SYLLABUS

Embry-Riddle Aeronautical University

Daytona Beach Campus

Course Number:	MA 345-06
Term	Fall 2023
Instructor:	Dr. E. Jacobs
Office:	COAS 301-36
Office Hours:	Mon, Tues, Wed, Fri: 2:30 - 3:30 PM
E-Mail Address:	jacobs50@xecu.net
Course Title:	Differential Equations and Matrix Methods Cr. Hrs. 4
Meetings:	MWF 4:00 - 4:50 in COAS 318 and Tues 3:45 - 5:00 in COAS 104
Course Text:	*Fundamentals of Differential Equations* by Nagle, Saff and Snider

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

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.

Performance Objectives: 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.

Grading:

The grade in this course will be computed from homework and exams.

Exam Average	85%
Homework	15%

There will be four exams altogether. The fourth exam is the final exam. All exams are equally weighted.

Grade in the course is determined by the following scale:

Avge of HW and Exams:	90 - 100	80 - 89	70 - 79	60 - 69	Below 60
Grade in Course:	A	B	C	D	F

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.

Missed Exams:

A student who misses a regularly scheduled exam may, at the discretion of the instructor, take a make-up exam. However, the student must contact the instructor within 24 hours of the original exam to be eligible for a make-up exam.

Disability Support Services:

Those students who have been appropriately certified by the DSS office may take their exams there. Students will be required to complete all relevant DSS paperwork no later than one week before the exam. Since exams are announced a month in advance, this should pose no hardship to any student.

Calculator:

Calculators will generally not be needed for the exams. If a particular exam requires a calculator, this will be announced in advance in class and on Canvas. The only restriction on calculators is that on Exam 2, no calculators will be permitted that can do matrix calculations.

Homework Assignments:

All homework will be submitted online via Canvas. Write your homework on paper and upload a scanned copy to Canvas. I prefer .pdf format for the file. If your homework is two or more pages long, merge all the scans of your pages into one file before uploading. Make sure that your submitted assignments are legible, clear and concise.

Attendance:

Attendance is noted. A student's attendance record will not be counted toward the final course grade except for borderline cases.