

**Springfield Technical Community College**  
School of Science, Technology, Engineering & Math  
Department of Electrical Engineering Technology  
Course Syllabus

**Course Title:** Solid State Electronics  
**Course Credits:** 2 cr. Lecture, 1 cr. Lab

**Course Number:** EET-200 & 200L  
**Semester:** Fall 2019

**Professor:** Rick Jagodowski

**Meeting Times:** Lecture T.Th. 8:30-9:20; Lab-D01 T. 9:30-12:00; Lab-D02 Th. 9:30-12:00.  
Lab-D03 W. 1:35-4:05

**Meeting Locations:** Lecture: Bldg. 20 Rm. M118, Lab: Bldg. 20 Rm. M115.

**Course Description:** Industrial electronics is changing faster than ever because of the rapid changes in the electronics field. Large discrete solid state electronic devices with an emphasis on solid-state devices as they relate to specific applications are studied. Each device will have associated with it a laboratory exercise in order to provide a better understanding of the material at hand. Some of the topics covered will include diodes, diode applications, transistor switches, field effect transistors, DC biasing, switching circuits, thyristors, and voltage regulators.

**PRE-REQUISITES:** EET-111 & MAT-124 or permission of Department Chair.

**CO-REQUISITE:** EET-200L

### **Student Learning Outcomes (SLO's)**

*Upon successful completion of this course, students will be able to:*

- understand common two layer semiconductor devices (ex: diodes) & their applications..
- understand common three layer semiconductor devices (ex: transistors) & their applications.
- understand common four layer semiconductor devices (ex: thyristors) & their applications.
- understand how these solid state components can be interfaced to other control circuits.
- have the ability to read and create schematic diagrams.
- use appropriate conduct in professional environments.
- apply the skills necessary for technicians in the electrical and electronics industry.
- use professional written and oral communication skills.

### **Text & Materials:**

There is no required text or lab manual for this course. The majority of course content will be presented using web-links, handouts & pdfs, simulations and other relevant information. You may find the latter chapters in your Electric Circuits 2 text to be helpful with fundamental concepts. Lab exercises will be provided by your instructor. Most of this material will be posted on the Forums at [cset.stcc.edu/forums/](https://cset.stcc.edu/forums/). Within the first two weeks of classes you will create an account and be required to use the Forums throughout the semester. Students should regularly check these Forums for current materials for EET-200 and EET-200L. You MUST bring your own DMM to each lab session. Do not expect one to be available for your use. If you don't have one, ask your instructor for recommendations. In addition, you must have at least one USB Flash Drive in which to store your files. You will use this flash drive to record screen-shots and other data measured with your oscilloscope. It is recommended that you have two such flash drives and get into the habit of keeping them backed up.

## Office Hours:

**R. Jagodowski:** Bldg. 20 Rm. 120. Office hours posted on the door.

E-mail: [Jagodowski@stcc.edu](mailto:Jagodowski@stcc.edu) Phone: (413) 755-4594

## Grading Policy

**\* Attendance:** Attendance is mandatory. Students absent from more than 3 classes may be removed from the class at the professor's discretion. It is the student's responsibility to make arrangements to make up any missed work. Missed work may only be made up if the professor allows. The schedule for any make up work will be at the instructor's discretion. If the student knows in advance he or she may not be in lecture it is the student's responsibility to notify the professor in advance. Attendance will be taken at each lecture & lab session. Be sure to sign in or follow the lab instructor's guidelines to properly record your attendance.

**\* Professionalism:** The "Professionalism" portion of the grade may be reduced due to being late to the class, "fooling around", inappropriate language or conduct in or out of class and lab, being a disruption to the educational process, having non-course related conversations during lecture/lab, or similar violations of the course rules & policies. During exams and quizzes we do not allow the use of cell phones or any device with wireless, infrared or similar communications capability.

**\* Policy on course disruptions:** Students are expected to act in a respectful and mature manner. Course disruptions, loud or disruptive behavior, intimidation, violation of the policies and procedures set down in the STCC Student Handbook, or similar problems will result in the student being removed from the lab or lecture.

Be sure to turn off all cell phones or other electronic devices before entering the lecture or lab. In many cases the professors allow cell phones during lab but not while lectures are in process. Talking, texting or causing disruptions while lecture is in process is also considered disruptive. At the professor's discretion he or she may attempt to correct the student's behavior or remove the student from the class if a student cannot responsibly use their cell phone during class & lab times.

The following is the STCC Code of Conduct from [www.stcc.edu](http://www.stcc.edu):

*"Springfield Technical Community College recognizes that all students, as members of the college community, enjoy the freedom of speech and assembly, freedom of association, freedom of the press, right of petition and the right of due process. These rights do not come without responsibilities and respect for others in the College community. Attendance at the College is a privilege and not a right, and enrollment carries with it obligations in regard to conduct, both in and out of class. Students are responsible for knowing and understanding the contents of this Code. Students are responsible for abiding by the laws governing the College and are expected to observe standards of conduct set by the College."*

**\* Professional behavior:** Students are expected to act in a professional and mature manner at all times, in and out of class and lab. Improper behavior will result in a reduced grade and if not corrected may result in removal from the course.

**\* Due Dates:** Late work may be depreciated by 25% every week or part of a week it is late. Solutions to homework and labs may be distributed. Once the solution is distributed no further homework will be accepted. It is the student's responsibility to be aware of all work assigned and the due dates.

**\* Quality:** Submission of poor quality work will not be accepted. Submissions which do not meet minimum documentation standards set forth in class, are incoherent, or are illegible will be returned [not graded] to the student. These cases are treated as if no work was submitted.

**\* Academic Honesty:** All students are assumed to do their own work. Using other's work is permitted, under some circumstances, with proper credit to the original author(s). Academic dishonesty of any manner is not tolerated. In the event it is discovered by the professor ALL PARTIES INVOLVED receive a grade of "F" [0.0]. No distinction is made between those "cheating" and those being "cheated from". If a student believes his/her work is being borrowed without consent it is her/his responsibility to report the incident. This is the only means to escape the consequences. All incidents are examined on a case-by-case basis by the professor whose decision is final.

**\*Homework:** Homework problems will be assigned frequently. Students are encouraged to keep their completed homework assignments in a notebook. The homework notebook may be collected at mid-semester and/or final exam time. Many of the homework problems will also be part of the problems and circuits investigated in lab experiments.

**\*Quizzes:** Quizzes will be unannounced and given frequently. Quizzes will be based upon material covered in lecture or homework/lab assignments. There are no make-ups given for missed quizzes. The two lowest quiz grades will be dropped so that a missed quiz or two should not significantly effect your grade. Quizzes may be given in lecture and/or lab times.

**\*Exams:** There are two exams during the semester: a mid-semester exam and a comprehensive final exam. These exams may be in-class, take home or a combination. They may also consist of closed book & notes or open book & notes formats. Specifics for each exam will be given at least one week before the scheduled exam.

**\*Labs:** Lab experiments will be performed each week. Students are responsible for completing each assignment. Unless otherwise stated, lab experiments and reports should be completed and appropriate posts made on the CSET Forums within one week after they are assigned.

#### *Grade Evaluation:*

<b>Lecture:</b>	Professionalism:	20%	<b>Lab:</b>	Professionalism	20%
	Homework:	5%		Lab Experiments:	55%
	Quizzes:	25%		Research Skills	25%
	Exams (2):	50% (25% each)			

#### *Grade Determination:*

$$\text{Lecture grade} \times 0.70 + \text{Lab grade} \times 0.30 = \text{Final Common Course/Lab Grade}$$

**Please note:** You will receive a common grade for the lecture & lab portions calculated based upon the weights and formula given above.

#### **Class Organization**

The course is presented in a combination lecture/lab format. Relevant questions and discussion are encouraged. Presentations may include a combination of blackboard & chalk/whiteboard, computer based presentations (PowerPoint) & computer simulation. Labs will include hands-on activities making use of available test & assembly equipment as well as computers and software applications. Internet research will be required for numerous aspects of the course.

# Course Outline\*

<u>Week</u>	<u>Topic</u>
1	Introduction and overview of course
2	Review of Electronic Concepts, Conductors, Insulators and Semi-Conductors
3	The p-n junction: Diodes.
4	Diode Applications: Rectification (Half & Full Wave)
5	Diode Applications: Zener Diodes, LEDs, Laser Diodes, varactors, clippers & clampers.
6	Diode Applications: Special purpose diodes.
7	Introduction to BJTs (bipolar junction transistors, NPN, PNP).
***** <b>Mid-Semester Exam</b> *****	
8	BJT Applications - Amplifiers & Switches.
9	Introduction to FETs (Field Effect Transistors)
10	FET Applications – Amplifiers & Switches
11	Silicon Controlled Rectifiers & Thyristors
12	Special purpose semiconductor devices – UJT, DIACs, TRIACs
13	Multi-Stage Transistor Amplifiers
14	Power Conditioning
15	Advanced Topics
***** <b>Final Exam Exam</b> *****	

\*Note: The instructor reserves the right to modify the course outline as necessary to best serve the educational needs of the students.

**Lab Outline:** The lab portion of the course will include a combination of hands-on activities, research assignments & simulations to support the theories presented in the lecture each week. The exact activities & documentation will be announced and distributed prior to each scheduled lab period. Students should check the Forums at [cset.stcc.edu/forums/](http://cset.stcc.edu/forums/) for the latest lab information & schedule.

## Course Methodology and Philosophy

S.T.C.C. invests a considerable amount of resources into equipment for student and faculty use. As a member of the faculty, I will make use of all available teaching methods and tools. For lectures, most instruction will be a combination of Power Point and blackboard/whiteboard. Students are encouraged to actively participate by way of relevant questions and comments about the subject matter under discussion. It is my responsibility to make sure that the subject matter is presented in as clear a manner as possible. Your feedback is invaluable to my ability to accomplish this goal.

You, as the student, also have your share of responsibility:

**Attendance:** The scope of the material presented in this course is broad. Attendance is required to experience all the information as presented by the instructor. In addition, your input into the classroom discussion helps other students to better understand the material.

**Preparation:** It is your responsibility to complete all assignments, reading and written, in a timely manner. Thorough preparation will help instill greater confidence in the subject matter and will facilitate lively classroom discussions. Proper preparation for quizzes and tests is also expected.

**Attitude and Behavior:** It is your responsibility to make sure that your contributions to this course, and your attitude toward the people around you, are positive. Foul language and disruptive behavior will not be tolerated in this course. In addition, school property must be treated with respect at all times. This is especially true in laboratories. If you do not understand how to use a particular piece of equipment, you are encouraged to ask for assistance. You should report malfunctioning equipment immediately. Always return equipment and components to their proper locations. Leave your study or work area clean and neat for the next student.

### Students with Special Needs

Any student who feels s/he may need an accommodation based on the impact of a disability should contact the instructor privately to discuss your specific needs. Before any accommodations are put in place, you must contact the Office of Disability Services at 755-4785 or stop by Building 19 Room 141 to coordinate reasonable accommodations for students with documented disabilities. <https://www.stcc.edu/resources/academic-support/ods/>