



Course Syllabus

Course #: EET-1360 **Course Name:** Power Electronics

Division: Engineering and Industrial Technologies

Class Days:

Class Time:

Location: Classroom:

Laboratory:

Credit Hours: 3

Contact Hours: 4

Lab Hours: 2

Lecture Hours: 2

Instructor: _____

Office Location:

Phone: _____

Email Address: _____

Office Hours: TBD

Division Office/Location: Engineering Building **Division Fax:** 419-334-2300

Full-time Contact Person: Jayne Bowersox

Phone(s): (419) 559-2410

(800)334-3886 ext 410

Course Description: A study of power electronic devices and circuits as they apply to power circuits such as power diodes, SCR's Triacs, power transistors, and IGBT (insulated gate bipolar transistors) as they are used in power supplies, AC and DC motor speed drives, and different types of amplifiers that are used in servo and stepper motors. A variety of circuits such as op amp circuits, opto coupled circuits and amplifier circuits will be studied as they apply to PLC modules and other industrial circuits.

Prerequisite(s): EET 1050 Electricity I

Corequisite(s): None

Entry Level Skills and Knowledge:

A working knowledge of the fundamentals of electricity

Required Texts, Supplies and Equipment:

Text : Industrial Electronics - Thomas E. Kissell, Third Edition

Laboratory Manual to accompany Industrial Electronics -
Thomas E. Kissell, Third Edition

Materials: Safety glasses,
wire strippers for 22 gauge wire,
wire cutters
small needle nose pliers

Grading:

Test 1
Test 2
Lab Test 1
Lab Test 2
Completion of all labs
Final

Grading:

100 - 90 = A
89 - 80 = B
79 - 70 = C
69 - 60 = D
59 - 0 = F

Learning Outcomes:

1. Identify common industrial solid-state components on an electronic schematic.
2. Become familiar with the operation and characteristics of single phase and three phase rectifiers.
3. Understand the characteristics, parameters and operation of a Bipolar Transistor.
4. Understand the operation, characteristics and applications and troubleshoot for the SCR and UJT, Power Transistor.
5. Understand the operation, characteristics and applications for the Triac and Diac.
6. Understand the function of the power and control sections of a power control circuits.
7. Utilize the oscilloscope to make measurements of conduction angles, timing pulses and troubleshooting in solid-state circuits.
8. Explain the operation and characteristics of operational amplifiers.
9. Explain the type of output you would get from an operational amplifier depending on the circuit.

Assessment of Student Learning:

Assessment Project and Measurement in course (if any):

Plan of Work:

<u>Week</u>	<u>READING</u>	<u>ACTIVITY</u>
Terra Community College Syllabus		

Week 1	Pgs. 191-194 of EET-105 Book	Overview of course and review of basic circuits Introduction to solid state and PN junction
Week 2	Pgs. 249-251 Pgs. 252-253	Half wave rectifiers Full wave center tap rectifiers
Week 3	Pgs. 253-255	Full wave bridge rectifier Filtered power supplies
Week 4	Pgs. 260-261 Pgs. 255-260	Zener Diodes Three phase rectifiers
Week 5	Written Test 1 and Lab Test 1	
Week 6,7	Pgs. 166-174	Transistors
Week 8	Pgs. 166-174	Power transistors
Week 9	Pgs. 144-158 Pgs 160-166	Silicon controlled rectifiers TRIACS
Week 10	Pgs. 179-188 Pgs. 189-199	UJTs DIACS Other triggering devices
Week 11	Written Test 2 and Lab Test 2	
Week 12	Pgs. 204-224	Photo electronics (LEDs)
Week 13	Pgs. 225-230	Solid state relays
Week 14	Pgs. 286-292	Operational amplifiers, comparators
Week 15	Pgs. 292-296	Operational amplifiers: inverting, non-inverting
Week 16	FINAL	

Labs:

	Lab #	
Week 1	8	From EET105, Oscilloscope operation
	13.	Testing Semiconductor Diodes
Week 2	22.	Half- Wave, Full-Wave and Bridge Rectifiers

Week 3	23.	Filtered Bridge Rectifier, Zener Diode Regulator (Shunt Regulator)
Week 4	24.	3 phase Bridge Rectifier
Week 5		Test 1 and Lab Test 1
Week 6	14.	Transistor Identification and testing
Week 7	15.	Power Transistors (operation and testing transistor blocks)
Week 8	16.	Silicon Controlled Rectifier (SCRs) (operation and testing the SCR)
Week 9	17.	TRIACs (operation and testing the TRIAC)
Week 10	18.	UJTs and other triggers (the relaxation oscillator)
Week 11		Test 2 and Lab Test 2
Week 12	21.	Solid state relays (operation and testing of SSR)
Week 13	25	Operational Amplifier, Comparator
Week 14	26	Operational Amplifier, Inverting and Non-Inverting
Week 15	27	Operational Amplifier with Transducers
Week 16		Final

Course Requirements:

Complete all assignments as required

Policies

Course Withdrawing: If for any reason you need to withdraw from this course, be certain that you do so according to College procedure. It is your responsibility to know and follow this procedure. If you simply stop coming to class, without officially withdrawing from the course, your grade is an automatic "F." Please follow official College procedure for withdrawing from this or any course.

College Academic Policies are located in the College Catalog. A copy of the current catalog may be picked up in any of the division offices or admissions. The list of college policies is also available online at <https://www.terra.edu/register/Collegecat/policies.asp>.

Support Services: The College offers a number of support services to assist in your success in this course and all courses. Among these services are the Writing & Math Center in B105, the Office of Learning Support Services, which coordinates the campus disability services and tutoring programs, the computer labs, and the computers in the atriums.

Any student who feels he/she may need an accommodation based on the documentation of a disability should contact the Office of Learning Support Services privately to discuss his/her specific issues. Please contact the OLSS at (419) 334-8400 X 208 or visit 100 Roy Klay Hall (Building A) to coordinate reasonable accommodations.

If you have a documented disability and are receiving academic accommodations through the Office of Learning Support Services, please schedule a meeting with your instructor in a timely manner so that we may discuss how these services will be arranged.

Tutoring services are available to students beginning the second week of every quarter. Students requesting tutoring services should obtain a tutor request form from the OLSS in 100 Roy Klay Hall (Building A) or online at the Terra website. Please note that instructor verification and acceptance of the Student Learner Agreement is necessary for all tutoring requests. All requests should be submitted to 100 Roy Klay Hall (Building A).