## Official Undergraduate Course Outline Information

Students are advised to keep course outlines in personal files for future use. Shaded headings are subject to change at the discretion of the department – see course syllabus available from instructor.

<table>
<thead>
<tr>
<th>COURSE NAME/NUMBER</th>
<th>FACULTY/DEPARTMENT</th>
<th>UFV CREDITS</th>
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</thead>
<tbody>
<tr>
<td>ENGR 350</td>
<td>Physics</td>
<td>4</td>
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### Calendar Description:

This course provides an introduction to sensors and actuators for electromechanical, computer-controlled machines, and devices. Topics include operating principles, design considerations, and applications of analog sensors, digital transducers, stepper motors, continuous-drive actuators, and drive system electronics. Component integration and design considerations are studied through examples selected from applications of machine tools, mechatronics, precision machines, robotics, aerospace systems, and ground and underwater vehicles. Laboratory exercises strengthen the understanding of component performance, system design, and integration.

### Prerequisites:

ENGR 330

### Corequisites:

PRE or COREQUISITES:

### Synonymous Course(s):

(a) Replaces: 
(b) Cross-listed with: 
(c) Cannot take: for further credit.

### Total Hours per Term: 75

<table>
<thead>
<tr>
<th>STRUCTURE OF HOURS</th>
<th>TRAINING DAY-BASED INSTRUCTION:</th>
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<tbody>
<tr>
<td>Lectures: 45 Hrs</td>
<td>Length of course:</td>
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<tr>
<td>Seminar:</td>
<td>Hours per day:</td>
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<tr>
<td>Laboratory: 30 Hrs</td>
<td>Other: Maximum enrolment: 18</td>
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<td>Field experience:</td>
<td>Expected frequency of course</td>
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<tr>
<td>Student directed</td>
<td>offerings: annually</td>
</tr>
<tr>
<td>Other (specify):</td>
<td>(every semester, annually,</td>
</tr>
<tr>
<td></td>
<td>every other year, etc.)</td>
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</tbody>
</table>

### WILL TRANSFER CREDIT BE REQUESTED? (lower-level courses only)

- [ ] Yes
- [x] No

### WILL TRANSFER CREDIT BE REQUESTED? (upper-level requested by department)

- [x] Yes
- [ ] No

### Transfer Credit Exists in BCCAT Transfer Guide?

- [ ] Yes
- [x] No

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Course designer(s): Xiaolin Long

Department Head: Derek Harnett  
Date approved: August 26, 2013

Campus-Wide Consultation (CWC)  
Date of meeting: June 28, 2013

Curriculum Committee chair: David Fenske  
Date approved: September 20, 2013

Dean/Associate VP: Lucy Lee  
Date approved: September 20, 2013

Undergraduate Education Committee (UEC) approval  
Date of meeting: October 25, 2013
LEARNING OUTCOMES:
Upon successful completion of this course, students will be able to:
- Acquire and analyze the data from analog sensors and digital transducers.
- Identify numerous examples of applications of sensors and actuators across a wide variety of fields.
- Demonstrate improved hands-on skills in assembling systems of sensors and actuators.
- Design and evaluate the controllers for the stepper motors and continuous-drive actuators.
- Collaborate in teams to complete projects.
- Communicate orally in an effective manner.

METHODS: (Guest lecturers, presentations, online instruction, field trips, etc.)
Lectures, lab projects, presentations, examinations

METHODS OF OBTAINING PRIOR LEARNING ASSESSMENT RECOGNITION (PLAR):
☐ Examination(s) ☐ Portfolio assessment ☐ Interview(s)
☐ Other (specify):
☒ PLAR cannot be awarded for this course for the following reason(s): The course has a lab

TEXTBOOKS, REFERENCES, MATERIALS:
[Textbook selection varies by instructor. An example of texts for this course might be:]
Transducer and instrumentation trainer. Progressive Educational Systems.
Control Sensors and Actuators, Clarence W. de Silva, Prentice Hall 1989

SUPPLIES / MATERIALS:

STUDENT EVALUATION:
[An example of student evaluation for this course might be:]
Assignments: 20%
Presentation: 10%
Midterm exam: 10%
Final exam: 30%
Labs (including report): 30%

COURSE CONTENT:
[Course content varies by instructor. An example of course content might be:]
1. Basic control systems
2. Input transducers
3. Output transducers
4. Display devices
5. Signal conditioning circuits
6. Closed loop control systems