Linear Algebra and Differential Equations (Math 307)
Course Information – Fall 2018

INSTRUCTOR: Professor Karl Heinz Dovermann

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TEXT & MATERIAL: Linear Algebra and Differential Equations, by: Peterson and Sochacki, Addison Wesley

OFFICE HOURS: MWF 10:30–11:20 and R 10:30–11:20. Other hours are available by appointment.

Topics: Approximate Timeline:


3. Linear Transformations, Eigenvectors and Values (5 weeks):
Linear transformations, algebra of linear transformations, matrices and linear transformations, similar matrices, singularity and rank, inner products, orthogonality and complements, eigenvectors and values, diagonalization, Jordan normal form.

4. Systems of Differential equations (3 weeks): Theory of systems of differential equations, higher order ordinary differential equations, homogeneous systems with constant coefficients the diagonalizable case, the nondiagonalizable case, applications to $2 \times 2$ and $3 \times 3$ systems of differential equations.

5. More, as time allows (2 weeks): Linearization of nonlinear systems and computational stability.

Student Learning Outcomes: A successful student will
• have an understanding of the basic concepts of linear algebra.
• know the principal results in the theory.
• be able to compute examples.
• apply linear algebra to solve problems.
• solve systems of differential equations via eigen value and eigen vector methods.

Program objectives: Linear algebra is one of the basic and foundational topics in mathematics. It is applied in many fields. The course is intended for non-majors who need to understand the basic principles and apply them in the solution of systems of differential equations.

EXAMS: There will be two midterms (the dates will be announced in class) and a final exam (see the university calendar for the date and time). Make-up exams will be given only under excruciating circumstances such as serious illness or family emergencies. Proof may be required. If you are a student athlete, or you need to travel for academic reason, then you must make arrangements in advance to take tests at an alternate time, possibly early.

HOMEWORK: I will assign homework every lecture. It is due during the next lecture. Homework should be cleanly written, and you may have to revise it before it is in an acceptable form. Your solutions should show the steps of your solution in a logical order and end with a proper formulation of the final answer. Students are encouraged to collaborate on homework, but final write-ups must be done individually.

GRADING: Your grade will be determined by the number of points earned throughout the semester. Each midterm is worth 100 points and the final 150 points. The maximal number of points you can earn on homework, quizzes or other activities is 150 points. Cut-offs for letter grades will be decided at a later time. Throughout the semester you may ask me what your approximate standing is.

ABSENSES: It is expected that you attend every class. If you are absent, then you are responsible for the material covered. Arrange to copy another student’s notes and be informed of any announcements.

ACADEMIC EXPECTATIONS: Please read the statement about the academic expectations on the Mathematics Department webpage. Go to
http://www.math.hawaii.edu, pick ‘Undergraduate’ and click on Academic Expectations.

**ACADEMIC HONESTY:** No student shall claim or submit the work of another as one’s own. No dishonesty will be tolerated.

**IMPORTANT DATES:** It is your responsibility to know about the important dates, such as deadlines to drop or withdraw from a course, holidays, final exam, etc.