MA345 Differential Equations & Matrix Method

MA345 – Section 01DB Fall 2018

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Office hours: M. Berezovski, **COAS_301.12**

M,W,F 10AM-11AM & noon-1PM & 2PM-3PM, Th: 9:30 -11:15AM

Web Page: Course materials will be linked to Canvas

Course Description:

Treatment of ordinary differential equations to include principle types of first and second order equations; methods of substitution on simple higher order equations; linear equations and systems of linear equations with constant coefficients; methods of undetermined coefficients and variation of parameters; Laplace transforms; series solutions; linear algebra and matrix methods of solutions; applications to physics and engineering. *Prerequisite*: MA-243

Course Goals:

This course is required by the Aerospace Engineering, Electrical Engineering, Avionics and Engineering Physics degree programs. Its purpose is to provide intermediate mathematical skills for the student to use in many of the applications he will encounter in future engineering courses.

Class Schedule

03DB	Lecture in COAS205	9:00am - 9:50 am	MWF
	Lecture in COAS407	8:15am - 9:30 am	Thu

Text: Fundamentals of Differential Eqns., Nagle, Saff, Snider, 9th Ed.

Please note: The final exam will be on
Tuesday, December 11, 2018 from 8AM to 10AM at COAS205
– please mark your calendar now!

COURSE LEARNING OUTCOMES

The course content is prescribed by the Department of Mathematics.
The following is a minimal list of skills that you must attain. The requirements of the course include but are not limited to this list.

1. Recognize and solve separable, homogeneous, exact and linear first order differential equations.
2. Construct and solve appropriate differential equations for applied problems involving mixtures, populations and Newtonian mechanics.
3. Calculate numerical solutions of differential equations.
4. Solve homogeneous, linear second and higher order differential equations with constant coefficients.
5. Solve nonhomogeneous, linear differential equations with constant coefficients by the Method of Undetermined Coefficients and the Method of Variation of Parameters.
6. Construct and solve applied problems involving mechanical vibrations, forced vibrations and electric circuits.
7. Compute Laplace transforms of polynomials, exponential and trigonometric functions.
8. Compute inverse Laplace transforms of rational function and solve initial-value problems by Laplace Transform Method.
9. Find a power series solution to a given differential equation.
10. Solve a linear system by the Gauss-Jordan elimination method and by Matrix Methods.
11. Compute eigenvalues and eigenvectors of a given matrix.
12. Solve systems of first order linear differential equations by matrix methods.

Evaluation

Homework – max 200 points

Workshop: Quizzes - max 600 points

There will be 6 quizzes each worth 100 points;

Final Exam – max 200 points.

There will be 2 hours common exam.

Grades will be assigned as either A, B, C, D, or F

- >900 will ensure an A for the course
- 800-899 will ensure a B for the course.
- 700-799 will ensure a C for the course.
- 600-699 will ensure a D for the course.
- <599 will ensure a F for the course.

Attendance Policy: Read the "Class Attendance" section of the ERAU Catalog. Rolls will be systematically taken. A student's attendance record will not be counted toward the final course grade except for borderline cases. Only official university excuses will be accepted.

When a student attends a lecture, he should stay for the entire class period. Unless a student becomes ill during class, he may not leave class early without prior permission from the instructor.

Academic Dishonesty

There is no place for cheating in a university. As future leaders of our society, ERAU students will be held to the highest ethical standards. Hard-working honest students can be assured that I will do my best to preserve the integrity of their good work by being vigilant and promptly and forcefully prosecuting cases of academic dishonesty. Each student should be familiar with ERAU's Academic Integrity Policy http://goo.gl/wKJMJ3

Special Arrangements

If you need course adaptations or accommodations because of a disability, or if you have medical information to share with me that may impact your performance or participation in this course, please make an appointment with me as soon as possible. Exceptions to the policies and procedures be handled on a case-by-case basis.
Please contact the Office of Disability Support Services: 386-226-7916.

EMERGENCY SAFETY STATEMENT

Hurricanes, tornadoes and other natural disasters (fires) are a part of life in Florida. In the event a natural disaster threatens our area, everyone at ERAU is expected to monitor voicemail, email, and the local media for any changes to the normal schedule, including evacuation plans. Decisions to close the Daytona Beach campus are typically made sometime in the afternoon on the day before the intended closure. In the event of an emergency during class hours please listen carefully to directions from the course instructor. If it becomes necessary to evacuate the classroom, we will gather at a designated meeting point away from the building and take attendance to insure everyone is safe and accounted for. As part of the disaster preparedness process it is strongly suggested that each member of the ERAU community enroll in the CODE RED emergency notification system. If you have not done so, please sign up using the link provided on your ERNIE home page.

Course information and homework assignments will be posted on Canvas.

Students who are having difficulty with any homework assignment are permitted to get some assistance from other instructors or classmates. However, students should not simply copy solutions verbatim or permit others to do their assignments for them.

Homework

Weekly assignments will be given via Canvas. These will be posted with specific due date and time.

Workshop Activity

There is a system of two days workshop introduced to this course. The concept of workshop is designed to enhanced and test your understanding of the basic concepts and ideas presented. Assigned and suggested problems allow you to explore these concepts at a more in depth level.

Workshop consist of conference day and following quiz day. During the conference the variation of 5 problems is assigned to students, three of them are easy to solve and last two is advanced. During conference, students allowed to use any tools to solve the problems, ask for help and encouraged to ask for help from their peers. This practice was designed to run explicitly hand-on activity for solving the problems. The next day quiz consists of similar problems to the conference. Students working independently. The instructor tracking the progress of each student in real time, grading on a fly.

Missed quiz policy: If a student does not have a valid reason for missing a quiz, that quiz will be scored as a 0. It is very important to communicate with me in advance if you are going to miss a quiz.

MakeUp: Only one quiz could be redone during last week of classes.

Conduct During Exams: Students will not be allowed to use any formula sheets or notes on exams. Students may not receive assistance from classmates or attempt to copy the work of a classmate during an exam. Violators are subject to immediate failure in the course as well as other administrative sanctions such as suspension if appropriate

Calculators: Calculators cannot be passed among students during tests. Graphing/programmable calculators are **NOT** allowed during tests or quizzes. Students are allowed to use non-graphing calculators, i.e. scientific calculators with a one line screen display that do not have the capability of storing alpha-numeric data. Furthermore, no wireless communication devices such as cell phones, iPads or laptops will be allowed.

Cell phones and other electronic devices: Use of electronic devices or cell phones during class or during examination can result in grade penalties up to the assignment of a failing grade or referral to the university administration.