Nashville State Community College  
Computer and Engineering Technologies Division  
Electrical Engineering Technology  

Master Course Syllabus  

EETH 2245 Instrumentation Lab  
1 Credit  
2 Laboratory Hours  
Parallels the EETH 2240 lecture course. Lab exercises include work with transducers, monitoring systems, computer interfaces for TCP/IP transmissions and RFID systems.  
Co-requisite: EETH 2240  

Instructor Information:  
Name:  
Email:  
Office Phone:  
Office Location:  
Office Hours:  

Textbook and Other Materials:  
Textbook: http://www.ibiblio.org/kuphaldt/socratic/sinst/  
Reference Materials:  
Supplies: Lab materials provided by the instructor  

Course Outcomes:  
Upon successful completion of this course, students should be able to:  
- Identify and explain the basic principles of measurement and error.  
- Identify industrial instrumentation used for process control and measurement.  
- Explain basic process variables including temperature, level, flow, pressure, PH, speed, position, gas detection and analysis, viscosity, etc.  
- Explain the difference between sensors and actuators.  

Course Competencies:  
The following are detailed course competencies intended to support the course outcomes  
- Analyze measurement results and errors using probability and statistics  
- Observe "meter loading" and sensitivity, dead band, calibration, and types of errors.  
- Observe the operation of potentiometers and resistance bridges and analyze the results  
- Describe the principles of closed and open loop control  
- Observe the operation of sensors and actuators  
- Describe the operation of various MEMS
Course Assessments:
The following performance assessments will be used to demonstrate students' understanding, knowledge and skills: This course requires graded reports on lab observations and calculations, and on case study projects.

Grading Policy
Lab reports 70%
Case study projects (MEMS) 30%

Grading Scale:
A (90-100%), B (80-89%), C (70-79%), D (60-69%), F (less than 60%)

Topics to Be Covered:

<table>
<thead>
<tr>
<th>WEEK</th>
<th>TOPIC</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Electric Circuit Troubleshooting Review</td>
<td>Troubleshooting Worksheets</td>
</tr>
<tr>
<td>2</td>
<td>Variable resistance</td>
<td>Wheatstone bridge</td>
</tr>
<tr>
<td>3</td>
<td>Measurement sensitivity</td>
<td>Wheatstone bridge</td>
</tr>
<tr>
<td>4</td>
<td>Variable resistance</td>
<td>Variable area transducers</td>
</tr>
<tr>
<td>5</td>
<td>Variable resistance</td>
<td>Strain guage</td>
</tr>
<tr>
<td>6</td>
<td>Displacement transducers</td>
<td>LVDT</td>
</tr>
<tr>
<td>7</td>
<td>Actuators</td>
<td>SCME Actuator activity</td>
</tr>
<tr>
<td>8</td>
<td>Sensors</td>
<td>SCME Sensor activity</td>
</tr>
<tr>
<td>9</td>
<td>Transducers</td>
<td>SCME Transducer activity</td>
</tr>
<tr>
<td>10</td>
<td>Frequency discrimination</td>
<td>f to v conversion</td>
</tr>
<tr>
<td>11</td>
<td>Reluctance</td>
<td>Variable reluctance transducers</td>
</tr>
<tr>
<td>12</td>
<td>MEMS case project 1</td>
<td>SCME Microfluidics activity</td>
</tr>
<tr>
<td>13</td>
<td>MEMS case project 2</td>
<td>SCME Optical MEMS activity</td>
</tr>
<tr>
<td>14</td>
<td>MEMS case project 3</td>
<td>SCME Sensors activity</td>
</tr>
</tbody>
</table>

SCME Southwest Center for Microsystems Education

Attendance Policy
A student is expected to attend all scheduled classes and laboratories. Each instructor will formulate an attendance policy and provide it on the course syllabus. Absences are counted from the first scheduled meeting of the class, and it is the responsibility of each student to know the attendance policy of each instructor in whose class he/she is enrolled. If a student is absent from a class, he/she should give an advanced explanation to the instructor. Absences in a course may affect a student’s final grade. The student is responsible for all assigned work in the
course regardless of excused or unexcused absences. Tardiness may also affect a student’s final grade.
Failure to attend class will result in a final course grade of “FA” or “FN” (see explanation below) depending on the individual instructor’s course policy.
FA= failure, attendance-related (unofficial withdrawal) Last recorded date of attendance required.
FN= failure, never attended class (unofficial withdrawal)

**Student Communication Channels**
It is the student’s responsibility to check D2L and MyNSCC email on a regular basis. These are the official communication channels between the college and students. Students are responsible for the information communicated through those channels. D2L contains specific course information and MyNSCC contains information important for other purposes.

**Early Warning System**
Nashville State Community College has implemented an Early Warning System to notify students via e-mail about academic problems such as poor classroom attendance, poor performance on assignments/tests, poor communication skills, late/missing assignments, and/or lack of classroom participation. Please note that Early Warning Alerts do not affect a student’s academic standing.

**ADA Compliance Statement**
Nashville State complies with the Americans with Disabilities Act. Please contact the Access Services Coordinators at 615-353-3721 or 615-353-3741 if you would like to arrange ADA accommodations.

**Classroom Misconduct**
Nashville State Community College has a zero tolerance policy for disruptive conduct in the classroom. Students whose behavior disrupts the classroom will be subject to disciplinary sanctions. Please consult your Student Handbook for more specific details.
The instructor has primary responsibility for control over classroom behavior and maintenance of academic integrity. He/she can order temporary removal or exclusion from the classroom of any student engaged in disruptive conduct or in conduct which violates the general rules and regulations of the College.
Disruptive behavior in the classroom may be defined as, but is not limited to, behavior that obstructs or disrupts the learning environment (e.g., offensive language, harassment of students and professors, repeated outbursts from a student which disrupt the flow of instruction or prevent concentration on the subject taught, failure to cooperate in maintaining classroom decorum, etc.), the continued use of any electronic or other noise or light emitting device which disturbs others (e.g., disturbing noises from beepers, cell phones, palm pilots, lap-top computers, games, etc.).
Please be aware that children are not allowed in class or unattended on campus.

**Academic Dishonesty (Honor Code)**
Any form of academic dishonesty, cheating, plagiarizing, or other academic misconduct is prohibited. “Plagiarism may result from: (1) failing to cite quotations and borrowed ideas, (2) failing to enclose borrowed language in quotation marks, and (3) failing to put summaries and
paraphrases in your own words (A Writer’s Reference 331). Academic dishonesty may be defined as, but is not limited to, intentionally trying to deceive by claiming credit for the work of another person, using information from a web page or source without citing the reference, fraudulently using someone else’s work on an exam, paper, or assignment, recycling your own work from another course, purchasing papers or materials from another source and presenting them as your own, attempting to obtain exams/materials/assignments in advance of the date of administration by the instructor, impersonating someone else in a testing situation, providing confidential test information to someone else, submitting the same assignment in two different classes without requesting both instructor’s permission, allowing someone else to copy or use your work, using someone else’s work to complete your own, altering documents, transcripts or grades, and forging a faculty/staff member’s signature.

In addition to other possible disciplinary sanctions that may be imposed through regular college procedures as a result of academic dishonesty the instructor has the authority to assign an “F” or a “Zero” for the exercise, paper, or examination or to assign an “F” for the course. Students may appeal through the appropriate college grade appeal procedures.

Inclement Weather Policy

In the event of an inclement weather event, check the Nashville State web site home page at www.nscc.edu for announcements on campus closures. Campus closures will also be announced on local television stations (channels 2, 4, 5, and 17).

When classes are cancelled, an online assignment will be posted in NS Online. Check your NS Online email for a message from your instructor regarding your online assignment requirements. Even though classes may be cancelled, some areas, i.e. Testing Center, may be open. However, you should check before commuting to campus.

The Vice President for Academic Affairs and the Director of Security are responsible for cancellation decisions during an inclement weather event for the Nashville State main campus and the Southeast campus. Cookeville, Waverly, and Dickson Campus Directors will make class cancellation decisions based on conditions in their respective areas. Decisions about class cancellations are based on actual conditions, not forecasts. The perspective used for making decisions is that of the college as an employer, not as a K-12 institution. Students should use their own best judgment in determining whether to report to campus during inclement weather when classes are not cancelled.

NOTE: This syllabus is meant simply as a guide and overview of the course. Some items are subject to change or may be revised at the instructor’s discretion. Each instructor will further clarify their criteria for grading, classroom procedures, attendance, exams and dates, etc. on his/her course syllabus.