PHYS 3350: Electronics
Course Syllabus for Spring 2013, MW 11:00-11:55 am, T 2:30-5:25 pm

Instructor: Dr. Wayne Keith 793-3874, keith.wayne@mcm.edu
Office Hours: S 110-C: MTWRF 10-11, MWF 1-2:30, and W 2:30-4:30
Web: http://www.mcm.edu/~keith.wayne
Text: *Electronics: Circuits and Devices, (3rd)* by Ralph J. Smith
Required: scientific calculator, paper, pencil, lab notebook
Prerequisites: PHYS 2520

Course Description: This course will introduce students to the basic electronic devices which comprise most electronic equipment. Topics include general circuitry, diodes, transistors, oscilloscopes, power supplies, and a touch of digital electronic devices such as op-amps and logic gates. Laboratory exercises are an integral part of the course.

Grading: 10% Homework: Assignments will be made in class and posted online. Homework will be due at the beginning of class on the date indicated. Also includes any graded non-lab activities conducted during class (quizzes, presentations, discussions, etc.)
5% Lab Notebook: You will be expected to keep records of everything you do in a lab notebook, which will be collected periodically during the semester.
30% Lab Reports: There will be a report for each lab (10 total), written in the style of a scientific journal article. Lab reports are due the following Tuesday. During the term, any two reports may be rewritten for a grade to replace the original.
10% Project: After the second exam, in addition to the normal coursework, you will be working as a group on a class project. This is to give you some experience with soldering, amplifiers, complicated circuits, and everyday electronic devices. 40% of this grade will be making it work, and 60% will be explaining it.
30% exams (15% each): In-class exams.
15% Final exam: Not comprehensive, covers the final third of the course.

Attendance/Make up policy: Make-up exams will be given for excused absences only at the discretion of the instructor. Contacting the instructor via email or phone prior to missing class for any reason is strongly encouraged, even if it is for a school sponsored event.

Classroom Rules: Students are expected to be present and on time for all class meetings. Excessive unexcused absences (more than 3 consecutive) may result in the student being dropped from the course. Ringing cell phones and other disruptions during class may result in a loss of daily grade points or other penalties. Late homework loses 5% per class period. Computers should be used in class for course-related purposes and only when instructed to use them; violators will forfeit the use of their computer during class for a period of time up to the remainder of the semester.

ADA Policy: If you have a documented disability that may impact your performance in this class and for which you may require accommodations, you must be registered with and provide documentation of your disability to the Disability Services Office, President Hall, 793-4880.

Final notes: Class discussion is strongly encouraged; please feel free to ask questions, during class or outside of class, about anything that is not clear. Properly preparing for class by reading the textbook and keeping up with the homework is the most important factor in doing well in this course.

PHYS 3350 Spring 2013 Course Schedule

All dates are tentative and subject to change except **bold** dates.

Date	Lecture	Tentative Topic	Text
1/14	1	Introduction, Circuit Elements, Ohm's law	1:1-22
1/15		**Lab 1**: Meters	Pre-lab
1/16	2	Kirchhoff's Laws, Systems of Equations	2:26-38
1/21		**No Class - MLK**	
1/22		**Lab 2**: Kirchoff	Pre-lab
1/23	3	Thevenin & Norton, Load Line	2:38-48
1/28	4	Load Line, Dividers	2:38-52
1/29		**Lab 3**: Thevenin & Norton	2:49-52
1/30	5	RC Circuits, Oscilloscopes, & Waveforms	3:59-70
2/4	6	Waveforms & Filters	3:84-88
2/5		**Lab 4**: 'Scope & Filters: Part I	4:105-113
2/6		**Lab 4**: 'Scope & Filters: Part II	4:105-113
2/11	7	Exam Review	
2/12		**Exam 1**	Ch. 1 – 4
2/13	8	Band Theory of Solids	5:118-128
2/18	9	Junction Diodes	5:128-140
2/19		**Lab 5**: Diodes	p.80-86, 135
2/20	10	Diode Applications	3:80- 92
2/25	11	Transistors	6:151-159
2/26		**Lab 6**: Power Supplies	3:80- 85
2/27	12	Amplifier Design	6:157-159 12:358-361 14:417-419
3/4	13	Operational Amplifiers (Op-Amp)	3:74-80 11:316-319, 323, 335-336
3/5		**Lab 7**: Transistors	6: 145-156
3/6		**Project Proposal**	
3/11		**Spring Break – NO CLASS**	
3/12		**Spring Break – NO CLASS**	
3/13		**Spring Break – NO CLASS**	
3/18	14	Logic Circuits	7:168-184
3/19		**Lab 8**: Op-Amps	7:173, 177
3/20	15	Electronic Logic & Logic Gate	7:168-184
3/25	16	Exam Review	
3/26		**Exam 2**	Ch. 3, 5-7, 11
3/27	17	Boole and DeMorgan, Logic Circuit Design	8:200-213
4/1	18	Binary Logic	8:208-213, 216-217
4/2		**Lab 9**: The NAND Gate	
4/3	19	Registers, Counters, Memory	8:216-234
4/8	20	Memory Devices, Sequential Circuits	7:184-194
4/9		**Lab 10**: Logic Circuits	
4/10	21	Microprocessors	9:242-274
4/15	22	Phasors, Circuit Analysis	10:277-294
4/16		**Project**	
4/17	23	Frequency Response, Resonance	10:295-310
4/22	24	Large-Signal Amplifiers	12:344-368
4/23		**Project**	
4/24	25	Small-Signal Models	13:375-392
4/29	26	Small-Signal Amplifiers	14:395-420
4/30		**Project**	
5/1	27	Final Review	
5/6		**Final Exam – Test 3 (10:30 am – 12:30 pm)**	Ch. 8-14
5/7		**Finals Week – No Class**	
5/8		**Finals Week – No Class**	

Course objectives and goals	Linked to which departmental program goal(s)	Linked to which institutional goal(s)?	Types of evidence used to demonstrate student achievement of objectives & goals
Students will demonstrate conceptual understanding of the basic principles of electronics.	- to prepare physics graduates for a wide range of career opportunities including not only graduate study in physics, engineering, pre-med, or other sciences; but also, science teaching and careers in industry and science-related business	1,2,3,8	Successful completion of in-class exam essay questions.
Students will demonstrate the ability to apply various mathematical methods towards solutions of electronics problems.	- Same as above	1,2,3,8	Successful solving of appropriate problems during in-class discussions, homework and exams.
Students will demonstrate conceptual and practical understanding of the physics behind electric circuits, transistors, and digital electronic devices.	- Same as above	1,2,3,8	Successful completion of in-class exam questions and solving of appropriate problems during laboratory procedures.