Course Outcomes [Related ME Program Outcomes in Brackets]

1. Ability to use and interpret information from modern engineering instrumentation and measurement systems. [A1, A2, A3, A4, B1]
2. A discussion on the design of modern engineering instrumentation. [A3, A4, A5]
3. A chance to design a measurement system to meet the requirement of a given measurement problem. [A3, A5]

Static Instrument Characteristics (4 wks)
1. Calibration
2. Accuracy in steady-state
3. Error analysis

Dynamics Instrument Characteristics (4 wks)
1. Frequency response
2. System Identification
3. Transfer functions
4. Harmonic distortion

Loading Effects (2 wks)
1. Process loading
2. Inter-element loading
3. Impedance conditions
   a. matching
   b. low loading
   c. low noise

Sensing & Signal Conditioning (5 wks)
1. Self-generating sensors
2. Non Self-generating sensors
3. Filters
4. Modulation & demodulation
5. Sampling methods
6. Digital methods
7. Noise sources
8. Noise reduction methods
9. Software

Revision Date: 2/05/2013
1. COURSE NUMBER AND TITLE: ME 58500 Instrumentation for Engineering Measurements

2. CREDITS AND CONTACT HOURS: 3 credits
   a. Lecture – 3 days per week at 50 minutes for 16 weeks

3. COURSE COORDINATOR OR INSTRUCTOR: G. B. King

4. TEXTBOOK: Course Notes

5. SPECIFIC COURSE INFORMATION:
   a. Catalog Description: Fundamental concepts of static and dynamic measurements are reviewed. Transducers, signal conditioning, data transmission and digital data. Acquisition systems are discussed. Emphasis is on applications and dynamic measurements. Typically offered alternate years in the fall.
   b. Prerequisites: First Semester Senior Standing or Higher
   c. Status: Elective

6. SPECIFIC GOALS FOR THE COURSE
   a. Course Outcomes:
      [Related ME Program Outcomes in Brackets]
      This course is designed to give advanced Mechanical Engineering seniors and beginning graduate engineering students the following skills:
      1. The ability to use and interpret information from modern engineering instrumentation and measurement systems. [A1, A2, A3, A4, B1]
      2. A discussion on the design of modern engineering instrumentation. [A3, A4, A5]
      3. A chance to design a measurement system to meet the requirement of a given measurement problem. [A3, A5]

   b. Related ME Program Outcomes:
      [Related ABET Outcomes Listed in Brackets]
      A1. Engineering Fundamentals; B3. Prof/Ethical Responsibility;
      A3. Experimental Skills; B5. Life-Long Learning;
      A4. Modern Engr Tools; C1. Leadership,
      A5. Design Skills; C2. Global Engineering Skills;
      A6. Impact of Engr Solns; C3. Innovation;
      B1. Communication Skills; C4. Entrepreneurship
      B2. Teamwork Skills

7. LIST OF TOPICS: See following page.

PREPARED BY: G.B. King

REVISION DATE: February 5, 2013