

Springfield Technical Community College
School of Engineering Technologies
Department of Electrical Engineering Technology
Course Syllabus

Course Title: Digital and Linear Circuits
Course Credits: 2 cr. Lecture, 1 cr. lab
Date: Fall 2016

Course Number: EET-210 & 210L
Lecture Professor: Rick Jagodowski
Lab Professor: Rick Jagodowski

Course Description: The goal of this course is to provide comprehensive and practical coverage of linear integrated circuits, digital circuits and applications. The extensive troubleshooting coverage and innovative system application serve as very important and necessary links between theory and the real world. It progresses from the fundamental circuit building blocks through to analog/digital conversion systems. The course is divided into two basic parts. The first part of this course will cover the fundamentals of digital circuits. The second part will be devoted to linear integrated circuits with considerable emphasis on the operational amplifier.

PRE-REQUISITES: EET-111 & MAT-124 (formerly ELEC-210 & MATH-132) or permission of Department Chair.

CO-REQUISITE: EET-210L

Course Objectives:

1. Understand common linear integrated circuits and their applications.
2. Understand common digital integrated circuits and their applications.
3. Understand the basic theories and applications of common analog-to-digital (ADC) and digital-to-analog converters (DAC).
4. Understand how the circuits studied are incorporated in modern control systems.
5. The ability to read and create schematic diagrams.
6. Reinforce professional conduct in lecture and laboratory environments.
7. Develop “hands-on” skills necessary for technicians in the electrical and electronics industry.
8. Develop professional written and oral communication skills.

Text(s) & Materials:

There is no assigned text or lab manual for this course. Course materials will consist of handouts, web-links, pdfs, simulations and other relevant information. Most of this material will be posted on the 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 the Forums at cset.stcc.edu/forums/ for current materials for this course & lab. You should bring your own DMM (digital multimeter) to each lab session. 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 program files. It is recommended that you have two so that your file data is always backed up.

Office Hours:

R. Jagodowski: Bldg. 20 Rm. 120. Office hours posted on the door.
E-mail: 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.

* **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.

* **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 lab.

***Exams:** There are three exams during the semester: a mid-semester exam, and end of the 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 submitted one week after they are assigned.

Grade Evaluation:

Lecture:	Professionalism:	20%	Lab:	Professionalism	20%
	Homework:	5%		Lab Experiments/Reports:	55%
	Quizzes:	20%		Research Skills	25%
	Exams (2):	30% (15% each)			
	Final Exam:	25%			

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, computer based presentations (PowerPoint) & computer simulations. Labs will include hands-on activities making use of available test & assembly equipment as well as computers and software applications. Internet access and research will be required for numerous aspects of the course.

Course Outline*

Week	Topic
1	Introduction and overview of course
	Introduction to Digital Electronics – Binary, Octal, Hexadecimal
2	Basic Logic Functions, Gates, Truth Tables
3	Combinational Logic Fundamentals, Multiplexers(MUX)/DeMultiplexers(DMUX)
4	Encoders/Decoders/Adders/Comparators
5	Sequential Logic – Latches, Flip-Flops, Registers, Counters, State Machines
6	Analog to Digital (ADC) & Digital to Analog (DAC) Converters
7	PLDs, PLA's, PICs, ASIC's
	***** Mid-Semester Exam *****
8	Review of Analog Electronics Fundamentals/Intro to Operational Amplifiers
9	Operational Amplifiers – Inverting/Non-Inverting Amplifiers (Op Amps)
10	Operational Amplifiers – Op-Amp Applications
11	Operational Amplifiers – Op-Amp Applications, Ideal & Practical Limitations & Considerations
12	Differential and Instrumentation Amplifiers
13	555 Timer/PLLs/Amplifiers/Filters
14	Interface Circuits & Drivers
	***** End of Semester Exam *****
15	Advanced Digital & Analog Applications
	***** Final Exam Exam *****

*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/ 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 should contact the Office of Disability Services at 755-4785 or stop by Building 27/2nd Floor to coordinate reasonable accommodations for students with documented disabilities.