A. **TITLE:** Instrumentation and Controls

B. **COURSE NUMBER:** MKTX 310

C. **CREDIT HOURS:** 3

D. **WRITING INTENSIVE COURSE:** No

E. **COURSE LENGTH:** 15 weeks

F. **SEMESTER(S) OFFERED:** Spring

G. **CATALOG DESCRIPTION:**

This course will introduce instrumentation systems, process measurements, and process control. Specifically, the course will discuss measurement terminology, differentiating between analog and digital, describe the instrumentation used for electronic testing and develop the principles of operation of transducers used for process measurement and control.

H. **PRE-REQUISITES/CO-REQUISITES:**

a. Pre-requisite(s): ENGS 263/264 Electric Circuit/Laboratory

b. Co-requisite(s): None

I. **GOALS (STUDENT LEARNING OUTCOMES):**

By the end of this course, the student will be able to:

<table>
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<tr>
<th>Course Objective</th>
<th>ABET</th>
<th>Institutional SLO</th>
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<tbody>
<tr>
<td>1. Demonstrate the basic instrumentation system elements: sensors and actuators.</td>
<td>a, c, e, k</td>
<td>3. Professional Competence</td>
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<tr>
<td>2. Apply control units to design automated systems.</td>
<td>a, c, d, e, k</td>
<td>3. Professional Competence</td>
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K. **TEXTS:** Most recent and compatible with Instrumentation and Control systems

L. **REFERENCES:** None

M. **EQUIPMENT:** None

N. **GRADING METHOD:** A-F

O. **MEASUREMENT CRITERIA/METHODS:**

- Homework
- Tests, Quizzes
- Case studies
P. DETAILED COURSE OUTLINE:

Measurement Systems
Instrumentation System Elements (sensors)
Data Presentation Elements
Control Systems
Process Controllers
Correction Elements
Programmable Logic Control Systems
System Models
Transfer Function
System Response
Frequency Response
Nyquist Diagrams