Course Syllabus: Biomechanics of Orthopaedic Implants (051:158)

1  Introduction; Articular Joints, Bones, Musculoskeletal Tissues
2  Major Pathologies Treated Using Orthopaedic Implants
3  Historical Development of Orthopaedic Implants
4  Charnley’s Innovations in Total Hip Replacement (THR)
5  The Iowa Total Hip
6  Biomechanical Techniques: In-Class Presentations # 1
7  Biomechanical Techniques: In-Class Presentations # 2
8  THR Femoral Component Design & Performance
9  THR Acetabular Component Design & Performance
10 Biomechanics of Acrylic Cement Fixation
11 Porous Ingrowth Fixation
12 Press Fit Fixation
13 Complications: Polyethylene Wear
14 Polyethylene Wear (cont’d)
15 Complications: Dislocation
16 Resurfacing
17 Revision THR and Custom Prostheses
18 Impaction Grafted Constructs
19 Hip Surgeon’s Viewpoint (Guest Lecturer)

**Mid-Term Examination**

20 Knee Kinematic Considerations for TKR
21 TKR Femoral Component Design & Performance
22 TKR Tibial Component Design & Performance
23 Patello-Femoral Joint Replacement
24 Failure Mechanisms in TKR
25 Total Ankle Replacement
26 Total Shoulder Replacement
27 Total Elbow Replacement
28 Wrist and Finger Arthroplasty
29 Reconstructive Surgeon’s Viewpoint (Guest Lecturer)
30 Survey of Currently Marketed TJR Devices
31 Mechanical Issues in Fracture Healing
32 Internal Fixation of Long Bone Fractures
33 Bone Plates
34 Bone Screws
35 Intramedullary Rods & Nails
36 Pins, Tension Bands, and Cerclage Wiring
37 External Fixation of Appendicular Fractures
38 External Fixation of Pelvic Fractures
39 Survey of Currently Marketed Trauma Devices
40 Trauma Surgeon’s Viewpoint (Guest Lecturer)
41 Limb Lengthening (Wagner, DeBastiani, & Ilizarov Devices)
42 Casts, Braces, and Orthotics
43 Arthroscopy
44 Standards and Regulatory Requirements (FDA, ASTM/ISO)