This course provides an overview of solid-state electronics from basic components to advanced circuit analysis. Topics include diodes, bipolar transistor, field effect transistor (FET), thyristor, amplifiers and application of the operational amplifiers.

**Prerequisites:** MTH 099, and EET 100, or permission of the department head.

**Textbook:**

**Course objectives:** Listed below are course objectives and associated learning outcomes:

<table>
<thead>
<tr>
<th>Course Objectives</th>
<th>Assessment Goals</th>
<th>Assessment Strategies</th>
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<tbody>
<tr>
<td>1. Describe the concept of atomic structure, bonding, drift and diffusion current. <em>(GEO 3)</em></td>
<td>Define doping and explain how n-type and p-type semiconductors are formed. Define forward and reverse bias and state the required conditions. Discuss the effect of barrier potential on forward bias semiconductor junction.</td>
<td>Exam questions, quizzes, and graded lab exercises.</td>
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<td>2. Describe the structure of the P-N junction and current flow in a diode. <em>(GEO 3)</em></td>
<td>Discuss the bias of a diode and test a diode using a digital multimeter. Analyze the voltage-current (V-I) characteristic curve of a diode. Identify a properly functioning diode and a faulty diode.</td>
<td>Exam questions, quizzes, and graded lab exercises.</td>
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</table>
| 3. Analyze and explain the operation of half-wave, full wave rectifier and other type diode circuits. *(GEO 3)* | Construct full-wave rectifier circuit, perform various measurements and computations.  Test a zener regulator circuit for the effect of changing source and load.  Use an oscilloscope to plot the characteristic curve of a diode.  Assessment Strategy: Exam questions, quizzes and homework. | Exam questions, quizzes, and graded lab exercises  
**Test 1** 2/9 |
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<td>4. Apply concepts of semiconductors to explain controlled conduction. <em>(GEO 3)</em></td>
<td>Explain how a photodiode detects light and analyze the response curve of a photodiode.  Interpret a varactor diode datasheet, and discuss how capacitance of the diode varies with reverse-bias Voltage.  Discuss transistor parameters and characteristics and use these to analyze a transistor circuit.  Describe the construction and basic operation of the clipping and clamping circuits.</td>
<td>Exam questions, quizzes, and graded lab exercises</td>
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| 5. Use transistor, their characteristics and applications. *(GEO 3)* | Build amplifier, compute and measure the dc and ac parameters.  Predict and test the effects of certain faults in an amplifier.  Analyze base, emitter, collector-feedback, voltage-divider bias circuits. | Exam questions, quizzes, and graded lab exercises  
**Test 2** 3/23 |
| 6. Describe the operation of the following amplifiers: Class A, B, C, and push-pull. *(GEO 3)* | Calculate and measure the dc and ac parameters for multistage class A power amplifier.  Construct a push-pull amplifier driven by a common-emitter voltage amplifier and measure performance characteristics of circuit constructed. | Exam questions, quizzes, and graded lab exercises. |
| 7. Explain the operation of the operational and FET amplifier circuits. *(GEO 3)* | Analyze a self-biased and voltage divider bias JFET, and discuss Q-point stability.  Explain the depletion and enhancement mode MOSFET and how D-MOSFET and E-MOSFET Differ.  Discuss the basic op-amp, op-amp mode, and several parameters. | Exam questions, quizzes, and graded lab exercises. |
8. Describe the operation of optoelectronic device.
[GEO 3]

- Describe phototransistor and its operation, and explain how the base current is produced.
- Describe various types of optical couplers.
- Compare LASCR to conventional SCR.

Exam questions, quizzes, and graded lab exercises

Test 3  4/18

COURSE GUIDELINES
The course will be 2 hours lecture and 2 hours laboratory per week.

Tentative Schedule

<table>
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<tr>
<th>Week</th>
<th>Chapters</th>
<th>All assignments due on</th>
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<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>02/02</td>
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<tr>
<td>2</td>
<td>2</td>
<td>02/09</td>
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<tr>
<td>3</td>
<td>3</td>
<td>02/16</td>
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<td>4,5</td>
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<td>02/23</td>
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<td>6,7</td>
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<td>03/02</td>
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<td>8</td>
<td>6</td>
<td>03/14</td>
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<td>9,10</td>
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<td>03/23</td>
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<tr>
<td>11,12</td>
<td>8</td>
<td>04/06</td>
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<tr>
<td>13</td>
<td>Review</td>
<td>04/13</td>
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Electronic Literacy Assignment

An Electronic library research paper exploring some aspect of Electronic Circuits will be required with the following minimum requirements: Reference from The electronic library database collection. Due week 12: Cover page with name, title and date; body with Introduction, report and summary. The paper shall be not less than three full pages, and a bibliography from the electronic library database page with a minimum of four total references. The grading rubric for the paper:

- Cover Page: 5%
- Report:
  - Grammar 10%
  - Style 20%
  - Organization 30%
  - Content 10%
  - Show evidence in development of this ELA of thinking critically and reasoning logically 10%
- Bibliography: 15%
- TOTAL 100%
COURSE EVALUATION
The grade will be based on 1000 points which will be divided as follows:

- Electronic Library database Assignment = 50 points
- Class Preparation & Participation = 50 points
- Monthly Quizzes = 450 points
- Competency = 100 points
- Comprehensive Final Exam = 200 points
- Laboratory Exercises = 150 points
- TOTAL 1,000 points

Letter grade will be assigned as follows: A = 900-1000 points, B = 800-899 points, C = 700-799 points, D = 600-699 points, F - Less than 600 points

ACADEMIC HONESTY POLICY:
Students are required to maintain a high level of academic performance. All work submitted to the instructor will be regarded as the work of the student taking the course. Cheating and plagiarism are defined in Wor-Wic’s Student Conduct Policy found in the College Catalog. Infractions of this policy will result in disciplinary action including failure of the assignment, test, or the course.

EMERGENCY INFORMATION STATEMENT
In the event of severe inclement weather or other emergency, information about the closing of the college will be communicated via e2Campus and the College's website. Faculty will communicate with students about their courses and course requirements, such as assignments, quiz and exam dates, and class and grading policies, via Blackboard. Students will be responsible for completing all assignments in accordance with class policies.

SERVICES FOR STUDENTS WITH DISABILITIES
Wor-Wic provides reasonable accommodations for students with disabilities, in compliance with the Americans with Disabilities Act of 1990 and Section 504 of the Rehabilitation Act of 1973. If you are in need of accommodations, please contact the counseling office at (410) 334-2899. For more information, see Wor-Wic's Services for Students with Disabilities web page.

SEXUAL VIOLENCE DISCLOSURES
Wor-Wic Community College seeks a campus free of sexual violence which includes sexual harassment, domestic violence, dating violence, stalking, and/or any form of sex or gender discrimination. Please be aware that if a student discloses a personal experience verbally or in writing as a Wor-Wic student to a faculty or staff member, the employee cannot maintain confidentiality and has the mandatory responsibility to notify one of the college’s Title IX coordinators. However, if you’d like to make a confidential disclosure of any such violence, you can contact Wor-Wic’s director of counseling (X-2900) or you can contact the Life Crisis Center at 410-749-HELP or 2-1-1

STATEMENT CONCERNING USE OF BLACKBOARD IN COURSE:
Blackboard is being used as a supplementary site in this course. To access course content in Blackboard you need to have access to Internet connection, (other requirements may apply). Computers that meet these requirements are available on campus in BH 217, HH 100, GH 204, FOH 305, and AHB 108.

Please follow these directions to access course syllabi and any other materials posted for this course:
Login Information:
From Wor Wic home page, point to “Quick Links” (top right) and click the “Blackboard Login” link. Enter your Wor-Wic user ID and password (same as your Wor-Wic email user ID and password). Don’t know your user ID or password? Contact Student Services.
STATEMENT CONCERNING USE OF ACADEMIC INTEGRITY AND COMPUTER USAGE POLICY:

All students logging into Blackboard affirm that they understand and agree to follow Wor-Wic Community College policies regarding academic integrity and the use of College resources as described in the college catalog. Wor-Wic Community College considers the following as violations of the computer usage policy:

- Using the campus computing network and facilities to violate the privacy of other individuals.
- Sharing of account passwords with friends, family members or any unauthorized individuals
- Violators are subject to college disciplinary procedures.

Grading Rubric

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>F</th>
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<tbody>
<tr>
<td>Practical</td>
<td>Each assignment demonstrates an understanding of the objective. The correct use of commands and syntax is evident. Assignments always meet and exceed stated requirements.</td>
<td>Most assignments demonstrate an understanding of the objective. The correct use of commands and syntax is evident. Assignments meet and usually exceed stated requirements.</td>
<td>Some assignments demonstrate an understanding of the objective. The correct use of commands and syntax is usually evident. Assignments meet the stated requirements.</td>
<td>Assignments incomplete or missing. Shows little or no effort in assigned work. Assignment does not meet stated requirements.</td>
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<tr>
<td>(Use of technology to obtain information GEO 7)</td>
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<td>Theory</td>
<td>Each of the problems/answers is accurate and demonstrates understanding of the objective. Well formatted and saved in the appropriate file format. Work always exceeds stated requirements</td>
<td>Most of the problems/answers are accurate and demonstrates understanding of the objective. Well formatted and saved in the appropriate file format. Work usually exceeds stated requirements</td>
<td>Some of the problems/answers usually show no understanding of the objective. Work does not meet the stated requirements.</td>
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