

Syllabus for
PHY 455--Mathematical Methods in Physics
3 Credit hours
Spring 2008

I. COURSE DESCRIPTION

Application of mathematics methods in solving physics problems involving linear and nonlinear differential and partial differential equations.

II. COURSE GOALS

The purpose of this course is to expose the student to various mathematical methods and techniques involved in solving various kinds of dynamical physics and engineering problems in real life settings; and to develop skills in solving these problems, and applying the solutions to build or improve devices that are beneficial to humankind.

III. STUDENT LEARNING OUTCOMES FOR THIS COURSE

As a result of successfully completing this course, the student will be able to do the following:

- A. Demonstrate concepts of physics performing satisfactorily on homework and tests;
- B. Solve problems by applying the laws of physics and the tool of mathematics;
- C. Demonstrate communication skills by answering questions in class, writing reports and journals, and turning in homework assignments;
- D. Apply the scientific method in analyzing natural physical phenomena in written reports;
- E. Demonstrate professional and ethical responsibility through punctual class attendance and stewardship of resources.

IV. TEXTBOOKS AND OTHER LEARNING RESOURCES

Required Textbook

Boas, Mary L., Mathematical Methods in the Physical Sciences, 3rd Edition, Hoboken: John Wiley & Sons, Inc, 2006.

V. POLICIES AND PROCEDURES

- A. University Policies and Procedures
 - 1. Attendance at each class or laboratory is mandatory at Oral Roberts University. Excessive absences can reduce a student's grade or deny credit for the course.
 - 2. Students taking a late exam because of an unauthorized absence are charged a late exam fee.
 - 3. Students and faculty at Oral Roberts University must adhere to all laws addressing the ethical use of others' materials, whether it is in the form of print, video, multimedia, or computer software. By Submitting an assignment of any form, the student gives permission for the assignment to be checked for plagiarism, either by submitting the work for electronic verification or by other means.

4. Final exams cannot be given before their scheduled times. Students need to check the final exam schedule before planning return flights or other event at the end of the semester.
 5. Students are to be in compliance with University, school and departmental policies regarding ePortfolio requirements. Students should consult the ePortfolio handbooks for requirements regarding general education and the students' majors.
 - a. The penalty for not submitting electronically or for incorrectly submitting an ePortfolio artifact is a zero for that assignment.
 - b. By submitting an assignment, the student gives permission for the assignment to be assessed electronically.
- B. Course Policies and Procedures
1. Evaluation Procedures
 - a. Two one-hour exams are given during the semester. These account for 40 percent of the final course grade.
 - b. Homework assignments are due at the beginning of the next class. Homework grade constitutes 40 percent of the final grade.
 - d. The final exam accounts for 10 percent of the final course grade.
 2. Unexcused Absences
 - a. If a test is missed, the student should make a petition to the instructor for makeup either before the test date or the day the student comes back to school. If the reason for absence is valid, the instructor may give a makeup test and impose a penalty of up to 25 percent. A late exam fee of \$10 will be levied.
 - b. The final average of the semester will be reduced by one point for each unexcused absence above the first three.
 3. Tardiness and leaving classroom—A student may leave the class without the instructor's permission for reasons of personal necessity. If students are tardy, they must clear with the instructor at the end of the class. **Three tardies equal an absence. Students who would be more than 15 minutes late are not allowed in the class unless they have cleared it with the instructor in advance.**
 4. ePortfolio Requirements:
none

VI. COURSE CALENDAR

Week		Assignment	Topic	Homework
1		1 Review Chs 1-5	Review of Calculus III	
2		2 Ch 6	Vector Analysis	To Be Assigned
3		3 Ch 7	Fourier Series and Transforms	TBA
4		4	Continue Fourier Analysis	TBA
5		5 Ch 8	Ordinary Differential Equations	TBA
6		6 Ch 9	Calculus of Variations	TBA
7		7 Ch 10	Tensor Analysis	TBA
8		8 Ch 11	Special Functions	TBA
9		9	Continue Special Functions	TBA
10		10 Ch 12	Series Solutions of Dif Eqs	TBA
11		11	Continue Series Solutions	TBA
12		12 Ch 13	Partial Differential Equations	TBA
13		13 Ch 14	Complex Variables	TBA
14		14 Ch 15	Probability and Statistics	TBA
15			FINAL EXAM WEEK	

Course Inventory for ORU's Student Learning Outcomes
PHY 455--Mathematical Methods in Physics

Spring 2008

This course contributes to the ORU student learning outcomes as indicated below:

Significant Contribution – Addresses the outcome directly and includes targeted assessment.

Moderate Contribution – Addresses the outcome directly or indirectly and includes some assessment.

Minimal Contribution – Addresses the outcome indirectly and includes little or no assessment.

No Contribution – Does not address the outcome.

The Student Learning Glossary at <http://ir.oru.edu/doc/glossary.pdf> defines each outcome and each of the proficiencies/capacities.

OUTCOMES & Proficiencies/Capacities		Significant Contribution	Moderate Contribution	Minimal Contribution	No Contribution
1	Outcome #1 – Spiritually Alive Proficiencies/Capacities				
1A	Biblical knowledge			√	
1B	Sensitivity to the Holy Spirit				√
1C	Evangelistic capability				√
1D	Ethical behavior			√	
2	Outcome #2 – Intellectually Alert Proficiencies/Capacities				
2A	Critical thinking	√			
2B	Information literacy			√	
2C	Global & historical perspectives			√	
2D	Aesthetic appreciation			√	
2E	Intellectual creativity		√		
3	Outcome #3 – Physically Disciplined Proficiencies/Capacities				
3A	Healthy lifestyle				√
3B	Physically disciplined lifestyle				√
4	Outcome #4 – Socially Adept Proficiencies/Capacities				
4A	Communication skills			√	
4B	Interpersonal skills			√	
4C	Appreciation of cultural & linguistic differences			√	
4D	Responsible citizenship				√
4E	Leadership capacity			√	