PHYS 3300: Modern Physics
Course Syllabus for Fall 2010, TR 1:00-2:25 am

Instructor: Dr. Wayne Keith: 793-3874, keith.wayne@mcm.edu
Office Hours: S 110-C: MW 1-2, WR 2:30-5, R 11-12, and F 10-12.
Web: http://www.mcm.edu/~keith.wayne
Text: *Modern Physics (5th)*, by P. Tipler and R. Llewellyn
Required: scientific calculator, paper, pencil
Prerequisites: PHYS 2520

Course Description: This is a required course for physics majors. This course is intended to introduce the student to a wide range of areas known collectively as Modern Physics. These areas include relativity theory, atomic and nuclear physics, quantum mechanics, and elementary particle physics.

Grading: 40% 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 activities conducted during class (quizzes, presentations, discussions, etc.)
40% exams (20% each): In-class exams.
20% 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 absences (more than 3 unexcused) may result in the student being dropped from the course. Late homework loses 10% per week (up to a maximum of 40%), unless an extension is granted by the instructor. All late work requires a **written explanation** of why it was not turned in on time.

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, Old Main 102, 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 3300 Fall 2010 Course Schedule

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

Date	Lecture #	Tentative Topic	Reading	Homework
8/24	1	Syllabus and Relativity basics	Ch 1-1	HW1
8/26	2	Einstein's Big Idea	Ch 1-2	HW2 – Ch 1
8/31	3	Lorentz Transformation	Ch 1-3	4,6,9,11,12,15,18
9/2	4	Time & Space	Ch 1-4	22,25,30,34,47,55
9/7	5	Doppler & Paradoxes	Ch 1-5, 1-6	
9/9	6	Quantization	Ch 3-1	HW3 – Ch 3
9/14	7	Blackbody Radiation	Ch 3-2	4, 5, 6, 8, 15, 21,
9/16	8	Photoelectric and Compton Effects	Ch 3-3, 3-4	24, 31, 35, 48
9/21	9	Test 1 Review		
9/23		**Test 1**		
9/28	10	Rutherford's Atomic Model	Ch 4-1, 4-2	HW4 – Ch 4
9/30	11	Bohr's Atomic Model	Ch 4-3	2, 4, 6, 10, 13, 16,
10/5	12	X-Ray Spectra	Ch 4-4	18, 25
10/7	13	Franck-Hertz	Ch 4-5, 4-6	
10/12	14	Matter Waves	Ch 5-1, 5-2	HW 5 – Ch 5
10/14	15	Wave Packets	Ch 5-3	1, 3, 12, 13, 17, 21,
10/19	16	Uncertainty	Ch 5-4, 5-5	23, 28, 37, 42
10/21	17	Wave-Particle Duality	Ch 5-6, 5-7	
10/26	18	Test 2 Review		
10/28		**Test 2**		
11/2	19	1D Schrodinger Equation	Ch 6-1	HW6 – Ch 6
11/4	20	Infinite Square Well	Ch 6-2	1, 6, 12, 16, 27, 29,
11/9	21	Finite Square Well	Ch 6-3, 6-4	41, 49
11/11	22	Harmonic Oscillator	Ch 6-5	
11/16	23	Reflection/Transmission	Ch 6-6	
11/18	24	3D Schrodinger Equation	Ch 7-1	HW7 - Ch
11/23	25	Energy Quantization	Ch 7-2	2, 17, 20
11/25		**Thanksgiving – NO CLASS**		
11/30	26	H Wave Function	Ch 7-3	
12/2	27	Test 3 Review		
12/7		**Final Exam – Test 3 (10:30 – 12:30)**		

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 modern physics.	- 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 modern physics 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 relativity, atomic and elementary particle physics, and quantum mechanics	- Same as above	1,2,3,8	Successful completion of in-class exam essay questions and solving of appropriate problems during in-class discussions, homework and exams.