

**PHYS 3350: Electronics**  
**Course Syllabus for Spring 2024, MW 11:00-11:50 am, T 2:30-5:20 pm**

Instructor: Dr. Wayne Keith 793-3874, [keith.wayne@mcm.edu](mailto:keith.wayne@mcm.edu)  
Office Hours: S 110-C: MTWRF 9:30-11, and MWF 1-2:30  
Web: <https://mail.mcm.edu/~keith.wayne>  
Text: *Electronics: Circuits and Devices, (3<sup>rd</sup>)* 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.

**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 written report for each lab, due the following Tuesday.

**10% Project:** After the second exam, during the lab period you will be working as a group on a class project. This is to give you some experience with soldering, complicated circuits, and everyday devices.

**30% Exams (15% each):** In-class exams.

**15% Final exam:** Not comprehensive, covers the final third of the course.

**Mindset for Success:** I will provide feedback regarding your performance in this course by the 5<sup>th</sup> week of classes and after midterm. You may access your midterm grades through your MyMcM portal. If you are at risk in the 5<sup>th</sup> week or your grade is below a C- at midterm, you will receive a message from the Mindset for Success Office and your academic coach regarding your academic performance. Your academic coach can provide you with strategies and connect you to resources that will help you succeed. Additional academic supports can be found at [Student Success and Support - McMurry University](#).

**Counseling Services:** McMurry University's Counseling Services offers professional counseling to students and staff members. [Click here](#) for more information.

**Disability Services:** Disability Services provides support to enable students with permanent or temporary disabilities to participate in the full range of university experiences. [Click here](#) for more information. 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.

**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 absences (more than 4) 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. Tablet PC's may only be open when needed for class activities. Late work requires permission from the instructor.

**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 Course Schedule

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

Date	Lect.	Tentative Topic	Text	Homework
<b>1/15</b>		<b>No Class - MLK</b>		
1/16	1	Introduction, Circuit Elements, Ohm's law	1:1-22	HW1: Ch1: Q: 8, 10, 16
1/17	2	Kirchhoff's Laws, Systems of Equations	2:26-38	E: 4, 7, 10, 13
1/22	3	Network Theorems	2:38-48	P: 3
1/23		<b>Lab 1: Meters</b>	Pre-lab	HW2: Ch 2:
1/24	4	Household Power		Q: 5, 8, 16
1/29	5	RC Circuits, Oscilloscopes, & Waveforms	2:59-70	E: 2, 4, 13c, 18,
1/30		<b>Lab 2: Kirchoff</b>	Pre-lab	26, 37b
1/31	6	Diodes and Filters	3:84-88, 5:118-128	HW3: Ch 3
2/5	7	Band Theory of Solids	5:118-140	Q: 2, 10
2/6		<b>Lab 3: Thevenin &amp; Norton</b>	2:49-52	E: 31, 32, 39
2/7	8	Junction Diodes		P: 8
2/12	9	Exam Review		Q Ch 5: 11, 12
2/13		<b>Exam 1</b>	Ch. 1 – 5	E: Ch 5: 27
2/14	10	Soldering Tips		HW4: Ch 6:
2/19	11	Transistors	6:151-159	Q: 1, 8
2/20		<b>Lab 4: 'Scope &amp; Filters</b>	4:105-113	E: 18, 19, 21
2/21	12	Amplifiers	6:157-159 12:358-361 14:417-419	
2/26	13	Operational Amplifiers (Op-Amp)	3:74-80 11:316-319, 323, 335-336	
2/27		<b>Lab 5: Diodes</b>	p.80-86, 135	
2/28	14	Logic Gates	7:168-184	HW5:
4/4	15	Logic Circuit Design	7:173, 177	
4/5		<b>Lab 6: Transistors</b>	6: 145-156	Ch 7:
4/6		<b>Project Proposal</b>		Q: 5
3/11		<b>Spring Break – NO CLASS</b>		E: 5, 8
3/12		<b>Spring Break – NO LAB</b>		
3/13		<b>Spring Break – NO CLASS</b>		Ch 8:
3/18	16	Memory Devices	7:184-194	Q: 6
3/19		<b>Lab 7: Op-Amps</b>	7:173, 177	E: 2, 11c, 15
3/20	17	Registers, Counters, Memory	8:216-234	P: 1a&b
3/25	18	Microprocessors, Exam Review	9:242-274	
3/26		<b>Exam 2</b>	Ch. 3, 5-9, 11	
3/27	19	AC Circuits	10:277-294	
<b>4/1</b>		<b>No Class – Easter</b>		
4/2		<b>Project</b>		
4/3	20	AC Circuit Analysis	10:277-294	HW6: Ch 10:
4/8		<b>NO CLASS – Eclipse Trip</b>		Q: 4, 10, 19
4/9		<b>Project</b>		E: 2, 11, 12, 16,
4/10	21	Phasors	10:277-294	30
4/15	22	AC Circuit Examples	10:277-294	
4/16		<b>Project</b>		
4/17	23	AC Thevinin	10:277-294	
4/22	24	Frequency Response, Resonance	10:295-310	
4/23		<b>Project</b>		
4/24	25	Bandwidth		
4/29	26	Final Review		
4/30		<b>Project</b>		
5/1		<b>Project presentation</b>		
<b>5/6</b>		<b>Finals Week – No Class</b>		
<b>5/7</b>		<b>Finals Week – No Lab</b>		
<b>5/8</b>		<b>Exam 3 (10:30 am – 12:30 pm)</b>	Ch. 10-13	

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.