

**College of Science
Course Syllabus**

Course title/number, number of credit hours

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|---|----------------------------------|
| Course Title: Mathematical Methods for Physicists | Meeting time: Tu, Th 2:00-3:50pm |
| Term: Fall 2015 | Classroom location: FA 103 |
| Is this an online course: Yes [] or No [X] | Credit hours: 4 |
| CRN: 86795 | Course number: PHZ 3113 |

Course prerequisites

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| Course number: MAP 2302 or MAP 3305 |
| Pre-requisites Course Title: Differential equations 1 or Engineering math 1 |

Permission of the instructor is required:
Yes [] or No [X]

Instructor contact information

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| Instructor: Dr. Jonathan Engle | Office: SE-430 |
| Office Hours: Tu, Th 4:00-4:50pm | Phone: 561-353-6423 |
| E-mail Address: jonathan.engle@fau.edu | |

Course description

This course develops applied mathematics for the physical sciences. The main topics covered include linear algebra, integral transforms, Green's functions and orthogonal function expansion methods for solving differential equations. It also examines selected advanced topics, such as complex variables.

Course objectives/student learning outcomes

- To understand to the basic ideas involved in the mathematics covered by the course
- To be able to apply the mathematics
- To stimulate the curiosity of the student

Important dates and course topical outline by week

All readings in the outline below are from *Mathematical Methods in the Physical Sciences* by Mary L. Boas (3rd edition). In addition to the exams and assigned reading listed in the outline below, a **problem set** will be assigned **each week**, normally due each Tuesday (except the first Tuesday, which is the first day of class). The combined time spent outside of class on reading and homework each week is intended to be at least 8 hours. Dates for individual topics are approximate and depend on the progress of the class.

| Date | Topic | Assigned reading |
|--------------|---|---|
| Aug. 18, 20 | Linear Algebra, part I | Sections 3.1-3.5 |
| Aug. 25, 27 | Linear Algebra, part II | Sections 3.6-3.10 |
| Sept. 1, 3 | Linear Algebra, part III | Sections 3.11-3.14 |
| Sept. 8, 10 | Partial differentiation | Sections 4.1, 4.2, 4.5, 4.7, 4.11, 4.12 |
| Sept. 15, 17 | Vector analysis | Sections 6.4-6.8 |
| Sept. 22, 24 | Fourier Series, part I | Sections 7.1-7.5 |
| Sept. 29 | Fourier Series, part II | Sections 7.6-7.9 |
| Oct. 1 | In-class Mid-term exam | |
| Oct. 6, 8 | Parseval's theorem and Fourier transforms | Sections 7.11-7.13 |
| Oct. 13, 15 | The Laplace transform, part I | Sections 8.8-8.10 |
| Oct. 20, 22 | The Dirac delta function, Green functions, The Gamma function part I | Sections 8.11-8.12, 11.1-11.3 |
| Oct. 27, 29 | The Gamma function part II, Solving differential equations using orthogonal functions part I | Sections 11.4-11.5, 11.11, 12.1-12.3 |
| Nov. 3, 5 | Solving differential equations using orthogonal functions, part II | Sections 12.4-12.8 |
| Nov. 10, 12 | Complex analysis, part I | Sections 12.9, 14.1-14.4 |
| Nov. 17, 19 | Complex analysis, part I | Sections 14.1-14.5 |
| Nov. 24 | Complex analysis, part III (Last Class) Take home final exam handed out today | Section 14.6-14.7 |
| Dec. 8 | Official final exam period from 1:15-3:45pm: To be used for questions and/or discussion. Take home final exam due by midnight tonight | |

Course evaluation method

- **Homework (45%).** For each homework assignment, some of the problems will be out of the book, and some will be handed out in class. Collaboration is permitted, even encouraged, but copying is of course not allowed. Because the goal of this course is that the student be able to *do* mathematics, and because this is possible only through practice, homework problems form an important part of the grade.
- **Class Participation (10%).** Each student will be required to present in class at least one homework problem which I designate as 'difficult'.
- **Midterm exam (15%)** will be in-class, open book, and open note.
- **Final exam (30%)** will be take-home, and is open book and open note. No collaboration is allowed, but you can ask me questions.

Course grading scale

| Cumulative Performance | Grade |
|------------------------|-------|
| >93% | A |
| >90%-93% | A- |
| >87%-90% | B+ |
| >83%-87% | B |
| >80%-83% | B- |
| >77%-80% | C+ |
| >73%-77% | C |
| >70%-73% | C- |
| >67%-70% | D+ |
| >63%-67% | D |
| >60%-63% | D- |
| <60% | F |

Policy on makeup tests, late work, and incompletes (if applicable)

- **Make-up policy:** Make-up exams are possible only with a documented, exceptionally good, excuse – if in doubt, ask beforehand.
- **Policy on late homework:** For each class period late, there will be a 10% penalty, up to a maximum 50% penalty. Late homework turned in after the last class (November 24th) will not be accepted. (Thus, no matter how late the homework, as long as it is turned by class time on Nov. 24th, not more than 50% will be taken off.)
- **Extra credit:** I may designate certain homework problems or problems on exams as extra credit. This is the only extra credit in the course.

Required text

Mary L. Boas, *Mathematical Methods in the Physical Sciences*, 3rd edition.

Classroom etiquette policy

University policy on the use of electronic devices states: "In order to enhance and maintain a productive atmosphere for education, personal communication devices, such as cellular telephones and pagers, are to be disabled in class sessions."

Disability policy statement

In compliance with the Americans with Disabilities Act (ADA), students who require special accommodation due to a disability to properly execute coursework must register with the Office for Students with Disabilities (OSD) - in Boca Raton, SU 133 (561-297-3880); in Davie, MOD 1 (954-236-1222); in Jupiter, SR 117 (561-799-8585); or at the Treasure Coast, CO 128 (772-873-3305) – and follow all OSD procedures.

Honor Code policy statement

Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty, including cheating and plagiarism, is considered a serious breach of these ethical standards, because it interferes with the University mission to provide a high quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive of the University community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, see University Regulation 4.001 at http://www.fau.edu/ctl/4.001_Code_of_Academic_Integrity.pdf