EE 3904 – Special Topics in Power Electronics (Spring 2012) syllabus

Southern Polytechnic State University

Division of Engineering

**Administrative information:**

a. Course. 4.0 credit hours

Prerequisite: EE 2302 – Circuit Analysis II

b. Instructor. Associate Prof. Bill Diong

*Offic*e: Q-345 Engineering Technology Center

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*Office Phone*: (678) 915-5574 or 5574 (on campus)

*Cell Phone*: (817) 721-0875 (please no calls between 11:30pm and 7:30am)

c. Instructor Class Schedule.

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| --- | --- | --- | --- |
|  | Class | Time |  |
|  | EE 3401 | MWF 11:00 - 11:50AM |  |
|  | EE 3401 lab | MW 12:00 - 2:50PM |  |
|  | EE 3904 | TR 6:00 - 7:15PM |  |
|  | EE 3904 lab | R 7:30 - 10:20PM |  |
|  | EE 3803 | M 5:00 - 5:50PM |  |

d. Office Hours. TR 3–5pm; F 12–1pm

I welcome you to stop by my office at other times if these office hours conflict with your schedule. If I am in the office and not taking care of something urgent, I will be glad to help you. But it will be best for both of us if you could phone, text message or e-mail me ahead of time to make an appointment during non-office hours and ensure I’m in the office then.

e. Required Text. *Power Electronics*: *Converters, Applications and Design*, 3rd ed.; Mohan *et al*.

**Course description:** Power electronic devices (diodes, thyristors, etc); Power electronic circuits (rectifiers, DC choppers, inverters, etc); Applications (power supplies, DC and AC motor drives, etc); Modeling and simulation using PSpice software, and analysis using Matlab.

**Grading:**

Homeworks 8%

Quizzes 6%

Design Project 4%

Laboratory Work 25%

Mid-term Exams  32%

Final Exam 25%

Tentatively, the correspondence between Course Total percentage and letter grade will be: 10090% = A, 9080% = B, 8070% = C, 7060% = D, 600% = F. However, I reserve the right to **lower** the grade thresholds should the situation warrant it.

**Homework:** The assigned homework problems will be collected and then given a ‘*completion/effort’* grade only instead of a ‘correctness’ grade since they are considered to be the *practice* that is necessary for you to learn the material in this course. Problems are assigned and due according to my weekly instructions. They must be turned in by the specified deadline: *w*ork will not be accepted late, unless you have specifically requested that privilege for good cause. Work that is submitted is expected to be neatly done and clearly organized on loose leaf paper that is not torn from a spiral binder. *Homework solutions will be posted on the Vista web site for this course* the same day that they are collected so you can check their correctness (*I suggest you make a hard or scanned copy of your homework before you turn it in*). On certain weeks, in lieu of the assigned problems being collected and graded, *a quiz (HW-Quiz) on 1 of those problems will be given and then graded on its correctness*.

Laboratory Exercises: The purposes of the laboratory portion of this course are for you to: (1) learn the proper use of instrumentation, (2) learn good laboratory habits, and (3) experience the subject material of this course. These goals can be accomplished without writing long-winded laboratory reports. Instead, you should concentrate on accurately documenting your thoughts and plans about the experiment before you do it, your thoughts, procedures, and experiences as you do it, and your comments and conclusions after you complete it. Your reports will be graded with this in mind.

**Project:** One design project – requiring the use of PSpice software – will be assigned mid-semester.

**Quizzes & Exams:** Three Quizzes will be given as scheduled. In addition, there will be 2 mid-term exams and 1 final exam. Solutions to the quizzes and exams will be posted on the Vista web site for this course. Make up exams will only be given in exceptional situations and only if arrangements have been made in advance.

**Course Outcomes**: The purpose of this course is for you the student to learn about power electronic devices, circuits and applications. The concepts gained in this course through lecture, laboratory, and additional assignments will enable you to build an essential foundation for a rewarding engineering career related to power electronics. Note below the course’s key learning outcomes:

* *An understanding of the behavior of semiconductor devices operated as power switches.*
* *Ability to analyze and design ac-to-dc circuits.*
* *Ability to analyze and design dc-to-dc converters.*
* *Ability to analyze and design dc-to-ac inverters.*
* *Become proficient with computer skills (e.g., PSPICE and MATLAB) for the simulated analysis and design of power electronic circuits*
* *Ability to design, set up, and test power electronic circuits in the laboratory*

**Attendance:** Regular and punctual attendance is essential and expected of students. If you will miss or be late for a scheduled meeting time (lecture, lab, or individual meeting), you are expected to conduct yourself in a professional manner by informing the instructor beforehand, if possible, or contacting the instructor *ASAP after that missed meeting*. Guidance regarding class absence may be found on the SPSU website. If attendance is below 50% (as of 5 mins after class starts), I will conduct really easy pop quizzes for those who are present to count as part of their homework grade.

**Academic Misconduct:** In order to encourage and preserve the honor and integrity of the academic community, SPSU expects its students to maintain high standards of personal and scholarly conduct. Detailed guidance regarding academic misconduct may be found in SPSU’s Undergraduate Catalog (accessible on its website). Although discussion and collaboration between students regarding homework and laboratory assignments is encouraged, one example of misconduct is either letting a classmate read/copy your completed assignment, or reading/copying your classmate’s completed assignment, then turning it in.

**Students with Disabilities:** SPSU complies with the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973 regarding students with disabilities. Eligible students seeking accommodations should contact the counselor working with disabilities at 678-915-7244 and/or the ATTIC at 678-915-7361 as soon as possible in the term for which they are seeking accommodations.