MATH 421 - Advanced Calculus for Engineering
TF 8:40 AM - 10:00 AM, Room: TIL-242
Course website

Instructor: Triet Pham, Office: Hill 207, Email: triet.pham@rutgers.edu

Instructor office hours: TTh 2:00 - 3:30 pm, and by appointment.

Course grader: Haojing Wang, Email: hw355@scarletmail.rutgers.edu

TA at large: Ross Berkowitz, Office: Hill 620, Email: rkb73@math.rutgers.edu

TA office hours: T 12:00 - 1:00 pm, W 2:00 - 3:00 pm and online office hours (TBA)

Textbook: Dennis G. Zill and Warren S. Wright ; *Advanced Engineering Mathematics* (Fifth edition). See also the lecture notes.

Course topics: Math 421 is oriented toward students in Chemical and Biochemical Engineering (curriculum 155) and Mechanical and Aerospace Engineering (curriculum 650). It develops mathematical tools used in upper-level engineering courses in these areas. The course has four major topics:

Linear algebra (approx 6 lectures):
Math 421 students are assumed to have some background in linear algebra in two and three dimensions. This part of the course is a fast-paced treatment of matrices and vectors of any size. The aim is to insure that important facts and algorithms are clearly stated and can be used by students in later courses.

Laplace transforms (approx 6 lectures):
The definition, main properties, and applications to the solution of ODE's

Fourier series and orthogonal expansions (approx 5 lectures):
Orthogonal expansions in one variable; Fourier series; Fourier sine and cosine series; Sturm-Liouville problems; Orthogonal expansions and Fourier series in two variables

Classical PDE of mathematical physics (approx 9 lectures):
Solution of boundary value problems for the heat equation, wave equation, and Laplace's equation by separation of variables and orthogonal expansions

Technology: Many of the computations needed to apply the techniques of this course are quite elaborate. Therefore such software packages as Matlab, Maple, and Mathematica include many special functions designed to handle these techniques. While I strongly encourage you to use these programs whenever appropriate in your engineering and science courses, the exams and the homework in this course should be done by hand. You should have enough facility with "hand computation" to carry out basic Laplace transform, matrix, Fourier series, and differential equation calculations without computer assistance. The exams will be designed to avoid elaborate and tedious

computation as much as possible.

Course Outline:

We will tentatively follow the schedule as outlined here: M421 - Schedule

Grade Breakdown:

Homework: 20 %; Midterm 1: 20 %; Midterm 2: 20 %; Final: 40 %
There may be a quiz component to the course (to be decided based on TA availability). In this case Homework will be 10 % and Quiz 10 %.

Academic Honesty: As a Rutgers University student, you have agreed to abide by the Universitys academic honesty policy, as stated in http://academicintegrity.rutgers.edu. Lack of knowledge of the academic honesty policy is not a reasonable explanation for a violation. Questions related to course assignments and the academic honesty policy should be directed to the instructor.

University Attendance Policy: Students are expected to attend classes regularly, according to what is stated in http://sasundergrad.rutgers.edu/academics/courses/registration-and-course-policies/attendance-and-cancellation-of-class

Important Dates:

First midterm ..... Oct 14, 2016
Second midterm ..... Nov 18, 2016
Final Exam ..... Tuesday December 20, 8am - 11am
You can also check the final exam schedule here

Student-Wellness Services:

Just In Case Web App
http://codu.co/cee05e
Access helpful mental health information and resources for yourself or a friend in a mental health crisis on your smartphone or tablet and easily contact CAPS or RUPD.

Counseling, ADAP & Psychiatric Services (CAPS)

(848) 932-7884 / 17 Senior Street, New Brunswick, NJ 08901/ www.rhscaps.rutgers.edu/
CAPS is a University mental health support service that includes counseling, alcohol and other drug assistance, and psychiatric services staffed by a team of professional within Rutgers Health services to support students efforts to succeed at Rutgers University. CAPS offers a variety of services that include: individual therapy, group therapy and workshops, crisis intervention, referral to specialists in the community and consultation and collaboration with campus partners.

Violence Prevention & Victim Assistance (VPVA)

(848) 932-1181 / 3 Bartlett Street, New Brunswick, NJ 08901 / www.vpva.rutgers.edu/
The Office for Violence Prevention and Victim Assistance provides confidential crisis intervention, counseling and advocacy for victims of sexual and relationship violence and stalking to

students, staff and faculty. To reach staff during office hours when the university is open or to reach an advocate after hours, call 848-932-1181.

Disability Services

(848) 445-6800 / Lucy Stone Hall, Suite A145, Livingston Campus, 54 Joyce Kilmer Avenue, Piscataway, NJ 08854 / https://ods.rutgers.edu/

Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation: https://ods.rutgers.edu/students/documentation-guidelines.

If the documentation supports your request for reasonable accommodations, your campuss disability services office will provide you with a Letter of Accommodations. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. To begin this process, please complete the Registration form on the ODS web site at: https://ods.rutgers.edu/students/registration-form.

Scarlet Listeners

(732) 247-5555 / http://www.scarletlisteners.com/

Free and confidential peer counseling and referral hotline, providing a comforting and supportive safe space.

Acknowledgement: This syllabus is adapted from professor Sontag's 2011 website.