberal Arts minor within their required engineering curriculum (per the new Elective Focus Area guidelines) if they had had the opportunity.

Overall Assessment:

Despite its imperfections (uneven instruction in multiple sections, disattachment from technical writing issues, etc.) the Rhetoric course sequence seems to be appreciated by the students and resulting in improved communication skills for many. The current curriculum’s Hum/SS structure (lower- and upper-level courses from the same department) does not appear to working as well as it should, primarily because the lower-level courses are not seen as meaningful as the upper-level ones by at least some students. Interestingly enough, students seem to think it would be good to require more, not less, Hum/SS coursework. The new curriculum offers this opportunity through the Elective Focus Area structure. Students see the program Professional Seminars as the best vehicle for addressing contemporary topics and the relevance of engineering solutions in a global context. However students in most programs feel their Professional Seminars largely missed this opportunity. Programs should consider student comments and suggestions as their Professional Seminars evolve in the new curriculum.
Indicate your level of agreement or disagreement with each statement:
1 = strongly disagree; 6 = strongly agree

<table>
<thead>
<tr>
<th>Question No.</th>
<th>ABET Criterion 3 outcome</th>
<th>Statement</th>
<th>Rating 1-6 (average)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(g) - ability to communicate effectively</td>
<td>My required Rhetoric courses improved my ability to communicate effectively</td>
<td>2.5</td>
</tr>
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In your opinion, how could the Rhetoric program be improved to better provide engineering students with the ability to communicate effectively?

1) Took Rhetoric at Kirkwood before attending UI. Suggests making sure UI Rhetoric program stresses importance of good communication; eye contact, clear voice, grammar, spelling. It is difficult to respect a person who uses incorrect grammar.
2) Rhetoric program needs more uniformity from one section to another, so each student has a similar experience.
3) Did not get much out of Rhetoric. A positive aspect was being in class with other majors and hearing their viewpoints. Instructors should touch on some technical issues.
4) “Debating” element of Rhetoric is positive.
5) Communication skills actually decreased during Rhetoric experience.
6) “Debating” element of Rhetoric is positive.
7) It would be a loss to have only engineers in Rhetoric – heterogeneity of class is main benefit of the course.
8) Most engineering classes now have their own writing exercises.
9) Rhetoric should include instruction on effective PowerPoint presentations.
Indicate your level of agreement or disagreement with each statement:
1 = strongly disagree; 6 = strongly agree

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</tr>
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<tbody>
<tr>
<td>2</td>
<td>(h) – the broad education necessary to understand the impact of engineering solutions in a global and societal context</td>
<td>My required Humanities and Social Sciences courses gave me the broad education necessary to understand the impact of engineering solutions in a global and societal context</td>
<td>3.0</td>
</tr>
</tbody>
</table>

In your opinion, which of your Humanities / Social Sciences courses were most helpful in giving you the broad education necessary to understand the impact of engineering solutions in a global and societal context?

1) My philosophy courses make me think analytically about my actions and about how people interact with each other in the world. Just having the Hum/SS requirements forces engineering students to think outside of the calculator and PC world where everything always works out to some number. The Hum/SS make engineers a little more “human”.

2) Course Loss in Trauma (Psychology) showed several examples of how technology can affect the human psychological coping mechanisms.

3) Contemporary Environmental Issues (44:019) was very beneficial. Upper level selections were less worthwhile.

4) Main benefit, like Rhetoric, was being in classes, and communicating, with non-engineering students.

5) Literature courses very useful for gaining a broad awareness of the world.

In your opinion, how could we restructure our Humanities and Social Science requirements to better achieve the above outcome for engineering students?

1) Requirements are fine as presently constituted.

2) Allow students to choose from a larger selection of classes that would be more fitting to their knowledge base and future expectations. Students shouldn’t have to squeeze their personalities into “cookie cutter” requirements to broaden their personalities.

3) Allow students to take courses in different areas. Reduce the lower and upper-level requirements to only one set instead of two.

4) Might be good to tailor breadth or depth to profile of a particular student.

5) Lower-level courses tend to be of problematic contribution to outcome (h)
Indicate your level of agreement or disagreement with each statement:
1 = strongly disagree; 6 = strongly agree

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<tr>
<td>3</td>
<td>(j) – a knowledge of contemporary issues</td>
<td>My required Humanities and Social Sciences courses gave me a knowledge of the role of engineering in my major relative to contemporary issues in the world, nation, state, and community</td>
<td>2.33</td>
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In your opinion, how could the Humanities and Social Science requirements be improved to give engineering students a knowledge of contemporary issues?

1) Allow more outside projects specifically catered to each student’s area of study.
2) Point out specific classes that provide the most knowledge.

In your opinion, how could your Departmental professional seminar be improved to give engineering students a knowledge of contemporary issues?

1) Seminar is a joke as it stands. Seminar assumes that Career Services provides all that is needed for career searches, but this is not true. Seminar should provide much more support for job searches (mock interview sessions, etc). Also Seminar should participate in community service and share ideas on project organization, time management, teamwork.
2) Seminar is working well.
3) Require students to keep abreast of current news and issues, through more group work and discussions.
4) Professional seminar should be, and is in some programs, driven by contemporary issues in the discipline.
5) Programs have varying emphasis on having outside speakers.

In your opinion, which of your Humanities / Social Sciences courses were most helpful in giving you a knowledge of contemporary issues?

1) Upper level Spanish and Psychology classes.
2) Lower level geography, Literature courses that utilize current journals/papers.
3) Rhetoric, Microeconomics required subscription to journals and discussion of contemporary topics.
4) Technical electives could be chosen to address contemporary issues.
5) Product liability exposure through one ME professor is very contemporary and useful.
6) Professional society magazines could be a good basis for contemporary issues in seminars.
7) Engineers should be more knowledgeable than UI student body as a whole on contemporary issues.
Figure III.2
Rhetoric / Humanities /Social Science Assessment

Spring 2002 College of Engineering Graduating Seniors
26 March 2002

Please indicate your major:
__ Biomed: __Chemical: __Civil: __Electrical: __Mechanical: __Industrial

Indicate your level of agreement or disagreement with each statement:
1 = strongly disagree; 6 = strongly agree

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<td>(g) - ability to communicate effectively</td>
<td>My required Rhetoric courses improved my ability to communicate effectively</td>
<td>4.4</td>
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</table>

In your opinion, how could the Rhetoric program be improved to better provide engineering students with the ability to communicate effectively?

1. Provide technical writing/presentation as a part of the class. I don't think there is enough room in the average engineering student's schedule for extra courses and I don't think they are necessary. I feel I have no problem with technical writing but additions to courses already offered, such as Rhetoric, would have been helpful. Other helpful changes include changing how reports early on before Design I, such as Statics and Engineering I are graded so they are consistent with the expectations of later classes.

2. Rhetoric did a great job at preparing me to communicate effectively. I think the problem lies in my engineering courses. I feel more of my engineering courses should have papers and presentations that focus on grammar and style as well as the content. Most of my reports/papers are graded on the technical content and not the technical writing style. Also, I rarely ever give presentations in my classes. In addition to more papers and presentations, I would love to see a Tech Comm course be offered as a tech elective. I would like to see the CTC be available to all students in engineering, not just students in specific courses.

3. More emphasis on technical papers. Good interaction with students of different areas.

4. I took Accelerated Rhetoric and it certainly helped me learn to communicate better with students in other majors. It didn't improve my writing or speaking skills very much, although my presentation/speaking skills have been improved through various projects I've had in Engineering courses. I think a technical writing course would be of great benefit. My overall writing skills are fine, but technical writing skills can always be improved.

5. I don't think a technical writing course should be required. I feel that we have enough
opportunities to improve our technical writing throughout our careers in other classes. I felt that my Rhetoric experience at U of I was a small step backwards because of my senior year high school English teacher. I basically thought my high school teacher was better and more experienced than my Rhetoric teacher. The one benefit of Rhetoric was that it laid the foundation for my improvement in speaking in front of an audience. I feel that I have improved with each public presentation I have given which I can attribute, in part, to Rhetoric.

6. I think the Rhetoric program could be improved by providing a technical writing course in addition to the required Rhetoric course. I feel that the experience and interaction gained by myself in my Rhetoric course was valuable in the development of myself not only as a student, but as an engineering student. I think requiring a technical writing course in addition to the required Rhetoric course would be very worthwhile to every engineering student. I do not think that students should require a technical writing certificate because certificates are overrated and the technical writing course should just be required for graduation.

7. Cater to the technical interests of the engineering students. Offer more technical writing related instruction (i.e., how to write a proposal, abstract, etc.). Personally, I feel prepared and think my college experience has prepared and helped my efforts in becoming an effective communicator.

8. I think that it was a good introductory freshman and was good as far as meeting non-engineering majors. I do think that it does not prepare the students adequately as far as technical writing. It does do a good job of preparing students to speak in public.

9. More experience in technical writing and communicating to people with less technical knowledge.

10. Maybe have the engineering faculty and the rhetoric faculty meet in order to have some standard for both tech and non-tech writings. There is too much discrepancy b/t lessons taught in writing.

11. The speech aspect of the Rhetoric program was excellent. The persuasion paper and letter to the editor were very good aspects of the course. Some of the personal papers were good but not very related to engineering.

12. I don't recall being disappointed with my Rhetoric class other than switching sections initially. Although I don't completely support the withdrawal of engineering students from rhetoric courses, I feel involvement with the new Technical Communication Center would be beneficial. I believe there is an informal publication that lists the books covered in Rhetoric courses and if students could hand pick their section based on their interests, it may be appealing.

13. Don't need improvement, just watch who teaches the classes. I think rhetoric is a nice transition from high school to college level communication. It was a good environment to meet people since it was in my 1st semester at college. However, the TA was horrible. I thought the topic of the speeches and papers we had to do was interesting, but the TA didn't help me to improve my writing/speaking at all. Most of the students disliked her, she was horrible.

14. I would perhaps like to see a technical writing course. It's great to be able to find the deep,
rhetorical meaning in a writing, but that's not what the rest of our courses seem to want. Being able to communicate in a clear, concise manner is more important to me than flowery, deep prose.

15. Technical writing. I wrote my papers too technically in Rhetoric and was docked for it. I had to relearn them when I got into classes in engineering that needed it.

16. Definitely should be required to take a technical writing class. However, make it possible to pass out of the class if they are already a good technical writer.

17. I think a required technical writing and speaking course would be beneficial. Rhetoric was a negative experience for me. The classes would be better if a full professor taught them (I had a TA). The toastmasters club in engineering would be good. I would join it.

18. Have the Rhetoric program make students be more interactive in a way that each student speaks with each other (group work) or do more presentations. Frankly, I'm one of those who really like to have excellent public-speaking skills. However, I'm always nervous when speaking in front of a large group of people. Rhetoric classes which consist of about 30 people would be a good exercise for students like me to have practices as early as possible in the freshman year.

19. Rhetoric isn't supposed to be a technical writing course, but it has helped my writing skills as far as E-mails and cover letter writing goes. I wouldn't change Rhetoric or add a technical writing course. I think the writing center is a good idea.

20. Keep Rhetoric as is, but make more of an emphasis on communication skills in current engineering courses. Grade class presentations more heavily. In early courses allow students to feedback on the rough drafts of their technical reports so they can learn as they go. Expect professional presentations, ask the students challenging questions. Too many instructors don't place enough emphasis on writing and oral communication skills.

21. No comments provided.
Indicate your level of agreement or disagreement with each statement:
1 = strongly disagree; 6 = strongly agree

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<td>3.3</td>
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</table>

In your opinion, which of your Humanities / Social Sciences courses were most helpful in giving you the broad education necessary to understand the impact of engineering solutions in a global and societal context?

1. I chose my Humanities/Social Sciences courses based on either what was easiest or looked like fun. They did not help me understand the impact of engineering solutions, most of that is covered in actual engineering classes.

2. If I had to choose one, I would say Microeconomics was helpful to my engineering education. I would have liked to take a business class that was more closely related to engineering applied to the business world.

3. The engineering program is such that only a specific number of these classes can be taken (to graduate in a reasonable timeframe). The FLIP and CLEP tests are excellent incentives to incoming students.

4. I took health/sport/leisure courses for my Humanities and it gave me a good perspective on how others view engineers and their contributions to work in our society.

5. Given my interest in HF and Ergonomics, I feel that most of my psychology classes have given me insight into how people think and interact with their environment. Need to understand how to design things based on how people behave.

6. My Intro to Ethics course was a very helpful Humanities course because it helped me think about my actions and consequences not only as an engineer, but also as a human being. My Social Science Microeconomic Theory course was helpful because it showed me to money side of companies and industries.

7. Psychology-interpersonal relationships. Didn't really benefit "engineering solutions" per say, however, contributed to understanding how people interact.

8. Introduction to International Politics showed me how mathematics can be applied toward non-engineering situations and allowed me to interact w/non-technical people.
9. I think that any psychology course should be taken, especially by Biomedical engineers who may want to work in health care. I took Elementary Psychology and Experimental Psychology which helped me learn basic aspects of psychology as well as good experimental techniques.

10. Humanities and Social Sciences, in my opinion, should offer understanding of factors outside of engineering. Yes, they did a good idea of this. Most of the classes did not touch on engineering.

11. My Social Sciences courses were excellent. These courses helped to broaden my view of thinking.

12. Rather than any courses I took. My involvement with cultural events with the honors program made me realize my role as an engineer in society. Also attendance of global speakers have been very beneficial to me.

13. Sociology classes were great →6! I was going to minor in Sociology. Might help me in dealing w/co-workers, bosses, operators.

14. I don't know that any of mine really did specifically do that. Maybe taking an ethics course would have helped.

15. Econ would be helpful, but not Microecon, which I took.

16. None were beneficial!

17. None--but I think engineers need to know about different topics to be well rounded.

18. Principles of Micro Economics. When people leaves their studies and jump into the working world, classes like this is important besides engineering classes.

19. None, I got to see how the other half lives. It was a nice break from engineering though. My engineering classes helped me see how global engineering is.

20. Took religion and psych classes which were for my own interest and did not help to meet criterion. Saw them as a fun break from engineering. Include more global issues examples within current curriculum.

21. Found Social Sciences classes interesting, but not Humanities. Didn't have ABET criteria in mind when selecting Humanities/Social Science classes.

In your opinion, how could we restructure our Humanities and Social Science requirements to better achieve the above outcome for engineering students?

1. Upper level/lower level isn't necessary, they do not always relate anyway.
2. Allow students to take all Humanities or Social Science classes if they want to. I would have liked to take advantage of the JPEC program but I couldn't fit it in and still graduate in 4 years.

3. Don't restrict choices for students. Although students may want to explore the areas of history, religion, business, psychology, and Greek, they are limited to only 2 areas that will count towards completion of an engineering degree.

4. I think they are good right now, however, I would not mind having an additional Humanities or Social Science. They are a good change of topic.

5. Humanities and Social Science electives have broadened my interests away from BME, which was my goal. I don't think the structure should be changed at all. Instead, I think engineering classes should be broadened to include engineering solutions in a global and societal context. I feel like classes such as Human Factors, Senior Design classes, and some electives are going in the right direction. I think the new curriculum should not constrict what classes we get to choose from.

6. I felt that my advisor did not help me choose Humanities/Social Sciences courses that correlated with engineering. It was a shot in the dark that I chose Humanities/Social Sciences courses that correlated with my engineering career objectives. I think that better advising from advisors, professors, and students that have completed the courses in question.

7. Incorporate business and ethical issues into engineering core classes, specifically in lower level engineering courses. I appreciated the 16 semester hours to explore outside of engineering issues-I think it helps form more well-rounded graduates.

8. I think you should require at least 2 upper level classes and/or allow people to take 4 upper level classes which involve more interaction w/other people.

9. Maybe students should be required to take more than just two classes in courses that help such as psychology.

10. Increase the number of hours we have to take. Not require lower level/upper level--just allow us to take anything we want outside of math and science.

11. Engineering students need more opportunities to take more of these courses. Too many engineers are too narrow minded.

12. Provide a list/database of recommended courses for students. I believe the key is to take a good, informative course rather than a bad one.

13. Cut out some engineering classes, add in some Humanities and Social Science classes.

14. Maybe put more restrictions on what would count. Some courses are just too far out there to have much engineering connection. Or, if that takes away too much freedom, maybe there could be a
pool of "recommended" choices. And if you wanted to take something else, you'd have to justify the reason/connection.

15. I would like to have less structure with having to take upper and lower from the same college. What happens when you take one lower level thinking you would like the subject and then find you don't? Now you've forced to take the upper level.

16. Offer classes in Engineering College which fit Social Science/Humanities requirements such as Engineering Econ or also business classes that could be taken to fulfill these goals.

17. Don't make us pick from a small list of acceptable courses.

18. No comments provided.

19. No comments provided.

20. If you want students to be more rounded, do away with lower level and upper level requirements within same department to allow wider breadth. We need more electives in Humanities and Social Science. IEs shouldn't have to take psych and economics as we are required to now.

21. I wish that I could have taken more business classes. I feel that they would have been more useful than my Humanities classes.
Indicate your level of agreement or disagreement with each statement: 
1 = strongly disagree; 6 = strongly agree

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<td>(j) – a knowledge of contemporary issues</td>
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<td>3.1</td>
</tr>
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In your opinion, how could the Humanities and Social Science requirements be improved to give engineering students a knowledge of contemporary issues?

1. I don't know that they could. To apply to engineering students it would have to be included w/engineering classes.

2. I would like to see information on the various Humanities and Social Science courses as they relate to engineering so I can better choose my courses.

3. Humanities/Social Science class did not touch on this at all. In my experience, the Humanities and Social Science classes were not geared specifically at contemporary issues. They were more of an opportunity to pursue outside interests.

4. Giving us the option of taking more courses that also count towards graduation would be beneficial.

5. Broader restrictions.

6. I think it is hit or miss whether or not a person selects a Humanities/Social Science course that covers contemporary issues. Advisors could help students select courses from input provided by students who had completed the course of interest.

7. Increase flexibility--allow more broad learning (variety of departments rather than lower/upper level requirements).

8. Yes, we discussed a lot of contemporary political issues.

9. I don't think there are very many Humanities classes that can relate to engineering.

10. Require upper-level only--lower-level is too review. Stress study-abroad.

11. The ability to take more Humanities and Social Science courses.

12. Encourage enrollment in courses that are good in this area.
13. No improvement needed. I thought it increased my knowledge in areas other than math and science.

14. Again, maybe have a recommended course that deals with contemporary issues that are related to your major.

15. No comments provided.

16. Let us take contemporary issues in engineering classes and have it count for Social Science and Humanities credit.

17. No comments provided.

18. No comments provided.

19. No comments provided.

20. Again, this criterion could be better addressed within current engineering curriculum.

21. It is hard to change courses. Upper level courses are far more useful. I believe that most/all engineering students are capable of succeeding in upper level courses without having taken lower level requirements.

In your opinion, how could your Departmental professional seminar be improved to give engineering students a knowledge of contemporary issues?

1. Bring in speakers knowledgeable about contemporary issues.

2. The EE seminar could meet more than just two semesters.

3. At least in the Civil Department, the seminars have greatly improved in the last few years. The professors responsible for the seminars have shown to incorporate student's input from past semesters. Also, taking part in a graduate seminar has been both interesting and intellectually stimulating.

4. Professional Seminars repeat the same topics each semester. There is little variety. Bring in professional engineers from our major to come tell us what they usually do at work.

5. BME has seminars weekly for eight semesters. Seems like there are a lot of filler seminars. Feeling that seminar was a waste of time diminished the effect of the good seminars.

6. I think that bringing companies in to show students how their engineering skills are being put to use in the workforce. I feel that Professional Seminar should be a portal for students to the outside world. Less talks by U of I professors and more presentations by outside sources.
7. Host lecturers to speak on contemporary issues rather than repetitious guests from industry.

8. Yes, get more global speakers.

9. Have more interactive seminars instead of boring guest speakers who turn off the lights and do a slide show and put students to sleep.

10. Have global lectures, more speakers in University but outside specific engineering. Do not have library/med school/etc. every year. Once every 3 years would cover all students.

11. Bring in more people from industry to explain the day-to-day operations and projects that they are worked on so the students can see what they are getting into.

12. Global speakers traveling through the town.

13. No comments provided.

14. Don't have 8 semesters of every week mandatory attendance! Invite people from outside the University to speak (if $ permits). Have "year in school" specific topics on various weeks—a freshman doesn't care about the job market too much, and a senior doesn't need to know about internship stuff or hear the med school lady 10 times.

15. Less recruitment oriented, student organized.

16. Let us go to other seminars, possibly outside of Engineering College, and get credit for them.

17. No comments provided.

18. More speeches from experienced people.

19. The Fall 2001 ME Professional Seminar was exceptional. It had a great mix of research/professional presentations.

20. Seminar is definitely a good place to address this issue, but current issues are not discussed in this forum.

21. Tackle more contemporary/cultural/global issues. Try to avoid repeat presentations (1 presentation/year). BME has had problems finding speakers, but still require students to show up. For one seminar, we had an egg drop contest. The seniors had an egg drop contest the week before in BME design. Honors Seminar w/ Prof. Fischer more valuable than the sum of 8 semesters of BME Professional Seminar.
In your opinion, which of your Humanities/Social Sciences courses were most helpful in giving you a knowledge of contemporary issues?

1. My classes were not helpful with regard to this issue.

2. Microeconomics I guess.

3. I honestly don't believe the areas I chose for my Humanities/Social Sciences requirements gave me knowledge of contemporary issues. They did help in communication or in understanding people.


5. Psychology - Social Cognition, Brain and Behavior. Engineering Economy did a good job of this too. Ethics and diversity in course options I feel are extremely important and would benefit all engineering students. I feel all majors, especially BME should have the opportunity to get certificates. It is a struggle relaying to potential employers that BMEs can do a "Mechanical/Electrical/Industrial" job.

6. My Microeconomic Theory Social Science course was very beneficial in covering the present day issues of business and engineering. My Intro to Ethics class was also beneficial in covering the present day issues between Biomedical Engineering, the health care/medical industry, and ethical issues.

7. Studying abroad experience was most beneficial.

8. Intro to International Politics.

9. Again, probably the psychology courses.

10. All psych, philosophy, poli sci, biz, econ.

11. Justice of Geography - Film Analysis. Global Perspective - Film Styles and Generic Art Appreciation. Excellent class for all engineering disciplines.

12. Modern History taken at a different University. Also, GE too here was good.


14. I took a good, basic Economics class which was helpful, also my Work and Family Institutions class was good--not completely related, but interesting.

15. None!

16. None and I need to know more to become a well rounded individual.
17. No comments provided.

18. Religion, Philosophy and History.

19. I would say the Social Sciences give a better idea of contemporary issues. On the other hand, Humanities give students a greater appreciation of their topic.

20. No comments provided.

IV. Assessment Results for Core Courses

The overall outcomes assessment framework implemented in the College of Engineering in Fall 2000 comprises two general components: “bottom-up” assessment of required core and program courses as they contribute to a program’s outcomes; and “top-down” direct assessment of program outcomes where feasible and appropriate. Although the “bottom-up” component of the process is based in part on student self-assessment, it has lead to a regular, systematic mechanism for course evaluation and improvement. The assessment process for College core courses is coordinated and supervised by the Associate Dean for Academic Programs, working closely with the College Curriculum Committee.

The “bottom-up” College procedure for assessment of individual College core courses is best described as the COW-EASY-CAR process.

- **COW** = Course Outcomes Worksheet (for each course offering, associates course-specific learning goals with Criterion 3 or Program outcomes, and provides student self-assessment (EASY) questions).

- **EASY** = Evaluation and Assessment Survey (on-line, secure, course-specific course-goal assessment survey, developed and maintained by the College of Engineering database services).

- **CAR** = Course Assessment Report (for each course offering, summarizes overall course assessment, evaluates effectiveness of revisions to course and course goals, recommends further revisions if judged necessary).

As part of the planning for each offering of a College core course, the instructor and other faculty associated with it develop or revise the COW for the course, taking into account any recommendations arising from the CAR for the previous offering. The course goals derive from the course description and syllabus for the course, but may be more specific since they may lead directly to self-assessment EASY questions to be asked of the students. The College core-course goals are mapped to Criterion 3 (a-k) outcomes, and the core-course assessment process is done in the framework of (a-k).

For all College core courses, an EASY survey is launched during the final weeks of the semester. The course instructor (in collaboration with the course coordinator) designs/revises an EASY survey for the course, either directly through the EASY web site or with the assistance of the College of Engineering database manager. The instructor is encouraged to remind the students of the purpose and mechanics of the EASY survey. The EASY system them automatically issues an email to the engineering students enrolled in the course announcing the availability window (start and end dates) for the EASY survey, and opens and closes the window on the announced dates. The EASY system includes protections against multiple responses, and assures anonymity of the student responses. Midway through the survey, the system issues an email reminder.
to students who have not yet responded. By College policy, EASY results (numerical data and transcripts of student comments) are issued to the instructor only after semester grades have been submitted.

By College of Engineering policy adopted by the faculty, any student comments from an EASY survey are distributed directly to the instructor in a separate report.

The final step of the COW-EASY-CAR process for each offering of a College core course is a course assessment meeting, the outcome of which is the Course Assessment Report (CAR). Assessment of College core courses is the responsibility of individual course coordinators, assigned by the College Curriculum Committee. A course assessment meeting is convened by the course coordinator within several weeks following the end of the semester. The meeting consists of the course coordinator, the instructor for the most recent course offering, and other faculty who have taught the course in the last several years.

During this assessment meeting, the course instructor presents the Course Description, the Course Outcomes Worksheet (COW), a draft of the Course Assessment Report (CAR), results of an EASY student survey, and other supplementary material to document satisfaction of the course learning objectives. The course coordinator is responsible for informing the instructor at the next course offering of the results of the previous assessment meeting. All assessment documentation for College core courses is maintained in the Dean's Office so that it is readily available for inspection by faculty prior to each semester offering. Electronic copies of the Course Description, COW and CAR forms are also maintained by the Associate Dean for distribution by the course coordinator to instructors prior to each offering of the course.

The above COW-EASY-CAR process is implemented for every offering of every College core course. For math/chemistry/physics/statistics required courses offered by the College of Liberal Arts and Sciences (CLAS), a very similar procedure is followed (starting Fall semester 2001). For these CLAS courses, the Associate Dean for Academic Programs works with the appropriate engineering faculty liaison to develop and revise the COW in consultation with the faculty of the affected department in the CLAS. The Associate Dean then assures that the EASY survey is launched, and convenes a CAR meeting including him or herself, the Engineering faculty liaison, and the appropriate CLAS faculty representatives. The CLAS instructors are not asked to collect and evaluate student material, however.

Table IV.1 (a,b,c) summarizes the core-course assessment activity for the academic year 2001-02.
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<td>Christoph Beckermann</td>
<td>26 Feb '02</td>
<td>24 May '02</td>
<td>24 May '02</td>
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</tr>
<tr>
<td>57:010</td>
<td>Dynamics</td>
<td>Ray Han</td>
<td>28 Feb '02</td>
<td>7 Jun '02</td>
<td>N.C.</td>
<td>7 Jun '02</td>
</tr>
<tr>
<td>57:012</td>
<td>Linear Systems Analysis</td>
<td>Er-Wei Bai</td>
<td>26 Feb '02</td>
<td>23 May '02</td>
<td>23 May '02</td>
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<tr>
<td>57:014</td>
<td>Engineering Economy</td>
<td>John Lee</td>
<td>26 Feb '02</td>
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<tr>
<td>57:015</td>
<td>Materials Science</td>
<td>David Rethwisch</td>
<td>26 Feb '02</td>
<td>27 May '02</td>
<td>27 May '02</td>
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</tr>
<tr>
<td>57:017</td>
<td>Computers in Engineering</td>
<td>Andrew Williams</td>
<td>1 March '02</td>
<td>21 May '02</td>
<td>N.C.</td>
<td>21 May '02</td>
</tr>
<tr>
<td>57:018</td>
<td>Princ of Electronic Instrum</td>
<td>Steve Collins</td>
<td>15 March '02</td>
<td>21 May '02</td>
<td>21 May '02</td>
<td>21 May '02</td>
</tr>
<tr>
<td>57:019</td>
<td>Mech of Deformable Bodies</td>
<td>Han-Chin Wu</td>
<td>26 Feb '02</td>
<td>22 May '02</td>
<td>N.C.</td>
<td>22 May '02</td>
</tr>
<tr>
<td>57:020</td>
<td>Mech of Fluids &amp; Trans Proc</td>
<td>Jeff Marshall</td>
<td>26 Feb '02</td>
<td>6 Jun '02</td>
<td>N.C.</td>
<td>6 Jun '02</td>
</tr>
<tr>
<td>57:021</td>
<td>Principles of Design I</td>
<td>Jasbir Arora</td>
<td>26 Feb '02</td>
<td>29 May '02</td>
<td>29 May '02</td>
<td>29 May '02</td>
</tr>
<tr>
<td>57:022</td>
<td>Principles of Design II</td>
<td>Dennis Bricker</td>
<td>28 Feb '02</td>
<td>7 Jun '02</td>
<td>7 Jun '02</td>
<td>7 Jun '02</td>
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<tr>
<td>57:090</td>
<td>First-Year Seminar</td>
<td>Gary Fischer</td>
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</table>

**NOT OFFERED IN THE SPRING**

<table>
<thead>
<tr>
<th>Course #</th>
<th>Course Title</th>
<th>Coordinator/ Liaison</th>
<th>Course Description</th>
<th>Course Syllabus</th>
<th>COW</th>
<th>CAR</th>
<th>Supporti ng Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>04:013</td>
<td>Principles of Chemistry I</td>
<td>David Murhammer</td>
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<td>04:014</td>
<td>Principles of Chemistry II</td>
<td>David Murhammer</td>
<td>25 Feb '02</td>
<td>16 Jan '02</td>
<td>28 May '02</td>
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<td>04:016</td>
<td>Principles of Chemistry Lab</td>
<td>David Murhammer</td>
<td>25 Feb '02</td>
<td>16 Jan '02</td>
<td>28 May '02</td>
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<tr>
<td>029:017</td>
<td>Introductory Physics I</td>
<td>David Andersen</td>
<td>N.C.</td>
<td>N.C.</td>
<td>11 Jun '02</td>
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<tr>
<td>029:018</td>
<td>Introductory Physics II</td>
<td>David Andersen</td>
<td>N.C.</td>
<td>N.C.</td>
<td>11 Jun '02</td>
<td></td>
<td>N.A.</td>
</tr>
<tr>
<td>029:083</td>
<td>Modern Physics</td>
<td>David Andersen</td>
<td>CoE Assessment Not Performed</td>
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<td>010:003</td>
<td>Rhetoric</td>
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<td>26 Feb '02</td>
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<td>Course Title</td>
<td>Instructor</td>
<td>Start Date</td>
<td>End Date</td>
<td>Start Date</td>
<td>End Date</td>
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<tr>
<td>22M:035</td>
<td>Engineering Calc I</td>
<td>M. A. Bhatti</td>
<td>1 March '02</td>
<td>N.A.</td>
<td>N.C.</td>
<td>10 Jun</td>
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<td>'02</td>
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<tr>
<td>22M:036</td>
<td>Engineering Calc II</td>
<td>M. A. Bhatti</td>
<td>1 March '02</td>
<td>N.A.</td>
<td>N.C.</td>
<td>10 Jun</td>
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<td>N.C.</td>
<td>'02</td>
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<td>Matrix Algebra for Engineers</td>
<td>M. A. Bhatti</td>
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<td>N.A.</td>
<td>N.C.</td>
<td>10 Jun</td>
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<td>N.C.</td>
<td>'02</td>
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<td>22M:041</td>
<td>Differential Equations for Eng</td>
<td>M. A. Bhatti</td>
<td>1 March '02</td>
<td>N.A.</td>
<td>N.C.</td>
<td>10 Jun</td>
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<td>N.C.</td>
<td>'02</td>
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<td>22M:042</td>
<td>Vector Calculus for Eng</td>
<td>M. A. Bhatti</td>
<td>1 March '02</td>
<td>N.A.</td>
<td>N.C.</td>
<td>10 Jun</td>
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<td>N.A.</td>
<td>N.C.</td>
<td>'02</td>
<td>N.A.</td>
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<tr>
<td>22S:039</td>
<td>Prob &amp; Stat for Engr &amp; Phys Sci</td>
<td>M. Andersland</td>
<td>28 Feb '02</td>
<td>3 Jun '02</td>
<td>31 May</td>
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<td>'02</td>
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<td>'02</td>
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</tbody>
</table>

The assessment summaries below have been prepared by the Associate Dean for Academic Programs and comprise, for each core course:

- Summary discussion of any implementation of previous recommendations, and of any new recommendations and their planned implementation, for each semester;
- Assessment critique for the course.
- Course Outcomes Worksheets (COW) for the course during the academic year; if the same COW was used for each course offering, only one is included here.
- Course Assessment Reports (CAR) for each offering of the course during the academic year;
- Summary EASY survey results for each administration of the survey during the academic year;

All assessment material for a course can be found in the appropriate course binders archived by the Associate Dean for Academic Programs.
IV.1 57:005 Engineering I

Summer ’01: Not offered

Fall ’01: EASY survey results for Parts I and II of the course showed positive but mixed results. Some students enjoy and see strong value in the course; others do not. It is significant that about half the students continue to think that the writing assignment was useless. As in previous semesters, the “Yes-No” format of the EASY questions used in this course make it difficult to glean valuable assessment information. Recommend smaller class sizes, and inclusion of design and project type activities. Open-ended problem solving might be possible for the spring offering, but is impossible with the current structure in the fall. Part II assessments included use of the ACE survey, though these results are normally used for instructor assessment rather than outcomes assessment. Pro/E version of the support software for Part II was updated to the latest version; project-based learning was introduced in a systematic comprehensive manner in Part II.

Spring ’02: Numerical course-goal survey data not available due to EASY system data loss. Assessment based on instructor observations, review of student work, and EASY survey comments by students. Broad heterogeneity of student backgrounds continues to make this a challenging class. Students and instructor generally felt course goals were achieved, though some students felt the course was too fast-paced. Many students could not see relevance of the material to engineering. Excel worksheets and evening Excel sessions were useful and successful. Close coordination of lecture and discussion sections was very helpful, and possible in the relatively small spring class size.

Overall Assessment: Spring ’02 was the last offering of this course in its old form. The new course, 59:005 Engineering Problem Solving I, will have many of the same challenges and opportunities. Previous assessment’s recognition of the importance of close coordination between lecture and project/discussions sections, and the continuing need to show relevance of the course to real engineering problems, is an important point
<table>
<thead>
<tr>
<th>Course Goals</th>
<th>Supports ABET Outcomes</th>
<th>Course Activity</th>
<th>Basis for Course-Goal Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The student will be able identify and describe selected engineering</td>
<td>A(<em>), E(</em>)</td>
<td>Homework and exams test the students ability in these areas. Specifically the</td>
<td>EASY survey assessment by students and instructor. Exam no. 1.</td>
</tr>
<tr>
<td>systems and subsystems, and apply the appropriate fundamentals and</td>
<td></td>
<td>course uses material, force and moment balances to demonstrate this. Lectures</td>
<td></td>
</tr>
<tr>
<td>unifying concepts to solve problems.</td>
<td></td>
<td>and discussion.</td>
<td></td>
</tr>
<tr>
<td>2. Students will be introduced to several engineering software &quot;tools&quot;</td>
<td>K(*)</td>
<td>Homework gives students experience using spreadsheets for computations,</td>
<td>EASY survey assessment by students and instructor. Homework and exams.</td>
</tr>
<tr>
<td>useful in problem solving.</td>
<td></td>
<td>graphing software for presentation and analysis in Part I of course. Part II uses</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pro-E software extensively in teaching of representations of solid objects.</td>
<td></td>
</tr>
<tr>
<td>3. The student will learn basic elements of acceptable graphical presentation</td>
<td>G(<em>), B(</em>)</td>
<td>Homework and exams test the students ability in these areas. Lectures and</td>
<td>EASY survey assessment by students and instructor. Exam no. 2.</td>
</tr>
<tr>
<td>and analysis of data.</td>
<td></td>
<td>discussion.</td>
<td></td>
</tr>
<tr>
<td>4. Students will be able to make engineering decisions based on an</td>
<td>A(<em>), E(</em>)</td>
<td>Homework and exam questions test the students in these areas. Lectures and</td>
<td>EASY survey assessment by students and instructor. Exam no. 2.</td>
</tr>
<tr>
<td>appropriate economic analysis.</td>
<td></td>
<td>discussion.</td>
<td></td>
</tr>
<tr>
<td>5. The student will have an understanding of the differences and</td>
<td>J(*)</td>
<td>Representatives from each department make weekly presentations to lectures.</td>
<td>EASY survey assessment by students and instructor.</td>
</tr>
<tr>
<td>similarities in the several engineering disciplines represented on campus.</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>6. The student will be able to make and interpret basic engineering</td>
<td>K(<em>),G(</em>)</td>
<td>Homework and exams test this. Lectures and computer lab activities focus on</td>
<td>EASY survey assessment by students and instructor. Exams and homework evaluation.</td>
</tr>
<tr>
<td>drawings.</td>
<td></td>
<td>computer aided drawing and design</td>
<td></td>
</tr>
<tr>
<td>7. The student will be able to collaborate with peers towards addressing</td>
<td>D(<em>), G(</em>)</td>
<td>8-week long project of groups, where 5 students are requested to collaborate</td>
<td>Feedback from jury members at the end of the semester. Feedback from students peer evaluation of presentations.</td>
</tr>
<tr>
<td>and solving a design problem.</td>
<td></td>
<td>towards a common objective. Short presentations are made to the class and a</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>panel of jury members evaluate.</td>
<td></td>
</tr>
<tr>
<td>8. The student will be able to present his/her idea in a professional</td>
<td>G(<em>),K(</em>)</td>
<td>The half-semester projects are used to conduct a formal presentation at the end of</td>
<td>Student presentations, EASY survey assessment, and peer evaluations.</td>
</tr>
<tr>
<td>manner to a client and a technical audience.</td>
<td></td>
<td>the semester.</td>
<td></td>
</tr>
<tr>
<td>9. The students will be able to analyze and visualize surfaces and edges.</td>
<td>C(*)</td>
<td>Homework and exams as well as computer assignments using a professional CAD</td>
<td>Submission of computer assignments are graded. Homework and exams. EASY survey.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>environment (Pro/E).</td>
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<tr>
<td>10. The students will be able to communicate engineering design in terms of a graphical language</td>
<td>G(*)</td>
<td>Group presentations at the end of the semester use oral presentation skills to communicate engineering design. Peer review of projects feedback. Submission of an integrated project (collaborative effort among 5 students) as a complete design.</td>
<td></td>
</tr>
<tr>
<td>11. The students will be able to solve technical design problems using commercial CAD systems</td>
<td>C(<em>), E(</em>)</td>
<td>Weekly computer assignments in the electronic classroom (and laboratories) are aimed towards a rigorous introduction in a commercial CAD package (pro/e). Graded computer assignments (individually), Final group projects (as a collaborative team), EASY.</td>
<td></td>
</tr>
<tr>
<td>12. The student will have opportunities to further his or her professional development through a written assignment and access to modern computer tools.</td>
<td>G(<em>), E(</em>)</td>
<td>Written paper assignment on engineering topic. Extensive use of library resources expected. Modern software used in calculations, graphical analysis, and preparation of engineering drawings. EASY survey assessment by students and instructor</td>
<td></td>
</tr>
</tbody>
</table>

* denotes moderate contribution to the outcome
** denotes substantial contribution to the outcome
<table>
<thead>
<tr>
<th>Course Activity</th>
<th>Basis for Course-Goal Assessment</th>
<th>Supports ABET Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework and exams test the students' ability in these areas. Specifically the use of software in problem solving.</td>
<td>EASY survey assessment by students and instructor.</td>
<td>A( ), B( ), E( ), K( ), G( )</td>
</tr>
<tr>
<td>Homework and exams test the students' ability in these areas.</td>
<td>EASY survey assessment by students and instructor.</td>
<td>A( ), B( ), E( ), K( ), G( )</td>
</tr>
<tr>
<td>Homework and exams test the students' ability in these areas. Lectures and discussion.</td>
<td>EASY survey assessment by students and instructor.</td>
<td>A( ), B( ), E( ), K( ), G( )</td>
</tr>
<tr>
<td>Homework and exams test the students' ability in these areas. Lectures and discussion.</td>
<td>EASY survey assessment by students and instructor.</td>
<td>A( ), B( ), E( ), K( ), G( )</td>
</tr>
</tbody>
</table>

**Course Goals**

1. The student will be able to identify and describe selected engineering topics and apply the appropriate fundamental principles and unifying concepts to solve problems in problem solving.

2. Students will be introduced to spreadsheets for computational and graphical software for presentation and analysis of engineering results.

3. The student will learn basic elements of acceptable graphical presentation and analysis of data.

4. Students will be able to make due engineering decisions based on an understanding of the fundamental engineering disciplines represented on campus.

5. The student will have an understanding of the fundamental engineering disciplines represented on campus.

6. The student will be able to make due engineering decisions based on an understanding of the fundamental engineering disciplines represented on campus.

7. The student will have opportunities to further his or her professional development through a written assignment and access to computer-aided design tools.

*denotes moderate contribution to the outcome
**denotes substantial contribution to the outcome
Course Assessment Report
College of Engineering
The University of Iowa

Course Number: 57: 005  Semester/Year: Fall 2001  Course Name: Engineering I

COORDINATOR: VALENTINE, R. L.  SIGNATURE: [Signature]

DATE: 7/14/01

INSTRUCTOR: Richard Valentine (Part I)  SIGNATURE: (optional)

OTHER: Abdel-Malek (Part 2)  SIGNATURE: (optional)

Please attach the course syllabus and course outcomes worksheet (COW).

Assessment Techniques:
Please indicate which of the following assessment techniques were used in the course and your judgment of their utility in assessing accomplishment of the Course Learning Objectives.

<table>
<thead>
<tr>
<th>Assessment Technique</th>
<th>Not Used</th>
<th>Used, provided useful data</th>
<th>Used, not recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
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<td>Exams</td>
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<td>Quizzes</td>
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<tr>
<td>Projects</td>
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<tr>
<td>Written Reports (other than projects)</td>
<td>x</td>
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<tr>
<td>Oral Reports</td>
<td>x</td>
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<tr>
<td>Student Self-Evaluation</td>
<td>x</td>
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<td>Student Peer-Evaluation</td>
<td>x</td>
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<tr>
<td>Course Portfolios</td>
<td>x</td>
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<tr>
<td>Class Surveys (e.g., EASY)</td>
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<tr>
<td>Instructor Observation</td>
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<tr>
<td>Other (specify) Guest Lecturers on disciplines</td>
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</tbody>
</table>

(See Homework)
1. **ASSESSMENT RESULTS:** (and their relation to past results)

ACE (Assessing the Classroom Environment) forms and EASY forms were used to assess Part I and Part II separately. In the Fall approximately 270 students complete this course with about 230 responders in Part I for the ACE, and about 150 responders for the EASY. Part I is taught in two large lectures.

In general results were positive but mixed. This is probably attributed to the great heterogeneity of the class in terms of student backgrounds and previous experiences. Some students really enjoy the class, some don’t. Most comments about the instructor were favorable although a number said he went too fast and that more time was needed. Also, many mentioned that the class size was too large.

Easy results were generally favorable except that about half the students thought the paper assignment was useless. Statistics on the exams indicates that the majority of students met the learning objectives.

2. **SUMMARY OF PRIOR REMEDIATION ACTIONS:** (and their estimated effect)

Remedial action is probably best based on the course taught in the previous Fall since it represents primarily recent high school graduates without any prior college experience and very large class sections. Spring session has approximately 1/10 the number of students and is probably not comparable in either student characteristics or in presentation. It is well established that there exists a correlation of perception of course outcomes and class size.

We tried to better explain EXCEL in a special section.

3. **RECOMMENDED ACTIONS:**

Clearly the very large class size limits presentation and perception of value. Smaller classes would allow "eye contact". If resources could be found it is suggested that this course be taught using 10 faculty each meeting 3 times per week in groups of 30. Additionally, format and content changes should be investigated. For example, inclusion of design and project type activities would integrate with the lectures and benefit the course.

4. **CHANGES TO COURSE LEARNING OBJECTIVES:**

See above. Include "bigger picture" material oriented toward a broader understanding of engineering problem solving and design. Incorporate "open-ended" problem solving in groups. This is impossible with the current structure in the Fall. It might be possible in the Spring with such a small class.

5. **MODIFICATIONS TO ASSESSMENT TECHNIQUES:**

The assessment techniques utilized seemed to work well.
COURSE SUPPORT

TA SUPPORT FROM THE DEAN'S OFFICE (IN TERMS OF FTE): 4 one-quarter time TAs (Part I)

OTHER TA SUPPORT AND SOURCE (IN TERMS OF FTE):

TA RESPONSIBILITIES:
Grading assignments, help with proctoring exams, grading short answer questions on exams, office hours to answer questions about grading, and a small amount of help for the students with Excel.

WAS THE TA SUPPORT ALLOCATED TO YOUR SECTION SUFFICIENT? PLEASE ELABORATE.
Yes, they seemed to be able to accomplish everything that I gave them to do in 20 hours per week for only 8 weeks of the semester.

IF USED, WAS THE COMPUTER HARDWARE AND SOFTWARE SUPPORT FROM ECSS ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.
Yes.

WERE THE FACILITIES (CLASSROOM, LABS, ETC.) ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.
Yes, the new classrooms are a considerable relief and improvement. However, 1505 is too small to put more than about 100 students in comfortably.

COURSE ORGANIZATION/CONTENTS

LECTURE (HOURS/WEEK): 3 per section
LABORATORY (HOURS/WEEK): 0
DISCUSSION (HOURS/WEEK): 1
TOTAL NUMBER OF STUDENTS: 270


PLEASE COMMENT ON THE SUITABILITY OF THE TEXTBOOK AND ITS TIMELY AVAILABILITY.
Textbook seems to be one of the best if problem solving is the only course goal (in part I). If the thrust of the course changes to include more or less open-ended "project/design" concepts, then the students will need to read chapters 1 and especially 2. One of two lectures should be included in lecture to introduce students to this.

TEACHING AIDS:
Computer in the classroom. Some simple class demonstrations.
Part II Engineering Drawing

Assessment Techniques:
Please indicate which of the following assessment techniques were used in the course and your judgment of their utility in assessing accomplishment of the Course Learning Objectives.

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<tr>
<td>Exams</td>
<td>X</td>
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</tr>
<tr>
<td>Quizzes</td>
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<tr>
<td>Projects</td>
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<tr>
<td>Written Reports (other than projects)</td>
<td>X</td>
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<tr>
<td>Oral Reports</td>
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<tr>
<td>Student Self-Evaluation</td>
<td>X</td>
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<tr>
<td>Student Peer-Evaluation</td>
<td>X</td>
<td></td>
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</tr>
<tr>
<td>Course Portfolios</td>
<td>X</td>
<td></td>
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</tr>
<tr>
<td>Class Surveys (e.g., EASY)</td>
<td>X</td>
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<td></td>
</tr>
<tr>
<td>Instructor Observation</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Other [specify] Guest Lecturers on disciplines</td>
<td>X</td>
<td></td>
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</tr>
</tbody>
</table>

(see project)
2. ASSESSMENT RESULTS: (and their relation to past results)

ACE (Assessing the Classroom Environment) results were very very positive. 145 ACE forms were received and 79 had written comments. On the question, “The instructor was effective”, the response median was 5.89/6.00. On the question, “I acquired a basic understanding of the subject,” the response median was 5.83/6.00. Clearly, students benefited from the class and felt that the instruction was effective. The written comments were also very positive. Comments include “Excellent class”; “This is a great class taught very well”; “I actually like this part of the course, I like drawingand I wish lab time was spent doing step by step projects w/ TA as opposed to just on our own”, “It’s great that the instructor knew each of his students”; I liked the drawing part of this class (lecture).the labs weren’t well taught”; The professor was very good”; Professor Malek was very concerned w/ whether we were catching on, he made sure we all understood before moving on..very good quality in a teacher”; “The course was enjoyable and fun”.

2. SUMMARY OF PRIOR REMEDIATION ACTIONS: (and their estimated effect)

No major changes in the class/lecture took place. However, the first two lecture were used to motivate the need for engineering drawing as a language of communication among engineers (these did not exist prior to this semester).

Students had previously complained about the lab hours with one instructor leading the students through computer projects. This year, a Click-by-Click textbook was introduced that allowed students to learn on their own time. This method allowed the TA’s to present a model of the Cad drawing in the electronic classroom first, then allowed the students to develop their own model.

3. RECOMMENDED ACTIONS:
Changing the textbook has greatly benefited the class. This new textbook is more modern, provides emphasis on the concepts for engineering drawing. Also, the Pro/E version of the software system was updated (as proposed in our last CAR) to the most recent revision (Pro/e 2001). Project based learning was introduced at the beginning of the second half of the semester in a systematic comprehensive manner.

4. CHANGES TO COURSE LEARNING OBJECTIVES:

None.

5. MODIFICATIONS TO ASSESSMENT TECHNIQUES:

No correction at this time. It seems that the evaluative techniques used work well.

COURSE SUPPORT

TA SUPPORT FROM THE DEAN’S OFFICE (IN TERMS OF FTE): 6 one-quarter time TAs (Part II)

OTHER TA SUPPORT AND SOURCE (IN TERMS OF FTE):

TA RESPONSIBILITIES:
Presenting the use of Pro/e twice a week in the electronic classroom, helping students through their group projects, grading assignments, help with proctoring exams, office hours to answer questions about grading.
WAS THE TA SUPPORT ALLOCATED TO YOUR SECTION SUFFICIENT? PLEASE ELABORATE.

Yes. The TAs worked mostly to support students during electronic class free hours (using Pro/e) as well as grading.

IF USED, WAS THE COMPUTER HARDWARE AND SOFTWARE SUPPORT FROM ECSS ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

Yes, the new computer classrooms are ideal for these larger class lectures using software in front of the class.

WERE THE FACILITIES (CLASSROOM, LABS, ETC.) ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

Yes, absolutely.

COURSE ORGANIZATION/CONTENTS

LECTURE (HOURS/WEEK): 3
LABORATORY (HOURS/WEEK): 3
DISCUSSION (HOURS/WEEK): 0
TOTAL NUMBER OF STUDENTS: 35

TEXTBOOK AUTHOR AND TITLE:
2. Pro/e 2001 click-by-click by Toogood and Zecher.

PLEASE COMMENT ON THE SUITABILITY OF THE TEXTBOOK AND ITS TIMELY AVAILABILITY.
The book was changed to a more modern edition with different examples and better presentation.

TEACHING AIDS:
Demonstration of software systems in class.
Using engineering objects in class to allows students to visualize projections.
Course Assessment Report
College of Engineering
The University of Iowa
(Revision of 27 November 2001)

Course Number: 57:005  Semester/Year: Spring 2002
Course Name: Engineering I

COORDINATOR: Richard Valentine  SIGNATURE: 


INSTRUCTORS: Michelle Scherer, Sharif Rahman  SIGNATURE: (optional)

OTHER: SIGNATURE: (optional)

Please attach the course syllabus and course outcomes worksheet (COW).

Assessment Techniques:
Please indicate which of the following techniques were used in assessing the course and your judgment of their utility in assessing achievement of the Course Learning Goals.

<table>
<thead>
<tr>
<th>Assessment Technique</th>
<th>Used, provided useful data</th>
<th>Used, not recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
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<tr>
<td>Hours; TA Help Sessions</td>
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</tr>
</tbody>
</table>

38
1. ASSESSMENT RESULTS: (How were each of the course learning goals (from the COW) achieved? Support your assessments qualitatively and/or quantitatively with data from each of the assessment techniques used (see Table on previous page). Explain the relation of the present assessment results to previous ones.)

Part I:

Overall, the course objectives (see course syllabus or COW) for Part 1 of Engineering I were achieved during the Spring 2002 semester. The average overall course score was 84 (median of 86) with a standard deviation of 13. Example of poor, average, and excellent homework sets, writing assignments, and exams are included in the course binder. As expected for an Introduction class, there is significant heterogeneity in the skills of the incoming students. As a result, the “poor” examples are quite poor and the “excellent” examples are really outstanding. I found the diverse skill level of the students to be one of the most challenging aspects of the class.

Based on the EASY results (comments only, as numerical scores were lost due to a computer glitch), the students seem confident that they learned the material, although some felt the course was too fast-paced. In addition, I got a lot of verbal feedback indicating that most of the students could handle the material, but they were often unsure of the relevance of the material. I anticipate this problem will be resolved in the new Engineering Problem Solving I (EPS I) course because the students will be more heavily involved in projects that illustrate the relevance of the lecture material. For EPS I to be a success, I think it is critical for there to be significant communication among the lecturing faculty and the faculty designing and leading the projects.

Part II:

Based on students’ performance in homework, computer projects, and examinations, all Part II course objectives 1-8 (see course syllabus or COW) were satisfied in Spring 2002. Sample copies (poor, average, and excellent) of all Homework sets, Computer Projects, and Examinations III and IV are available in the binder.

Part II Objective 1: All Homework Sets, Computer Projects, and Examinations
Part II Objective 2: Homework Sets 1-2, Exam III Problems 1-4
Part II Objective 3: Homework Sets 1-2, Exam III Problems 1-4, Exam IV Problem 1
Part II Objective 4: Homework Set 3, Exam IV Problem 2
Part II Objective 5: Homework Set 4, Exam IV Problem 3
Part II Objective 6: Homework Set 5, Exam IV Problem 4
Part II Objective 7: Computer Projects 2-4, and 6
Part II Objective 8: Computer Project 5

EASY survey comments indicated a need for further improvements in the discussion (Pro/Engineer) section of this course (Part II).
Parts I and II:

The grade distribution in Spring 2002 is as follows: 19 A, 16 B, 3 C, and 4 F.

2. SUMMARY OF RECENT REMEDIAL ACTIONS: (and their estimated effect)

For Part I (on the advice of the course coordinator, Rich Valentine), I introduced “worksheets” for each section. An example of a worksheet developed for using EXCEL’s Solver algorithm is included in the course binder. In addition, we held an EXCEL tutorial one evening during the first few weeks of class. Based on verbal feedback from the students, I think the worksheets were very effective. In the past, there have also been some problems with coordination among discussion leaders and the main lecturer. Since the class size is small in the spring (about 40 students), I chose to lead both the lecture and a discussion section. This left only one other discussion leader, Patrick O’Shaughnessy, to coordinate with. Patrick had taught the lecture twice before, and was already familiar with the material. The combination of me doing a lecture and a discussion and Patrick having taught the lecture before made it very easy to coordinate the discussions and lectures. Although EPS I will not have the same discussion format, I think it would be beneficial to have project leaders that are familiar with the lecture material.

For Part II, a course notes package was developed and was made available to all students as one of three textbooks. The estimated effort in developing the course note involved 160 man hours.

3. RECOMMENDED NEW REMEDIAL ACTIONS, IF ANY

Based on previous experience with Engineering I, the College of Engineering has chosen to reformat the course into Engineering Problem Solving I, which will be taught for the first time in Fall 2002. EPS I has been designed to address many of the same problems we experienced this Spring (i.e., lack of relevance, etc.). The new format may have some challenges, but I am confident over time it will provide a better format for the students to meet the objectives designed for their first engineering course.

Assign two TAs simultaneously to demonstrate Pro/Engineer during each discussion section. This will significantly improve the quality of instruction during the discussion section of Part II. Also, the demonstration of the Pro/Engineer software requires substantial TA effort. Hence, more TA support should be allocated in teaching the Part II of this course. Note, the EPS-I course, to be offered in the future, does not have Pro/Engineer anymore. Hence, the comments above are not relevant for EPS-I.

4. RECOMMENDED CHANGES TO COURSE LEARNING GOALS:

None.
5. RECOMMENDED MODIFICATIONS TO ASSESSMENT TECHNIQUES:

Assess the satisfaction of course objectives by EASY numerical scores.

6. SIGNIFICANT DEVIATIONS IN COURSE CONTENT FROM SYLLABUS (SUMMARIZE):

COURSE SUPPORT

TA SUPPORT FROM THE COLLEGE (IN TERMS OF FTE):

Parts I and II: Two ¼ time TAs

OTHER TA SUPPORT AND SOURCE (IN TERMS OF FTE):

TA RESPONSIBILITIES:

Part I: Grading homeworks plus office hours for answering questions
Part II: Demonstrate Pro/Engineer, grade homeworks, and hold office hours

WAS THE TA SUPPORT ALLOCATED TO YOUR SECTION SUFFICIENT? PLEASE ELABORATE.

Part I: Yes (only because we only had 40 students).
Part II: No. Since the demonstration of the Pro/Engineer software requires substantial TA effort, three ¼ time TAs are requested.

IF USED, WAS THE COMPUTER HARDWARE AND SOFTWARE SUPPORT FROM CSS ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

Part I: Yes.
Part II: Yes. However, sometime the computers froze, which added to students’ frustrations during the discussion sections.

WERE THE FACILITIES (CLASSROOM, LABS, ETC.) ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

Parts I and II: Yes.
COURSE ORGANIZATION/CONTENTS

LECTURE (HOURS/WEEK): Part 1: 3
(HOURS/WEEK): Part 1: 3

DISCUSSION

LABORATORY (HOURS/WEEK): TOTAL NUMBER OF STUDENTS: 40

TEXTBOOK AUTHOR AND TITLE:


PLEASE COMMENT ON THE SUITABILITY OF THE TEXTBOOK AND ITS TIMELY AVAILABILITY.

Part 1: We switched from the third edition to the fourth edition this semester. I think the text does a nice job of introducing the fundamentals of Engineering.

TEACHING AIDS:

PLEASE ATTACH A COPY OF THE SYLLABUS THAT WAS DISTRIBUTED TO THE CLASS, A SAMPLE OF CLASS HANDOUTS IF AVAILABLE, AND THE COURSE ASSESSMENT WORKSHEET (COW) FOR THE COURSE. USE THE SPACE BELOW TO DESCRIBE ANY PARTICULAR PROBLEMS YOU MIGHT HAVE HAD WITH THIS COURSE (E.G., UNUSUAL ATTRITION, LACK OF PREREQUISITES, UNUSUAL GRADE DISTRIBUTION, ETC.) OR ANY INNOVATIONS/IDEAS THAT SHOULD BE CONSIDERED IN THE FUTURE.

Part II:

See the course outline and syllabus in the 3-ring binder.
**College of Engineering EASY Survey Responses**

**Results For:** 057/005; Engineering I; Section: AAA- Lecture

**Instructor(s):** Richard Valentine

**Session Code:** 20013  **Beginning On:** 10-15-01  **Running For:** 12 days  **Course Enrollment:** 299

**Survey #:** 202  **Survey Name:** 057/0052/0013  **Section Enrollment:** 141

**Base Set Used:** ABET  **Privacy:** Faculty Distribute  **Remarks:** ABET

**Headings and Subheadings (Instructors) Used in Survey:**
- Accreditation Board for Engineering and Technology (ABET) Survey
- This survey was designed to provide feedback to your instructor on selected aspects of this course. Your responses should reflect YOUR INDIVIDUAL PERCEPTIONS, not those of the class as a whole.

**Score Type Name:** True/False

1. I understand that the ABET survey questions address course objectives not comments on the instructor's effectiveness.

<table>
<thead>
<tr>
<th>Mean: 1.03</th>
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<tbody>
<tr>
<td>Response Value:</td>
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<tr>
<td>Count of Responses:</td>
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</table>

2. I understand that this group of questions pertains ONLY to the first part of the course.

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<thead>
<tr>
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<tr>
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**Score Type Name:** Yes/No

3. I acquired a basic understanding of the programs and opportunities available in the 6 different engineering departments at UI.

<table>
<thead>
<tr>
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4. I understand the importance of first visualizing and describing the particular engineering system I am working with.

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<th>Mean: 1.01</th>
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5. I learned how to resolve 2-dimensional force vectors into X and Y components and use these to develop an equivalent, resultant vector.

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<td>Count of Responses:</td>
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**Survey Response Summary** 3/31/2002 4:04PM
6. I learned how to use simple 2-dimensional force and moment balances to solve simple equilibrium, statics problems.

   **Mean: 1.66**

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<tbody>
<tr>
<td>Count of Responses</td>
<td>73</td>
<td>5</td>
<td>78</td>
</tr>
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</table>

7. I have a basic understanding of material balances as applied to simple processes.

   **Mean: 1.68**

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<tbody>
<tr>
<td>Count of Responses</td>
<td>76</td>
<td>2</td>
<td>78</td>
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</table>

8. I learned how to make basic engineering economic calculations of importance in project selection.

   **Mean: 1.65**

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<tr>
<th>Response Value</th>
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<th>2</th>
<th>Total Responding</th>
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</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>74</td>
<td>4</td>
<td>78</td>
</tr>
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</table>

9. I developed a basic understanding of linear, exponential, and power relationships, and how they are used to describe engineering data.

   **Mean: 1.73**

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<tr>
<td>Count of Responses</td>
<td>68</td>
<td>10</td>
<td>78</td>
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</tbody>
</table>

10. I learned how to plot data using rectilinear, semi-log, and log-log paper.

    **Mean: 1.69**

    | Response Value | 1 | 2 | Total Responding |
    |----------------|---|---|------------------|
    | Count of Responses | 76 | 2 | 78               |

11. I learned how statistical techniques such as mean, standard deviation, least-squares linear regression, and correlation coefficient can be used to evaluate engineering data.

    **Mean: 1.21**

    | Response Value | 1 | 2 | Total Responding |
    |----------------|---|---|------------------|
    | Count of Responses | 62 | 16 | 78               |

12. The writing assignment helped me to improve my writing skills and learn how to access technical information using the UI library system and the internet.

    **Mean: 1.20**

    | Response Value | 1 | 2 | Total Responding |
    |----------------|---|---|------------------|
    | Count of Responses | 56 | 22 | 78               |
13. I learned that solving engineering problems may frequently involve a common approach such as visualization and development of systems of simultaneous equations.

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<tbody>
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<td>Count of Responses</td>
<td>77</td>
<td>1</td>
<td>78</td>
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</table>

Mean: 1.61

14. I improved my skills in using spreadsheets for analyzing and graphically showing data.

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<td>73</td>
<td>5</td>
<td>78</td>
</tr>
</tbody>
</table>

Mean: 1.65

15. I learned that different disciplines are characterized by using different organizing principles but frequently common problem solving approaches.

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Score type Mean: 1.68
### College of Engineering EASY Survey Responses

**Results for:** 057005; Engineering I; Section: BBB- Lecture  
**Instructor(s):** Richard Valentino  
**Session Code:** 20013 **Beginning On:** 10-15-01 **Running for:** 12 days  
**Survey #:** 202 **Survey Name:** 05700520013  
**Base Set Used:** ABET **Privacy:** Faculty Distribute  
**Remarks:** ABET  

#### Headings and Subheadings (Instructors) Used in Survey:
- **Heading(s):** Accreditation Board for Engineering and Technology (ABET) Survey  
- **Subheading(s):** This survey was designed to provide feedback to your instructor on selected aspects of this course. Your responses should reflect YOUR INDIVIDUAL PERCEPTIONS, not those of the class as a whole.

#### Score Type Name: True/False

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<tr>
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<td>2</td>
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<tr>
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</table>

1. I understand that the ABET survey questions address course objectives not comments on the instructor's effectiveness.

**Mean:** 1.03

2. I understand that this group of questions pertains ONLY to the first part of the course.

**Mean:** 1.00

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<td>79</td>
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3. I acquired a basic understanding of the programs and opportunities available in the 6 different engineering departments at UI.

**Mean:** 1.01

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4. I understand the importance of first visualizing and describing the particular engineering system I am working with.

**Mean:** 1.01

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<td>78</td>
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5. I learned how to resolve 2-dimensional force vectors into X and Y components and use these to develop an equivalent, resultant vector.

**Mean:** 1.01

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<td>1</td>
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#### Survey Response Summary

3/31/2002 4:04PM
6. I learned how to use simple 2-dimensional force and moment balances to solve simple equilibrium, statics problems.

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8. I learned how to make basic engineering economic calculations of importance in project selection.

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9. I developed a basic understanding of linear, exponential, and power relationships, and how they are used to describe engineering data.

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10. I learned how to plot data using rectilinear, semi-log, and log-log paper.

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11. I learned how statistical techniques such as mean, standard deviation, least-squares linear regression, and correlation coefficient can be used to evaluate engineering data.

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12. The writing assignment helped me to improve my writing skills and learn how to access technical information using the UI library system and the internet.

<table>
<thead>
<tr>
<th>Response Value</th>
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<th>Total Responding</th>
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<tbody>
<tr>
<td>Count of Responses</td>
<td>61</td>
<td>18</td>
<td>79</td>
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</tbody>
</table>
13. I learned that solution of engineering problems may frequently involve a common approach such as visualization and development of systems of simultaneous equations.

<table>
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<tr>
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<tbody>
<tr>
<td>Count of Responses</td>
<td>77</td>
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14. I improved my skills in using spreadsheets for analyzing and graphically showing data.

<table>
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<tbody>
<tr>
<td>Count of Responses</td>
<td>67</td>
<td>12</td>
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</table>

15. I learned that different disciplines are characterized by using different organizing principles but frequently common problem solving approaches.

<table>
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## College of Engineering EASY Survey Responses

<table>
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<tr>
<th>Results for:</th>
<th>057-005; Engineering I; Section: AAA- Lecture</th>
</tr>
</thead>
<tbody>
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<td>Instructor(s):</td>
<td>Abed-Malek</td>
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<tr>
<td>Session Code:</td>
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<tr>
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<td>Privacy:</td>
<td>Faculty Distribute</td>
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<tr>
<td>Remarks:</td>
<td>ABET</td>
</tr>
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</table>

### Headings and Subheadings (Instructors) Used in Survey:
- **Heading(s):**
  - Accreditation Board for Engineering and Technology (ABET) Survey
- **Subheading(s):**
  - This survey was designed to provide feedback to your instructor on selected aspects of this course. Your responses should reflect YOUR INDIVIDUAL PERCEPTIONS, not those of the class as a whole.

### Score Type Name: Disagree/Agree 1-6

<table>
<thead>
<tr>
<th>Response Value</th>
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</table>

8. The "Pro/E Tutorial-Click-by-Click" lecture note is easy to follow, and it clearly describes basic concepts of computer graphics.

**Mean:** 3.34

### Response Value: 1-6

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</tbody>
</table>

9. The computer lab facilities were adequate for effective learning of computer graphics software.

**Mean:** 4.64

### Response Value: 1-6

<table>
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<tr>
<th>Response Value</th>
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<td>66</td>
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</tbody>
</table>

13. The workbook used for engineering drawing (not the Pro/E tutorial) has helped me practice visualization.

**Mean:** 4.20

### Response Value: 1-6

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<tr>
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</table>


**Mean:** 4.62

### Response Value: 1-6

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</table>

15. I acquired the skills applying orthographic projection to a 3D part.

**Mean:** 4.85

### Response Value: 1-6

<table>
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</table>

Survey Response Summary | 3/31/2002 4:04PM |
16. I am capable of reconstructing a 3D pictorial view from two orthographic views.  
Mean: 5.52

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<tr>
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</table>

17. My design creative abilities have been enhanced.  
Mean: 4.3

<table>
<thead>
<tr>
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<th>3</th>
<th>4</th>
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<td>2</td>
<td>11</td>
<td>28</td>
<td>19</td>
<td>66</td>
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</table>

18. The project working in teams has benefited my creative thinking.  
Mean: 3.32

<table>
<thead>
<tr>
<th>Response Value</th>
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</tbody>
</table>

Score Type: True/False

1. I understand that the ABET survey questions address course objectives not comments on the instructor's effectiveness.  
Mean: 1.00

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
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</tbody>
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2. I understand that questions with the numerical scale, 1 - 6, use "1" to mean "Strongly Disagree" and "6" to mean "Strongly Agree."  
Mean: 1.00

<table>
<thead>
<tr>
<th>Response Value</th>
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</thead>
<tbody>
<tr>
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</table>

3. I understand that the questions pertain ONLY to the second half of this course.  
Mean: 1.00

<table>
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<tr>
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</table>

Score Type Mean: 1.00
4. I learned how to graphically represent engineering components and designs using projection view method.  
Mean: 1.82

<table>
<thead>
<tr>
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</tbody>
</table>

5. I understand how to interpret engineering drawings.  
Mean: 1.63

<table>
<thead>
<tr>
<th>Response Value</th>
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<th>Total Responding</th>
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<tbody>
<tr>
<td>Count of Responses</td>
<td>64</td>
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</tbody>
</table>

6. I learned the role of engineering graphics in engineering practices.  
Mean: 1.63

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>Total Responding</th>
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<tbody>
<tr>
<td>Count of Responses</td>
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7. I am capable of using computer graphics tool (Pro/ENGINEER) to create simple components of a design for communication with other team members in the engineering environment.  
Mean: 1.63

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
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</table>

10. I learned how to dimension a part of the engineering design geometry.  
Mean: 1.62

<table>
<thead>
<tr>
<th>Response Value</th>
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<tr>
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</table>

11. I learned how to apply tolerances to dimensions in engineering practices.  
Mean: 1.70

<table>
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</table>

12. I have difficulties in visualizing 3-dimensional structures.  
Mean: 1.71

<table>
<thead>
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</table>
### College of Engineering EASY Survey Responses

**Results for:** 057005; Engineering I; Section: BBB- Lecture  
**Instructor:** A. Sabat-Malek  
**Session Code:** 20013  
**Beginning On:** 12-01-01  
**Running for:** 9 days  
**Survey #:** 241  
**Survey Name:** 057005AB20013  
**Base Set Used:** ABET  
**Privacy:** Faculty Distribute  
**Remarks:** ABET

#### Headings and Subheadings (Instructors) Used in Survey:
- **Heading:** Accreditation Board for Engineering and Technology (ABET) Survey  
- **Subheading:** This survey was designed to provide feedback to your instructor on selected aspects of this course. Your responses should reflect YOUR INDIVIDUAL PERCEPTIONS, not those of the class as a whole.

**Score Type Name: Disagree/Agree 1-6**

1. Strictly Disagree  
2. Moderately Disagree  
3. Slightly Disagree  
4. Slightly Agree  
5. Moderately Agree  
6. Strictly Agree

8. The "Pro/E Tutorial-Click-by-Click" lecture notes is easy to follow, and it clearly describes basic concepts of computer graphics.

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
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<td>9</td>
<td>17</td>
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9. The computer lab facilities were adequate for effective learning of computer graphics software.

<table>
<thead>
<tr>
<th>Response Value</th>
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13. The workbook used for engineering drawing (not the pro/e tutorial) has helped me practice visualization.

<table>
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<td>3</td>
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<td>29</td>
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</table>

15. I acquired the skills applying orthographic projection to a 3D part.

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
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### Survey Response Summary

3/31/2002 4:04PM
Results For: 057065_Engineering I; Section: BBB- Lecture  
Instructor(s): K. Auel-Makek  
Session Code: 20013  
Beginning On: 12-01-01  
Running for: 9 days  
Course Enrolment: 300  
Survey #: 241  
Survey Name: 0570050AB20013  
Section Enrolment: 152  
Base Set Used: ABET  
Privacy: Faculty Distribute  
Remarks: ABET

Score Type Name: Disagree/Agree 1-6

<table>
<thead>
<tr>
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</table>

16. I am capable of reconstructing a 3D pictorial view from two orthographic views.  
Mean: 5.90

Score Type Name: True/False

<table>
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<td>70</td>
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</tbody>
</table>

1. I understand that the ABET survey questions address course objectives not comments on the instructor's effectiveness.  
Mean: 1.01

2. I understand that questions with the numerical scale, 1 - 6, use "1" to mean "Strongly Disagree" and "6" to mean "Strongly Agree."  
Mean: 1.80

3. I understand that the questions pertain ONLY to the second half of this course.  
Mean: 1.80

Score Type Name: Mean: 1.00

Survey Response Summary 3/31/2002 4:04PM
4. I learned how to graphically represent engineering components and designs using projection view method.  
   Mean: 1.81
<table>
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<td>70</td>
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</table>

5. I understand how to interpret engineering drawings.  
   Mean: 1.83
<table>
<thead>
<tr>
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</tbody>
</table>

6. I learned the role of engineering graphics in engineering practices.  
   Mean: 1.84
<table>
<thead>
<tr>
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<td>70</td>
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7. I am capable of using computer graphics tool (Pro/ENGINEER) to create simple components of a design for communication with other team members in the engineering environment.  
   Mean: 1.87
<table>
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<tbody>
<tr>
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<td>5</td>
<td>70</td>
</tr>
</tbody>
</table>

10. I learned how to dimension a part of the engineering design geometry.  
    Mean: 1.83
    | Response Value | 1 | 2 | Total Responding |
    |----------------|---|---|------------------|
    | Count of Responses | 68 | 2 | 70 |

11. I learned how to apply tolerances to dimensions in engineering practices.  
    Mean: 1.40
    | Response Value | 1 | 2 | Total Responding |
    |----------------|---|---|------------------|
    | Count of Responses | 42 | 28 | 70 |

12. I have difficulties in visualizing 3-dimensional structures.  
    Mean: 1.67
    | Response Value | 1 | 2 | Total Responding |
    |----------------|---|---|------------------|
    | Count of Responses | 23 | 47 | 70 |
IV.2  57:006 Engineering II

Summer ’01: Not offered

Fall ’01: The course continues to be a moving target, evolving rapidly in response to changes in the overall core curriculum and in upper level program courses. Elimination of spreadsheet use per previous recommendations resulted in learning goals 1 and part of 2 not being achieved; these goals should be revised accordingly. Student EASY responses and informal feedback support the focussing of the course on just two programming/computational dimensions, namely C and MATLAB. Learning goal 6 (object oriented programming) was only minimally met due to the decision to spend only two lectures on C++ and JAVA; this goal should be modified accordingly. Student comments indicate satisfaction with the attention given to coverage of engineering applications. Direct interaction between discussion section leaders and students in at-the-computer problem solving is a very positive contribution to student learning. This kind of interaction should be facilitated in the future. A new set of learning goals is proposed in the CAR. Suggest exploration of innovative assessment methods, including the use of small focus groups, to more accurate gauge student learning and retention.

Spring ’02: Numerical course-goal survey data not available due to EASY system data loss. Assessment based on analysis of homework and exam performance, as well as instructor observation. Students who successfully completed the class were ble to utilize Matlab and write simple programs in C. Reordering of material (C first and Matlab second) seemed to lead to improved lecture attendance. Uneven use of quizzes in discussion sections seemed to lead to uneven discussion-section attendance and performance on the exams. It is recommended that TAs be given more training, and that the discussion sections have more structure. It is also recommended that discussion-section attendance count for a certain portion of the course grade. It would be helpful if student had access to computers in the discussion room. Exams should include an expansion of the demonstration of problem solving. C text was adequate and available. The stock of recommended Matlab paperpacks ran out.

Overall Assessment: Spring 2002 saw the last offering of this course under its present number. The first offering of its replacement, 59:006, will be Spring 2003. The new course will be essentially the same as the present one, so the recommendations resulting from assessment should be directly carried over to the new course.
### Course Outcomes Worksheet (COW)
57:006 Engineering II

Created 28 February 2001 by Geb Thomas  
Updated 12 October, 2001 by Forrest Holly

<table>
<thead>
<tr>
<th>Course Goals</th>
<th>Supports ABET Outcomes</th>
<th>Course Activity</th>
<th>Basis for Course-Goal Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The student will understand how a spreadsheet is organized and how to</td>
<td>a(<em>) c(</em>) e(*)</td>
<td>Lectures, discussion sections, quizzes, exams and homework.</td>
<td>Homework, quiz, and exam scores. EASY survey assessment by students and instructor</td>
</tr>
<tr>
<td>manipulate and combine cell values and create macros.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. The student will be able to analyze data sets using regression,</td>
<td>a(<em>) b(</em>) e(*)</td>
<td>Lectures, discussion sections, quizzes, exams and homework.</td>
<td>Homework, quiz, and exam scores. EASY survey assessment by students and instructor</td>
</tr>
<tr>
<td>interpolation and basic statistical concepts (mean, min, max,</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>standard deviation, and histograms)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. The student will be able to analyze data and write algorithmic</td>
<td>a(<em>) c(</em>) e(<em>) j(</em>)</td>
<td>Lectures, discussion sections, quizzes, exams and homework.</td>
<td>Homework, quiz, and exam scores. EASY survey assessment by students and instructor</td>
</tr>
<tr>
<td>functions in an array-based mathematical programming environment.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. The student will be able to design efficient, logical algorithms in a</td>
<td>a(<em>) c(</em>) e(*)</td>
<td>Lectures, discussion sections, quizzes, exams and homework.</td>
<td>Homework, quiz, and exam scores. EASY survey assessment by students and instructor</td>
</tr>
<tr>
<td>structured programming language.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. The student will be able to write, debug and compile computer code in</td>
<td>b(<em>) c(</em>) e(<em>) j(</em>)</td>
<td>Lectures, discussion sections, quizzes, exams and homework.</td>
<td>Homework, quiz, and exam scores. EASY survey assessment by students and instructor</td>
</tr>
<tr>
<td>a structured programming language.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. The student will be familiar with an object-oriented programming</td>
<td>c(<em>) e(</em>) j(<em>) k(</em>)</td>
<td>Lectures, discussion sections, quizzes, exams and homework.</td>
<td>Homework, quiz, and exam scores. EASY survey assessment by students and instructor</td>
</tr>
<tr>
<td>language and be able to write a simple program in an object-oriented</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>language.</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

○ denotes moderate contribution to the outcome  ● denotes substantial contribution to the outcome

*Samples of each to represent 10% of the class. One high score and one low score will be collected with the remainder of the sample a random selection.*
Course Assessment Report
College of Engineering
The University of Iowa
(Revision of 27 November 2001)

<table>
<thead>
<tr>
<th>Course Number:</th>
<th>057:006</th>
<th>Semester/Year</th>
<th>Fall, 2001</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Name:</td>
<td>Engineering II</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| COORDINATOR:   | JON KUHL | SIGNATURE:    |               |
| DATE:          | 03/15/02 |              |              |
| INSTRUCTOR:    | Ed Dove  | SIGNATURE:   | (optional)    |
| OTHER:         | John Robinson | SIGNATURE: | (optional)    |
| OTHER:         | Geb Thomas | SIGNATURE:  | (optional)    |

Please attach the course syllabus and course outcomes worksheet (COW).

Assessment Techniques:
Please indicate which of the following techniques were used in assessing the course and your judgment of their utility in assessing achievement of the Course Learning Goals.

<table>
<thead>
<tr>
<th>Assessment Technique</th>
<th>Used, provided useful data</th>
<th>Used, not recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>X</td>
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<tr>
<td>Written Reports (other than projects)</td>
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<td>Student Self-Evaluation</td>
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<td>Course Portfolios</td>
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<tr>
<td>Class Surveys (e.g., EASY)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Instructor Observation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other (specify)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. ASSESSMENT RESULTS: (How were each of the course learning goals (from the COW) achieved? Support your assessments qualitatively and/or quantitatively with data from each of the assessment techniques used (see Table on previous page). Explain the relation of the present assessment results to previous ones.)

Learning Goal 1 and part of Learning Goal 2 were not achieved since coverage of spreadsheets was eliminated from the course this semester (see items 2 and three below). The assessment data indicates that learning goals 2, 3, and 4 are being met. On EASY survey questions 3-6 which relate to student understanding of engineering computations and problem solving using C and MATLAB, mean student responses were 4.42, 4.64, 4.61, and 5.15 respectively. These responses fall in the range between slight agreement and moderate agreement with the notion that students have achieved and understanding of: i) how to develop computer programs to solve engineering problems, ii) how to use MATLAB to solve engineering problems, iii) the basics of structured program development in C or MATLAB, and iv) the differences between C and MATLAB and the ability to select the appropriate tool for a given task. Written student comments are generally favorable and express overall satisfaction with the course. The EASY survey clearly indicates that the removal of EXCEL coverage from the course has improved student satisfaction and perceived understanding of the remaining topics. Since no EASY survey question or final exam question addresses Learning Objective 6, it is difficult to assess whether or not this objective is being met. Since only two lectures were devoted to coverage of object oriented programming (C++ and Java) Learning Objective 6 is probably unrealistic.

2. SUMMARY OF RECENT REMEDIAL ACTIONS: (and their estimated effect)

The assessment process following the Spring, 2001 semester revealed considerable student dissatisfaction with the course. This dissatisfaction appeared to be primarily related to the coverage of EXCEL spreadsheets. Some students indicated that this material substantially duplicated coverage in 57:05 and others found coverage of three main tools (C programming, MATLAB, and spreadsheets) to be too much for a single course. As a result, a decision was made to eliminate all coverage of spreadsheets from 57:006, effective with the fall, 2001 semester, and to use the freed-up lecture time to expand coverage of the remaining topics and strengthen the coverage of engineering applications. As noted above, these changes seem to have had a positive effect on student perceptions regarding the course and it is recommended that the changes be made permanent.

3. RECOMMENDED NEW REMEDIAL ACTIONS, IF ANY:

The course appears to working well following the changes noted in item 2) above. In particular the emphasis on engineering applications is mentioned favorably in a number of written student comments. Although many students still appear to find the course challenging, the past complaints about an excessive amount of material have largely disappeared.

Input from the instructor, echoed by some written student comments, indicates that direct interaction between the discussion section leaders and students in solving problems at the computer is most beneficial to student learning. It is recommended that future instructors attempt to schedule at least some discussion section time in technology-equipped room that will facilitate this type of interaction.

4. RECOMMENDED CHANGES TO COURSE LEARNING GOALS:
As noted above course learning goals 1 and 2 are no longer relevant due to the elimination of spreadsheet coverage from the course and course learning goal 6 is somewhat unrealistic due to the scant coverage of object oriented programming concepts in the course. Therefore it is recommended that the course learning objectives be modified to read as follows:

1. The student will be able to analyze data and write algorithmic functions in an array-based mathematical programming environment.
2. The student will be able to design efficient, logical algorithms using structured development techniques.
3. The student will be able to implement algorithms a modern structured programming language.
4. The student will have a basic understanding of the structure and features of modern programming languages and tools.
5. The student will be able to apply computational tools to the solution of engineering problems.

5. RECOMMENDED MODIFICATIONS TO ASSESSMENT TECHNIQUES:

No specific recommendations are offered at this time. However, future instructors are encouraged to experiment with innovative assessment methods including the use of small focus groups or other means of more accurately gauging student learning and retention.

6. SIGNIFICANT DEVIATIONS IN COURSE CONTENT FROM SYLLABUS (SUMMARIZE):

None

COURSE SUPPORT

TA SUPPORT FROM THE COLLEGE (IN TERMS OF FTE):

3/4 FTE

OTHER TA SUPPORT AND SOURCE (IN TERMS OF FTE):

1/4 FTE supplied by instructor from his research funds

TA RESPONSIBILITIES:

Lead discussion sections, hold office hours, grade homework, assist in grading of exams

WAS THE TA SUPPORT ALLOCATED TO YOUR SECTION SUFFICIENT? PLEASE ELABORATE.

No. College support was not sufficient. With four sections, at least four 1/4 time TAs are needed.

IF USED, WAS THE COMPUTER HARDWARE AND SOFTWARE SUPPORT FROM CSS ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.
In general yes. It would be nice to have a computer-equipped space where students and discussion leaders could interact in problem-solving exercises.

WERE THE FACILITIES (CLASSROOM, LABS, ETC.) ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

Lecture room was fine.

As noted above, a more suitable computer-equipped space is needed for lab/discussion section meetings.

COURSE ORGANIZATION/CONTENTS

LECTURE (HOURS/WEEK): 3  
DISCUSSION (HOURS/WEEK): 1

LABORATORY (HOURS/WEEK): 0  
TOTAL NUMBER OF STUDENTS: 66

TEXTBOOK AUTHOR AND TITLE:
Deitel & Deitel, C-How to Program, Prentice Hall, 2001
Hanselman & Littlefield, Mastering MATLAB 6, Prentice Hall, 2000

PLEASE COMMENT ON THE SUITABILITY OF THE TEXTBOOK AND ITS TIMELY AVAILABILITY.

The Deitel & Deitel text used for the C portion of the course is suitable and readily available.

The MATLAB text, Hanselman and Littlefield, Mastering MATLAB 6, was not satisfactory. A change is recommended to:

Etter, Engineering Problem Solving With MATLAB, Prentice Hall

TEACHING AIDS:

PLEASE ATTACH A COPY OF THE SYLLABUS THAT WAS DISTRIBUTED TO THE CLASS, A SAMPLE OF CLASS HANDOUTS IF AVAILABLE, AND THE COURSE ASSESSMENT WORKSHEET (COW) FOR THE COURSE. USE THE SPACE BELOW TO DESCRIBE ANY PARTICULAR PROBLEMS YOU MIGHT HAVE HAD WITH THIS COURSE (E.G., UNUSUAL ATTENTION, LACK OF PREREQUISITES, UNUSUAL GRADE DISTRIBUTION, ETC.) OR ANY INNOVATIONS/IDEAS THAT SHOULD BE CONSIDERED IN THE FUTURE.
Course Assessment Report  
College of Engineering  
The University of Iowa  

<table>
<thead>
<tr>
<th>Course Number:</th>
<th>57:006</th>
<th>Semester/Year</th>
<th>Spring/2002</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>COORDINATOR:</th>
<th>J. G. KUHL</th>
<th>SIGNATURE:</th>
</tr>
</thead>
<tbody>
<tr>
<td>DATE:</td>
<td>June 2002</td>
<td></td>
</tr>
</tbody>
</table>

| INSTRUCTOR:     | Geb Thomas | SIGNATURE: (optional) |
| Lecture A 9:30 AM 1505 SC |          |                     |

| INSTRUCTOR:     | John Robinson | SIGNATURE: (optional) |
| Lecture B 12:30 PM W151 PBB |            |                       |

Please attach the course syllabus and course outcomes worksheet (COW).

Assessment Techniques:
Please indicate which of the following assessment techniques were used in the course and your judgment of their utility in assessing accomplishment of the Course Learning Objectives.

<table>
<thead>
<tr>
<th>Assessment Technique</th>
<th>Not Used</th>
<th>Used, provided useful data</th>
<th>Used, not recommended</th>
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</thead>
<tbody>
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</tr>
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</tr>
<tr>
<td>Course Portfolios</td>
<td>X</td>
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<tr>
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<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instructor Observation</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other [specify]</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. **ASSESSMENT RESULTS:** (and their relation to past results)

Students who passed the class were able to utilize Matlab and write simple programs in C (see samples of homework and sample exam performance).

2. **SUMMARY OF PRIOR REMEDIATION ACTIONS:** (and their estimated effect)

Lecture attendance was better than the previous spring; apparently due in part to the reordering of the material where C was first and the more complete environment of Matlab was second. There were fewer complaints about the material covered in the class than when C, Matlab, and Excel were all covered the previous spring.

The discussion sections for lecture B did not have quizzes and were able to have more presentation and discussion time. Without the pressure of a quiz, however, the attendance in the four discussion sections was uneven. The weakest TA had the lowest attendance and the lowest performance on the exams. The section with the best TA had the most students, the highest attendance, and scored about 4% higher than the weakest section on the exams.

3. **RECOMMENDED ACTIONS:**

There appeared to be unequal learning in the different discussion sections. If discussion sections are retained then it is recommended that more training be given to the discussion teaching assistants; and that more structure be established in the conduct of the discussion sections. It is recommended that attendance at discussion sections count for up to 3% of the course grade. Ideally, students should have access to computers (perhaps in pairs) in the discussion room.

4. **CHANGES TO COURSE LEARNING OBJECTIVES:**

No changes

5. **MODIFICATIONS TO ASSESSMENT TECHNIQUES:**

Expand the demonstration of problem solving in exams.

---

**COURSE SUPPORT**

TA SUPPORT FROM THE DEAN'S OFFICE (IN TERMS OF FTE):
- Lec A: 3 quarter-time G TAs, 4 quarter-time UG TAs
- Lec B: 1 half-time G TA, 2 half-time UG TAs

OTHER TA SUPPORT AND SOURCE (IN TERMS OF FTE):
TA RESPONSIBILITIES: Discussion section; office hours; grading quizzes, homeworks, and exams; prepared discussion section quizzes.

WAS THE TA SUPPORT ALLOCATED TO YOUR SECTION SUFFICIENT? PLEASE ELABORATE.

Yes

IF USED, WAS THE COMPUTER HARDWARE AND SOFTWARE SUPPORT FROM ECSS ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

Yes

WERE THE FACILITIES (CLASSROOM, LABS, ETC.) ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

For Lecture A, 1505 SC is adequate. For Lecture B, W151 PBB is not much better than 106 Gilmore Hall. The projector in W151 is not bright enough & there is cumbersome access to UNIX from the lecture podium. The PC in the room is relatively slow.

COURSE ORGANIZATION/CONTENTS

LECTURE (HOURS/WEEK): 3 DISCUSSION (HOURS/WEEK): 1
LABORATORY (HOURS/WEEK): 0 TOTAL NUMBER OF STUDENTS: Lec A 141

TEXTBOOK AUTHOR AND TITLE:
Recommended; Etter, Matlab 6, Prentice Hall, 2002.

PLEASE COMMENT ON THE SUITABILITY OF THE TEXTBOOK AND ITS TIMELY AVAILABILITY.

The C text was well suited and was available on time. The recommended Matlab paperback ran out and some students were unable to get a copy.

TEACHING AIDS:

Power point presentations; projection of on line UNIX environment with C and Matlab examples live during lecture. Examples, power point slides, and computer example portions of most lectures were available on the class web page.
College of Engineering EASY Survey Responses

Results for: 057066; Engineering II; Section: AAA- Lecture
Instructor(s): E. Dewo
Session Code: 20013  Beginning On: 12-10-01  Running for: 7 days  Course Enrollment: 61
Survey #: 224  Survey Name: 057006AAA20013  Section Enrollment: 61
Base Set Used: ABET  Privacy: Faculty Distribute  Remarks: ABET

Headings and Subheadings (Instructors) Used in Survey:

For each statement, circle whether you generally agree or disagree then indicate the strength of agreement or disagreement by selecting the appropriate number.

This survey was designed to provide feedback to your instructor on selected aspects of this course. Your responses should reflect YOUR INDIVIDUAL PERCEPTIONS, not those of the class as a whole.

Score Type Name: Disagree/Agree 1-6

1 = Strongly Disagree
2 = Moderately Disagree
3 = Slightly Disagree
4 = Slightly Agree
5 = Moderately Agree
6 = Strongly Agree

3. I understand how to develop computer programs to solve engineering problems.
Mean: 4.2
Response Value:

<table>
<thead>
<tr>
<th>Count of Responses</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>15</td>
<td>7</td>
<td>33</td>
</tr>
</tbody>
</table>

4. I understand how to use MATLAB to solve engineering problems.
Mean: 4.04
Response Value:

<table>
<thead>
<tr>
<th>Count of Responses</th>
<th>1</th>
<th>2</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
<td>1</td>
<td>5</td>
<td>16</td>
<td>8</td>
<td>33</td>
</tr>
</tbody>
</table>

5. I am familiar with structured programming, and I am able to design structured programs in C or MATLAB using functions.
Mean: 4.61
Response Value:

<table>
<thead>
<tr>
<th>Count of Responses</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<tbody>
<tr>
<td></td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>7</td>
<td>12</td>
<td>9</td>
<td>33</td>
</tr>
</tbody>
</table>

6. I understand the differences between C and MATLAB, and I am able to select the appropriate computer tool for a given task.
Mean: 5.15
Response Value:

<table>
<thead>
<tr>
<th>Count of Responses</th>
<th>1</th>
<th>4</th>
<th>5</th>
<th>6</th>
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<tr>
<td></td>
<td>2</td>
<td>5</td>
<td>8</td>
<td>18</td>
<td>33</td>
</tr>
</tbody>
</table>

Score Type Name: True/False

1 = True
2 = False

Survey Response Summary 3/31/2002 4:04PM
Score Type Name: True/False

1. I understand that the ABET survey questions address course objectives not comments on the instructor’s effectiveness.

   Mean: 1.00
   Response Value: 1  Total Responding
   Count of Responses: 33

2. I understand that questions with the numerical scale, 1 - 6, use "1" to mean "Strongly Disagree" and "6" to mean "Strongly Agree."

   Mean: 1.00
   Response Value: 1  Total Responding
   Count of Responses: 33
IV.3  57:007 Statics

Summer ’01:  No assessment performed; see memo in binder.

Fall ’01:  Friction “handbook” was not used, and students fell back to lack of confidence and poor achievement in friction problems. This verifies (through comparison with Spring ’00 EASY results) that the “handbook” is indeed and helpful and should be used routinely. Writing exercise continues to be valuable and appreciated. There is a need for more consistency in grading of successive drafts. Peer mentoring on writing assignments is working well, is cost effective, and should be continued. Improved grading procedures for content vs. expression were developed and should be implemented in Spring ’02. Recommend continued administration of EASY survey each semester.

Spring ’02: Numerical course-goal survey data not available due to EASY system data loss. Assessment was based primarily on EASY survey student comments, instructor observation, exams, and written student reports. Analysis of exam questions showed that friction is somewhat less of a problem than in previous semesters, despite the fact that the “friction recipe book” was not useful according to some student comments. It is recommended that the handbook be made available electronically in future offerings of the course. The refined procedures and grading system for the student written essays seem to have worked well. Although not cases of academic misconduct were known to have occurred, it is strongly suggested that some means of checking for plagiarism on the student essays be invoked in the near future. Wacky Fun Noodles were effective as a teaching aid for Statics principles, and serve to create a relaxed class environment. It is recommended that the summer offering of the course not include the writing exercise due to the time compression in the summer term, but that this be re-evaluated after moments of inertia are eliminated in the 59:007 reincarnation of the course in the new curriculum. It is also recommended that the course 57:019 Deformable Bodies include a pre-test on basic Statics principles, by which students who do not do well are required to work an additional set of Statics problems to “get up to speed” in that course and reinforce the importance of the prerequisite structure.

Overall Assessment:  The assessment processes for Statics appear to be working particularly well, and are leading to useful and continuous improvement of the course. The course appears to be achieving its goals well.
<table>
<thead>
<tr>
<th>Course Goals</th>
<th>Supports ABET Outcomes</th>
<th>Course Activity</th>
<th>Basis for Course-Goal Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Representation of forces and moments as vectors in two and three dimensions.</td>
<td>a (●), e (●), k (●)</td>
<td>Homework and exams test the students abilities in these areas. Specifically, the course addresses representation of forces and moments as vectors.</td>
<td>EASY survey assessment by students and instructor; graded copies of all exam questions*.</td>
</tr>
<tr>
<td>2. Use of equilibrium equations to determine the forces acting on a point or a body in two and three dimensions.</td>
<td>a (●), e (●), k (●)</td>
<td>Homework and exams test the students abilities in these areas. Specifically, the course addresses principles of static equilibrium.</td>
<td>EASY survey assessment by students and instructor; graded copies of all exam questions*.</td>
</tr>
<tr>
<td>3. Determination of the centroids of shapes, composite shapes and bodies.</td>
<td>a (●), e (●), k (●)</td>
<td>Homework and exams test the students abilities in these areas. Specifically, the course addresses principles of first moment of area.</td>
<td>EASY survey assessment by students and instructor; graded copies of all exam questions*.</td>
</tr>
<tr>
<td>4. Determination of the moments of inertia of shapes, composite cross sections, and bodies.</td>
<td>a (●), e (●), k(●)</td>
<td>Homework and exams test the students abilities in these areas. Specifically, the course addresses principles of second moments of area.</td>
<td>EASY survey assessment by students and instructor; graded copies of all exam questions*.</td>
</tr>
<tr>
<td>5a. Use of the concepts of equilibrium to determine forces acting on trusses and in frames and machines.</td>
<td>k (●)</td>
<td>Application of static equilibrium principles to the analysis of point and rigid-body equilibrium, and to equilibrium of frames and machines with and without friction.</td>
<td>EASY survey assessment by students and instructor; graded copies of all exam questions*.</td>
</tr>
<tr>
<td>5b. Use of the concepts of equilibrium to analyze simple friction problems.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Composition of a written description of the principles of statics observable in an observed structure.</td>
<td>g(w) (●)</td>
<td>Students write one substantial paper, and receive feedback on first and second drafts. The paper counts for 15% of the course grade. The paper is intended to develop skills in narrative description of technical principles.</td>
<td>EASY survey assessment by students and instructor; writing guidelines handout; graded copies of final drafts*</td>
</tr>
</tbody>
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● denotes moderate contribution to the outcome  ● denotes substantial contribution to the outcome

*Samples of each to represent 10% of the class. One high score and one low score will be collected with the remainder of the sample a random selection.
Course Assessment Report
College of Engineering
The University of Iowa
(Revision of 27 November 2001)

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<th>57:007</th>
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<th>Fall 2001</th>
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</thead>
<tbody>
<tr>
<td>Course Name:</td>
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<td>Statics</td>
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<table>
<thead>
<tr>
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<th>WILFRID NIXON</th>
<th>SIGNATURE:</th>
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<tr>
<td>DATE:</td>
<td>1/22/02</td>
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<tr>
<td>INSTRUCTOR:</td>
<td>Weber/Raghavan</td>
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<td>(optional)</td>
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<tr>
<td>OTHER:</td>
<td></td>
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<td>(optional)</td>
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</tbody>
</table>

Please attach the course syllabus and course outcomes worksheet (COW).

Assessment Techniques:
Please indicate which of the following techniques were used in assessing the course and your judgment of their utility in assessing achievement of the Course Learning Goals.

<table>
<thead>
<tr>
<th>Assessment Technique</th>
<th>Used, provided useful data</th>
<th>Used, not recommended</th>
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<tr>
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<td>Instructor Observation</td>
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<td>X</td>
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<tr>
<td>Other [specify]</td>
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</tbody>
</table>

68
1. ASSESSMENT RESULTS: (How were each of the course learning goals (from the COW) achieved? Support your assessments qualitatively and/or quantitatively with data from each of the assessment techniques used (see Table on previous page). Explain the relation of the present assessment results to previous ones.)

One course goal was developing an understanding of friction. In Fall 2001, we tried teaching this without the friction handbook used in spring 2001. On the basis of EASY results, students had problems with friction, and this suggests that we need to use the friction handbook. The final exam results suggest also that friction comprehension was somewhat weak. The writing assignment was reviewed in a separate meeting (see memo). It was agreed that the assignment would continue refinement, with emphasis on two areas: grading issues, and a change in the review process.

2. SUMMARY OF RECENT REMEDIAL ACTIONS: (and their estimated effect)

Friction: tried in Fall 2001 without handbook, and it was clear that the handbook actually helped. Goal for 2002 is to refine the handbook further.

Writing exercise:- we had the first application of the “streamlined” grading process in the large class offering. This worked well, and will be retained and refined (see memo).

3. RECOMMENDED NEW REMEDIAL ACTIONS, IF ANY:

Friction:- we will use the handbook again, and work to refine and extend it through all offerings in 2002.

Writing exercise:- we’ll continue to refine. In particular, only the instructor will assess for statics content and bias points. This assessment will occur at the second draft stage and also at the final version. Greater use of peer tutors will be made.

4. RECOMMENDED CHANGES TO COURSE LEARNING GOALS:

No changes recommended at this time.

5. RECOMMENDED MODIFICATIONS TO ASSESSMENT TECHNIQUES:

The group discussed whether we should conduct an Easy assessment each semester, or only in the larger fall offering. It was decided for now that the spring semester is a useful opportunity for development of new ideas, and thus we’ll retain EASY in each semester for the present.

6. SIGNIFICANT DEVIATIONS IN COURSE CONTENT FROM SYLLABUS (SUMMARIZE):

None

COURSE SUPPORT

TA SUPPORT FROM THE COLLEGE (IN TERMS OF FTE): 1.5

OTHER TA SUPPORT AND SOURCE (IN TERMS OF FTE): None

TA RESPONSIBILITIES: grading and leading discussion/recitation sections.

WAS THE TA SUPPORT ALLOCATED TO YOUR SECTION SUFFICIENT? PLEASE ELABORATE.

Yes
IF USED, WAS THE COMPUTER HARDWARE AND SOFTWARE SUPPORT FROM CSS ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

N/A

WERE THE FACILITIES (CLASSROOM, LABS, ETC.) ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

Yes

**COURSE ORGANIZATION/CONTENTS**

LECTURE (HOURS/WEEK): 2  
DISCUSSION (HOURS/WEEK): 1  
LABORATORY (HOURS/WEEK): 0  
TOTAL NUMBER OF STUDENTS: 201

TEXTBOOK AUTHOR AND TITLE: Hibbeler Statics, 9th Edition

PLEASE COMMENT ON THE SUITABILITY OF THE TEXTBOOK AND ITS TIMELY AVAILABILITY.
It's a good textbook and readily available.

TEACHING AIDS:

None.

PLEASE ATTACH A COPY OF THE SYLLABUS THAT WAS DISTRIBUTED TO THE CLASS, A SAMPLE OF CLASS HANDOUTS IF AVAILABLE, AND THE COURSE ASSESSMENT WORKSHEET (COW) FOR THE COURSE. USE THE SPACE BELOW TO DESCRIBE ANY PARTICULAR PROBLEMS YOU MIGHT HAVE HAD WITH THIS COURSE (E.G., UNUSUAL ATTENTION, LACK OF PREREQUISITES, UNUSUAL GRADE DISTRIBUTION, ETC.) OR ANY INNOVATIONS/IDEAS THAT SHOULD BE CONSIDERED IN THE FUTURE.
## Course Assessment Report

**College of Engineering**

**The University of Iowa**

(Revision of 27 November 2001)

<table>
<thead>
<tr>
<th>Course Number:</th>
<th>57:007</th>
<th>Semester/Year</th>
<th>Spring 2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Name:</td>
<td>Statics</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| COORDINATOR:   | WILFRID NIXON | SIGNATURE: |               |
| DATE:          | 5/24/02       |            |              |
| INSTRUCTOR:    | Nixon         | SIGNATURE: | (optional)   |
| OTHER:         |               | SIGNATURE: | (optional)   |

*Please attach the course syllabus and course outcomes worksheet (COW).*

Assessment Techniques:

Please indicate which of the following techniques were used in assessing the course and your judgment of their utility in assessing achievement of the Course Learning Goals.

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<th>Assessment Technique</th>
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<td>X</td>
<td></td>
</tr>
<tr>
<td>Instructor Observation <em>(see attached)</em></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Other [specify]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. **ASSESSMENT RESULTS:** (How were each of the course learning goals (from the COW) achieved? Support your assessments qualitatively and/or quantitatively with data from each of the assessment techniques used (see Table on previous page). Explain the relation of the present assessment results to previous ones.)

Data from exam questions were collected, in terms of average score for each question and the standard deviation of that score. The information is presented in the Table below.

<table>
<thead>
<tr>
<th>Exam and Question Number</th>
<th>Topic of Question</th>
<th>Mean Score (out of 20)</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid-Term Exam 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#1</td>
<td>3-D Equilibrium of a point</td>
<td>15.5</td>
<td>6.27</td>
</tr>
<tr>
<td>#2</td>
<td>2-D equilibrium of a point</td>
<td>15.7</td>
<td>5.81</td>
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<tr>
<td>#3</td>
<td>Moments, vector expression of forces</td>
<td>12.2</td>
<td>5.91</td>
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<tr>
<td>Mid-Term Exam 2</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>#1</td>
<td>Equilibrium of a Body</td>
<td>13.5</td>
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<tr>
<td>#2</td>
<td>Trusses</td>
<td>11.4</td>
<td>5.86</td>
</tr>
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<td>#3</td>
<td>Frames/Machines</td>
<td>10.4</td>
<td>6.50</td>
</tr>
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<tr>
<td>#5</td>
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<td>#6</td>
<td>Centroids</td>
<td>12.3</td>
<td>6.61</td>
</tr>
<tr>
<td>#7</td>
<td>Moments of Inertia</td>
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<td>6.89</td>
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</tbody>
</table>

In previous CARs, friction has been identified as a subject that causes particular problems for students. On the basis of the exam data, and given the lack of numerical data from the EASY survey, it appears that students did not find friction to be a particularly difficult subject. Indeed, none of the exam questions is statistically different, in terms of scoring, than any other, suggesting no particular problem areas.

There were relatively few written comments on the EASY survey. Of these, students identified two areas as being difficult, friction and frames/machines. However, the few comments make it impossible to make useful inferences from these responses. That said, three comments indicated that the friction recipe book was not useful. However, clearly friction was less of a problem (based upon exam results) than in previous semesters. Accordingly, the friction recipe book will be scanned and made available electronically (as a pdf file) on the course web site.

As noted in previous CARs, refinement of the writing exercise has continued. This semester students had to submit a first draft, which was reviewed by an editorial consultant. After receiving the first draft back, students were required to meet with a peer tutor at the Technical Communication Center, before the second draft was due. The second draft was reviewed solely by the instructor with emphasis on technical content. The final draft was reviewed first by the editorial consultant, who suggested scores for the writing portion of the exercise. The instructor then evaluated technical content and provided the actual final scores. On the whole this process worked well, and it is recommended that it be used in Fall semester too. One change to consider for Fall would be to include some electronic means of checking for plagiarism (see below).

2. **SUMMARY OF RECENT REMEDIAL ACTIONS:** (and their estimated effect)
Friction: the handbook was used in Spring 2002. From exam scores friction was not the problem it has been in the past, but student comments suggest that the friction handbook may not have been the thing that made the difference.

Writing exercise: The writing process again used a refined grading process described above. This will be continued next semester.
3. RECOMMENDED NEW REMEDIAL ACTIONS, IF ANY:
Friction: we will try with an electronic version of the handbook for Fall 2002. The loss of EASY data in this regard was somewhat of a blow, and we need some further evaluation here. Writing exercise: there is a clear need for some simple ways to check for plagiarism. There are indications that a few students may be taken significant amounts of material off the web. Next semester, students will be required to submit an electronic version of their final paper, which will be evaluated for plagiarism, most likely using the “turnitin” software method.

4. RECOMMENDED CHANGES TO COURSE LEARNING GOALS:
No changes recommended at this time.

5. RECOMMENDED MODIFICATIONS TO ASSESSMENT TECHNIQUES:
No changes recommended at this time.

6. SIGNIFICANT DEVIATIONS IN COURSE CONTENT FROM SYLLABUS (SUMMARIZE):
None

**COURSE SUPPORT**

TA SUPPORT FROM THE COLLEGE (IN TERMS OF FTE): 0.5

OTHER TA SUPPORT AND SOURCE (IN TERMS OF FTE): None

TA RESPONSIBILITIES: grading and leading discussion/recitation sections.

WAS THE TA SUPPORT ALLOCATED TO YOUR SECTION SUFFICIENT? PLEASE ELABORATE.

Yes

IF USED, WAS THE COMPUTER HARDWARE AND SOFTWARE SUPPORT FROM CSS ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

N/A

WERE THE FACILITIES (CLASSROOM, LABS, ETC.) ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

Yes

**COURSE ORGANIZATION/CONTENTS**

LECTURE (HOURS/WEEK): 2

DISCUSSION (HOURS/WEEK): 1

LABORATORY (HOURS/WEEK): 0

TOTAL NUMBER OF STUDENTS: 33
PLEASE COMMENT ON THE SUITABILITY OF THE TEXTBOOK AND ITS TIMELY
AVAILABILITY.
It’s a good textbook and readily available.

TEACHING AIDS:
Wacky Fun Noodles. These are very helpful for demonstrating a number of Statics principles, including
moments, trusses, frames and machines, and moments of inertia/radius of gyration. Plus, they serve as a
useful way to relax students. It would be worth expending some effort to develop some good
demonstration tools for the class.

PLEASE ATTACH A COPY OF THE SYLLABUS THAT WAS DISTRIBUTED TO THE CLASS, A
SAMPLE OF CLASS HANDOUTS IF AVAILABLE, AND THE COURSE ASSESSMENT
WORKSHEET (COW) FOR THE COURSE. USE THE SPACE BELOW TO DESCRIBE ANY
PARTICULAR PROBLEMS YOU MIGHT HAVE HAD WITH THIS COURSE (E.G., UNUSUAL
ATTRITION, LACK OF PREREQUISITES, UNUSUAL GRADE DISTRIBUTION, ETC.) OR ANY
INNOVATIONS/IDEAS THAT SHOULD BE CONSIDERED IN THE FUTURE.

Only comment on grade distribution would be that I had to fail three students who took the final.
Normally, students fail themselves by simply stopping attending, but in this case all three students simply
failed to do the work. We might need to keep an eye on this in the future.

It was agreed that the summer offering of Statics would not, at this time, include the writing exercise.
However, this will be re-evaluated once the new curriculum for statics is in place.

There is evidence that students in 57:019 Deformable Bodies are not carrying forward all that they have
learned about equilibrium, free-body diagrams, and calculation of supporting forces and moments. It is
suggested that a simple pre-test of these concepts be administered early in the semester in 57:019. Students
who fail this simple pre-test would be required to complete a work book of simple problems by a certain
date. Failure to accomplish this would result in students being dropped from the class. This will
emphasize to students that pre-requisite is not just a long word, but a reality.

IF USED, WAS THE COMPUTER HARDWARE AND SOFTWARE SUPPORT FROM CSS
ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

N/A

WERE THE FACILITIES (CLASSROOM, LABS, ETC.) ADEQUATE? PLEASE ELABORATE WITH
SUGGESTIONS FOR IMPROVEMENT.

Yes

COURSE ORGANIZATION/CONTENTS

LECTURE (HOURS/WEEK): 2 DISCUSSION (HOURS/WEEK): 1
LABORATORY (HOURS/WEEK): 0 TOTAL NUMBER OF STUDENTS: 33
College of Engineering EASY Survey Responses

Results for: 057007; Statics; Section: AAA- Lecture
Instructor(s): M. Raghibim
Session Code: 20013  Beginning On:  12-01-01  Running for: 9 days  Course Enrollment: 200
Survey #: 157  Survey Name: 057007AAA-20004  Section Enrollment: 78
Base Set Used: ABET  Privacy: Faculty Distribute  Remarks: ABET

Headings and Subheadings (Instructors) Used in Survey:

Heading(s): Accreditation Board for Engineering and Technology (ABET) Survey
For each statement decide whether you generally agree or disagree then indicate the strength of agreement or disagreement by selecting the appropriate number.

Subheading(s):
This survey was designed to provide feedback to your instructor on selected aspects of this course. Your responses should reflect YOUR INDIVIDUAL PERCEPTIONS, not those of the class as a whole.

Score Types Name: Disagree/Agree 1-6

<table>
<thead>
<tr>
<th>Score Type Name: Disagree/Agree 1-6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1= Strongly Disagree</td>
</tr>
<tr>
<td>2= Moderately Disagree</td>
</tr>
<tr>
<td>3= Slightly Disagree</td>
</tr>
<tr>
<td>4= Slightly Agree</td>
</tr>
<tr>
<td>5= Moderately Agree</td>
</tr>
<tr>
<td>6= Strongly Agree</td>
</tr>
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</table>

3. I can represent forces and moments as vectors in two and three dimensions.

   Mean: 5.30
   
<table>
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<tr>
<th>Response Value</th>
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5. I can use equilibrium equations to determine the forces acting on a point or a body in two and three dimensions.

   Mean: 5.56
   
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<th>4</th>
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7. I can use the concepts of equilibrium to determine forces acting on trusses and in frames and machines.

   Mean: 4.82
   
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<tr>
<th>Response Value</th>
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<td>2</td>
<td>7</td>
<td>12</td>
<td>38</td>
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</table>

9. I can use the concepts of equilibrium to analyze simple friction problems.

   Mean: 4.82
   
<table>
<thead>
<tr>
<th>Response Value</th>
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<th>2</th>
<th>3</th>
<th>4</th>
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<th>6</th>
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<td>2</td>
<td>4</td>
<td>17</td>
<td>12</td>
<td>38</td>
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</table>

11. I can find the centroids of shapes, composite shapes, and bodies.

   Mean: 4.57
   
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<th>3</th>
<th>4</th>
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<td>1</td>
<td>6</td>
<td>15</td>
<td>14</td>
<td>38</td>
</tr>
</tbody>
</table>

Survey Response Summary 3/31/2002 4:04PM
13. I can find the moment of inertia of shapes, composite cross sections, and bodies.
   
   **Mean:** 4.66

<table>
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<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<td>2</td>
<td>4</td>
<td>15</td>
<td>12</td>
<td>38</td>
</tr>
</tbody>
</table>

15. I have the ability to describe, in written form to a lay reader, the principles of statics observable in a structure.

   **Mean:** 4.34

<table>
<thead>
<tr>
<th>Response Value</th>
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<td>1</td>
<td>5</td>
<td>17</td>
<td>11</td>
<td>38</td>
</tr>
</tbody>
</table>

17. The friction recipe book was helpful.

   **Mean:** 2.65

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
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<td>6</td>
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<td>1</td>
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</table>

**Score Type Name: True/False**

1. I understand that the ABET survey questions address course objectives not comments on the instructor’s effectiveness.

   **Mean:** 1.66

<table>
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<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>36</td>
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</tr>
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</table>

2. I understand that questions with the numerical scale, 1 - 6, use “1” to mean “Strongly Disagree” and “6” to mean “Strongly Agree.”

   **Mean:** 1.83

<table>
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<tbody>
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</table>

**Score Type Mean:** 1.04

Survey Response Summary 3/31/2002 4:04PM
## College of Engineering EASY Survey Responses

**Results for:** 057007; Statics; Section: BBJ- Lecture

**Instructor(s):** Weber

**Session Code:** 20013  **Beginning On:** 12-01-01  **Running for:** 9 days  **Course Enrollment:** 200

**Survey #:** 157  **Survey Name:** 057007AAA-20004  **Section Enrollment:** 130

**Base Set Used:** ABET  **Privacy:** Faculty Distribute  **Remarks:** ABET

### Headings and Subheadings (Instructions) Used in Survey:

**Heading(s):** Accreditation Board for Engineering and Technology (ABET) Survey

**Subheading(s):** For each statement decide whether you generally agree or disagree then indicate the strength of agreement or disagreement by selecting the appropriate number.

This survey was designed to provide feedback to your instructor on selected aspects of this course. Your responses should reflect YOUR INDIVIDUAL PERCEPTIONS, not those of the class as a whole.

### Score Type Name: Disagree/Agree 1-6

1 = Strongly Disagree  
2 = Moderately Disagree  
3 = Slightly Disagree  
4 = Slightly Agree  
5 = Moderately Agree  
6 = Strongly Agree

#### 3. I can represent forces and moments as vectors in two and three dimensions.

<table>
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<th>3</th>
<th>4</th>
<th>5</th>
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<tbody>
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<td>10</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>21</td>
<td>28</td>
<td>64</td>
</tr>
</tbody>
</table>

#### Mean: 4.06

#### 5. I can use equilibrium equations to determine the forces acting on a point or a body in two and three dimensions.

<table>
<thead>
<tr>
<th>Response Value</th>
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<th>2</th>
<th>4</th>
<th>5</th>
<th>6</th>
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<td>5</td>
<td>10</td>
<td>38</td>
<td>63</td>
</tr>
</tbody>
</table>

#### Mean: 4.34

#### 7. I can use the concepts of equilibrium to determine forces acting on trusses and in frames and machines.

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
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<tbody>
<tr>
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<td>2</td>
<td>2</td>
<td>9</td>
<td>21</td>
<td>23</td>
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</tbody>
</table>

#### Mean: 4.61

#### 9. I can use the concepts of equilibrium to analyze simple friction problems.

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
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<th>3</th>
<th>4</th>
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<td>1</td>
<td>4</td>
<td>23</td>
<td>28</td>
<td>63</td>
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</tbody>
</table>

#### Mean: 4.54

#### 11. I can find the centroids of shapes, composite shapes, and bodies.

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
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<td>1</td>
<td>7</td>
<td>18</td>
<td>30</td>
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</tbody>
</table>

#### Mean: 4.30

### Survey Response Summary 3/31/2002 4:04PM
13. I can find the moment of inertia of shapes, composite cross sections, and bodies.

**Mean: 4.30**

<table>
<thead>
<tr>
<th>Response Value</th>
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<th>2</th>
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<td>14</td>
<td>24</td>
<td>13</td>
<td>63</td>
</tr>
</tbody>
</table>

15. I have the ability to describe, in written form to a lay reader, the principles of statics observable in a structure.

**Mean: 4.65**

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
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</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>6</td>
<td>3</td>
<td>10</td>
<td>23</td>
<td>21</td>
<td>63</td>
</tr>
</tbody>
</table>

17. The friction recipe book was helpful.

**Mean: 2.71**

<table>
<thead>
<tr>
<th>Response Value</th>
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<th>2</th>
<th>3</th>
<th>4</th>
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<th>Total Responding</th>
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</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>21</td>
<td>11</td>
<td>9</td>
<td>13</td>
<td>2</td>
<td>6</td>
<td>62</td>
</tr>
</tbody>
</table>

**Score Type Name: True/False**

1. I understand that the ABET survey questions address course objectives not comments on the instructor’s effectiveness.

**Mean: 1.68**

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>62</td>
<td>2</td>
<td>64</td>
</tr>
</tbody>
</table>

2. I understand that questions with the numerical scale, 1 - 6, use "1" to mean "Strongly Disagree" and "6" to mean "Strongly Agree."

**Mean: 1.80**

<table>
<thead>
<tr>
<th>Response Value</th>
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<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>64</td>
<td>64</td>
</tr>
</tbody>
</table>
IV.4 57:008 Electrical Circuits

Summer ’01: Not offered

Fall ’01: Differential equations not pre- or co-requisite this semester, causing difficulties in transient analysis for students lacking this background. Limited exposure to complex numbers and vectors made AC analysis more difficult for some students. Overall, student performance remains satisfactory, but limited practice with mathematics held some students back. Additional design-oriented material into homework continues to be helpful for integrating material. No new SPICE package yet available widely, so it was not significantly used. Current version of SPICE incorporated in homework problems. Recommend continued incorporation of design-oriented problems in homework sets, including typed report. Include homework problems specifically covering differential equations and complex numbers to help students with weak background in these areas. Invest in more up-to-date version of SPICE. Include pre-exam quizzes for student self-assessment in discussion sections.

Spring ’02: Numerical course-goal survey data not available due to EASY system data loss. Assessment based on review of student work, instructor observations, and student comments on EASY questions. Course goals essentially achieved, though material on transformers was not covered due to time constraints. Analysis techniques well understood, but mechanics of deriving the numerical solutions was problematic. Transient analysis limited to “step by step” method due to differential equations being neither a pre- or co-requisite for the course. AC analysis was difficult for students lacking experience with complex numbers and vectors. Open-ended group design projects were brought into the course, one with a formal report; students found this to be challenging but it was a successful innovation. Demo version of SPICE (B2SPICE) was used effectively, but this version lacks solid documentation and is restricted in circuit size. The textbook uses PSICE; it is highly recommended that the College purchase a license to use PSICE for this and other courses (e.g. 57:018, 55:032, 55:041).

Overall Assessment: The course is seeing continuous improvement and innovation in team project work. Software support (SPICE) continues to be problematic, prompting the current discussion in the Engineering Faculty Council regarding the possible role of the Curriculum Committee in setting priorities for College software acquisition and maintenance for the core.
<table>
<thead>
<tr>
<th>Course Goals</th>
<th>Supports ABET Outcomes</th>
<th>Course Activity</th>
<th>Basis for Course-Goal Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Application of Ohm's Law and Kirchoff's Laws to resistive circuits.</td>
<td>A (○), B (●)</td>
<td>Homework and exams test the students' abilities in this area.</td>
<td>EASY survey assessment by students; graded copies of all exam questions; sample homework submissions.*</td>
</tr>
<tr>
<td>2. Analysis of resistive circuits using node and loop analysis.</td>
<td>A (●), E (●)</td>
<td>Homework and exams test the students' abilities in this area.</td>
<td>EASY survey assessment by students; graded copies of all exam questions; sample homework submissions.*</td>
</tr>
<tr>
<td>3. Modeling of ideal operational amplifier and analysis of basic op-amp</td>
<td>A (●), C (●), K (●)</td>
<td>Homework, exams, and design problems test the students' abilities in this area.</td>
<td>EASY survey assessment by students; graded copies of all exam questions; sample homework and design problem submissions.*</td>
</tr>
<tr>
<td>configurations.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Determination of the Thevenin equivalent of a circuit.</td>
<td>A (●), C (●), E (●)</td>
<td>Homework and exams test the students' abilities in this area.</td>
<td>EASY survey assessment by students; graded copies of all exam questions; sample homework submissions.*</td>
</tr>
<tr>
<td>5. Simplification and analysis of circuits using source transformation and</td>
<td>A (●), E (●)</td>
<td>Homework and exams test the students' abilities in this area.</td>
<td>EASY survey assessment by students; graded copies of all exam questions; sample homework submissions.*</td>
</tr>
<tr>
<td>superposition.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Use of SPICE to describe and analyze circuits.</td>
<td>A (●), B (●), C (●), K (●)</td>
<td>Homework problems test the students' abilities in this area.</td>
<td>EASY survey assessment by students; sample homework submissions.*</td>
</tr>
<tr>
<td>7. Characterization of capacitors and inductors.</td>
<td>A (●)</td>
<td>Homework and exams test the students' abilities in this area.</td>
<td>EASY survey assessment by students; graded copies of all exam questions; sample homework submissions.*</td>
</tr>
<tr>
<td>8. Computation of the transient response of circuits containing a single</td>
<td>A (●), E (●)</td>
<td>Homework, exams, and design problems test the students' abilities in this area.</td>
<td>EASY survey assessment by students; graded copies of all exam questions; sample homework and design problem submissions.*</td>
</tr>
<tr>
<td>capacitor or inductor.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Representation of sinusoidal signals in the frequency domain with</td>
<td>A (●)</td>
<td>Homework and exams test the students' abilities in this area.</td>
<td>EASY survey assessment by students; graded copies of all exam questions; sample homework submissions.*</td>
</tr>
<tr>
<td>phasors.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Computation of impedance and analysis of AC circuits in the frequency</td>
<td>A (●), C (●), E (●)</td>
<td>Homework, exams, and design problems test the students' abilities in this area.</td>
<td>EASY survey assessment by students; graded copies of all exam questions; sample homework and design problem submissions.*</td>
</tr>
<tr>
<td>domain.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Formulation of basic voltage and current relationships in transformers.</td>
<td>A (●)</td>
<td>Lectures provide examples in this area.</td>
<td>EASY survey assessment by students.</td>
</tr>
</tbody>
</table>

○ denotes moderate contribution to the outcome ● denotes substantial contribution to the outcome

*Representative samples of each are chosen from student submissions. At least one high score and one low passing score will be collected, with the remainder of the sample coming from average student performance.
Course Assessment Report
College of Engineering
The University of Iowa
(Revision of 27 November 2001)

<table>
<thead>
<tr>
<th>Course Number:</th>
<th>57:008</th>
<th>Semester/Year</th>
<th>Fall 2001</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Name:</td>
<td></td>
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<td>Electrical Circuits</td>
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<table>
<thead>
<tr>
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<th>SOURA DASGUPTA</th>
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<tbody>
<tr>
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<td></td>
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</tr>
<tr>
<td>INSTRUCTOR:</td>
<td>Daniel Thedens</td>
<td>SIGNATURE:</td>
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</table>

Please attach the course syllabus and course outcomes worksheet (COW).

Assessment Techniques:
Please indicate which of the following techniques were used in assessing the course and your judgment of their utility in assessing achievement of the Course Learning Goals.

<table>
<thead>
<tr>
<th>Assessment Technique</th>
<th>Used, provided useful data</th>
<th>Used, not recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>X</td>
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</tr>
<tr>
<td>Exams</td>
<td>X</td>
<td></td>
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<tr>
<td>Quizzes</td>
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<td></td>
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<td>Projects</td>
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<td>Written Reports (other than projects)</td>
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<td>Oral Reports</td>
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<td>Student Peer-Evaluation</td>
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<td>Course Portfolios</td>
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<td>Class Surveys (e.g., EASY)</td>
<td>X</td>
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<td>Instructor Observation</td>
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<tr>
<td>Other [specify]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. **ASSESSMENT RESULTS:** (How were each of the course learning goals (from the COW) achieved? Support your assessments qualitatively and/or quantitatively with data from each of the assessment techniques used (see Table on previous page). Explain the relation of the present assessment results to previous ones.)

   Student performance was at about the same level as in past semesters. Basic analysis techniques were well understood, with most difficulties arising from the mechanics of deriving the numerical solutions. For this semester, differential equations was not a pre- or co-requisite for this course, and so transient analysis caused difficulties for students without this background. Similarly, limited exposure to complex numbers and vectors made AC analysis more difficult for some. Material on transformers was covered only during the last lecture, and could not be assessed by survey or homework results. Overall, students did a good job choosing and setting up the proper analysis methods, but their limited practice with some of the mathematics held some back.

2. **SUMMARY OF RECENT REMEDIAL ACTIONS: (and their estimated effect)**

   Additional design-oriented material was incorporated into the homework problem sets. These were helpful to better integrate the material together and to practice open-ended problems solving. Generally, students needed a "nudge" to get started towards what techniques were likely to work, but after getting on the right track, they could readily create the needed designs. Time constraints prevented incorporation of design-based material on exams.

   Lectures presented problems with multiple solution techniques, and this helped students look over problems and select the analysis technique best suited to the problem. Students were less successful at this on exams, however, presumably due to time pressure.

   No newer (graphical) SPICE package was widely available yet, so it was not significantly used for lecture demonstrations. The current version was incorporated into homework problems.

3. **RECOMMENDED NEW REMEDIAL ACTIONS, IF ANY:**

   Design-oriented problems should continue to be incorporated into the homework sets. A typed report for one of the design assignments could help exercise communications skills.

   Including problems specifically covering differential equations and complex numbers may help students whose background in these areas is lacking due to the lack of these course requirements as prerequisites.

   Investment in a more up-to-date version of SPICE for the College computer systems would make learning and utilizing this important tool much more effective. Collection of some pre-made web-based applets for demonstration purposes would also help students with review and self-study.

4. **RECOMMENDED CHANGES TO COURSE LEARNING GOALS:**

   None are recommended.

5. **RECOMMENDED MODIFICATIONS TO ASSESSMENT TECHNIQUES:**

   Self-study and assessment outside of class are often not utilized by the students who most need it. Pre-exam quizzes for self-assessment (where the TA then works the problems immediately after) or informal 5-10 minute exercises may be more useful to include in discussion sections.

6. **SIGNIFICANT DEVIATIONS IN COURSE CONTENT FROM SYLLABUS (SUMMARIZE):**

   None.
COURSE SUPPORT

TA SUPPORT FROM THE COLLEGE (IN TERMS OF FTE): 1.25 (2 x 50% + 1 x 25%)

OTHER TA SUPPORT AND SOURCE (IN TERMS OF FTE):

TA RESPONSIBILITIES:
Leading weekly discussion sections, holding office hours, grading of homework and exam problems.

WAS THE TA SUPPORT ALLOCATED TO YOUR SECTION SUFFICIENT? PLEASE ELABORATE.
Support was sufficient.

IF USED, WAS THE COMPUTER HARDWARE AND SOFTWARE SUPPORT FROM CSS ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.
Computer hardware was adequate. Software available (SPICE) was a very old version and should be upgraded to a much more modern version for circuit simulation.

WERE THE FACILITIES (CLASSROOM, LABS, ETC.) ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.
Facilities were good. 1505 SC is a good room for this class.

COURSE ORGANIZATION/CONTENTS

LECTURE (HOURS/WEEK): 3  
DISCUSSION (HOURS/WEEK): 1

LABORATORY (HOURS/WEEK): 0  
TOTAL NUMBER OF STUDENTS: 141

TEXTBOOK AUTHOR AND TITLE:
J. David Irwin, Basic Engineering Circuit Analysis (7th Ed)

PLEASE COMMENT ON THE SUITABILITY OF THE TEXTBOOK AND ITS TIMELY AVAILABILITY.

Textbook is fine for this course. This was the first semester with this edition, so the text did contain a few errors. Textbook was readily available on time.

TEACHING AIDS: No special teaching aids were used.

PLEASE ATTACH A COPY OF THE SYLLABUS THAT WAS DISTRIBUTED TO THE CLASS, A SAMPLE OF CLASS HANDOUTS IF AVAILABLE, AND THE COURSE ASSESSMENT WORKSHEET (COW) FOR THE COURSE. USE THE SPACE BELOW TO DESCRIBE ANY PARTICULAR PROBLEMS YOU MIGHT HAVE HAD WITH THIS COURSE (E.G., UNUSUAL ATTENTION, LACK OF PREREQUISITES, UNUSUAL GRADE DISTRIBUTION, ETC.) OR ANY INNOVATIONS/IDEAS THAT SHOULD BE CONSIDERED IN THE FUTURE.
This well-established class presented no unusual difficulties in this semester in terms of student preparedness or attrition. At present, however, a course in differential equations is not a listed pre- or co-requisite for this class, so some students without this preparation found certain topics difficult because of a lack of this background knowledge.
### Course Assessment Report
**College of Engineering**
**The University of Iowa**
(Revision of 27 November 2001)

<table>
<thead>
<tr>
<th>Course Number:</th>
<th>57:008</th>
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<th>Spring 2002</th>
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</thead>
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<tr>
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<th>SOURA DASGUPTA</th>
<th>SIGNATURE:</th>
<th><strong>Soura Dasgupta</strong></th>
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</thead>
<tbody>
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<td>May 30, January 18, 2002</td>
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<tr>
<td>INSTRUCTOR:</td>
<td>Daniel Thedens</td>
<td>SIGNATURE:</td>
<td><strong>Daniel The dens</strong></td>
</tr>
<tr>
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<td>(optional)</td>
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Please attach the course syllabus and course outcomes worksheet (COW).

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**Assessment Techniques:**

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<td>Instructor Observation</td>
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<tr>
<td>Other [specify]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Easy surveys numerical results were unavailable due to flawed programming.
1. ASSESSMENT RESULTS: (How were each of the course learning goals (from the COW) achieved? Support your assessments qualitatively and/or quantitatively with data from each of the assessment techniques used (see Table on previous page). Explain the relation of the present assessment results to previous ones.)

   Student performance was at about the same level as in past semesters. Basic analysis techniques were well understood, with most difficulties arising from the mechanics of deriving the numerical solutions. Again this semester, differential equations was not a pre- or co-requisite for this course, and so transient analysis was limited to the "step by step" method rather than the differential equation approach.

   Limited experience with complex numbers and vectors made AC analysis more difficult for some students.

   Time did not permit the material on transformers to be covered this semester.

   Two open-ended group design problems were assigned this semester, including one with a formal report. The students found these challenging but most groups were able to design a satisfactory solution with some guidance.

2. SUMMARY OF RECENT REMEDIAL ACTIONS: (and their estimated effect)

   One team design problem included a formal written report. Both design problems used SPICE for design verification.

   Differential equation coverage was limited to illustrating how to derive the differential equations from the circuit diagram, rather than focusing on solution methods for the differential equations. Transient problems were solved using the step by step method.

   A brief review of complex numbers was included this semester, along with a complex numbers review web page from the class home page.

   A new graphical version of SPICE (B2SPICE) was used this semester for the first time. B2SPICE is a PC-based system with schematic capture. B2SPICE was used in lecture demonstrations, homework and the design problem assignments. The College does not yet have a license for full version of B2SPICE, the class used a free demo copy of the software this semester.

   The B2SPICE software was easy enough to use that it was able to replace custom-built web applets for demonstration purposes.

3. RECOMMENDED NEW REMEDIAL ACTIONS, IF ANY:

   Investment in the full version of B2SPICE (or an equivalent product) is recommended. The demo version has little documentation and limitations on the size of the circuits that can be analyzed. B2SPICE would be useful in other courses as well, including 57:018, 55:032, and 55:041. *

4. RECOMMENDED CHANGES TO COURSE LEARNING GOALS:

   None are recommended.

5. RECOMMENDED MODIFICATIONS TO ASSESSMENT TECHNIQUES:

   None are recommended.

6. SIGNIFICANT DEVIATIONS IN COURSE CONTENT FROM SYLLABUS (SUMMARIZE):

   Transformers were not covered this semester due to time limitations.

---

**COURSE SUPPORT**

* Note from Coordinator: Since the text book uses Pspice, and it is readily accessible, I recommend that it be purchased. It is only $4,000.
TA SUPPORT FROM THE COLLEGE (IN TERMS OF FTE): 1.5 (1 x 50%, 2 x 37.5%, 1 x 25%)

OTHER TA SUPPORT AND SOURCE (IN TERMS OF FTE):

TA RESPONSIBILITIES:

Leading weekly discussion sections, holding office hours, grading of homework and exam problems.

WAS THE TA SUPPORT ALLOCATED TO YOUR SECTION SUFFICIENT? PLEASE ELABORATE.

Support was sufficient.

IF USED, WAS THE COMPUTER HARDWARE AND SOFTWARE SUPPORT FROM CSS ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

Computer hardware was adequate. A full version of B2SPICE is recommended since the demo version lacks full documentation and has limitations on number of devices in a circuit.

WERE THE FACILITIES (CLASSROOM, LABS, ETC.) ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

1505 SC is a good room for this class. One section was held in 101BCSB. 101BCSB has only a portable blackboard and overhead. A different room would be preferable.

COURSE ORGANIZATION/CONTENTS

LECTURE (HOURS/WEEK): 3  DISCUSSION (HOURS/WEEK): 1
LABORATORY (HOURS/WEEK): 0  TOTAL NUMBER OF STUDENTS: 147 (74 + 73)

TEXTBOOK AUTHOR AND TITLE:
J. David Irwin, Basic Engineering Circuit Analysis (7th Ed)

PLEASE COMMENT ON THE SUITABILITY OF THE TEXTBOOK AND ITS TIMELY AVAILABILITY.

Textbook is fine for this course. Textbook was available on time.

TEACHING AIDS: No special teaching aids were used. The textbook publisher has a special web page for the book with additional problems, homework problem solutions, etc.

PLEASE ATTACH A COPY OF THE SYLLABUS THAT WAS DISTRIBUTED TO THE CLASS, A SAMPLE OF CLASS HANDOUTS IF AVAILABLE, AND THE COURSE ASSESSMENT WORKSHEET (COW) FOR THE COURSE. USE THE SPACE BELOW TO DESCRIBE ANY PARTICULAR PROBLEMS YOU MIGHT HAVE HAD WITH THIS COURSE (E.G., UNUSUAL ATTRITION, LACK OF PREREQUISITES, UNUSUAL GRADE DISTRIBUTION, ETC.) OR ANY INNOVATIONS/IDEAS THAT SHOULD BE CONSIDERED IN THE FUTURE.
There were no unusual difficulties in this semester in terms of student preparedness or attrition. At present, however, a course in differential equations is not a listed pre- or co-requisite for this class, so some students without this preparation found certain topics difficult because of a lack of this background knowledge. We focused on the step by step solution to transient problems rather than the differential equation approach.
### College of Engineering EASY Survey Responses

**Results For:** 057/068; Electrical Circuits, Section: AAA- Lecture  
**Instructor(s):** Treadern  
**Session Code:** 20013  
**Beginning On:** 12-01-01  
**Running For:** 9 days  
**Course Enrollment:** 139  
**Survey #:** 233  
**Survey Name:** 057008AAA20013  
**Base Set Used:** ABET  
**Privacy:** Faculty Distribute  
**Remarks:** ABET

#### Headings and Subheadings (Instructions) Used in Survey:

**Heading(s):**  
Accreditation Board for Engineering and Technology (ABET) Survey

**Subheading(s):**  
For each statement decide whether you generally agree or disagree then indicate the strength of agreement or disagreement by selecting the appropriate number.  
This survey was designed to provide feedback to your instructor on selected aspects of this course. Your responses should reflect YOUR INDIVIDUAL PERCEPTIONS, not those of the class as a whole.

#### Score Type Name: Disagree/Agree 1-6

1. Strongly Disagree  
2. Moderately Disagree  
3. Slightly Disagree  
4. Slightly Agree  
5. Moderately Agree  
6. Strongly Agree

*3. I learned how to apply Ohm’s Law and Kirchoff’s Laws to resistive circuits.*  
**Mean:** 5.38

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>17</td>
<td>48</td>
<td>71</td>
</tr>
</tbody>
</table>

5. I learned how to analyze resistive circuits using node and loop analysis.  
**Mean:** 5.38

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>3</td>
<td>4</td>
<td>21</td>
<td>43</td>
<td>71</td>
</tr>
</tbody>
</table>

7. I learned the ideal model of an operational amplifier and basic op-amp configurations.  
**Mean:** 4.58

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
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<tbody>
<tr>
<td>Count of Responses</td>
<td>5</td>
<td>2</td>
<td>7</td>
<td>11</td>
<td>25</td>
<td>21</td>
<td>71</td>
</tr>
</tbody>
</table>

9. I learned how to determine the Thévenin equivalent of a circuit.  
**Mean:** 5.35

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
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<td>2</td>
<td>5</td>
<td>20</td>
<td>42</td>
<td>71</td>
</tr>
</tbody>
</table>

11. I learned how to simplify and analyze circuits with source transformation and superposition.  
**Mean:** 5.65

<table>
<thead>
<tr>
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<th>1</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<td>1</td>
<td>5</td>
<td>21</td>
<td>43</td>
<td>71</td>
</tr>
</tbody>
</table>

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Survey Response Summary  
3/31/2002 4:04PM
13. I learned how to use SPICE to describe and analyze circuits.
   \[ \text{Mean: 4.23} \]
<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>3</th>
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<td>9</td>
<td>23</td>
<td>19</td>
<td>12</td>
<td>71</td>
</tr>
</tbody>
</table>

15. I learned the characteristics of capacitors and inductors.
   \[ \text{Mean: 5.31} \]
<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
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<td>1</td>
<td>5</td>
<td>30</td>
<td>34</td>
<td>71</td>
</tr>
</tbody>
</table>

17. I learned how to compute the transient response of circuits containing a single capacitor or inductor.
   \[ \text{Mean: 4.48} \]
<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>3</td>
<td>5</td>
<td>2</td>
<td>15</td>
<td>23</td>
<td>23</td>
<td>71</td>
</tr>
</tbody>
</table>

19. I learned how to represent sinusoidal signals in the frequency domain with phasors.
   \[ \text{Mean: 5.31} \]
<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
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<td>Count of Responses</td>
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<td>1</td>
<td>7</td>
<td>21</td>
<td>40</td>
<td>71</td>
</tr>
</tbody>
</table>

21. I learned how to compute impedance and analyze AC circuits in the frequency domain.
   \[ \text{Mean: 5.34} \]
<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
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<td>2</td>
<td>1</td>
<td>5</td>
<td>21</td>
<td>41</td>
<td>71</td>
</tr>
</tbody>
</table>

23. I learned the basic voltage and current relationships in transformers.
   \[ \text{Mean: 3.67} \]
<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>15</td>
<td>5</td>
<td>6</td>
<td>19</td>
<td>12</td>
<td>13</td>
<td>79</td>
</tr>
</tbody>
</table>
1. I understand that the ABET survey questions address course objectives not comments on the instructor's effectiveness.

   Mean: 1.00
   
   Response Value:  | 1 | Total Responding |
   Count of Responses:  | 71          | 71          |

2. I understand that questions with the numerical scale, 1 - 6, use "1" to mean "Strongly Disagree" and "6" to mean "Strongly Agree."

   Mean: 1.00
   
   Response Value:  | 1 | Total Responding |
   Count of Responses:  | 71          | 71          |

Score Type: Mean: 1.00
IV.5  57:009 Thermodynamics

Summer ’01: No EASY survey was performed. Examination of course material revealed that course goals were achieved. Problems with IT software continue from last year. Project work will be re-introduced in Fall course offering. Text by Moran and Shapiro may have some problems in clarity of presentations; other texts should be examined for possible adoption. Property calculations and cycle sign convention presentations have been improved.

Fall ’01: Course goals were achieved, based on assessment of student feedback and exam/homework performance. Project was assigned, student performance was satisfactory. Interactive Thermodynamics (IT) performance has improved. Students accept project only reluctantly, especially due to its connection with IT. Project may be extended to include second-law aspects of efficiency measures etc.). Discussion suggests it will be difficult to introduce psychometrics/combustion into the course. Current text is adequate. Computer with IT provided for Help Room – this was very successful. IT installation on faculty machines is still stumbling. Avoid use of 107 EPB at all costs. Additional rooms should be reserved for final exam, to ensure adequate student separation.

Spring ’02: Numerical course-goal survey data not available due to EASY system data loss. Overall assessment indicates course goals achieved. Student feedback through informal questionnaire at end of course, as well as student performance on exams and homework, support the above conclusion; student comments were analyzed in detail. Student performance on project was satisfactory. Performance of the Interactive Thermodynamics software has improved, and significantly supported the project component of the course. Recommend that lecture on IT use be moved earlier in the course, at the end of Chapter 3. Help-room instructor-donated computer was very useful and should be continued. Psychometrics were introduced into the syllabus per earlier recommendations, but too late in the semester to have homework on this subject; but homework is needed to teach this topic effectively. Current textbook is adequate. Help room before and after class is appreciated by students.

Overall Assessment: Assessment process for the course is working well. Course benefits from this careful assessment and consequent continuous improvement and experimentation with new modalities of instruction and student support.
### Course Outcomes Worksheet (COW)

**57:009 THERMODYNAMICS I**  
19 March 2001 by C. Beckermann

<table>
<thead>
<tr>
<th>Course Goals</th>
<th>Supports ABET Outcomes</th>
<th>Course Activity</th>
<th>Basis for Course-Goal Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The student will become familiar with fundamental concepts and definitions used in the study of thermodynamics.</td>
<td>A (●), E (●)</td>
<td>Three class hours at the beginning of the semester introduce the students to the fundamental concepts and definitions in thermodynamics.</td>
<td>EASY survey assessment by students and instructor; graded copies of homework and exam questions*.</td>
</tr>
<tr>
<td>2. The student will learn about properties of pure, simple, compressible substances and property relations relevant to engineering thermodynamics.</td>
<td>A (●), E (●)</td>
<td>Six class hours are spent on properties of pure substances and the ideal gas law.</td>
<td>EASY survey assessment by students and instructor; graded copies of homework and exam questions*.</td>
</tr>
<tr>
<td>3. The student will have an understanding of macroscopic and microscopic energy modes, energy transfer, and energy transformation.</td>
<td>A (●), E (●)</td>
<td>Three class hours are spent on introducing the concepts of work and heat.</td>
<td>EASY survey assessment by students and instructor; graded copies of homework and exam questions*.</td>
</tr>
<tr>
<td>4. The student will understand the basic laws of classical thermodynamics for open and closed systems.</td>
<td>A (●), E (●)</td>
<td>Ten class hours are spent on the First Law and fourteen class hours are spent on the Second Law of thermodynamics.</td>
<td>EASY survey assessment by students and instructor; graded copies of homework and exam questions*.</td>
</tr>
<tr>
<td>5. The student will learn about some important thermodynamic cycles and their applications.</td>
<td>A (●), E (●), J (○)</td>
<td>Six class hours are spent on cycles.</td>
<td>EASY survey assessment by students and instructor; graded copies of homework and exam questions*.</td>
</tr>
<tr>
<td>6. The student will utilize a computer software tool to learn about the design aspect of engineering thermodynamics.</td>
<td>C (○), G (●), J (○), K (○)</td>
<td>Students use the Interactive Thermodynamics software to complete a design project, involving contemporary issues in thermodynamics, and write a final report.</td>
<td>EASY survey assessment by students and instructor; graded copies of the project report*.</td>
</tr>
</tbody>
</table>

○ denotes moderate contribution to the outcome  ● denotes substantial contribution to the outcome

*Homework samples to represent 5% of all homework problems assigned; one sample of each exam and of the project. One high score, one medium score, and one low score will be collected for each sample.
Course Assessment Report  
College of Engineering  
The University of Iowa

<table>
<thead>
<tr>
<th>Course Number:</th>
<th>57:009</th>
<th>Semester/Year</th>
<th>Summer 2001</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Name:</td>
<td>Thermodynamics 1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| COORDINATOR: | C. BECKERMAN | SIGNATURE: | [Signature]
<table>
<thead>
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</thead>
<tbody>
<tr>
<td>DATE:</td>
<td>9/7/01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INSTRUCTOR:</td>
<td>K.D. Carlson</td>
<td>SIGNATURE:</td>
<td>(optional)</td>
</tr>
<tr>
<td>OTHER:</td>
<td>H.S. Udaykumar</td>
<td>SIGNATURE:</td>
<td>(optional)</td>
</tr>
</tbody>
</table>

Please attach the course syllabus and course outcomes worksheet (COW).

Assessment Techniques:
Please indicate which of the following assessment techniques were used in the course and your judgment of their utility in assessing accomplishment of the Course Learning Objectives.

<table>
<thead>
<tr>
<th>Assessment Technique</th>
<th>Not Used</th>
<th>Used, provided useful data</th>
<th>Used, not recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Exams</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Quizzes</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Projects</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Written Reports (other than projects)</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oral Reports</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student Self-Evaluation</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student Peer-Evaluation</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course Portfolios</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class Surveys (e.g., EASY)</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instructor Observation</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other [specify]</td>
<td>x</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. **ASSESSMENT RESULTS:** (and their relation to past results)

In the summer semester, no project was given. Also, no EASY survey was performed, and no written instructor observation was provided.

Overall, examination of all material by the assessment group revealed that the course goals were achieved. No major problems were reported, and the previously noted minor problems were fixed.

The problems with the IT software continued. Effort is underway in the fall semester to fix them. Also, a project will be administered in Fall 2001 and much discussion focused on possible ways to improve the project.

Some discussion focused on the text by Moran and Shapiro. It was felt that some material in the text is not presented with enough clarity.

2. **SUMMARY OF PRIOR REMEDIATION ACTIONS:** (and their estimated effect)

- The problems with the IT software are not entirely fixed yet.
- Since no project was given, the recommendations regarding the project are not applicable to the summer semester.
- The instruction in regard to property calculations and sign convention for cycles has been satisfactorily improved.

3. **RECOMMENDED ACTIONS:**

- Continue to improve the use of IT
- Continue to improve the project
- Examine other texts for purpose of possible adoption

4. **CHANGES TO COURSE LEARNING OBJECTIVES:**

None recommended.

5. **MODIFICATIONS TO ASSESSMENT TECHNIQUES:**

- Continue to provide spread sheet with average scores on individual homework sets and exam questions
- Provide written Instructor Observations, as was done for spring 2001.

**COURSE SUPPORT**

TA SUPPORT FROM THE DEAN'S OFFICE (IN TERMS OF FTE):

1 0.5FTE TA (undergraduate student)

OTHER TA SUPPORT AND SOURCE (IN TERMS OF FTE):
TA RESPONSIBILITIES:
Holding office hours, which amounts to helping students (one-on-one or in small groups) with homework; grading homework and exams; maintaining the grade spreadsheet; updating the class web page; and helping instructor proctor exams.

WAS THE TA SUPPORT ALLOCATED TO YOUR SECTION SUFFICIENT? PLEASE ELABORATE. Yes, I had one TA for 24 students. He took care of the grading, grade spreadsheets, updating the class web page, and had 2 office hours per day. He didn’t feel that the workload was excessive, and all tasks were promptly completed.

IF USED, WAS THE COMPUTER HARDWARE AND SOFTWARE SUPPORT FROM ECSS ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.
Yes, it was fine.

WERE THE FACILITIES (CLASSROOM, LABS, ETC.) ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.
Yes, the facilities were adequate.

COURSE ORGANIZATION/CONTENTS
LECTURE (HOURS/WEEK): 3 DISCUSSION (HOURS/WEEK): 0
LABORATORY (HOURS/WEEK): 0 TOTAL NUMBER OF STUDENTS: 24

TEXTBOOK AUTHOR AND TITLE:

PLEASE COMMENT ON THE SUITABILITY OF THE TEXTBOOK AND ITS TIMELY AVAILABILITY.
I think it’s a good reference text, but I don’t think the title is accurate. It is far from the mere ‘fundamentals’ of thermodynamics. Because of this, I think students have a hard time trying to learn the subject from reading the text, since basic concepts are often muddled with details that are unnecessary at the introductory level.

TEACHING AIDS:
overhead projector; chalk board; handouts containing example problems; projection computer for showing graphs, figures, and demonstrating it
### Course Assessment Report

**College of Engineering**

**The University of Iowa**

(Revision of 27 November 2001)

<table>
<thead>
<tr>
<th>Course Number:</th>
<th>57:009</th>
<th>Semester/Year:</th>
<th>Fall 2001</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Name:</td>
<td>Thermodynamics 1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**COORDINATOR:** C. Beckermann  
**SIGNATURE:** C. Beckermann

**DATE:** 1/24/02

**INSTRUCTOR:** C. Beckermann, H.S. Udaykumar  
**SIGNATURE:** (optional)

**OTHER:** T.F. Smith, C.-L. Lin, W. Eichinger  
**SIGNATURE:** (optional)

---

Please attach the course syllabus and course outcomes worksheet (COW).

---

**Assessment Techniques:**

Please indicate which of the following techniques were used in assessing the course and your judgment of their utility in assessing achievement of the Course Learning Goals.

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<thead>
<tr>
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<td></td>
<td>x</td>
</tr>
<tr>
<td>Other (specify)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. ASSESSMENT RESULTS: (How were each of the course learning goals (from the COW) achieved? Support your assessments qualitatively and/or quantitatively with data from each of the assessment techniques used (see Table on previous page). Explain the relation of the present assessment results to previous ones.)

Overall, the course goals as laid out in the COW were achieved. This assessment was based on the student feedback through EASY survey and also from performance on exams and homework.

A project was assigned in this (Fall 2001) semester and student performance was satisfactory. Overall, IT performance has improved and students did not report many serious problems accessing or using IT. Students have expressed some reluctance to accept the Project as a necessary part of the course, especially due to its connection with IT. However, the instructors were in agreement that using IT was the only way to perform the calculations and analysis required by the project. Furthermore, IT in itself is a useful instrument to work on homework problems that require parametric variations. Plans were discussed to extend the project to take into account the Second Law aspects (efficiency measures etc.).

There is a move, prompted by the forthcoming new curriculum, to introduce psychometrics into the syllabus for this course. Following discussion, it was felt that adequate treatment of concepts related to combustion would not be possible.

Discussion of possible alternative text books led to the conclusion that the text currently in use is adequate and is not surpassed in any way by other available books.

2. SUMMARY OF RECENT REMEDIAL ACTIONS: (and their estimated effect)

Problems with IT seem to have been substantially fixed.
High quality and availability of TA help in this semester was appreciated by the students.

3. RECOMMENDED NEW REMEDIAL ACTIONS, IF ANY:

Continue to improve and extend the project. Inclusion of second-law principles is planned.

4. RECOMMENDED CHANGES TO COURSE LEARNING GOALS:

None.

5. RECOMMENDED MODIFICATIONS TO ASSESSMENT TECHNIQUES:

None. Currently detailed statistics of the exam performance and regular homework assignment grades are being used to assess student performance. The project was also weighted higher this semester than previously upon student request, and also to encourage students to pay greater attention to the project.

6. SIGNIFICANT DEVIATIONS IN COURSE CONTENT FROM SYLLABUS (SUMMARIZE):

None.

COURSE SUPPORT
TA SUPPORT FROM THE COLLEGE (IN TERMS OF FTE):

6 0.25FTE TA's

OTHER TA SUPPORT AND SOURCE (IN TERMS OF FTE):

TA RESPONSIBILITIES:
Holding office hours in the Help Room; grading of exams and homework; proctor exams

WAS THE TA SUPPORT ALLOCATED TO YOUR SECTION SUFFICIENT? PLEASE ELABORATE.
Yes, having six TA’s is sufficient for two sections each with about 85 students.

IF USED, WAS THE COMPUTER HARDWARE AND SOFTWARE SUPPORT FROM CSS ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.
A computer with IF was provided for the Help Room – this was very helpful. IT still does not work properly on all NT machines in the computer labs. I have not been able to get version 2.0 of IT installed on my faculty machine – despite repeated requests.

WERE THE FACILITIES (CLASSROOM, LABS, ETC.) ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.
Section 1 classes were held in 107 EPB – this is a terrible classroom and should be avoided at all cost. Also, not enough rooms were provided for the Final Exam – it is recommended that additional rooms be reserved such that there is an empty seat between each student.

COURSE ORGANIZATION/CONTENTS

LECTURE (HOURS/WEEK): 3 (two sections)  DISCUSSION (HOURS/WEEK): 0

LABORATORY (HOURS/WEEK): 0  TOTAL NUMBER OF STUDENTS: 185

TEXTBOOK AUTHOR AND TITLE:
Moran and Shapiro, Fundamentals of Engineering Thermodynamics, 4th edition, Wiley, with IT software

PLEASE COMMENT ON THE SUITABILITY OF THE TEXTBOOK AND ITS TIMELY AVAILABILITY.
The book is fine and readily available.

TEACHING AIDS:
Overhead projector, chalk board, handouts, computer.

PLEASE ATTACH A COPY OF THE SYLLABUS THAT WAS DISTRIBUTED TO THE CLASS, A SAMPLE OF CLASS HANDOUTS IF AVAILABLE, AND THE COURSE ASSESSMENT WORKSHEET (COW) FOR THE COURSE. USE THE SPACE BELOW TO DESCRIBE ANY PARTICULAR PROBLEMS YOU MIGHT HAVE HAD WITH THIS COURSE (E.G., UNUSUAL ATTRITION, LACK OF PREREQUISITES, UNUSUAL GRADE DISTRIBUTION, ETC.) OR ANY INNOVATIONS/IDEAS THAT SHOULD BE CONSIDERED IN THE FUTURE.
TA RESPONSIBILITIES:
Holding office hours, which amounts to helping students (one-on-one or in small groups) with homework; grading homework and exams; maintaining the grade spreadsheet; updating the class web page; and helping instructor proctor exams.

WAS THE TA SUPPORT ALLOCATED TO YOUR SECTION SUFFICIENT? PLEASE ELABORATE.
Yes, I had one TA for 24 students. He took care of the grading, grade spreadsheets, updating the class web page, and had 2 office hours per day. He didn’t feel that the workload was excessive, and all tasks were promptly completed.

IF USED, WAS THE COMPUTER HARDWARE AND SOFTWARE SUPPORT FROM ECSS ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.
Yes, it was fine.

WERE THE FACILITIES (CLASSROOM, LABS, ETC.) ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.
Yes, the facilities were adequate.

COURSE ORGANIZATION/CONTENTS
LECTURE (HOURS/WEEK): 3 DISCUSSION (HOURS/WEEK): 0
LABORATORY (HOURS/WEEK): 0 TOTAL NUMBER OF STUDENTS: 24

TEXTBOOK AUTHOR AND TITLE:

PLEASE COMMENT ON THE SUITABILITY OF THE TEXTBOOK AND ITS TIMELY AVAILABILITY.
I think it’s a good reference text, but I don’t think the title is accurate. It is far from the mere ‘fundamentals’ of thermodynamics. Because of this, I think students have a hard time trying to learn the subject from reading the text, since basic concepts are often muddled with details that are unnecessary at the introductory level.

TEACHING AIDS:
overhead projector; chalk board; handouts containing example problems; projection computer for showing graphs, figures, and demonstrating IT
Course Assessment Report
College of Engineering
The University of Iowa
(Revision of 27 November 2001)

Course Number: 57:009  Semester/Year: Spring 2002
Course Name: Thermodynamics 1

COORDINATOR: C. BECKERMANN  SIGNATURE: C. Beckermann
DATE:
INSTRUCTOR: W. Eichinger  SIGNATURE: (optional) W. Eichinger
OTHER: T.F. Smith, C.-L. Lin, C. Beckermann, H.S. Udaykumar  SIGNATURE: (optional)

Please attach the course syllabus and course outcomes worksheet (COW).

Assessment Techniques:
Please indicate which of the following techniques were used in assessing the course and your judgment of their utility in assessing achievement of the Course Learning Goals.

<table>
<thead>
<tr>
<th>Assessment Technique</th>
<th>Used, provided useful data</th>
<th>Used, not recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
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</tr>
<tr>
<td>Exams</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Quizzes</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Projects</td>
<td>X</td>
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<tr>
<td>Written Reports (other than projects)</td>
<td></td>
<td></td>
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<tr>
<td>Oral Reports</td>
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<td></td>
</tr>
<tr>
<td>Student Self-Evaluation</td>
<td></td>
<td></td>
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<tr>
<td>Student Peer-Evaluation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course Portfolios</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class Surveys (e.g., EASY)</td>
<td>X</td>
<td>INVALID RESULTS</td>
</tr>
<tr>
<td>Instructor Observation</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Other [specify]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. **ASSESSMENT RESULTS:** (How were each of the course learning goals (from the COW) achieved? Support your assessments qualitatively and/or quantitatively with data from each of the assessment techniques used (see Table on previous page). Explain the relation of the present assessment results to previous ones.)

Overall, the course goals as laid out in the COW were achieved. This assessment was based on the student feedback and also from performance on exams and homework.

A questionnaire was used at the end of the class to provide feedback for improvement of the instructor's teaching methods and to evaluate a number of specific questions about the course. The student feedback was quite useful. The responses were quite consistent.

A project was assigned in this (Spring 2002) semester and student performance was satisfactory. Overall, IT performance has improved and students did not report many serious problems accessing or using IT. The Project was an interesting part of the course. IT made the solution of the problem much easier and was used by over 90% of the students. IT was not as useful as it could have been for homework problems. The instructor took a class period to explain the program using the classroom electronic connections. This was of great help to the students, but was too late in the course. It should be taught at the end of chapter 3. The computer in the help room was used every day once it was available. It should also be continued.

Two lessons on psychometrics were introduced into the syllabus for this semester. Because it was the last two class sessions, homework was not assigned. This was a mistake. Homework forces the students to work problems.

Discussion of possible alternative textbooks led to the conclusion that the text currently in use is adequate and is not surpassed in any way by other available books.

2. **SUMMARY OF RECENT REMEDIAL ACTIONS:** (and their estimated effect)

Problems with IT seem to have been substantially fixed. The availability of a computer in the help room to run IT with an instructor or TA present is useful. The use of help room before and after the class period was appreciated by the students.

3. **RECOMMENDED NEW REMEDIAL ACTIONS, IF ANY:**

Continue to improve and extend the project assignment.

4. **RECOMMENDED CHANGES TO COURSE LEARNING GOALS:**

None.

5. **RECOMMENDED MODIFICATIONS TO ASSESSMENT TECHNIQUES:**

None. Currently detailed statistics of the exam performance and regular homework assignment grades are being used to assess student performance. The project was also weighted at half the value of a mid-term exam to encourage students to pay greater attention to the project.

6. **SIGNIFICANT DEVIATIONS IN COURSE CONTENT FROM SYLLABUS (SUMMARIZE):**

None.
COURSE SUPPORT

TA SUPPORT FROM THE COLLEGE (IN TERMS OF FTE):
  2  0.25 FTE TA’s

OTHER TA SUPPORT AND SOURCE (IN TERMS OF FTE):

TA RESPONSIBILITIES:
  Holding office hours in the Help Room; grading of exams and homework; proctor exams

WAS THE TA SUPPORT ALLOCATED TO YOUR SECTION SUFFICIENT? PLEASE ELABORATE.
  Yes, having two TA’s is sufficient for a section with about 70 students.

IF USED, WAS THE COMPUTER HARDWARE AND SOFTWARE SUPPORT FROM CSS ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.
  No computer support was available. The instructor donated a computer with IT for the Help Room. This computer was very helpful and was used daily by students once it was installed.

WERE THE FACILITIES (CLASSROOM, LABS, ETC.) ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

COURSE ORGANIZATION/CONTENTS

LECTURE (HOURS/WEEK): 3 (one section)   DISCUSSION (HOURS/WEEK): 0
LABORATORY (HOURS/WEEK): 0   TOTAL NUMBER OF STUDENTS: 74

TEXTBOOK AUTHOR AND TITLE:
  Moran and Shapiro, Fundamentals of Engineering Thermodynamics, 4th edition, Wiley, with IT software

PLEASE COMMENT ON THE SUITABILITY OF THE TEXTBOOK AND ITS TIMELY AVAILABILITY.
  The book is fine and readily available.

TEACHING AIDS:
  Overhead projector, chalk board, handouts, computer.

PLEASE ATTACH A COPY OF THE SYLLABUS THAT WAS DISTRIBUTED TO THE CLASS, A SAMPLE OF CLASS HANDOUTS IF AVAILABLE, AND THE COURSE ASSESSMENT WORKSHEET (COW) FOR THE COURSE. USE THE SPACE BELOW TO DESCRIBE ANY PARTICULAR PROBLEMS YOU MIGHT HAVE HAD WITH THIS COURSE (E.G., UNUSUAL ATTENTION, LACK OF PREREQUISITES, UNUSUAL GRADE DISTRIBUTION, ETC.) OR ANY INNOVATIONS/IDEAS THAT SHOULD BE CONSIDERED IN THE FUTURE.
College of Engineering EASY Survey Responses

Results for: 057/069; Thermodynamics I; Section: 001- Lecture
Instructor(s): C. Beckmann
Session Code: 20013  Beginning On: 12-02-01  Running for: 13 days
Survey #: 211  Survey Name: 057005001220013
Base Set Used: ABET  Privacy: Faculty Distribute  Remarks: ABET

Headings and Subheadings (Instructors) Used in Survey:

<table>
<thead>
<tr>
<th>Heading(s):</th>
<th>Accreditation Board for Engineering and Technology (ABET) Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subheading(s):</td>
<td>This survey was designed to provide feedback to your instructor on selected aspects of this course. Your responses should reflect YOUR INDIVIDUAL PERCEPTIONS, not those of the class as a whole.</td>
</tr>
</tbody>
</table>

Score Type Name: Disagree/Agree 1-6

<table>
<thead>
<tr>
<th>1 = Strongly Disagree</th>
<th>2 = Moderately Disagree</th>
<th>3 = Slightly Disagree</th>
<th>4 = Slightly Agree</th>
<th>5 = Moderately Agree</th>
<th>6 = Strongly Agree</th>
</tr>
</thead>
</table>

3. I learned the definitions and underlying concepts of thermodynamic terms such as system, property, state, phase, process and cycle.

**Mean: 5.38**

Response Value: 2 3 4 5 6 Total Responding

| Count of Responses: | 1 1 9 15 23 | 49 |

4. I learned about the concepts of energy transfer by heat and work, and energy transformation from one form to another.

**Mean: 5.70**

Response Value: 2 4 5 6 Total Responding

| Count of Responses: | 1 8 24 16 | 49 |

5. I learned how to determine properties for pure, simple, compressible substances, and the relations between these properties.

**Mean: 4.67**

Response Value: 1 2 3 4 5 6 Total Responding

| Count of Responses: | 1 2 3 13 17 49 |

6. I learned the basic laws of classical thermodynamics for closed and open systems.

**Mean: 5.12**

Response Value: 1 2 3 4 5 6 Total Responding

| Count of Responses: | 1 1 2 6 16 23 | 49 |

7. I learned about some important thermodynamic cycles and their applications.

**Mean: 4.65**

Response Value: 2 3 4 5 6 Total Responding

| Count of Responses: | 1 5 11 24 7 | 48 |

Survey Response Summary 3/31/2002 4:04PM
8. I learned to utilize interactive Thermodynamics software to compute thermodynamic properties and solve thermodynamics problems.

<table>
<thead>
<tr>
<th>Score Type Name: Disagree/Agree 1-6</th>
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<tbody>
<tr>
<td>Response Value:</td>
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<td>1: Strongly Disagree</td>
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<tr>
<td>2: Moderately Disagree</td>
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<tr>
<td>3: Slightly Disagree</td>
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9. I learned to use IT software to vary parameters in a thermodynamic process or cycle to see the effect on the operation of the process/cycle, thus allowing for the design optimization of the process/cycle.

<table>
<thead>
<tr>
<th>Score Type Name: True/False</th>
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<td>6: 4</td>
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</table>

1. I understand that the ABET survey questions address course objectives not comments on the instructor's effectiveness.

<table>
<thead>
<tr>
<th>Score Type Name: True/False</th>
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<tbody>
<tr>
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<table>
<thead>
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<td>2: 1</td>
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2. I understand that questions with the numerical scale, 1 - 6, use "1" to mean "Strongly Disagree" and "6" to mean "Strongly Agree."

<table>
<thead>
<tr>
<th>Score Type Name: True/False</th>
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<td>1:</td>
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<tr>
<td>2: Total Responding:</td>
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<tr>
<td>Mean: 1.00</td>
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</table>

Survey Response Summary: 3/31/2002 4:04PM
### College of Engineering EASY Survey Responses

**Results for:** 057-069; Thermodynamics I; Section: 002- Lecture  
**Instructor(s):** Utagajuma  
**Session Code:** 20013  
**Beginning On:** 12-02-01  
**Running for:** 13 days  
**Survey #:** 211  
**Survey Name:** 0570050601220013  
**Base Set Used:** ABET  
**Privacy:** Faculty Distribute  
**Remarks:** ABET  

#### Headings and Subheadings (Instructions) Used in Survey:
- **Heading(s):** Accreditation Board for Engineering and Technology (ABET) Survey  
- **Subheading(s):** This survey was designed to provide feedback to your instructor on selected aspects of this course. Your responses should reflect YOUR INDIVIDUAL PERCEPTIONS, not those of the class as a whole.

#### Score Type Name: Disagree/Agree 1-6

1 = Strongly Disagree  
2 = Moderately Disagree  
3 = Slightly Disagree  
4 = Slightly Agree  
5 = Moderately Agree  
6 = Strongly Agree

#### Question 3

3. I learned the definitions and underlying concepts of thermodynamic terms such as system, property, state, phase, process, and cycle.

**Mean:** 5.24  
**Response Value:** 1 2 3 4 5 6  
**Total Responding:** 51

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<td>14</td>
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<td>4</td>
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</table>

#### Question 4

4. I learned about the concepts of energy transfer by heat and work, and energy transformation from one form to another.

**Mean:** 5.25  
**Response Value:** 1 2 3 4 5 6  
**Total Responding:** 51

<table>
<thead>
<tr>
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<tr>
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</tbody>
</table>

#### Question 5

5. I learned how to determine properties for pure, simple, compressible substances, and the relations between these properties.

**Mean:** 5.16  
**Response Value:** 1 2 3 4 5 6  
**Total Responding:** 51

<table>
<thead>
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</table>

#### Question 6

6. I learned the basic laws of classical thermodynamics for closed and open systems.

**Mean:** 5.31  
**Response Value:** 1 2 3 4 5 6  
**Total Responding:** 51

<table>
<thead>
<tr>
<th>Response Value</th>
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</table>

#### Question 7

7. I learned about some important thermodynamic cycles and their applications.

**Mean:** 5.8  
**Response Value:** 1 2 3 4 5 6  
**Total Responding:** 51

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Survey Response Summary  
3/31/2002 4:04PM
Score Type Name: Disagree/Agree 1-6

1 = Strongly Disagree
2 = Moderately Disagree
3 = Slightly Disagree
4 = Slightly Agree
5 = Moderately Agree
6 = Strongly Agree

8. I learned to utilize interactive Thermodynamics software to compute thermodynamic properties and solve thermodynamics problems.

Mean: 4.57

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<td>8</td>
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<td>18</td>
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</table>

9. I learned to use IT software to vary parameters in a thermodynamic process or cycle to see the effect on the operation of the process/cycle, thus allowing for the design optimization of the process/cycle.

Mean: 4.40

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</table>

Score Type Name: True/False

1 = True
2 = False

1. I understand that the ABET survey questions address course objectives not comments on the instructor’s effectiveness.

Mean: 1.00

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<tr>
<th>Response Value</th>
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<tbody>
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</table>

2. I understand that questions with the numerical scale, 1 - 6, use "1" to mean "Strongly Disagree" and "6" to mean "Strongly Agree."

Mean: 1.00

<table>
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<tr>
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</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>51</td>
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</tr>
</tbody>
</table>
IV.6  57:010 Dynamics

Summer ’01: EASY survey not conducted due to small number of students. Exam sets used for assessment, with questions targeted to course goals from COW. Exam results indicated successful student achievement of goals related to both particle and rigid-body dynamics. Summer session limits time available for energy methods for rigid body dynamics. Recommend eliminating summary class hours after each chapter in the summer session, freeing up four lecture hours for rigid-body energy methods. Recommend moving Dynamics to afternoon class to provide some space between it and Def Bods class. Help-session interaction hours were very successful and very helpful to students.

Fall ’01: Principal assessment tool was 40 homework sets, 4 monthly tests, and EASY survey. Assessment results show marked improvement in student performance from Fall ’00, especially for rigid-body kinematics and dynamics. This appears to reflect the increased instructor emphasis and time devoted to rigid-body material following earlier assessments. It is recommended that this reallocation of emphasis be continued in future semesters.

Spring ’02: Numerical course-goal survey data not available due to EASY system data loss. Assessment based primarily on analysis of 36 homework sets, midterm and final exams, and student comments on the EASY survey. Based on earlier recommendations, two additional lectures were added to rigid-body portion of the course. As a result, the student perception of weakness in rigid-body mechanics vis-a-vis particle mechanics seems to have faded. Students and instructors found that course management using WebCT was very useful and helpful.

Overall Assessment: Course assessment has been very effective and led to a useful restructuring of the syllabus to correct an imbalance in student performance and perception of strength (particle vs. rigid-body dynamics). Targeting of EASY questions directly to course goals has been very useful.
**Course Outcomes Worksheet (COW)**

**57:010 DYNAMICS**

Created: September 30, 2001 by Emad Tanbour  
Last Modified: October, 11, 2001 by Emad Tanbour

<table>
<thead>
<tr>
<th>Course Goals</th>
<th>Supports ABET Outcomes</th>
<th>Course Activity</th>
<th>Basis for Course-Goal Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The student will able to carryout a kinematic analysis [i.e. motion analysis] of particles.</td>
<td></td>
<td>The student completes a total of 37 HW assignments and 2 midterm exams and a final exam that require an understanding and application of kinematic and dynamic principles.</td>
<td>HW and Exam Grades, graded copies of all HW and exam problems*.</td>
</tr>
<tr>
<td>2. The student will able to perform a kinetic analysis [i.e. force analysis] of particles via Newton's Second Law.</td>
<td>A (●), E (●), G (ο), K (●)</td>
<td>The student is expected to present the formulations and solutions of kinematic and dynamic problems in a clear, systematic and logical manner.</td>
<td></td>
</tr>
<tr>
<td>3. The student will able to apply energy and momentum methods to study the dynamics of particles.</td>
<td></td>
<td>The student is also expected to express her/his solutions in graphical forms, e.g. free body diagrams, graphical plots, etc.</td>
<td></td>
</tr>
<tr>
<td>4. The student will able to carryout a kinematic analysis [i.e. motion analysis] of rigid bodies.</td>
<td></td>
<td>Formula sheets were provided to students in all exams. No formula memorization was required. Understanding how to apply them to problems was the objective.</td>
<td></td>
</tr>
<tr>
<td>5 The student will able to perform a kinetic analysis [i.e. force analysis] of rigid bodies via Newton's Second Law.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. The student will able to apply energy and momentum methods to study the dynamics of rigid bodies.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ο denotes moderate contribution to the outcome  
● denotes substantial contribution to the outcome

*Samples of each to represent random selection of the class. One high score and one low score will be collected with the remainder of the sample a random selection.
<table>
<thead>
<tr>
<th>Course Goals</th>
<th>Supports ABET Outcomes</th>
<th>Course Activity</th>
<th>Basis for Course-Goal Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The student will able to carryout a kinematic analysis [i.e. motion analysis] of particles.</td>
<td>A ( ), E ( ), G (o), K ( )</td>
<td>The student completes a total of 40 HW assignments and 4 monthly exams that require an understanding and application of kinematic and dynamic principles.</td>
<td>HW and Exam Grades, graded copies of all HW and exam problems* and EASY survey assessment by students.</td>
</tr>
<tr>
<td>2. The student will able to perform a kinetic analysis [i.e. force analysis] of particles via Newton's Second Law.</td>
<td>A ( ), E ( ), G (o), K ( )</td>
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<td></td>
</tr>
<tr>
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<td>A ( ), E ( ), G (o), K ( )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. The student will able to perform a kinetic analysis [i.e. force analysis] of rigid bodies via Newton's Second Law.</td>
<td>A ( ), E ( ), G (o), K ( )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. The student will able to apply energy and momentum methods to study the dynamics of rigid bodies.</td>
<td>A ( ), E ( ), G (o), K ( )</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* denotes substantial contribution to the outcome, o denotes moderate contribution to the outcome.

*Samples of each to represent 10% of the class. One high score and one low score will be collected with the remainder of the sample a random selection.
Core Course Assessment Report
College of Engineering
University of Iowa

<table>
<thead>
<tr>
<th>Course Number</th>
<th>57:010</th>
<th>Semester/Year</th>
<th>Summer 2001</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Name</td>
<td></td>
<td></td>
<td>Dynamics</td>
</tr>
</tbody>
</table>

**COORDINATOR:** RAY P.S. HAN  **SIGNATURE:** RayHan

**DATE:** OCT., 11, 2001

**INSTRUCTOR:** EMAD TANBOUR  **SIGNATURE:** (optional)

**OTHER:** M. RAGHAVAN  **SIGNATURE:** M. Raghavan

K. ABDEL-MALEK

Please attach the course syllabus and course outcomes worksheet (COW).

**Assessment Techniques:**
Please indicate which of the following assessment techniques were used in the course and your judgment of their utility in assessing accomplishment of the Course Learning Objectives.

<table>
<thead>
<tr>
<th>Assessment Technique</th>
<th>Not Used</th>
<th>Used, provided useful data</th>
<th>Used, not recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exams</td>
<td></td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>Quizzes</td>
<td></td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>Projects</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Written Reports (other than projects)</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oral Reports</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student Self-Evaluation</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student Peer-Evaluation</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course Portfolios</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class Surveys (e.g., EASY)</td>
<td>√</td>
<td>$^*$</td>
<td></td>
</tr>
<tr>
<td>Instructor Observation</td>
<td></td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>Other [specify]</td>
<td>√</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$^*$ EASY was not conducted during the summer due to the small number of students in the summer class.
1. **ASSESSMENT RESULTS:** (and their relation to past results)

The principal tools used in the assessment were three exam sets [consisting mostly of 4 to 7 questions of which the students were asked to solve four to five of them]. The EASY survey was not conducted this summer for this and other classes due to the limited number of students compared to the large classes in fall and spring. Each exam problem carried a maximum grade of 20. Additionally, students were assessed continuously throughout the semester, in the form of a midterm tests [3 in total first, second and final exams]. In these exams, questions pertaining directly to the identified course goals were employed and these are listed in the attached COW. Please refer to the attached spreadsheet containing the details of the exam assessment. Students were queried on their ability to perform certain but well defined tasks in these three exams. Broadly, the questions can be divided into 3 main groupings: those dealing with the kinematics and dynamics of particles (First exam and part of the second exam) and those dealing with the kinematics and dynamics of rigid bodies (part of the second exam and the final exam).

The class average for the first exam was 61.6% in the group of problems pertaining to course goals number 1 and 2. The average for the first exam problems pertaining to the second course goal was 63%. This indicates that the class has satisfactorily acquired the first and second course goals. The class average for the second exam in the problems pertaining to goal number 3 was 94.46% indicating excellent performance in this goal. The other part of the second exam problems pertaining to the same goal number 3 the students scored an average of 74.46% indicating a good understanding of this goal. The final exam problems were representing all course goals and the average was 75.1% indicating good accomplishment of the rest of these goals.

2. **SUMMARY OF PRIOR REMEDIATION ACTIONS:** (and their estimated effect)

Not applicable.

3. **RECOMMENDED ACTIONS:**

Instructor will try to allocate more time to the chapters pertaining to rigid body kinematics and dynamics. During the summer class, the number of lecture hours for energy methods for rigid body dynamics was very limited. I recommend eliminating summary class hours after each chapter. This will provide about four more lecture hours for the energy methods for rigid body dynamics. Also the dynamics class was scheduled right after the Deformable Bodies class which made it difficult for the students to come fresh to the Dynamics class. I recommend pushing the dynamics class to an afternoon time so the students can have a break between these two major courses.

It is also important to realize that this course demands intensive daily effort from students during the summer semester. Due to this daily classes and fast pace of the summer semester, students had shown daily needs to help sessions. Help sessions was provided by the TA weekly at two different days and before each midterm exam, the instructor gave help sessions of an average of 8 interaction hours mostly over the weekend days due to the fact that students work during the weekdays of the summer session. Attendance to help session was very satisfactory and mostly two third of the class was attending at any help session. Student response to these extra interaction hours was overwhelming. It is also recommended that the summer instructor provide these help sessions to assist students due to the intensity of summer semester.

One last observation, is that the Dynamics class was having conflicts with the Deformable bodies class and students who have Dynamics in the summer usually need to have the Deformable bodies too. This challenge had been communicated with the Department Chair and next summer schedule should resolve that conflict.
4. **CHANGES TO COURSE LEARNING OBJECTIVES:**
None.

5. **MODIFICATIONS TO ASSESSMENT TECHNIQUES:**
None.
Course Assessment Report
College of Engineering
The University of Iowa
(Revision of 27 November 2001)

Course Number: 57:010  Semester/Year: Fall 2001
Course Name: Dynamics

COORDINATOR: Ray P.S. Han  SIGNATURE: Ray Han
DATE: January 26, 2002
INSTRUCTOR: Ray P.S. Han  SIGNATURE: (optional)
OTHER: M. Raghavan  SIGNATURE: (optional)
Emad Tanbour

Please attach the course syllabus and course outcomes worksheet (COW).

Assessment Techniques:
Please indicate which of the following techniques were used in assessing the course and your judgment of their utility in assessing achievement of the Course Learning Goals.

<table>
<thead>
<tr>
<th>Assessment Technique</th>
<th>Used, provided useful data</th>
<th>Used, not recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>√</td>
<td></td>
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</tr>
<tr>
<td>Class Surveys (e.g., EASY)</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>Instructor Observation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other [specify]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. **ASSESSMENT RESULTS:** (How were each of the course learning goals (from the COW) achieved? Support your assessments qualitatively and/or quantitatively with data from each of the assessment techniques used (see Table on previous page). Explain the relation of the present assessment results to previous ones.)

The principal tools used in the assessment were 40 HW sets (consisting of 3 questions each, for a total of 120 questions), 4 monthly tests and an EASY survey. Each HW set carries a maximum grade of 30 and thus, the maximum the student can get from all HW sets is 1200. Additionally, students were assessed continuously throughout the semester, in the form of a monthly test (1 each for September, October, November and December), and these tests were given in lieu of a final exam. The class averages for HW and the 4 tests for the fall 2001 semester compared to the fall 2000 semester are depicted in Table 1.

<table>
<thead>
<tr>
<th></th>
<th>HW</th>
<th>Test 1</th>
<th>Test 2</th>
<th>Test 3</th>
<th>Test 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall 2001</strong></td>
<td>93.6%</td>
<td>83.2%</td>
<td>88.5%</td>
<td>72.6%</td>
<td>86.8%</td>
</tr>
<tr>
<td><strong>Fall 2000</strong></td>
<td>86.6%</td>
<td>85.9%</td>
<td>79.8%</td>
<td>74.7%</td>
<td>67.2%</td>
</tr>
</tbody>
</table>

Note that in Table 1 the first 2 tests examine a student’s knowledge in the kinematic and dynamic analyses of particles and the remaining 2 tests in the kinematic and dynamic analyses of rigid bodies.

In the EASY survey, questions pertaining directly to the identified course goals were employed and these are listed in the attached COW. Students were queried on their ability to perform certain but well defined tasks. Broadly, the questions can be divided into 2 main groups: those dealing with particle kinematics and dynamics (Questions 1-3) and those dealing with rigid body kinematics and dynamics. (Questions 4-6). The EASY responses to these 2 groups of questions for the fall 2001 semester compared to the fall 2000 semester are listed in Table 2.

<table>
<thead>
<tr>
<th></th>
<th>EASY Participation</th>
<th>EASY Questions pertaining to Particle Modeling</th>
<th>EASY Questions pertaining to Rigid Body Modeling</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall 2001</strong></td>
<td>60.3%</td>
<td>94.3%*</td>
<td>82.9%*</td>
</tr>
<tr>
<td><strong>Fall 2000</strong></td>
<td>42.8%</td>
<td>77.9 %*</td>
<td>68.5 %*</td>
</tr>
</tbody>
</table>

Note that the figures in Table 2 refer to the percentage of respondents who said they felt competent in carrying out kinematic and dynamic analyses of particles / rigid bodies.

It is clear from the tables that the fall 2001 class demonstrated a marked improvement in the learning and understanding of the course materials compared to the Fall 2000 class. This upward trend is especially noticeable in the kinematics and dynamics of rigid bodies. Recall that in the fall 2000’s Report, it was concluded that students did not feel comfortable with the rigid body modeling as they did with particle modeling. It was then recommended that the "instructor try to allocate more time to the chapters pertaining to rigid body kinematics and dynamics”. This was implemented in the fall 2001 semester and the result of the extra effort is the significant improvement in students’ performance in rigid body kinematics and dynamics.
2. SUMMARY OF RECENT REMEDIAL ACTIONS: (and their estimated effect)

   Fall 2000 CAR recommendation
   Instructor will try to allocate more time to the chapters pertaining to rigid body kinematics and
dynamics.

   Based on the above recommendation, I have allocated extra time and effort in the instructional
delivery of the chapters concerning rigid body kinematics and dynamics for the fall 2001
dynamics class. The result is a significant improvement in students’ performance in these
chapters. Therefore, the identified deficiency in the fall 2000 dynamics CAR appears to have
been adequately addressed in the fall 2001 class.

3. RECOMMENDED NEW REMEDIAL ACTIONS, IF ANY:

   Keep do the same, particularly for the sections on the kinematics and dynamics of rigid bodies!

4. RECOMMENDED CHANGES TO COURSE LEARNING GOALS:

   None.

5. RECOMMENDED MODIFICATIONS TO ASSESSMENT TECHNIQUES:

   None.

6. SIGNIFICANT DEVIATIONS IN COURSE CONTENT FROM SYLLABUS (SUMMARIZE):

   None.

COURSE SUPPORT

TA SUPPORT FROM THE COLLEGE (IN TERMS OF FTE): 0.5 FTE

OTHER TA SUPPORT AND SOURCE (IN TERMS OF FTE): 0

TA RESPONSIBILITIES: Grading HW and Tests

WAS THE TA SUPPORT ALLOCATED TO YOUR SECTION SUFFICIENT? PLEASE ELABORATE.

Due to the large class size [~60], it would have been easier on the 2 TAs if the TA support were increased by
1/4 FTE to 0.75 FTE.

IF USED, WAS THE COMPUTER HARDWARE AND SOFTWARE SUPPORT FROM CSS
ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.
N/A

WERE THE FACILITIES (CLASSROOM, LABS, ETC.) ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

Yes

COURSE ORGANIZATION/CONTENTS

LECTURE (HOURS/WEEK):  3    DISCUSSION (HOURS/WEEK):  2
LABORATORY (HOURS/WEEK): 0    TOTAL NUMBER OF STUDENTS:  58

TEXTBOOK AUTHOR AND TITLE:

PLEASE COMMENT ON THE SUITABILITY OF THE TEXTBOOK AND ITS TIMELY AVAILABILITY.

It's a good textbook and was readily available. The 3rd edition will be coming out in 2002.

TEACHING AIDS:

Slides and overhead projector.

PLEASE ATTACH A COPY OF THE SYLLABUS THAT WAS DISTRIBUTED TO THE CLASS, A SAMPLE OF CLASS HANDOUTS IF AVAILABLE, AND THE COURSE ASSESSMENT WORKSHEET (COW) FOR THE COURSE. USE THE SPACE BELOW TO DESCRIBE ANY PARTICULAR PROBLEMS YOU MIGHT HAVE HAD WITH THIS COURSE (E.G., UNUSUAL ATTRITION, LACK OF PREREQUISITES, UNUSUAL GRADE DISTRIBUTION, ETC.) OR ANY INNOVATIONS/IDEAS THAT SHOULD BE CONSIDERED IN THE FUTURE.
Core Course Assessment Report
College of Engineering
University of Iowa

<table>
<thead>
<tr>
<th>Course Number:</th>
<th>57:010</th>
<th>Semester/Year</th>
<th>Spring 2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Name:</td>
<td>Dynamics</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>COORDINATOR:</th>
<th>RAY P.S. HAN</th>
<th>SIGNATURE:</th>
<th>7. M. Helly, for Ray Han</th>
</tr>
</thead>
<tbody>
<tr>
<td>DATE:</td>
<td></td>
<td>10 June 02</td>
<td></td>
</tr>
<tr>
<td>INSTRUCTOR:</td>
<td>MADHAVAN L. RAGHAVAV</td>
<td>SIGNATURE: (optional)</td>
<td>M. Lall, 9 June 02</td>
</tr>
<tr>
<td>OTHER:</td>
<td></td>
<td>SIGNATURE: (optional)</td>
<td></td>
</tr>
</tbody>
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Please attach the course syllabus and course outcomes worksheet (COW).

Assessment Techniques:
Please indicate which of the following assessment techniques were used in the course and your judgment of their utility in assessing accomplishment of the Course Learning Objectives.

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<tbody>
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<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
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<td></td>
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<td></td>
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</tr>
<tr>
<td>Other [specify]</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>
1. **ASSESSMENT RESULTS:** (and their relation to past results)

The principal tools used in the assessment were 36 HW sets [consisting of 3 questions each for assignments given when a chapter is being taught and one question at the end of the chapter during a discussion of its summary], 2 mid-term tests, one final exam and the EASY survey. Typically, of the three problems assigned, one problem was randomly pre-chosen and assigned 6 points while 2 others were assigned 2 points each. Thus each problem set carried a maximum of 10 points.

Additionally, students were assessed during the semester, in the form of a mid term test [1st in End February 2002 and 2nd in early April, 2002], and a final exam [Mid May 2002]. In the EASY, questions pertaining directly to the identified course goals were employed and these are listed in the attached COW. Students were queried on their ability to perform certain but well defined tasks in the survey. Broadly, the questions can be divided into 2 main groupings: those dealing with the kinematics and dynamics of particles (Questions 1-3) and those dealing with the kinematics and dynamics of rigid bodies (Questions 4-6). Just over one-third of the class (34 of 77 students) responded to the EASY survey.

Action based on prior recommendation: In keeping with the prior recommendation to allocate more time for rigid body dynamics, two additional lecture were added to this portion of the course by combining lectures in the particle kinematics/dynamics portion and greater emphasis was placed while teaching this portion to ensure students understand and feel more comfortable with this portion.

The class averages for HW and tests were

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>HW</td>
<td>89 %</td>
</tr>
<tr>
<td>Midterm 1</td>
<td>70 %</td>
</tr>
<tr>
<td>Midterm 2</td>
<td>67 %</td>
</tr>
<tr>
<td>Final Exam</td>
<td>79 %</td>
</tr>
</tbody>
</table>

From the HW and tests results, it appears clear that students were competent with the kinematics and dynamics of particles. This is also evident form the EASY survey responses. Quantitative ratings from the students were unavailable this semester, but qualitative comments were. Therefore, the EASY responses were subjectively studied for any broad opinions expressed. It was noted that the students were predominantly positive in their assessments. Particularly, it was also noted that the opinions expressed did not indicate any greater concern for the “rigid body” portions of the course as opposed to the “particles” portion of the course.

It therefore seems clear that the steps undertaken during this and the last two semesters have effectively addressed concerns about the rigid body portion of the course that were expressed in earlier years.

Additionally, this semester, the course management was performed using the WebCT course online management system. This system allows for a password-protected website where the students can view and download course material. The instructor and TAs were able to access the course online and enter/modify/update the grades for all the assignments and exams. The students were able to view their grades as and when they are recorded online. This system allowed for a smooth and error-free management of student grades. One particularly useful feature of the course management was the use of the “running grade” option in which, the students were provided an automated running grade through the entire course. The running grade at any point in time is in effect a prediction of the grade that the student could expect to get (allowing a reasonable room for error) if his/her performance so far will with respect to the class average will remain unchanged. The instructor was able to setup an automated system with presumed formulae. At the end of the course, the predicted grade closely followed the actual final grade. This feature received particularly positive responses from the students during
personal conversations. It certainly appears that use of WebCT will be of much benefit to the instructors, TAs and the students.

Although personal interactions with students seem to suggest that they find it useful, it may be worthwhile to quantify student response in this regard to get a more reliable perspective of its utility.

2. **SUMMARY OF PRIOR REMEDIATION ACTIONS:** (and their estimated effect)

Maintain the additional lecture-hour allocation for rigid body dynamics portion of the course and observe student feedback for one more year to get a more reliable idea of its utility.

3. **RECOMMENDED ACTIONS:**

Incorporate WebCT for course management in future semesters.

4. **CHANGES TO COURSE LEARNING OBJECTIVES:**

None.

5. **MODIFICATIONS TO ASSESSMENT TECHNIQUES:**

Evaluate student opinions on the running grade option via EASY survey in the next semester.
College of Engineering EASY Survey Responses

Results for: 057010; Dynamics; Section: AAA- Lecture
Instructor(s): Han
Session Code: 20013 Beginning On: 12-02-01 Running for: 6 days Course Enrollment: 59
Survey #: 232 Survey Name: 057010AAA20013 Section Enrollment: 56
Base Set Used: ABET Privacy: Faculty Distribute Remarks: ABET

Headings and Subheadings (Instructors) Used in Survey:

Header(s):
Accreditation Board for Engineering and Technology (ABET) Survey
For each statement decide whether you generally agree or disagree then indicate the strength of agreement or disagreement by selecting the appropriate number.
Subheader(s):
This survey was designed to provide feedback to your instructor on selected aspects of this course. Your responses should reflect YOUR INDIVIDUAL PERCEPTIONS, not those of the class as a whole.

<table>
<thead>
<tr>
<th>Score Type Name</th>
<th>Disagree/Agree 1-6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 = Strongly Disagree</td>
<td></td>
</tr>
<tr>
<td>2 = Moderately Disagree</td>
<td></td>
</tr>
<tr>
<td>3 = Slightly Disagree</td>
<td></td>
</tr>
<tr>
<td>4 = Slightly Agree</td>
<td></td>
</tr>
<tr>
<td>5 = Moderately Agree</td>
<td></td>
</tr>
<tr>
<td>6 = Strongly Agree</td>
<td></td>
</tr>
</tbody>
</table>

3. From this course, I have gained an ability to apply knowledge of mathematics, science and engineering in my chosen field:

   Mean: 5.00
   
<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>14</td>
<td>14</td>
<td>35</td>
</tr>
</tbody>
</table>

5. From this course, I have gained an ability to identify, formulate, and solve practical engineering problems:

   Mean: 4.54
   
<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>3</td>
<td>4</td>
<td>14</td>
<td>14</td>
<td>35</td>
</tr>
</tbody>
</table>

7. From this course, I have gained an ability to communicate my formulation/solution effectively in written forms [e.g. clear, systematic and logical manner]:

   Mean: 5.89
   
<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>15</td>
<td>14</td>
<td>35</td>
</tr>
</tbody>
</table>

9. From this course, I have gained an ability to communicate my formulation/solution effectively in graphical forms [e.g. free body diagrams, etc]:

   Mean: 5.54
   
<table>
<thead>
<tr>
<th>Response Value</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>1</td>
<td>14</td>
<td>20</td>
<td>35</td>
</tr>
</tbody>
</table>

11. From this course, I have gained an ability to understand contemporary issues [e.g. solving of contemporary engineering problems in lectures and HW problems]:

   Mean: 5.00
   
<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>14</td>
<td>13</td>
<td>35</td>
</tr>
</tbody>
</table>

Survey Response Summary 3/31/2002 4:04PM
13. From this course, I have gained an ability to use the principles, techniques, skills and modern engineering tools necessary for successful engineering practice and/or research in my chosen field:

<table>
<thead>
<tr>
<th>Mean: 4.37</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Response Value:</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses:</td>
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<td>1</td>
<td>2</td>
<td>6</td>
<td>16</td>
<td>0</td>
<td>35</td>
</tr>
</tbody>
</table>

15. From this course, I can carry out a kinematic analysis [i.e. motion analysis] of particles:

<table>
<thead>
<tr>
<th>Mean: 5.37</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Response Value:</th>
<th>2</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses:</td>
<td>1</td>
<td>1</td>
<td>16</td>
<td>17</td>
<td>35</td>
</tr>
</tbody>
</table>

17. From this course, I can perform a kinetic analysis [i.e. force analysis] of particles via Newton's Second Law:

<table>
<thead>
<tr>
<th>Mean: 5.46</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Response Value:</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses:</td>
<td>1</td>
<td>17</td>
<td>17</td>
<td>35</td>
</tr>
</tbody>
</table>

19. From this course, I can apply energy and momentum methods to study the dynamics of particles:

<table>
<thead>
<tr>
<th>Mean: 5.21</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Response Value:</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses:</td>
<td>2</td>
<td>1</td>
<td>16</td>
<td>16</td>
<td>35</td>
</tr>
</tbody>
</table>

21. From this course, I can carry out a kinematic analysis [i.e. motion analysis] of rigid bodies:

<table>
<thead>
<tr>
<th>Mean: 5.26</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Response Value:</th>
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<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses:</td>
<td>1</td>
<td>4</td>
<td>15</td>
<td>15</td>
<td>35</td>
</tr>
</tbody>
</table>

23. From this course, I can perform a kinetic analysis [i.e. force analysis] of rigid bodies via Newton's Second Law:

<table>
<thead>
<tr>
<th>Mean: 5.21</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Response Value:</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses:</td>
<td>1</td>
<td>3</td>
<td>15</td>
<td>16</td>
<td>35</td>
</tr>
</tbody>
</table>

25. From this course, I can apply energy and momentum methods to study the dynamics of rigid bodies:

<table>
<thead>
<tr>
<th>Mean: 5.11</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Response Value:</th>
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<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
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<td>Count of Responses:</td>
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<td>7</td>
<td>14</td>
<td>13</td>
<td>35</td>
</tr>
</tbody>
</table>

Survey Response Summary 3/31/2002 4:04PM
<table>
<thead>
<tr>
<th>Score Type Name: True/False</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I understand that the ABET survey questions address course objectives not comments on the instructor's effectiveness.</td>
</tr>
<tr>
<td>Mean: 1.83</td>
</tr>
<tr>
<td>Response Value:</td>
</tr>
<tr>
<td>Count of Responses:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Score Type Mean: 1.83</th>
</tr>
</thead>
</table>
| 2. I understand that questions with the numerical scale, 1 - 6, use "1" to mean "Strongly Disagree" and "6" to mean "Strongly Agree."
| Mean: 1.83 |
| Response Value: | 1 | 2 | Total Responding |
| Count of Responses: | 34 | 1 | 35 |
IV.7  57:012 Linear Systems Analysis

Summer '01: An EASY survey was not conducted. Instructor assessment found the course to have been satisfactory. As recommended earlier, a more manageable amount of material was presented. It is recommended that to make the MATLAB symbolic manipulator toolbox available for the course, and to have an exam question on convolution.

Fall '01: Course-goal achievement assessed through homework and test grading, and analysis of EASY survey results. Results suggest that more time should be spent teaching the students how to use MATLAB. Course syllabus did not mesh well with organization of the textbook, causing considerable confusion among the students. Either syllabus or book should be changed.

Spring '02: Numerical course-goal survey data not available due to EASY system data loss. Assessment performed on basis of instructor observation, examination of homework and exams, and examination of student comments on the EASY survey. Lack of necessary prerequisites was a concern. Based on assessment from earlier offerings, two additional lectures were devoted to MATLAB and SIMULINK, and MATLAB examples were used in class. This was especially helpful for convolution. Some homework assignments contained assessment questions; these were a very efficient and reliable way to get student feedback.

Overall Assessment:

Assessment of the course has led to awareness of need for increased attention on MATLAB use and familiarity, and this increased attention appears to be paying off. The notion of including assessment questions in homework is an intriguing one and should be further pursued as a possible model for other courses.
## Course Outcomes Worksheet

**057:012 Linear Systems Analysis**

<table>
<thead>
<tr>
<th>Contribution to Outcome</th>
<th>ABET Outcomes</th>
<th>Course Activity</th>
<th>Supporting Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>•</td>
<td>They will have the ability to apply knowledge of mathematics, science and</td>
<td>Students complete exams, MATLAB lectures and weekly homework assignments that</td>
<td>Exams, Homework and Two MATLAB</td>
</tr>
<tr>
<td></td>
<td>engineering in their chosen fields.</td>
<td>require the application of basic mathematics and physical principles.</td>
<td>Lectures</td>
</tr>
<tr>
<td></td>
<td>They will have the ability to design and conduct experiments, and to analyze</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and interpret experimental results.</td>
<td>Basic modeling of electrical circuits and mechanical systems are discussed in</td>
<td>Lectures</td>
</tr>
<tr>
<td></td>
<td>They will have the ability to work as members of multidisciplinary project</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and/or research teams, and have an understanding of leadership in teams and</td>
<td>Basic modeling of electrical circuits and mechanical systems are discussed in</td>
<td>Lectures</td>
</tr>
<tr>
<td></td>
<td>organizations.</td>
<td>classes.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>They will have the ability to identify, formulate, and solve engineering</td>
<td>Students complete exams, MATLAB lectures and weekly homework assignments that</td>
<td>Exams, MATLAB Lectures, &amp;</td>
</tr>
<tr>
<td></td>
<td>problems.</td>
<td>require the solution of a variety of system analysis problems.</td>
<td>Homework</td>
</tr>
<tr>
<td></td>
<td>They will have an understanding of professional and ethical responsibility</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and the value of mentorship and peer support.</td>
<td>Many homework are designed in a way that students have to rely on graphical</td>
<td>Homework and MATLAB Lectures</td>
</tr>
<tr>
<td></td>
<td>They will have the ability to communicate effectively in written form.</td>
<td>Solutions.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>They will have the ability to communicate effectively in oral form.</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td></td>
<td>They will have the ability to communicate effectively in graphical form.</td>
<td>Students complete homework assignments that require that some insights and</td>
<td>Homework</td>
</tr>
<tr>
<td></td>
<td>They will have an education that is supportive of a broad awareness of the</td>
<td>results be developed and communicated graphically.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>diversity of the world and its cultures, and that provides an understanding</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td></td>
<td>of the impact of engineering practice in the global community.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>They will understand the importance of updating and maintaining their</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td></td>
<td>technical skills and continuing their education throughout their</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>professional careers.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>They will have knowledge of contemporary issues.</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td></td>
<td>They will have the ability to use the principles, techniques, skills and</td>
<td>Students complete exams, MATLAB lectures and weekly homework assignments that</td>
<td>Exams, MATLAB Lectures, &amp;</td>
</tr>
<tr>
<td></td>
<td>modern engineering tools necessary for successful engineering practice and</td>
<td>require the application of analysis techniques essential to basic linear</td>
<td>Homework</td>
</tr>
<tr>
<td></td>
<td>or research in their chosen fields.</td>
<td>system analysis.</td>
<td></td>
</tr>
</tbody>
</table>

*o* denotes moderate contribution to the outcome  
*•* denotes substantial contribution to the outcome

Prepared by: M.S. Andersland/Soura Dasgupta  
Modified by: E.W. Bai, Date: May 12, 2001  
Date: November 13, 2000
<table>
<thead>
<tr>
<th>Course Goals</th>
<th>Supports ABET Outcomes</th>
<th>Course Activity</th>
<th>Basis for Course-Goal Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Gain an understanding of continuous and discrete time signals and systems.</td>
<td>A (●), E (●), G (○), K (●)</td>
<td>Lectures, homework, weekly TA lead discussion sessions, TA and instructor office hours and exams.</td>
<td>Homework, Matlab projects, Exams, and EASY survey *</td>
</tr>
<tr>
<td>2. Learn how to describe and analyze discrete time systems using difference equations and continuous time systems using differential equations.</td>
<td>A (●), C (○), E (●), G (○), K (●)</td>
<td>Lectures, homework, weekly TA lead discussion sessions, TA and instructor office hours and exams.</td>
<td>Homework, Matlab projects, Exams, and EASY survey *</td>
</tr>
<tr>
<td>3. Learn how to analyze linear time invariant systems using the discrete time and continuous time convolution equations.</td>
<td>A (●), E (●), G (○), K (●)</td>
<td>Lectures, homework, weekly TA lead discussion sessions, TA and instructor office hours and exams.</td>
<td>Homework, Matlab projects, Exams, and EASY survey *</td>
</tr>
<tr>
<td>4a. Learn the relationship between the time and frequency domains for the analysis of signals and systems.</td>
<td>A (●), E (●), G (○), K (●)</td>
<td>Lectures, homework, weekly TA lead discussion sessions, TA and instructor office hours and exams.</td>
<td>Homework, Matlab projects, Exams, and EASY survey *</td>
</tr>
<tr>
<td>4b. Learn how to represent continuous time periodic functions using the continuous time Fourier Series.</td>
<td>A (●), E (●), G (○), K (●)</td>
<td>Lectures, homework, weekly TA lead discussion sessions, TA and instructor office hours and exams.</td>
<td>Homework, Matlab projects, Exams, and EASY survey *</td>
</tr>
<tr>
<td>4c. Learn how to represent continuous time signals and systems using the continuous time Fourier Transform.</td>
<td>A (●), E (●), G (○), K (●)</td>
<td>Lectures, homework, weekly TA lead discussion sessions, TA and instructor office hours and exams.</td>
<td>Homework, Matlab projects, Exams, and EASY survey *</td>
</tr>
<tr>
<td>4d. Learn how to analyze continuous time systems using the continuous time Fourier Transform.</td>
<td>A (●), E (●), G (○), K (●)</td>
<td>Lectures, homework, weekly TA lead discussion sessions, TA and instructor office hours and exams.</td>
<td>Homework, Matlab projects, Exams, and EASY survey *</td>
</tr>
<tr>
<td>5a. Learn how to use single sided Laplace Transforms to represent continuous time signals and systems.</td>
<td>A (●), E (●), G (○), K (●)</td>
<td>Lectures, homework, weekly TA lead discussion sessions, TA and instructor office hours and exams.</td>
<td>Homework, Matlab projects, Exams, and EASY survey *</td>
</tr>
<tr>
<td>5b. Learn how to find system transfer functions, use them to assess system stability, and have an understanding of their significance in linear system analysis.</td>
<td>A (●), E (●), G (○), K (●)</td>
<td>Lectures, homework, weekly TA lead discussion sessions, TA and instructor office hours and exams.</td>
<td>Homework, Matlab projects, Exams, and EASY survey *</td>
</tr>
<tr>
<td>5c. Learn how to analyze continuous time systems using the Laplace Transform.</td>
<td>A (●), E (●), G (○), K (●)</td>
<td>Lectures, homework, weekly TA lead discussion sessions, TA and instructor office hours and exams.</td>
<td>Homework, Matlab projects, Exams, and EASY survey *</td>
</tr>
</tbody>
</table>
6. The student will have gained familiarity with aspects of MatLab used in linear systems analysis, including its use in solving difference equations and generating frequency response.

| A (●), B(○), J (●), K (●) | Lectures, homework, weekly TA lead discussion sessions, TA and instructor office hours. | Homework, MatLab projects, and EASY survey *.

○ denotes moderate contribution to the outcome ● denotes substantial contribution to the outcome

*Samples of each to represent: One high score, one middle score, and one just passing score will be collected.
Core Course Assessment Report
College of Engineering
University of Iowa

Course Number: 57:12  Semester/Year: Summer 2001
Course Name: Linear Systems

COORDINATOR: Saurabh Dasgupta  SIGNATURE: 
DATE: 9/6/01
INSTRUCTOR: Dong Chyun  SIGNATURE: (optional)
OTHER: SIGNATURE: (optional)

Please attach the course syllabus and course outcomes worksheet (COW).

Assessment Techniques:
Please indicate which of the following assessment techniques were used in the course and your judgment of their utility in assessing accomplishment of the Course Learning Objectives.

<table>
<thead>
<tr>
<th>Assessment Technique</th>
<th>Not Used</th>
<th>Used, provided useful data</th>
<th>Used, not recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exams</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quizzes</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Projects</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Written Reports (other than projects)</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oral Reports</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student Self-Evaluation</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student Peer-Evaluation</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course Portfolios</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class Surveys (e.g., EASY)</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instructor Observation (see p. 2)</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other [specify]</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Page 1 of 2
1. **ASSESSMENT RESULTS:** (and their relation to past results)
   Satisfactory

2. **SUMMARY OF PRIOR REMEDIATION ACTIONS:** (and their estimated effect)
   As recommended in in an earlier semester, more manageable amount of material was presented

3. **RECOMMENDED ACTIONS:**
   Needs symbolic manipulator toolbox in MATLAB. Have an exam question on convolution

4. **CHANGES TO COURSE LEARNING OBJECTIVES:**

5. **MODIFICATIONS TO ASSESSMENT TECHNIQUES:**
Course Assessment Report  
College of Engineering  
The University of Iowa  
(Revision of 27 November 2001)

Course Number: 57:012  
Semester/Year: Fall 2001

<table>
<thead>
<tr>
<th>COORDINATOR:</th>
<th>E.W. BAI</th>
<th>SIGNATURE:</th>
</tr>
</thead>
<tbody>
<tr>
<td>DATE:</td>
<td>2/18/02</td>
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</tr>
<tr>
<td>INSTRUCTOR:</td>
<td>G.E. Christensen</td>
<td>SIGNATURE: (optional)</td>
</tr>
<tr>
<td>OTHER:</td>
<td></td>
<td>SIGNATURE: (optional)</td>
</tr>
</tbody>
</table>

Please attach the course syllabus and course outcomes worksheet (COW).

Assessment Techniques:
Please indicate which of the following techniques were used in assessing the course and your judgment of their utility in assessing achievement of the Course Learning Goals.

<table>
<thead>
<tr>
<th>Assessment Technique</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Exams</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Quizzes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Projects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Written Reports (other than projects)</td>
<td></td>
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<td>Oral Reports</td>
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<tr>
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<tr>
<td>Student Peer-Evaluation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course Portfolios</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class Surveys (e.g., EASY)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Instructor Observation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other [specify]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. **ASSESSMENT RESULTS:** (How were each of the course learning goals (from the COW) achieved? Support your assessments qualitatively and/or quantitatively with data from each of the assessment techniques used (see Table on previous page). Explain the relation of the present assessment results to previous ones.)

The course goals were achieved by covering the course material during class lecture, weekly discussion groups lead by TA, weekly homework assignments, MATLAB assignments, and textbook reading assignments. The effectiveness of achieving the course goals was evaluated by grading the homework and tests and analyzing the EASY survey results.

2. **SUMMARY OF RECENT REMEDIAL ACTIONS:** (and their estimated effect)

3. **RECOMMENDED NEW REMEDIAL ACTIONS, IF ANY:**

The EASY results suggest that more time should be spent teaching the students how to use MATLAB.

4. **RECOMMENDED CHANGES TO COURSE LEARNING GOALS:**

None

5. **RECOMMENDED MODIFICATIONS TO ASSESSMENT TECHNIQUES:**

None

6. **SIGNIFICANT DEVIATIONS IN COURSE CONTENT FROM SYLLABUS (SUMMARIZE):**

None

**COURSE SUPPORT**

TA SUPPORT FROM THE COLLEGE (IN TERMS OF FTE): 1/2

OTHER TA SUPPORT AND SOURCE (IN TERMS OF FTE): None

**TA RESPONSIBILITIES:**

Preparing homework solutions, grading homework, leading discussion, and helping to grade the exams.
WAS THE TA SUPPORT ALLOCATED TO YOUR SECTION SUFFICIENT? PLEASE ELABORATE.

Yes. However, the TA’s English was very poor making it difficult for students to understand her and communicate with her.

IF USED, WAS THE COMPUTER HARDWARE AND SOFTWARE SUPPORT FROM CSS ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

Matlab was used in this course and the computer software support was adequate.

WERE THE FACILITIES (CLASSROOM, LABS, ETC.) ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

Yes.

COURSE ORGANIZATION/CONTENTS

LECTURE (HOURS/WEEK): 3
DISCUSSION (HOURS/WEEK): 1
LABORATORY (HOURS/WEEK): 0
TOTAL NUMBER OF STUDENTS: 41


PLEASE COMMENT ON THE SUITABILITY OF THE TEXTBOOK AND ITS TIMELY AVAILABILITY.

The syllabus of the course did not match the organization of the textbook and this caused great confusion with the students.

TEACHING AIDS:

Course webpage, java applets from http://www.jhu.edu/~signals/, Matlab

PLEASE ATTACH A COPY OF THE SYLLABUS THAT WAS DISTRIBUTED TO THE CLASS, A SAMPLE OF CLASS HANDOUTS IF AVAILABLE, AND THE COURSE ASSESSMENT WORKSHEET (COW) FOR THE COURSE. USE THE SPACE BELOW TO DESCRIBE ANY PARTICULAR PROBLEMS YOU MIGHT HAVE HAD WITH THIS COURSE (E.G., UNUSUAL ATTRITION, LACK OF PREREQUISITES, UNUSUAL GRADE DISTRIBUTION, ETC.) OR ANY INNOVATIONS/IDEAS THAT SHOULD BE CONSIDERED IN THE FUTURE.

It would be nice to either use another book or change the syllabus of the course.
Please attach the course syllabus and course outcomes worksheet (COW).

Assessment Techniques:
Please indicate which of the following techniques were used in assessing the course and your judgment of their utility in assessing achievement of the Course Learning Goals.

<table>
<thead>
<tr>
<th>Assessment Technique</th>
<th>Used, provided useful data</th>
<th>Used, not recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
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<tr>
<td>Student Self-Evaluation</td>
<td></td>
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<tr>
<td>Student Peer-Evaluation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course Portfolios</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class Surveys (e.g., EASY)</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Instructor Observation**</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Other [specify]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Instructor Observation: (1) invitation of questions and comments during the class; (2) responses from the students when questions were asked.
1. **ASSESSMENT RESULTS:** (How were each of the course learning goals (from the COW) achieved? Support your assessments qualitatively and/or quantitatively with data from each of the assessment techniques used (see Table on previous page). Explain the relation of the present assessment results to previous ones.)

The course goals were achieved by covering the course material during class lecture, weekly discussion groups lead by TA, weekly homework assignments, MATLAB assignments, and textbook reading assignments. In general, the students were satisfied with the way that this course was taught. The lack of necessary prerequisite was a concern.

2. **SUMMARY OF RECENT REMEDIAL ACTIONS:** (and their estimated effect)

(1) Based on the students comments, two lectures were spent on MATLAB and SIMULINK. Moreover, several examples using MATLAB were demonstrated in the classes. In particular, the convolution example seemed to be very useful in which the students could choose signals and view how the convolution evolves at each step. This demonstration greatly helped the students in understanding the concept of convolution.
(2) Some homework assignments contained survey questions. This is an efficient and reliable way to get students feedback.

3. **RECOMMENDED NEW REMEDIAL ACTIONS, IF ANY:**

More MATLAB simulations seem to be helpful.

4. **RECOMMENDED CHANGES TO COURSE LEARNING GOALS:**

None

5. **RECOMMENDED MODIFICATIONS TO ASSESSMENT TECHNIQUES:**

Add some survey questions to homework assignments.
6. SIGNIFICANT DEVIATIONS IN COURSE CONTENT FROM SYLLABUS (SUMMARIZE):

None

COURSE SUPPORT

TA SUPPORT FROM THE COLLEGE (IN TERMS OF FTE): 1/2

OTHER TA SUPPORT AND SOURCE (IN TERMS OF FTE): None

TA RESPONSIBILITIES:

Preparing homework solutions, grading homework and leading discussions.

WAS THE TA SUPPORT ALLOCATED TO YOUR SECTION SUFFICIENT? PLEASE ELABORATE.

Yes.

IF USED, WAS THE COMPUTER HARDWARE AND SOFTWARE SUPPORT FROM CSS ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

MATLAB was used in this course and the computer software support was adequate.

WERE THE FACILITIES (CLASSROOM, LABS, ETC.) ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

Yes.

COURSE ORGANIZATION/CONTENTS
LECTURE (HOURS/WEEK): 3, DISCUSSION (HOURS/WEEK): 1

LABORATORY (HOURS/WEEK): 0, TOTAL NUMBER OF STUDENTS: 40


PLEASE COMMENT ON THE SUITABILITY OF THE TEXTBOOK AND ITS TIMELY AVAILABILITY.

The book is fine if the instructor can provide supplementary material.

TEACHING AIDS: MATLAB
# College of Engineering EASY Survey Responses

**Results for:** 057-012; Linear Systems Analysis; Section: AAA- Lecture  
**Instructor(s):** G. Christensen  
**Session Code:** 20013  
**Beginning On:** 12-03-01  
**Survey #:** 176  
**Survey Name:** 05701206A-20004  
**Running for:** 5 days  
**Course Enrollment:** 41  
**Section Enrollment:** 41  
**Base Set Used:** ABET  
**Privacy:** Faculty Distribute  
**Remarks:** ABET

<table>
<thead>
<tr>
<th>Headings and Subheadings (Instructors) Used in Survey:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accreditation Board for Engineering and Technology (ABET) Survey</td>
</tr>
<tr>
<td>For each statement decide whether you generally agree or disagree then indicate the strength of agreement or disagreement by selecting the appropriate number.</td>
</tr>
<tr>
<td>Subheading(s):</td>
</tr>
<tr>
<td>This survey was designed to provide feedback to your instructor on selected aspects of this course. Your responses should reflect YOUR INDIVIDUAL PERCEPTIONS, not those of the class as a whole.</td>
</tr>
</tbody>
</table>

## Score Type Name: Disagree/Agree 1-6

1. Strongly Disagree  
2. Moderately Disagree  
3. Slightly Disagree  
4. Slightly Agree  
5. Moderately Agree  
6. Strongly Agree  

### Question 3: I understand basic system properties including, linearity, time invariance, and causality.

<table>
<thead>
<tr>
<th>Mean: 5.00</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Response Value:</strong></td>
</tr>
<tr>
<td><strong>Count of Responses:</strong></td>
</tr>
</tbody>
</table>

### Question 5: I learned to formulate differential equations and transfer functions for basic electrical circuits and mechanical systems.

<table>
<thead>
<tr>
<th>Mean: 4.38</th>
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</thead>
<tbody>
<tr>
<td><strong>Response Value:</strong></td>
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<tr>
<td><strong>Count of Responses:</strong></td>
</tr>
</tbody>
</table>

### Question 7: I know the difference between continuous and discrete time signals.

<table>
<thead>
<tr>
<th>Mean: 5.83</th>
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<tbody>
<tr>
<td><strong>Response Value:</strong></td>
</tr>
<tr>
<td><strong>Count of Responses:</strong></td>
</tr>
</tbody>
</table>

### Question 9: I know the difference between continuous and discrete time systems.

<table>
<thead>
<tr>
<th>Mean: 5.75</th>
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</thead>
<tbody>
<tr>
<td><strong>Response Value:</strong></td>
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<tr>
<td><strong>Count of Responses:</strong></td>
</tr>
</tbody>
</table>

### Question 11: I can perform discrete time and continuous time convolution.

<table>
<thead>
<tr>
<th>Mean: 5.00</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Response Value:</strong></td>
</tr>
<tr>
<td><strong>Count of Responses:</strong></td>
</tr>
</tbody>
</table>

---

Survey Response Summary  
3/31/2002 4:04PM
13. I can compute Laplace and inverse Laplace Transforms.  
   \[ \text{Mean: 5.6} \]
   
<table>
<thead>
<tr>
<th>Response Value</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>1</td>
<td>5</td>
<td>6</td>
<td>12</td>
</tr>
</tbody>
</table>

15. I can solve differential equations using Laplace Transforms.  
   \[ \text{Mean: 5.7} \]
   
<table>
<thead>
<tr>
<th>Response Value</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>12</td>
</tr>
</tbody>
</table>

17. I can find the transfer function of a system.  
   \[ \text{Mean: 4.8} \]
   
<table>
<thead>
<tr>
<th>Response Value</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>2</td>
<td>5</td>
<td>1</td>
<td>4</td>
<td>12</td>
</tr>
</tbody>
</table>

19. I can use transfer functions to determine whether a system is stable.  
   \[ \text{Mean: 4.50} \]
   
<table>
<thead>
<tr>
<th>Response Value</th>
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<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>12</td>
</tr>
</tbody>
</table>

21. I understand zero input and zero state responses.  
   \[ \text{Mean: 5.8} \]
   
<table>
<thead>
<tr>
<th>Response Value</th>
<th>2</th>
<th>4</th>
<th>5</th>
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<th>Total Responding</th>
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<td>Count of Responses</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>5</td>
<td>12</td>
</tr>
</tbody>
</table>

23. I can calculate system response using the Laplace transform.  
   \[ \text{Mean: 4.3} \]
   
<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td>4</td>
<td>12</td>
</tr>
</tbody>
</table>

25. I know how to find the Fourier Series of periodic signals.  
   \[ \text{Mean: 4.00} \]
   
<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>5</td>
<td>1</td>
<td>12</td>
</tr>
</tbody>
</table>
27. I know how to find the Fourier Transform of signals.

Mean: 4.25

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>12</td>
</tr>
</tbody>
</table>

29. I understand the importance of frequency domain representation of signals and systems.

Mean: 4.33

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>2</td>
<td>3</td>
<td>12</td>
</tr>
</tbody>
</table>

31. I have gained a familiarity with aspects of Matlab used in system analysis.

Mean: 4.68

<table>
<thead>
<tr>
<th>Response Value</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<tr>
<td>Count of Responses</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td>3</td>
<td>1</td>
<td>12</td>
</tr>
</tbody>
</table>

33. I know how to use Matlab to calculate time and frequency response.

Mean: 3.83

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>3</th>
<th>4</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>1</td>
<td>1</td>
<td>9</td>
<td>1</td>
<td>12</td>
</tr>
</tbody>
</table>

Score Type Name: True/False

1. I understand that the ABET survey questions address course objectives not comments on the instructor’s effectiveness.

Mean: 1.00

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>12</td>
<td>12</td>
</tr>
</tbody>
</table>

2. I understand that questions with the numerical scale, 1 - 6, use "1" to mean "Strongly Disagree" and "6" to mean "Strongly Agree."

Mean: 1.00

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>12</td>
<td>12</td>
</tr>
</tbody>
</table>
IV.8  57:014 Engineering Economy

Summer ’01: Limitations of six-week summer session made it difficult to cover all of the material. Three-hour lecture sessions left insufficient time for digestion/reflection of material; future summer offerings should avoid six-week session with three-hour lectures. Suggest consideration of alternative test, viz. Engineering Economy by Garmo, Sullivan, and Bontadelli.

Fall ’01: Course objectives broadly met. Greater emphasis placed on subject of risk; this had a positive effect on meeting course objectives; the general area of financial risk should continued to be expanded. Alternative textbooks should be examined. Text was not readily available at start of semester.

Spring ’02: Course assessment not submitted.

Overall Assessment: Spring 2002 was the last offering of this course in its present form – it will become a program course in the new curriculum. Conclusions from the current assessments should be extended to the new course in Industrial Engineering.
**VERSION A: BASED ON COURSE GOALS**

Course Outcomes Worksheet (COW)

57:014 Engineering Economy

Created 1 December 2000 by Peter O'Grady
Modified December 4, 2000 by Peter O'Grady

<table>
<thead>
<tr>
<th>Course Goals</th>
<th>Supports ABET Outcomes</th>
<th>Course Activity</th>
<th>Basis for Course-Goal Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The time value of money and equivalence in economic decision making</td>
<td>A (●), K (●)</td>
<td>Homework, quizzes, projects and exams test the students' abilities in these areas. Specifically, the course addresses the issues associated with the time value of money and equivalence in economic decision making.</td>
<td>Graded copies of all exam questions*.</td>
</tr>
<tr>
<td>2. Present worth, annual cost, future worth, rate of return, incremental rate of return.</td>
<td>A (●), K (●)</td>
<td>Homework, quizzes, projects and exams test the students' abilities in these areas. Specifically, the course addresses the issues associated with present worth, annual cost, future worth, rate of return, incremental rate of return.</td>
<td>Graded copies of all exam questions*.</td>
</tr>
<tr>
<td>3. Depreciation and taxation and their role in project decision-making.</td>
<td>A (●), C(c), D(c), E (●), Gw (●), H(c), J(c), K (●)</td>
<td>Homework, quizzes, projects and exams test the students' abilities in these areas. Specifically, the course addresses the issues associated with depreciation and taxation and their role in project decision-making. Students undertake a team based project on taxation.</td>
<td>Graded copies of all exam questions, copies of project report*.</td>
</tr>
<tr>
<td>4. Elements of cost estimating, economic life and replacement analysis.</td>
<td>A (●), E (●)</td>
<td>Homework, quizzes, projects and exams test the students' abilities in these areas. Specifically, the course addresses the issues associated with cost estimating, economic life and replacement analysis.</td>
<td>Graded copies of all exam questions*.</td>
</tr>
<tr>
<td>5. Spread-sheet analysis</td>
<td>K (●)</td>
<td>Homework and projects test the students' abilities in this area. Specifically, the course addresses the issues associated with using spread-sheets for economic analysis.</td>
<td>None Collected.</td>
</tr>
<tr>
<td>6. Fundamentals of financial risk</td>
<td>A (●), K (●)</td>
<td>Homework and projects test the students' abilities in this area. Specifically, the course addresses the issues associated with financial risk.</td>
<td>None Collected.</td>
</tr>
<tr>
<td>7. Fundamentals of company financial analysis, accounting, cost accounting concepts, and financial documents</td>
<td>A (●), D(c), E(●), Gw (●), K (●)</td>
<td>Homework, quizzes, projects and exams test the students' abilities in these areas. Specifically, the course addresses the issues associated with fundamentals of company financial analysis, accounting, cost accounting concepts, and financial documents. Students undertake a team-based project on company financial analysis.</td>
<td>Graded copies of all exam questions, copies of project report *.</td>
</tr>
</tbody>
</table>

○ denotes moderate contribution to the outcome ● denotes substantial contribution to the outcome

*Samples of each to represent more than 10% of the class. A representative sample was collected.
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<tr>
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<th>Supports ABET Outcomes</th>
<th>Course Activity</th>
<th>Basis for Course-Goal Assessment</th>
</tr>
</thead>
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<td>EASY survey assessment by students and instructor; graded copies of all exam questions*.</td>
</tr>
<tr>
<td>2. Present worth, annual cost, future worth, rate of return, incremental rate of return</td>
<td>A (●), K (●)</td>
<td>Homework, quizzes, projects and exams test the students' abilities in these areas. Specifically, the course addresses the issues associated with present worth, annual cost, future worth, rate of return, incremental rate of return.</td>
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</tr>
<tr>
<td>3. Depreciation and taxation and their role in project decision-making.</td>
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<td>4. Elements of cost estimating, economic life and replacement analysis.</td>
<td>A (●), E (●)</td>
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</tr>
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<td>5. Spread-sheet analysis</td>
<td>K (●)</td>
<td>Homework and projects test the students' abilities in this area. Specifically, the course addresses the issues associated with using spreadsheets for economic analysis.</td>
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<tr>
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<td>Homework, quizzes, projects and exams test the students' abilities in these areas. Specifically, the course addresses the issues associated with fundamentals of company financial analysis, accounting, cost accounting concepts, and financial documents. Students undertake a team-based project on company financial analysis.</td>
<td>EASY survey assessment by students and instructor; graded copies of all exam questions, copies of project report*.</td>
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○ denotes moderate contribution to the outcome    ● denotes substantial contribution to the outcome

*Samples of each to represent 10% of the class. One high score and one low score will be collected with the remainder of the sample a random selection.
Course Assessment Report
College of Engineering
The University of Iowa

Course Number: 057:014  Semester/Year: Summer 2001
Course Name: Engineering Economy

COORDINATOR: JOHN LEE  SIGNATURE: 
DATE: 18 September 2001
INSTRUCTOR: Timothy L Brown  SIGNATURE: (optional)
OTHER: SIGNATURE: (optional)

Please attach the course syllabus and course outcomes worksheet (COW).

Assessment Techniques:
Please indicate which of the following assessment techniques were used in the course and your judgment of their utility in assessing accomplishment of the Course Learning Objectives.

<table>
<thead>
<tr>
<th>Assessment Technique</th>
<th>Not Used</th>
<th>Used, provided useful data</th>
<th>Used, not recommended</th>
</tr>
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<tbody>
<tr>
<td>Homework</td>
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<td></td>
<td>(not collected)</td>
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<td>Exams</td>
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</tr>
<tr>
<td>Student Self-Evaluation</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student Peer-Evaluation</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course Portfolios</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class Surveys (e.g., EASY)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instructor Observation</td>
<td>See p.2</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Other (specify)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. ASSESSMENT RESULTS: (and their relation to past results)
Course functioned fairly well, although it was difficult to cover all of the material due to the limited number of classroom hours available during the six-week summer session. Additionally the 3-hr classroom session made it difficult to cover the material thoroughly because students did not have an opportunity to practice the course material between different portions of the lecture.

2. SUMMARY OF PRIOR REMEDIATION ACTIONS: (and their estimated effect)
N/A

3. RECOMMENDED ACTIONS:
Avoid offering this course during the six-week summer session with 3-hr lectures.

4. CHANGES TO COURSE LEARNING OBJECTIVES:
None

5. MODIFICATIONS TO ASSESSMENT TECHNIQUES:
None.

COURSE SUPPORT
TA SUPPORT FROM THE DEAN'S OFFICE (IN TERMS OF FTE): None
OTHER TA SUPPORT AND SOURCE (IN TERMS OF FTE): None

TA RESPONSIBILITIES: N/A

WAS THE TA SUPPORT ALLOCATED TO YOUR SECTION SUFFICIENT? PLEASE ELABORATE.
For a summer session with relatively few students a TA was not necessary.
IF USED, WAS THE COMPUTER HARDWARE AND SOFTWARE SUPPORT FROM ECSS ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

N/A

WERE THE FACILITIES (CLASSROOM, LABS, ETC.) ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

Yes. The room was adequate and had sufficient supplies.

COURSE ORGANIZATION/CONTENTS

LECTURE (HOURS/WEEK): 6          DISCUSSION (HOURS/WEEK): 0
LABORATORY (HOURS/WEEK): 0        TOTAL NUMBER OF STUDENTS: 7

TEXTBOOK AUTHOR AND TITLE:  D.G. Newnan, J.P. Lavelle, and T.G. Eschenbach

Engineering Economic Analysis: Eighth Edition

PLEASE COMMENT ON THE SUITABILITY OF THE TEXTBOOK AND ITS TIMELY AVAILABILITY.

The book was adequate; however, I would consider a switch to another textbook that more accurately emphasizes the content of this course. I would suggest considering Engineering Economy by E.P. DeGarmo, W.G. Sullivan, and J.A. Bontadelli.

TEACHING AIDS:

None Used.
Course Assessment Report  
College of Engineering  
The University of Iowa  

Course Number: 057:014  
Semester/Year: Fall/2001  
Course Name: Engineering Economy  

COORDINATOR: J. LEE  
SIGNATURE:  

DATE: Dec. 17, 2001  

INSTRUCTOR: P. O’Grady  
SIGNATURE: (optional)  

OTHER: SIGNATURE: (optional)  

Please attach the course syllabus and course outcomes worksheet (COW).  

Assessment Techniques:  
Please indicate which of the following assessment techniques were used in the course and your judgment of their utility in assessing accomplishment of the Course Learning Objectives.  

<table>
<thead>
<tr>
<th>Assessment Technique</th>
<th>Not Used</th>
<th>Used, provided useful data</th>
<th>Used, not recommended</th>
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</thead>
<tbody>
<tr>
<td>Homework</td>
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<td>X</td>
</tr>
<tr>
<td>Exams</td>
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<tr>
<td>Quizzes</td>
<td>X</td>
<td></td>
<td></td>
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<tr>
<td>Projects</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Written Reports (other than projects)</td>
<td>X</td>
<td></td>
<td></td>
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<tr>
<td>Oral Reports</td>
<td>X</td>
<td></td>
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</tr>
<tr>
<td>Student Self-Evaluation</td>
<td>X</td>
<td></td>
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</tr>
<tr>
<td>Student Peer-Evaluation</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course Portfolios</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class Surveys (e.g., EASY)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instructor Observation (see attached)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other [specify]</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. **ASSESSMENT RESULTS**: (and their relation to past results)
   It would appear that, judging from the various assessment methods, the course objectives were broadly met.

2. **SUMMARY OF PRIOR REMEDIATION ACTIONS**: (and their estimated effect)
   A greater emphasis was placed on the subject of risk and this had a beneficial effect on meeting the course objectives.

3. **RECOMMENDED ACTIONS**:
   Alternative textbooks be examined with a view to a possible change.
   Explore expanding the coverage of the area of financial risk

4. **CHANGES TO COURSE LEARNING OBJECTIVES**:
   None

5. **MODIFICATIONS TO ASSESSMENT TECHNIQUES**:
   None

**COURSE SUPPORT**

TA SUPPORT FROM THE DEAN'S OFFICE (IN TERMS OF FTE): 0.25
OTHER TA SUPPORT AND SOURCE (IN TERMS OF FTE): None
TA RESPONSIBILITIES:
   Grading and answering student questions
WAS THE TA SUPPORT ALLOCATED TO YOUR SECTION SUFFICIENT? PLEASE ELABORATE.
   Yes
   Increased TA support would be beneficial to increase student – TA interaction.
IF USED, WAS THE COMPUTER HARDWARE AND SOFTWARE SUPPORT FROM ECSS ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.
   Yes
WERE THE FACILITIES (CLASSROOM, LABS, ETC.) ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.
   Yes

**COURSE ORGANIZATION/CONTENTS**

LECTURE (HOURS/WEEK): 3
LABORATORY (HOURS/WEEK): 0
TEXTBOOK AUTHOR AND TITLE:
   DISCUSSION (HOURS/WEEK): 0
   TOTAL NUMBER OF STUDENTS: 43

PLEASE COMMENT ON THE SUITABILITY OF THE TEXTBOOK AND ITS TIMELY AVAILABILITY.
   The text does not fully cover the area of risk.
   The text was not readily available at the start of the semester.

TEACHING AIDS:
   A fairly comprehensive web site was developed and maintained.
### College of Engineering EASY Survey Responses

**Results for:** 057-014; Engineering Economy; Section: 001- Lecture  
**Instructor(s):** Peter O'Grady

<table>
<thead>
<tr>
<th>Session Code</th>
<th>Beginning On</th>
<th>Running for</th>
<th>Course Enrollment</th>
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<tr>
<td>20013</td>
<td>12-01-01</td>
<td>9 days</td>
<td>42</td>
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<td></td>
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<td>177</td>
<td>057014-001-20014</td>
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<td>42</td>
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<td>Base Set Used:</td>
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<td>Privacy: Faculty Distribute</td>
<td>Remarks: ABET</td>
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</tbody>
</table>

### Headings and Subheadings (Instructors) Used in Survey:
- Accreditation Board for Engineering and Technology (ABET) Survey
- For each statement decide whether you generally agree or disagree then indicate the strength of agreement or disagreement by selecting the appropriate number.
- This survey was designed to provide feedback to your instructor on selected aspects of this course. Your responses should reflect YOUR INDIVIDUAL PERCEPTIONS, not those of the class as a whole.

### Score Type Name: Disagree/Agree 1-6

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. I have an understanding of the time value of money and equivalence in economic decision making.</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>11</td>
<td>17</td>
</tr>
<tr>
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<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>11</td>
<td>17</td>
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</table>

<table>
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<tr>
<th></th>
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<th>2</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. I have an understanding of present worth, annual cost, future worth, rate of return, incremental rate of return.</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>17</td>
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<tr>
<td>Mean: 5.80</td>
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<td>1</td>
<td>3</td>
<td>1</td>
<td>17</td>
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<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>7. I have an understanding of depreciation and taxation and their role in project decision-making.</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>11</td>
<td>17</td>
</tr>
<tr>
<td>Mean: 4.54</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Response Value:</td>
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<td>2</td>
<td>4</td>
<td>5</td>
<td>6</td>
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<td>1</td>
<td>1</td>
<td>2</td>
<td>11</td>
<td>17</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>9. I have an understanding of cost estimating, economic life and replacement analysis.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>7</td>
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</tr>
<tr>
<td>Mean: 4.82</td>
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<td>2</td>
<td>4</td>
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<td>Total Responding</td>
</tr>
<tr>
<td>Count of Responses:</td>
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<td>2</td>
<td>3</td>
<td>4</td>
<td>7</td>
<td>17</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. I have an understanding of spread-sheet analysis.</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>9</td>
<td>17</td>
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<tr>
<td>Mean: 5.06</td>
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<td>2</td>
<td>4</td>
<td>5</td>
<td>6</td>
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<td>1</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>9</td>
<td>17</td>
</tr>
</tbody>
</table>

Survey Response Summary

3/31/2002 4:04PM

148
13. I have an understanding of the fundamentals of financial risk.

Mean: 4.00

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>9</td>
<td>17</td>
</tr>
</tbody>
</table>

15. I have an understanding of company financial analysis, accounting, cost accounting concepts, and financial documents.

Mean: 4.53

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>6</td>
<td>17</td>
</tr>
</tbody>
</table>

Score Type Name: True/False

1. I understand that the ABET survey questions address course objectives not comments on the instructor's effectiveness.

Mean: 1.06

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>17</td>
<td>1</td>
<td>18</td>
</tr>
</tbody>
</table>

2. I understand that questions with the numerical scale, 1 - 6, use "1" to mean "Strongly Agree" and "6" to mean "Strongly Agree."

Mean: 1.00

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>18</td>
<td>18</td>
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</tbody>
</table>

Survey Response Summary 3/31/2002 4:04PM
IV.9 57:015 Materials Science

Summer '01: Due to inherent time constraints of summer course, neither formal assessment, nor EASY survey, were conducted. Examination of student work in comparison with work from prior years indicates that course goals are being met. Prior actions of lab-equipment upgrading seems to have led to greater student satisfaction with the course. In addition, students seem to be satisfied with continued availability of lab-related instructional materials on the course web site. In future, written-communication skills support of the Center for Technical Communication should be enlisted in editorial critique of one lab report. Feedback should be sought from senior students who have had the material and subsequently had to apply the principles to a design project or as part of an internship or co-op. Students could be asked which topics they found very important, and if they felt adequately prepared for those topics. No changes to course learning objectives are necessary at this time; focus should first be on the assessment techniques.

Fall '01: Review of responses to EASY student self-assessment showed that change to two-person lab groups has significantly decreased the student agreement with “ability to function in multi-disciplinary teams”. Inaugural use of the services of the Center for Technical Communication in critiquing student lab reports appears to have decreased the student self-assessment of their writing skills – likely because the CTC critique of the English expression was harsher than the usual TA critique of the lab reports. EASY assessment showed “gained a knowledge of contemporary issues” dropped somewhat from previous assessment, even though instructor tried to include contemporary examples wherever possible. This effort should continue. Students suggest covering lecture material more slowly, and changing lab grading to emphasize content over writing style. Abbreviated online lecture notes may help the first problem. Instructor feels emphasis on good writing on lab reports should continue to be emphasized, and this should be emphasized to the students. Use of CTC as a resource for the course was extensive and very valuable. Recommend maintaining abbreviated lecture notes on line, to be brought to the lecture and completed by the students. Reword EASY question #10. Continue to use CTC for lab portion of the course. Professor, not CTC, should present lecture to students on writing expectations. Increase project team size to 3 or 4 for multi-disciplinary experience. Consider peer evaluation of teamwork and oral presentations.

Spring '02: Numerical course-goal survey data not available due to EASY system data loss. Assessment was primarily on written student comments to EASY questions and evaluation of student performance on exams, projects, lab reports, and presentations. Exam questions were related to specific course learning goals, and individual-question scores used to assess achievement of course goals. This detailed analysis indicated that most course learning goals were being met. Areas of weakness include thermal properties of materials, and characteristics of polymers. Personnel of the Center for Technical Communication (CTC) were closely involved in the multiple report-writing activities of the course, and confirmed that student communication skills continuously
improved. Interdisciplinary group work and project presentations went well, with the increased group size (per earlier recommendations) helpful. Students found post-lecture posting of full PowerPoint presentations on the web to be useful; future instructors should consider continuing this practice. Recommend that scheduling the course for a later time in the day be considered to help a chronic attendance problem; and recommend use of a room other than 1505 SC, whose “distant” chalkboard discourages interactive discussion with students. Oral project proposals should be presented before written proposals, since this is commonly the pattern in industry. Examples of effective project posters should be made available to students. CTC consultants should visit each lab section early in the semester to introduce CTC and describe expectations for the written work of the course.

Overall Assessment: This course has benefited from a particularly comprehensive and instructive assessment process, as a result of which the course is seeing continuous improvement. The course’s interaction with the Center for Technical Communication is particularly fruitful.
**VERSION A: BASED ON COURSE GOALS**
Course Outcomes Worksheet (COW)
57:015 Materials Science
Created 8 October 2001 by Audrey A. Butler

<table>
<thead>
<tr>
<th>Course Goals</th>
<th>Supports ABET Outcomes</th>
<th>Course Activity</th>
<th>Basis for Course-Goal Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The student will have an understanding of atomic and crystal structure and chemical bond types, and understand how these affect material properties.</td>
<td>A (●), E (●)</td>
<td>The student completes several homework assignments which require application of chemistry, mathematics and materials science principles. Exams are used to test the student's abilities in these areas.</td>
<td>Samples of graded copies of all exams and representative homework.</td>
</tr>
<tr>
<td>2. The student will have an understanding of mechanical, thermal and electrical properties of materials and why a specific material is suited to particular applications.</td>
<td>A (●), E (●),</td>
<td>The student completes several homework assignments which require application of chemistry, mathematics and materials science principles. Exams are used to test the student's abilities in these areas.</td>
<td>Samples of graded copies of all exams and representative homework.</td>
</tr>
<tr>
<td>3. The student will have an understanding of the unique characteristics of ceramics, polymers and metallic materials with an introduction to their engineering applications.</td>
<td>A (●), E (●), J (○)</td>
<td>The student completes several homework assignments which require application of chemistry, mathematics and materials science principles. Exams are used to test the student's abilities in these areas. Contemporary examples of materials and material failures are presented in lecture.</td>
<td>Samples of graded copies of all exams and representative homework.</td>
</tr>
<tr>
<td>4. The student will have an understanding of and experience in testing material properties, with an emphasis on mechanical properties.</td>
<td>B (●)</td>
<td>The student conducts five laboratory experiments as specified in the lab manual and analyzes and interprets data from these experiments. Results are explained using theory learned in class.</td>
<td>Samples of graded copies of representative laboratory reports.</td>
</tr>
<tr>
<td>5. The student will have had opportunities to further his or her professional development through working on group assignments; practicing written, oral and graphical communication skills; and using modern computer tools.</td>
<td>D(○), G(●)K (○)</td>
<td>The student writes five laboratory reports. Written reports include graphical representation of data and occasionally equipment diagrams. Spreadsheet and graphics software are used for calculations and presentation of experimental results.</td>
<td>Samples of graded copies of representative lab reports and writing guidelines handout.</td>
</tr>
<tr>
<td>Course Goals</td>
<td>Supports ABET Outcomes</td>
<td>Course Activity</td>
<td>Basis for Course-Goal Assessment</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------</td>
<td>------------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>1. The student will have an understanding of atomic and crystal structure and chemical bond types, and understand how these affect material properties.</td>
<td>A (●), E (●)</td>
<td>Student completes suggested homework assignments that require application of chemistry, math and materials science principles. Exams and quizzes are used to test the student's abilities in these areas.</td>
<td>EASY survey assessment by students; samples of graded copies of all exams and quizzes.</td>
</tr>
<tr>
<td>2. The student will have an understanding of mechanical, thermal and electrical properties of materials and why a specific material is suited to particular applications.</td>
<td>A (●), E (●)</td>
<td>Student completes suggested homework assignments that require application of chemistry, math and materials science principles. Exams and quizzes are used to test the student's abilities in these areas.</td>
<td>EASY survey assessment by students; samples of graded copies of all exams and quizzes.</td>
</tr>
<tr>
<td>3. The student will have an understanding of the unique characteristics of ceramics, polymers and metallic materials with an introduction to their engineering applications.</td>
<td>A (●), E (●), J (○)</td>
<td>Student completes suggested homework assignments that require application of chemistry, math and materials science principles. Exams and quizzes are used to test the student's abilities in these areas. Contemporary examples of materials and material failures are presented in lecture.</td>
<td>EASY survey assessment by students; samples of graded copies of all exams and quizzes.</td>
</tr>
<tr>
<td>4. The student will have an understanding of and experience in testing material properties, with an emphasis on mechanical properties.</td>
<td>B (●)</td>
<td>The student conducts three laboratory experiments as specified in the lab manual and analyzes and interprets data from these experiments. As part of a team, the student also designs and conducts a project that applies materials science principles. Resultant data are analyzed and explained using theory learned in class.</td>
<td>EASY survey assessment by students; samples of graded copies of all lab reports, project proposals, and project reports.</td>
</tr>
<tr>
<td>5. The student will have had opportunities to further his or her professional development through working on group assignments; practicing written, oral and graphical communication skills; and using modern computer tools.</td>
<td>D(○), G(●)K (○)</td>
<td>The student works in a cross-disciplinary team to design and conduct a project that applies materials science principles. The team prepares a proposal, two progress reports, a preliminary presentation, and a final group presentation. The student also writes three laboratory reports. Written reports include graphical representation of data and occasionally equipment diagrams. Spreadsheet and graphics software are used for calculations and presentation of experimental results.</td>
<td>EASY survey assessment by students; samples of graded copies of all lab reports, project proposals, and project reports; copies of presentation grade sheets; writing guidelines handout.</td>
</tr>
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</table>
Core Course Assessment Report
College of Engineering
University of Iowa

<table>
<thead>
<tr>
<th>Course Number:</th>
<th>57:015</th>
<th>Semester/Year</th>
<th>Summer 2001</th>
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<tbody>
<tr>
<td>Course Name:</td>
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<td>Materials Science</td>
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<tr>
<th>COORDINATOR:</th>
<th>DAVID RETHWISCH</th>
<th>SIGNATURE:</th>
<th>David</th>
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<tr>
<td>DATE:</td>
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<td>AUDREY BUTLER</td>
<td>SIGNATURE:</td>
<td>Audrey</td>
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Please attach the course syllabus and course outcomes worksheet (COW).

Assessment Techniques:
Please indicate which of the following assessment techniques were used in the course and your judgment of their utility in assessing accomplishment of the Course Learning Objectives.

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1. **ASSESSMENT RESULTS: (and their relation to past results)**

Given the time constraints inherent in a summer course, formal assessment was not used. EASY was not available during the summer. From examination of student work in comparison with work from prior years indicates, in general, that students are achieving the goals of understanding the various properties of materials, the appropriate tests necessary for the testing of the materials and the selection of suitable material for a particular application.

2. **SUMMARY OF PRIOR REMEDIATION ACTIONS: (and their estimated effect)**

Prior actions include upgrading the lab equipment and facilities and, based on informal student feedback, this seems to have had a great effect on student satisfaction.

In the Spring 2001 semester, all related lab instructional materials were available on a course web site. This practice was continued. Once again, informal student feedback indicates a general satisfaction with this as the material is readily available from a variety of venues and is easily retrieved if written copies have been misplaced.

3. **RECOMMENDED ACTIONS:**

1) Now that the Center for Technological Communications has been established, students should submit one lab report for editorial assistance and then resubmit the final version of the lab. This will help in the development of written communication skills.

2) Obtain feedback from senior students who have had the material and subsequently had to apply the principles to a design project or on the job in an internship or co-op. The students could be asked which topics they found very important and if they had adequate preparation from the course or which topics might be emphasized more.

3) Use a formal method for obtaining student feedback in the form of an EASY survey or a written survey.

4. **CHANGES TO COURSE LEARNING OBJECTIVES:**

No changes recommended at this time. The focus should first be on the assessment techniques to ensure that thorough assessment is being done and that we’re getting the most useful feedback possible. This feedback could, in the future, lead to suggested changes to the course goals.

5. **MODIFICATIONS TO ASSESSMENT TECHNIQUES:**

Item 3 under “Recommended Actions” above addresses this issue.

6. **ATTACHMENTS**

Course syllabus, Course Outcomes Worksheets, Writing Guidelines handed out to Materials Science Students and Copies of Relevant Course Notes.
Core Course Assessment Report
College of Engineering
University of Iowa

<table>
<thead>
<tr>
<th>Course Number:</th>
<th>57:015</th>
<th>Semester/Year</th>
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</tr>
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<tr>
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Please attach the course syllabus and course outcomes worksheet (COW).

Assessment Techniques:
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1. **ASSESSMENT RESULTS: (and their relation to past results)**

An EASY survey (attached) was used as one of the course assessment tools. Each course goal was presented and students were asked if they agreed or disagreed that the goal was met. In most cases, at least 86% of the respondents agreed (slightly, moderately or strongly) that they had achieved the goal. The exception to this was EASY questions #8-10. Each of these is discussed briefly below.

Question 8, “From this course I have gained an ability to function in multi-disciplinary teams.” Only 67% of the students agreed with this question. In past semesters the response to this question was typically >86% agreed. The students work in groups in the laboratory. In previous years these groups typically had three students. The only change in this regard is that this semester I tried only having two students to a group. This would reduce the probability of having multiple disciplines in one group and may have caused this decrease.

Question 9, “I have gained an ability to communicate effectively in written and graphical form.” 81% of the students agreed with this statement, only a little below the ca. 88% seen in previous semesters. This is interesting; however, because the major change to the course this semester was to have the Writing Center work with the students when writing their reports and proposals and in grading the resulting papers. In my assessment, the actual written quality of the student papers was better this semester and improved markedly during the course of the semester. However, the average scores on lab reports were quite a bit lower than in the past (average grade Spring 2001 was 42.7/50 while in Fall 2001 it was 35.2/50). This resulted because the Writing Center grades were typically lower than the lab TA grades on the same lab report. In some cases the grades were remarkably lower. This did not affect the final grades since this was taken into consideration, but the lower scores did impact the students’ perception of their writing skills. We may wish to work with the Writing Center to indicate the desired range of scores for the class. It is crucial to clearly convey to the graders exactly what average grade is expected. I believe this is now better established due to the efforts spent working with the Writing Center last semester.

Question 10, “From this course, I have gained a knowledge of contemporary issues”. This question received a 71% agreement. This is a little below the 81% agreement in Spring 2001. While this is not a key emphasis of this course, I try to include contemporary examples where possible. Perhaps additional examples could be included from the newspaper or literature to increase the awareness in this area.

Comments from the students did not really address the course goals and how well they were met but they were not specifically asked to address these. Instead, students were asked to comment on the strengths and weaknesses of the course. In summary, students had a mix of comments with a few suggesting 1) cover lecture material more slowly, and 2) change laboratory grading to emphasize content over writing style. There were times when the lectures went rather fast. I believe that providing an abbreviated set of lecture notes on-line as discussed below, will help with this problem. Regarding the lab reports, I believe that writing style is at least as important as content and recommend no changes in
this area. Perhaps we need to be sure to clearly reiterate in lecture the important of writing quality.

There appear to be no problems with laboratory facilities. Recent upgrades to lab equipment and the new facilities have produced much higher satisfaction ratings.

2. SUMMARY OF PRIOR REMEDIATION ACTIONS: (and their estimated effect)

The major effort on modifying the course for Fall 2001 was the heavy use of the Writing Center in the laboratory section of this course. The Writing Center was involved in two ways. First they assisted in delivery of two lectures: one on how to write a good laboratory report and the second on how to write a good proposal. The students wrote their first lab report twice. The first draft was submitted and then graded by the lab TA (for technical content) and the Writing Center (for writing style). The TA and WC grade were added together to arrive at the report grade. The students were then required to make an appointment to work with one of the consultants at the Writing Center to see how to improve their draft. The students then were required to write a second draft of the report and submit that for grading. This made the writing requirements for the report much clearer. The Writing Center also assisted in the grading of the 2nd and 3rd laboratory reports, the grading of the project proposal, and the grading of the final project report. Students were also free to meet with the consultants at the center throughout the semester to help improve their writing.

The use of the Writing Center was helpful in several ways. The laboratory TA’s for this class were not always equipped with the writing skills to properly evaluate the writing style of student papers. Indeed, some are not even native English speakers. The use of the Writing Center was a definite help in improving the writing skills of the students in the class. This also slightly (though not greatly) reduced the time the TA’s were required to spend in grading. The Writing Center graded the papers first, so the TA’s needed only to focus on the technical content.

While I appreciated Mark Isham’s help in the lectures on writing, I think the contrast in lecture styles may have made this less helpful for the students. As such, in the future I would recommend that the class Professor deliver that material on writing requirements.

In Spring 2001 I prepared an initial set of Powerpoint notes for this class. In Fall 2001 these notes were refined and additional notes added. As I noted last semester, some students expressed a wish that the Powerpoint slides be available on-line. I resisted this as I felt it would encourage students to skip class. I think it would be desirable to provide them a partial set of notes on-line which they could print, bring to class, and fill in the in the missing information. This would save them from spending the class furiously writing down everything on the board and they could listen more. However, I did not have time to prepare two sets of notes (the full set and the “abbreviated”). I would recommend that this be done time allowing in the future.
3. RECOMMENDED ACTIONS:

1) Make an “abbreviated” set of the Powerpoint lecture notes available on line to reduce the amount of note taking required while still requiring active participation in class.

2) EASY question #10 needs to be reworded. The general question for outcome (j) was used and this question should be tailored for the course. The Course Activity identified to meet this outcome states that “Contemporary examples of materials science are presented in lecture” and the EASY question should address this specific activity to determine if the activity was adequately accomplished.

3) Continue to make use of the Writing Center for the laboratory part of this course. Be sure to work closely with them to ensure that the grading average is appropriate. Also, be sure the same grader from the Writing Center always grades the same lab section. This past semester there were problems with large grader-to-grader variability in scores given and even large variability for the same grader. In one instance the same grader scored the first draft of a paper as 23/25 and the second draft (which addressed the only concern raised in the first draft) received a 16/25. The Writing Center staff were very responsive when this was pointed out; however, we need to be careful to avoid these problems if we are to maintain credibility.

4) When the students submit the second draft of the lab report, be sure to have them attach the first draft and grading sheets. This will make it easier to grade since you can focus on the changes, and it will improve grading consistency because the grader will know the previous grade and can better judge what the new grade should be.

5) Have the course professor (not the Writing Center) provide the two lectures on writing that introduce what is expected in the lab reports and in the project proposal and final project report.

6) To increase the interdisciplinary focus of the class, I would recommend increasing the project team size from the current 2 members to 3 (or 4 at the max) and require that the team have students from at least two different disciplines.

4. CHANGES TO COURSE LEARNING OBJECTIVES:

No changes recommended at this time. At least 80% of the respondents indicated that these goals are being met. The focus should first be on the assessment techniques to ensure that thorough assessment is being done and that we’re getting the most useful feedback possible. This feedback could, in the future, lead to suggested changes to the course goals.

5. MODIFICATIONS TO ASSESSMENT TECHNIQUES:
Suggested changes are listed above, under “Recommended Actions”, specifically item 2. Also, peer evaluation of teamwork and oral presentations should be considered.

6. ATTACHMENTS

Course syllabus
Course Outcomes Worksheets
EASY survey results
%Core Course Assessment Report

%College of Engineering

%University of Iowa

<table>
<thead>
<tr>
<th>Course Number:</th>
<th>57:015</th>
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<th>Spring 2002</th>
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| LECTURE INSTRUCTOR: | ALEC SCRANTON | SIGNATURE: (optional) |            |
| LABORATORY INSTRUCTOR: | AUDREY BUTLER | SIGNATURE: (optional) |            |

Please attach the course syllabus and course outcomes worksheet (COW).

**Assessment Techniques:**
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* Computer glitch invalidated the results
1. **ASSESSMENT RESULTS: (and their relation to past results)**

The EASY numerical results were invalid this term, therefore the assessment process did not include the students' self-assessment of their achievement of the learning objectives. The assessment of the learning objectives is based primarily on an evaluation of the student's performance on exams, projects, laboratory reports, and presentations. Each exam question was related to a specific learning objective and the students' understanding of each learning objective was evaluated based upon the students' exam performance using the scale shown below. This scale was developed based upon the fact that the exams were written to have an average of approximately 65%, with the inclusion of both basic questions and more difficult questions that require a depth of understanding to successfully complete.

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<td>4. Some understanding</td>
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<td>5. Poor understanding</td>
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The first three learning objectives were assessed in this way, and the results are summarized and analyzed below:

1) The student will have an understanding of atomic and crystal structure and chemical bond types, and understand how these affect material properties.

The understanding of atomic and crystal structure was tested on two exams. On Exam #1 exam, 76% of the students had a fair understanding or better, and on Exam #3, 84% of the students had a fair understanding or better (35% had a mastery of this topic). These results suggest that this learning objective was met.

An understanding of chemical bonds was tested on two exams. On the Exam #1, 92% of the students had a fair understanding or better (44% had a mastery of this topic), and on Exam #2 65% of the students had a fair understanding or better. Again, these results suggest that this learning objective was met.

2) The student will have an understanding of mechanical, thermal and electrical properties of materials and why a specific material is suited to particular applications.

An understanding of the mechanical properties of materials was tested on two exams. On the Exam #1, 80% of the students had a fair understanding or better (14% had a mastery of this topic), and on Exam #2 86% of the students had a fair understanding or better (20% had a mastery of this topic). These results suggest that this learning objective was met.

An understanding of the thermal properties of materials was tested on Exam #1. 41% of the students had a fair understanding or better (14% had a poor understanding of this topic). This topic had the poorest outcome of any topic in the course, and there results suggest that more attention should be paid to this topic in the future. Perhaps the topic should be emphasized more in the assigned homework.
An understanding of the electrical properties of materials was tested on Exam #3. 74% of the students had a fair understanding or better. These results suggest that this learning objective was met.

3) The student will have an understanding of the unique characteristics of ceramics, polymers and metallic materials with an introduction to their engineering applications.

An understanding of the characteristics of ceramics was tested on Exam #3. 93% of the students had a fair understanding or better (13% had a mastery of this topic). These results suggest that this learning objective was met.

An understanding of the characteristics of polymers was tested on Exam #3. 50% of the students had a fair understanding or better (5% had a mastery of this topic, 4% had a poor understanding of this topic).

An understanding of the characteristics of metals was tested on Exam #2. 84% of the students had a fair understanding or better (10% had a mastery of this topic). These results suggest that this learning objective was met.

4) The student will have an understanding of and experience in testing material properties, with an emphasis on mechanical properties.

The assessment of this goal was accomplished through the laboratory and project reports. The average lab report grades were approximately 78-80% and the project report average was 86%. Throughout the semester, the grades associated with this goal increased, indicating the students gained a better understanding of materials testing, culminating with the final project.

5) The student will have had opportunities to further his or her professional development through working on group assignments; practicing written, oral and graphical communication skills; and using modern computer tools.

There is no numerical assessment of this goal. Students wrote several reports with grades generally improving through the semester, indicating their communication skills were improving and this was confirmed through discussion with the CTC personnel. Excel spreadsheets were used extensively for lab reports and the final project. All students participated in two project presentations and all students exhibited adequate to good skills. Lastly, students worked in self-selected interdisciplinary groups. All projects were completed and attained reasonable results, indicating at least some success in group work.

Most questions had relatively few comments (less than ten percent of the class); therefore it is difficult to draw broad conclusions from the student comments. The most common complaints about the course concerned the time the course is offered (8:05 a.m.) and the high work load.
2. SUMMARY OF PRIOR REMEDIATION ACTIONS: (and their estimated effect)

Based upon his experience teaching in Room 1505 SC, the previous instructor (Prof. Rethwisch) recommended that the lectures be delivered using Powerpoint, and provided a set of Powerpoint files to build from. This was an excellent recommendation since, as he had reported, the room is not well designed for use of the chalkboard. In addition, in the past CAR, it was recommended that an “abbreviated” set of the Powerpoint slides be made available on the web. I did make the full set of Powerpoint slides available after the lectures, and I think that this was useful to the students. Some students requested that the slides be available prior to the lectures. This practice would have advantages and disadvantages for each instructor to weigh and make their decision.

It was also recommended that the EASY question #10 be reworded. This rewording was done, however the EASY survey was not useful this year.

It was recommended the Writing Center continue to be used in the laboratory portion of the course. This recommendation was adopted. The CTC was very actively involved in the course, specifically in the development of writing guidelines as well as in consultation and grading.

Finally, it was recommended that the project team size be expanded from 2 to 3 or 4, and that each team be required to have members from at least two departments. This requirement was instituted this semester, and as a result the multidisciplinary interactions were increased.

3. RECOMMENDED ACTIONS:

1) The largest problem with the course is attendance. Many students complained about the early meeting time (8:05 am), and a later meeting time could have a positive impact on the course attendance. Therefore I recommend that a later meeting time for the course should at least be considered. There are clearly a lot of considerations that must be accounted for in such a change (classroom availability, accommodating the laboratory schedule, etc). Perhaps a move to 8:30-9:40 am or 12:05-1:20 pm on Tuesday and Thursday could be considered.

2) I recommend that the class be scheduled for a different classroom. Room 1505 SC is not designed to facilitate an interactive discussion or use of the chalkboard. In addition, I suspect that the relatively dim lighting for an early morning class reduces the students’ attentiveness. The relatively large classrooms in Schaeffer Hall would be preferable if they are available.

3) It is recommended that the course website be updated and that some of the changes we made this year be considered.

4) It may be more effective to have the 2-minute oral project proposal precede the written proposal since it is generally more common in industry to have the oral discussion first.

5) Examples of particularly effective project posters could be made available to the students.
6) It is recommended that the CTC consultants visit each lab section at the beginning of the semester to discuss purpose, audience, organizational rationale, and persuasion. If possible, Writing Consultants who will work with that section’s papers could make the visit and establish contact. Consultants could also introduce students to the CTC.

4. **CHANGES TO COURSE LEARNING OBJECTIVES:**

No changes recommended at this time. The focus should first be on the assessment techniques to ensure that thorough assessment is being done and that we’re getting the most useful feedback possible. This feedback could, in the future, lead to suggested changes to the course goals.

5. **MODIFICATIONS TO ASSESSMENT TECHNIQUES:**

Again, no changes at this time.

6. **ATTACHMENTS**

Course syllabus, Course Outcomes Worksheets, Writing Guidelines handed out to Materials Science Students and Copies of Relevant Course Notes, Summary of Post-Course Meeting with CTC.
### College of Engineering EASY Survey Responses

**Instructor(s):** David Rathwein

**Session Code:** 20013  **Beginning On:** 12-01-01  **Running for:** 9 days  **Course Enrollment:** 30

**Survey #:** 185  **Survey Name:** 05701506A-20004  **Section Enrollment:** 30

**Base Set Used:** ABET  **Privacy:** Faculty Distribute  **Remarks:** ABET

#### Headings and Subheadings (Instructions) Used in Survey:

**Heading(s):** Accreditation Board for Engineering and Technology (ABET) Survey

For each statement decide whether you generally agree or disagree then indicate the strength of agreement or disagreement by selecting the appropriate number.

**Subheading(s):** This survey was designed to provide feedback to your instructor on selected aspects of this course. Your responses should reflect your INDIVIDUAL PERCEPTIONS, not those of the class as a whole.

#### Score Type Name: Disagree/Agree 1-6

1 = Strongly Disagree  
2 = Moderately Disagree  
3 = Slightly Disagree  
4 = Slightly Agree  
5 = Moderately Agree  
6 = Strongly Agree

3. I have gained an understanding of atomic and crystal structure and understand how these affect material properties

**Mean:** 4.52

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4. I have gained an understanding of mechanical, thermal and electrical properties and why a specific material is suited to particular applications

**Mean:** 4.68

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</tr>
</tbody>
</table>

5. I have gained an understanding of the characteristics of ceramics, polymers and metallic materials

**Mean:** 4.57

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
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<td>8</td>
<td>9</td>
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<td>21</td>
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</tbody>
</table>

6. I have gained an understanding of testing material properties

**Mean:** 4.62

<table>
<thead>
<tr>
<th>Response Value</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<td>4</td>
<td>21</td>
</tr>
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</table>

7. From this course I have gained an ability to design and conduct experiments, as well as to analyze and interpret data:

**Mean:** 4.62

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>3</th>
<th>4</th>
<th>5</th>
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</table>

---

Survey Response Summary 3/31/2002 4:04PM
8. From this course I have gained an ability to function on multi-disciplinary teams.

<table>
<thead>
<tr>
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<td>4</td>
<td>6</td>
<td>3</td>
<td>5</td>
<td>21</td>
</tr>
</tbody>
</table>

Mean: 4.65

9. I have gained an ability to communicate effectively in written and graphical forms.

<table>
<thead>
<tr>
<th>Response Value</th>
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<th>3</th>
<th>4</th>
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</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>9</td>
<td>4</td>
<td>21</td>
</tr>
</tbody>
</table>

Mean: 4.6

10. From this course I have gained a knowledge of contemporary issues.

<table>
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<tr>
<th>Response Value</th>
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<th>4</th>
<th>5</th>
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<tbody>
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<td>3</td>
<td>10</td>
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<td>2</td>
<td>21</td>
</tr>
</tbody>
</table>

Mean: 3.90

11. I have gained an ability to identify, formulate and solve problems related to material properties and selection of appropriate materials.

<table>
<thead>
<tr>
<th>Response Value</th>
<th>2</th>
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<th>4</th>
<th>5</th>
<th>6</th>
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</thead>
<tbody>
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<td>10</td>
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<td>1</td>
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</table>

Mean: 4.24

12. I have gained skills using tools such as spreadsheets to analyze and graphically present experimental data.

<table>
<thead>
<tr>
<th>Response Value</th>
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<th>5</th>
<th>6</th>
<th>Total Responding</th>
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<td>1</td>
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<td>9</td>
<td>8</td>
<td>21</td>
</tr>
</tbody>
</table>

Mean: 5.05

Score Type Name: True/False

1. I understand that the ABET survey questions address course objectives not comments on the instructor's effectiveness.

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>20</td>
<td>1</td>
<td>21</td>
</tr>
</tbody>
</table>

Mean: 1.65

Survey Response Summary 3/31/2002 4:04PM
2. I understand that questions with the numerical scale, 1 - 6, use "1" to mean "Strongly Disagree" and "6" to mean "Strongly Agree."

<table>
<thead>
<tr>
<th>Response Value</th>
<th>Count of Responses</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>21</td>
<td>21</td>
</tr>
</tbody>
</table>

Score Type Mean: 1.02
IV.10 57:017 Computers in Engineering

Summer '01: Not offered.

Fall '01: Mapping of final-exam question average scores to learning objectives revealed high miss rate on questions dealing with interrupts and top-down structured design. This belies satisfactory performance on other questions related to these goals. Review of student work does not reveal any notable problems. Students continue to be dissatisfied with the second two lab experiments. Course is slated for complete redesign prior to 2002-03 AY. Therefore no reason exists to implement significant short-term changes at this time. Additional class time should be devoted to motivating and explaining the second two lab experiments, and arranging relevant help sessions if necessary. EASY survey should be revised to include questions directly related to course learning goals rather than Criterion 3 outcomes. Mapping of final-exam question performance to course learning goals should be continued. Procedures for timely repair of lab equipment should be improved. Textbook is well-liked by students.

Spring '02: Numerical course-goal survey data not available due to EASY system data loss. Assessment based on examination of student work and evaluation of examination question results. Exam results suggest weakness in achieving goals A, C, and I (advanced C programming concepts). Other learning goals appear to be met. Additional time was spent on setting second two labs into context. Recommend better focus on advanced C concepts and data structures (taking advantage of new structure of 59:006), and integration of lab experiences with these advanced programming notions. Recommend significant revision of course learning goals, see CAR. There is concern for insufficient lab stations if course enrollment exceeds 70 students. Textbook should be replaced by one that better covers advanced C data structures.

Overall Assessment: Assessment process is working well and leading to course improvement. Proposed course changes are articulated with changes to prerequisite course 57/59:006.
## Course Outcomes Worksheet (COW)

### 57:017 Computers in Engineering  
**FALL 2001**

Created 6 November 2000 by Forrest M. Holly  
Last modified 15 November 2000 by C.C. Swan

<table>
<thead>
<tr>
<th>Course Goals</th>
<th>Supports ABET Outcomes</th>
<th>Course Activity</th>
<th>Basis for Course-Goal Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding of, and facility with, the C programming language.</td>
<td>A(●), K(●)</td>
<td>Homework and exams test the students abilities in this area. Computer programs in the C programming languages are designed and developed by the students.</td>
<td>EASY survey assessment by students and instructor</td>
</tr>
<tr>
<td>Understanding of the principles of top-down structured development of software.</td>
<td>A(●), K(●)</td>
<td>Homework and exams test the students abilities in this area. Students practice writing algorithms using pseudo-code and flowcharts for some of the homework problems written in the C programming language.</td>
<td>EASY survey assessment by students and instructor</td>
</tr>
<tr>
<td>Understanding of parameter passage (by value versus by reference), pointers, and dynamic memory allocation/deallocation.</td>
<td>A(●), K(●)</td>
<td>Homework and exams test the students abilities in this area. Computer programs in the C programming languages are designed and developed by the students.</td>
<td>EASY survey assessment by students and instructor</td>
</tr>
<tr>
<td>Understanding of internal data representations used by computers for integer, floating point, and character data.</td>
<td>A(●), K(●)</td>
<td>Exams and lab projects test the students abilities in this area. Students perform lab projects that require and understanding of the internal data representations used</td>
<td>EASY survey assessment by students and instructor</td>
</tr>
<tr>
<td>Topic</td>
<td>A, K</td>
<td>Description</td>
<td>Assessment Method</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>------</td>
<td>-----------------------------------------------------------------------------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td>Basic understanding of the architectural organization of computer systems.</td>
<td>A(●), K(●)</td>
<td>Exams and lab projects test the students abilities in this area. Students perform lab projects that require and understanding of the architectural organization of computer systems.</td>
<td>EASY survey assessment by students and instructor</td>
</tr>
<tr>
<td>Basic understanding of device interfaces.</td>
<td>A(●), C(●), K(●)</td>
<td>Exams and lab projects test the students abilities in this area. Students perform lab projects that require and understanding of device interfaces.</td>
<td>EASY survey assessment by students and instructor</td>
</tr>
<tr>
<td>Understanding of the basics of serial and parallel input/output.</td>
<td>A(●), C(●), K(●)</td>
<td>Exams and lab projects test the students abilities in this area. Students perform lab projects that require an understanding of parallel input/output.</td>
<td>EASY survey assessment by students and instructor</td>
</tr>
<tr>
<td>Understanding of analog-to-digital and digital-to-analog conversion.</td>
<td>A(●), K(●)</td>
<td>Exams and lab projects test the students abilities in this area. Students perform lab projects that require an understanding of analog-to-digital and digital-to-analog conversion.</td>
<td>EASY survey assessment by students and instructor</td>
</tr>
<tr>
<td>Basic understanding of interrupts and their role in input/output operations.</td>
<td>A(●), K(●)</td>
<td>Exams test the students understanding of interrupts and their role in input/output operations.</td>
<td>EASY survey assessment by students and instructor</td>
</tr>
</tbody>
</table>

○ denotes moderate contribution to the outcome ● denotes substantial contribution to the outcome
Course Assessment Report
College of Engineering
The University of Iowa
(Revision of 27 November 2001)

<table>
<thead>
<tr>
<th>Course Number:</th>
<th>57:017</th>
<th>Semester/Year</th>
<th>Fall, 2001</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Name:</td>
<td>Computers in Engineering</td>
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</tbody>
</table>

**COORDINATOR:** ANDREW WILLIAMS
**SIGNATURE:**

**DATE:** 03/20/02

**INSTRUCTOR:** Andrew Williams
**SIGNATURE:** (optional)

**OTHER:** Jon Kuhl
**SIGNATURE:** (optional)

Please attach the course syllabus and course outcomes worksheet (COW).

Assessment Techniques:
Please indicate which of the following techniques were used in assessing the course and your judgment of their utility in assessing achievement of the Course Learning Goals.

<table>
<thead>
<tr>
<th>Assessment Technique</th>
<th>Used, provided useful data</th>
<th>Used, not recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Exams</td>
<td>X</td>
<td></td>
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<tr>
<td>Quizzes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Projects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Written Reports (other than projects)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Oral Reports</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student Self-Evaluation</td>
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<td>Student Peer-Evaluation</td>
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<tr>
<td>Course Portfolios</td>
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</tr>
<tr>
<td>Class Surveys (e.g., EASY)</td>
<td>X</td>
<td></td>
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<tr>
<td>Instructor Observation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other [specify]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. **ASSESSMENT RESULTS:** (How were *each* of the course learning goals (from the COW) achieved? Support your assessments qualitatively and/or quantitatively with data from each of the assessment techniques used (see Table on previous page). Explain the relation of the present assessment results to previous ones.)

Overall, learning goals are being met. Mapping of average scores on final exam questions to learning objectives revealed high miss rate on several questions dealing with interrupts (learning goal i) and one question dealing with top-down structured design (learning goal b). However, performance on other questions related to these goals does not indicate a significant problem with overall comprehension in these areas. Since this is the first semester in which this mapping has been done, there is no past assessment data with which to compare these results. Mean scores on the EASY questionnaire were generally in the "slightly agree" to "moderately agree" category with respect to satisfaction of relevant ABET outcomes and these results are comparable to past semesters. However, since the questions were not tied directly to course learning goals it is a little difficult to interpret the results in terms of the learning goals. Sample exams, homework assignments, and lab reports show the normal range of performance and do not reveal any notable problems. Students continue to express dissatisfaction with the second two laboratory experiments.

2. **SUMMARY OF RECENT REMEDIAL ACTIONS:** (and their estimated effect)

None

3. **RECOMMENDED NEW REMEDIAL ACTIONS, IF ANY:**

This course is slated for a complete redesign prior to the 2002-03 AY as a result of the new college curriculum and the new ECE curriculum. Since the current course appears to be running smoothly and meeting its goals, there is no reason to implement significant short-term changes at this time. The student dissatisfaction with the second two lab experiments should be addressed by devoting additional class time to motivating and explaining these experiments and, if necessary, arranging additional help sessions for students.

4. **RECOMMENDED CHANGES TO COURSE LEARNING GOALS:**

No changes to course learning goals are recommended at this time. When the course is redesigned for the 2002-03 AY, a complete revamping of the learning goals should be undertaken.

5. **RECOMMENDED MODIFICATIONS TO ASSESSMENT TECHNIQUES:**

The EASY survey should be revised to include questions directly related to course learning goals rather and to ABET program outcomes.

The practice of mapping performance on final exam questions to learning goals should be continued.
6. SIGNIFICANT DEVIATIONS IN COURSE CONTENT FROM SYLLABUS (SUMMARIZE):
None.

COURSE SUPPORT
TA SUPPORT FROM THE COLLEGE (IN TERMS OF FTE): 1 FTE

OTHER TA SUPPORT AND SOURCE (IN TERMS OF FTE): none

TA RESPONSIBILITIES:
Grade homework and lab reports, hold office hours, conduct labs.

WAS THE TA SUPPORT ALLOCATED TO YOUR SECTION SUFFICIENT? PLEASE ELABORATE.
Yes

IF USED, WAS THE COMPUTER HARDWARE AND SOFTWARE SUPPORT FROM CSS
ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.
Yes

WERE THE FACILITIES (CLASSROOM, LABS, ETC.) ADEQUATE? PLEASE ELABORATE WITH
SUGGESTIONS FOR IMPROVEMENT.
Addition of several new lab stations has helped to alleviate overcrowding in the lab. However, at least one
lab station failed during the semester. Procedures for timely repair of lab equipment need to be improved.

COURSE ORGANIZATION/CONTENTS
LECTURE (HOURS/WEek): 3 DISCUSSION (HOURS/WEek): 0

LABORATORY (HOURS/WEek): 2 (last 8 weeks of semester) TOTAL NUMBER OF STUDENTS: 61

TEXTBOOK AUTHOR AND TITLE:
Deitel & Deitel, C- How to Program, Prentice Hall, 2001

PLEASE COMMENT ON THE SUITABILITY OF THE TEXTBOOK AND ITS TIMELY
AVAILABILITY.
Textbook is well-liked by students. The edition is new in 2001 and is readily available.

TEACHING AIDS:

PLEASE ATTACH A COPY OF THE SYLLABUS THAT WAS DISTRIBUTED TO THE CLASS, A SAMPLE OF CLASS HANDOUTS IF AVAILABLE, AND THE COURSE ASSESSMENT WORKSHEET (COW) FOR THE COURSE. USE THE SPACE BELOW TO DESCRIBE ANY PARTICULAR PROBLEMS YOU MIGHT HAVE HAD WITH THIS COURSE (E.G., UNUSUAL ATTRITION, LACK OF PREREQUISITES, UNUSUAL GRADE DISTRIBUTION, ETC.) OR ANY INNOVATIONS/IDEAS THAT SHOULD BE CONSIDERED IN THE FUTURE.
Course Assessment Report  
College of Engineering  
The University of Iowa  
(Revision of 27 November 2001)

<table>
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<th>Semester/Year</th>
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<td>Course Name:</td>
<td>Computers in Engineering</td>
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**COORDINATOR:** ANDREW WILLIAMS  
**DATE:** 5/21/02  
**INSTRUCTOR:** JON KUHL  
**OTHER:** TOM CASAVANT  
**SIGNATURE:**

*Please attach the course syllabus and course outcomes worksheet (COW).*

**Assessment Techniques:**

Please indicate which of the following techniques were used in assessing the course and your judgment of their utility in assessing achievement of the Course Learning Goals.

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<td>Written Reports (other than projects)</td>
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<tr>
<td>Other (specify)</td>
<td></td>
<td></td>
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</tbody>
</table>
1. **ASSESSMENT RESULTS:** (How were each of the course learning goals (from the COW) achieved? Support your assessments qualitatively and/or quantitatively with data from each of the assessment techniques used (see Table on previous page). Explain the relation of the present assessment results to previous ones.)

Final exam results indicate some concern about learning objectives A and C, especially mastery of advanced C programming concept – pointers, dynamic memory allocation, etc. On questions related to learning objective C the miss rate averaged 35%. And on questions related to learning objective A the miss rate averaged 29%. There's also some concern about learning objective I which relates to interrupts. The miss rate on final exam questions related to this question reached 54%. All other learning objectives appear to be met.

2. **SUMMARY OF RECENT REMEDIAL ACTIONS: (and their estimated effect)**

More time was spent on explaining labs 2 and 3 and putting them into context. For example, lab 3 dealt with A/D and D/A conversion and instructor explained it into context of CD audio recording.

3. **RECOMMENDED NEW REMEDIAL ACTIONS, IF ANY:**

Take advantage of new 57:006 content to focus on advance C concepts and data structures. Try to better integrate laboratory experience with these advanced C programming notions. Current course organization does not allow students to do homework on these C programming concepts due to lab projects that are assigned. New course structure will allow advanced C programming course to be covered the first two thirds of the semester and the last semester cover the lab projects.

4. **RECOMMENDED CHANGES TO COURSE LEARNING GOALS:**

The course learning goals should be changed as follows:

Current goals E, G, H, and I should be deleted.

Current goal C should be split into two goals.

Three new goals should be added. The new course learning goals should be changed to:

A. The student will have an understanding of, and facility with, the C programming language.
B. The student will have an understanding of the principles of top-down structured development of software.
C. The student will have an understanding of recursion.
D. The student will have an understanding of parameter passage (by value versus by reference).
E. The student will have an understanding of pointers and dynamic memory allocation.
F. The student will have a basic understanding of device interfaces.
G. The student will have an understanding of advanced data structures in C (stacks, queues, trees and graphs).

5. **RECOMMENDED MODIFICATIONS TO ASSESSMENT TECHNIQUES:**

None.
6. SIGNIFICANT DEVIATIONS IN COURSE CONTENT FROM SYLLABUS (SUMMARIZE):
None.

COURSE SUPPORT

TA SUPPORT FROM THE COLLEGE (IN TERMS OF FTE): 1 FTE

OTHER TA SUPPORT AND SOURCE (IN TERMS OF FTE): none

TA RESPONSIBILITIES: Grade homework and lab reports, hold office hours, conduct labs.

WAS THE TA SUPPORT ALLOCATED TO YOUR SECTION SUFFICIENT? PLEASE ELABORATE.
Yes.

IF USED, WAS THE COMPUTER HARDWARE AND SOFTWARE SUPPORT FROM CSS ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.
Yes.

WERE THE FACILITIES (CLASSROOM, LABS, ETC.) ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.
Yes. However, if the class grows over 70 students, there will not be enough lab stations.

COURSE ORGANIZATION/CONTENTS

LECTURE (HOURS/WEEK): 3
DISCUSSION (HOURS/WEEK): 0

LABORATORY (HOURS/WEEK): 2 (last 8 weeks of semester)

TOTAL NUMBER OF STUDENTS: 66

TEXTBOOK AUTHOR AND TITLE:
Deitel and Deitel, C – How to Program, Prentice Hall, 2001

PLEASE COMMENT ON THE SUITABILITY OF THE TEXTBOOK AND ITS TIMELY AVAILABILITY.
The textbook does not cover advanced C data structures and therefore, a new one should be selected.
TEACHING AIDS:

PLEASE ATTACH A COPY OF THE SYLLABUS THAT WAS DISTRIBUTED TO THE CLASS, A SAMPLE OF CLASS HANDOUTS IF AVAILABLE, AND THE COURSE ASSESSMENT WORKSHEET (COW) FOR THE COURSE. USE THE SPACE BELOW TO DESCRIBE ANY PARTICULAR PROBLEMS YOU MIGHT HAVE HAD WITH THIS COURSE (E.G., UNUSUAL ATTRITION, LACK OF PREREQUISITES, UNUSUAL GRADE DISTRIBUTION, ETC.) OR ANY INNOVATIONS/IDEAS THAT SHOULD BE CONSIDERED IN THE FUTURE.
### College of Engineering EASY Survey Responses

**Results for:** 057/017; Computers In Engr; Section: AAA- Lecture

**Instructor(s):** A. Williams

**Session Code:** 20013  **Beginning On:** 12-01-01  **Running for:** 9 days

**Survey #:** 186  **Survey Name:** 05701706A-20004

**Base Set Used:** ABET  **Privacy:** Faculty Distribute  **Remarks:** ABET

#### Headings and Subheadings (Instructor) Used in Survey:
- **Heading(s):** Accreditation Board for Engineering and Technology (ABET) Survey
- **Subheading(s):** This survey was designed to provide feedback to your instructor on selected aspects of this course. Your responses should reflect YOUR INDIVIDUAL PERCEPTIONS, not those of the class as a whole.

#### Score Type Name: Disagree/Agree 1-6

<table>
<thead>
<tr>
<th>Score Value</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<tbody>
<tr>
<td>Count of Responses</td>
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<td>1</td>
<td>2</td>
<td>9</td>
<td>14</td>
<td>3</td>
<td>32</td>
</tr>
</tbody>
</table>

3. From this course I have gained an ability to apply knowledge of mathematics, science and engineering:

   **Mean:** 4.22

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
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<td>6</td>
<td>5</td>
<td>6</td>
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</tr>
</tbody>
</table>

5. From this course I have gained an ability to design and conduct experiments, as well as to analyze and interpret data:

   **Mean:** 4.6

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<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>14</td>
<td>6</td>
<td>7</td>
<td>31</td>
</tr>
</tbody>
</table>

7. From this course I have gained an ability to design a system, component, or process to meet desired needs:

   **Mean:** 4.6

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>8</td>
<td>7</td>
<td>8</td>
<td>31</td>
</tr>
</tbody>
</table>

9. From this course I have gained an ability to function on multi-disciplinary teams:

   **Mean:** 4.9

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>3</td>
<td>5</td>
<td>8</td>
<td>12</td>
<td>3</td>
<td>3</td>
<td>31</td>
</tr>
</tbody>
</table>

11. From this course I have gained an ability to identify, formulate, and solve engineering problems:

   **Mean:** 4.7

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>3</td>
<td>5</td>
<td>8</td>
<td>12</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>
13. From this course I have gained an understanding of professional and ethical responsibility:

   **Mean: 3.29**

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>5</td>
<td>5</td>
<td>7</td>
<td>8</td>
<td>2</td>
<td>4</td>
<td>31</td>
</tr>
</tbody>
</table>

15. From this course I have gained an ability to communicate effectively:

   **Mean: 3.42**

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>4</td>
<td>2</td>
<td>8</td>
<td>14</td>
<td>3</td>
<td>31</td>
</tr>
</tbody>
</table>

17. From this course I have gained the broad education necessary to understand the impact of engineering solutions in a global and societal context:

   **Mean: 3.42**

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>6</td>
<td>4</td>
<td>3</td>
<td>10</td>
<td>5</td>
<td>3</td>
<td>31</td>
</tr>
</tbody>
</table>

19. From this course I have gained a recognition of the need for, and an ability to engage in life-long learning:

   **Mean: 3.71**

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>5</td>
<td>1</td>
<td>4</td>
<td>14</td>
<td>2</td>
<td>5</td>
<td>31</td>
</tr>
</tbody>
</table>

21. From this course I have gained a knowledge of contemporary issues:

   **Mean: 3.48**

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>11</td>
<td>6</td>
<td>2</td>
<td>31</td>
</tr>
</tbody>
</table>

23. From this course I have gained an ability to use the techniques, skills and modern engineering tools necessary for engineering practice:

   **Mean: 4.74**

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>1</td>
<td>1</td>
<td>9</td>
<td>12</td>
<td>8</td>
<td>31</td>
</tr>
</tbody>
</table>

**Score Type Name: True/False**

1 - True
2 - False

Survey Response Summary: 3/31/2002 4:04PM
1. I understand that the ABET survey questions address course objectives not comments on the instructor's effectiveness.

   Mean: 1.03

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>32</td>
<td>1</td>
<td>33</td>
</tr>
</tbody>
</table>

2. I understand that questions with the numerical scale, 1 - 6, use "1" to mean 'Strongly Disagree' and "6" to mean 'Strongly Agree.'

   Mean: 1.02

<table>
<thead>
<tr>
<th>Response Value</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>32</td>
</tr>
</tbody>
</table>

Score Type Mean: 1.02
IV.11 57:018 Principles of Electronic Instrumentation

Summer 01: Assessment was based on instructor assessment and student work; no EASY survey was conducted. Students appear to be weak in application of critical thinking to problems of electronic circuit design. The other course goals seem to be relatively well met based on analysis of homework. Students develop strong lab skills in the course, despite the fast pace of the summer offering. Textbook is approaching obsolescence (going out of print). Course continues to suffer from lack of a reasonable version of the SPICE software on the CSS computer system.

Fall '01: EASY survey response rate was low, but detailed analysis of final exam question performance complemented by EASY results provided a useful basis for assessment of course-goal achievement. Course goal 1 (regarding ability to think critically) was not strongly achieved, indicating the need for more student development in this area. Course goals 2 and 4, dealing with circuit design, were more strongly achieved; but course goal 3, dealing with diode circuits, was weaker (this could be an artifact of the assessment process.) Students achieve significant growth in their electronic laboratory skills. It is recommended that greater emphasis be put on development of critical-thinking and problem-solving skills and engineering intuition in solving design problems. The course will need to revised somewhat as a new textbook is phased in to replace the present text that is going out of print. As is the case for some other electrical and computer engineering courses, the lack of a broadly supported version of the SPICE software on the CSS system is a continuing problem.

Spring '02: Numerical course-goal survey data not available due to EASY system data loss. Assessment was based primarily on instructor observation and detailed analysis of exam and homework performance relative to each of the five individual course goals. Overall, recent changes in the course appear to be resulting in more satisfactory achievement of the course goals, though the goal of development of critical thinking skills on the part of students continues to be problematic. The need to phase-in a new textbook remains. The continuing lack of a college-supported version of SPICE compatible with textbooks is viewed as a major problem.

Overall Assessment

The procedures for detailed assessment of course goals, and in particular the combined, interactive analysis of both exam/homework performance and student self-assessment, appear to be working well and resulting in continuous improvement of the course. It is anticipated that the continuing issue of College-level support for the SPICE software will be resolved as the College Curriculum Committee is given responsibility for core-course software recommendations during the 2002-2003 academic year.
### Course Outcomes Worksheet (COW)

#### 57:018 Principles of Electronic Instrumentation

<table>
<thead>
<tr>
<th>Course Goals</th>
<th>Supports ABET Outcomes</th>
<th>Course Activity</th>
<th>Basis for Course-Goal Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Ability to think critically and to apply problem solving and reasoning strategies to analysis of electronic circuits</td>
<td>A(●), E(●)</td>
<td>Class discussion, homework assignments</td>
<td>Instructor assessment of classroom interactions, EASY survey assessment by students and instructor, Exams</td>
</tr>
<tr>
<td>2. Ability to analyze operational amplifier circuits</td>
<td>A(●), E(●), K(●)</td>
<td>Class discussion, homework assignments</td>
<td>EASY survey assessment by students and instructor, Exams</td>
</tr>
<tr>
<td>3. Ability to analyze diode circuits</td>
<td>A(●), E(●), K(●)</td>
<td>Class discussion, homework assignments</td>
<td>EASY survey assessment by students and instructor, Exams</td>
</tr>
<tr>
<td>4. Ability to analyze BJT and FET circuits and gain some experience with design of transistor circuits</td>
<td>A(●), C(●), E(●), K(●)</td>
<td>Class discussion, homework assignments</td>
<td>EASY survey assessment by students and instructor, Exams</td>
</tr>
<tr>
<td>5. Ability to use electronic instruments to make basic electrical measurements and perform experiments</td>
<td>A(●), B(●), K(●)</td>
<td>Class discussion, homework assignments</td>
<td>EASY survey assessment by students and instructor, Lab reports</td>
</tr>
</tbody>
</table>

○ denotes moderate contribution to the outcome  ● denotes substantial contribution to the outcome
Course Assessment Report
College of Engineering
The University of Iowa
(Revision of 27 November 2001)

Course Number: 57:018  Semester/Year: Summer, 2001
Course Name: Principles of Electronic Instrumentation

COORDINATOR: S. M. Collins  SIGNATURE: 

DATE: 4/29/02

INSTRUCTOR: S. M. Collins  SIGNATURE: (optional)

OTHER : SIGNATURE: (optional)

Please attach the course syllabus and course outcomes worksheet (COW).

Assessment Techniques:
Please indicate which of the following techniques were used in assessing the course and your judgment of their utility in assessing achievement of the Course Learning Goals.

<table>
<thead>
<tr>
<th>Assessment Technique</th>
<th>Used, provided useful data</th>
<th>Used, not recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual Homework Scores</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Exams</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quizzes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Projects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Written Reports (other than projects)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oral Reports</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student Self-Evaluation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student Peer-Evaluation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course Portfolios</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class Surveys (e.g., EASY)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instructor Observation</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Other [specify]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

185
1. **ASSESSMENT RESULTS**: (How were each of the course learning goals (from the COW) achieved? Support your assessments qualitatively and/or quantitatively with data from each of the assessment techniques used (see Table on previous page). Explain the relation of the present assessment results to previous ones.)

Students come into this class with limited ability to think critically and to apply problem solving and reasoning strategies to analysis of electronic circuits (course goal 1). This result is not surprising as most students have grown accustomed to absorbing facts and procedures as they are presented by the instructor without thinking too much about how to make effective use of that knowledge. It was apparent from classroom interactions that students benefited from the small class size in summer and made significant progress during the course of the semester.

Students did reasonably well on course goals 2, 3 & 4 as demonstrated by student responses to homework assignments directed at the individual goals (Table 1). The average student response was quite high and the variability modest. This conclusion must be tempered by the recognition that some students get help on their homework and/or have access to solutions from earlier offerings of the course. Students were quite conscientious about doing their homework in spite of the fast pace of the summer session - all but one student did all of the homework and that student did all but one homework assignment.

Students come into this course with very limited laboratory skills. Attendance at lab is required and all students completed all 11 lab experiments (Table 4). The high attendance rate and the uniformly high scores on laboratory reports (Table 3) indicate that students achieved significant growth in their electronic laboratory skills. This comes at a high cost in terms of student time but is clearly a benefit of completing the course.

2. **SUMMARY OF RECENT REMEDIAL ACTIONS**: (and their estimated effect)

Given the small size of the class, I put greater emphasis on creating a learning community in which everybody contributes to class discussion.

3. **RECOMMENDED NEW REMEDIAL ACTIONS, IF ANY**

Textbook will need to be changed in the not too distant future as it is out of print. Because the book is unique in its approach, the course will need to be redesigned somewhat when the text is changed.

The fact that a reasonable version of SPICE is not support on ECN computers means that this course is out of date with respect to courses that are offered elsewhere and the textbooks that are currently being published. More importantly, it means we are not able to take advantage of a very powerful pedagogical tool to help students learn.
4. RECOMMENDED CHANGES TO COURSE LEARNING GOALS:

No changes are recommended at this time.

5. RECOMMENDED MODIFICATIONS TO ASSESSMENT TECHNIQUES:

Use scores on individual final exam questions to assess course goals 1-4 and EASY survey to add information about course goal 5.

6. SIGNIFICANT DEVIATIONS IN COURSE CONTENT FROM SYLLABUS (SUMMARIZE):

None. Given that the summer session is shortened compared to a "regular" semester (eight weeks and 39 class meetings) it was necessary to drop two laboratory experiments and to decrease the amount of lecture time spent on all topics.

COURSE SUPPORT

TA SUPPORT FROM THE COLLEGE (IN TERMS OF FTE): 0.75

OTHER TA SUPPORT AND SOURCE (IN TERMS OF FTE): None

TA RESPONSIBILITIES: See attached Composite List of Duties Assigned to Teaching Assistants document that formed the basis for individual letters to the two TAs dated 6/4/01.

WAS THE TA SUPPORT ALLOCATED TO YOUR SECTION SUFFICIENT? PLEASE ELABORATE.

One half-time and one quarter-time TA was more than an adequate level of support. Both TAs were junior and inexperienced in teaching this course and that created some transition problems.

IF USED, WAS THE COMPUTER HARDWARE AND SOFTWARE SUPPORT FROM CSS ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

Hardware support was fine. The fact that a contemporary version of SPICE with a reasonable user interface (input and output) and modest functionality is not available is a major problem.

WERE THE FACILITIES (CLASSROOM, LABS, ETC.) ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

Yes.
COURSE ORGANIZATION/CONTENTS

LECTURE (HOURS/WEEK): 5  DISCUSSION (HOURS/WEEK): 0
LABORATORY (HOURS/WEEK): 4  TOTAL NUMBER OF STUDENTS: 11

TEXTBOOK AUTHOR AND TITLE:


PLEASE COMMENT ON THE SUITABILITY OF THE TEXTBOOK AND ITS TIMELY AVAILABILITY.

No problem with availability. It is a very good book. It is well written and well organized. Will need to be changed in the not too distant future as it is out of print.

TEACHING AIDS:

Colored chalk.

PLEASE ATTACH A COPY OF THE SYLLABUS THAT WAS DISTRIBUTED TO THE CLASS, A SAMPLE OF CLASS HANDOUTS IF AVAILABLE, AND THE COURSE ASSESSMENT WORKSHEET (COW) FOR THE COURSE. USE THE SPACE BELOW TO DESCRIBE ANY PARTICULAR PROBLEMS YOU MIGHT HAVE HAD WITH THIS COURSE (E.G., UNUSUAL ATTRITION, LACK OF PREREQUISITES, UNUSUAL GRADE DISTRIBUTION, ETC.) OR ANY INNOVATIONS/IDEAS THAT SHOULD BE CONSIDERED IN THE FUTURE.

Course procedures document attached.

It would be a major boon to the course to have a modern version of SPICE available on ECN computers.

Attachments
Course Outcome Analysis
COW
Procedures document
Composite List of Duties Assigned to Teaching Assistants document
Course Outcomes Analysis
57:018 Principles of Electronic Instrumentation - Summer 2001

Table 1: Summary of student responses to a set of homework assignments related to each of the course goals 2 to 4 identified on the Course Outcomes worksheet (COW) and listed in Table 2. Responses are expressed as a percent of the maximum possible score for each set of assignments.

<table>
<thead>
<tr>
<th>Goal 2</th>
<th>Goal 3</th>
<th>Goal 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>82%</td>
<td>79%</td>
</tr>
<tr>
<td>S.D.</td>
<td>17%</td>
<td>13%</td>
</tr>
<tr>
<td>Median</td>
<td>90%</td>
<td>77%</td>
</tr>
<tr>
<td>Maximum</td>
<td>97%</td>
<td>100%</td>
</tr>
<tr>
<td>Minimum</td>
<td>44%</td>
<td>53%</td>
</tr>
</tbody>
</table>

Table 2: Course goals with corresponding homework assignments and maximum points possible for each set of homework assignments.

<table>
<thead>
<tr>
<th>Course Goals</th>
<th>Homework Assignments</th>
<th>Max Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Ability to think critically and to apply problem solving and reasoning strategies to analysis of electronic circuits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Ability to analyze operational amplifier circuits</td>
<td>2</td>
<td>39</td>
</tr>
<tr>
<td>3. Ability to analyze diode circuits</td>
<td>3, 4</td>
<td>30</td>
</tr>
<tr>
<td>4. Ability to analyze BJT and FET circuits and gain some experience with design of transistor circuits</td>
<td>5, 6, 7</td>
<td>72</td>
</tr>
</tbody>
</table>

Note: Homework questions often relate to multiple course goals. For purposes of this analysis each homework assignment was identified with the single course goal to which it most closely related.

Table 3: Indicator related to course goal 5. Summary of student laboratory scores. Lab score expressed as a percent of the maximum possible score of 220.

<table>
<thead>
<tr>
<th>Total lab score</th>
<th>Average</th>
<th>S. D.</th>
<th>Median</th>
<th>Max</th>
<th>Min</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>92%</td>
<td>2%</td>
<td>92%</td>
<td>93%</td>
<td>86%</td>
</tr>
</tbody>
</table>

Course goal 5: Ability to use electronic instruments to make basic electrical measurements and perform experiments.
Table 4: Indicator related to course goal 5. Summary of student laboratory attendance rates.

<table>
<thead>
<tr>
<th>Attendance rate</th>
<th>100%</th>
<th>92%</th>
<th>85%</th>
<th>77%</th>
<th>&lt;77%</th>
</tr>
</thead>
<tbody>
<tr>
<td># students</td>
<td>11</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>% of students</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5: Individual student responses to sets of homework assignments related to each of course goals two to four and lab scores together with the overall z-score for the course. The final course grade is assigned based on the course z-score. Student responses are presented from highest to lowest z-score.

<table>
<thead>
<tr>
<th>Z-score</th>
<th>Goal 2 Assignments</th>
<th>Goal 3 Assignments</th>
<th>Goal 4 Assignments</th>
<th>Lab score (Goal 5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>58.1</td>
<td>36</td>
<td>26</td>
<td>66</td>
<td>203</td>
</tr>
<tr>
<td>55.5</td>
<td>34</td>
<td>22</td>
<td>70</td>
<td>204</td>
</tr>
<tr>
<td>54.9</td>
<td>17</td>
<td>21</td>
<td>67</td>
<td>202</td>
</tr>
<tr>
<td>53.2</td>
<td>31</td>
<td>22</td>
<td>57</td>
<td>199</td>
</tr>
<tr>
<td>53.0</td>
<td>35</td>
<td>23</td>
<td>67</td>
<td>204</td>
</tr>
<tr>
<td>52.1</td>
<td>36</td>
<td>29</td>
<td>66</td>
<td>204</td>
</tr>
<tr>
<td>47.9</td>
<td>37</td>
<td>26</td>
<td>72</td>
<td>205</td>
</tr>
<tr>
<td>47.3</td>
<td>36</td>
<td>26</td>
<td>64</td>
<td>203</td>
</tr>
<tr>
<td>46.0</td>
<td>38</td>
<td>30</td>
<td>67</td>
<td>205</td>
</tr>
<tr>
<td>43.5</td>
<td>22</td>
<td>21</td>
<td>42</td>
<td>189</td>
</tr>
<tr>
<td>34.7</td>
<td>30</td>
<td>16</td>
<td>48</td>
<td>201</td>
</tr>
</tbody>
</table>

Note: The z-score is a weighted combination of z-scores for the various components of the course (exams, homeworks, labs, etc). For example, a student's raw score on an exam is converted to a z-score by subtracting the class mean, dividing the difference by the class standard deviation, multiplying by 10, and adding 50. Thus, a student with a z-score of 65, performed at a level 1.5 standard deviations above the class average.
Course Assessment Report
College of Engineering
The University of Iowa
(Revision of 27 November 2001)

<table>
<thead>
<tr>
<th>Course Number:</th>
<th>57:018</th>
<th>Semester/Year</th>
<th>Fall, 2001</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Name:</td>
<td></td>
<td></td>
<td>Principles of Electronic Instrumentation</td>
</tr>
</tbody>
</table>

**COORDINATOR:** S. M. Collins  
**SIGNATURE:** [Signature]

**DATE:** 4/25/02

**INSTRUCTOR:** S. M. Collins  
**SIGNATURE:** (optional)

**OTHER:**  
**SIGNATURE:** (optional)

*Please attach the course syllabus and course outcomes worksheet (COW).*

**Assessment Techniques:**
Please indicate which of the following techniques were used in assessing the course and your judgment of their utility in assessing achievement of the Course Learning Goals.

<table>
<thead>
<tr>
<th>Assessment Technique</th>
<th>Used, provided useful data</th>
<th>Used, not recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Exams</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Quizzes</td>
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<td>Written Reports (other than projects)</td>
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<td>Oral Reports</td>
<td></td>
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<tr>
<td>Student Self-Evaluation</td>
<td></td>
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<tr>
<td>Course Portfolios</td>
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<tr>
<td>Class Surveys (e.g., EASY)</td>
<td>X</td>
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<tr>
<td>Instructor Observation</td>
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<tr>
<td>Other [specify]</td>
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</tbody>
</table>

191
1. **ASSESSMENT RESULTS:** (How were each of the course learning goals (from the COW) achieved? Support your assessments qualitatively and/or quantitatively with data from each of the assessment techniques used (see Table on previous page). Explain the relation of the present assessment results to previous ones.)

Although the response rate was low, the students who participated in the EASY survey were quite positive (mean response of 5.45) about their ability to think critically and to apply problem solving and reasoning strategies to analysis of electronic circuits (course goal 1). The class as a whole nonetheless did not do particularly well on final exam questions that required students to draw upon these skills (see Table 1 in attached Course Outcome Analysis). This result is not surprising as most students that enter the course have grown accustomed to absorbing facts and procedures as they are presented by the instructor without thinking too much about how to make effective use of that knowledge. Although it was apparent from classroom interactions that students made significant progress during the course of the semester, they still need more development in this area.

Students did reasonably well on course goals 2 & 4 as demonstrated by student responses to exam questions directed at the individual goals (Table 1). The average and variability of student responses were consistent with the way I design exams (i.e. for a mean response in the neighborhood of 65% and a standard deviation of about 20%). Students didn’t appear to do quite as well on diode circuits (course goal 3). This may have been an artifact of the fact that only two questions were asked on diode circuits and/or the grading process. I am of the opinion that students had no particular problem with diode circuits, a conclusion that is supported by the fact that the average and standard deviation of scores on the three homework assignments related to diodes were similar to those on other homework assignments. Students who participated in the EASY survey were quite positive (mean response of 5.45) about their understanding of the basic principles of electronic devices and systems and their ability to apply that understanding to the analysis of electronic circuits.

Students come into this course with very limited laboratory skills. Attendance at lab is required and nearly all students complete all 13 lab experiments (Table 4). Those few students who do miss lab suffer a substantial grade penalty. The high attendance rate, high scores on laboratory reports (Table 3), and the responses to the EASY survey all indicate that students achieve significant growth in their electronic laboratory skills. This comes at a high cost in terms of student time but is clearly a benefit of completing the course.

2. **SUMMARY OF RECENT REMEDIAL ACTIONS:** (and their estimated effect)

Put greater emphasis on helping students develop their critical thinking, problem solving skills and engineering intuition and applying these skills and intuition to design problems.
3. RECOMMENDED NEW REMEDIAL ACTIONS, IF ANY:

Textbook will need to be changed in the not too distant future as it is out of print. Because the book is unique in its approach, the course will need to be redesigned somewhat when the text is changed.

The fact that a reasonable version of SPICE is not support on ECN computers means that this course is out of date with respect to courses that are offered elsewhere and the textbooks that are currently being published. More importantly, it means we are not able to take advantage of a very powerful pedagogical tool to help students learn.

4. RECOMMENDED CHANGES TO COURSE LEARNING GOALS:

No changes are recommended at this time.

5. RECOMMENDED MODIFICATIONS TO ASSESSMENT TECHNIQUES:

No changes are recommended at this time.

6. SIGNIFICANT DEVIATIONS IN COURSE CONTENT FROM SYLLABUS (SUMMARIZE):

None.

COURSE SUPPORT

TA SUPPORT FROM THE COLLEGE (IN TERMS OF FTE): 1.0

OTHER TA SUPPORT AND SOURCE (IN TERMS OF FTE): None

TA RESPONSIBILITIES: See attached Composite List of Duties Assigned to Teaching Assistants document that formed the basis for individual letters to the two TAs dated 8/28/01.

WAS THE TA SUPPORT ALLOCATED TO YOUR SECTION SUFFICIENT? PLEASE ELABORATE.

Two half-time TAs was an adequate level of support. Both TAs were junior and inexperienced in teaching this course and that created some transition problems. In addition, there was a prolonged problem early in the semester with the TAs not having keys to get into the lab and their offices at the beginning of the semester.
IF USED, WAS THE COMPUTER HARDWARE AND SOFTWARE SUPPORT FROM CSS ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

Hardware support was fine. The fact that a contemporary version of SPICE with a reasonable user interface (input and output) and modest functionality is not available is a major problem.

WERE THE FACILITIES (CLASSROOM, LABS, ETC.) ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

A problem with needed equipment being located in another room.

COURSE ORGANIZATION/CONTENTS

LECTURE (HOURS/WEEK): 3       DISCUSSION (HOURS/WEEK): 0
LABORATORY (HOURS/WEEK): 2     TOTAL NUMBER OF STUDENTS: 44

TEXTBOOK AUTHOR AND TITLE:


PLEASE COMMENT ON THE SUITABILITY OF THE TEXTBOOK AND ITS TIMELY AVAILABILITY.

No problem with availability. It is a very good book It is well written and well organized. Will need to be changed in the not too distant future as it is out of print.

TEACHING AIDS:

Colored chalk.

PLEASE ATTACH A COPY OF THE SYLLABUS THAT WAS DISTRIBUTED TO THE CLASS, A SAMPLE OF CLASS HANDOUTS IF AVAILABLE, AND THE COURSE ASSESSMENT WORKSHEET (COW) FOR THE COURSE. USE THE SPACE BELOW TO DESCRIBE ANY PARTICULAR PROBLEMS YOU MIGHT HAVE HAD WITH THIS COURSE (E.G., UNUSUAL ATTENTION, LACK OF PREREQUISITES, UNUSUAL GRADE DISTRIBUTION, ETC.) OR ANY INNOVATIONS/IDEAS THAT SHOULD BE CONSIDERED IN THE FUTURE.

Course procedures document attached.

It would be a major boon to the course to have a modern version of SPICE available on ECN computers.

Attachments
Course Outcome Analysis
EASY survey results
COW
Procedures document
Composite List of Duties Assigned to Teaching Assistants document
Six examples of student exams
Course Outcomes Analysis
57:018 Principles of Electronic Instrumentation - Fall 2001

Table 1: Summary of student responses to a set of final exam questions related to each of the course goals identified on the Course Outcomes worksheet (COW) and listed in Table 2. Responses are expressed as a percent of the maximum possible score for each set of questions.

<table>
<thead>
<tr>
<th></th>
<th>Goal 1</th>
<th>Goal 2</th>
<th>Goal 3</th>
<th>Goal 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>35%</td>
<td>61%</td>
<td>53%</td>
<td>62%</td>
</tr>
<tr>
<td>S.D.</td>
<td>17%</td>
<td>13%</td>
<td>24%</td>
<td>16%</td>
</tr>
<tr>
<td>Median</td>
<td>32%</td>
<td>65%</td>
<td>50%</td>
<td>63%</td>
</tr>
<tr>
<td>Maximum</td>
<td>88%</td>
<td>81%</td>
<td>95%</td>
<td>98%</td>
</tr>
<tr>
<td>Minimum</td>
<td>12%</td>
<td>23%</td>
<td>0%</td>
<td>6%</td>
</tr>
</tbody>
</table>

Table 2: Course goals with corresponding set of final exam questions and maximum points possible for each set.

<table>
<thead>
<tr>
<th>Course Goals</th>
<th>Final Exam Questions</th>
<th>Max Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Ability to think critically and to apply problem solving and reasoning strategies to analysis of electronic circuits</td>
<td>2, 16, 17, 18, 22, 24, 26</td>
<td>59</td>
</tr>
<tr>
<td>2. Ability to analyze operational amplifier circuits</td>
<td>1, 4, 5, 6, 9, 10, 11, 12, 14, 19, 21</td>
<td>124</td>
</tr>
<tr>
<td>3. Ability to analyze diode circuits</td>
<td>15, 20</td>
<td>20</td>
</tr>
<tr>
<td>4. Ability to analyze BJT and FET circuits and gain some experience with design of transistor circuits</td>
<td>3, 7, 8, 13, 23, 25, 27</td>
<td>64</td>
</tr>
</tbody>
</table>

Note: Exam questions often relate to multiple course goals. For purposes of this analysis each exam question was identified with the single course goal to which it most closely related.

Table 3: Indicator related to course goal 5. Summary of student laboratory scores. Lab score expressed as a percent of the maximum possible score of 260.

<table>
<thead>
<tr>
<th></th>
<th>Average</th>
<th>S. D.</th>
<th>Median</th>
<th>Max</th>
<th>Min</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total lab score</td>
<td>91%</td>
<td>6%</td>
<td>93%</td>
<td>98%</td>
<td>69%</td>
</tr>
</tbody>
</table>

Course goal 5: Ability to use electronic instruments to make basic electrical measurements and perform experiments.
Table 4: Indicator related to course goal 5. Summary of student laboratory attendance rates.

<table>
<thead>
<tr>
<th>Attendance rate</th>
<th>100%</th>
<th>92%</th>
<th>85%</th>
<th>77%</th>
<th>&lt; 77%</th>
</tr>
</thead>
<tbody>
<tr>
<td># students</td>
<td>38</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>% of students</td>
<td>86%</td>
<td>7%</td>
<td>2%</td>
<td>5%</td>
<td></td>
</tr>
</tbody>
</table>

Table 5: Individual student responses to sets of final exam questions related to each of course goals one to four and lab scores together with the overall z-score for the course. The final course grade is assigned based on the course z-score. Student responses are presented from highest to lowest z-score.

<table>
<thead>
<tr>
<th>Z-score</th>
<th>Goal 1 Questions</th>
<th>Goal 2 Questions</th>
<th>Goal 3 Questions</th>
<th>Goal 4 Questions</th>
<th>Lab score (Goal 5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>62.8</td>
<td>52</td>
<td>91</td>
<td>19</td>
<td>55</td>
<td>230</td>
</tr>
<tr>
<td>62.3</td>
<td>34</td>
<td>96</td>
<td>16</td>
<td>48</td>
<td>255</td>
</tr>
<tr>
<td>59.9</td>
<td>17</td>
<td>93</td>
<td>16</td>
<td>48</td>
<td>255</td>
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<tr>
<td>59.6</td>
<td>23</td>
<td>89</td>
<td>12</td>
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<tr>
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<td>13</td>
<td>42</td>
<td>232</td>
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<td>24</td>
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<td>15</td>
<td>63</td>
<td>230</td>
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<td>85</td>
<td>17</td>
<td>41</td>
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<tr>
<td>57.9</td>
<td>43</td>
<td>85</td>
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<td>43</td>
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<td>36</td>
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<td>7</td>
<td>4</td>
<td>179</td>
</tr>
</tbody>
</table>

Note: The z-score is a weighted combination of z-scores for the various components of the course (exams, homeworks, labs, etc). For example, a student's raw score on an exam is converted to a z-score by subtracting the class mean, dividing the difference by the class standard deviation, multiplying by 10, and adding 50. Thus, a student with a z-score of 65, performed at a level 1.5 standard deviations above the class average.
Course Assessment Report
College of Engineering
The University of Iowa

<table>
<thead>
<tr>
<th>Course Number:</th>
<th>57:018</th>
<th>Semester/Year</th>
<th>Spring, 2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Name:</td>
<td>Principles of Electronic Instrumentation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**COORDINATOR:** S. M. Collins  
**SIGNATURE:**

**DATE:** 5/21/02  
**INSTRUCTOR:** S. M. Collins  
**SIGNATURE:** (optional)

**OTHER:**  
**SIGNATURE:** (optional)

Please attach the course syllabus and course outcomes worksheet (COW).

Assessment Techniques:
Please indicate which of the following techniques were used in assessing the course and your judgment of their utility in assessing achievement of the Course Learning Goals.

<table>
<thead>
<tr>
<th>Assessment Technique</th>
<th>Used, provided useful data</th>
<th>Used, not recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual Homework Scores</td>
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<td></td>
</tr>
<tr>
<td>Exams - individual question scores</td>
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<td></td>
</tr>
<tr>
<td>Quizzes</td>
<td></td>
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</tr>
<tr>
<td>Projects</td>
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<tr>
<td>Written Reports (other than projects)</td>
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</tr>
<tr>
<td>Oral Reports</td>
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<tr>
<td>Student Self-Evaluation</td>
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<tr>
<td>Student Peer-Evaluation</td>
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<td></td>
</tr>
<tr>
<td>Course Portfolios</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class Surveys (e.g., EASY)</td>
<td></td>
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</tr>
<tr>
<td>Instructor Observation</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Other [specify] Individual Lab Scores</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

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1. ASSESSMENT RESULTS: (How were each of the course learning goals (from the COW) achieved? Support your assessments qualitatively and/or quantitatively with data from each of the assessment techniques used (see Table on previous page). Explain the relation of the present assessment results to previous ones.)

Student responses to questions on the second hourly exam directed at goal 1 were encouraging (Table 5 in attached Course Outcome Analysis). The class as a whole nonetheless did not do particularly well on final exam questions that required students to draw upon these skills (see Table 1). This result is not surprising as most students that enter the course have grown accustomed to absorbing facts and procedures as they are presented by the instructor without thinking too much about how to make effective use of that knowledge. Although it was apparent from classroom interactions that students made significant progress during the course of the semester, they still need more development in this area.

Students did reasonably well on course goals 2 & 4 as demonstrated by student responses to final exam questions directed at the individual goals (Table 1). The average and variability of student responses were consistent with the way the instructor designs exams (i.e. for a mean response in the neighborhood of 65% and a standard deviation of about 20%). These data were similar to the results from Fall 2001. Students didn’t appear to do quite as well on diode circuits (course goal 3). This may have been an artifact of the grading process and/or the fact that only two questions were asked on diode circuits (one being a fairly difficult op amp and diode problem). The instructor is of the opinion that students had no particular problem with diode circuits, a conclusion that is supported by the fact that the average and standard deviation of scores on the homework assignments related to diodes were similar to those on other homework assignments.

Student responses to questions on the second hourly exam directed at goal 4 were quite good suggesting that students did grasp the essentials of BJT and FET circuit analysis (Table 5).

Students did well on course goals 2, 3 & 4 as demonstrated by student responses to homework assignments directed at the individual goals (Table 7). Most students were quite conscientious about doing their homework. The average student response was good. The variability was a bit high for the homeworks related to goals 3 and 4. This is in part due to the fall off in homework submission rates near the end of the semester. Conclusions drawn from analysis of homework scores must be tempered by the recognition that some students get help on their homework and/or have access to solutions from earlier offerings of the course. It should also be noted that in contrast to final exam scores which assess what students take away from the course, homework scores assess student performance while the course is in progress.

Students come into this course with very limited laboratory skills. Attendance at lab is required and nearly all students complete all 13 lab experiments (Table 4). Those few students who do miss lab suffer a substantial grade penalty including in one case earning a failing grade. The high attendance rate and high scores on laboratory reports (Table 3
both indicate that students achieve significant growth in their electronic laboratory skills. This comes at a high cost in terms of student time but is clearly a benefit of completing the course.

Table 9 shows the distribution of assigned course grades. The overall course grade point average (GPA) was 2.57. The grade distribution and GPA for this course are consistent with those for previous offerings of this course. The instructor has kept detailed statistics on overall course GPA, grade distributions, and grade breakpoints (absolute and standardized) for all courses he has taught since 1976. This information provides a reference to help ensure that grades assigned to individual students provide a meaningful assessment of their progress toward achieving course goals.

2. SUMMARY OF RECENT REMEDIAL ACTIONS: (and their estimated effect)

Put greater emphasis on helping students develop their critical thinking, problem solving skills and engineering intuition and applying these skills and intuition to design problems.

3. RECOMMENDED NEW REMEDIAL ACTIONS, IF ANY:

Textbook will need to be changed in the not too distant future as it is out of print. Because the book is unique in its approach, the course will need to be redesigned somewhat when the text is changed.

The fact that a reasonable version of SPICE is not support on ECN computers means that this course is out of date with respect to courses that are offered elsewhere and the textbooks that are currently being published. More importantly, it means we are not able to take advantage of a very powerful pedagogical tool to help students learn.

4. RECOMMENDED CHANGES TO COURSE LEARNING GOALS:

No changes are recommended at this time.

5. RECOMMENDED MODIFICATIONS TO ASSESSMENT TECHNIQUES:

Considerable changes were implemented this semester. No further changes are recommended at this time.

6. SIGNIFICANT DEVIATIONS IN COURSE CONTENT FROM SYLLABUS (SUMMARIZE):

None.
COURSE SUPPORT

TA SUPPORT FROM THE COLLEGE (IN TERMS OF FTE): 1.5

OTHER TA SUPPORT AND SOURCE (IN TERMS OF FTE): None

TA RESPONSIBILITIES: See attached Composite List of Duties Assigned to Teaching Assistants document that formed the basis for individual letters to the two TAs dated 1/17/02.

WAS THE TA SUPPORT ALLOCATED TO YOUR SECTION SUFFICIENT? PLEASE ELABORATE.

Three half-time TAs was an adequate level of support. All three TAs were junior and inexperienced in teaching this course and that created some transition problems.

IF USED, WAS THE COMPUTER HARDWARE AND SOFTWARE SUPPORT FROM CSS ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

Hardware support was fine. The fact that a contemporary version of SPICE with a reasonable user interface (input and output) and modest functionality is not available is a major problem.

WERE THE FACILITIES (CLASSROOM, LABS, ETC.) ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

A problem with needed equipment being located in another room.

COURSE ORGANIZATION/CONTENTS

LECTURE (HOURS/WEEK): 3 DISCUSSION (HOURS/WEEK): 0
LABORATORY (HOURS/WEEK): 2 TOTAL NUMBER OF STUDENTS: 54

TEXTBOOK AUTHOR AND TITLE:


PLEASE COMMENT ON THE SUITABILITY OF THE TEXTBOOK AND ITS TIMELY AVAILABILITY.

No problem with availability. It is a very good book It is well written and well organized. Will need to be changed in the not too distant future as it is out of print.

TEACHING AIDS:

Colored chalk.
PLEASE ATTACH A COPY OF THE SYLLABUS THAT WAS DISTRIBUTED TO THE CLASS, A
SAMPLE OF CLASS HANDOUTS IF AVAILABLE, AND THE COURSE ASSESSMENT
WORKSHEET (COW) FOR THE COURSE. USE THE SPACE BELOW TO DESCRIBE ANY
PARTICULAR PROBLEMS YOU MIGHT HAVE HAD WITH THIS COURSE (E.G., UNUSUAL
ATTRITION, LACK OF PREREQUISITES, UNUSUAL GRADE DISTRIBUTION, ETC.) OR ANY
INNOVATIONS/IDEAS THAT SHOULD BE CONSIDERED IN THE FUTURE.

Course procedures document attached.

It would be a major boon to the course to have a modern version of SPICE available on
ECN computers.

Attachments
Course Outcome Analysis
COW
Procedures document
Composite List of Duties Assigned to Teaching Assistants document
Six examples of student exams
Course Outcomes Analysis
57:018 Principles of Electronic Instrumentation - Spring 2002

Table 1: Summary of student responses to a set of final exam questions related to each of the course goals identified on the Course Outcomes worksheet (COW) and listed in Table 2. Responses are expressed as a percent of the maximum possible score for each set of questions.

<table>
<thead>
<tr>
<th></th>
<th>Goal 1</th>
<th>Goal 2</th>
<th>Goal 3</th>
<th>Goal 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>38%</td>
<td>55%</td>
<td>24%</td>
<td>59%</td>
</tr>
<tr>
<td>S.D.</td>
<td>18%</td>
<td>17%</td>
<td>27%</td>
<td>20%</td>
</tr>
<tr>
<td>Median</td>
<td>38%</td>
<td>58%</td>
<td>20%</td>
<td>62%</td>
</tr>
<tr>
<td>Maximum</td>
<td>78%</td>
<td>85%</td>
<td>100%</td>
<td>90%</td>
</tr>
<tr>
<td>Minimum</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Table 2: Course goals with corresponding set of final exam questions and maximum points possible for each set.

<table>
<thead>
<tr>
<th>Course Goals</th>
<th>Final Exam Questions</th>
<th>Max Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Ability to think critically and to apply problem solving and reasoning strategies to analysis of electronic circuits</td>
<td>16, 17, 18, 22, 24, 26, 29</td>
<td>59</td>
</tr>
<tr>
<td>2. Ability to analyze operational amplifier circuits</td>
<td>1, 4, 5, 6, 9, 10, 11, 12, 14, 19, 21</td>
<td>124</td>
</tr>
<tr>
<td>3. Ability to analyze diode circuits</td>
<td>15, 20</td>
<td>20</td>
</tr>
<tr>
<td>4. Ability to analyze BJT and FET circuits and gain some experience with design of transistor circuits</td>
<td>3, 7, 8, 13, 23, 25, 27, 28</td>
<td>78</td>
</tr>
</tbody>
</table>

Note: Exam questions often relate to multiple course goals. For purposes of this analysis each exam question was identified with the single course goal to which it most closely related.

Table 3: Indicator related to course goal 5. Summary of student laboratory scores. Lab score expressed as a percent of the maximum possible score of 260.

<table>
<thead>
<tr>
<th></th>
<th>Average</th>
<th>S. D.</th>
<th>Median</th>
<th>Max</th>
<th>Min</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total lab score</td>
<td>83%</td>
<td>9%</td>
<td>85%</td>
<td>94%</td>
<td>31%</td>
</tr>
</tbody>
</table>

Course goal 5: Ability to use electronic instruments to make basic electrical measurements and perform experiments.
Table 4: Indicator related to course goal 5. Summary of student laboratory attendance rates.

<table>
<thead>
<tr>
<th>Attendance rate</th>
<th>100%</th>
<th>92%</th>
<th>85%</th>
<th>77%</th>
<th>&lt; 77%</th>
</tr>
</thead>
<tbody>
<tr>
<td># students</td>
<td>50</td>
<td>3</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>% of students</td>
<td>93%</td>
<td>6%</td>
<td></td>
<td></td>
<td>2%</td>
</tr>
</tbody>
</table>

Table 5: Summary of student responses to a set of hourly exam II questions related to course goals 1 and 4. Responses are expressed as a percent of the maximum possible score for each set of questions.

<table>
<thead>
<tr>
<th></th>
<th>Goal 1</th>
<th>Goal 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>51%</td>
<td>74%</td>
</tr>
<tr>
<td>S.D.</td>
<td>25%</td>
<td>19%</td>
</tr>
<tr>
<td>Median</td>
<td>47%</td>
<td>76%</td>
</tr>
<tr>
<td>Maximum</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Minimum</td>
<td>7%</td>
<td>29%</td>
</tr>
</tbody>
</table>

Note: The data in this table must be interpreted with caution since the number of exam questions on which the data are based is small.

Table 6: Course goals with corresponding set of hourly exam questions and maximum points possible for each set.

<table>
<thead>
<tr>
<th>Course Goals</th>
<th>Hourly Exam Questions</th>
<th>Max Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Ability to think critically and to apply problem solving and reasoning</td>
<td>Exam II: 3, 4, 6</td>
<td>44</td>
</tr>
<tr>
<td>strategies to analysis of electronic circuits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Ability to analyze BJT and FET circuits and gain some experience with</td>
<td>Exam II: 1, 2, 5</td>
<td>72</td>
</tr>
<tr>
<td>design of transistor circuits</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Exam questions often relate to multiple course goals. For purposes of this analysis each exam question was identified with the single course goal to which it most closely related.
Table 7: Summary of student responses to a set of homework assignments related to each of the course goals 2 to 4 identified on the Course Outcomes worksheet (COW) and listed in Table 2. Responses are expressed as a percent of the maximum possible score for each set of assignments.

<table>
<thead>
<tr>
<th></th>
<th>Goal 2</th>
<th>Goal 3</th>
<th>Goal 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>71%</td>
<td>61%</td>
<td>62%</td>
</tr>
<tr>
<td>S.D.</td>
<td>23%</td>
<td>28%</td>
<td>27%</td>
</tr>
<tr>
<td>Median</td>
<td>76%</td>
<td>65%</td>
<td>71%</td>
</tr>
<tr>
<td>Maximum</td>
<td>100%</td>
<td>100%</td>
<td>95%</td>
</tr>
<tr>
<td>Minimum</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Table 8: Course goals with corresponding homework assignments and maximum points possible for each set of homework assignments.

<table>
<thead>
<tr>
<th>Course Goals</th>
<th>Homework Assignments</th>
<th>Max Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Ability to think critically and to apply problem solving and reasoning</td>
<td>1, 2, 3, 4</td>
<td>66</td>
</tr>
<tr>
<td>strategies to analysis of electronic circuits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Ability to analyze operational amplifier circuits</td>
<td>5</td>
<td>30</td>
</tr>
<tr>
<td>3. Ability to analyze diode circuits</td>
<td>7, 8, 9, 10, 11, 12</td>
<td>39</td>
</tr>
<tr>
<td>4. Ability to analyze BJT and FET circuits and gain some experience with</td>
<td></td>
<td></td>
</tr>
<tr>
<td>design of transistor circuits</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Homework questions often relate to multiple course goals. For purposes of this analysis each homework assignment was identified with the single course goal to which it most closely related.

Table 9: Course grade distribution. Plus and minus grades are assigned but are not shown here. The overall course GPA was 2.57.

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td># Students</td>
<td>14</td>
<td>12</td>
<td>21</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Percent</td>
<td>25%</td>
<td>22%</td>
<td>38%</td>
<td>10%</td>
<td>5%</td>
</tr>
<tr>
<td>Cumulative Percent</td>
<td>25%</td>
<td>47%</td>
<td>85%</td>
<td>95%</td>
<td>100%</td>
</tr>
</tbody>
</table>
Table 10: Individual student responses to sets of final exam questions related to each of course goals one to four and lab scores together with their overall z-score for the course. The final course grade is assigned based on the course z-score. Student responses are presented from highest to lowest z-score.

<table>
<thead>
<tr>
<th>Z-score</th>
<th>Goal 1 Questions</th>
<th>Goal 2 Questions</th>
<th>Goal 3 Questions</th>
<th>Goal 4 Questions</th>
<th>Lab score (Goal 5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>64.5</td>
<td>39</td>
<td>105</td>
<td>16</td>
<td>69</td>
<td>245</td>
</tr>
<tr>
<td>63.5</td>
<td>42</td>
<td>88</td>
<td>10</td>
<td>62</td>
<td>240</td>
</tr>
<tr>
<td>60.4</td>
<td>32</td>
<td>86</td>
<td>6</td>
<td>49</td>
<td>233</td>
</tr>
<tr>
<td>59.9</td>
<td>28</td>
<td>72</td>
<td>16</td>
<td>70</td>
<td>235</td>
</tr>
<tr>
<td>59.3</td>
<td>46</td>
<td>86</td>
<td>8</td>
<td>53</td>
<td>235</td>
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<tr>
<td>59.3</td>
<td>37</td>
<td>94</td>
<td>2</td>
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<tr>
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<td>24</td>
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<td>234</td>
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<tr>
<td>58.1</td>
<td>25</td>
<td>98</td>
<td>12</td>
<td>56</td>
<td>232</td>
</tr>
<tr>
<td>57.8</td>
<td>26</td>
<td>88</td>
<td>4</td>
<td>55</td>
<td>232</td>
</tr>
<tr>
<td>57.5</td>
<td>39</td>
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<td>8</td>
<td>49</td>
<td>216</td>
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<td>83</td>
<td>6</td>
<td>55</td>
<td>200</td>
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<td>28</td>
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<td>4</td>
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<td>0</td>
<td>44</td>
<td>233</td>
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<td>8</td>
<td>60</td>
<td>216</td>
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<td>9</td>
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</tr>
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<td>35</td>
<td>72</td>
<td>0</td>
<td>48</td>
<td>205</td>
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<td>221</td>
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<td>59</td>
<td>198</td>
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<td>83</td>
<td>0</td>
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<td>232</td>
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<td>10</td>
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<td>34</td>
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<td>48.1</td>
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<td>211</td>
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<td>46.9</td>
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<td>2</td>
<td>28</td>
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<td>2</td>
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<td>8</td>
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<td>4</td>
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</tr>
<tr>
<td>21.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>81</td>
</tr>
</tbody>
</table>

Note: The z-score is a weighted combination of z-scores for the various components of the course (exams, homeworks, labs, etc). For example, a student’s raw score on an exam is converted to a z-score by subtracting the class mean, dividing the difference by the class standard deviation, multiplying by 10, and adding 50. Thus, a student with a z-score of 65, performed at a level 1.5 standard deviations above the class average.

**Table 10:** Individual student responses to sets of hourly exam questions and homework assignments related to each course goal together with their overall z-score for the course. Student responses are presented from highest to lowest z-score.

<table>
<thead>
<tr>
<th>Z-score</th>
<th>Hourly Exam II</th>
<th>Homework</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Goal 1</td>
<td>Goal 2</td>
</tr>
<tr>
<td>64.5</td>
<td>33</td>
<td>65</td>
</tr>
<tr>
<td>63.5</td>
<td>44</td>
<td>72</td>
</tr>
<tr>
<td>60.4</td>
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<td>68</td>
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<tr>
<td>59.9</td>
<td>27</td>
<td>60</td>
</tr>
<tr>
<td>59.3</td>
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<td>72</td>
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<td>58.1</td>
<td>39</td>
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</table>
College of Engineering EASY Survey Responses

Results for: 057:018; Prin Elect Instrum; Section: AAA- Lecture
Instructor(s): Steve Collins
Survey #: 187 Survey Name: 05701800A-20004 Section Enrollment: 46
Base Set Used: ABET Privacy: Faculty Distribute Remarks: ABET

Headings and Subheadings (Instructions) Used in Survey:
Head(s):
Accreditation Board for Engineering and Technology (ABET) Survey
For each statement decide whether you generally agree or disagree then indicate the strength of agreement or disagreement by selecting the appropriate number.
Subheading(s):
This survey was designed to provide feedback to your instructor on selected aspects of this course. Your responses should reflect YOUR INDIVIDUAL PERCEPTIONS, not those of the class as a whole.

Score Type Name: Disagree/Agree 1-6
1 = Strongly Disagree
2 = Moderately Disagree
3 = Slightly Disagree
4 = Slightly Agree
5 = Moderately Agree
6 = Strongly Agree

3. I have an understanding of the basic principles of electronic devices and systems and am able to apply that understanding to the analysis of electronic circuits.
   Mean: 5.65
   Response Value: 5 6 Total Responding 11
   Count of Responses: 6 5

5. I am able to think critically and to apply problem solving and reasoning strategies to the analysis of electronic circuits.
   Mean: 5.65
   Response Value: 4 5 6 Total Responding 11
   Count of Responses: 1 4 6

7. I am able to use electronic instruments to make basic electrical measurements and perform experiments.
   Mean: 5.27
   Response Value: 4 5 6 Total Responding 11
   Count of Responses: 2 4 5

Score Type Name: True/False
1 = True
2 = False

1. I understand that the ABET survey questions address course objectives not comments on the instructor's effectiveness.
   Mean: 1.00
   Response Value: 1 Total Responding 11
   Count of Responses: 11

Survey Response Summary 3/31/2002 4:04PM
2. I understand that questions with the numerical scale, 1 - 6, use "1" to mean "Strongly Disagree" and "6" to mean "Strongly Agree."

<table>
<thead>
<tr>
<th>Count of Responses</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>11</td>
</tr>
</tbody>
</table>

Score Type: Mean: 1.00
IV.12 57:019 Mechanics of Deformable Bodies

Summer '01: Limited assessment conducted for summer offering. Three informal written inputs received from students in a class of 18. No major changes in course content or delivery are dictated by this informal feedback.

Fall '01: Analysis of homework, quizzes, exams, and EASY student self-assessment indicates that course goals are being achieved. Some changes to EASY survey questions have been made. The question on stress-strain relations and strain rosettes should be more focused as proposed. Recommend two-week EASY survey run to capture late-semester material such as deflection of beams and shafts. Recommend a general comment section as opposed to comments for each question. Collected homework may not represent a random sample from the class. A handful of the textbooks were technically flawed (should have been rejects). Homework assignments included one problem specifically designed to require a recall of previous lecture material.

Spring '02: Numerical course-goal survey data not available due to EASY system data loss. Assessment was based on review of student EASY comments, instructor observation, and detailed analysis of examinations by question, including score distributions. Assessment indicates that course goals are being achieved for the most part. Mohr’s circle material seems to come relatively easily to the students with its placement near the end of the course (in contrast to past textbooks in which it was introduced early). There is evidence that some students have difficulties with advanced Statics problems involving combined loading. It may be useful to require a Statics pre-test in the first week of this course, as a mechanism for obliging students with weaker background to get up to speed to working remedial Statics problems. New CD-Rom supportive material has been purchased and will be made available to students through the Engineering Library; a future EASY question is proposed to track student use of this resource. Additional EASY question modifications are proposed for the next offering of the course.

Overall Assessment: This course is benefiting from a careful and strong assessment process. Assessment is demonstrating the need for paying careful attention to the prerequisite knowledge carry-over from Statics.
### Appendix E

57:019 Course Outcomes Worksheet (COW)

<table>
<thead>
<tr>
<th>Contribution to Outcome (*, 0 or blank)</th>
<th>CoE and CE Outcomes</th>
<th>Course Activity</th>
<th>Material to be Collected (what, when, how)</th>
</tr>
</thead>
<tbody>
<tr>
<td>•</td>
<td>i) They will have the ability to apply knowledge of mathematics, science and engineering in their chosen fields.</td>
<td>The student completes homework assignments requiring application of mathematics, physics and engineering principles.</td>
<td>Graded copies of homework and exams</td>
</tr>
<tr>
<td>°</td>
<td>ii) They will have the ability to design and conduct engineering experiments, and to analyze and interpret experimental results.</td>
<td>The student will have knowledge about tension test and strain gauge. Homework will be assigned which are related to the interpretation of tension test results and to results obtained by strain gauges.</td>
<td>Graded copies of homework</td>
</tr>
<tr>
<td>°</td>
<td>iii) They will have the ability to design systems, components, or processes to meet specified objectives in their chosen fields.</td>
<td>The student will learn the principle and method of design for beams and mechanical components. There are homework related to these topics.</td>
<td>Graded copies of homework</td>
</tr>
<tr>
<td>°</td>
<td>iv) They will have the ability to work as members of multidisciplinary project and/or research teams, and have an understanding of leadership in teams and organizations.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>•</td>
<td>v) They will have the ability to identify, formulate, and solve engineering problems.</td>
<td>Most examples and homework problems are related to identify, formulate, and solve engineering problems.</td>
<td>Graded copies of homework</td>
</tr>
<tr>
<td></td>
<td>vi) They will have an understanding of professional and ethical responsibility and the value of mentorship and peer support.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>vii-w) They will have the ability to communicate effectively in written form.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>vii-o) They will have the ability to communicate effectively in oral form.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>vii-g) They will have the ability to communicate effectively in graphical form.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

212
| viii) They will have an education that is supportive of a broad awareness of the diversity of the world and its cultures, and that provides an understanding of the impact of engineering practice in the global community. |
| x) They will have a knowledge of contemporary issues. |
| xi) They will have the ability to use the principles, techniques, skills and modern engineering tools necessary for successful engineering practice and/or research in their chosen fields. |
| xii) CE outcome to be developed |
| xiii) CE outcome to be developed |
| Etc |

○ denotes moderate contribution to the outcome  • denotes substantial contribution to the outcome

*Samples of each to represent 10% of the class. One high score and one low score will be collected with the remainder of the sample a random selection.
# Course Outcomes Worksheet (COW)

*57:019 Mechanics of Deformable Bodies*  
**FALL 2001-02**

Created 6 November 2000 by Forrest M. Holly  
Last modified 15 November 2000 by C.C. Swan

<table>
<thead>
<tr>
<th>Course Goals</th>
<th>Supports ABET Outcomes</th>
<th>Course Activity</th>
<th>Basis for Course-Goal Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. To understand internal loadings (stresses and strains) and deflections of beams/shafts as a result of various loading conditions (i.e., axial, torsional, bending, and combined)</td>
<td>A(●), E(●), K(●)</td>
<td>Homework, exams, and quizzes, were used to monitor the students' abilities in these areas.</td>
<td>EASY survey assessment by students and instructor</td>
</tr>
<tr>
<td>2. To gain an appreciation for the relationship between stress and strain</td>
<td>A(●), E(●), K(●)</td>
<td>Homework, exams, and quizzes, were used to monitor the students' abilities in these areas.</td>
<td>EASY survey assessment by students and instructor</td>
</tr>
<tr>
<td>3. To acquire the knowledge to design beams and shafts</td>
<td>A(●), C(○), E(●), K(●)</td>
<td>Homework, exams, and quizzes, were used to monitor the students' abilities in these areas.</td>
<td>EASY survey assessment by students and instructor</td>
</tr>
<tr>
<td>4. The student will have knowledge to design and conduct tension/compression tests and on the applicability of strain gauges to measure strain</td>
<td>A(●), B(○), E(●), K(●)</td>
<td>Homework, exams, and quizzes, were used to monitor the students' abilities in these areas.</td>
<td>EASY survey assessment by students and instructor</td>
</tr>
<tr>
<td>5. To perform stress and strain transformations (via equations and/or Mohr’s circle)</td>
<td>A(●), E(●), K(●)</td>
<td>Homework, exams, and quizzes, were used to monitor the students' abilities in these areas.</td>
<td>EASY survey assessment by students and instructor</td>
</tr>
</tbody>
</table>

○ denotes moderate contribution to the outcome ● denotes substantial contribution to the outcome
Course Assessment Report
College of Engineering
The University of Iowa

<table>
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<th>Course Number:</th>
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<th>Semester/Year</th>
<th>Summer 01</th>
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<th>PROF. HAN WU</th>
<th>SIGNATURE:</th>
<th>WC Wu</th>
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<tr>
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<td>K. B. Chandran</td>
<td>SIGNATURE:</td>
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<td>(optional)</td>
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<tr>
<td>OTHER:</td>
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<td>SIGNATURE:</td>
<td>(optional)</td>
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</table>
1. **ASSESSMENT RESULTS:** (and their relation to past results)

   Based on the written feedback from the students, they were generally satisfied with the course. One requested a better coordination between lectures and homework.

2. **SUMMARY OF PRIOR REMEDIATION ACTIONS:** (and their estimated effect)

3. **RECOMMENDED ACTIONS:**

   None recommended

4. **CHANGES TO COURSE LEARNING OBJECTIVES:**

   None recommended

5. **MODIFICATIONS TO ASSESSMENT TECHNIQUES:**

   None recommended

---

**COURSE SUPPORT**

TA SUPPORT FROM THE DEAN’S OFFICE (IN TERMS OF FTE): 0.25 FTE

OTHER TA SUPPORT AND SOURCE (IN TERMS OF FTE):

None

TA RESPONSIBILITIES:

Grade homework, help grade exams, keep records. Hold office hours to help students with home work assignments

WAS THE TA SUPPORT ALLOCATED TO YOUR SECTION SUFFICIENT? PLEASE ELABORATE.

Yes, the amount of support was appropriate for the amount of time spent by the TA
IF USED, WAS THE COMPUTER HARDWARE AND SOFTWARE SUPPORT FROM ECSS ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

NA

WERE THE FACILITIES (CLASSROOM, LABS, ETC.) ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

Yes

**COURSE ORGANIZATION/CONTENTS**

LECTURE (HOURS/WEEK): 5          DISCUSSION (HOURS/WEEK): -
LABORATORY (HOURS/WEEK): -        TOTAL NUMBER OF STUDENTS: 17

TEXTBOOK AUTHOR AND TITLE:
Hibbeler, R. C. Mechanics of Materials (Fourth Edition), McMillan

PLEASE COMMENT ON THE SUITABILITY OF THE TEXTBOOK AND ITS TIMELY AVAILABILITY.

The textbook has been used for several years and is suitable for this course. It was available in the bookstore for the students at the beginning of the session.

TEACHING AIDS:

None
Course Assessment Report
College of Engineering
The University of Iowa
Revision of 27 November 2001
(Subject to Approval by Curriculum Committee)

<table>
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<th>057:019</th>
<th>Semester/Year</th>
<th>Fall 2001</th>
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<td>Course Name:</td>
<td>Mechanics of Deformable Bodies</td>
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**COORDINATOR:** H.C. WU

**SIGNATURE:**

DATE: 17-Jan-02

**INSTRUCTOR:** Nicole M Grosland

**SIGNATURE:** (optional)

**OTHER:**

- Forrest Holly

**SIGNATURE:** (optional)

- K.B. Chandran

- David Wilder

Please attach the course syllabus and course outcomes worksheet (COW).

Assessment Techniques:
Please indicate which of the following assessment techniques were used in the course and your judgment of their utility in assessing achievement of the Course Learning Goals.

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<tr>
<th>Assessment Technique</th>
<th>Used, provided useful data</th>
<th>Used, not recommended</th>
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<td>Quizzes</td>
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<tr>
<td>Projects</td>
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<td>Written Reports (other than projects)</td>
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<td>Oral Reports</td>
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<td>Student Self-Evaluation</td>
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<td>Student Peer-Evaluation</td>
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<tr>
<td>Course Portfolios</td>
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<tr>
<td>Class Surveys (e.g., EASY)</td>
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<td>x</td>
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<tr>
<td>Instructor Observation</td>
<td></td>
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<tr>
<td>Other [specify]</td>
<td></td>
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</tbody>
</table>
1. **ASSESSMENT RESULTS**: (How were each of the course learning goals (from the COW) achieved? Support your assessments qualitatively and/or quantitatively with data from each of the assessment techniques used (see Table on previous page). Explain the relation of the present assessment results to previous ones.)

The course file contains the following:
- EASY survey report,
- Three copies of each homework set assigned throughout the semester: two students were chosen at random (one from each of the discussion sections) at the onset of the semester. In addition to each of their assignments, an additional assignment from each set was chosen at random and copied.
- Copies of the quizzes: sample similar to that of the homework selection.
- Copies of the three midterm exams and the final exam – the copies represent the high, average (2), and low scores for each exam. In addition the exams of the two students whose homework had been tracked throughout the semester are included.

Based on the aforementioned files, we believe that the course outcomes set by the COW have been achieved.

2. **SUMMARY OF RECENT REMEDIAL ACTIONS**: (and their estimated effect)

Suggested changes to the EASY form were incorporated
A simplistic tensile test video clip is available. Formatting issues prohibited its use this semester.

3. **RECOMMENDED NEW REMEDIAL ACTIONS, IF ANY**:

Suggested that the EASY question: “I learned the concept of stress-strain relations and their determination by experiment and the analysis of strains measured by strain rosettes” be more focused. The following change has been suggested:

I learned the relationship between stress and strain (ie as determined by experimentation and the analysis of strains measured by strain rosettes).

4. **RECOMMENDED CHANGES TO COURSE LEARNING GOALS**:

No changes are recommended at this time

5. **RECOMMENDED MODIFICATIONS TO ASSESSMENT TECHNIQUES**:

A request was made to have the EASY survey run for two weeks. In doing so, if the students completed the survey early, this most likely artificially influenced the responses to “I learned to determine the deflection of beams and shafts” as this topic had yet to be covered or was in progress.

Furthermore, I recommend requesting a general comment section as opposed to comments for each question in the survey. That was the intention for this report, but a miscommunication led to the current
survey design. I believe more students may provide a general impression of the course as opposed to the handful of responses for each question.

My student sample for the homework collection does not necessarily reflect the class as a whole. Overall, the homework scores were high, out of a possible 390 points, the max, min, and average were 389, 66, and 338, respectively. As it turned out the students I chose at random at the onset of the semester were two of the top students in the course. The random assignment chosen each time should reflect some of the variation in scores, however.

6. SIGNIFICANT DEVIATIONS IN COURSE CONTENT FROM SYLLABUS (SUMMARIZE):

None

COURSE SUPPORT

TA SUPPORT FROM THE COLLEGE (IN TERMS OF FTE): 0.5 FTE

OTHER TA SUPPORT AND SOURCE (IN TERMS OF FTE): N/A

TA RESPONSIBILITIES:

There were two TAs assigned to the course. One TA was solely responsible for grading homework, and scanning the solutions to be posted on the web. He also held two hours of office hours weekly. The second TA was responsible for the two discussion sections. He too, held office hours weekly (4 hours)

WAS THE TA SUPPORT ALLOCATED TO YOUR SECTION SUFFICIENT? PLEASE ELABORATE.

Yes, students rarely sought the TAs help outside of the discussion section

IF USED, WAS THE COMPUTER HARDWARE AND SOFTWARE SUPPORT FROM CSS ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

WERE THE FACILITIES (CLASSROOM, LABS, ETC.) ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

Yes, the room was equipped with a projection system. Few problems were encountered with the system. On occasion, the computer would not cooperate, but help was available to rectify the situation.

COURSE ORGANIZATION/CONTENTS

LECTURE (HOURS/WEEK): 3  DISCUSSION (HOURS/WEEK): 2
LABORATORY (HOURS/WEEK): N/A  TOTAL NUMBER OF STUDENTS: 42

TEXTBOOK AUTHOR AND TITLE:
Hibbeler, Mechanics of Material, 4th Edition

PLEASE COMMENT ON THE SUITABILITY OF THE TEXTBOOK AND ITS TIMELY AVAILABILITY.

Overall, there were no problems with the textbook, nor with the timing of its arrival. Both the course texts and the solutions manuals arrived promptly.

A handful of textbooks were plagued with errors (i.e., incomplete equations, examples, figures). Students spoke of contacting the publisher. I did not hear what came of that. These textbooks were distinguishable initially as having figures with a grey tone as opposed to blue.

TEACHING AIDS:
Lectures were presented in PowerPoint, demonstrations provided of bending failure.
Course lectures, handouts, and homework solutions were posted on the web.

Homework problems were assigned such that each assignment had one problem pertaining to the previous lecture material. This forced the students to look at the material on more than one occasion. Coupled with what presented in both lecture and discussion sections, they should have had ample review of each topic.

PLEASE ATTACH A COPY OF THE SYLLABUS THAT WAS DISTRIBUTED TO THE CLASS, A SAMPLE OF CLASS HANDOUTS IF AVAILABLE, AND THE COURSE ASSESSMENT WORKSHEET (COW) FOR THE COURSE. USE THE SPACE BELOW TO DESCRIBE ANY PARTICULAR PROBLEMS YOU MIGHT HAVE HAD WITH THIS COURSE (E.G., UNUSUAL ATTRITION, LACK OF PREREQUISITES, UNUSUAL GRADE DISTRIBUTION, ETC.) OR ANY INNOVATIONS/IDEAS THAT SHOULD BE CONSIDERED IN THE FUTURE.
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College of Engineering
The University of Iowa
(Revision of 27 November 2001)

<table>
<thead>
<tr>
<th>Course Number:</th>
<th>057:019</th>
<th>Semester/Year</th>
<th>Spring 2002</th>
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<tbody>
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<td>Course Name:</td>
<td>Mechanics of Deformable Bodies</td>
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<tr>
<th>INSTRUCTOR:</th>
<th>Han-Chin Wu</th>
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</table>

<table>
<thead>
<tr>
<th>K.B. Chandran</th>
<th></th>
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</tr>
</thead>
</table>

| N.M. Grosland        |              |                |

Please attach the course syllabus and course outcomes worksheet (COW).

Assessment Techniques:
Please indicate which of the following assessment techniques were used in the course and your judgment of their utility in assessing achievement of the Course Learning Goals.

<table>
<thead>
<tr>
<th>Assessment Technique</th>
<th>Used, provided useful data</th>
<th>Used, not recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>(Samples not provided)</td>
<td>x</td>
</tr>
<tr>
<td>Exams</td>
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<td>x</td>
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<tr>
<td>Quizzes</td>
<td>(Samples not provided)</td>
<td>x</td>
</tr>
<tr>
<td>Projects</td>
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<tr>
<td>Written Reports</td>
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<tr>
<td>Oral Reports</td>
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<tr>
<td>Student Self-Evaluation</td>
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<td>Student Peer-Evaluation</td>
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<tr>
<td>Course Portfolios</td>
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<tr>
<td>Class Surveys</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Instructor Observation</td>
<td>(See attached)</td>
<td>x</td>
</tr>
<tr>
<td>Other [specify]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. **ASSESSMENT RESULTS:** (How were each of the course learning goals (from the COW) achieved? Support your assessments qualitatively and/or quantitatively with data from each of the assessment techniques used (see Table on previous page). Explain the relation of the present assessment results to previous ones.)

The course file contains the following:

- EASY survey report (due to the unexpected loss of data, only the comments could be used as part of the assessment process).
- Copies of the three midterm exams and the final exam — copies from papers of 4 students for each exam. The copies represent the high, better than average, lower than average and low scores for each exam.
- Instructor observation
  a. Score distribution curves for all exams.
  b. Score distribution curves for Exams #1 & #2 are compared in a graph. Scores for Exam #2 is not as high as scores for Exam #1. Possible reasons are:
     1. Exam #2 was a little too lengthy;
     2. Some have trouble with combined loading (Question #3). Many students were unable to determine the resultant forces and moments at a cross-section of a beam subjected to combined loading. This is actually a Statics problem.
     3. Spring Break was a factor. Exam #2 was given on Friday following the spring break.
  c. Three score distribution curves from Exam #3 are shown in a graph. Question #1(a) is a simple question on Mohr’s circle. 41 students out of 62 got a perfect score for this question. Question #3 is a comprehensive question on Mohr’s circle. The graph shows that the score distribution for this question is better than that for the whole exam. Therefore, we can conclude that the Mohr’s circle part of course goal #5 stated in COW has been achieved. This conclusion is also supported by students comments in EASY survey report. We note that ten years ago we used another textbook for this course and Mohr’s circle was discussed quite early during the semester. The students had great difficulties in understanding the topic of Mohr’s circle, and we switched to the current textbook. In the present textbook, the topic is included in the third Mid-term and is discussed after the students have had experience working with stress and strain. Our students feel now that Mohr’s circle is an easy topic.
  d. Three score distribution curves from Final Exam are shown in a graph. Question #4 is a combined loading problem designed to compare with Question #3 of Exam #2. In Exam #2, students did poorly in the determination of the resultant forces and moments at a cross-section of a structure. After that exam, the students have had many occasions (including lectures, discussions by T.A., and homework assignments) to study this type of problems involving Statics. However, the graph shows that the students did not do well on this type of problem compared with the over all score of the final exam, even though there is an improvement over Exam #2 (we do not have data, but it was bad). The students have commented in EASY survey that their understanding of Statics have improved through this course. But, the graph shows that some still have difficulty in handling sophisticated Statics problems such as combined loading. A third curve in this graph shows students' performance in shear and moment diagrams. This is Question #1(b) of the Final Exam, and the question is of intermediate difficulty because a moment is applied to the beam. The student did very well in this question. 30 out of 62 students got a perfect score in this question.
There were two TAs assigned to the course. One TA led two discussion sessions and the other led one session. Both graded homework and exams, closely supervised by the instructor. They also held office hours.

WAS THE TA SUPPORT ALLOCATED TO YOUR SECTION SUFFICIENT? PLEASE ELABORATE.

Yes.

IF USED, WAS THE COMPUTER HARDWARE AND SOFTWARE SUPPORT FROM CSS ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

WERE THE FACILITIES (CLASSROOM, LABS, ETC.) ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

Yes, the room was equipped with a projection system

COURSE ORGANIZATION/CONTENTS

LECTURE (HOURS/WEEK): 3  DISCUSSION (HOURS/WEEK): 3
LABORATORY (HOURS/WEEK): N/A  TOTAL NUMBER OF STUDENTS: 62

TEXTBOOK AUTHOR AND TITLE:

Hibbeler, Mechanics of Material, 4th Edition

PLEASE COMMENT ON THE SUITABILITY OF THE TEXTBOOK AND ITS TIMELY AVAILABILITY.

Overall, there were no problems with the textbook, nor with the timing of its arrival. Both the course texts and the solutions manuals arrived promptly.

TEACHING AIDS:

PLEASE ATTACH A COPY OF THE SYLLABUS THAT WAS DISTRIBUTED TO THE CLASS, A SAMPLE OF CLASS HANDOUTS IF AVAILABLE, AND THE COURSE ASSESSMENT WORKSHEET (COW) FOR THE COURSE. USE THE SPACE BELOW TO DESCRIBE ANY PARTICULAR PROBLEMS YOU MIGHT HAVE HAD WITH THIS COURSE (E.G., UNUSUAL ATTRITION, LACK OF PREREQUISITES, UNUSUAL GRADE DISTRIBUTION, ETC.) OR ANY INNOVATIONS/IDEAS THAT SHOULD BE CONSIDERED IN THE FUTURE.
### College of Engineering EASY Survey Responses

**Results for:** 057019; Mech Deform Bodies; Section: AAA; Lecture

**Instructor(s):** M. Cleveland

**Session Code:** 20013  **Beginning On:** 11-30-01  **Running for:** 14 days  **Course Enrollment:** 42

**Survey #:** 217  **Survey Name:** 057019;AAA;20013  **Section Enrollment:** 42

**Base Set Used:** ABET  **Privacy:** Faculty Distribute  **Remarks:** ABET

---

#### Headings and Subheadings (Instructions) Used in Survey:

**Heading(s):**
Accreditation Board for Engineering and Technology (ABET) Survey

**Subheading(s):**
This survey was designed to provide feedback to your instructor on selected aspects of this course. Your responses should reflect YOUR INDIVIDUAL PERCEPTIONS, not those of the class as a whole.

#### Score Type Name: Disagree/Agree 1-6

1. Strongly Disagree
2. Moderately Disagree
3. Slightly Disagree
4. Slightly Agree
5. Moderately Agree
6. Strongly Agree

**3. I have been able to apply my prior knowledge of mathematics and science in this course.**

<table>
<thead>
<tr>
<th>Mean: 5.30</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Response Value:</strong> 1 5 6 <strong>Total Responding</strong></td>
</tr>
<tr>
<td><strong>Count of Responses:</strong> 1 9 18 28</td>
</tr>
</tbody>
</table>

**5. I learned to determine stress and strain when a structural component is subjected to axial, torsional, bending, and combined loading conditions.**

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
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</tr>
<tr>
<td><strong>Count of Responses:</strong> 1 11 15 27</td>
</tr>
</tbody>
</table>

**7. I learned to draw shear and moment diagrams, which are useful in design.**

<table>
<thead>
<tr>
<th>Mean: 5.33</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Response Value:</strong> 1 4 5 6 <strong>Total Responding</strong></td>
</tr>
<tr>
<td><strong>Count of Responses:</strong> 1 2 9 15 27</td>
</tr>
</tbody>
</table>

**9. I learned to design beams and shafts.**

<table>
<thead>
<tr>
<th>Mean: 5.30</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Response Value:</strong> 4 5 6 <strong>Total Responding</strong></td>
</tr>
<tr>
<td><strong>Count of Responses:</strong> 4 11 12 27</td>
</tr>
</tbody>
</table>

**11. I learned to draw Mohr's circle for stress and strain transformation.**

<table>
<thead>
<tr>
<th>Mean: 5.74</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Response Value:</strong> 4 5 6 <strong>Total Responding</strong></td>
</tr>
<tr>
<td><strong>Count of Responses:</strong> 1 5 21 27</td>
</tr>
</tbody>
</table>

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Survey Response Summary 3/31/2002 4:04PM
13. I learned to determine the deflection of beams and shafts.

   Mean: 4.93
   Response Value: 3 4 5 6 Total Responding
   Count of Responses: 1 9 8 9 27

15. This course reinforced my understanding of concepts learned in statics (equilibrium and moment of inertia).

   Mean: 5.34
   Response Value: 4 5 6 Total Responding
   Count of Responses: 1 5 21 27

17. I learned the concept of stress-strain relations and their determination by experiment and the analysis of strains measured by strain rosettes.

   Mean: 5.61
   Response Value: 4 5 6 Total Responding
   Count of Responses: 1 14 12 27

Score Type: True/False

1. I understand that the ABET survey questions address course objectives not comments on the instructor’s effectiveness.

   Mean: 1.67
   Response Value: 1 2 Total Responding
   Count of Responses: 27 2 29

2. I understand that questions with the numerical scale, 1 - 6, use “1” to mean “Strongly Disagree” and “6” to mean “Strongly Agree.”

   Mean: 1.00
   Response Value: 1 Total Responding
   Count of Responses: 29 29
IV.13 57:020 Mechanics of Fluids and Transfer Processes

Summer '01: Not offered.

Fall '01: Detailed analysis of homework sets, midterms, lab reports, and CFD reports showed that course learning goals were achieved. Final exam used FE-type format. EASY survey reveals that students do not see high value in experimental and computational labs; this confirms spring '01 survey results. Number of experiment repetitions for uncertainty analysis was reduced in all but the first experiment, enabling more focus on the flow physics. CFD lab handouts were completely rewritten to accommodate new Flowlab front end. Recommend consideration of further simplification in experimental lab writeups; load Flowlab software on CSS system or otherwise make it available to students as a centralized resource; and continue requiring paper reviews. Recommend parsing EASY question 9 into two sub questions.

Spring '02: Numerical course-goal survey data not available due to EASY system data loss. Assessment based on evaluation of student work, and instructor observation. Prior remedial actions having positive contribution to meeting course goals; course goals achieved. Recommend making Flowlab software more robust; it was not functional for the numerical simulation of lift on an airfoil. Instructor felt that students were not sufficiently engaged in the use of the software. Recommend including paper review projects with student reporting on relation of paper to course material. Recommend development of more simple experiments for earlier part of course, and use of handouts rather than pre-lab sessions to free up more time such additional lab experiments. Fluids Lab Coordinator should be involved in the course assessment meetings. Subsequent offerings of course should benefit from establishment of “home base” for the lab in the renovated Hydraulics Laboratory first floor.

Overall Assessment: Coordinator and instructors have devoted considerable effort to assessment of one of the more demanding courses in the curriculum. The assessment has been effective and instructive. As the course shifts from “soft core” in the old curriculum to “elective core” in the new curriculum, and as the fluids laboratory returns to the Hydraulics Laboratory building, the affected programs (notably Mechanical and Civil Engineering) will need to find a common ground on the level of lab activity, combined use of physical and numerical experimental pedagogy, and credit hours.
### Course Outcomes Worksheet (COW)

**57:020 MECHANICS OF FLUIDS & TRANSFER PROCESSES**  
**FALL 2001-02**

Created 8 January 2002 by C.-L. Lin  
Last modified xx January 2002 by xxx

<table>
<thead>
<tr>
<th>Course Goals</th>
<th>Supports ABET Outcomes</th>
<th>Course Activity</th>
<th>Basis for Course-Good Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Students will have an understanding of the principles and methods used to solve practical problems in fluid statics.</td>
<td>A (<em>), E (</em>), K (*)</td>
<td>Homework and exams test student abilities in this area. Specifically, the course addresses pressure forces on flat and curved bodies, buoyancy, and stability of floating and submerged bodies.</td>
<td>EASY survey assessment by students; graded copy of exam questions.</td>
</tr>
<tr>
<td>2. Students will have an understanding of laws governing mass, momentum and energy conservation in fluids, in control-volume and differential form, and of how to apply these laws to various engineering problems.</td>
<td>A (<em>), E (</em>), K (*)</td>
<td>Homework and exams test student abilities in this area. Specifically, the course emphasizes application of the Bernoulli equations and control-volume forms of the mass, momentum and energy equations.</td>
<td>EASY survey assessment by students; graded copy of exam questions.</td>
</tr>
<tr>
<td>3. The student will be familiar with the basic dimensionless parameters of fluid mechanics and understand how to analyze a problem in terms of dimensional analysis and similarity and of how to design laboratory experiments representative of real applications.</td>
<td>B (<em>), E (</em>), K (*)</td>
<td>Homework and exams test student abilities in this area. Specifically, the course addresses the Buckingham pi theorem and geometric and dynamic similitude and their application in design of experiments.</td>
<td>EASY survey assessment by students; graded copy of exam questions.</td>
</tr>
<tr>
<td>4. Students will have experience with performing integrated laboratory experiments and numerical computations of fluid flows and will understand types of error and</td>
<td>B(<em>), G (</em>), D(oc), E(oc), K (*)</td>
<td>Students conduct three laboratory experiments as specified in the lab write-ups and analyze and interpret data from these experiments. Two experiments have accompanying computational projects. Laboratory and computational data are</td>
<td>EASY survey assessment by students; graded copy of exam questions and lab reports.</td>
</tr>
<tr>
<td>uncertainty propagation in experiments and simulations.</td>
<td>analyzed and explained using theory learned in class.</td>
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</tr>
<tr>
<td>5. Students will acquire familiarity with concepts of resistance and head loss in conduits, and lift and drag on bodies, and be able to solve problems requiring this knowledge.</td>
<td><strong>A(●), E(●), K(●)</strong></td>
<td>Homework and exams test student abilities in this area. Specifically, the course addresses exact and approximate solution for flow resistance in pipes and conduits, minor losses, and empirical results for drag and lift coefficients.</td>
<td>EASY survey assessment by students; graded copy of exam questions and lab reports.</td>
</tr>
</tbody>
</table>

● denotes moderate contribution to the outcome  ● denotes substantial contribution to the outcome
Course Assessment Report
College of Engineering
The University of Iowa
(Revision of 27 November 2001)

<table>
<thead>
<tr>
<th>Course Number:</th>
<th>57:020</th>
<th>Semester/Year</th>
<th>Fall/2001</th>
</tr>
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<tbody>
<tr>
<td>Course Name:</td>
<td>Mechanics of Fluids and Transfer Processes</td>
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<tr>
<th>COORDINATOR:</th>
<th>J. MARSHALL</th>
<th>SIGNATURE:</th>
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<tbody>
<tr>
<td>DATE:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INSTRUCTOR:</td>
<td>C.-L. Lin</td>
<td>SIGNATURE:</td>
</tr>
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<td>OTHER:</td>
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<td>(optional)</td>
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</tbody>
</table>

Please attach the course syllabus and course outcomes worksheet (COW).

Assessment Techniques:
Please indicate which of the following techniques were used in assessing the course and your judgment of their utility in assessing achievement of the Course Learning Goals.

<table>
<thead>
<tr>
<th>Assessment Technique</th>
<th>Used, provided useful data</th>
<th>Used, not recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>X</td>
<td>Used, but not documented</td>
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<tr>
<td>Exams</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Quizzes</td>
<td></td>
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</tr>
<tr>
<td>Projects</td>
<td></td>
<td></td>
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<tr>
<td>Written Reports (other than projects)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oral Reports</td>
<td></td>
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<td>Student Self-Evaluation</td>
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<tr>
<td>Student Peer-Evaluation</td>
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<tr>
<td>Course Portfolios</td>
<td></td>
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<tr>
<td>Class Surveys (e.g., EASY)</td>
<td></td>
<td></td>
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<tr>
<td>Instructor Observation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other [specify]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. ASSESSMENT RESULTS: (How were each of the course learning goals (from the COW) achieved? Support your assessments qualitatively and/or quantitatively with data from each of the assessment techniques used (see Table on previous page). Explain the relation of the present assessment results to previous ones.)

(a) There are a total of 35 homework problem sets with 10 points each, four midterm examinations, three experiment reports (EFD), two CFD reports and one final examination. Extra credits were given to students who reviewed and wrote a review report for one of the two papers: BLOOD FLOW IN ARTERIES, David N. Ku, Annu. Rev. Fluid Mech. 1997 29: 399-434, and MICRO-ELECTRO MECHANICAL SYSTEMS (MEMS) AND FLUID FLOWS, Chih-Ming Ho and Yu-Chong Tai, Annu. Rev. Fluid Mech. 1998, Vol. 30: 579-612. Based on the means and standard deviations (Std) of all assessment components, the course learning goals were overall achieved. (The final examination used the EIT-like format, consisting of 22 multi-choice problems. Most of the problems are similar to the homework problems or taken from the textbook, and are harder than typical EIT problems. Besides, it is a comprehensive examination and there are no partial credits so the mean of the final exam is lower than three of the four midterm examinations.)

<table>
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<tr>
<th>Points</th>
<th>HW</th>
<th>Exam1</th>
<th>Exam2</th>
<th>Exam3</th>
<th>Exam4</th>
<th>EFD 1</th>
<th>EFD 2</th>
<th>EFD 3</th>
<th>CFD 1</th>
<th>CFD 2</th>
<th>Final</th>
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<tr>
<td>350</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
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<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>110</td>
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<tr>
<td>Mean</td>
<td>305.8</td>
<td>71.1</td>
<td>63.2</td>
<td>88.5</td>
<td>82.9</td>
<td>95.3</td>
<td>93.4</td>
<td>97.4</td>
<td>91.3</td>
<td>97.2</td>
<td>66.8</td>
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<tr>
<td>Std</td>
<td>59.6</td>
<td>12.1</td>
<td>12.7</td>
<td>9.5</td>
<td>11.4</td>
<td>5.0</td>
<td>18.2</td>
<td>12.9</td>
<td>13.9</td>
<td>19.1</td>
<td>14.1</td>
</tr>
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</table>

(b) The Easy survey results based on 34 responses out of 61 students are summarized below (1-6 disagree-agree response). Students moderately or strongly agree that most of the course goals were achieved except question no. 8 and 9. Students only slightly agree that the experimental and computational fluids labs contributed to their understanding of fluid processes. The Easy survey conducted previously in the spring 2001 show the similar results. It is worth noting that question no. 5 has the highest mean of 5.29. That is, most of the students strongly agreed that they understand the principles of geometric and dynamic similarity.

<table>
<thead>
<tr>
<th>Question No.</th>
<th>Course Goal</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>5.17</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>5.37</td>
</tr>
<tr>
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<td>5.20</td>
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<td>4.97</td>
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<td>5.29</td>
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<td>4.91</td>
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<td>7</td>
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<td>9</td>
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<td>3.53</td>
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<td>5</td>
<td>5.03</td>
</tr>
<tr>
<td>11</td>
<td>5</td>
<td>4.82</td>
</tr>
</tbody>
</table>

2. SUMMARY OF RECENT REMEDIAL ACTIONS: (and their estimated effect)

(a) Investigate ways of changing the lab report format:
Only the first EFD experiment required students to perform 10 trials and do the uncertainty analysis. For the other two EFD experiments, the number of trials was reduced and the bias and precision errors were provided to simplify the uncertainty analysis and the lab report write up so that students could focus more on flow physics. In addition, students could refer to the number of equations that can be found in the lab handouts without typing the equations in preparation of the lab report.

(b) Consider an EIT format test for the final:
The EIT format was adopted for the final examination (there are 22 multiple-choice problems).
(c) Consider some form of recurring tests:
   There were four midterm examinations.

(d) The availability of a new front end for fluent (the program used in the computational fluids exercises)
   will require that the two laboratory handouts for the computational labs be reworked:
   Since the new CFD software Flowlab was used, the two CFD lab handouts were completely rewritten.
   In addition Flowlab adopted a much simplified CFD procedure than Fluent. As a result, the report
   format was also greatly simplified.

3. RECOMMENDED NEW REMEDIAL ACTIONS, IF ANY:

   (a) Consider further simplification in EFD lab write-ups.
   (b) Load the Flowlab software on the CSS computers or purchase separate computers for lab.
   (c) Consider some paper reviews (in general students like it and can relate it to what they learn from
       lectures and textbooks)

4. RECOMMENDED CHANGES TO COURSE LEARNING GOALS:

   None

5. RECOMMENDED MODIFICATIONS TO ASSESSMENT TECHNIQUES:

   Modify Easy question no. 9 to two questions: (1) I feel that the computational fluids labs exposed me to the
   techniques of computational fluid dynamics, (2) I feel that I will use the techniques of computational fluid
   dynamics in my career as an engineer.

6. SIGNIFICANT DEVIATIONS IN COURSE CONTENT FROM SYLLABUS (SUMMARIZE):

   None

COURSE SUPPORT

TA SUPPORT FROM THE COLLEGE (IN TERMS OF FTE):

OTHER TA SUPPORT AND SOURCE (IN TERMS OF FTE): 2.5 FTE from the MIE department (5 TAs)

TA RESPONSIBILITIES:

Two TAs took care of the homework and study sessions. Two TAs took care of the EFD labs and one TA
   took care of the CFD lab. The CFD TA also served as the head TA responsible for maintaining the class
   website. The homework TAs had more office hours than other TAs.

WAS THE TA SUPPORT ALLOCATED TO YOUR SECTION SUFFICIENT? PLEASE ELABORATE.

It depends on the TA’s experience, the support from CSS and whether or not the experiments and Flowlab
   work (hardware and software problems).
IF USED, WAS THE COMPUTER HARDWARE AND SOFTWARE SUPPORT FROM CSS ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

CSS refused to install Flowlab on its computers for some reasons, whereas Flowlab had to be used for CFD labs. Last semester, there was only one PC in the WTA computer room for CFD labs. Five rental PCs were placed in the WTA computer room with the assistance of IIHR computer engineers few days before the scheduled laboratory. In the future more PCs in the WTA computer room are needed and Flowlab should be loaded on some CSS computers.

WERE THE FACILITIES (CLASSROOM, LABS, ETC.) ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

Yes.

COURSE ORGANIZATION/CONTENTS
LECTURE (HOURS/WEEK): 3 hrs    DISCUSSION (HOURS/WEEK): none
LABORATORY (HOURS/WEEK): 1 hrs    TOTAL NUMBER OF STUDENTS: 61

TEXTBOOK AUTHOR AND TITLE: Engineering Fluid Mechanics by Crowe Robertson and Elger, 7th Edition

PLEASE COMMENT ON THE SUITABILITY OF THE TEXTBOOK AND ITS TIMELY AVAILABILITY.

Solution manuals have several errors. Use with caution.

TEACHING AIDS:

PC and screen projector.

PLEASE ATTACH A COPY OF THE SYLLABUS THAT WAS DISTRIBUTED TO THE CLASS, A SAMPLE OF CLASS HANDOUTS IF AVAILABLE, AND THE COURSE ASSESSMENT WORKSHEET (COW) FOR THE COURSE. USE THE SPACE BELOW TO DESCRIBE ANY PARTICULAR PROBLEMS YOU MIGHT HAVE HAD WITH THIS COURSE (E.G., UNUSUAL ATTENTION, LACK OF PREREQUISITES, UNUSUAL GRADE DISTRIBUTION, ETC.) OR ANY INNOVATIONS/IDEAS THAT SHOULD BE CONSIDERED IN THE FUTURE.
Course Assessment Report
College of Engineering
The University of Iowa

Course Number: 57:020  Semester/Year: Spring 2002
Course Name: Mechanics of Fluids and Transfer Processes

COORDINATOR: J. MARSHALL  SIGNATURE: Jeff Marshall
DATE: May 29, 2002
INSTRUCTOR: R. ETTEMA  SIGNATURE: (optional) Jeff Marshall
OTHER: C.-L. LIN  SIGNATURE: (optional)

Please attach the course syllabus and course outcomes worksheet (COW).

Assessment Techniques:
Please indicate which of the following assessment techniques were used in the course and your judgment of their utility in assessing accomplishment of the Course Learning Objectives.

<table>
<thead>
<tr>
<th>Assessment Technique</th>
<th>Not Used</th>
<th>Used, provided useful data</th>
<th>Used, not recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exams</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quizzes</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Projects 5 laboratory exercises, 3 experimental, and 2 computational.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Written Reports (other than projects)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A written report is required from each student for each laboratory</td>
<td></td>
<td></td>
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<tr>
<td>Oral Reports</td>
<td>X</td>
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<tr>
<td>Student Self-Evaluation</td>
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<td>Student Peer-Evaluation</td>
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<td>Course Portfolios</td>
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<td>Class Surveys (e.g., EASY)</td>
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<tr>
<td>Instructor Observation</td>
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<tr>
<td>Other [specify] Help Sessions</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. **ASSESSMENT RESULTS:** (and their relation to past results)

The course goals were achieved. Overall student performance in the various components of the course was in accordance with goals set for the course.

2. **SUMMARY OF PRIOR REMEDIATION ACTIONS:** (and their estimated effect)

See prior CAR. There was an overall concurrence with the prior remediation actions.

3. **RECOMMENDED ACTIONS:**

1. Improve FLOWLAB so that it is more robust. During the past two semesters there have been problems with the software functioning properly.

2. Consider assigning paper review projects, in which students review a paper on a fluid mechanics application, and write a short report relating the paper to the course material.

3. Develop a home base for the fluids lab, and try to conduct most of the fluids lab activities associated with the course in this home base. The home base will be on the first floor of the newly renovated Hydraulics Lab Building.

4. Develop more simple experiments to use in the earlier part of the course. These experiments should be short, dynamic, and involve hands-on student participation. Associated with these experiments we need to develop shortened lab reports, which might consist of a handout where students fill in answers and make straightforward sketches and plots.

5. Consider using handouts instead of prelabs. So doing would provide more time for additional experiments of the type mentioned in Item 4 above.

6. Involve the Fluids Lab Coordinator (at the current time, Marian Muste) in the course assessment meetings.

4. **CHANGES TO COURSE LEARNING OBJECTIVES:**

No changes are suggested.

5. **MODIFICATIONS TO ASSESSMENT TECHNIQUES:**

No changes suggested, though it was noted that the EASY form results were not available this semester

**COURSE SUPPORT**

TA SUPPORT FROM THE DEAN'S OFFICE (IN TERMS OF FTE): 1.25 FTE

OTHER TA SUPPORT AND SOURCE (IN TERMS OF FTE): 0 FTE

TA RESPONSIBILITIES:

Two 0.25-time TAs took care of homework and study sessions. Three 0.25-time TAs each took care of the experimental and computational part of the lab. The lab TAs were responsible for the set up of the lab, presentation of the prelab, conduct of the lab and grading of the lab.

WAS THE TA SUPPORT ALLOCATED TO YOUR SECTION SUFFICIENT? PLEASE ELABORATE.
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5. **MODIFICATIONS TO ASSESSMENT TECHNIQUES:**

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**COURSE SUPPORT**

**TA SUPPORT FROM THE DEAN'S OFFICE (IN TERMS OF FTE):** 1.25 FTE

**OTHER TA SUPPORT AND SOURCE (IN TERMS OF FTE):** 0 FTE

**TA RESPONSIBILITIES:**

Two TAs took care of homework and study sessions. Two TAs each took care of the experimental and computational part of the lab. The lab TAs were responsible for the set up of the lab, presentation of the prelab, conduct of the lab and grading of the lab.

**WAS THE TA SUPPORT ALLOCATED TO YOUR SECTION SUFFICIENT? PLEASE ELABORATE.**
IF USED, WAS THE COMPUTER HARDWARE AND SOFTWARE SUPPORT FROM ECSS ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

Yes, though the present version of the software FLOWLAB proved inadequate for the course. It did not work for the numerical simulation of lift on an airfoil. Instructor queried the overall utility of the software for this course. He felt that students really were not sufficiently engaged in the use of the software. Perhaps more could be done to enhance student use of the software.

WERE THE FACILITIES (CLASSROOM, LABS, ETC.) ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

Yes. As noted above, could do with more qualitative experiments that actually show the flow.

A home base for the labs would improve the ambience of, and student enthusiasm for, the labs.

COURSE ORGANIZATION/CONTENTS

LECTURE (HOURS/WEEK): 3 hrs          DISCUSSION (HOURS/WEEK): none
LABORATORY (HOURS/WEEK): 2 hrs        TOTAL NUMBER OF STUDENTS: 33

TEXTBOOK AUTHOR AND TITLE: Engineering Fluid Mechanics by Crowe Robertson and Elger, 7th Edition

PLEASE COMMENT ON THE SUITABILITY OF THE TEXTBOOK AND ITS TIMELY AVAILABILITY.

The book is appropriate for the course.

TEACHING AIDS:

None
College of Engineering EASY Survey Responses

Results for: 057020; Mech Flui Tran Proc; Section: AAA- Lecture
Instructor(s): C.L. Lam
Survey #: 214  Survey Name: 057020AAA20013  Section Enrollment: 62
Base Set Used: ABET  Privacy: Faculty Distribute  Remarks: ABET

Headsings and Subheadings (Instructorn) Used in Survey:

For each statement decide whether you generally agree or disagree then indicate the strength of agreement or disagreement by selecting the appropriate number.

Subheading(s):
This survey was designed to provide feedback to your instructor on selected aspects of this course. Your responses should reflect YOUR INDIVIDUAL PERCEPTIONS, not those of the class as a whole.

Score Type Name: Disagree/Agree 1-6

<table>
<thead>
<tr>
<th>Score Value</th>
<th>Count of Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<tr>
<td>2</td>
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</tr>
<tr>
<td>3</td>
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<td>5</td>
<td>13</td>
</tr>
<tr>
<td>6</td>
<td>35</td>
</tr>
</tbody>
</table>

3. I can solve problems involving fluid statics, such as force and moment on a gate, buoyancy force of submerged and floating bodies, and stability of floating bodies.

Mean: 5.57

<table>
<thead>
<tr>
<th>Score Value</th>
<th>Count of Responses</th>
</tr>
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<tbody>
<tr>
<td>4</td>
<td>4</td>
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<td>5</td>
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<tr>
<td>6</td>
<td>17</td>
</tr>
<tr>
<td>Total</td>
<td>35</td>
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</tbody>
</table>

4. I can determine pressure variation in a fluid using the Bernoulli equation.

Mean: 5.57

<table>
<thead>
<tr>
<th>Score Value</th>
<th>Count of Responses</th>
</tr>
</thead>
<tbody>
<tr>
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<td>4</td>
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<tr>
<td>4</td>
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</tr>
<tr>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>35</td>
</tr>
</tbody>
</table>

5. I can solve practical problems (pilot tubes, pump and turbine problems) using conservation of energy.

Mean: 5.20

<table>
<thead>
<tr>
<th>Score Value</th>
<th>Count of Responses</th>
</tr>
</thead>
<tbody>
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<td>6</td>
<td>16</td>
</tr>
<tr>
<td>Total</td>
<td>35</td>
</tr>
</tbody>
</table>

6. I can solve problems using the control-volume forms of mass, momentum and energy conservation.

Mean: 4.57

<table>
<thead>
<tr>
<th>Score Value</th>
<th>Count of Responses</th>
</tr>
</thead>
<tbody>
<tr>
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<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>34</td>
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</tbody>
</table>

7. I understand the principles of geometric and dynamic similarity.

Mean: 5.29

<table>
<thead>
<tr>
<th>Score Value</th>
<th>Count of Responses</th>
</tr>
</thead>
<tbody>
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<td>6</td>
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Survey Response Summary 3/31/2002 4:04PM
<table>
<thead>
<tr>
<th>Score Type Name: Disagree/Agree 1-6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1– Strongly Disagree</td>
</tr>
<tr>
<td>2– Moderately Disagree</td>
</tr>
<tr>
<td>3– Slightly Disagree</td>
</tr>
<tr>
<td>4– Slightly Agree</td>
</tr>
<tr>
<td>5– Moderately Agree</td>
</tr>
<tr>
<td>6– Strongly Agree</td>
</tr>
</tbody>
</table>

8. I can perform a fluid flow experiment, assess the data uncertainty, and report the results in written and graphical form.

**Mean: 4.51**

<table>
<thead>
<tr>
<th>Response Value:</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<tbody>
<tr>
<td>Count of Responses:</td>
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<td>3</td>
<td>5</td>
<td>14</td>
<td>11</td>
<td>34</td>
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</tbody>
</table>

9. I can perform a numerical computation of a fluid flow using the commercial code FLOWLAB.

**Mean: 4.90**

<table>
<thead>
<tr>
<th>Response Value:</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<th>6</th>
<th>Total Responding</th>
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<td>2</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>34</td>
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</tbody>
</table>

10. I feel that the laboratory program contributed to my understanding of fluid processes.

**Mean: 3.94**

<table>
<thead>
<tr>
<th>Response Value:</th>
<th>1</th>
<th>2</th>
<th>3</th>
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<td>5</td>
<td>4</td>
<td>9</td>
<td>7</td>
<td>34</td>
</tr>
</tbody>
</table>

11. I feel that the computational fluids labs exposed me to techniques that I will use in my career as an engineer.

**Mean: 3.53**

<table>
<thead>
<tr>
<th>Response Value:</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<td>Count of Responses:</td>
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<td>8</td>
<td>3</td>
<td>10</td>
<td>8</td>
<td>2</td>
<td>34</td>
</tr>
</tbody>
</table>

12. I can calculate the drag forces on bodies and plates.

**Mean: 5.03**

<table>
<thead>
<tr>
<th>Response Value:</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
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<tbody>
<tr>
<td>Count of Responses:</td>
<td>9</td>
<td>15</td>
<td>10</td>
<td>34</td>
</tr>
</tbody>
</table>

13. I can analyze required pressure head in pipe and conduit flows with a specified discharge, and vice versa.

**Mean: 4.82**

<table>
<thead>
<tr>
<th>Response Value:</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<td>2</td>
<td>10</td>
<td>14</td>
<td>8</td>
<td>34</td>
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</tbody>
</table>

**Score Type: True/False**

1– True
2– False
1. I understand that the ABET survey questions address course objectives not comments on the instructor's effectiveness.

<table>
<thead>
<tr>
<th>Score Type Name: True/False</th>
<th>1</th>
<th>2</th>
<th>Total Responding</th>
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<tbody>
<tr>
<td>Response Value</td>
<td>34</td>
<td>1</td>
<td>35</td>
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</tbody>
</table>

2. I understand that questions with the numerical scale, 1 - 6, use "1" to mean "Strongly Disagree" and "6" to mean "Strongly Agree."

<table>
<thead>
<tr>
<th>Score Type Mean: 1.83</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response Value</td>
</tr>
<tr>
<td>Count of Responses</td>
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</tbody>
</table>
IV.14 57:021 Principles of Design I

Summer '01: Written course-goal survey administered, alternative to EASY. Student response generally indicated that course goals were met. More practical examples added compared to previous offering of course, and student response was generally positive. Course should remain essentially as it is.

Fall '01: EASY survey revealed that more attention should be paid to technical report writing, and solving design optimization problems. Instructors feel that the previous changes have had a positive effect on the course, that it is working well. There may be a need for more handouts to complement the perceived too-mathematical approach in the book; this is consistent with plans to revise the book. Recommend requiring peer-perception grading sheet from design team members only once, as a summary for the four projects. Recommend putting good and bad sample reports on reserve for student consultation and guidance.

Spring '02: Numerical course-goal survey data not available due to EASY system data loss. Assessment based on student comments from EASY survey, instructor observations, and analysis of midterm and final exams. Remedial actions from earlier assessments have been implemented and had a positive effect on the course as outlined in the Course Assessment Report. Instructors feel that course is working well in achieving its goals, and see no need for immediate changes.

Overall Assessment: The assessment processes are working and confirming that the course is achieving its goals and appears to be in a mature equilibrium.
<table>
<thead>
<tr>
<th>Course Goals</th>
<th>Supports ABET Outcomes</th>
<th>Course Activity</th>
<th>Basis for Course-Goal Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Introduction to overall process of designing new systems or improving existing systems</td>
<td>C (○)</td>
<td>Lecture; use of overheads, class discussion</td>
<td>EASY survey assessment by students</td>
</tr>
<tr>
<td>2. Economic considerations in the design process; Present worth and Annual Cost methods</td>
<td>C (○), E (○)</td>
<td>Homework, examples solutions and exams. Some projects require use of economic analysis</td>
<td>EASY survey assessment by students and instructor; graded copies of all exam questions.</td>
</tr>
<tr>
<td>3. Formulation of a design problem as an optimization problem</td>
<td>E (●)</td>
<td>Homework, exams and projects</td>
<td>EASY survey assessment by students and instructor; graded copies of all exam questions.</td>
</tr>
<tr>
<td>4. Graphical solution of design optimization problems to illustrate some basic concepts</td>
<td>C (●), E (●), G (○)</td>
<td>Homework, exams and a project; Use of MATHEMATICA</td>
<td>EASY survey assessment by students and instructor; graded copies of all exam questions.</td>
</tr>
<tr>
<td>5. Basic principles of optimum design for unconstrained and constrained problems and their illustration using simple design examples: Optimality conditions</td>
<td>A (●), C (●), E (●), K (●)</td>
<td>Homework, exams and a project; Use of MATHEMATICA</td>
<td>EASY survey assessment by students and instructor; graded copies of all exam questions.</td>
</tr>
<tr>
<td>6. Methods for optimum design for linear problems: Linear programming using Simplex method</td>
<td>A (●), C (●), E (●), K (●)</td>
<td>Homework, exams and a project; Use of LINDO</td>
<td>EASY survey assessment by students and instructor; graded copies of all exam questions.</td>
</tr>
<tr>
<td>7. Methods for optimum design for nonlinear problems: One dimensional search, steepest descent method, conjugate directions method, sequential linear programming, quadratic programming problem, and constrained steepest descent method</td>
<td>A (●), C (●), E (●), K (●)</td>
<td>Homework, exams</td>
<td>EASY survey assessment by students and instructor; graded copies of all exam questions.</td>
</tr>
<tr>
<td>8. Team Work: Students work on four group projects and produce written reports</td>
<td>D (●), G (●)</td>
<td>4 projects</td>
<td>EASY survey assessment by students and instructor; graded copies of all exam questions.</td>
</tr>
</tbody>
</table>

○ denotes moderate contribution to the outcome  ● denotes substantial contribution to the outcome
Core Course Assessment Report
College of Engineering
University of Iowa

<table>
<thead>
<tr>
<th>Course Number:</th>
<th>57:021</th>
<th>Semester/Year</th>
<th>Summer 2001</th>
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<tbody>
<tr>
<td>Course Name:</td>
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<td></td>
<td>Principles of Design I</td>
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</table>

<table>
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<table>
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<table>
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<tr>
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<tbody>
<tr>
<td>M. Asghar Bhatti</td>
<td>M. Asghar Bhatti</td>
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<tr>
<td></td>
<td>(optional)</td>
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Please attach the course syllabus and course outcomes worksheet (COW).

**Assessment Techniques:**
Please indicate which of the following assessment techniques were used in the course and your judgment of their utility in assessing accomplishment of the Course Learning Objectives.

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<td>Quizzes</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Projects</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Written Reports (other than projects)</td>
<td>X</td>
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</tr>
<tr>
<td>Oral Reports</td>
<td>X</td>
<td></td>
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</tr>
<tr>
<td>Student Self-Evaluation</td>
<td>X</td>
<td></td>
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<tr>
<td>Student Peer-Evaluation</td>
<td>X</td>
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<td>Course Portfolios</td>
<td>X</td>
<td></td>
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<tr>
<td>Class Surveys (e.g., EASY)</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Instructor Observation</td>
<td>X</td>
<td></td>
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</tr>
<tr>
<td>Other [specify]</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
1. **ASSESSMENT RESULTS:** (and their relation to past results)

The course was well organized. Students generally gave 3 (Good) and 4 (Excellent) questions on the Learning Objectives and ABET Outcomes Survey.

2. **SUMMARY OF PRIOR REMEDIATION ACTIONS:** (and their estimated effect)

Added more practical examples. The response was generally positive.

3. **RECOMMENDED ACTIONS:**

Keep the course as is.

4. **CHANGES TO COURSE LEARNING OBJECTIVES:**

None.

5. **MODIFICATIONS TO ASSESSMENT TECHNIQUES:**

None.
Course Assessment Report
College of Engineering
The University of Iowa
(Revision of 27 November 2001)

<table>
<thead>
<tr>
<th>Course Number:</th>
<th>57:021</th>
<th>Semester/Year</th>
<th>Fall 2001</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Name:</td>
<td></td>
<td></td>
<td>Principles of Design 1</td>
</tr>
</tbody>
</table>

**COORDINATOR:** JASBIR S. ARORA

**DATE:** 5 February 2002

**INSTRUCTOR:** M. Asghar Bhatti

**SIGNATURE:** (optional)

**INSTRUCTOR:** Ray P. Han

**SIGNATURE:** (optional)

**INSTRUCTOR:** Jasbir S. Arora

**SIGNATURE:** (optional)

---

Please attach the course syllabus and course outcomes worksheet (COW).

**Assessment Techniques:**

Please indicate which of the following techniques were used in assessing the course and your judgment of their utility in assessing achievement of the Course Learning Goals.

<table>
<thead>
<tr>
<th>Assessment Technique</th>
<th>Used, provided useful data</th>
<th>Used, not recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework (not used in assessment)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Exams</td>
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<tr>
<td>Quizzes</td>
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<td>Projects (not used in assessment)</td>
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<tr>
<td>Written Reports (other than projects)</td>
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<tr>
<td>Other [specify]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

245
1. **ASSESSMENT RESULTS:** (How were each of the course learning goals (from the COW) achieved? Support your assessments qualitatively and/or quantitatively with data from each of the assessment techniques used (see Table on previous page). Explain the relation of the present assessment results to previous ones.)

The course goals were achieved by covering the material from the text and by assigning 4 projects during the semester (see attached schedule). Teams of three students who submitted written reports completed projects.

The EASY survey scores varied from 4.57 to 5.26 out of 6. The lowest score of 4.57 was for the question, "I gained experience in writing technical reports." The next lowest score was 4.88 for the question, "I learned concepts of numerical algorithms for solving design optimization problems." This indicates that more attention should be paid to these topics in the future.

The averages for the midterm and final exams were 76.8 and 68 respectively. These averages are comparable to those for the previous semester.

The instructors feel quite satisfied with the course. The changes that have been implemented have been quite good. We feel that there is enough time to cover all the topics appropriately in the class. We do not feel rushed in covering any of the topics. Some students commented that the book is too mathematical. Giving more handouts on the material for selected topics will alleviate this difficulty. It is noted that the current textbook is scheduled for revision (2nd Edition), and one of the objectives of the revision is to reduce the mathematical rigor of the material.

No further changes to the course material are proposed.

2. **SUMMARY OF RECENT REMEDIAL ACTIONS:** (and their estimated effect)

In the Fall 2000 assessment of the course, the following changes to the course were recommended:

- De-emphasize the regularity check and the graphical interpretation in Kuhn-Tucker optimality conditions.
- Review the matrix algebra concepts only when and where they are needed.
- In checking the form of a "quadratic form", present only the "principal minors" check.
- For one-dimensional search, cover just the Golden Sections method.
- Drop Newton's method from unconstrained optimization algorithms.
- Define and discuss sequential linear programming (SLP); HW should require only linearization of the problem and no SLP iterations.
- Real-world examples of optimization applications should be shown throughout the course to keep the students motivated about the material.
- "What is a good technical report" should be discussed in class.

These changes have been implemented, and their effect has been positive. The course material moves at a much better pace, and so students have more time to absorb the material.

3. **RECOMMENDED NEW REMEDIAL ACTIONS, IF ANY:**

The course has 4 team projects during the semester. This semester each Design Team member was required to fill out a Peer Perception Grading Sheet for each of the projects to evaluate team member's participation in the project and report writing. Filling out of the four sheets during the semester was too much. Some of the students kept forgetting to hand in the sheet. It is recommended that only one sheet be required containing evaluations for all the projects. This sheet should be handed at the end of the 4th project.
More emphasis will be placed on the report writing topic. Some good and bad sample reports will be placed on reserve for student guidance.

Some handouts may be used to explain the more difficult topics that students had trouble with.

4. RECOMMENDED CHANGES TO COURSE LEARNING GOALS:

NONE

5. RECOMMENDED MODIFICATIONS TO ASSESSMENT TECHNIQUES:

NONE

6. SIGNIFICANT DEVIATIONS IN COURSE CONTENT FROM SYLLABUS (SUMMARIZE):

NONE

COURSE SUPPORT

TA SUPPORT FROM THE COLLEGE (IN TERMS OF FTE): 3/4 time

OTHER TA SUPPORT AND SOURCE (IN TERMS OF FTE): NONE

TA RESPONSIBILITIES:

One 1/4 time TA handles the project grading (4 projects) and presentation of the software to be used in the projects. Two 1/4 time TAs handle the grading of the homework.

WAS THE TA SUPPORT ALLOCATED TO YOUR SECTION SUFFICIENT? PLEASE ELABORATE.

Yes

IF USED, WAS THE COMPUTER HARDWARE AND SOFTWARE SUPPORT FROM CSS ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

Adequate

WERE THE FACILITIES (CLASSROOM, LABS, ETC.) ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

Adequate

COURSE ORGANIZATION/CONTENTS

LECTURE (HOURS/WEEK): 3

DISCUSSION (HOURS/WEEK):

LABORATORY (HOURS/WEEK): 1

TOTAL NUMBER OF STUDENTS: 96

TEXTBOOK AUTHOR AND TITLE:


PLEASE COMMENT ON THE SUITABILITY OF THE TEXTBOOK AND ITS TIMELY AVAILABILITY.
The book was quite suitable for the course and was available on time.

TEACHING AIDS:

*Blackboard, Computer, Projector System, Overhead Projector.*

PLEASE ATTACH A COPY OF THE SYLLABUS THAT WAS DISTRIBUTED TO THE CLASS, A SAMPLE OF CLASS HANDOUTS IF AVAILABLE, AND THE COURSE ASSESSMENT WORKSHEET (COW) FOR THE COURSE. USE THE SPACE BELOW TO DESCRIBE ANY PARTICULAR PROBLEMS YOU MIGHT HAVE HAD WITH THIS COURSE (E.G., UNUSUAL ATTRITION, LACK OF PREREQUISITES, UNUSUAL GRADE DISTRIBUTION, ETC.) OR ANY INNOVATIONS/IDEAS THAT SHOULD BE CONSIDERED IN THE FUTURE.
Course Assessment Report
College of Engineering
The University of Iowa
(Revision of 27 November 2001)

Course Number: 57:021  Semester/Year: Spring 2002
Course Name: Principles of Design 1

COORDINATOR: JASBIR S. ARORA  SIGNATURE: ___________________________

DATE: 29 May 2002

INSTRUCTOR: Ray P. Han  SIGNATURE: (optional)
INSTRUCTOR: Jasbir S. Arora  SIGNATURE: (optional)

Please attach the course syllabus and course outcomes worksheet (COW).

Assessment Techniques:
Please indicate which of the following techniques were used in assessing the course and your judgment of their utility in assessing achievement of the Course Learning Goals.

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</table>
1. **ASSESSMENT RESULTS:** (How were each of the course learning goals (from the COW) achieved? Support your assessments qualitatively and/or quantitatively with data from each of the assessment techniques used (see Table on previous page). Explain the relation of the present assessment results to previous ones.)

   The course goals were achieved by covering the material from the text and by assigning 4 projects during the semester (see attached schedule). Teams of three students who submitted written reports completed projects.

   The numerical scores from EASY survey are not available for this semester. Student comments from the survey indicate that the course learning objectives were met and overall satisfaction with the course.

   The averages for the midterm and final exams were 82 and 66 respectively. The average for the final exam is slightly lower than usual. Most students remained in the exam room for full two hours. This indicates that either the exam was too long or somewhat difficult. The instructors feel that Part B of the exam was indeed a little longer and tougher.

   The instructors feel quite satisfied with the course. The changes that have been implemented have been quite good. We feel that there is enough time to cover all the topics appropriately in the class. We feel that the course goals were met quite satisfactorily.

   No further changes to the course material are proposed.

2. **SUMMARY OF RECENT REMEDIAL ACTIONS: (and their estimated effect)**

   In the recent past, the following changes to the course were recommended and have been implemented:

   ◆ De-emphasize the regularity check and the graphical interpretation in Kuhn-Tucker optimality conditions.
   ◆ Review the matrix algebra concepts only when and where they are needed.
   ◆ In checking the form of a "quadratic form", present only the "principal minors" check.
   ◆ For one-dimensional search, cover just the Golden Sections method.
   ◆ Drop Newton's method from unconstrained optimization algorithms.
   ◆ Define and discuss sequential linear programming (SLP); HW should require only linearization of the problem and no SLP iterations.
   ◆ For the constrained numerical methods, discuss use of only the Golden Sections method for line search; do not discuss approximate line search.
   ◆ Real-world examples of optimization applications should be shown throughout the course to keep the students motivated about the material.
   ◆ "What is a good technical report" should be discussed in class.
   ◆ One "Peer Perception Sheet" should be used for all projects; should be collected with the 4th project report.
   ◆ Some handouts were prepared and used to explain the more difficult topics that students had trouble with.

   The effect of these changes has been positive. The course material moves at a much better pace, and so students have more time to absorb the material.

3. **RECOMMENDED NEW REMEDIAL ACTIONS, IF ANY:**

   None
4. RECOMMENDED CHANGES TO COURSE LEARNING GOALS:

NONE

5. RECOMMENDED MODIFICATIONS TO ASSESSMENT TECHNIQUES:

NONE

6. SIGNIFICANT DEVIATIONS IN COURSE CONTENT FROM SYLLABUS (SUMMARIZE):

NONE

COURSE SUPPORT

TA SUPPORT FROM THE COLLEGE (IN TERMS OF FTE): 3/4 time

OTHER TA SUPPORT AND SOURCE (IN TERMS OF FTE): NONE

TA RESPONSIBILITIES:

One 1/4 time TA handles the project grading (4 projects) and presentation of the software to be used in the projects. Two 1/4 time TAs handle the grading of the homework.

WAS THE TA SUPPORT ALLOCATED TO YOUR SECTION SUFFICIENT? PLEASE ELABORATE.

Yes

IF USED, WAS THE COMPUTER HARDWARE AND SOFTWARE SUPPORT FROM CSS ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

Adequate

WERE THE FACILITIES (CLASSROOM, LABS, ETC.) ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

Adequate

COURSE ORGANIZATION/CONTENTS

LECTURE (HOURS/WEEK): 3

DISCUSSION (HOURS/WEEK):

LABORATORY (HOURS/WEEK): 1

TOTAL NUMBER OF STUDENTS: 53

TEXTBOOK AUTHOR AND TITLE:


PLEASE COMMENT ON THE SUITABILITY OF THE TEXTBOOK AND ITS TIMELY AVAILABILITY.

The book was quite suitable for the course and was available on time.

TEACHING AIDS:

Blackboard, Computer, Projector System, Overhead Projector.
PLEASE ATTACH A COPY OF THE SYLLABUS THAT WAS DISTRIBUTED TO THE CLASS, A SAMPLE OF CLASS HANDOUTS IF AVAILABLE, AND THE COURSE ASSESSMENT WORKSHEET (COW) FOR THE COURSE. USE THE SPACE BELOW TO DESCRIBE ANY PARTICULAR PROBLEMS YOU MIGHT HAVE HAD WITH THIS COURSE (E.G., UNUSUAL ATTRITION, LACK OF PREREQUISITES, UNUSUAL GRADE DISTRIBUTION, ETC.) OR ANY INNOVATIONS/IDEAS THAT SHOULD BE CONSIDERED IN THE FUTURE.
## College of Engineering EASY Survey Responses

### Results for: 057-021; Prin Of Design I; Section: 001- Lecture

**Instructor(s):** M. Bhatti  
**Session Code:** 20013  
**Beginning On:** 12-01-01  
**Running for:** 9 days  
**Course Enrollment:** 99  
**Survey #:** 228  
**Survey Name:** 05702112320015  
**Base Set Used:** ABET  
**Privacy:** Faculty Distribute  
**Remarks:** ABET

### Headings and Subheadings (Instructors) Used in Survey:
- **Heading(s):** Accreditation Board for Engineering and Technology (ABET) Survey
- **Subheading(s):** This survey was designed to provide feedback to your instructor on selected aspects of this course. Your responses should reflect YOUR INDIVIDUAL PERCEPTIONS, not those of the class as a whole.

### Score Type Name: Disagree/Agree 1-6

<table>
<thead>
<tr>
<th>Score</th>
<th>Desc</th>
<th>Value</th>
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<tbody>
<tr>
<td>1</td>
<td>Strongly Disagree</td>
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<tr>
<td>2</td>
<td>Moderately Disagree</td>
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<tr>
<td>3</td>
<td>Slightly Disagree</td>
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</tr>
<tr>
<td>4</td>
<td>Slightly Agree</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>Moderately Agree</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>Strongly Agree</td>
<td>6</td>
</tr>
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</table>

### Responses

<table>
<thead>
<tr>
<th>Question</th>
</tr>
</thead>
</table>
| 3. I was introduced to the overall process of designing systems.  
| **Mean:** 4.03  
| **Response Value:** 1 2 4 5 6 **Total Responding:** 7 16 |
| 5. I learned two economic analysis methods.  
| **Mean:** 4.47  
| **Response Value:** 1 2 3 5 6 **Total Responding:** 7 15 |
| 7. I learned the process of formulating a design problem as an optimization problem  
| **Mean:** 5.27  
| **Response Value:** 1 2 5 6 **Total Responding:** 7 15 |
| 9. I learned the graphical concepts for the design optimization process.  
| **Mean:** 4.83  
| **Response Value:** 2 4 5 6 **Total Responding:** 15 |
| 11. I learned the optimality conditions for design problems.  
| **Mean:** 5.67  
| **Response Value:** 2 4 5 6 **Total Responding:** 15 |

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Survey Response Summary  
3/31/2002 4:04PM
13. I learned the Simplex method for solving linear design problems.
   \[ \text{Mean: 5.67} \]

<table>
<thead>
<tr>
<th>Response Value</th>
<th>2</th>
<th>4</th>
<th>5</th>
<th>6</th>
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<td>4</td>
<td>8</td>
<td>15</td>
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</tbody>
</table>

15. I learned concept of numerical algorithms for solving design optimization problems.
   \[ \text{Mean: 4.58} \]

<table>
<thead>
<tr>
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<th>4</th>
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<th>6</th>
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</thead>
<tbody>
<tr>
<td>Count of Responses</td>
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<td>1</td>
<td>6</td>
<td>6</td>
<td>15</td>
</tr>
</tbody>
</table>

17. I learned to apply knowledge of mathematics, science and engineering to design and optimize systems.
   \[ \text{Mean: 4.58} \]

<table>
<thead>
<tr>
<th>Response Value</th>
<th>2</th>
<th>4</th>
<th>5</th>
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<td>2</td>
<td>4</td>
<td>7</td>
<td>15</td>
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</tbody>
</table>

19. I gained experience in writing technical reports.
   \[ \text{Mean: 4.67} \]

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
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<tbody>
<tr>
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<td>1</td>
<td>1</td>
<td>6</td>
<td>5</td>
<td>15</td>
</tr>
</tbody>
</table>

21. I gained experience to work as a design team on design projects from different disciplines.
   \[ \text{Mean: 4.67} \]

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
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<th>4</th>
<th>5</th>
<th>6</th>
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</tr>
</thead>
<tbody>
<tr>
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<td>1</td>
<td>5</td>
<td>6</td>
<td>15</td>
</tr>
</tbody>
</table>

Score Type: True/False

1. I understand that the ABET survey questions address course objectives not comments on the instructor’s effectiveness.
   \[ \text{Mean: 1.80} \]

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
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</thead>
<tbody>
<tr>
<td>Count of Responses</td>
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<td>17</td>
</tr>
</tbody>
</table>
2. I understand that questions with the numerical scale, 1 - 6, use "1" to mean "Strongly Disagree" and "6" to mean "Strongly Agree."

Mean: 1.80

<table>
<thead>
<tr>
<th>Response Value</th>
<th>Total Responding</th>
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<tbody>
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</tbody>
</table>

**Count of Responses:** 16

Score: Type: Mean: 1.00
College of Engineering EASY Survey Responses

Results for: 057021; Prin Of Design I; Section: 002- Lecture
Instructor(s): 1
Session Code: 20013  Beginning On: 12-01-91  Running for: 9 days
Survey #: 228  Survey Name: 05702112320013
Base Set Used: ABET  Privacy: Faculty Distribute  Remarks: ABET

Headings and Subheadings (Instructors) Used in Survey:

For each statement decide whether you generally agree or disagree then indicate the strength of agreement or disagreement by selecting the appropriate number.

This survey was designed to provide feedback to your instructor on selected aspects of this course. Your responses should reflect YOUR INDIVIDUAL PERCEPTIONS, not those of the class as a whole.

<table>
<thead>
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<th>Score Type Name: Disagree/Agree 1-6</th>
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<tbody>
<tr>
<td>1 = Strongly Disagree</td>
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<tr>
<td>3 = Slightly Disagree</td>
</tr>
<tr>
<td>4 = Slightly Agree</td>
</tr>
<tr>
<td>5 = Moderately Agree</td>
</tr>
<tr>
<td>6 = Strongly Agree</td>
</tr>
</tbody>
</table>

3. I was introduced to the overall process of designing systems.
   Mean: 5.30
   Response Value: 3 4 5 6 Total Responding
   Count of Responses: 1 1 4 5 11

5. I learned two economic analysis methods.
   Mean: 5.55
   Response Value: 5 6 Total Responding
   Count of Responses: 5 6 11

7. I learned the process of formulating a design problem as an optimization problem
   Mean: 5.27
   Response Value: 2 4 5 6 Total Responding
   Count of Responses: 1 1 2 7 11

9. I learned the graphical concepts for the design optimization process.
   Mean: 5.73
   Response Value: 5 6 Total Responding
   Count of Responses: 3 8 11

11. I learned the optimality conditions for design problems.
    Mean: 5.64
    Response Value: 4 5 6 Total Responding
    Count of Responses: 1 2 8 11

Survey Response Summary

3/31/2002 4:04PM
13. I learned the Simplex method for solving linear design problems.

<table>
<thead>
<tr>
<th>Response Value</th>
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<td>11</td>
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</table>

Mean: 5.8

15. I learned concept of numerical algorithms for solving design optimization problems.

<table>
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</tbody>
</table>

Mean: 5.55

17. I learned to apply knowledge of mathematics, science and engineering to design and optimize systems

<table>
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<td>1</td>
<td>1</td>
<td>9</td>
<td>11</td>
</tr>
</tbody>
</table>

Mean: 4.27

19. I gained experience in writing technical reports.

<table>
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<td>4</td>
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<td>11</td>
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</table>

Mean: 5.6

21. I gained experience to work as a design team on design projects from different disciplines.

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<tr>
<th>Response Value</th>
<th>2</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>1</td>
<td>2</td>
<td>8</td>
<td>11</td>
</tr>
</tbody>
</table>

Score Type Name: True/False

1. I understand that the ABET survey questions address course objectives not comments on the instructor's effectiveness.

<table>
<thead>
<tr>
<th>Response Value</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>11</td>
</tr>
</tbody>
</table>

Survey Response Summary 3/31/2002 4:04PM
258

Results For: 057021; Prin Of Design I; Section: 602; Lecture
Instructor(s): J. Avola
Session Code: 20013  Beginning On: 12-01-01  Running for: 9 days  Course Enrollment: 91
Survey #: 226  Survey Name: 05702112320013  Section Enrollment: 32
Base Set Used: ABET  Privacy: Faculty Distribute  Remarks: ABET

Score Type Name: True/False

1 = True
2 = False

2. I understand that questions with the numerical scale, 1 - 6, use "1" to mean "Strongly Disagree" and "6" to mean "Strongly Agree."

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>10</td>
<td>1</td>
<td>11</td>
</tr>
</tbody>
</table>

Score Type Mean: 1.05

Survey Response Summary 3/31/2002 4:04PM
### College of Engineering EASY Survey Responses

**Results for:** 057021; Prin Of Design I; Section: 003; Lecture

**Instructor(s):** Dr. Han

**Session Code:** 20013  **Beginning On:** 12-01-01  **Running for:** 9 days  **Course Enrollment:** 99

**Survey #:** 228  **Survey Name:** 05702112320015  **Section Enrollment:** 31

**Base Set Used:** ABET  **Privacy:** Faculty Distribute  **Remarks:** ABET

#### Headings and Subheadings (Instructors) Used in Survey:

**Heading(s):**
- Accreditation Board for Engineering and Technology (ABET) Survey

**Subheading(s):**
- This survey was designed to provide feedback to your instructor on selected aspects of this course. Your responses should reflect YOUR INDIVIDUAL PERCEPTIONS, not those of the class as a whole.

#### Score Type: Name: Disagree/Agree 1-6

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Strongly Disagree</td>
</tr>
<tr>
<td>2</td>
<td>Moderately Disagree</td>
</tr>
<tr>
<td>3</td>
<td>Slightly Disagree</td>
</tr>
<tr>
<td>4</td>
<td>Slightly Agree</td>
</tr>
<tr>
<td>5</td>
<td>Moderately Agree</td>
</tr>
<tr>
<td>6</td>
<td>Strongly Agree</td>
</tr>
</tbody>
</table>

#### 3. I was introduced to the overall process of designing systems.

<table>
<thead>
<tr>
<th>Response Value</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>2</td>
<td>8</td>
<td>6</td>
<td>16</td>
</tr>
</tbody>
</table>

**Mean:** 5.25

#### 5. I learned two economic analysis methods.

<table>
<thead>
<tr>
<th>Response Value</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>3</td>
<td>7</td>
<td>6</td>
<td>16</td>
</tr>
</tbody>
</table>

**Mean:** 5.19

#### 7. I learned the process of formulating a design problem as an optimization problem.

<table>
<thead>
<tr>
<th>Response Value</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>1</td>
<td>10</td>
<td>5</td>
<td>16</td>
</tr>
</tbody>
</table>

**Mean:** 5.25

#### 9. I learned the graphical concepts for the design optimization process.

<table>
<thead>
<tr>
<th>Response Value</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>1</td>
<td>4</td>
<td>6</td>
<td>5</td>
<td>10</td>
</tr>
</tbody>
</table>

**Mean:** 4.54

#### 11. I learned the optimality conditions for design problems.

<table>
<thead>
<tr>
<th>Response Value</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>2</td>
<td>10</td>
<td>4</td>
<td>16</td>
</tr>
</tbody>
</table>

**Mean:** 5.3

---

Survey Response Summary 3/31/2002 4:04PM
13. I learned the Simplex method for solving linear design problems.
   **Mean: 4.48**
   Response Value: | 1 | 3 | 4 | 5 | 6 | Total Responding |
   Count of Responses: | 1 | 1 | 3 | 7 | 4 | 16 |

15. I learned concept of numerical algorithms for solving design optimization problems.
   **Mean: 4.83**
   Response Value: | 1 | 3 | 4 | 5 | 6 | Total Responding |
   Count of Responses: | 1 | 1 | 4 | 6 | 4 | 16 |

17. I learned to apply knowledge of mathematics, science and engineering to design and optimize systems
   **Mean: 5.25**
   Response Value: | 4 | 5 | 6 | Total Responding |
   Count of Responses: | 2 | 8 | 6 | 16 |

19. I gained experience in writing technical reports.
   **Mean: 4.69**
   Response Value: | 2 | 3 | 4 | 5 | 6 | Total Responding |
   Count of Responses: | 1 | 1 | 5 | 4 | 5 | 16 |

21. I gained experience to work as a design team on design projects from different disciplines.
   **Mean: 5.9**
   Response Value: | 4 | 5 | 6 | Total Responding |
   Count of Responses: | 3 | 7 | 6 | 16 |

---

**Score Type Name: True/False**

1. I understand that the ABET survey questions address course objectives not comments on the instructor's effectiveness.
   **Mean: 1.80**
   Response Value: | 1 | Total Responding |
   Count of Responses: | 16 | 16 |

Survey Response Summary: 3/31/2002 4:04PM
2. I understand that questions with the numerical scale, 1 - 6, use "1" to mean "Strongly Disagree" and "6" to mean "Strongly Agree."

Mean: 1.80

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>16</td>
<td>16</td>
</tr>
</tbody>
</table>

Score Type Mean: 1.00
IV.15 57:022 Principles of Design II

Summer ’01: Not offered.

Fall ’01: The assessment was based on a goal-by-goal comparison of EASY student self-assessment responses and quiz questions. This assessment indicates that course goals are being met satisfactorily. Students remain somewhat frustrated with the textbook. Continuous Time Markov Chain topics were removed as redundant with other courses, per previous assessments. EASY questions were modified somewhat. Since this course is being discontinued next academic year, no specific additional recommendations were made.

Spring ’02: Numerical course-goal survey data not available due to EASY system data loss. Assessment based on analysis of homework and quiz questions, exams and projects, and instructor observation. Students were again required to work in teams for projects and homework, and this seemed to have a collateral benefit of improving the understanding of homework topics. Worksheets used to intersperse “active learning” activities among the lecture presentations; this seemed to be effective as those students who participated students grasped material more quickly.

Overall Assessment: Although Spring ’02 saw the last offering of this course, its assessment was productive and led to course improvements, notably in regard to student teamwork and active learning.
## Course Outcomes Worksheet (COW)

### 57:022 Principles of Design II

<table>
<thead>
<tr>
<th>Course Goals</th>
<th>Supports ABET Outcomes</th>
<th>Course Activity</th>
<th>Basis for Course-Goal Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Understanding random processes and characteristic probability distributions</td>
<td>A(<em>) , B(</em>)</td>
<td>Class discussion, homework assignments</td>
<td>EASY survey assessment by students and instructor; homework &amp; midterm exam grades</td>
</tr>
<tr>
<td>2. Understanding of curve-fitting (linear regression models) and the chi-square goodness-of-fit test for probability models and their engineering applications</td>
<td>A(<em>), B(</em>), E(○)</td>
<td>Class discussion, homework assignments, design projects</td>
<td>EASY survey assessment by students and instructor; project reports; homework, midterm and final exam grades</td>
</tr>
<tr>
<td>3. Understanding how to generate random numbers with specified distribution and to use these in Monte Carlo simulation. Understanding of basic statistical analysis of simulation models</td>
<td>A(<em>), B(</em>)</td>
<td>Class discussion, homework assignments, design projects</td>
<td>EASY survey assessment by students and instructor; project reports; homework, midterm and final exam grades</td>
</tr>
<tr>
<td>4. Understanding the classification and behavior of queues, especially Markovian queues, and their engineering applications.</td>
<td>A(<em>), B(</em>), C(*), E(○)</td>
<td>Class discussion, homework assignments, design projects</td>
<td>EASY survey assessment by students and instructor; project reports; homework, midterm and final exam grades</td>
</tr>
<tr>
<td>5. Understanding of the Weibull and Gumbel extreme value distributions, estimating the Weibull parameters from a sampling of failure times, the dependence of a system's reliability upon the reliability of its components, and how the system reliability may be improved by the inclusion of redundant &amp;/or stand-by components.</td>
<td>A(<em>), B(</em>), C(*) , E(○)</td>
<td>Class discussion, homework assignments, design projects</td>
<td>EASY survey assessment by students and instructor; project reports; homework, midterm and final exam grades</td>
</tr>
<tr>
<td>6. Understanding of the use of critical path methods, PERT, and Monte Carlo simulation in scheduling projects.</td>
<td>A(*), D(○), E(○)</td>
<td>Class discussion &amp; homework assignments</td>
<td>EASY survey assessment by students and instructor; homework, midterm and final exam grades</td>
</tr>
<tr>
<td>7. Have opportunities to further his/her professional development through working on teams in group projects; practicing written, oral and graphical communication skills; and using modern computer tools.</td>
<td>D(○), G(○), I(●)</td>
<td>Design projects</td>
<td>EASY survey assessment by students and instructor; project reports</td>
</tr>
</tbody>
</table>

○ denotes moderate contribution to the outcome  ● denotes substantial contribution to the outcome

*Samples of each to represent 10% of the class. One high score and one low score will be collected with the remainder of the sample a random selection.
Core Course Assessment Report
College of Engineering
University of Iowa

<table>
<thead>
<tr>
<th>Course Number:</th>
<th>57:022</th>
<th>Semester/Year</th>
<th>Fall 01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Name:</td>
<td>Principles of Design II</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>COORDINATOR:</th>
<th>BRICKER</th>
<th>SIGNATURE:</th>
</tr>
</thead>
<tbody>
<tr>
<td>DATE:</td>
<td>7/12/02</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INSTRUCTOR:</th>
<th>Geb Thomas</th>
<th>SIGNATURE: (optional)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>OTHER:</th>
<th>SIGNATURE: (optional)</th>
</tr>
</thead>
</table>

Please attach the course syllabus and course outcomes worksheet (COW).

Assessment Techniques:
Please indicate which of the following assessment techniques were used in the course and your judgment of their utility in assessing accomplishment of the Course Learning Objectives.

<table>
<thead>
<tr>
<th>Assessment Technique</th>
<th>Not Used</th>
<th>Used, provided useful data</th>
<th>Used, not recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Exams</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Quizzes</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Projects</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Written Reports (other than projects)</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Oral Reports</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Student Self-Evaluation</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Student Peer-Evaluation</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Course Portfolios</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Class Surveys (e.g., EASY)</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Instructor Observation (See Attached)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other [specify]</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Page 1 of 2

264
1. ASSESSMENT RESULTS: (and their relation to past results)

Understanding random processes and characteristic probability distributions: Majority strongly agreed on the survey results and scored an average of 8.6 and 8.9 on relevant quizzes.

Understanding of curve fitting (linear regression models) and the chi-square goodness-of-fit test for probability models and their engineering applications: Majority moderately agreed on EASY survey with respect to the curve fitting and strongly agreed on the goodness of fit questions. Average score of 8.91 on related quiz (#4) and

Understanding how to generate random numbers with specified distribution and to use these in Monte Carlo simulation. Understanding of basic statistical analysis of simulation models: Most students strongly agreed that they knew how to generate random numbers from a distribution. Most strongly to moderately agreed that they knew how to perform basic statistical analysis of an experiment.

Familiarity with the application of the Weibull and Gumbel distribution: Most students moderately agreed on the EASY survey that they understood these distributions with an average score of 5.13 compared to last year’s score of 4.56. Average quiz score (#5) was 9.48/10.0.

Understanding Critical Path and PERT methods: Most students strongly or moderately agreed that they understood both methods. Average quiz score (#6) was 6.91, but the quiz was poorly attended (students didn’t have one quiz waiver and this was the last quiz). Of the 17 students taking the quiz, 16 got perfect scores, the other got 9/10.

Team skills: Most students responded that they had opportunities to work in teams and practice their communication skills.

2. SUMMARY OF PRIOR REMEDIATION ACTIONS: (and their estimated effect)

Team projects were mandatory,
Computers used the same software as in the labs.
Still some frustration with text.
Changed EASY questions about the Weibull distribution.
Removed Continuous Time Markov Chain topics because they were redundant with OR.

3. RECOMMENDED ACTIONS:

None (course being discontinued).

4. RECOMMENDED CHANGES TO COURSE LEARNING OBJECTIVES:

None.
5. RECOMMENDED MODIFICATIONS TO ASSESSMENT TECHNIQUES:

None.

6. SIGNIFICANT DEVIATIONS IN COURSE CONTENT FROM SYLLABUS (SUMMARIZE): I should have spent more time on queues.

COURSE SUPPORT

TA SUPPORT FROM THE COLLEGE (IN TERMS OF FTE): ¼

OTHER TA SUPPORT AND SOURCE (IN TERMS OF FTE): None.

TA RESPONSIBILITIES: Help prepare quizzes and exams.

WAS THE TA SUPPORT ALLOCATED TO YOUR SECTION SUFFICIENTS? PLEASE ELABORATE.

Yes.

IF USED, WAS THE COMPUTER HARDWARE AND SOFTWARE SUPPORT FROM CSS ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

Yes

COURSE ORGANIZATION/CONTENTS

LECTURES (HOURS/WEEK): 3  DISCUSSION (HOURS/WEEK): 0

LABORATORY (HOURS/WEEK): 0  TOTAL NUMBER OF STUDENTS: 22

TEXTBOOK AUTHOR AND TITLE: Lecture Notes

PLEASE COMMENT ON THE SUITABILITY OF THE TEXTBOOK AND ITS TIMELY AVAILABILITY.

TEACHING AIDS:
Please attach the course syllabus and course outcomes worksheet (COW).

Assessment Techniques:

Please indicate which of the following techniques were used in assessing the course and your judgment of their utility in assessing achievement of the Course Learning Goals.

<table>
<thead>
<tr>
<th>Assessment Technique</th>
<th>Used, provided useful data</th>
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</thead>
<tbody>
<tr>
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<td>Projects</td>
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<td>Written Reports (other than projects)</td>
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<td>Student Self-Evaluation</td>
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<tr>
<td>Student Peer-Evaluation</td>
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<tr>
<td>Course Portfolios</td>
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</tr>
<tr>
<td>Class Surveys (e.g., EASY)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instructor Observation</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Other [specify]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. ASSOCIATION RESULTS: (How were each of the course learning goals (from the COW) achieved? Support your assessments qualitatively and/or quantitatively with data from each of the assessment techniques used (see Table on previous page). Explain the relation of the present assessment results to previous ones.)

<table>
<thead>
<tr>
<th>Goal #</th>
<th>Goal</th>
<th>Relevant HW</th>
<th>Relevant Quizzes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Understanding random processes and characteristic probability</td>
<td>1,2</td>
<td>1,2</td>
</tr>
<tr>
<td></td>
<td>distributions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Understanding of curve-fitting and chi-square goodness-of-fit test.</td>
<td>4,5</td>
<td>4,5</td>
</tr>
<tr>
<td>3</td>
<td>Understanding how to generate random numbers with specified</td>
<td>3</td>
<td>3</td>
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<tr>
<td></td>
<td>distribution and to use these in Monte Carlo simulation.</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Understanding of basic statistical analysis of simulation models</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Understanding the classification and behavior of queues, especially</td>
<td>10,11</td>
<td>10,11</td>
</tr>
<tr>
<td></td>
<td>Markovian queues, and their engineering applications.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Familiarity with the application of the Weibull and Gumbel extreme</td>
<td>5,6,7,8</td>
<td>5,6,7,8</td>
</tr>
<tr>
<td></td>
<td>value distributions in reliability, and how to estimate their</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>parameters. Understanding the dependence of a system's reliability</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>upon the reliability of its components, and how the system</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>reliability may be improved by the inclusion of redundant &amp;/or stand-</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>by components.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Understanding of the use of critical path methods, PERT, and Monte</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Carlo simulation in scheduling projects.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. SUMMARY OF RECENT REMEDIAL ACTIONS: (and their estimated effect)

An earlier recommendation that students be required to join a team for projects was again enforced. These teams were also used in preparing and submitting homework assignments.

(Although one major motivation for use of project teams for homework was to reduce the burden of grading homeworks, those teams which actually did work together on homework also seemed to gain a better understanding of the topics.)

3. RECOMMENDED NEW REMEDIAL ACTIONS, IF ANY:

None (course has been discontinued in its present form.)

4. RECOMMENDED CHANGES TO COURSE LEARNING GOALS:

None (course has been discontinued in its present form.)

5. RECOMMENDED MODIFICATIONS TO ASSESSMENT TECHNIQUES:

EASY results were unavailable this semester due to a systems error, but should be included in the future when available.

6. SIGNIFICANT DEVIATIONS IN COURSE CONTENT FROM SYLLABUS (SUMMARIZE):

Queuing systems were covered, including steadystate analysis of some simple birth-death models, and analysis of networks of queues using the software package RAQS (developed at the Center for Computer Integrated Manufacturing, School of Industrial Engineering & Management, Oklahoma State University).

COURSE SUPPORT
TA SUPPORT FROM THE COLLEGE (IN TERMS OF FTE): ½ - time TA

OTHER TA SUPPORT AND SOURCE (IN TERMS OF FTE): --

TA RESPONSIBILITIES:

Grading homework assignments, quizzes, and exams; consulting with students

WAS THE TA SUPPORT ALLOCATED TO YOUR SECTION SUFFICIENT? PLEASE ELABORATE.

Yes. Although course enrollment was high (49), the homeworks were submitted by teams of 3 or 4, reducing the grading burden substantially.

IF USED, WAS THE COMPUTER HARDWARE AND SOFTWARE SUPPORT FROM CSS ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

Adequate.

WERE THE FACILITIES (CLASSROOM, LABS, ETC.) ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

The classroom in MacBride Hall had sufficient seating, but the shape of the classroom (long and narrow) was frustrating—students in the back had difficulty hearing and were less involved in the class discussions and activities.

COURSE ORGANIZATION/CONTENTS

LECTURE (HOURS/WEEK): 3      DISCUSSION (HOURS/WEEK): 0

LABORATORY (HOURS/WEEK): 0      TOTAL NUMBER OF STUDENTS: 49

TEXTBOOK AUTHOR AND TITLE: On-line lecture notes by instructor (D. L. Bricker)

PLEASE COMMENT ON THE SUITABILITY OF THE TEXTBOOK AND ITS TIMELY AVAILABILITY.

TEACHING AIDS:

Worksheets were used to intersperse “active learning” activities among the lecture presentations. From the instructor’s viewpoint, these seemed to be effective—those students who actively participated seemed to be able to grasp the material more quickly and avoid confusion. Unfortunately, not all students participated actively in these activities!

PLEASE ATTACH A COPY OF THE SYLLABUS THAT WAS DISTRIBUTED TO THE CLASS, A SAMPLE OF CLASS HANDOUTS IF AVAILABLE, AND THE COURSE ASSESSMENT WORKSHEET (COW) FOR THE COURSE. USE THE SPACE BELOW TO DESCRIBE ANY PARTICULAR PROBLEMS YOU MIGHT HAVE HAD WITH THIS COURSE (E.G., UNUSUAL ATTRACTION, LACK OF PREREQUISITES, UNUSUAL GRADE DISTRIBUTION, ETC.) OR ANY INNOVATIONS/IDEAS THAT SHOULD BE CONSIDERED IN THE FUTURE.
College of Engineering EASY Survey Responses

Results for: 0571022; Prin Of Design II; Section: 001 - Lecture
Instructor(s): C. Thomas
Session Code: 20013  Beginning On: 12-12-01  Running for: 7 days
Survey #: 227  Survey Name: 0570200120015
Base Set Used: ABET  Privacy: Faculty Distribute  Remarks: ABET

Headings and Subheadings (Instructions) Used in Survey:
Heading(s):
Accreditation Board for Engineering and Technology (ABET) Survey
For each statement circle whether you generally agree or disagree then indicate the strength of agreement or disagreement by selecting the appropriate number.
Subheading(s):
This survey was designed to provide feedback to your instructor on selected aspects of this course. Your responses should reflect YOUR INDIVIDUAL PERCEPTIONS, not those of the class as a whole.

Score Type Name: Disagree/Agree 1-6
1= Strongly Disagree
2= Moderately Disagree
3= Slightly Disagree
4= Slightly Agree
5= Moderately Agree
6= Strongly Agree

3. I am familiar with Bernoulli and Poisson processes and their related probability distributions.
   Mean: 5.31
   Response Value: 2 4 5 6 Total Responding
   Count of Responses: 1 1 5 9 16

5. I understand how to fit a curve to data.
   Mean: 5.3
   Response Value: 2 4 5 6 Total Responding
   Count of Responses: 1 1 8 6 16

7. I can test a probability distribution's "goodness of fit" to sample data.
   Mean: 5.3
   Response Value: 2 5 6 Total Responding
   Count of Responses: 2 6 8 16

9. I know how to generate random numbers with a specified distribution.
   Mean: 5.9
   Response Value: 1 4 5 6 Total Responding
   Count of Responses: 1 2 4 9 16

11. I can perform some basic statistical analysis of a simulation experiment.
    Mean: 5.6
    Response Value: 2 3 4 5 6 Total Responding
    Count of Responses: 1 1 1 6 7 16

Survey Response Summary  3/31/2002 4:04PM
### Score Type Name: Disagree/Agree 1-6

<table>
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<tr>
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<td>1</td>
<td>2</td>
<td>6</td>
<td>7</td>
<td>16</td>
</tr>
</tbody>
</table>

13. I have an understanding of the classification and behavior of queues (waiting lines).

### Score Type Name: Agree 1-3

<table>
<thead>
<tr>
<th>Response Value</th>
<th>2</th>
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<th>Total Responding</th>
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</tr>
</tbody>
</table>

14. I can identify applications in which Weibull and Gumbel distributions are appropriate.

### Score Type Name: Agree 1-3

<table>
<thead>
<tr>
<th>Response Value</th>
<th>2</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
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</thead>
<tbody>
<tr>
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<td>1</td>
<td>1</td>
<td>8</td>
<td>6</td>
<td>16</td>
</tr>
</tbody>
</table>

17. I understand how to estimate the parameters of a Weibull model of component reliability, given a sample of failure times.

### Score Type Name: Agree 1-3

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
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</thead>
<tbody>
<tr>
<td>Count of Responses</td>
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<td>1</td>
<td>1</td>
<td>4</td>
<td>9</td>
<td>16</td>
</tr>
</tbody>
</table>

19. I can perform the critical path method to compute the completion time of a project whose activities have known durations.

### Score Type Name: Agree 1-3

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<td>1</td>
<td>1</td>
<td>4</td>
<td>9</td>
<td>16</td>
</tr>
</tbody>
</table>

21. I can perform a PERT analysis to estimate the probability distribution of a project whose activity durations are random.

### Score Type Name: True/False

<table>
<thead>
<tr>
<th>Response Value</th>
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<th>5</th>
<th>6</th>
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<tbody>
<tr>
<td>Count of Responses</td>
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<td>1</td>
<td>5</td>
<td>9</td>
<td>16</td>
</tr>
</tbody>
</table>

Survey Response Summary 3/31/2002 4:04PM
1. I understand that the ABET survey questions address course objectives not comments on the instructor's effectiveness.

   **Mean: 1.80**

<table>
<thead>
<tr>
<th>Response Value</th>
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<th>Total Responding</th>
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</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>16</td>
<td>16</td>
</tr>
</tbody>
</table>

2. I understand that questions with the numerical scale, 1 - 6, use "1" to mean 'Strongly Disagree' and "6" to mean 'Strongly Agree.'

   **Mean: 1.86**

<table>
<thead>
<tr>
<th>Response Value</th>
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<td>15</td>
<td>1</td>
<td>16</td>
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</table>
IV.16 57:090 First-Year Seminar

Summer ’01: Not offered

Fall ’01: Informal survey showed most students in agreement with achievement of learning goals. Students continue to express dissatisfaction with 0 s.h. credit. Recommend splitting seminar into first portion centralized, second portion program-specific for declared students. Provide participatory activities; bring in outside speakers; associate mentoring program more closely with departments.

Spring ’01: Not offered

Overall Evaluation: See Fall ’01 above
<table>
<thead>
<tr>
<th>Learning Objectives</th>
<th>ABET Outcome</th>
<th>Course Activity</th>
<th>Basis for Course-Goal Assessment (Input to course-coordinator and instructor assessment following each offering of course)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Gain understanding of the role of the engineer</td>
<td>10</td>
<td>12. Mark Andersland: Ethics</td>
<td>Experience, lecture, discussion, observation</td>
</tr>
<tr>
<td>2. Gain understanding of the role of the professional engineer</td>
<td>10</td>
<td>3. BME, CBE, CEE, ECE, IE, ME department</td>
<td>Instructors, surveys, lecture, discussion, observation</td>
</tr>
<tr>
<td>3. Gain understanding of the role of the student as engineer</td>
<td>10</td>
<td>3. BME, CBE, CEE, ECE, IE, ME department</td>
<td>Instructors, surveys, lecture, discussion, observation</td>
</tr>
<tr>
<td>5. Gain understanding of the engineering profession</td>
<td>10</td>
<td>Intro: how to change registration, Dean Fischer Top 10 list</td>
<td>Survey, instructor, observation</td>
</tr>
<tr>
<td>6. Gain understanding of the enrollment process</td>
<td>10</td>
<td>4. Phil Jordan: Job search process, internships/co-ops</td>
<td>Instructor, survey, observations</td>
</tr>
<tr>
<td>7. Gain understanding of how to write an effective resume</td>
<td>10</td>
<td>6. Cathy Bunnell: Career Services, Resume writing</td>
<td>Survey, instructor, observation</td>
</tr>
<tr>
<td>8. Gain understanding of the engineering profession</td>
<td>10</td>
<td>8. Student/Faculty Panel: Engineering &amp; more</td>
<td>Survey, instructor, observation</td>
</tr>
<tr>
<td>9. Gain understanding of the pre-registration advising process</td>
<td>10</td>
<td>10. Nancy Schneider: Pre-registration advising</td>
<td>Survey, instructor, observation</td>
</tr>
</tbody>
</table>

- denotes moderate contribution to the outcome  
- denotes substantial contribution to the outcome
Course Assessment Report
College of Engineering
The University of Iowa
(Revision of 27 November 2001)

<table>
<thead>
<tr>
<th>Course Number:</th>
<th>057:090</th>
<th>Semester/Year</th>
<th>Fall/2001</th>
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<tbody>
<tr>
<td>Course Name:</td>
<td></td>
<td></td>
<td>First-Year Seminar</td>
</tr>
</tbody>
</table>

**COORDINATOR:** NANCY SCHNEIDER  
**SIGNATURE:** [Signature]

**DATE:** 2/02

**INSTRUCTOR:**  
**SIGNATURE:** (optional)

**OTHER:**  
**SIGNATURE:** (optional)

Please attach the course syllabus and course outcomes worksheet (COW).

Assessment Techniques:
Please indicate which of the following techniques were used in assessing the course and your judgment of their utility in assessing achievement of the Course Learning Goals.

<table>
<thead>
<tr>
<th>Assessment Technique</th>
<th>Used, provided useful data</th>
<th>Used, not recommended</th>
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</thead>
<tbody>
<tr>
<td>Homework</td>
<td></td>
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<tr>
<td>Exams</td>
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<td>Quizzes</td>
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<tr>
<td>Projects</td>
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<tr>
<td>Written Reports (other than projects)</td>
<td></td>
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<tr>
<td>Oral Reports</td>
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<tr>
<td>Student Self-Evaluation</td>
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<tr>
<td>Student Peer-Evaluation</td>
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<tr>
<td>Course Portfolios</td>
<td></td>
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<tr>
<td>Class Surveys (e.g., EASY)</td>
<td>x</td>
<td></td>
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<tr>
<td>Instructor Observation</td>
<td>x</td>
<td>Used but not documented</td>
</tr>
<tr>
<td>Other (specify)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

275
1. ASSESSMENT RESULTS: (How were each of the course learning goals (from the COW) achieved? Support your assessments qualitatively and/or quantitatively with data from each of the assessment techniques used (see Table on previous page). Explain the relation of the present assessment results to previous ones.)

Goals were achieved mostly through lecture format presentations. The range on the learning objectives was from 72% to 90% in agreement. Students continue to express negativity regarding a required seminar for 0sh credit.

2. SUMMARY OF RECENT REMEDIAL ACTIONS: (and their estimated effect)

50% more departmental interaction with seminar
Decreased total number of sessions from 15 to 12
Added a third section of the seminar

3. RECOMMENDED NEW REMEDIAL ACTIONS, IF ANY:

Rather than alternating responsibility between SDC staff and departments, split seminar 6 weeks/6weeks
Provide participatory activities: case studies or set up scenarios for groups to discuss
Bring in outside speakers
Associate mentoring program more closely with the departments, for example have mentors assist by pre-advising students on course selection before meeting with faculty advisor

4. RECOMMENDED CHANGES TO COURSE LEARNING GOALS:

None

5. RECOMMENDED MODIFICATIONS TO ASSESSMENT TECHNIQUES:

None

6. SIGNIFICANT DEVIATIONS IN COURSE CONTENT FROM SYLLABUS (SUMMARIZE):

None

COURSE SUPPORT

TA SUPPORT FROM THE COLLEGE (IN TERMS OF FTE):
One ¼ time undergraduate TA

OTHER TA SUPPORT AND SOURCE (IN TERMS OF FTE):
None

TA RESPONSIBILITIES:
Maintain the seminar website
Assist with class facilitation every other week
WAS THE TA SUPPORT ALLOCATED TO YOUR SECTION SUFFICIENT? PLEASE ELABORATE.
Yes

IF USED, WAS THE COMPUTER HARDWARE AND SOFTWARE SUPPORT FROM CSS ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.
Yes

WERE THE FACILITIES (CLASSROOM, LABS, ETC.) ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.
Yes

COURSE ORGANIZATION/CONTENT

LECTURE (HOURS/WEEK): 1 hour weekly  DISCUSSION (HOURS/WEEK): 0

LABORATORY (HOURS/WEEK): 0  TOTAL NUMBER OF STUDENTS: 297

TEXTBOOK AUTHOR AND TITLE: No text

PLEASE COMMENT ON THE SUITABILITY OF THE TEXTBOOK AND ITS TIMELY AVAILABILITY. N/A

TEACHING AIDS: N/A

PLEASE ATTACH A COPY OF THE SYLLABUS THAT WAS DISTRIBUTED TO THE CLASS, A SAMPLE OF CLASS HANDOUTS IF AVAILABLE, AND THE COURSE ASSESSMENT WORKSHEET (COW) FOR THE COURSE. USE THE SPACE BELOW TO DESCRIBE ANY PARTICULAR PROBLEMS YOU MIGHT HAVE HAD WITH THIS COURSE (E.G., UNUSUAL ATTRITION, LACK OF PREREQUISITES, UNUSUAL GRADE DISTRIBUTION, ETC.) OR ANY INNOVATIONS/IDEAS THAT SHOULD BE CONSIDERED IN THE FUTURE.

The alternation between SDC presentations and departmental seminars every other week was very confusing. Students didn't know where they were supposed to be each week.
College of Engineering EASY Survey Responses

Results For: 059-090; First Year Experience; Section: 001 - Lecture
Instructor(s): Schneider
Session Code: 20013Beginning On: 12-03-01 Running for: 5 daysCourse Enrollment: 286
Survey # : 239 Survey Name: 057900AL20013Section Enrollment: 286
Base Set Used: CUSTOM Privacy: Faculty Distribute Remarks: ABET

Headings and Subheadings (Instructors) Used in Survey:

Heading(s):
FIRST YEAR SEMINAR EVALUATION SURVEY. This survey was designed to provide feedback on selected aspects of the seminar. Your responses should reflect YOUR INDIVIDUAL PERCEPTIONS of the seminar as a whole.
For each statement, decide whether you generally agree or disagree then indicate the strength of agreement or disagreement by selecting the appropriate number.

Subheading(s):
The sessions of the First Semester Seminar were developed to meet the following goals: Orientation to the College of Engineering & the University of Iowa; Career development skill building; increase awareness of engineering opportunities
This information will be summarized with others and not reported individually. Survey results will be utilized to revise and prepare the First Year Seminar for Fall 2002.

Score Type Name: Disagree/Agree 1-6

1. Strongly Disagree
2. Moderately Disagree
3. Slightly Disagree
4. Slightly Agree
5. Moderately Agree
6. Strongly Agree

2. My knowledge of available resources both in the College of Engineering and on the University of Iowa campus has increased.
Mean: 4.20

Response Value: 1 2 3 4 5 6 Total Responding
Count of Responses: 11 5 3 33 38 20 110

4. I am confident that I understand the policies and procedures of the College and the University.
Mean: 4.36

Response Value: 1 2 3 4 5 6 Total Responding
Count of Responses: 5 4 9 24 42 26 110

6. I have developed a relationship with my mentor from the Engineering Mentor Connection.
Mean: 2.46

Response Value: 1 2 3 4 5 6 Total Responding
Count of Responses: 45 20 9 23 8 4 109

8. I found the scavenger hunt of campus resources with the engineering mentors to be valuable.
Mean: 2.35

Response Value: 1 2 3 4 5 6 Total Responding
Count of Responses: 52 15 10 20 8 4 109

10. I have increased my knowledge of the job search process.
Mean: 4.3

Response Value: 1 2 3 4 5 6 Total Responding
Count of Responses: 10 6 0 37 29 18 109

Survey Response Summary 4/2/2002 11:52AM
# College of Engineering EASY Survey Responses

**Results For:** 059-090; First Year Experience; Section: 001- Lecture

**Instructor(s):** N. Schneider

**Session Code:** 2002  
**Beginning On:** 12-03-01  
**Running For:** 5 days  
**Course Enrolment:** 289

**Survey #:** 239  
**Survey Name:** 059090AL20013  
**Section Enrolment:** 289

**Base Set Used:** CUSTOM  
**Privacy:** Faculty Distribute  
**Remarks:** ABET

## Headings and Subheadings (Instructions) Used in Survey:

**Heading(s):**
- First Year Seminar Evaluation Survey. This survey was designed to provide feedback on selected aspects of the seminar. Your responses should reflect your individual perceptions of the seminar as a whole.
- For each statement, decide whether you generally agree or disagree then indicate the strength of agreement or disagreement by selecting the appropriate number.

**Subheading(s):**
- The sessions of the First Semester Seminar were developed to meet the following goals: Orientation to the College of Engineering & the University of Iowa; Career development skill building; Increase awareness of engineering opportunities
- This information will be summarized with others and not reported individually. Survey results will be utilized to revise and prepare the First Year Seminar for Fall 2002.

## Score Type Name: Disagree/Agree 1-6

1. Strongly Disagree
2. Moderately Disagree
3. Slightly Disagree
4. Slightly Agree
5. Moderately Agree
6. Strongly Agree

## 12. My skills in resume development have increased.

**Mean:** 3.84

<table>
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<tr>
<th>Response Value</th>
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<tbody>
<tr>
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<td>4</td>
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<td>13</td>
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<tr>
<td><strong>Total Responding:</strong></td>
<td><strong>109</strong></td>
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</table>

## 14. The seminar website was useful.

**Mean:** 4.01

<table>
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<tr>
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<tbody>
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<tr>
<td><strong>Total Responding:</strong></td>
<td><strong>109</strong></td>
</tr>
</tbody>
</table>

## 16. I received adequate information on the pre-registration and advising process.

**Mean:** 4.30

<table>
<thead>
<tr>
<th>Response Value</th>
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<tbody>
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<tr>
<td><strong>Total Responding:</strong></td>
<td><strong>109</strong></td>
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## 18. I have increased my knowledge about the profession of engineering through department presentations.

**Mean:** 4.38

<table>
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<tr>
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</tr>
</thead>
<tbody>
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<tr>
<td><strong>Total Responding:</strong></td>
<td><strong>109</strong></td>
</tr>
</tbody>
</table>

## 20. I am more inclined to participate in an internship/co-op, study abroad, or research position after hearing personal experiences of current students in the College.

**Mean:** 4.58

<table>
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<tr>
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<tbody>
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<td><strong>Total Responding:</strong></td>
<td><strong>109</strong></td>
</tr>
</tbody>
</table>

Survey Response Summary  
4/2/2002 11:52AM
22. Ethical dilemmas were helpful in considering my values and moral limits.

Mean: 3.62

<table>
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<tr>
<th>Response Value</th>
<th>1</th>
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<td>11</td>
<td>48</td>
<td>14</td>
<td>11</td>
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</table>

24. I have acquired a basic understanding of the subject areas presented in the seminar.

Mean: 4.36

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<td>27</td>
<td>45</td>
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<td>109</td>
</tr>
</tbody>
</table>

26. The content of this seminar is valuable.

Mean: 3.85

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<th>3</th>
<th>4</th>
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<td>12</td>
<td>29</td>
<td>31</td>
<td>14</td>
<td>109</td>
</tr>
</tbody>
</table>

28. The content is presented in a timely manner with the progression of the semester.

Mean: 4.02

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<td>13</td>
<td>34</td>
<td>34</td>
<td>12</td>
<td>109</td>
</tr>
</tbody>
</table>

30. I was exposed to the role of professional and ethical responsibility in engineering careers.

Mean: 4.11

<table>
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<td>8</td>
<td>29</td>
<td>42</td>
<td>16</td>
<td>108</td>
</tr>
</tbody>
</table>

32. I was exposed to a variety of contemporary engineering issues and the impact of engineering practice in the global community.

Mean: 4.73

<table>
<thead>
<tr>
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<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>9</td>
<td>5</td>
<td>16</td>
<td>25</td>
<td>37</td>
<td>15</td>
<td>107</td>
</tr>
</tbody>
</table>

34. I became aware of the need for lifelong learning and continuing education in engineering.

Mean: 4.34

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>3</th>
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<td>42</td>
<td>20</td>
<td>107</td>
</tr>
</tbody>
</table>

Survey Response Summary 4/2/2002 11:52AM
1. I understand that questions with the numerical scale, 1 - 6, use "1" to mean "Strongly Disagree" and "6" to mean "Strongly Agree."

<table>
<thead>
<tr>
<th>Response Value</th>
<th>I</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>110</td>
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</tr>
</tbody>
</table>

Score Type Mean: 1.00
IV.17 22M:035 Engineering Calculus I

Summer '01: Not assessed.

Fall '01: A course assessment meeting was held on 22 January 2002, including Profs. Tom Branson and Dan Anderson of Mathematics, and Profs. Bhatti (Math Liaison) and Holly (Associate Dean) from Engineering. The meeting included review of numerical student EASY responses, student narrative comments captured in the EASY survey, and actual and anecdotal instructor assessment. The initial course assessment, based primarily on the student EASY self-assessment, indicated that the course learning goals were essentially being met. The responses indicated that students felt the coverage of applications of integration was weak. Discussion with math faculty indicated that this student perception was likely accurate, and that references to applications in the course learning goals should be minimized to reflect actuality. There was general agreement that next year’s shift to a large-lecture based format should reduce some of the variability in student perceptions from one small section to another. Revisions to the EASY questions are recommended for the next assessment.

Spring '02: Numerical course-goal survey data not available due to EASY system data loss. A course assessment meeting was held on 30 May 2002, involving Profs. Tom Branson and Dan Anderson of Mathematics, and Profs. Asghar Bhatti (Math Liaison) and Forrest Holly (Associate Dean) from Engineering. Assessment was based on course-coordinator observation, anecdotal observations, and student comments on EASY survey questions regarding course goals. Students appreciated one instructor with considerable engineering experience. Expectations for homework submittal should be made more clear and applied uniformly across sections.

Overall Assessment: Spring '02 saw the last offering of this course as the new curriculum begins in Fall '02. Collaborative math-engineering assessment of the math courses has proven to be quite instructive and led to a new level of communication among the respective faculty.
### Course Outcomes Worksheet (COW)

**22M:035 Engineering Calculus I**  
**FALL 2001-02**

Created 19 November 2001 by A. Bhatti, E. Dove, F. Holly  
Last modified: 30 November 2001

<table>
<thead>
<tr>
<th>Course Goals</th>
<th>Supports ABET Outcomes</th>
<th>Course Activity</th>
<th>Basis for Course-Goal Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The student will learn the concepts of limits and continuity</td>
<td>a(●)</td>
<td>Lectures, homework, quizzes, exams, in-class problem solving</td>
<td>EASY survey assessment by students and instructor</td>
</tr>
<tr>
<td>2. The student will learn differentiation techniques, and applications of derivatives</td>
<td>a(●)</td>
<td>Lectures, homework, quizzes, exams, in-class problem solving</td>
<td>EASY survey assessment by students and instructor</td>
</tr>
<tr>
<td>3. The student will be introduced three-dimensional vector algebra</td>
<td>a(●)</td>
<td>Lectures, homework, quizzes, exams, in-class problem solving</td>
<td>EASY survey assessment by students and instructor</td>
</tr>
<tr>
<td>4. The student will learn analytical integration techniques, and applications of integration</td>
<td>a(●)</td>
<td>Lectures, homework, quizzes, exams, in-class problem solving</td>
<td>EASY survey assessment by students and instructor</td>
</tr>
</tbody>
</table>

○ denotes moderate contribution to the outcome  ● denotes substantial contribution to the outcome
Course Assessment Report
College of Engineering
The University of Iowa
(Revision of 27 November 2001)

Course Number: 22M:035  Semester/Year: Fall 2001
Course Name: Engineering Calculus I

<table>
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<th>M. A. Shell</th>
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<td>3/15/02</td>
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</tr>
<tr>
<td>INSTRUCTOR:</td>
<td>SIGNATURE: (optional)</td>
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</tr>
<tr>
<td>OTHER:</td>
<td>Thomas Branson</td>
<td>SIGNATURE: (optional)</td>
</tr>
<tr>
<td></td>
<td>Forrest Holly</td>
<td></td>
</tr>
</tbody>
</table>

Please attach the course syllabus and course outcomes worksheet (COW).

Assessment Techniques:
Please indicate which of the following techniques were used in assessing the course and your judgment of their utility in assessing achievement of the Course Learning Goals.

<table>
<thead>
<tr>
<th>Assessment Technique</th>
<th>Used, provided useful data</th>
<th>Used, not recommended</th>
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</thead>
<tbody>
<tr>
<td>Homework</td>
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<td>Oral Reports</td>
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<tr>
<td>Course Portfolios</td>
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<tr>
<td>Class Surveys (e.g., EASY)</td>
<td></td>
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<tr>
<td>Instructor Observation</td>
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<td></td>
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<tr>
<td>Other [specify]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

284
1. ASSESSMENT RESULTS: (How were each of the course learning goals (from the COW) achieved? Support your assessments qualitatively and/or quantitatively with data from each of the assessment techniques used (see Table on previous page). Explain the relation of the present assessment results to previous ones.)

Easy surveys indicate that the course goals are being met.

2. SUMMARY OF RECENT REMEDIAL ACTIONS: (and their estimated effect)

None

3. RECOMMENDED NEW REMEDIAL ACTIONS, IF ANY?

None

4. RECOMMENDED CHANGES TO COURSE LEARNING GOALS:

None

5. RECOMMENDED MODIFICATIONS TO ASSESSMENT TECHNIQUES:

None. Easy survey questions are slightly modified to better align them with the course goals.

6. SIGNIFICANT DEVIATIONS IN COURSE CONTENT FROM SYLLABUS (SUMMARIZE):

None
Course Assessment Report
College of Engineering
The University of Iowa
(Revision of 27 November 2001)

<table>
<thead>
<tr>
<th>Course Number:</th>
<th>22M:035</th>
<th>Semester/Year</th>
<th>Spring 2002</th>
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<tr>
<td>Course Name:</td>
<td>Engineering Calculus I</td>
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</tr>
</tbody>
</table>

COORDINATOR: M. A. BHATTI (MATH LIAISON)  SIGNATURE: M. A. BHATTI

DATE: 6/7/02

INSTRUCTOR:  SIGNATURE: (optional)

OTHER:
- Thomas Branson
  - Dan Anderson
  - (Math Department)
- Forrest Holly
  - (Associate Dean)

SIGNATURE: (optional)

F. M. Holly
10 June 02

Please attach the course syllabus and course outcomes worksheet (COW).

Assessment Techniques:
Please indicate which of the following techniques were used in assessing the course and your judgment of their utility in assessing achievement of the Course Learning Goals.

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<tr>
<td>Class Surveys (e.g., EASY)</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Instructor Observation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other [specify]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. **ASSESSMENT RESULTS:** (How were each of the course learning goals (from the COW) achieved? Support your assessments qualitatively and/or quantitatively with data from each of the assessment techniques used (see Table on previous page). Explain the relation of the present assessment results to previous ones.)

A course assessment meeting was held on May 30, 2002. The meeting was attended by Professors Tom Branson and Dan Anderson of Mathematics and Professors Asghar Bhatti and Forrest Holly from Engineering. Since no numerical data from student EASY surveys was available this semester, the meeting including only a review of student narrative comments captured in the EASY survey, and actual and anecdotal instructor assessment. Overall it appears that the course goals are being met. One of the two sections was taught by an instructor with considerable engineering experience. Some students appreciated this fact. It appeared that the students were not required to turn in homework. As a result some students skipped homework and that affected their preparation. It is recommended that the policies regarding homework should be made more clear and applied uniformly across all sections.

2. **SUMMARY OF RECENT REMEDIAL ACTIONS:** (and their estimated effect)

None.

3. **RECOMMENDED NEW REMEDIAL ACTIONS, IF ANY:**

None. This is the last offering of this course.

4. **RECOMMENDED CHANGES TO COURSE LEARNING GOALS:**

None.

5. **RECOMMENDED MODIFICATIONS TO ASSESSMENT TECHNIQUES:**

None.

6. **SIGNIFICANT DEVIATIONS IN COURSE CONTENT FROM SYLLABUS (SUMMARIZE):**

None.
College of Engineering EASY Survey Responses

Results For: 22M:035; Engineering Calculus I - Lecture
Instructor(s): Nils Andersen
Dearle Roseman
Ralph Strickland
George Nelson
Janya Lu
Session Code: 20013  Beginning On: 12-08-01  Running for: 14 days  Course Enrollment: 185
Survey ID: 248  Survey Name: 22M:035ALL20013
Base Set Used: ABET  Privacy: Faculty Distribute
Remarks: ABET

Headings and Subheadings (Instructions) Used In Survey:

Headings:
Accreditation Board for Engineering and Technology (ABET) Survey

For each statement decide whether you generally agree or disagree then indicate the strength of agreement or disagreement by selecting the appropriate number.

Subheadings:
This survey was designed to provide feedback to your instructor on selected aspects of this course. Your responses should reflect YOUR INDIVIDUAL PERCEPTIONS, not those of the class as a whole.

Survey Type Name: Disagree/Agree 1-6

1= Strongly Disagree
2= Moderately Disagree
3= Slightly Disagree
4= Slightly Agree
5= Moderately Agree
6= Strongly Agree

3. I am familiar with the concepts of limits.

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>3</td>
<td>5</td>
<td>1</td>
<td>12</td>
<td>18</td>
<td>27</td>
<td>66</td>
</tr>
</tbody>
</table>

5. I am familiar with the concept of continuity.

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
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</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>2</td>
<td>1</td>
<td>5</td>
<td>15</td>
<td>19</td>
<td>26</td>
<td>66</td>
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</table>

7. I learned differentiation techniques, and applications of derivatives to engineering problems.

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>9</td>
<td>28</td>
<td>20</td>
<td>66</td>
</tr>
</tbody>
</table>

8. I was introduced to the concepts of three-dimensional vector algebra.

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
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<td>13</td>
<td>23</td>
<td>19</td>
<td>66</td>
<td></td>
</tr>
</tbody>
</table>

11. I learned integration techniques, and applications of integration to engineering problems.

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
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<td>1</td>
<td>1</td>
<td>13</td>
<td>27</td>
<td>21</td>
<td>66</td>
</tr>
</tbody>
</table>

Survey Response Summary (non-comments) 4/16/2002 3:52AM
Results For: 22M:035; Engineering Calculus I- Lecture

Instructor(s): Nils Anderson
                Dennis Rosenman
                Risa Espinola
                George Nelson
                Jiayu Liu

Session Code: 20013  Beginning On: 12-03-01  Running for: 14 days  Course Enrollment: 185
Survey #: 248  Survey Name: 22M:035 ALL 20013
Base Set Used: ABET  Privacy: Faculty Distribute  Remarks: ABET

<table>
<thead>
<tr>
<th>Score Type Name: Disagree (Agree 1-6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1= Strongly Disagree</td>
</tr>
<tr>
<td>2= Moderately Disagree</td>
</tr>
<tr>
<td>3= Slightly Disagree</td>
</tr>
<tr>
<td>4= Slightly Agree</td>
</tr>
<tr>
<td>5= Moderately Agree</td>
</tr>
<tr>
<td>6= Strongly Agree</td>
</tr>
</tbody>
</table>

13. I learned applications of integration to engineering problems.

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
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<td>6</td>
<td>3</td>
<td>15</td>
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<td>13</td>
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</table>

Score Type Mean: 4.68

<table>
<thead>
<tr>
<th>Score Type Name: True/False</th>
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<tbody>
<tr>
<td>1= True</td>
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<tr>
<td>2= False</td>
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</table>

1. I understand that the ABET survey questions address course objectives not comments on the instructor's effectiveness.

<table>
<thead>
<tr>
<th>Response Value</th>
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<tbody>
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<td>Count of Responses</td>
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</table>

Score Type Mean: 1.80

2. I understand that questions with the numerical scale, 1 - 6, use "1" to mean "Strongly Disagree" and "6" to mean "Strongly Agree."

<table>
<thead>
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</thead>
<tbody>
<tr>
<td>Count of Responses</td>
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</tbody>
</table>

Score Type Mean: 1.00
IV.18 22M:036 Engineering Calculus II

Summer ’01: Not assessed.

Fall ’01: A course assessment meeting was held on 22 January 2002, including Profs. Tom Branson and Dan Anderson of Mathematics, and Profs. Bhatti (Math Liaison) and Holly (Associate Dean) from Engineering. The meeting included review of numerical student EASY responses, student narrative comments captured in the EASY survey, and actual and anecdotal instructor assessment. The initial course assessment, based primarily on the student EASY self-assessment, indicated that the course learning goals were essentially being met. Student EASY responses showed a relatively low level of confidence in the general area if application of sequences and series. It is not clear whether this refers to the applications of sequences and series, or the topics themselves. Therefore it is recommended that the EASY question set be slightly revised for the spring assessment.

Spring ’02: Numerical course-goal survey data not available due to EASY system data loss. A course assessment meeting was held on 30 May 2002, involving Profs. Tom Branson and Dan Anderson of Mathematics, and Profs. Asghar Bhatti (Math Liaison) and Forrest Holly (Associate Dean) from Engineering. Assessment was based on course-coordinator observation, anecdotal observations, and student comments on EASY survey questions regarding course goals. Although overall it appears that course goals are being met, many students struggle with sequences and series, and even Taylor series. There appears to be considerable variability in the responses, likely related to different pedagogy and instructors in multiple sections. Students are not getting the message regarding the importance of certain mathematical concepts to their engineering education and careers.

Overall Assessment: This course will be offered for the last time in Fall ’02. Its assessment has been helpful, but pointed out the non-homogeneity of material coverage and pedagogy in multiple sections. The new courses 22M:031 and 22M:032 will be structured around large, common lecture sections in response to this non-homogeneity.
## Course Outcomes Worksheet (COW)

**22M:036 Engineering Calculus II**  
**FALL 2001-02**

Created 19 November 2001 by A. Bhatti, E. Dove, F. Holly  
Last modified: 30 November 2001

<table>
<thead>
<tr>
<th>Course Goals</th>
<th>Supports ABET Outcomes</th>
<th>Course Activity</th>
<th>Basis for Course-Goal Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The student will learn the concepts of transcendental functions and their application</td>
<td>a(●)</td>
<td>Lectures, homework, quizzes, exams, in-class problem solving</td>
<td>EASY survey assessment by students and instructor</td>
</tr>
<tr>
<td>2. The student will learn the principles and application of sequences and series</td>
<td>a(●)</td>
<td>Lectures, homework, quizzes, exams, in-class problem solving</td>
<td>EASY survey assessment by students and instructor</td>
</tr>
<tr>
<td>3. The student will be introduced to calculus of parameterized curves and their applications</td>
<td>a(●)</td>
<td>Lectures, homework, quizzes, exams, in-class problem solving</td>
<td>EASY survey assessment by students and instructor</td>
</tr>
<tr>
<td>4. The student will learn integration techniques and their application</td>
<td>a(●)</td>
<td>Lectures, homework, quizzes, exams, in-class problem solving</td>
<td>EASY survey assessment by students and instructor</td>
</tr>
</tbody>
</table>

○ denotes moderate contribution to the outcome  ● denotes substantial contribution to the outcome
Course Assessment Report  
College of Engineering  
The University of Iowa  
(Revision of 27 November 2001)

<table>
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<th>22M:036</th>
<th>Semester/Year</th>
<th>Fall 2001</th>
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<th>SIGNATURE:</th>
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<table>
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<th>SIGNATURE:</th>
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</thead>
<tbody>
<tr>
<td>Thomas Branson</td>
<td>(optional)</td>
</tr>
<tr>
<td>Forrest Holly</td>
<td></td>
</tr>
</tbody>
</table>

Please attach the course syllabus and course outcomes worksheet (COW).

Assessment Techniques:
Please indicate which of the following techniques were used in assessing the course and your judgment of their utility in assessing achievement of the Course Learning Goals.

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<th>Assessment Technique</th>
<th>Used, provided useful data</th>
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<tr>
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<td>Exams</td>
<td>X</td>
<td></td>
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<td>X</td>
<td></td>
</tr>
<tr>
<td>Instructor Observation</td>
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<td></td>
</tr>
<tr>
<td>Other [specify]</td>
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<td></td>
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1. ASSESSMENT RESULTS: (How were each of the course learning goals (from the COW) achieved? Support your assessments qualitatively and/or quantitatively with data from each of the assessment techniques used (see Table on previous page). Explain the relation of the present assessment results to previous ones.)

Easy surveys indicate that the course goals are being met.

2. SUMMARY OF RECENT REMEDIAL ACTIONS: (and their estimated effect)

None

3. RECOMMENDED NEW REMEDIAL ACTIONS, IF ANY:

None

4. RECOMMENDED CHANGES TO COURSE LEARNING GOALS:

None

5. RECOMMENDED MODIFICATIONS TO ASSESSMENT TECHNIQUES:

None. Easy survey questions are slightly modified to better align them with the course goals.

6. SIGNIFICANT DEVIATIONS IN COURSE CONTENT FROM SYLLABUS (SUMMARIZE):

None
Course Assessment Report
College of Engineering
The University of Iowa
(Revision of 27 November 2001)

<table>
<thead>
<tr>
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<th>22M:036</th>
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<th>Spring 2002</th>
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<tr>
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</table>

COORDINATOR:  
M. A. BHATTI  
(MATH LIAISON)  

SIGNATURE:  
M. A. BHATTI

DATE:  
6/7/02

INSTRUCTOR:

SIGNATURE:  
(optional)

OTHER:  
Thomas Branson  
Dan Anderson  
(Math Department)

SIGNATURE:  
(optional)

Forrest Holly  
(Associate Dean)

7 M. HOLLY
10 June 02

Please attach the course syllabus and course outcomes worksheet (COW).

Assessment Techniques:
Please indicate which of the following techniques were used in assessing the course and your judgment of their utility in assessing achievement of the Course Learning Goals.

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A course assessment meeting was held on May 30, 2002. The meeting was attended by Professors Tom Branson and Dan Anderson of Mathematics and Professors Asghar Bhatti and Forrest Holly from Engineering. Since no numerical data from student EASY surveys was available this semester, the meeting including only a review of student narrative comments captured in the EASY survey, and actual and anecdotal instructor assessment. Overall it appears that the course goals are being met. Some students do not understand application of sequences and series (even Taylor series). There appears to be some variability in responses from different sections (six sections). Some variability is obviously expected because of different instructors. It is not clear from the responses whether the difference is solely due to instructors or some material was not covered in some sections. It is recommended to watch this carefully in future and recommend appropriate actions if warranted.

2. **SUMMARY OF RECENT REMEDIAL ACTIONS:** (and their estimated effect)

Slight modification of EASY questions was recommended in the Fall 2001 course activities report. This was implemented in the Spring 2002. The changes had the desired effect and produced meaningful responses from students.

3. **RECOMMENDED NEW REMEDIAL ACTIONS, IF ANY:**

None.

4. **RECOMMENDED CHANGES TO COURSE LEARNING GOALS:**

None.

5. **RECOMMENDED MODIFICATIONS TO ASSESSMENT TECHNIQUES:**

None.

6. **SIGNIFICANT DEVIATIONS IN COURSE CONTENT FROM SYLLABUS (SUMMARIZE):**

None.
College of Engineering EASY Survey Responses

Results For: 22M036; Engineering Calculus II- Lecture
Instructor(s): Yang Hou
Horibin Chen
Robert Ochinko
Survey #: 247  Survey Name: 22M036ALL20013
Base Set Used ABET  Privacy: Faculty Distribute  Remarks: ABET

Headings and Subheadings (Instructions) Used in Survey:
Headings:
Accreditation Board for Engineering and Technology (ABET) Survey
For each statement decide whether you generally agree or disagree then indicate the strength of agreement or disagreement by selecting the appropriate number.
Subheadings:
This survey was designed to provide feedback to your instructor on selected aspects of this course. Your responses should reflect YOUR INDIVIDUAL PERCEPTIONS, not those of the class as a whole.

Score Type Name: Disagree/Agree 1-6

1= Strongly Disagree
2= Moderately Disagree
3= Slightly Disagree
4= Slightly Agree
5= Moderately Agree
6= Strongly Agree

3. I learned the concepts of transcendental functions (sine, cosine, exponential, etc) and their application to engineering problems.
Mean: 4.43

<table>
<thead>
<tr>
<th>Response Values:</th>
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<th>3</th>
<th>4</th>
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<th>6</th>
<th>Total Responding</th>
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<tbody>
<tr>
<td>Count of Responses:</td>
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<td>5</td>
<td>8</td>
<td>6</td>
<td>12</td>
<td>7</td>
<td>39</td>
</tr>
</tbody>
</table>

5. I learned the principles and application of sequences and series, including Taylor series.
Mean: 3.70

<table>
<thead>
<tr>
<th>Response Values:</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
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<tbody>
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<td>4</td>
<td>7</td>
<td>14</td>
<td>6</td>
<td>5</td>
<td>39</td>
</tr>
</tbody>
</table>

7. I was introduced to the calculus of parameterized curves and their applications.
Mean: 4.02

<table>
<thead>
<tr>
<th>Response Values:</th>
<th>3</th>
<th>3</th>
<th>4</th>
<th>9</th>
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<tr>
<td>Count of Responses:</td>
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<td>5</td>
<td>9</td>
<td>17</td>
<td>7</td>
<td>39</td>
</tr>
</tbody>
</table>

9. I developed skill in integration techniques.
Mean: 6.00

<table>
<thead>
<tr>
<th>Response Values:</th>
<th>1</th>
<th>3</th>
<th>4</th>
<th>1</th>
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<th>Total Responding</th>
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<td>3</td>
<td>6</td>
<td>12</td>
<td>17</td>
<td>39</td>
</tr>
</tbody>
</table>

11. I developed in application of integration techniques.
Mean: 4.00

<table>
<thead>
<tr>
<th>Response Values:</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses:</td>
<td>3</td>
<td>9</td>
<td>15</td>
<td>12</td>
<td>39</td>
</tr>
</tbody>
</table>

Survey Response Summary (non-comments) 4/16/2002 8:53AM
1. I understand that the ABET survey questions address course objectives not comments on the instructor's effectiveness.

   **Response Values:**
<table>
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<tr>
<th>1</th>
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<th>Total Responding</th>
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<tbody>
<tr>
<td>38</td>
<td>1</td>
<td>39</td>
</tr>
</tbody>
</table>

2. I understand that questions with the numerical scale, 1 - 6, use "1" to mean "Strongly Disagree" and "6" to mean "Strongly Agree."

   **Response Values:**
<table>
<thead>
<tr>
<th>1</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>39</td>
<td>39</td>
</tr>
</tbody>
</table>

Score Type Name: True/False

Survey Response Summary (non-comments) 4/16/2002 8:33AM
IV.19 22M:040 Matrix Algebra for Engineers

Summer ’01: Not assessed.

Fall ’01: A course assessment meeting was held on 22 January 2002, including Profs. Tom Branson and Dan Anderson of Mathematics, and Profs. Bhatti (Math Liaison) and Holly (Associate Dean) from Engineering. The meeting included review of numerical student EASY responses, student narrative comments captured in the EASY survey, and actual and anecdotal instructor assessment. The initial course assessment, based primarily on the student EASY self-assessment, indicated that the course learning goals were essentially being met, most student responses to the EASY questions indicating fairly strong agreement. There was a systematically weak student EASY response on the questions regarding applications of eigenvalues and eigenvectors in engineering, and applications of orthogonal bases and principal axes to engineering problems. The review group agreed that the course was not really putting much focus on applications of these concepts, and that “diagonalization” is a term more likely to be recognized by the students than “principal axes”. It is recommended that the EASY questions be revised accordingly.

Spring ’02: Numerical course-goal survey data not available due to EASY system data loss. A course assessment meeting was held on 30 May 2002, involving Profs. Tom Branson and Dan Anderson of Mathematics, and Profs. Asghar Bhatti (Math Liaison) and Forrest Holly (Associate Dean) from Engineering. Assessment was based on course-coordinator observation, anecdotal observations, and student comments on EASY survey questions regarding course goals. Course goals appear to be achieved overall. Some students clearly feel the need for more emphasis on applications. Applications of eigenvalues and determinants should be stressed. Variability of experiences across multiple sections appears to be significant, extending even to the textbook used. This should be closely monitored in the future. Modification to EASY question per earlier recommendation appears to have been effective.

Overall Assessment: Course assessment process is working well, and leading to productive exchanges between math and engineering faculty. There is a continuing need to help students see the relevance of their foundational education in mathematics to their education and career in engineering.
# Course Outcomes Worksheet (COW)

**22M:040 Matrix Algebra for Engineers**  
**FALL 2001-02**

Created 19 November 2001 by A. Bhatti, E. Dove, F. Holly  
Last modified: 30 November 2001

<table>
<thead>
<tr>
<th>Course Goals</th>
<th>Supports ABET Outcomes</th>
<th>Course Activity</th>
<th>Basis for Course-Goal Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The student will learn the concepts and applications of matrix arithmetic</td>
<td>a(●)</td>
<td>Lectures, homework, quizzes, exams, in-class problem solving, computer lab applications</td>
<td>EASY survey assessment by students and instructor</td>
</tr>
<tr>
<td>2. The student will learn to solve linear systems</td>
<td>a(●)</td>
<td>Lectures, homework, quizzes, exams, in-class problem solving, computer lab applications</td>
<td>EASY survey assessment by students and instructor</td>
</tr>
<tr>
<td>3. The student will learn determinants, and their applications</td>
<td>a(●)</td>
<td>Lectures, homework, quizzes, exams, in-class problem solving, computer lab applications</td>
<td>EASY survey assessment by students and instructor</td>
</tr>
<tr>
<td>4. The student will learn eigenvalues and eigenvectors, and applications</td>
<td>a(●)</td>
<td>Lectures, homework, quizzes, exams, in-class problem solving, computer lab applications</td>
<td>EASY survey assessment by students and instructor</td>
</tr>
<tr>
<td>5. The student will learn orthogonal bases and principal axes, and applications</td>
<td>a(●)</td>
<td>Lectures, homework, quizzes, exams, in-class problem solving</td>
<td>EASY survey assessment by students and instructor</td>
</tr>
</tbody>
</table>

○ denotes moderate contribution to the outcome  ● denotes substantial contribution to the outcome
Course Assessment Report  
College of Engineering  
The University of Iowa  
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<table>
<thead>
<tr>
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<tr>
<td>OTHER: Thomas Branson</td>
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<tr>
<td>Forrest Holly</td>
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<td></td>
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*Please attach the course syllabus and course outcomes worksheet (COW).*

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Please indicate which of the following techniques were used in assessing the course and your judgment of their utility in assessing achievement of the Course Learning Goals.

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Easy surveys indicate that the course goals are being met.

2. **SUMMARY OF RECENT REMEDIAL ACTIONS:** (and their estimated effect)

None

3. **RECOMMENDED NEW REMEDIAL ACTIONS, IF ANY:**

None

4. **RECOMMENDED CHANGES TO COURSE LEARNING GOALS:**

None

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None. Easy survey questions are slightly modified to better align them with the course goals.

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College of Engineering
The University of Iowa
(Revision of 27 November 2001)

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<th>M. A. BHATTI (MATH LIAISON)</th>
<th>SIGNATURE:</th>
<th>M. A. BHATTI</th>
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</thead>
<tbody>
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</tr>
<tr>
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<td>SIGNATURE: (optional)</td>
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<tr>
<td></td>
<td>Forrest Holly (Associate Dean)</td>
<td></td>
<td>7/1/2001 10 June 02</td>
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</tbody>
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2. **SUMMARY OF RECENT REMEDIAL ACTIONS:** (and their estimated effect)

Slight modification of EASY questions was recommended in the Fall 2001 course activities report. This was implemented in the Spring 2002. The changes had the desired effect and produced meaningful responses from students.

3. **RECOMMENDED NEW REMEDIAL ACTIONS, IF ANY**

None.

4. **RECOMMENDED CHANGES TO COURSE LEARNING GOALS:**

None.

5. **RECOMMENDED MODIFICATIONS TO ASSESSMENT TECHNIQUES:**

None.

6. **SIGNIFICANT DEVIATIONS IN COURSE CONTENT FROM SYLLABUS (SUMMARIZE):**

None.
College of Engineering EASY Survey Responses

Results For: 22M:040; Matrix Algebra for Engineers - Lecture
Instructor(s): Mazgut Klabfield
George Nelson
Oguz Durumeric
Jiaying Lu

Session Code: 20013  Beginning On: 12-08-01  Running for: 14 days  Course Enrollment: 181
Survey #: 246  Survey Name: 22M040ALL20013
Base Set Used: ABET  Privacy: Faculty Distribute  Remarks: ABET

Headings and Subheadings (Instructions) Used in Survey:
Headings(s):
Accreditation Board for Engineering and Technology (ABET) Survey
For each statement decide whether you generally agree or disagree then indicate the strength of agreement or disagreement by selecting the appropriate number.
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Score Type Name: Disagree/Agree 1-6

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
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<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
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<td>5</td>
<td>1</td>
<td>15</td>
<td>23</td>
<td>47</td>
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</table>

3. I learned the concepts of matrix arithmetic.
   Mean 4.66

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>3</th>
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<td>3</td>
<td>1</td>
<td>5</td>
<td>15</td>
<td>18</td>
<td>46</td>
</tr>
</tbody>
</table>

6. I learned to apply the concepts of matrix arithmetic.
   Mean 4.70

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
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<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>9</td>
<td>27</td>
<td>46</td>
<td>66</td>
</tr>
</tbody>
</table>

9. I learned to calculate determinants.
   Mean 5.57

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>3</th>
<th>5</th>
<th>6</th>
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<td>1</td>
<td>6</td>
<td>35</td>
<td>46</td>
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</tbody>
</table>

11. I learned to calculate eigenvalues and eigenvectors.
    Mean 5.55

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>4</th>
<th>5</th>
<th>9</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>4</td>
<td>2</td>
<td>6</td>
<td>34</td>
<td>46</td>
</tr>
</tbody>
</table>
13. I learned of the potential applications of eigenvalues and eigenvectors in engineering.
   - Score Type Name: Disagreed/Agreed 1-6
   - Response Values: 1, 2, 3, 4, 5, 6
   - Count of Responses: 6, 3, 5, 11, 9, 12
   - Total Responding: 46

16. I learned about orthogonal bases and principal axes.
   - Score Type Name: Disagreed/Agreed 1-6
   - Response Values: 1, 2, 3, 4, 5, 6
   - Count of Responses: 2, 1, 4, 15, 12, 12
   - Total Responding: 46

17. I learned about the applications of orthogonal bases and principal axes to engineering problems.
   - Score Type Name: Disagreed/Agreed 1-6
   - Response Values: 1, 2, 3, 4, 5, 6
   - Count of Responses: 9, 3, 9, 13, 6, 8
   - Total Responding: 46

Score Type Name: True/False

1. I understand that the ABET survey questions address course objectives not comments on the instructor's effectiveness.
   - Score Type Name: True/False
   - Response Values: 1, False
   - Count of Responses: 47
   - Total Responding: 47

2. I understand that questions with the numerical scale, 1 - 6, use "1" to mean "Strongly Disagree" and "6" to mean "Strongly Agree."
   - Score Type Name: True/False
   - Response Values: 1, True
   - Count of Responses: 47
   - Total Responding: 47

Survey Response Summary (non-comments) 4/17/2002 2:21AM

305
IV.20 22M:041 Differential Equations for Engineers

Summer ’01: Not assessed.

Fall ’01: A course assessment meeting was held on 22 January 2002, including Profs. Tom Branson and Dan Anderson of Mathematics, and Profs. Bhatti (Math Liaison) and Holly (Associate Dean) from Engineering. The meeting included review of numerical student EASY responses, student narrative comments captured in the EASY survey, and actual and anecdotal instructor assessment. The initial course assessment, based primarily on the student EASY self-assessment, indicated that the course learning goals were essentially being met. There was a systematically low student response to the question regarding the applicability of nonlinear differential equations to engineering problems. This response seems to be driven by the applicability aspect of the question, since the preceding question on analysis of nonlinear equations received a relatively strong student response. It was agreed to delete this question in future surveys, since the course does not directly focus on the applicability of nonlinear ODEs in engineering.

Spring ’02: Numerical course-goal survey data not available due to EASY system data loss. A course assessment meeting was held on 30 May 2002, involving Profs. Tom Branson and Dan Anderson of Mathematics, and Profs. Asghar Bhatti (Math Liaison) and Forrest Holly (Associate Dean) from Engineering. Assessment was based on course-coordinator observation, anecdotal observations, and student comments on EASY survey questions regarding course goals. Students appear to be relatively satisfied with this course. One of the instructors bring a strong interest engineering (electrical) problems to the course, and this connection with their major clearly motivates and excites many students. The lack of numerical EASY student responses made it difficult to determine whether removal of the question on applicability of nonlinear differential equations led to any significant change in the responses to other questions.

Overall Assessment: The assessment of this course has been productive and useful. Among the five required math courses, Differential Equations seems to have the most transparent connection to real-world engineering problems, and this is reflected in student comments.
### Course Outcomes Worksheet (COW)

**22M:041 Differential Equations for Engineers**  
**FALL 2001-02**

Created 19 November 2001 by A. Bhatti, E. Dove, F. Holly  
Last modified: 30 November 2001

<table>
<thead>
<tr>
<th>Course Goals</th>
<th>Supports ABET Outcomes</th>
<th>Course Activity</th>
<th>Basis for Course-Goal Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The student will learn the principles of exponential growth and decay</td>
<td>a($)</td>
<td>Lectures, homework, quizzes, exams, in-class problem solving, computer lab applications</td>
<td>EASY survey assessment by students and instructor</td>
</tr>
<tr>
<td>2. The student will solve linear first-order differential equations with applications</td>
<td>a($)</td>
<td>Lectures, homework, quizzes, exams, in-class problem solving, computer lab applications</td>
<td>EASY survey assessment by students and instructor</td>
</tr>
<tr>
<td>3. The student will solve linear second-order differential equations, with applications</td>
<td>a($)</td>
<td>Lectures, homework, quizzes, exams, in-class problem solving, computer lab applications</td>
<td>EASY survey assessment by students and instructor</td>
</tr>
<tr>
<td>4. The student will learn Laplace Transform methods</td>
<td>a($)</td>
<td>Lectures, homework, quizzes, exams, in-class problem solving</td>
<td>EASY survey assessment by students and instructor</td>
</tr>
<tr>
<td>5. The student will learn homogeneous and particular solutions, and their applications</td>
<td>a($)</td>
<td>Lectures, homework, quizzes, exams, in-class problem solving</td>
<td>EASY survey assessment by students and instructor</td>
</tr>
<tr>
<td>6. The student will learn techniques for analyzing nonlinear differential equations, with applications</td>
<td>a($)</td>
<td>Lectures, homework, quizzes, exams, in-class problem solving, computer lab applications</td>
<td>EASY survey assessment by students and instructor</td>
</tr>
</tbody>
</table>

○ denotes moderate contribution to the outcome  ● denotes substantial contribution to the outcome
Course Assessment Report
College of Engineering
The University of Iowa
(Revision of 27 November 2001)

<table>
<thead>
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<th>Semester/Year</th>
<th>Fall 2001</th>
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<tr>
<td>Course Name:</td>
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<td>Differential Equations for Engineers</td>
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<tr>
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<th></th>
<th>SIGNATURE:</th>
<th>M. A. Bhati</th>
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<tbody>
<tr>
<td>OTHER:</td>
<td>Thomas Branson</td>
<td>SIGNATURE:</td>
<td>(optional)</td>
</tr>
<tr>
<td></td>
<td>Forrest Holly</td>
<td></td>
<td></td>
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</tbody>
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Please attach the course syllabus and course outcomes worksheet (COW).

Assessment Techniques:
Please indicate which of the following techniques were used in assessing the course and your judgment of their utility in assessing achievement of the Course Learning Goals.

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Easy surveys indicate that the course goals are being met.

2. SUMMARY OF RECENT REMEDIAL ACTIONS: (and their estimated effect)

None

3. RECOMMENDED NEW REMEDIAL ACTIONS, IF ANY:

None

4. RECOMMENDED CHANGES TO COURSE LEARNING GOALS:

None

5. RECOMMENDED MODIFICATIONS TO ASSESSMENT TECHNIQUES:

None. Easy survey questions are slightly modified to better align them with the course goals.

6. SIGNIFICANT DEVIATIONS IN COURSE CONTENT FROM SYLLABUS (SUMMARIZE):

None
Course Assessment Report  
College of Engineering  
The University of Iowa  
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<th>M. A. BHATTI</th>
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<tr>
<td>OTHER:</td>
<td>Thomas Branson Dan Anderson (Math Department)</td>
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<tr>
<td></td>
<td>Forrest Holly (Associate Dean)</td>
<td></td>
<td>J. M. Holly 10 June 02</td>
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1. ASSESSMENT RESULTS: (How were each of the course learning goals (from the COW) achieved? Support your assessments qualitatively and/or quantitatively with data from each of the assessment techniques used (see Table on previous page). Explain the relation of the present assessment results to previous ones.)

A course assessment meeting was held on May 30, 20002. The meeting was attended by Professors Tom Branson and Dan Anderson of Mathematics and Professors Asghar Bhatti and Forrest Holly from Engineering. Since no numerical data from student EASY surveys was available this semester, the meeting including only a review of student narrative comments captured in the EASY survey, and actual and anecdotal instructor assessment. Overall it appears that the course goals are being met. Student comments were generally positive. Students clearly were able to relate the material covered in this course with their engineering courses.

2. SUMMARY OF RECENT REMEDIAL ACTIONS: (and their estimated effect)

Slight modification of EASY questions was recommended in the Fall 2001 course activities report. This was implemented in the Spring 2002. The changes had the desired effect and produced meaningful responses from students.

3. RECOMMENDED NEW REMEDIAL ACTIONS, IF ANY:

None.

4. RECOMMENDED CHANGES TO COURSE LEARNING GOALS:

None.

5. RECOMMENDED MODIFICATIONS TO ASSESSMENT TECHNIQUES:

None.

6. SIGNIFICANT DEVIATIONS IN COURSE CONTENT FROM SYLLABUS (SUMMARIZE):

None.
College of Engineering EASY Survey Responses

Results For: 22M:041; Differential Equations for Engineers- Lecture
Instructor(s): Tong Li
Herb Histand
Tom Brannon
Ying-Qing Wu
Tom Brannon
Session Code: 20013  Beginning On: 12-08-01  Running for: 14 days  Course Enrollment: 116
Survey #: 245  Survey Name: 22M041ALL20013
Base Set Used ABET  Privacy: Faculty Distribute  Remarks: ABET

Seeds & Subheadings (Instructions) Used in Survey:

Handing(s):
Accreditation Board for Engineering and Technology (ABET) Survey
For each statement decide whether you generally agree or disagree then indicate the strength of agreement or disagreement by selecting the appropriate number.
Subheading(s):
This survey was designed to provide feedback to your instructor on selected aspects of this course. Your responses should reflect YOUR INDIVIDUAL PERCEPTIONS, not those of the class as a whole.

Score Type: None: Disagree/Agree: 1-6

1 = Strongly Disagree
2 = Moderately Disagree
3 = Slightly Disagree
4 = Slightly Agree
5 = Moderately Agree
6 = Strongly Agree

3. I learned the principles of exponential growth and decay in natural systems.
   Mean: 4.6
   Response Values: 1 2 3 4 5 6 Total Responding
   Count of Responses: 5 3 13 21 14 59

5. I learned to solve linear first-order differential equations.
   Mean: 6.6
   Response Values: 1 2 3 4 5 6 Total Responding
   Count of Responses: 3 2 18 29

7. I learned how linear first-order differential equations are applicable to engineering problems.
   Mean: 4.6
   Response Values: 1 2 3 4 5 6 Total Responding
   Count of Responses: 4 6 10 27 10

9. I learned to solve linear second-order differential equations.
   Mean: 5.8
   Response Values: 1 2 3 4 5 6 Total Responding
   Count of Responses: 2 1 5 24 24

11. I learned how linear second-order differential equations are applicable to engineering problems.
    Mean: 5.8
    Response Values: 1 2 3 4 5 6 Total Responding
    Count of Responses: 2 3 5 19 24 11

Survey Response Summary (non-comments) 4/16/2002 8:55AM

312
13. I learned to apply Laplace transform methods.
   Mean: 4.78
   Response Values: 1 2 3 4 5 6 Total Responding
   Count of Responses: 3 2 2 12 18 21 59

16. I learned to calculate homogeneous and particular solutions.
   Mean: 4.90
   Response Values: 1 2 3 4 5 6 Total Responding
   Count of Responses: 2 1 9 17 29 59

17. I learned about the analysis of nonlinear differential equations.
   Mean: 4.67
   Response Values: 1 2 3 4 5 6 Total Responding
   Count of Responses: 1 2 3 21 22 59

10. I learned how the analysis of nonlinear differential equations is applicable to engineering problems.
    Mean: 3.88
    Response Values: 1 2 3 4 5 6 Total Responding
    Count of Responses: 5 6 9 23 10 6 57

Score Type Name: True/False

1. I understand that the ABET survey questions address course objectives not comments on the instructor's effectiveness.
   Mean: 3.08
   Response Values: 1 2 Total Responding
   Count of Responses: 58 1 59
2. I understand that questions with the numerical scale, 1 - 6, use "1" to mean "Strongly Disagree" and "6" to mean "Strongly Agree."

<table>
<thead>
<tr>
<th>Response Value</th>
<th>Count of Responses</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>59</td>
<td>59</td>
</tr>
</tbody>
</table>

Score Type Mean: 1.01
IV.21 22M:042 Vector Calculus

Summer '01: Not assessed.

Fall '01: A course assessment meeting was held on 22 January 2002, including Profs. Tom Branson and Dan Anderson of Mathematics, and Profs. Bhatti (Math Liaison) and Holly (Associate Dean) from Engineering. The meeting included review of numerical student EASY responses, student narrative comments captured in the EASY survey, and actual and anecdotal instructor assessment. The initial course assessment, based primarily on the student EASY self-assessment, indicated that the course learning goals were essentially being met. Except for one section, the student response was generally very strong, indicating the course is working well. Some minor realignment of EASY question is recommended.

Spring '02: Numerical course-goal survey data not available due to EASY system data loss. A course assessment meeting was held on 30 May 2002, involving Profs. Tom Branson and Dan Anderson of Mathematics, and Profs. Asghar Bhatti (Math Liaison) and Forrest Holly (Associate Dean) from Engineering. Assessment was based on course-coordinator observation, anecdotal observations, and student comments on EASY survey questions regarding course goals. Student comments were quite variable, probably reflecting significant differences in pedagogy across multiple sections. Some students clearly found that the class helped them understand difficult three-dimensional vector concepts. Others found the engineering examples to be attempted, but trivial. Several students pleaded for a more visual approach to explanation of three-dimensional vector concepts.

Overall Assessment: The assessment process has been useful, and suggests the need for more uniformity across the multiple sections of this class. In particular, clearer and more “authentic” connections to engineering problems would be very helpful to the students. This course will see its last offering in Fall 2003; continuing assessment will help guide the design of the new replacement course Math V.
### Course Outcomes Worksheet (COW)

**22M:042 Vector Calculus for Engineers**  
**FALL 2001-02**

Created 19 November 2001 by A. Bhatti, E. Dove, F. Holly  
Last modified: 30 November 2001

<table>
<thead>
<tr>
<th>Course Goals</th>
<th>Supports ABET Outcomes</th>
<th>Course Activity</th>
<th>Basis for Course-Goal Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The student will learn the concepts and applications of parametric equations of curves</td>
<td>a(*)</td>
<td>Lectures, homework, quizzes, exams, in-class problem solving</td>
<td>EASY survey assessment by students and instructor</td>
</tr>
<tr>
<td>2. The student will learn vector geometry, and applications</td>
<td>a(*)</td>
<td>Lectures, homework, quizzes, exams, in-class problem solving</td>
<td>EASY survey assessment by students and instructor</td>
</tr>
<tr>
<td>3. The student will learn functions of several variables, coordinate transformations, and applications</td>
<td>a(*)</td>
<td>Lectures, homework, quizzes, exams, in-class problem solving</td>
<td>EASY survey assessment by students and instructor</td>
</tr>
<tr>
<td>4. The student will learn concepts and uses of minima and maxima</td>
<td>a(*)</td>
<td>Lectures, homework, quizzes, exams, in-class problem solving</td>
<td>EASY survey assessment by students and instructor</td>
</tr>
<tr>
<td>5. The student will learn integration techniques in two and three dimensions, and applications</td>
<td>a(*)</td>
<td>Lectures, homework, quizzes, exams, in-class problem solving</td>
<td>EASY survey assessment by students and instructor</td>
</tr>
<tr>
<td>6. The student will learn vector fields and flows, and integration on curves</td>
<td>a(*)</td>
<td>Lectures, homework, quizzes, exams, in-class problem solving</td>
<td>EASY survey assessment by students and instructor</td>
</tr>
</tbody>
</table>

○ denotes moderate contribution to the outcome  ● denotes substantial contribution to the outcome
Course Assessment Report
College of Engineering
The University of Iowa
(Revision of 27 November 2001)

<table>
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**COORDINATOR:**                                    **SIGNATURE:**

**DATE:** 3/15/02

**INSTRUCTOR:**                                    **SIGNATURE:** (optional)

**OTHER:** Thomas Branson                           **SIGNATURE:** (optional)

Forrest Holly

Please attach the course syllabus and course outcomes worksheet (COW).

**Assessment Techniques:**
Please indicate which of the following techniques were used in assessing the course and your judgment of their utility in assessing achievement of the Course Learning Goals.

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1. ASSESSMENT RESULTS: (How were each of the course learning goals (from the COW) achieved? Support your assessments qualitatively and/or quantitatively with data from each of the assessment techniques used (see Table on previous page). Explain the relation of the present assessment results to previous ones.)

Easy surveys indicate that the course goals are being met.

2. SUMMARY OF RECENT REMEDIAL ACTIONS: (and their estimated effect)

None

3. RECOMMENDED NEW REMEDIAL ACTIONS, IF ANY:

None

4. RECOMMENDED CHANGES TO COURSE LEARNING GOALS:

None

5. RECOMMENDED MODIFICATIONS TO ASSESSMENT TECHNIQUES:

None. Easy survey questions are slightly modified to better align them with the course goals.

6. SIGNIFICANT DEVIATIONS IN COURSE CONTENT FROM SYLLABUS (SUMMARIZE):

None
Course Assessment Report  
College of Engineering  
The University of Iowa  
(Revision of 27 November 2001)

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<td>Vector Calculus</td>
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**COORDINATOR:**  
M.A. BHATTI  
(MATH LIAISON)  

**DATE:**  
6/7/02

**INSTRUCTOR:**  
Thomas Branson  
Dan Anderson  
(Math Department)

**SIGNATURE:**  
M.A. BHATTI

**OTHER:**  
Forrest Holly  
(Associate Dean)

**SIGNATURE:**  
7.M. Holly  
10 June 02

*Please attach the course syllabus and course outcomes worksheet (COW).*

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</table>

319
1. ASSESSMENT RESULTS: (How were each of the course learning goals (from the COW) achieved? Support your assessments qualitatively and/or quantitatively with data from each of the assessment techniques used (see Table on previous page). Explain the relation of the present assessment results to previous ones.)

A course assessment meeting was held on May 30, 20002. The meeting was attended by Professors Tom Branson and Dan Anderson of Mathematics and Professors Asghar Bhatti and Forrest Holly from Engineering. Since no numerical data from student EASY surveys was available this semester, the meeting including only a review of student narrative comments captured in the EASY survey, and actual and anecdotal instructor assessment. Overall it appears that the course goals are being met. There appears to be some variability in responses from different sections (three sections). Some variability is obviously expected because of different instructors. It is not clear from the responses whether the difference is solely due to instructors or some material was not covered in some sections. It is recommended to watch this carefully in future and recommend appropriate actions if warranted.

2. SUMMARY OF RECENT REMEDIAL ACTIONS: (and their estimated effect)

Slight modification of EASY questions was recommended in the Fall 2001 course activities report. This was implemented in the Spring 2002. The changes had the desired effect and produced meaningful responses from students.

3. RECOMMENDED NEW REMEDIAL ACTIONS, IF ANY:

None.

4. RECOMMENDED CHANGES TO COURSE LEARNING GOALS:

None.

5. RECOMMENDED MODIFICATIONS TO ASSESSMENT TECHNIQUES:

None.

6. SIGNIFICANT DEVIATIONS IN COURSE CONTENT FROM SYLLABUS (SUMMARIZE):

None.
# College of Engineering EASY Survey Responses

**Results For:** 22M:042; Vector Calculus for Engineers - Lecture  
**Instructor(s):** Jon Simon, Richard Randell, David Stewart, Ying-Ching Wu  
**Session Code:** 20013  
**Beginning On:** 12-06-01  
**Running for:** 14 days  
**Survey #:** 243  
**Survey Name:** 22M042ALL20013  
**Base Set Used:** ABET  
**Privacy:** Faculty Distribute  
**Remarks:** ABET  
**Course Enrollment:** 122

**Survey Instructions:**
- **Headline(s):** Accreditation Board for Engineering and Technology (ABET) Survey
- **Subheading(s):** This survey was designed to provide feedback to your instructor on selected aspects of this course. Your responses should reflect YOUR INDIVIDUAL PERCEPTIONS, not those of the class as a whole.

**Score Type Name:** Disagree/Agree 1-6

<table>
<thead>
<tr>
<th>1= Strongly Disagree</th>
<th>2= Moderately Disagree</th>
<th>3= Slightly Disagree</th>
<th>4= Slightly Agree</th>
<th>5= Moderately Agree</th>
<th>6= Strongly Agree</th>
</tr>
</thead>
</table>

### 3. I learned the concepts of parametric equations of curves.

**Mean 4.10**

<table>
<thead>
<tr>
<th>Response Values</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>2</td>
<td>2</td>
<td>5</td>
<td>16</td>
<td>20</td>
<td>16</td>
<td>61</td>
</tr>
</tbody>
</table>

### 6. I learned the applications of parametric equations of curves to real-life problems.

**Mean 4.25**

<table>
<thead>
<tr>
<th>Response Values</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>3</td>
<td>11</td>
<td>26</td>
<td>14</td>
<td>61</td>
</tr>
</tbody>
</table>

### 7. I learned vector geometry.

**Mean 8.00**

<table>
<thead>
<tr>
<th>Response Values</th>
<th>2</th>
<th>3</th>
<th>4</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>1</td>
<td>3</td>
<td>14</td>
<td>23</td>
<td>61</td>
</tr>
</tbody>
</table>

### 8. I learned about the applications of vector geometry to engineering problems.

**Mean 4.41**

<table>
<thead>
<tr>
<th>Response Values</th>
<th>2</th>
<th>3</th>
<th>6</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>6</td>
<td>7</td>
<td>16</td>
<td>20</td>
</tr>
</tbody>
</table>

### 11. I learned to manipulate functions of several variables, coordinate transformations, and applications

**Mean 4.87**

<table>
<thead>
<tr>
<th>Response Values</th>
<th>1</th>
<th>2</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>1</td>
<td>1</td>
<td>14</td>
<td>26</td>
<td>19</td>
<td>61</td>
</tr>
</tbody>
</table>

**Survey Response Summary (non-comments)**  
4/16/2002 8:56AM
**Score Type Name: Disagree/Agree 1-6**

1. I learned the concepts and uses of minima and maxima.
   - **Mean:** 4.88
   - **Response Values:** 1, 2, 3, 4, 5, 6
   - **Count of Responders:** 5, 1, 5, 12, 30, 8

2. I learned integration techniques in two and three dimensions.
   - **Mean:** 4.86
   - **Response Values:** 1, 4, 5, 6
   - **Count of Responders:** 1, 5, 17, 34

3. I learned the applications of two- and three-dimensional integration techniques.
   - **Mean:** 4.66
   - **Response Values:** 1, 2, 4, 5
   - **Count of Responders:** 1, 1, 14, 19

4. I learned to calculate vector fields and flows.
   - **Mean:** 4.63
   - **Response Values:** 1, 2, 3, 5, 6
   - **Count of Responders:** 1, 2, 3, 15, 18, 12

5. I learned to perform integration along curves.
   - **Mean:** 4.57
   - **Response Values:** 1, 2, 3, 4, 5, 6
   - **Count of Responders:** 1, 2, 16, 21, 21, 61

**Score Type Name: True/False**

1. I understand that the ABET survey questions address course objectives not comments on the instructor's effectiveness.
   - **Mean:** 1.00
   - **Response Values:** 1
   - **Count of Responders:** 61

Survey Response Summary (non-comments)  4/16/2002  3:56AM
Score Type Name: True/False

2. I understand that questions with the numerical scale, 1 - 6, use "1" to mean "Strongly Disagree" and "6" to mean "Strongly Agree."

Mean: 1.00

<table>
<thead>
<tr>
<th>Response Value</th>
<th>Count of Respondent</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>61</td>
<td>61</td>
</tr>
</tbody>
</table>

Survey Response Summary (non-comments) 4/16/2002 8:56AM
IV.22 22S:039 Probability and Statistics for Engineers

Summer ’01: Not assessed.

Fall ’01: A course assessment meeting was held on 16 January 2002, comprising Profs. Broffitt and Dykstra of Statistics, and Profs. Andersland (Statistics Liaison) and Holly (Associate Dean) of Engineering. Student EASY survey responses, as well as anecdotal feedback on the course, provided the basis for the assessment. Exams touched on most course goals. EASY results suggested that students were comfortable with their understanding most topics supporting those goals, except: conditional probability, probability modeling, Shewart control charts, and hypothesis testing. The instructor felt that the level of student understanding of these topics was reasonable given the broad number of topics covered. Students are generally not happy with the text, do not see the engineering applications of the course. It is recommended that an improved text be adopted, one that includes more emphasis on engineering applications. More practical engineering applications should be introduced into the lecture, the time made available through de-emphasis of some specialized topics such as control charts. The notion of creating a parallel version of the course focused more on probability should be investigated. All agree that the present course is being asked to do too much. The TA support for the course may not be sufficient.

Spring ’02: Numerical course-goal survey data not available due to EASY system data loss. Course assessment was conducted during a 28 May 2002 meeting involving Profs. Broffitt (Chair), Billor, and Stramer of Statistics; and Profs. Andersland and Holly (Associate Dean) of Engineering. Assessment was based on review of student comments from the EASY survey, review of examinations and quizzes, and instructor observations. There continues to be a general perception that the course tries to cover too many topics. Detailed lecture notes were web-posted, but this seemed to damage class participation and attendance of students who must needed them. Student comments indicate continuing unhappiness with the text, and with the their perception of a disconnect with engineering applications. It is recommended, as was the case earlier, that some specialized topics be eliminated to free up more time for practical examples of engineering applications. Learning goal 9 (Shewart control charts) should be removed. The College of Engineering should seek example applications (especially as they may appear in engineering courses that students have not yet taken) that can be provided and explained to the Statistics instructors, to help them provide meaningful examples. The tension between emphasis on statistics on the one hand, and probability on the other, reflects a certain dichotomy of interest among the Engineering programs. Recent discussions between Engineering and Statistics have led to development of a prospective syllabus for a new probability-based course that Statistics will offer as soon as resources become available, and will be required by two or three engineering programs in place of 22S:039.

Overall Assessment: Assessment activity for this course has been meaningful and productive, and led to a new level of constructive communication among faculty of both
units. This particular course continues to suffer from trying to be all things to all people; the proposed new course emphasizing probability concepts should enable 22S:039 to better focus on statistical concepts.
<table>
<thead>
<tr>
<th>Course Goals</th>
<th>Supports ABET Outcomes</th>
<th>Course Activity</th>
<th>Basis for Course-Goal Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Use of graphical data representations, including histograms, and stem,</td>
<td>A (○), B (○), G (○)</td>
<td>Homework and exams test the students' abilities in these areas.</td>
<td>EASY survey assessment by students and instructor; copies of all exam questions.</td>
</tr>
<tr>
<td>leaf, dot, and box plots, to assess differences between sample data sets.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Use of basic sample space, event, and probability concepts to construct</td>
<td>A (○), B (○)</td>
<td>Homework and exams test the students' abilities in these areas.</td>
<td>EASY survey assessment by students and instructor; copies of all exam questions.</td>
</tr>
<tr>
<td>models, and compute probabilities for, simple random experiments.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Use of counting techniques to find the probability of particular events</td>
<td>A (○), K (●)</td>
<td>Homework and exams test the students' abilities in these areas.</td>
<td>EASY survey assessment by students and instructor; copies of all exam questions.</td>
</tr>
<tr>
<td>when the outcomes of a random experiment are equally likely.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>4. Computation of conditional probabilities from unconditional probabilities</td>
<td>A (○), B (○), K (●)</td>
<td>Homework and exams test the students' abilities in these areas.</td>
<td>EASY survey assessment by students and instructor; copies of all exam questions.</td>
</tr>
<tr>
<td>and use of Bayes’ Theorem to compute the probability that an event is due to</td>
<td></td>
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<tr>
<td>a particular cause</td>
<td></td>
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</tr>
<tr>
<td>5. Ability to recognize when standard pdfs, including binomial, Poisson,</td>
<td>A (○), B (○), K (●)</td>
<td>Homework and exams test the students' abilities in these areas.</td>
<td>EASY survey assessment by students and instructor; copies of all exam questions.</td>
</tr>
<tr>
<td>normal, and exponential, are appropriate models for random phenomena and</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>compute probabilities in each case.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
6. Use of the pdf of random variables to find their marginal pdfs, determine if they are independent, and compute the expectation of functions of the random variables.  
   A (○), B (○), K (●)  
   Homework and exams test the students' abilities in these areas.  
   EASY survey assessment by students and instructor; copies of all exam questions.

7. Use of the sample mean and sample variance to estimate a population's mean and variance and compute confidence intervals from these estimates.  
   A (●), B (●), K (●)  
   Homework and exams test the students' abilities in these areas.  
   EASY survey assessment by students and instructor; copies of all exam questions.

8. Use of the Central Limit Theorem to approximate the distribution of a sum of independent random variables and find approximate confidence intervals for population means.  
   A (●), B (●), K (●)  
   Homework and exams test the students' abilities in these areas.  
   EASY survey assessment by students and instructor; copies of all exam questions.

9. Use of various types of Shewhart control charts to detect changes in sample populations over time.  
   A (○), B (○), K (○)  
   Homework and exams test the students' abilities in these areas.  
   EASY survey assessment by students and instructor; copies of all exam questions.

10. Use of standard tests of statistical hypotheses to determine whether statistical conjectures are consistent with sample data.  
    A (●), B (●), K (●)  
    Homework and exams test the students' abilities in these areas.  
    EASY survey assessment by students and instructor; copies of all exam questions.

11. Use of linear regression to find the "best fitting" line through a set of points, and can use "the fit" to assess relationships among the variables.  
    A (●), B (●), K (●)  
    Homework and exams test the students' abilities in these areas.  
    EASY survey assessment by students and instructor; copies of all exam questions.

12. Use of statistical software to complete simple statistical investigations.  
    B (○), G (○), K (○)  
    Homework and exams test the students' abilities in these areas.  
    EASY survey assessment by students and instructor.

○ denotes moderate contribution to the outcome ● denotes substantial contribution to the outcome
## Course Outcomes Worksheet (COW)

### 22S:039 PROBABILITY AND STATISTICS FOR THE ENGINEERING AND PHYSICAL SCIENCES – FALL 2001-02

Created 20 November 2001 by M.S. Andersland
Last modified 27 February 2002 by M.S. Andersland

<table>
<thead>
<tr>
<th>Course Goals</th>
<th>Supports ABET Outcomes</th>
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</tr>
</thead>
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<td>b (○), g (○)</td>
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</tr>
<tr>
<td>2. Use of basic sample space, event, and probability concepts to construct models, and compute probabilities for, simple random experiments.</td>
<td>a (○), b (●)</td>
<td>Homework and exams test the students’ abilities in these areas.</td>
<td>EASY survey assessment by students and instructor; copies of all exam questions.</td>
</tr>
<tr>
<td>3. Use of counting techniques to find the probability of particular events when the outcomes of a random experiment are equally likely.</td>
<td>a (○), b (●), k (●)</td>
<td>Homework and exams test the students’ abilities in these areas.</td>
<td>EASY survey assessment by students and instructor; copies of all exam questions.</td>
</tr>
<tr>
<td>4. Computation of conditional probabilities from unconditional probabilities and use of Bayes’ Theorem to compute the probability that an event is due to a particular cause.</td>
<td>a (○), b (●), k (●)</td>
<td>Homework and exams test the students’ abilities in these areas.</td>
<td>EASY survey assessment by students and instructor; copies of all exam questions.</td>
</tr>
<tr>
<td>5. Ability to recognize when standard pdfs, including binomial, Poisson, normal, and exponential, are appropriate models for random phenomena and compute probabilities in each case.</td>
<td>a (○), b (●), k (●)</td>
<td>Homework and exams test the students’ abilities in these areas.</td>
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<td>---</td>
</tr>
<tr>
<td>6. Use of the sample mean and sample variance to estimate a population's mean and variance and compute confidence intervals from these estimates.</td>
<td>a (○), b (●), k (●)</td>
<td>Homework and exams test the students' abilities in these areas.</td>
<td>EASY survey assessment by students and instructor; copies of all exam questions.</td>
</tr>
<tr>
<td>7. Use of the Central Limit Theorem to approximate the distribution of a sum of independent random variables and find approximate confidence intervals for population means.</td>
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<td>8. Use of various types of Shewhart control charts to detect changes in sample populations over time.</td>
<td>a (○), b (●), k (●)</td>
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<td>EASY survey assessment by students and instructor; copies of all exam questions.</td>
</tr>
<tr>
<td>9. Use of standard tests of statistical hypotheses to determine whether statistical conjectures are consistent with sample data.</td>
<td>a (○), b (●), k (●)</td>
<td>Homework and exams test the students' abilities in these areas.</td>
<td>EASY survey assessment by students and instructor; copies of all exam questions.</td>
</tr>
<tr>
<td>10. Use of linear regression to find the &quot;best fitting&quot; line through a set of points, and can use &quot;the fit&quot; to assess relationships among the variables.</td>
<td>a (○), b (●), k (●)</td>
<td>Homework and exams test the students' abilities in these areas.</td>
<td>EASY survey assessment by students and instructor; copies of all exam questions.</td>
</tr>
<tr>
<td>11. Use of statistical software to complete simple statistical investigations.</td>
<td>b (○), g (○), k (○)</td>
<td>Homework and exams test the students' abilities in these areas.</td>
<td>EASY survey assessment by students and instructor.</td>
</tr>
</tbody>
</table>

○ denotes moderate contribution to the outcome ● denotes substantial contribution to the outcome
Course Assessment Report  
College of Engineering  
The University of Iowa  
(Revision of 27 November 2001)

<table>
<thead>
<tr>
<th>Course Number:</th>
<th>22S:039</th>
<th>Semester/Year</th>
<th>Fall, 2001</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Name:</td>
<td>Probability and Statistics for the Engineering and Physical Sciences</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**COORDINATOR:**  
MARK ANDERSLAND  
**SIGNATURE:**  

<table>
<thead>
<tr>
<th>DATE:</th>
<th>1/21/02</th>
</tr>
</thead>
</table>

**INSTRUCTOR:**  
R. DYKSTRA / N. BILLOR  
**SIGNATURE:**  
(optional)

**OTHER:**  
**SIGNATURE:**  
(optional)

*Please attach the course syllabus and course outcomes worksheet (COW).*

**Assessment Techniques:**
Please indicate which of the following techniques were used in assessing the course and your judgment of their utility in assessing achievement of the Course Learning Goals.

<table>
<thead>
<tr>
<th>Assessment Technique</th>
<th>Used, provided useful data</th>
<th>Used, not recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exams</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Quizzes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Projects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Written Reports (other than projects)</td>
<td></td>
<td></td>
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<tr>
<td>Oral Reports</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student Self-Evaluation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student Peer-Evaluation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course Portfolios</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class Surveys (e.g., EASY)</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Instructor Observation</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Other [specify]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. **ASSESSMENT RESULTS:** (How were *each* of the course learning goals (from the COW) achieved? Support your assessments qualitatively and/or quantitatively with data from each of the assessment techniques used (see Table on previous page). Explain the relation of the present assessment results to previous ones.)

The exams given touched on most goals. The numerical EASY results suggest that students were comfortable with their understanding of most topics supporting these goals except: conditional probability, probability modeling, Shewhart control charts, and hypothesis testing (goals 4, 5, 9 & 10). The instructor felt that the level of understanding the students achieved for these topics was reasonable given the number of topics covered. The prose EASY results suggest that a sizable number of students are not happy with the text and are not seeing the engineering applications of the course.

2. **SUMMARY OF RECENT REMEDIAL ACTIONS:** (and their estimated effect)

*N/A.*

3. **RECOMMENDED NEW REMEDIAL ACTIONS, IF ANY:**

Adopt a new text that provides more coverage of probability and random variables (the present text's coverage is limited), more problems (an instructor request), and more practical examples of engineering applications. When possible, introduce additional practical engineering application examples in lecture. Free up time for these examples by de-emphasizing specialized topics (such as control charts).

4. **RECOMMENDED CHANGES TO COURSE LEARNING GOALS:**

No changes recommended at this time, but the possibility of reducing the number of topics covered, or offering two versions of the course—one emphasizing probability, the other statistics—during alternating semesters should be investigated in conjunction with development of the new college curriculum. During the semester review, both the instructor and the statistics department chairman observed that the present course is being asked to do too much.

5. **RECOMMENDED MODIFICATIONS TO ASSESSMENT TECHNIQUES:**

No changes recommended at this time.

6. **SIGNIFICANT DEVIATIONS IN COURSE CONTENT FROM SYLLABUS (SUMMARIZE):**

*None.*
COURSE SUPPORT

TA SUPPORT FROM THE COLLEGE (IN TERMS OF FTE): None.

OTHER TA SUPPORT AND SOURCE (IN TERMS OF FTE): 7/8 FTE (Statistics Department).

TA RESPONSIBILITIES:

Leading discussions, holding office hours, and grading homework.

WAS THE TA SUPPORT ALLOCATED TO YOUR SECTION SUFFICIENT? PLEASE ELABORATE.

No. According to the instructor, once the TAs had prepared for and led seven weekly discussion sections and held office hours little time remained for thorough grading of 164 students' weekly homework and no time remained for grading weekly quizzes (the instructor had to resort to machine grading to reduce the TAs' loads).

IF USED, WAS THE COMPUTER HARDWARE AND SOFTWARE SUPPORT FROM CSS ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

N/A. Support for the software used (MINITAB) was provided by University ITCs and was adequate.

WERE THE FACILITIES (CLASSROOM, LABS, ETC.) ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

The classrooms were adequate. The efficiency of the software discussions (MINITAB) would be improved if they could be held in computer labs. One hour of lab time would be required per discussion section per semester.

COURSE ORGANIZATION/CONTENTS

LECTURE (HOURS/WEEK): 3

DISCUSSION (HOURS/WEEK): 1

LABORATORY (HOURS/WEEK): 0

TOTAL NUMBER OF STUDENTS: 164

TEXTBOOK AUTHOR AND TITLE:


PLEASE COMMENT ON THE SUITABILITY OF THE TEXTBOOK AND ITS TIMELY AVAILABILITY.

The text's coverage of probability and random variables is limited (by design). The instructor wished that it had more problems. Students wished that it provided more examples of engineering applications. A new text is needed.

TEACHING AIDS:

PLEASE ATTACH A COPY OF THE SYLLABUS THAT WAS DISTRIBUTED TO THE CLASS, A SAMPLE OF CLASS HANDOUTS IF AVAILABLE, AND THE COURSE ASSESSMENT WORKSHEET (COW) FOR THE COURSE. USE THE SPACE BELOW TO DESCRIBE ANY PARTICULAR PROBLEMS YOU MIGHT HAVE HAD WITH THIS COURSE (E.G., UNUSUAL ATTRITION, LACK OF PREREQUISITES, UNUSUAL GRADE DISTRIBUTION, ETC.) OR ANY INNOVATIONS/IDEAS THAT SHOULD BE CONSIDERED IN THE FUTURE.
Course Assessment Report
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<table>
<thead>
<tr>
<th>Course Number:</th>
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<td>Probability and Statistics for the Engineering and Physical Sciences</td>
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<table>
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<tr>
<th>COORDINATOR:</th>
<th>MARK ANDERSLAND</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIGNATURE:</td>
<td>[Signature]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DATE:</th>
<th>5/30/02</th>
</tr>
</thead>
<tbody>
<tr>
<td>INSTRUCTOR:</td>
<td>N. BILLOR</td>
</tr>
<tr>
<td>SIGNATURE:</td>
<td>(optional)</td>
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</table>

<table>
<thead>
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<th>OTHER:</th>
<th>SIGNATURE:</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>(optional)</td>
</tr>
</tbody>
</table>

Please attach the course syllabus and course outcomes worksheet (COW).

Assessment Techniques:
Please indicate which of the following techniques were used in assessing the course and your judgment of their utility in assessing achievement of the Course Learning Goals.

<table>
<thead>
<tr>
<th>Assessment Technique</th>
<th>Used, provided useful data</th>
<th>Used, not recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td></td>
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<tr>
<td>Exams</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Quizzes</td>
<td>X</td>
<td></td>
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<tr>
<td>Projects</td>
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<tr>
<td>Written Reports (other than projects)</td>
<td></td>
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<tr>
<td>Oral Reports</td>
<td></td>
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<td>Student Self-Evaluation</td>
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</tr>
<tr>
<td>Class Surveys (e.g., EASY)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Instructor Observation</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Other (specify) Detailed Syllabus</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>
1. ASSESSMENT RESULTS: (How were each of the course learning goals (from the COW) achieved? Support your assessments qualitatively and/or quantitatively with data from each of the assessment techniques used (see Table on previous page). Explain the relation of the present assessment results to previous ones.)

The quizzes and exams given touched on most course goals. The instructor felt that the students’ quiz and exam performances were reasonable but observed, as did the F’01 instructor, that the course is being asked to cover too many topics. This semester detailed lecture notes were web-posted to help students keep up but unfortunately only seemed to lessen the participation and attendance of the students that needed them most. As did the F’01 prose EASY responses, the Sp’02 responses suggest that some students are not happy with the text and are not seeing the engineering applications of the course. Numerical EASY results were not reviewed because, due to a system-wide EASY programming error, no responses were collected.

2. SUMMARY OF RECENT REMEDIAL ACTIONS: (and their estimated effect)

The F’01 review proposed two remedial actions: (1) adopting a new text that provides more coverage of probability and random variables (the present text’s coverage is limited), more problems (an instructor request), and more practical examples of engineering applications and (2) de-emphasizing specialized topics (such as control charts) to free-up time to introduce additional practical engineering application examples in lecture. The possibility of reducing the number of topics covered by offering two versions of the course—one emphasizing probability, the other statistics—was also noted.

Unfortunately, the F’01 recommendations were not forwarded to the Sp’02 instructor in time to permit consideration of a new text or conscious de-emphasis of specialized topics to free-up more time for practical examples. The F’02 instructor did attend the latest assessment meeting, is aware of the above noted recommendations, and has indicated that a new text will be considered for F’02.

The possibility of offering two versions of the course was pursued. Tentative syllabi have been prepared, texts selected and course numbers assigned. The new courses will be offered as soon as resources permit.

3. RECOMMENDED NEW REMEDIAL ACTIONS, IF ANY:

Continue to pursue the remedial actions listed above, i.e., adopt a new text and de-emphasize specialized topics to free-up time for more practical engineering application examples.

Encourage each engineering department enrolling students in 22S:039 to identify examples of practical subject-specific applications of probability and statistics suitable for 22S:039 lecture presentation (and texts containing such problems) and incorporate these examples into the course.

4. RECOMMENDED CHANGES TO COURSE LEARNING GOALS:

Delete learning goal 9, “Use of various types of Shewhart control charts to detect changes in sample populations over time,” and accordingly de-emphasize the coverage of control charts, to free-up time for covering additional practical engineering application examples in lecture.

5. RECOMMENDED MODIFICATIONS TO ASSESSMENT TECHNIQUES:

Ensure that both the current and upcoming semester’s instructors are invited to attend end-of-semester assessment meetings and provide copies of the assessment to them as soon as the assessment is completed.

6. SIGNIFICANT DEVIATIONS IN COURSE CONTENT FROM SYLLABUS (SUMMARIZE):

None.
COURSE SUPPORT

TA SUPPORT FROM THE COLLEGE (IN TERMS OF FTE): None.

OTHER TA SUPPORT AND SOURCE (IN TERMS OF FTE): 7/8 FTE (Statistics Department).

TA RESPONSIBILITIES:

Leading discussions, holding office hours, grading quizzes and grading homework.

WAS THE TA SUPPORT ALLOCATED TO YOUR SECTION SUFFICIENT? PLEASE ELABORATE.

Yes. Neither the instructor nor the students had any complaints.

IF USED, WAS THE COMPUTER HARDWARE AND SOFTWARE SUPPORT FROM CSS ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

N/A. Support for the software used (MINITAB) was provided by University ITCs and was adequate.

WERE THE FACILITIES (CLASSROOM, LABS, ETC.) ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

Yes.

COURSE ORGANIZATION/CONTENTS

LECTURE (HOURS/WEEK): 3

DISCUSSION (HOURS/WEEK): 1

LABORATORY (HOURS/WEEK): 0

TOTAL NUMBER OF STUDENTS: 107 (95 CoE)

TEXTBOOK AUTHOR AND TITLE:


PLEASE COMMENT ON THE SUITABILITY OF THE TEXTBOOK AND ITS TIMELY AVAILABILITY.

The text's coverage of probability and random variables is limited (by design). Students wished that it provided more examples of engineering applications. A new text is needed.

TEACHING AIDS:

PLEASE ATTACH A COPY OF THE SYLLABUS THAT WAS DISTRIBUTED TO THE CLASS, A SAMPLE OF CLASS HANDOUTS IF AVAILABLE, AND THE COURSE ASSESSMENT WORKSHEET (COW) FOR THE COURSE. USE THE SPACE BELOW TO DESCRIBE ANY PARTICULAR PROBLEMS YOU MIGHT HAVE HAD WITH THIS COURSE (E.G., UNUSUAL ATTENTION, LACK OF PREREQUISITES, UNUSUAL GRADE DISTRIBUTION, ETC.) OR ANY INNOVATIONS/IDEAS THAT SHOULD BE CONSIDERED IN THE FUTURE.
College of Engineering EASY Survey Responses

Results for: 22S09: Probability & Stat for Engr & Phys Sci; Section: AAA- Lecture
Instructor(s): Richard Djebara / Nuket Biler
Session Code: 20013  Beginning On: 12-08-01  Running for: 14 days
Survey #: 252  Survey Name: 22S09:AAA20013
Base Set Used: ABET  Privacy: Faculty Distribute  Remarks: ABET

Headings and Subheadings (Instructs) Used in Survey:

**Heading(s):**
Accreditation Board for Engineering and Technology (ABET) Survey

**Subheading(s):**
This survey was designed to provide feedback to your instructor on selected aspects of this course. Your responses should reflect YOUR INDIVIDUAL PERCEPTIONS, not those of the class as a whole.

**Score Type Name: Disagree/Agree 1-6**

3. I can use graphical data representations, including histograms, and stem, leaf, dot, and box plots, to assess differences between sample data sets.
   **Mean:** 5.23
   **Response Value:** 1 2 4 5 6  Total Responding
   **Count of Responses:** 3 2 3 11 33 52

4. I can use basic sample space, event, and probability concepts to construct models, and compute probabilities for, simple random experiments.
   **Mean:** 4.35
   **Response Value:** 1 2 3 4 5 6  Total Responding
   **Count of Responses:** 2 2 6 19 12 11 52

5. I can use counting techniques to find the probability of particular events when the outcomes of a random experiment are equally likely.
   **Mean:** 4.72
   **Response Value:** 1 2 3 4 5 6  Total Responding
   **Count of Responses:** 3 5 7 15 12 10 52

6. I can compute conditional probabilities from unconditional probabilities and can use Bayes’ Theorem to compute the probability that an event is due to a particular cause.
   **Mean:** 3.88
   **Response Value:** 1 2 3 4 5 6  Total Responding
   **Count of Responses:** 4 5 10 13 14 8 52

7. I can recognize when standard pdfs, including binomial, Poisson, normal, and exponential, are appropriate models for random phenomena and can compute probabilities in each case.
   **Mean:** 3.96
   **Response Value:** 1 2 3 4 5 6  Total Responding
   **Count of Responses:** 4 7 6 16 8 11 52

Survey Response Summary  3/31/2002 4:19PM
8. I can use the joint pdf of random variables to find their marginal pdfs, determine if they are independent, and compute the expectation of functions of the random variables.

| Mean: 4.2 |
| Response Value: | 1 | 2 | 3 | 4 | 5 | 6 | Total Responding |
| Count of Responses: | 5 | 4 | 5 | 15 | 12 | 11 | 42 |

9. I can use the sample mean and sample variance to estimate a population's mean and variance and compute confidence intervals from these estimates.

| Mean: 4.40 |
| Response Value: | 1 | 2 | 3 | 4 | 5 | 6 | Total Responding |
| Count of Responses: | 1 | 2 | 2 | 12 | 15 | 20 | 52 |

10. I can use the Central Limit Theorem to approximate the distribution of a sum of independent random variables and find approximate confidence intervals for population means.

| Mean: 4.60 |
| Response Value: | 1 | 2 | 3 | 4 | 5 | 6 | Total Responding |
| Count of Responses: | 1 | 2 | 7 | 11 | 17 | 14 | 52 |

11. I can use various types of Shewhart control charts to detect changes in sample populations over time.

| Mean: 3.36 |
| Response Value: | 1 | 2 | 3 | 4 | 5 | 6 | Total Responding |
| Count of Responses: | 6 | 7 | 7 | 12 | 9 | 8 | 42 |

12. I can use standard tests of statistical hypotheses to determine whether statistical conjectures are consistent with sample data.

| Mean: 4.68 |
| Response Value: | 1 | 2 | 3 | 4 | 5 | 6 | Total Responding |
| Count of Responses: | 4 | 7 | 6 | 9 | 16 | 10 | 52 |

13. I can use linear regression to find the "best fitting" line through a set of points, and can use "the fit" to assess relationships among the variables.

| Mean: 4.25 |
| Response Value: | 1 | 2 | 3 | 4 | 5 | 6 | Total Responding |
| Count of Responses: | 3 | 7 | 3 | 12 | 15 | 12 | 52 |
Score Type Name: Disagree/Agree 1-6
1. Strongly Disagree
2. Moderately Disagree
3. Slightly Disagree
4. Slightly Agree
5. Moderately Agree
6. Strongly Agree

4.1. I can use statistical software to complete simple statistical investigations.

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>16</td>
<td>12</td>
<td>12</td>
<td>52</td>
</tr>
</tbody>
</table>

Score Type Name: True/False
1. I understand that the ABET survey questions address course objectives not comments on the instructor's effectiveness.

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>52</td>
<td>52</td>
</tr>
</tbody>
</table>

2. I understand that questions with the numerical scale, 1 - 6, use "1" to mean "Strongly Disagree" and "6" to mean "Strongly Agree."

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>52</td>
<td>52</td>
</tr>
</tbody>
</table>
IV.23 004:013 Principles of Chemistry I

Summer ’01: Not assessed.

Fall ’01: A course assessment meeting was held on 14 January 2002, involving Profs. Pienta, Hansen, and Sikorski of chemistry; and Profs. Murhammer (chemistry Liaison) and Holly (Associate Dean) of Engineering. Assessment was based on EASY survey results and student comments, and instructor observations. One overall conclusion was that student achievement of the course goals is strongly correlated to student effort, as exemplified in student participation in the optional internet-based “Mastering Chemistry” self-guided tutorial. Students only slightly agreed, on the average, that they had achieved the course goals. The instructors feel that the writing portion of course goal 4 should be removed, since it is simply not covered sufficiently, and this conclusion is clearly borne out in the student EASY responses. The course goals also may overreach in their expectation of development of teamwork and oral communication skills. Instructors propose to vie more guidance to discussion leaders in this regard, to ensure more consistency across discussion sections. Engineering should encourage its students to take the honors discussions sections, in which writing assignments are required. Teamwork and communication need to receive more overall attention in the course. A brief presentation regarding the importance of the EASY survey should be given to the class in subsequent semesters.

Spring ’02: Since this is the off-semester for most engineering students in this course, it was not assessed. Note that beginning Fall ’02, this course disappears, replaced by the new course 004:011 including lab.

Overall Assessment: See Fall ’01 above.
<table>
<thead>
<tr>
<th>Course Goals</th>
<th>Supports ABET Outcomes</th>
<th>Course Activity</th>
<th>Basis for Goal Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. By the end of the course, the student will have a basic understanding of atoms, molecules, ions, mass relationships in chemical reactions, and reactions in aqueous solution, and be able to solve corresponding problems.</td>
<td>A (●)</td>
<td>Homework allows practice of skills; exams assesses abilities</td>
<td>EASY survey assessment by students; instructor assessment</td>
</tr>
<tr>
<td>2. By the end of the course, the student will have a basic understanding of gases, thermochemistry, quantum theory, periodic relationships, chemical bonding, and chemical equilibrium, and be able to solve corresponding problems.</td>
<td>A (●)</td>
<td>Homework allows practice of skills; exams assesses abilities</td>
<td>EASY survey assessment by students; instructor assessment</td>
</tr>
<tr>
<td>3. By the end of the course, the student will have a basic understanding of acids, bases, acid-base equilibrium, and solubility equilibrium, and be able to solve corresponding problems.</td>
<td>A (●)</td>
<td>Homework allows practice of skills; exams assesses abilities</td>
<td>EASY survey assessment by students; instructor assessment</td>
</tr>
<tr>
<td>4. By the end of the course, the student will have had opportunities to further his/her professional development through group work, and through practicing written and oral communication skills.</td>
<td>D (○), G(w) (○), G(o) (○)</td>
<td>Group work in discussion; explanation of principles on written homework; explaining problem solutions on board during discussion section</td>
<td>EASY survey assessment by students; Instructor assessment</td>
</tr>
</tbody>
</table>

○ denote moderate contribution to the outcome; ● denote substantial contribution to the outcome.
Please attach the course syllabus and course outcomes worksheet (COW).

Assessment Techniques:
Please indicate which of the following techniques were used in assessing the course and your judgment of their utility in assessing achievement of the Course Learning Goals.

<table>
<thead>
<tr>
<th>Assessment Technique</th>
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<th>Used, not recommended</th>
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</thead>
<tbody>
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<tr>
<td>Exams</td>
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<tr>
<td>Quizzes</td>
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<td>Student Peer-Evaluation</td>
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<tr>
<td>Course Portfolios</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class Surveys (e.g., EASY)</td>
<td>XX</td>
<td></td>
</tr>
<tr>
<td>Instructor Observation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other [specify]; Discussion with course instructors (Hansen/Sikorski) and Chem UG Coordinator (Pienta) on 1/14/02</td>
<td>XX</td>
<td></td>
</tr>
</tbody>
</table>
1. ASSESSMENT RESULTS: (How were each of the course learning goals (from the COW) achieved? Support your assessments qualitatively and/or quantitatively with data from each of the assessment techniques used (see Table on previous page). Explain the relation of the present assessment results to previous ones.)

Course Goals 1-3: The course instructors believe that student achievement of these goals is strongly correlated to student effort. For example, the course uses units from the internet-based "Mastering Chemistry" in which students can go through the exercises to learn the material. They can then assess their skills by answering short questions after completing the exercises. The students obtain full credit for completing the module if they answer 75% of the questions correctly by the specified due date. In light of the fact that they can repeat answering questions until they achieve the 75% correct threshold, it is disheartening that only ~15% of the students received full credit on all 13 units (this is an indication of lack of effort and/or procrastination). It should also be noted that both instructors and students believe that spending sufficient time with these units does a good job of preparing the students for the exams. In an EASY survey, the students slightly agreed (~4.3/6 rating) that they successfully achieved these course goals. In summary, students appear to generally achieve these course goals if their effort is sufficient.

Course Goal 4: The instructors felt that the writing portion of this goal should be eliminated from the course goal since this is not covered sufficiently. Also, the achievement of enhancing teamwork skills and oral communication skills needs improvement. They propose to give more guidance to the discussion leaders in promoting teamwork and oral communication in the discussion sections (i.e., there is currently much variation between discussion sections). It should also noted that the College of Engineering should encourage its students to take the honor discussion sections, in which writing assignments are required. In an EASY survey, students slightly disagreed (~2.6-3.0/6 rating) that they successfully achieved the teamwork and written communication components of this course goal. Achievement of the oral communication component was given a slightly higher rating (~3.1-3.5/6). This, however, is also an unsatisfactory rating and improvement is needed. In summary, it is clear that this course goal was not achieved at a satisfactory level and that more effort needs to be made to enhance the teamwork and oral communication component.

2. SUMMARY OF RECENT REMEDIAL ACTIONS: (and their estimated effect)
Not Applicable.

3. RECOMMENDED NEW REMEDIAL ACTIONS, IF ANY:
Improve teamwork and oral communication components in discussion section (through improved guidance to discussion leaders, etc.).

4. RECOMMENDED CHANGES TO COURSE LEARNING GOALS:
Change Course Goal 4 to eliminate writing component.

5. RECOMMENDED MODIFICATIONS TO ASSESSMENT TECHNIQUES:
Give presentation to class in which the importance of completing the EASY survey is emphasized (i.e., work to improve response rate).

6. SIGNIFICANT DEVIATIONS IN COURSE CONTENT FROM SYLLABUS (SUMMARIZE):
None.

COURSE SUPPORT

TA SUPPORT FROM THE COLLEGE (IN TERMS OF FTE):

OTHER TA SUPPORT AND SOURCE (IN TERMS OF FTE):

TA RESPONSIBILITIES:
WAS THE TA SUPPORT ALLOCATED TO YOUR SECTION SUFFICIENT? PLEASE ELABORATE.

IF USED, WAS THE COMPUTER HARDWARE AND SOFTWARE SUPPORT FROM CSS ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

WERE THE FACILITIES (CLASSROOM, LABS, ETC.) ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

**COURSE ORGANIZATION/CONTENTS**

LECTURE (HOURS/WEEK):  
DISCUSSION (HOURS/WEEK):

LABORATORY (HOURS/WEEK):  
TOTAL NUMBER OF STUDENTS:

TEXTBOOK AUTHOR AND TITLE:

PLEASE COMMENT ON THE SUITABILITY OF THE TEXTBOOK AND ITS TIMELY AVAILABILITY.

TEACHING AIDS:

PLEASE ATTACH A COPY OF THE SYLLABUS THAT WAS DISTRIBUTED TO THE CLASS, A SAMPLE OF CLASS HANDOUTS IF AVAILABLE, AND THE COURSE ASSESSMENT WORKSHEET (COW) FOR THE COURSE. USE THE SPACE BELOW TO DESCRIBE ANY PARTICULAR PROBLEMS YOU MIGHT HAVE HAD WITH THIS COURSE (E.G., UNUSUAL ATTRITION, LACK OF PREREQUISITES, UNUSUAL GRADE DISTRIBUTION, ETC.) OR ANY INNOVATIONS/IDEAS THAT SHOULD BE CONSIDERED IN THE FUTURE.
College of Engineering EASY Survey Responses

Survey Name: 0040130AB20013
Base Set Used: ABET
Privacy: Faculty Distribute
Remarks: ABET

<table>
<thead>
<tr>
<th>Question</th>
<th>Description</th>
<th>Score Type Name</th>
<th>Disagree/Agree</th>
<th>Count of Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.</td>
<td>I have acquired a basic understanding of atoms, molecules, ions, mass relationships in chemical reactions, and reactions in aqueous solution, and I am able to solve the corresponding problems.</td>
<td>Likert</td>
<td>1-6</td>
<td>96</td>
</tr>
<tr>
<td>5.</td>
<td>I have acquired a basic understanding of atoms, molecules, ions, mass relationships in chemical reactions, and reactions in aqueous solution, and I am able to solve the corresponding problems.</td>
<td>Likert</td>
<td>1-6</td>
<td>85</td>
</tr>
<tr>
<td>7.</td>
<td>I have acquired a basic understanding of acids, bases, acid-base equilibrium, and solubility equilibrium, and I am able to solve the corresponding problems.</td>
<td>Likert</td>
<td>1-6</td>
<td>83</td>
</tr>
<tr>
<td>9.</td>
<td>I have improved my teamwork skills through group work participation.</td>
<td>Likert</td>
<td>1-6</td>
<td>83</td>
</tr>
<tr>
<td>11.</td>
<td>I have improved my written communication skills through explaining principles on homework solutions.</td>
<td>Likert</td>
<td>1-6</td>
<td>83</td>
</tr>
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</table>

Survey Response Summary (non-comments) 4/16/2002 8:57AM
Score Type Name: Disagree/Agree 1-6

<table>
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<tr>
<th>Response Value</th>
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<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
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<tr>
<td>Count of Responses</td>
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<td>9</td>
<td>15</td>
<td>25</td>
<td>16</td>
<td>3</td>
<td>82</td>
</tr>
</tbody>
</table>

Score Type Name: True/False

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>86</td>
<td>86</td>
</tr>
</tbody>
</table>

2. I understand that questions with the numerical scale, 1 - 6, use "1" to mean "Strongly Disagree" and "6" to mean "Strongly Agree."

Score Type Mean: 1.50
IV.24 004:014 Principles of Chemistry II

Summer '01: Not assessed.

Fall '01: Since most Engineering students take this course in the spring, a formal assessment meeting was not conducted, although a Course Assessment Worksheet was prepared.

Spring '02: Numerical course-goal survey data not available due to EASY system data loss. Assessment was based on a 28 May 2002 meeting involving Associate Dean Holly, Prof. Norbert Pienta (Director of Undergraduate Programs in Chemistry) and Prof. Russ Lawson (Lab Director in Chemistry). The Engineering Chemistry Liaison, Prof. David Murhammer, reviewed and approved the CAR resulting from this meeting. Student written comments from the EASY survey, as well as general anecdotal observations of the course, were the basis for the assessment. It is noted that Fall '02 will be the last offering of this course, as the 004:013-014-016 sequence is changing to 004:011-012 in the next academic year. There is concern that the organizational complexity of the new sequence (in which lecture, discussion, lab, and case-study sections must all be scheduled) may lead to confusion on the part of students and should be handled carefully. Videos and other visual aids appear to be helpful to many students. The course goals dealing with group work and oral communication get short shrift in this course, and this is reflected in student comments. But both concepts will be much more central to the new series, and should be reflected in the Course Outcomes Worksheets and associated EASY questions for these courses.

Overall Assessment: See Spring '02 above.
<table>
<thead>
<tr>
<th>Course Goals</th>
<th>Supports ABET Outcomes</th>
<th>Course Activity</th>
<th>Basis for Goal Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. By the end of the course, the student will have a basic understanding of intermolecular forces, properties of liquids, crystal structure, amorphous solids, and phase changes, and be able to solve corresponding problems.</td>
<td>A (●)</td>
<td>Homework allows practice of skills; exams assesses abilities</td>
<td>EASY survey assessment by students; instructor assessment</td>
</tr>
<tr>
<td>2. By the end of the course, the student will have a basic understanding of the molecular view of solutions, concentrations, temperature &amp; pressure effects, and colligative properties, and be able to solve corresponding problems.</td>
<td>A (●)</td>
<td>Homework allows practice of skills; exams assesses abilities</td>
<td>EASY survey assessment by students; instructor assessment</td>
</tr>
<tr>
<td>3. By the end of the course, the student will have a basic understanding of atmospheric chemistry, including ozone, the greenhouse effect, acid rain, smog, and indoor pollution, and be able to solve corresponding problems.</td>
<td>A (●)</td>
<td>Homework allows practice of skills; exams assesses abilities</td>
<td>EASY survey assessment by students; instructor assessment</td>
</tr>
<tr>
<td>4. By the end of the course, the student will have a basic understanding of rates of reaction, rate laws, activation energy &amp; temperature, reaction mechanisms, and catalysis, and be able to solve corresponding problems.</td>
<td>A (●)</td>
<td>Homework allows practice of skills; exams assesses abilities</td>
<td>EASY survey assessment by students; instructor assessment</td>
</tr>
<tr>
<td>5. By the end of the course, the student will have a basic understanding of nuclear reactions, nuclear stability, radioactivity, transmutation, fission, fusion, and relevant biological issues, and be able to solve corresponding problems.</td>
<td>A (●)</td>
<td>Homework allows practice of skills; exams assesses abilities</td>
<td>EASY survey assessment by students; instructor assessment</td>
</tr>
<tr>
<td>6. By the end of the course, the student will have a basic understanding of the 3 laws of thermodynamics, Gibbs free energy, entropy, and energy &amp; equilibrium, and be able to solve corresponding problems.</td>
<td>A (●)</td>
<td>Homework allows practice of skills; exams assesses abilities</td>
<td>EASY survey assessment by students; instructor assessment</td>
</tr>
<tr>
<td>7. By the end of the course, the student will have a basic understanding of redox reactions, electrochemical cells, standard electrode potentials, batteries, corrosion, and electrolysis, and be able to solve corresponding problems.</td>
<td>A (●)</td>
<td>Homework allows practice of skills; exams assesses abilities</td>
<td>EASY survey assessment by students; instructor assessment</td>
</tr>
<tr>
<td>8. By the end of the course, the student will have a basic understanding of metals, metallurgy, band theory of conductivity, and periodic trends in metals, and be able to solve corresponding problems.</td>
<td>A (●)</td>
<td>Homework allows practice of skills; exams assesses abilities</td>
<td>EASY survey assessment by students; instructor assessment</td>
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</tr>
<tr>
<td>9. By the end of the course, the student will have a basic understanding of nonmetallic elements (e.g., hydrogen, carbon, nitrogen, oxygen and sulfur, and the halogens), and be able to solve corresponding problems.</td>
<td>A (●)</td>
<td>Homework allows practice of skills; exams assesses abilities</td>
<td>EASY survey assessment by students; instructor assessment</td>
</tr>
<tr>
<td>10. By the end of the course, the student will have a basic understanding of transition metals, coordination compounds, crystal field theory, and reactions, and be able to solve corresponding problems.</td>
<td>A (●)</td>
<td>Homework allows practice of skills; exams assesses abilities</td>
<td>EASY survey assessment by students; instructor assessment</td>
</tr>
<tr>
<td>11. By the end of the course, the student will have a basic understanding of organic chemistry, classes of compounds (e.g., aliphatic and aromatic compounds), and functional groups, and be able to solve corresponding problems.</td>
<td>A (●)</td>
<td>Homework allows practice of skills; exams assesses abilities</td>
<td>EASY survey assessment by students; instructor assessment</td>
</tr>
<tr>
<td>12. By the end of the course, the student will have a basic understanding of synthetic and natural polymers, and be able to solve corresponding problems.</td>
<td>A (●)</td>
<td>Homework allows practice of skills; exams assesses abilities</td>
<td>EASY survey assessment by students; instructor assessment</td>
</tr>
<tr>
<td>13. By the end of the course, the student will have had opportunities to further his/her professional development through group work, and through practicing oral communication skills.</td>
<td>D (○), G(o) (○)</td>
<td>Group work in discussion; explaining problem solutions on board during discussion section</td>
<td>EASY survey assessment by students; Instructor assessment</td>
</tr>
</tbody>
</table>

○ denote moderate contribution to the outcome; ● denote substantial contribution to the outcome
Course Assessment Report
College of Engineering
The University of Iowa
(Revision of 27 November 2001)

<table>
<thead>
<tr>
<th>Course Number:</th>
<th>004:014</th>
<th>Semester/Year</th>
<th>Spring 2002</th>
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<tbody>
<tr>
<td>Course Name:</td>
<td>Principles of Chemistry II</td>
<td></td>
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<table>
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<tr>
<td>DATE:</td>
<td>28 May 2002</td>
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</tr>
<tr>
<td>INSTRUCTOR:</td>
<td>Signature (optional)</td>
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<tr>
<td>OTHER:</td>
<td>Norbert Pienta</td>
<td>Signature (optional)</td>
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<tr>
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Please attach the course syllabus and course outcomes worksheet (COW).

Assessment Techniques:
Please indicate which of the following techniques were used in assessing the course and your judgment of their utility in assessing achievement of the Course Learning Goals.

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<td>Course Portfolios</td>
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<tr>
<td>Class Surveys (e.g., EASY)</td>
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<tr>
<td>Instructor Observation</td>
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</tr>
<tr>
<td>Other [specify]: Discussion with Chem UG Coordinator and Lab Coordinator</td>
<td></td>
<td>x</td>
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</table>
1. **ASSESSMENT RESULTS:** (How were *each* of the course learning goals (from the COW) achieved? Support your assessments qualitatively and/or quantitatively with data from each of the assessment techniques used (see Table on previous page). Explain the relation of the present assessment results to previous ones.)

The unavailability of numerical EASY survey results handicapped the assessment to some extent. However student comments were available and were analyzed in detail. It is of particular note that this is the last year in which the traditional sequence 004:013 – 004:016 – 004:014 is offered; they will morph into 004:011 and 004:012. Therefore the present assessment is focussed on gleaning possible recommendations to be brought into the new courses. There is concern that in 004:011, the four course venues (lecture, discussion, lab, and case studies) will lead to confusion on the part of students since the Schedule of Courses cannot presently list all four times and locations. However they will be part of the ISIS database and appear on student registration verifications. In 004:014, the videos and other visual aids seemed to be helpful for some students. EASY Question #27 (group work) and Question #29 (oral communication) deal with a course goals that are really not relevant for 004:014, and this is reflected in the student comments. However these are both very relevant course goals for the new series 004:011 and 004:012, and should be included in their COW and EASY surveys.

2. **SUMMARY OF RECENT REMEDIAL ACTIONS:** (and their estimated effect)

This being the first (and last) assessment of 004:014, there are no previous remedial actions to report. In some sense the advent of the new series 004:011 and 004:012 is a major remedial action.

3. **RECOMMENDED NEW REMEDIAL ACTIONS, IF ANY:**

See 2) above.

4. **RECOMMENDED CHANGES TO COURSE LEARNING GOALS:**

See 2) above.

5. **RECOMMENDED MODIFICATIONS TO ASSESSMENT TECHNIQUES:**

See 2) above.

6. **SIGNIFICANT DEVIATIONS IN COURSE CONTENT FROM SYLLABUS (SUMMARIZE):**

None
COURSE SUPPORT

TA SUPPORT FROM THE COLLEGE (IN TERMS OF FTE):

OTHER TA SUPPORT AND SOURCE (IN TERMS OF FTE):

TA RESPONSIBILITIES:

WAS THE TA SUPPORT ALLOCATED TO YOUR SECTION SUFFICIENT? PLEASE ELABORATE.

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COURSE ORGANIZATION/CONTENTS

LECTURE (HOURS/WEEK): DISCUSSION (HOURS/WEEK):
LABORATORY (HOURS/WEEK): TOTAL NUMBER OF STUDENTS:

TEXTBOOK AUTHOR AND TITLE:

PLEASE COMMENT ON THE SUITABILITY OF THE TEXTBOOK AND ITS TIMELY AVAILABILITY.

TEACHING AIDS:

PLEASE ATTACH A COPY OF THE SYLLABUS THAT WAS DISTRIBUTED TO THE CLASS, A SAMPLE OF CLASS HANDOUTS IF AVAILABLE, AND THE COURSE ASSESSMENT WORKSHEET (COW) FOR THE COURSE. USE THE SPACE BELOW TO DESCRIBE ANY PARTICULAR PROBLEMS YOU MIGHT HAVE HAD WITH THIS COURSE (E.G., UNUSUAL ATTENTION, LACK OF PREREQUISITES, UNUSUAL GRADE DISTRIBUTION, ETC.) OR ANY INNOVATIONS/IDEAS THAT SHOULD BE CONSIDERED IN THE FUTURE.
**IV.25 004:016 Principles of Chemistry Lab I**

**Summer '01:** Not assessed.

**Fall '01:** Since most Engineering students take this course in the spring, a formal assessment meeting was not conducted. However an EASY survey was administered. The student self-assessment indicated relatively weak agreement that the course goals had been achieved. This was particularly true of the goal regarding improvement of written communication skills through laboratory report preparation. The student comments bear out this lukewarm enthusiasm for the value of the course. A more complete assessment for the Spring '02 offering should be aimed at recommending ways to improve the student perception of the value of the course.

**Spring '02:** Numerical course-goal survey data not available due to EASY system data loss. Assessment was based on a 28 May 2002 meeting involving Associate Dean Holly, Prof. Norbert Pienta (Director of Undergraduate Programs in Chemistry) and Prof. Russ Lawson (Lab Director in Chemistry). The Engineering Chemistry Liaison, Prof. David Murhammer, reviewed and approved the CAR resulting from this meeting. Student written comments from the EASY survey, as well as general anecdotal observations of the course, were the basis for the assessment. It is noted that Fall '02 will be the last offering of this course, as the 004:013-014-016 sequence is changing to 004:011-012 in the next academic year. Student comments generally indicate that most course goals were being met in their view. Protein isolation and characterization, which focuses on technique rather than discovery, is viewed less positively by the students. Negative student comments on the laboratory notebook and evaluation of written lab reports reflect the difficulty of providing meaningful critique and feedback in such a large class. Some students found the case-study presentations trivial, indicating the possible need for a more clever approach in setting the context of these presentations. The case-study portions of the new sequence 004:011-012 should directly address this issue.

**Overall Assessment:** The 2 s.h. of this course are morphing into the 1 s.h. laboratory work being integrated into the new courses 004:011 and 004:012. This year’s assessments of the laboratory course have been valuable in pointing out the challenges of introducing meaningful written communication activity, and meaningful case-study exposure, into the laboratory portions of those courses.
<table>
<thead>
<tr>
<th>Course Goals</th>
<th>Supports ABET Outcomes</th>
<th>Course Activity</th>
<th>Basis for Goal Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. By the end of the course, the student will have a basic understanding of the principles of experimental qualitative analysis.</td>
<td>A (●), B (●)</td>
<td>Pre-lab quiz; perform experiment; post-lab report</td>
<td>EASY survey assessment by students; instructor assessment</td>
</tr>
<tr>
<td>2. By the end of the course, the student will have a basic understanding of the principles of experimental quantitative analysis.</td>
<td>A (●), B (●)</td>
<td>Pre-lab quiz; perform experiment; post-lab report</td>
<td>EASY survey assessment by students; instructor assessment</td>
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<td>3. By the end of the course, the student will have a basic understanding of the experimental methods involved in polymer synthesis and characterization, batteries and electrochemical cells, and pH measurement.</td>
<td>A (●), B (●)</td>
<td>Pre-lab quiz; perform experiment; post-lab report</td>
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<td>4. By the end of the course, the student will have a basic understanding of the experimental methods involved in determining reaction kinetics, enzyme catalysis, and determination of equilibrium constants.</td>
<td>A (●), B (●)</td>
<td>Pre-lab quiz; perform experiment; post-lab report</td>
<td>EASY survey assessment by students; instructor assessment</td>
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<tr>
<td>5. By the end of the course, the student will have a basic understanding of the experimental methods involved in protein isolation and characterization.</td>
<td>A (●), B (●)</td>
<td>Pre-lab quiz; perform experiment; post-lab report</td>
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<td>6. By the end of the course, the student will have had the opportunity to further his/her professional development by working in groups, and to develop skills in maintaining a laboratory notebook, writing laboratory reports, collecting and analyzing data, and laboratory safety.</td>
<td>B (●), D (○), G(w) (○)</td>
<td>Group work in conducting experiments; maintaining a laboratory notebook; laboratory report writing; collecting and analyzing data; laboratory safety quiz??</td>
<td>EASY survey assessment by students; instructor assessment</td>
</tr>
<tr>
<td>7. By the end of the course, the student will have been exposed to contemporary issues</td>
<td>J (○)</td>
<td>Case studies related to each experiments, e.g., nitrates in Iowa City water</td>
<td>EASY survey assessment by students; instructor assessment</td>
</tr>
</tbody>
</table>

○ denote moderate contribution to the outcome; ● denote substantial contribution to the outcome.
Course Assessment Report
College of Engineering
The University of Iowa
(Revision of 27 November 2001)

Course Number: 004:016  Semester/Year: Spring 2002
Course Name: Principles of Chemistry Laboratory

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Please attach the course syllabus and course outcomes worksheet (COW).

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Please indicate which of the following techniques were used in assessing the course and your judgment of their utility in assessing achievement of the Course Learning Goals.

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The unavailability of numerical EASY survey results handicapped the assessment to some extent. However student comments were available and were analyzed in detail. It is of particular note that this is the last year in which the traditional sequence 004:013 – 004:016 – 004:014 is offered; they will morph into 004:011 and 004:012. Therefore the present assessment is focussed on gleaning possible recommendations to be brought into the new courses. Student comments on EASY questions 3, 5, 7, 9 are very positive overall, indicating that the associated course goals are being met (qualitative analysis; quantitative analysis; polymer synthesis, electrochemical cells, pH measurement; reaction kinetics, enzyme catalysis, equilibrium constants). Student comments on question 11 (protein isolation and characterization) are less positive, but this likely reflects the fact that this is a techniques experiment, rather than a discovery experiment. The comments on EASY question 13 (laboratory notebook) indicate a mixed level of satisfaction with the value of the very structured lab notebook, and the comments are for the most part valid. This highly structured activity is a consequence of it being such a large class, and of graders having taken over evaluation from TA's in the past year. The comments on EASY question 15 (written communication) are also largely valid if not strongly positive, again reflecting the difficulty of having meaningful evaluation of lab reports in such a large class. Obviously several students did not understand the explanation of why the pre-lab reports described procedures in the past tense. The student comments on EASY question 17 (skills in experimental data collection and analysis) are negative, but reflect the fact that this introductory lab course is to some extent "paint by the numbers" as a way of establishing familiarity with systematic lab procedures. The student comments on EASY question 19 (applications of chemistry) suggest they found some of the case-study applications trivial; perhaps more cleverness is needed in setting the context of these demonstrations. Indeed, the case-studies portions of the new courses 004:011 and 004:012 directly address this need.

2. **SUMMARY OF RECENT REMEDIAL ACTIONS:** (and their estimated effect)

This being the first (and last) detailed assessment of 004:016, there are no previous remedial actions to report. In some sense the advent of the new series 004:011 and 004:012 is a major remedial action.

3. **RECOMMENDED NEW REMEDIAL ACTIONS, IF ANY:****

See 2) above.

4. **RECOMMENDED CHANGES TO COURSE LEARNING GOALS:**

See 2) above.

5. **RECOMMENDED MODIFICATIONS TO ASSESSMENT TECHNIQUES:**

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### College of Engineering EASY Survey Responses

**Results for:** 004016; Principles of Chemistry Laboratory; Section: AAA Lecture  
**Instructor:** [Name]  
**Session Code:** 20013  
**Survey #:** 244  
**Survey Name:** 004016AAA20013  
**Base Set Used:** ABET  
**Privacy:** Faculty Distribute  
**Course Enrollment:** 37  
**Section Enrollment:** 31  
**Remarks:** ABET

#### Headings and Subheadings (Instructs) Used in Survey:
- **Heading(s):** Accreditation Board for Engineering and Technology (ABET) Survey  
- **Subheading(s):** This survey was designed to provide feedback to your instructor on selected aspects of this course. Your responses should reflect YOUR INDIVIDUAL PERCEPTIONS, not those of the class as a whole.

#### Score Type Name: Disagree/Agree 1-6

1. Strongly Disagree  
2. Moderately Disagree  
3. Slightly Disagree  
4. Slightly Agree  
5. Moderately Agree  
6. Strongly Agree

<table>
<thead>
<tr>
<th>Statement</th>
<th>Response Value</th>
<th>Count of Responses</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. I have acquired a basic understanding of the experimental methods involved in qualitative analysis.</td>
<td>1 2 3 4 5 6</td>
<td>2 2 1 3 6 1</td>
<td>15</td>
</tr>
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</table>

| Mean: 3.80                                                               |

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<tbody>
<tr>
<td>5. I have acquired a basic understanding of the experimental methods involved in qualitative analysis.</td>
<td>1 2 3 4 5</td>
<td>1 2 1 2 9</td>
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| Mean: 4.57                                                               |

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<tr>
<td>7. I have acquired a basic understanding of the experimental methods involved in polymer synthesis and characterization, batteries and electrochemical cells, and pH measurement.</td>
<td>1 2 3 4 5 6</td>
<td>1 1 1 6 2 4</td>
<td>15</td>
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| Mean: 4.27                                                               |

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<tr>
<td>9. I have acquired a basic understanding of the experimental methods involved in determining reaction kinetics, enzyme catalysis, and determination of equilibrium constants.</td>
<td>1 2 3 4 5 6</td>
<td>1 1 2 6 3 2</td>
<td>15</td>
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</table>

| Mean: 4.00                                                               |

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<th>Total Responding</th>
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<tbody>
<tr>
<td>11. I have acquired a basic understanding of experimental methods involved in protein isolation and characterization.</td>
<td>1 2 3 4 5</td>
<td>1 1 1 6 6</td>
<td>15</td>
</tr>
</tbody>
</table>

| Mean: 4.00                                                               |

---

Survey Response Summary  
3/31/2002 4:19PM
### Score Type Name: Disagree/Agree 1-6

1. I have improved my skills in properly maintaining a laboratory notebook.
   **Mean: 4.80**

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<th>Total Responding</th>
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<tr>
<td>Count of Responses</td>
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<td>1</td>
<td>2</td>
<td>5</td>
<td>5</td>
<td>15</td>
</tr>
</tbody>
</table>

15. I have improved my written communication skills through writing laboratory reports.
   **Mean: 3.67**

<table>
<thead>
<tr>
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<th>4</th>
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<td>4</td>
<td>2</td>
<td>5</td>
<td>1</td>
<td>15</td>
</tr>
</tbody>
</table>

17. I have improved my skills in experimental data collection and analysis.
   **Mean: 3.33**

<table>
<thead>
<tr>
<th>Response Value</th>
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<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
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<td>Count of Responses</td>
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<td>5</td>
<td>3</td>
<td>5</td>
<td>1</td>
<td>15</td>
</tr>
</tbody>
</table>

19. I have gained an appreciation for the application of chemistry in modern society as a result of the case studies discussed in this laboratory course.
   **Mean: 4.73**

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>15</td>
</tr>
</tbody>
</table>

### Score Type Name: True/False

1. I understand that the ABET survey questions address course objectives not comments on the instructor's effectiveness.
   **Mean: 1.00**

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>15</td>
<td>15</td>
</tr>
</tbody>
</table>

2. I understand that questions with the numerical scale, 1 – 6, use "1" to mean "Strongly Disagree" and "6" to mean "Strongly Agree."
   **Mean: 1.00**

<table>
<thead>
<tr>
<th>Response Value</th>
<th>1</th>
<th>Total Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of Responses</td>
<td>15</td>
<td>15</td>
</tr>
</tbody>
</table>
IV.26 29:017 Introductory Physics I

Summer '01: Not assessed.

Fall '01: Since most engineering students take this course in spring semester, a fall assessment was not performed.

Spring '02: Numerical course-goal survey data not available due to EASY system data loss. A course assessment meeting was held on 28 May 2002, involving Profs. Penzo and De Angelo of Physics, and Prof. David Andersen (Physics Liaison) from Engineering. Assessment was based on course-coordinator observation, anecdotal observations, and student comments on EASY survey questions regarding course goals. Students appear to have felt that they had been exposed to and were competent with topics represented by each of the course goals. Since Thermodynamics topics were de-emphasized in this offering of the course, students were somewhat less confident in this area than others. Student comments corroborated that this semester had been a difficult one from an instructor and course-management viewpoint. It is recommended that Engineering and Physics and Astronomy pay close attention to the quality of instruction and be ready to make personnel changes when required. Several changes to course learning goals were developed, and will be incorporated as appropriate into the new course descriptions for 29:081. The lab facilities are excellent, and the textbook appropriate and available.

Overall Assessment: This course will be last offered in Fall 2003, after which the new course 29:081 will replace it in the new curriculum. The assessment is process is working well, though the loss of numerical EASY data in spring limited the scope of assessment. Assessment is leading to productive and regular exchanges between Physics and Engineering faculty.
### Course Outcomes Worksheet (COW)

#### 29:017 Introductory Physics I

<table>
<thead>
<tr>
<th>Course Goals</th>
<th>Supports ABET Outcomes</th>
<th>Course Activity</th>
<th>Basis for Course-Goal Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The student will have an understanding of the basic properties of mechanics.</td>
<td>A(●), B(●), G(●), I(○), K(●)</td>
<td>Class discussion, homework assignments, laboratory projects</td>
<td>EASY survey assessment by students and instructor; homework; midterm and final exams.</td>
</tr>
<tr>
<td>2. The student will have an understanding of mechanical wave propagation.</td>
<td>A(●), B(●), G(●), I(○), K(●)</td>
<td>Class discussion, homework assignments, laboratory projects</td>
<td>EASY survey assessment by students and instructor; homework; midterm and final exams.</td>
</tr>
<tr>
<td>3. The student will have an understanding of thermodynamics.</td>
<td>A(●), B(●), G(●), I(○), K(●)</td>
<td>Class discussion, homework assignments, laboratory projects</td>
<td>EASY survey assessment by students and instructor; laboratory reports; homework; midterm and final exams.</td>
</tr>
</tbody>
</table>

○ denotes moderate contribution to the outcome  ● denotes substantial contribution to the outcome
Course Assessment Report
College of Engineering
The University of Iowa
(Revision of 27 November 2001)

<table>
<thead>
<tr>
<th>Course Number:</th>
<th>29:017</th>
<th>Semester/Year</th>
<th>Spring 2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Name:</td>
<td></td>
<td></td>
<td>Physics I</td>
</tr>
</tbody>
</table>

**LIAISON:**
DAVID R. ANDERSEN

**SIGNATURE:**

**DATE:**
6/11/02

**INSTRUCTOR:**
Penzo

**SIGNATURE:**
(optional)

**OTHER:**

**SIGNATURE:**
(optional)

*Please attach the course syllabus and course outcomes worksheet (COW).*

**Assessment Techniques:**

Please indicate which of the following techniques were used in assessing the course and your judgment of their utility in assessing achievement of the Course Learning Goals.

<table>
<thead>
<tr>
<th>Assessment Technique</th>
<th>Used, provided useful data</th>
<th>Used, not recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Exams</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Quizzes</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Projects</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Written Reports (other than projects)</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Oral Reports</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student Self-Evaluation</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Student Peer-Evaluation</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Course Portfolios</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class Surveys (e.g., EASY)</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Instructor Observation</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Other [specify]</td>
<td></td>
<td>x</td>
</tr>
</tbody>
</table>

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1. ASSESSMENT RESULTS: (How were each of the course learning goals (from the COW) achieved? Support your assessments qualitatively and/or quantitatively with data from each of the assessment techniques used (see Table on previous page). Explain the relation of the present assessment results to previous ones.)

EASY results showed that students felt they had been exposed to and were competent with topics represented by each of the course goals. Thermodynamics topics were de-emphasized in the course this time through and as a result, students were less confident in this area than others.

2. SUMMARY OF RECENT REMEDIAL ACTIONS: (and their estimated effect)

Students continue to be challenged by the instructors that teach this course. The Engineering and Physics and Astronomy administrations need to continue to be aware of the quality of instruction that is given, and be ready to make personnel changes when required.

3. RECOMMENDED NEW REMEDIAL ACTIONS, IF ANY:

No changes to the content were recommended in light of the fact that 29:017 will be changing to 29:081 as we adopt the new curriculum.

4. RECOMMENDED CHANGES TO COURSE LEARNING GOALS:

Several changes to the Course Learning Goals were recommended at the joint meeting of Physics and CoE faculty held on 5/28/02 to discuss Physics I and Physics II. These will be incorporated as appropriate into the course descriptions for 29:081 and 29:082.

5. RECOMMENDED MODIFICATIONS TO ASSESSMENT TECHNIQUES:

EASY questions will need to be modified as appropriate given the changes to the Course Learning Goals.

6. SIGNIFICANT DEVIATIONS IN COURSE CONTENT FROM SYLLABUS (SUMMARIZE):

Thermodynamics was de-emphasized in order to provide more detailed coverage of other topics.

COURSE SUPPORT

TA SUPPORT FROM THE COLLEGE (IN TERMS OF FTE):

OTHER TA SUPPORT AND SOURCE (IN TERMS OF FTE):

TA RESPONSIBILITIES: Grading, Lab supervision, Tutor room
WAS THE TA SUPPORT ALLOCATED TO YOUR SECTION SUFFICIENT? PLEASE ELABORATE.

IF USED, WAS THE COMPUTER HARDWARE AND SOFTWARE SUPPORT FROM CSS ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

WERE THE FACILITIES (CLASSROOM, LABS, ETC.) ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

Lab facilities are excellent

**COURSE ORGANIZATION/CONTENTS**

LECTURE (HOURS/WEEK): 3  
DISCUSSION (HOURS/WEEK):

LABORATORY (HOURS/WEEK): 2.5  
TOTAL NUMBER OF STUDENTS:

TEXTBOOK AUTHOR AND TITLE: Serway – Physics for Engineers, most recent ed.

PLEASE COMMENT ON THE SUITABILITY OF THE TEXTBOOK AND ITS TIMELY AVAILABILITY.

Text is appropriate for the course and available.

TEACHING AIDS:

PLEASE ATTACH A COPY OF THE SYLLABUS THAT WAS DISTRIBUTED TO THE CLASS, A SAMPLE OF CLASS HANDOUTS IF AVAILABLE, AND THE COURSE ASSESSMENT WORKSHEET (COW) FOR THE COURSE. USE THE SPACE BELOW TO DESCRIBE ANY PARTICULAR PROBLEMS YOU MIGHT HAVE HAD WITH THIS COURSE (E.G., UNUSUAL ATTRITION, LACK OF PREREQUISITES, UNUSUAL GRADE DISTRIBUTION, ETC.) OR ANY INNOVATIONS/IDEAS THAT SHOULD BE CONSIDERED IN THE FUTURE.
IV.27 29:018 Introductory Physics II

Summer '01: Not assessed.

Fall '01: A course assessment meeting was held on 28 January 2002, involving Profs. Boggess, DeAngelo, and Onel of Physics, and Profs. Andersen (Physics Liaison) and Holly (Associate Dean) of Engineering. Assessment was based primarily on EASY student survey responses and written comments, and instructor evaluation. The general consensus was that no remedial actions were deemed necessary at this time, since the course seems to be working well. Student responses to the EASY questions regarding understanding of dielectric materials, linearly-polarized electromagnetic waves, and Huygen’s principle received relatively weak student responses, though the latter is probably explained by the late appearance of this material in the semester given the timing of the EASY survey. Some modifications will be made as the course transitions into 29:082.

Spring '02: Numerical course-goal survey data not available due to EASY system data loss. A course assessment meeting was held on 28 May 2002, involving Profs. Penzo and De Angelo of Physics, and Prof. David Andersen (Physics Liaison) from Engineering. Assessment was based on course-coordinator observation, anecdotal observations, and student comments on EASY survey questions regarding course goals. All indications are that students felt they had been exposed to, and were competent with, topics represented by each of the course goals. Several changes to course learning goals were developed, and will be incorporated as appropriate into the new course descriptions for 29:082. The lab facilities are excellent, and the textbook appropriate and available

Overall Assessment: This course will be last offered in Spring 2004, after which the new course 29:082 will replace it in the new curriculum. The assessment is process is working well, though the loss of EASY numerical data in the spring limited the scope and depth of assessment. The assessment process is leading to productive and regular exchanges between Physics and Engineering faculty.
### Course Outcomes Worksheet (COW)

#### 29:018 Introductory Physics II

<table>
<thead>
<tr>
<th>Course Goals</th>
<th>Supports ABET Outcomes</th>
<th>Course Activity</th>
<th>Basis for Course-Goal Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The student will have an understanding of the basic properties of electricity and magnetism.</td>
<td>A(●), B(●), G(●), I(○), K(●)</td>
<td>Class discussion, homework assignments, laboratory projects</td>
<td>EASY survey assessment by students and instructor; homework; midterm and final exams.</td>
</tr>
<tr>
<td>2. The student will have an understanding of capacitance and inductance.</td>
<td>A(●), B(●), G(●), I(○), K(●)</td>
<td>Class discussion, homework assignments, laboratory projects</td>
<td>EASY survey assessment by students and instructor; homework; midterm and final exams.</td>
</tr>
<tr>
<td>3. The student will have an understanding of electromagnetic waves.</td>
<td>A(●), B(●), G(●), I(○), K(●)</td>
<td>Class discussion, homework assignments, laboratory projects</td>
<td>EASY survey assessment by students and instructor; laboratory reports; homework; midterm and final exams.</td>
</tr>
<tr>
<td>4. The student will have an understanding of the nature of light, including interference phenomena and total internal reflection.</td>
<td>A(●), B(●), G(●), I(○), K(●)</td>
<td>Class discussion, homework assignments, laboratory projects</td>
<td>EASY survey assessment by students and instructor; homework; final exam.</td>
</tr>
</tbody>
</table>

○ denotes moderate contribution to the outcome  ● denotes substantial contribution to the outcome
Course Assessment Report
College of Engineering
The University of Iowa
(Revision of 27 November 2001)

Course Number: 29:18  Semester/Year: Fall 2001
Course Name: Introductory Physics II

LIAISON: DAVID R. ANDERSEN  SIGNATURE: [Signature]
DATE: January, 2002
INSTRUCTOR: Yaser Onel  SIGNATURE: (optional)
OTHER: Forrest M. Holly  SIGNATURE: (optional)

Please attach the course syllabus and course outcomes worksheet (COW).

Assessment Techniques:
Please indicate which of the following techniques were used in assessing the course and your judgment of their utility in assessing achievement of the Course Learning Goals.

<table>
<thead>
<tr>
<th>Assessment Technique</th>
<th>Used, provided useful data</th>
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</thead>
<tbody>
<tr>
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<td>Oral Reports</td>
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<tr>
<td>Course Portfolios</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class Surveys (e.g., EASY)</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Instructor Observation</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Other (specify)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. **ASSESSMENT RESULTS:** (How were each of the course learning goals (from the COW) achieved? Support your assessments qualitatively and/or quantitatively with data from each of the assessment techniques used (see Table on previous page). Explain the relation of the present assessment results to previous ones.)

The Course Assessment report meeting between Associate Dean Forrest Holly (CoE), Prof. David Andersen (CoE), Prof. Tom Boggess (Physics), Prof. Yaser Onel (Physics), and Prof. Nick DeAngelo (Physics) was held primarily to acquaint the Physics people with the process being established by the College of Engineering. Assessment results used as a basis for discussion included an EASy survey of the students in 29:18 Fall 2001 and Prof. Onel’s thoughts on how the semester went.

2. **SUMMARY OF RECENT REMEDIAL ACTIONS:** (and their estimated effect)

At this point no remedial actions were deemed necessary. The sense of the group was that the course was working. Some modifications will be made as we transform from 29:18 to 29:82.

3. **RECOMMENDED NEW REMEDIAL ACTIONS, IF ANY:**

None

4. **RECOMMENDED CHANGES TO COURSE LEARNING GOALS:**

No changes to the course learning goals were recommended at this point. Some changes will become necessary based on the change from 29:18 to 29:82.

5. **RECOMMENDED MODIFICATIONS TO ASSESSMENT TECHNIQUES:**

Several proposed modifications to the EASy survey questions were proposed, but the group decided to wait until a second semester had gone by in order to gain as much insight into the results of the EASy questions as possible.

6. **SIGNIFICANT DEVIATIONS IN COURSE CONTENT FROM SYLLABUS (SUMMARIZE):**

None.
COURSE SUPPORT

TA SUPPORT FROM THE COLLEGE (IN TERMS OF FTE):
None from the CoE

OTHER TA SUPPORT AND SOURCE (IN TERMS OF FTE):
TA support was provided by the CLAS.

TA RESPONSIBILITIES:
- Homework grading, lab section supervision, and tutorial room staff.

WAS THE TA SUPPORT ALLOCATED TO YOUR SECTION SUFFICIENT? PLEASE ELABORATE.
Yes.

IF USED, WAS THE COMPUTER HARDWARE AND SOFTWARE SUPPORT FROM CSS ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.
Not applicable

WERE THE FACILITIES (CLASSROOM, LABS, ETC.) ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.
Yes.

COURSE ORGANIZATION/CONTENTS

LECTURE (HOURS/WEEK): 3  DISCUSSION (HOURS/WEEK): 0
LABORATORY (HOURS/WEEK): 2.5  TOTAL NUMBER OF STUDENTS: 181

TEXTBOOK AUTHOR AND TITLE:
Physics for Scientists and Engineers, by Serway, 5th edition

PLEASE COMMENT ON THE SUITABILITY OF THE TEXTBOOK AND ITS TIMELY AVAILABILITY.
This text is suitable for the course.

TEACHING AIDS:

PLEASE ATTACH A COPY OF THE SYLLABUS THAT WAS DISTRIBUTED TO THE CLASS, A SAMPLE OF CLASS HANDOUTS IF AVAILABLE, AND THE COURSE ASSESSMENT WORKSHEET (COW) FOR THE COURSE. USE THE SPACE BELOW TO DESCRIBE ANY
PARTICULAR PROBLEMS YOU MIGHT HAVE HAD WITH THIS COURSE (E.G., UNUSUAL
ATTRITION, LACK OF PREREQUISITES, UNUSUAL GRADE DISTRIBUTION, ETC.) OR ANY
INNOVATIONS/IDEAS THAT SHOULD BE CONSIDERED IN THE FUTURE.

No problems.
Course Assessment Report
College of Engineering
The University of Iowa
(Revision of 27 November 2001)

<table>
<thead>
<tr>
<th>Course Number:</th>
<th>29:018</th>
<th>Semester/Year</th>
<th>Spring 2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Name:</td>
<td></td>
<td></td>
<td>Physics II</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LIAISON:</th>
<th>DAVID R. ANDERSEN</th>
<th>SIGNATURE:</th>
<th>DalMAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>DATE:</td>
<td>6/11/02</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INSTRUCTOR:</td>
<td>De Angelo</td>
<td>SIGNATURE:</td>
<td>(optional)</td>
</tr>
<tr>
<td>OTHER:</td>
<td></td>
<td>SIGNATURE:</td>
<td>(optional)</td>
</tr>
</tbody>
</table>

Please attach the course syllabus and course outcomes worksheet (COW).

Assessment Techniques:
Please indicate which of the following techniques were used in assessing the course and your judgment of their utility in assessing achievement of the Course Learning Goals.

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<tr>
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<td></td>
<td>x</td>
</tr>
<tr>
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<td></td>
<td>x</td>
</tr>
<tr>
<td>Instructor Observation</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Other [specify]</td>
<td></td>
<td>x</td>
</tr>
</tbody>
</table>
1. ASSESSMENT RESULTS: (How were each of the course learning goals (from the COW) achieved? Support your assessments qualitatively and/or quantitatively with data from each of the assessment techniques used (see Table on previous page). Explain the relation of the present assessment results to previous ones.)

EASY results showed that students felt they had been exposed to and were competent with topics represented by each of the course goals.

2. SUMMARY OF RECENT REMEDIAL ACTIONS: (and their estimated effect)

Students responded very positively to the instruction in this course.

3. RECOMMENDED NEW REMEDIAL ACTIONS, IF ANY:

No changes to the content were recommended in light of the fact that 29:018 will be changing to 29:082 as we adopt the new curriculum.

4. RECOMMENDED CHANGES TO COURSE LEARNING GOALS:

Several changes to the Course Learning Goals were recommended at the joint meeting of Physics and CoE faculty held on 5/28/02 to discuss Physics I and Physics II. These will be incorporated as appropriate into the course descriptions for 29:081 and 29:082.

5. RECOMMENDED MODIFICATIONS TO ASSESSMENT TECHNIQUES:

EASY questions will need to be modified as appropriate given the changes to the Course Learning Goals.

6. SIGNIFICANT DEVIATIONS IN COURSE CONTENT FROM SYLLABUS (SUMMARIZE):

None.

### COURSE SUPPORT

TA SUPPORT FROM THE COLLEGE (IN TERMS OF FTE):

OTHER TA SUPPORT AND SOURCE (IN TERMS OF FTE):

TA RESPONSIBILITIES: Grading, Lab supervision, Tutor room

WAS THE TA SUPPORT ALLOCATED TO YOUR SECTION SUFFICIENT? PLEASE ELABORATE.
IF USED, WAS THE COMPUTER HARDWARE AND SOFTWARE SUPPORT FROM CSS ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

WERE THE FACILITIES (CLASSROOM, LABS, ETC.) ADEQUATE? PLEASE ELABORATE WITH SUGGESTIONS FOR IMPROVEMENT.

Lab facilities are excellent.

**COURSE ORGANIZATION/CONTENTS**

LECTURE (HOURS/WEEK): 3  DISCUSSION (HOURS/WEEK):

LABORATORY (HOURS/WEEK): 2.5  TOTAL NUMBER OF STUDENTS:

TEXTBOOK AUTHOR AND TITLE: Serway – Physics for Engineers, most recent ed.

Please comment on the suitability of the textbook and its timely availability.

Text is appropriate for the course and available.

TEACHING AIDS:

Please attach a copy of the syllabus that was distributed to the class, a sample of class handouts if available, and the course assessment worksheet (COW) for the course. Use the space below to describe any particular problems you might have had with this course (e.g., unusual attrition, lack of prerequisites, unusual grade distribution, etc.) or any innovations/ideas that should be considered in the future.
College of Engineering EASY Survey Responses

Results For: 029-018; Introductory Physics II - Lecture
Instructor(s): Year Oral
Session Code: 20014  Beginning On: 01-21-02  Running for: 5 days  Course Enrollment: 160
Survey #: 261  Survey Name: 02901800A-20013
Base Set Used: ABET  Privacy: Faculty Distribute  Remarks: ABET

Handlings and Subheadings (Instructions) Used in Survey:

1. Accreditation Board for Engineering and Technology (ABET) Survey
   - For each statement decide whether you generally agree or disagree then indicate the strength of agreement or disagreement by selecting the appropriate number.
   - This survey was designed to provide feedback to your instructor on selected aspects of this course. Your responses should reflect YOUR INDIVIDUAL PERCEPTIONS, not those of the class as a whole.

Score Type Name: Disagree/Agree 1-6

1. I understand basic properties of electric fields and charges.
   Mean: 4.29
   | Response Value: | 1 | 2 | 3 | 4 | 5 | 6 | Total Responding |
   | Count of Responses: | 4 | 4 | 3 | 5 | 15 | 11 | 40 |

4. I am familiar with Gauss’s law, including how to calculate electric flux, given a particular charge distribution.
   Mean: 4.08
   | Response Value: | 1 | 2 | 3 | 4 | 9 | 6 | Total Responding |
   | Count of Responses: | 4 | 5 | 3 | 11 | 10 | 9 | 40 |

6. I am familiar with electric potential, including potential difference and electric potential.
   Mean: 4.49
   | Response Value: | 1 | 2 | 3 | 4 | 5 | 6 | Total Responding |
   | Count of Responses: | 4 | 1 | 4 | 9 | 10 | 12 | 40 |

6. I am familiar with the definitions of capacitance and inductance.
   Mean: 4.46
   | Response Value: | 1 | 2 | 3 | 4 | 5 | 6 | Total Responding |
   | Count of Responses: | 3 | 2 | 2 | 7 | 9 | 15 | 40 |

7. I understand dielectric materials.
   Mean: 4.75
   | Response Value: | 1 | 2 | 3 | 4 | 5 | 6 | Total Responding |
   | Count of Responses: | 3 | 5 | 6 | 15 | 7 | 4 | 40 |

8. I am familiar with sources of the magnetic field.
   Mean: 4.23
   | Response Value: | 1 | 2 | 3 | 4 | 5 | 6 | Total Responding |
   | Count of Responses: | 3 | 3 | 5 | 17 | 6 | 4 | 40 |

Survey Response Summary (non-comments) 4/17/2002 10:08AM

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<table>
<thead>
<tr>
<th>Score Type Name: 1-6</th>
<th>1 = Strongly Disagree</th>
<th>2 = Moderately Disagree</th>
<th>3 = Slightly Disagree</th>
<th>4 = Slightly Agree</th>
<th>5 = Moderately Agree</th>
<th>6 = Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>9. I am familiar with Faraday’s law. Mean: 4.33</td>
<td></td>
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<td>10. I am familiar with linearly-polarized electromagnetic waves. Mean: 3.87</td>
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<td>11. I am familiar with the energy carried by electromagnetic waves. Mean: 4.23</td>
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<td>15. I am familiar with total internal reflection of light and optical interference phenomena. Mean: 4.86</td>
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Score Type Name: True/False

Survey Response Summary (non-comments)  4/17/2002 10:03AM
1. I understand that the ABET survey questions address course objectives not comments on the instructor's effectiveness.

   **Mean:** 1.00

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<tbody>
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</table>

2. I understand that questions with the numerical scale, 1 - 6, use "1" to mean "Strongly Disagree" and "6" to mean "Strongly Agree."

   **Mean:** 1.00

<table>
<thead>
<tr>
<th>Response Values</th>
<th>Total Responding</th>
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V. Overall Evaluation of Assessment Process and Recommendations

This second cycle of the Yearly Assessment of the Core is the first one covering a full academic year. Experience has confirmed the tentative conclusions of the 2000-2001 report (page 227), in particular that the COW-EASY-CAR process has resulted in a very positive and constructive system of course critique and improvement.

It must be said that this report, as the previous one, reflects some unevenness in the breadth and depth of course-goal assessment from one course to another, and from one semester to another. However it is clear that the process is maturing and attracting more “true believers” since it clearly leads to systematic and constructive evaluation of a just-offered course, and is resulting in positive change in many courses. A particular and unprecedented activity resulting from this process is the regular meetings with colleagues in mathematics, chemistry, physics/astronomy, and statistics regarding the experience of engineering students in required courses offered by those departments. This is a cultural shift for all parties, and has led to the opening of regular paths of communication to deal with issues that come up in these courses.

It is particularly beneficial that the Yearly Assessment of the Core process has had two years to mature as the College embarks on its new curriculum in the Fall of 2002. It will be particularly important to conduct careful assessment and evaluation of new courses such as 59:005 Engineering Problem Solving I, 22M:031 Engineering Math I, 22M:032 Engineering Math II, 004:011 Chemistry I, and 004:012 Chemistry II in the coming year.

The EASY student self-assessment system has worked well for the most part during this past year. There was a very unfortunate loss of numerical data in the Spring 2002 implementations of the surveys, calling attention to the need for more careful testing whenever seemingly minor changes are made to the underlying database program. The EASY system remains character-based, but a prototype browser-based (html) interface has been designed and tested with a few students. This friendlier interface will be further developed and implemented in the coming academic year. Despite the unfriendliness of the interface and the risk of EASY-fatigue, students continue to participate in significant numbers, and appear to be convinced that their feedback is relevant and carefully considered.

The Abet Anonymous faculty group has recommended that the COW-EASY-CAR process continue indefinitely for the Engineering core courses (including math/chemistry/physics/statistics). However they recommended that, in the interests of sustainability, the process not be required for summer course offerings. In addition, they recommended that the humanities/social sciences/rhetoric open forum be conducted only in the spring semester. They also recommended that whereas student work should be collected and used for the course assessment meetings, it should not be necessary to archive core-course student work in course binder as has been done up to now. This
collection and archiving remains important for the assessment of achievement of *program* educational outcomes, however. During the Fall 2002 semester, the Engineering Faculty Council will discuss and take action on these recommendations.
Appendix A. EASY System for Course-Goal Assessment

The EASY system (Evaluation and Assessment SurveY) is an on-line, secure, course-specific course-goal assessment survey, developed and maintained by the College of Engineering database services. The system was developed in 1999-2000 as part of the College’s efforts to implement a sustainable outcomes assessment process.

For all College core courses, and for some program courses in those programs that choose to use the EASY student self-assessment survey as part of their assessment process, an EASY survey is launched during the final weeks of the semester. The course instructor (in collaboration with the course coordinator, if applicable) designs/revises an EASY survey for the course, either directly through the EASY web site or with the assistance of the College of Engineering database manager. The instructor is encouraged to remind the students of the purpose and mechanics of the EASY survey. The EASY system then automatically issues an email to the engineering students enrolled in the course announcing the availability window (start and end dates) for the EASY survey, and opens and closes the window on the announced dates. The EASY system includes protections against multiple responses, and assures anonymity of the student responses. Midway through the survey, the system issues an email reminder to students who have not yet responded. By College policy, EASY results (numerical data and transcripts of student comments) are issued to the instructor only after semester grades have been submitted.

During the 2002-03 Academic Year, the College will upgrade the EASY system, in particular replacing the present character-based user interface with an HTML-based one (browser environment).