

Course Title: EE 184 Electronic Design Project
Class Information: Spring 2020
Class time: Lecture 1:15-2:30 T Lafayette L111
Lab A01:10:05-12:55 T Lab A02:10:05-12:55 Votey 334
Instructor Information: Instructor: Dr. James Kay Votey 373
Phone: (802) 656-0734
jkay@uvm.edu

Teaching Assistant: Wenzhe Chen (Wenzhe.Chen@uvm.edu)
Office Hours (Votey 373): Monday 3:30 to 4:30 Thursday 4:15 to 5:15

Prerequisite: EE 183
Course Description: Requirements based analog and digital circuit design. Specification, design, analysis, construction and test of 4 design projects. Introduction to circuit card assembly design techniques.

Course Objectives:

1. Understand and implement a requirements based design flow.
2. Gain experience in creating physical circuit and system realizations of specified functionality.
3. Develop skill in communicating technical ideas and issues through written reports, and verbal presentations.

Course Culture: Respect yourself and all others. I can't work on a problem or issue with the class if I do not know about it, so please let me know of any issues that come up.

References: D. Neamen, *Microelectronics, circuit analysis and design*, McGraw Hill, 2010
Gray and Searle, *Electronic Principles, Physics, Models, and Circuits*, John Wiley and Sons, 1969 (available online at [webarchive](#))
Online manufacturer datasheets (critical to good designs)
Course Blackboard site

Grading:

Project 1	20%
Project 2	20%
Project 3	30%
Project 4 or Final Project	30%

Note: In the most recent term project 3 took longer than 4 weeks so the scope of the final project was reduced. If a similar situation occurs this year the project weighting will be updated to reflect the change in scope of the projects
Note: A passing grade will not be received unless a student receives a passing grade of each of the projects.

Late submittals of deliverables will not be accepted unless prior arrangements are made with the instructor. In general late reports will not be approved except in extenuating circumstances. However, one report may be resubmitted during the term if it was originally submitted on time. The resubmittal must be within 2 weeks of the date at which the report was returned graded to the student. If a report is resubmitted the grade for that report will be the weighted average of the two submittals with a weighting of 75% given to the best submittal, and 25% to the other submittal.

Report Format: The required report format is posted on the Blackboard site for this course.

Final Project: Student teams will select their own final project, subject to TA and instructor approval. Final projects may build upon or extend any of the other 3 projects, or be entirely new. Some suggested final projects are:

Linear Power Supply
Curve Tracer
Precision capacitance or impedance measurement meter
IR transmitter/receiver with modulated signals
Function generator
Sound activated guided robotic car
Multi-stage amplifier (Good if you are interested in advanced analog design)

Topics (Tentative, projects 3 and 4 are subject to change):

1. Project 1: Sound Activated Switch (Individual project, 3 week duration)
2. Common Emitter Amplifier (Individual project, 2 week duration)
3. Stepper Motor Controller (Team project, 4 week duration) (May be replaced based upon class interest)
4. Student Final Project (Team project, 4 week duration) (May be replaced by phase locked loop lab)

- Parts:** Parts for the first two projects should be available in your lab kits from EE183 and the supplemental parts listed on the Blackboard site. Everyone should have a lab kit from their previous EE lab courses at UVM (EE183). Some kits are available for purchase as needed. Additionally some general purpose parts (Op Amps, transistors, logic gates, flip flops, resistors, capacitors) are available in the lab for projects 3 and 4. Speak to the TA or instructor if you need parts. Students are welcome to discuss suggested parts with the instructor, or to request parts specific applicable to their project. These requests will be evaluated on a case to case basis.
- Attendance:** Students are expected to attend all lab lectures and sessions and are responsible for assignments and material presented during these meeting times.
- Academic Integrity:** Students are encouraged to work together and to exchange ideas when working on lab assignments. However, students must be sure to submit only their own work and to reference that work properly, including all web sources. UVM's policy on academic integrity is clearly defined and can be found at <http://www.uvm.edu/~uvmppg/ppg/student/acadintegrity.pdf>
- ADA:** In keeping with University policy, any student with a documented disability interested in utilizing accommodations should contact SAS, the office of Disability Services on campus. SAS works with students and faculty in an interactive process to explore reasonable and appropriate accommodations, which are communicated to faculty in an accommodation letter. All students are strongly encouraged to meet with their faculty to discuss the accommodations they plan to use in each course. A student's accommodation letter lists those accommodations that will not be implemented until the student meets with their faculty to create a plan. Please visit the following site for contact information. www.uvm.edu/academicsuccess/student_accessibility_services
- Religious Holidays:** Students have the right to practice the religion of their choice. Students should submit in writing to the instructor by the end of the second full week of classes their documented religious holiday schedule for the semester. An arrangement could then be made to make up the missed work.
- Alcohol/Cannabis:** As a faculty member, I want you to get the most you can out of this course. You play a crucial role in your education and in your readiness to learn and fully engage with the course material. It is important to note that alcohol and cannabis have no place in an academic environment. They can seriously impair your ability to

learn and retain information not only in the moment you may be using, but up to 48 hours or more afterwards. It is my expectation that you will do everything you can to optimize your learning and to fully participate in this course.

- ABET Matrix:**
- *Outcome (1):* An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
Contribution: 2
 - *Outcome (2):* An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
Contribution: 2
 - *Outcome (3):* An ability to communicate effectively with a range of audiences.
Contribution: 1
 - *Outcome (4):* An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
Contribution: 0
 - *Outcome (5):* An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
Contribution: 1
 - *Outcome (6):* An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
Contribution: 2
 - *Outcome (7):* An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.
Contribution: 2
 - *EE Criterion (A):* The curriculum must include probability and statistics, including applications appropriate to the program name; mathematics through differential and integral calculus; sciences (defined as biological, chemical, or physical science); and engineering topics (including computing science) necessary to analyze and design complex electrical and electronic devices, software, and systems containing hardware and software components.
Contribution: 1
 - *EE Criterion (B):* The curriculum for programs containing the modifier “electrical,” “electronic(s),” “communication(s),” or
- 0 - little or no contribution**
- 1 - moderate contribution**
- 2 - high level of contribution**

“telecommunication(s)” in the title must include advanced mathematics, such as differential equations, linear algebra, complex variables, and discrete mathematics.

Contribution: 0