

CATALOG INFORMATION

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Dept & Nbr: MTH 215 Title: DIFFERENTIAL EQUATIONS

Full Title: Differential Equations

Units	Course Hours	Per Week	Nbr of Weeks	Course Hours	Total
Max: 3.0	Lecture	3.0	17	Lecture	51.0
Min: 3.0	Lab	0.0		Lab	0.0
	Contact DHR	0.0		Contact DHR	0.0
	Contact Total	3.0		Contact Total	51.0
	Non-contact DHR	0.0		Non-contact DHR	0.0

Title 5 Category: 01 AA Degree Applic
Grading: GC Credit course for grade or CR/NC
Repeatability: 00 No repeatability allowed or defined
Also listed as:

CATALOG DESCRIPTION:

Covers the theory and applications of the solutions of ordinary differential equations. Students will be introduced to various topics useful in solving first- and second-order differential equations including power series, Laplace transforms, matrices, eigenvalues and eigenvectors, and numerical methods. Math 215 is primarily for majors in mathematics and engineering. Use of graphing calculators will be essential for the course.

PREREQUISITES:

MTH 212 and MTH 214.

COREQUISITES:

RECOMMENDED PREPARATION:

No advisories.

LIMITS ON ENROLLMENT:

SCHEDULE OF CLASSES INFORMATION:

Prerequisites: MTH 212 and MTH 214.

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Transfer Credit: CSU; UC. (CAN MATH 24)

ARTICULATION and CERTIFICATE INFORMATION

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ASSOCIATE DEGREE: Effective: FALL 2004 Inactive:
 Area: D2 COMMUNICATIONS & ANALYTICAL THINKING

CSU GE: Effective: FALL 2004 Inactive:
 Transfer area: B4 MATHEMATICS/QUANTITATIVE REASONING

IGETC: Effective: FALL 2004 Inactive:
 Transfer area: 2A MATHEMATICS

CSU TRANSFER: TRANSFERABLE Effective: FALL 2003 Inactive:

UC TRANSFER: TRANSFERABLE Effective: FALL 2007 Inactive:

CAN:

MATH 24 Grp Nbr: 01 Effective: FALL 2003 Inactive:

CERTIFICATE APPLICABLE: N NOT CERTIFICATE/MAJOR APPLICABLE

APPROVAL AND DATES

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Version 01 Submitted by: ROGER AHDERS Date: 11/15/2002
 Department approved: Date:
 Curriculum approved: 02/05/2003 Version approved: 02/05/2003
 Prerequisites approved: 02/05/2003 Last reviewed: 02/05/2003
 Term effective: FALL 2003 Last taught: SPRING 2008 Inactive:

COURSE CONTENT

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OUTCOME AND OBJECTIVES:

1. Distinguish ordinary differential equations by order and type.
2. Select appropriate techniques to solve single differential equations and systems of linear differential equations.
3. Perform appropriate techniques to solve separable, exact, and linear differential equations.
4. Use numerical techniques to approximate solutions to differential equations.
5. Solve initial value problems using Laplace transforms.
6. Use power series to solve differential equations around both singular and nonsingular points.
7. Apply matrix techniques and Laplace transforms to solve systems of differential equations.
8. Analyze, model, and solve applied science problems with ordinary differential equations.
9. Use traditional manual techniques and newer technological methods (graphing calculator and/or CAS such as Mathematica® and TI-92®) in establishing the skills above.

TOPICS AND SCOPE:

1. First-order differential equations and their applications:
 - a. Definitions and theory
 - b. Separable and exact equations
 - c. Linear equations

- d. Numerical solutions: Euler and Runge-Katta methods
- e. Applications
- 2. Higher-order differential equations:
 - a. Definitions and theory
 - b. Homogeneous linear equations with constant coefficients
 - c. Non-homogeneous linear equations with constant coefficients
 - d. Cauchy-Euler equations
 - e. Variation of parameters
 - f. Applications
- 3. Power series solutions
 - a. (Optional; review of power series)
 - b. Solutions around ordinary points
 - c. Solutions around singular points using the method of Frobenius
- 4. Laplace transforms:
 - a. Definitions and properties
 - b. Use of Laplace transforms and inverse transforms in solving initial value problems
 - c. (Optional: transforms of periodic, discontinuous and impulse functions)
- 5. Systems of linear differential equations:
 - a. (Optional: review of matrices, eigenvalues and eigenvectors)
 - b. Introduction and definitions
 - c. Homogeneous linear systems
 - d. Non-homogeneous linear systems
 - e. Numerical solutions: Euler and Runge-Katta methods
 - f. Applications

ASSIGNMENTS:

READING ASSIGNMENTS:

Students will have daily reading assignments on each instructional unit from required text(s), or instructor-chosen supplementary materials.

WRITING ASSIGNMENTS:

1. Daily homework problem assignments for each instructional unit.
2. Student-developed projects using appropriate course techniques to solve applications problems.

OUTSIDE ASSIGNMENTS:

1. Completion of reading and writing assignments as detailed above.
2. Preparing for in-class presentation of project.
3. Preparing for course examinations.

METHOD OF INSTRUCTION:

METHODS OF EVALUATION:

1. Evaluation of homework problem assignments for understanding of terminology, knowledge of subject matter, and ability to perform manual or technological methods of solution.
2. Evaluation of student-developed projects for ability to choose an appropriate method of solutions, and for ability to correctly interpret solutions in a physical situation.
3. Evaluation of occasional tests and a final examination for

understanding of terminology, knowledge of subject matter, ability to choose an appropriate method of solution, and ability to perform manual or technological methods of solution.

BASIS FOR GRADING:

The assignment of a grade is based on the level of achievement of the outcomes and objectives of the course outline and is reflected in quantifiable terms in the course syllabus.

REPRESENTATIVE TEXTBOOKS:

1. Modern Differential Equations, latest ed., Abel and Braselton, Brooks/Cole, 2001.
2. A First Course in Differential Equations with Modeling Applications, latest ed., D. Zill, Brooks/Cole, 2001.

RATIONALE

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RESOURCES REQUIRED

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MISCELLANEOUS

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Advisory generate desc:	N	NO
Area department:	MTH	MATHEMATICS
Audit flag:	N	NOT AUDITABLE
Basic skills:	X	NOT BASIC SKILLS
Classification:	A	Liberal Arts and Sciences
Cost level:	00	VALUE NOT FOUND
Disciplines:		MATHEMATICS
Division:	00	VALUE NOT FOUND
Faculty service areas:		MATHEMATICS
Fee:	\$0.00	
In-service:	X	NOT IN-SERVICE
Level below transfer:	X	NOT APPLICABLE
Matric-requiring:	M	Requires Math assessment
Maximum class size:	0	
Maximum wait list:	0	
Method of instruction:	02	LECTURE
Non-credit category:	X	NOT APPLICABLE, CREDIT COURSE
Open entry/exit:	N	Not open entry/exit
Pacs activity:	1701	MATHEMATICS GENERAL
Pacs program project:	0000	
Preq/coreq generate desc:	N	NO
Preq/coreq provisional:	N	NO
Preq/coreq reg check:	Y	PREREQUISITE RULES EXIST
Repeat group id:		
Requires instructor sig:	N	INSTRUCTOR'S SIGNATURE NOT REQUIRED
SAM classification:	E	Non-occupational
Selected/special topic:	N	NOT A SELECTED TOPIC COURSE
Special class:	X	NOT A SPECIAL COURSE
TOP code:	1701.00	MATHEMATICS ,GENERAL
Workload:	0.0000	