

# PHY 306, Mathematical Physics

## Course Syllabus

### Fall 2012

**Instructor:** Dr. R. J. Pfeiffer

**Office:** SCP-134 Science Complex (Physics Department)

**Telephone:** 771-2557, or 771-2569 (Dept. No.)

**Office Hours:** Tues., 14:00 to 15:20 and Thurs., 15:30 to 16:20; other times by appointment.

**Text:** Boas, M., 3rd ed. Wiley Co., NY.

#### References:

Chisholm J. S. R., & Morris, R. M., *Mathematical Methods in Physics*, W. B. Saunders Co., Philadelphia

Cushing, J. T., *Applied Analytical Mathematics for Physical Sciences*, Wiley Co., NY.

Hassani, S., *Foundations of Mathematical Physics*, Allyn and Bacon, Needham Heights, MA.

#### COURSE OUTLINE:

Programming: Mathematica and Fortran

Chap. 2 Complex numbers and functions

Chap. 3 Matrix algebra and vectors

Chap. 4 Partial Differentiation and Total Differentials

Chap. 5. Multiple Integrals with functional limits.

Chap. 6. Vector Analysis and Calculus

Chap. 7. Fourier Analysis

Chap. 10. Coordinate Transformation and Tensor Analysis

Chap. 12. Orthogonal Functions

Chap. 13 Boundary Value Problems

Selected topics from Chaps. 9, 11, 14, & 15.

#### Tests:

There will be 3 tests given during the semester. This includes a final examination that will be held during the formal final examination period as scheduled by the registrar. Tests will be given on dates to be determined. Students are advised to do all the assigned homework and to keep up with their studies.

#### Homework Problems:

There will be many assigned homework problems. Some of these problems will be graded and included in the computation of one's course grade.

**Problems that are to be submitted for grading must be done independently. That is, no two submitted should look the same.**

**Only 8 1/2 by 11-inch paper without serrated edges may be used for all assignments and tests.**

Write on only one side of each page and start a new problem on a new page.

All pages for a given problem must be stapled together, but since each problem will be separately filed,

DO NOT staple together the pages of different problems.

Students who fail to comply with the above instructions and insist on bringing about unnecessary increases in the entropy of the universe by complicating the logistics of homework handling will have

to suffer the consequences of a confrontation with the dark side of the time rate of change of momentum.

### **Grading Criteria:**

1. Perform well on all tests and achieve passing grades.
2. Complete all assigned problems in a satisfactory manner and on time.
3. Complete all other assignments satisfactorily
4. Instructor's judgement of a student's achievement and mastery of the course subject matter.
5. Students will be expected to write programs as part of some assignments.

### **Computation of Course Average and Grade:**

Course grades will be awarded primarily on the basis of a student's grand average percentage. The latter is found by adding together all the points a student has earned on all tests and assignments (total earned course points) and dividing this by the total number of possible course points. The following is a partial example for a hypothetical student:

Test #1: 185 out of 200 points

Test #2: 165 out of 180 points

Test #3: 175 out of 210 points

Quiz #1: 25 out of 40 points

Hmwrk : 85 out of 95 points

Final Exam: 305 out of 325 points

Sums: 940 earned course points out of 1050 total number of possible course points.

This is a grand percentage equal to  $940 / 1055 = .8952 = 90\%$ .

This grand percentage is converted to a letter grade (A, A-, B+, ..... F) for the course after the instructor examines the distribution of all such percentages for all the students in the class. This is often referred to as "curving." For example, a 90% usually translates to an A- and an 85% usually translates to at least a B. However, curving may translate an 85% to be a higher grade such as B+, but a curve does not lower a grade.

### **SELECTED TCNJ POLICIES:**

TCNJ's final examination policy is available on the web:

<http://www.tcnj.edu/~academic/policy/finalevaluations.htm>

Attendance:

Every student is expected to participate in each of his/her courses through regular attendance at lecture and laboratory sessions. It is further expected that every student will be present, on time, and prepared to participate when scheduled class sessions begin. At the first class meeting of a semester, instructors are expected to make available the attendance policies which apply to their courses. While attendance itself is not used as a criterion for academic evaluations, grading is frequently based on participation in class discussion, laboratory work, performance, studio practice, field experience, or other activities which may take place during class sessions. If these areas for evaluation make class attendance essential, the student may be penalized for failure to perform satisfactorily in the required activities. Students who must miss classes due to participation in a field trip, athletic event, or other official college function should arrange with their instructors for such class absences well in advance. The Office of Academic Affairs will verify, upon request, the

dates of and participation in such college functions. In every instance, however, the student has the responsibility to initiate arrangements for make-up work.

Students are expected to attend class and complete assignments as scheduled, to avoid outside conflicts (if possible), and to enroll only in those classes that they can expect to attend on a regular basis. Absences from class are handled between students and instructors. The instructor may require documentation to substantiate the reason for the absence.

Students must have a valid and documented excuse for missing a scheduled test or they will incur a failure. All other appointments must be made scheduled at times that do not conflict with scheduled test times. If a test is missed because of an emergency and the instructor cannot be informed prior to the time of a scheduled test, a student must arrange for a rescheduled test at the earliest opportunity and no later than the first day they return to class.

The instructor should provide make-up opportunities for student absences caused by illness, injury, death in the family, observance of religious holidays, and similarly compelling personal reasons including physical disabilities. For lengthy absences, make-up opportunities might not be feasible and are at the discretion of the instructor. The Office of Academic Affairs will notify the faculty of the dates of religious holidays on which large numbers of students are likely to be absent and are, therefore, unsuitable for the scheduling of examinations. Students have the responsibility of notifying the instructors in advance of expected absences. In cases of absence for a week or more, students are to notify their instructors immediately. If they are unable to do so they may contact the Office of Records and Registration. The Office of Records and Registration will notify the instructor of the student's absence. The notification is not an excuse but simply a service provided by the Office of Records and Registration. Notifications cannot be acted upon if received after an absence. In every instance the student has the responsibility to initiate arrangements for make-up work.

TCNJ's attendance policy is available on the web:

<http://www.tcnj.edu/~recreg/policies/attendance.html>

### Academic Integrity Policy

Academic dishonesty is any attempt by the student to gain academic advantage through dishonest means, to submit, as his or her own, work which has not been done by him/her or to give improper aid to another student in the completion of an assignment. Such dishonesty would include, but is not limited to: submitting as his/her own a project, paper, report, test, or speech copied from, partially copied, or paraphrased from the work of another (whether the source is printed, under copyright, or in manuscript form). Credit must be given for words quoted or paraphrased. The rules apply to any academic dishonesty, whether the work is graded or ungraded, group or individual, written or oral.

TCNJ's academic integrity policy *is available on the web:*

<http://www.tcnj.edu/~academic/policy/integrity.html>.

### **Americans with Disabilities Act (ADA) Policy**

Any student who has a documented disability and is in need of academic accommodations should notify the professor of this course and contact the Office of Differing Abilities Services (609-771-2571). Accommodations are individualized and in

accordance with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1992.

TCNJ's Americans with Disabilities Act (ADA) policy is available on the web:

<http://www.tcnj.edu/~affirm/ada.html>.

END OF FILE