



COURSE OUTLINE : ECT 201
D Credit – Degree Applicable
COURSE ID 001450
Cyclical Review: September 2020

COURSE DISCIPLINE : ECT
COURSE NUMBER : 201
COURSE TITLE (FULL) : Solid State Devices
COURSE TITLE (SHORT) : Solid State Devices

CATALOG DESCRIPTION

ECT 201 encompasses the study of Solid-State semiconductor theory, including diode rectifiers, filtered power supplies, transistor and amplifiers, oscillators, and thyristor devices. Students also construct solid-state circuits, and perform circuit analysis and diagnostics of electronic parameters using state-of-the-art digital electronic test equipment.

Total Lecture Units: 3.00

Total Laboratory Units: 0.00

Total Course Units: 3.00

Total Lecture Hours: 54.00

Total Laboratory Hours: 0.00

Total Laboratory Hours To Be Arranged:0.00

Total Contact Hours: 54.00

Total Out-of-Class Hours: 108.00

Prerequisite: ECT 110 or equivalent (ECT 110 may be taken concurrently). Recommended Preparation: ENGL 100 or ESL 141.



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ENTRY STANDARDS

	Subject	Number	Title	Description	Include
1	ECT	110	Electricity and Electronics Principles	Describe basic laboratory equipment and components;	Yes
2	ECT	110	Electricity and Electronics Principles	determine the value of resistors from their color code, measure DC (Direct Current) and AC (Alternating Current) voltage;	Yes
3	ECT	110	Electricity and Electronics Principles	identify conductors and insulators, and test common types of switches;	Yes
4	ECT	110	Electricity and Electronics Principles	measure current in a circuit, verify ohms law, investigate errors in measurement;	Yes
5	ECT	110	Electricity and Electronics Principles	design a series and parallel circuit that will meet specified resistance requirements;	Yes
6	ECT	110	Electricity and Electronics Principles	develop a general rule for calculating the voltage across each resistor in an unloaded and loaded resistive voltage divider;	Yes
7	ECT	110	Electricity and Electronics Principles	develop methods of troubleshooting circuits using voltage, current, capacitor and resistance measurements;	Yes
8	ECT	110	Electricity and Electronics Principles	identify the operating controls of an oscilloscope;	Yes
9	ECT	110	Electricity and Electronics Principles	identify the controls and features of an audio frequency generator;	Yes
10	ECT	110	Electricity and Electronics Principles	describe the effect of AC and DC electrical motors and inductance;	Yes
11	ECT	110	Electricity and Electronics Principles	identify and measure affect transformers and magnetic relays and contactors.	Yes
12	ENGL	100	Writing Workshop	write a summary of a contemporary article or story with correct citation techniques;	Yes
13	ENGL	100	Writing Workshop	write compositions (e.g., summaries and argumentative essays) that are easy to read and follow, though some errors in grammar, mechanics, spelling, or diction may exist;	Yes



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14	ESL	141	Grammar and Writing IV	<p>compose a 400 to 450-word thesis-based essay which:</p> <p>(a) summarizes and cites appropriately a reading passage provided as a prompt,</p> <p>(b) includes a clear thesis statement,</p> <p>(c) uses evidence to support the thesis,</p> <p>(d) shows clear organization into an introduction, body, and conclusion, and</p> <p>(e) uses appropriate rhetorical modes such as comparison/contrast, cause/effect, and persuasion in order to support a thesis.</p>	Yes
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EXIT STANDARDS

- 1 Construct solid-state diode and transistor circuits, using appropriate circuit components and properly following schematic diagrams;
- 2 use proper electronics test equipment to evaluate and apply measurement results in circuit diagnostics and repairs;
- 3 develop and run diagnostic programs in BASIC, FORTRAN, or PASCAL that will analyze solidstate circuit parameters;
demonstrate critical thinking skills by attaining satisfactory scores on examination procedures
- 4 solving problems in semiconductor theory and analyzing solid-state circuit theorems and concepts.

STUDENT LEARNING OUTCOMES

- 1 design appropriate circuits using solid state devices and following schematics and diagrams
- 2 analyze and troubleshoot complex solid-state diodes, and transistor circuits
- 3 demonstrate skillful use of electronic testing equipment to analyze and troubleshoot circuit defects

COURSE CONTENT WITH INSTRUCTIONAL HOURS

	Description	Lecture	Lab	Total Hours
1	Semiconductor Theory <ul style="list-style-type: none"> • Atomic structure • Crystalline P-N Material • Semiconductor current 	2	0	2



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2	<p>The PN Junction Diode</p> <ul style="list-style-type: none"> • PB junction barrier • Forward-reverse bias • PN diode characteristics 	3	0	3
3	<p>Junction Diode Circuits</p> <ul style="list-style-type: none"> • Rectifiers • Regulated power supplies • Special diode devices 	3	0	3
4	<p>Bipolar Junction Transistors (BJT)</p> <ul style="list-style-type: none"> • BJT construction • PNP-NPN configurations • Static transistor characteristics 	3	0	3
5	<p>BJT Configurations</p> <ul style="list-style-type: none"> • Common emitter • Common collector (emitter follower) • Common base 	3	0	3
6	<p>BJT Dynamic Applications</p> <ul style="list-style-type: none"> • Gain analysis • Impedance matching • Frequency response 	3	0	3
7	<p>BJT Amplifier Circuits</p> <ul style="list-style-type: none"> • Small signal amplifiers • Large signal amplifiers • Tuned amplifiers 	4	0	4
8	<p>Introduction to Field-Effect Transistors (FET)</p> <ul style="list-style-type: none"> • Field effect construction • Junction FET (JFET) • Metal Oxide Semiconductor FET (MOSFET) 	4	0	4
9	<p>FET Biasing</p> <ul style="list-style-type: none"> • Characteristic curves • JFET transfer characteristics • Biasing circuits 	4	0	4
10	<p>FET Amplifier Circuits (3 hours)</p> <ul style="list-style-type: none"> • JFET configurations • Dynamic FET amplifier analysis • Enhancement-Depletion Mode MOSFET 	4	0	4



11	Power Amplifiers <ul style="list-style-type: none"> • Amplifiers classes • Power amplifiers characteristics • Symmetrical amplifiers 	4	0	4
12	Feedback Amplifiers <ul style="list-style-type: none"> • Feedback concepts • Negative Feedback • Amplifier Circuits • Positive feedback 	3	0	3
13	Introduction to Oscillators <ul style="list-style-type: none"> • Oscillation criteria • Phase-Shift Oscillators • The Hartley • Oscillator Principles 	3	0	3
14	Oscillator Circuits <ul style="list-style-type: none"> • Low frequency oscillators • Crystal Controlled Oscillator Circuits • Multivibrators 	3	0	3
15	Thyristor Devices <ul style="list-style-type: none"> • Unijunction transistor • Silicon Controlled Rectifier (SCR) • DIAC-TRIAC Circuits 	3	0	3
16	Wave Shaping Circuits <ul style="list-style-type: none"> • Clipping circuits • Clamping circuits • Differentiation circuits 	3	0	3
17	BJT Biasing <ul style="list-style-type: none"> • Characteristic curves • Load lines • Designing bias components 	2	0	2
				54

OUT OF CLASS ASSIGNMENTS

- 1 problems (e.g. solve applied electronics circuit analyses);
- 2 final project (e.g. design voltage dividers and BJT amplifier).



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METHODS OF EVALUATION

- 1 quizzes
- 2 examination at the end of each instruction module
- 3 final project
- 4 final examination

METHODS OF INSTRUCTION

- Lecture
- Laboratory
- Studio
- Discussion
- Multimedia
- Tutorial
- Independent Study
- Collaboratory Learning
- Demonstration
- Field Activities (Trips)
- Guest Speakers
- Presentations

TEXTBOOKS

Title	Type	Publisher	Edition	Medium	Author	ISBN	Date
Electronic Devices (Conventional Current Version)	Required	Pearson Education, Inc.	10	print	Floyd, Thomas L.	978-0134414447	2018
Electronic Devices (Conventional Current Version)	Supplemental	Pearson Education, Inc.	10	digital	Floyd, Thomas L.	978-0134414546	2018



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