Clackamas Community College

Online Course/Outline Submission System

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Section #1 General Course Information

Department: Mathematics

Submitter

First Name: Adam
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Course Prefix and Number: MTH - 256

 # Credits: 4

Contact hours

Lecture (# of hours): 44
Lec/lab (# of hours):
Lab (# of hours):
Total course hours: 44

For each credit, the student will be expected to spend, on average, 3 hours per week in combination of in-class and out-of-class activity.

Course Title: Differential Equations

Course Description:

This course is an introduction to the study of first-order differential equations, first-order systems of differential equations, linear systems of differential equations, and applications of these topics.

Type of Course: Lower Division Collegiate

Is this class challengeable?

Yes

Can this course be repeated for credit in a degree?

No

Is general education certification being sought at this time?

Yes

Check which General Education requirement:

✓ Mathematics

Is this course part of an AAS or related certificate of completion?

No

Are there prerequisites to this course?

Yes

Pre-reqs: Pass MTH-252 with a C or better

Have you consulted with the appropriate chair if the pre-req is in another program?

No

Are there corequisites to this course?

No

Are there any requirements or recommendations for students taken this course?

Yes

Recommendations: Pass RD-090 or placement in RD-115; pass WR-095 or placement in WR-121

Requirements:

Are there similar courses existing in other programs or disciplines at CCC?

No

Will this class use library resources?

No

Is there any other potential impact on another department?

No

Does this course belong on the Related Instruction list?

No

GRADING METHOD:

A-F or Pass/No Pass

Audit: No

When do you plan to offer this course?

✓ Summer

✓ Winter

Is this course equivalent to another?

If yes, they must have the same description and outcomes.

No

Will this course appear in the college catalog?

Yes

Will this course appear in the schedule?

Yes

Student Learning Outcomes:

Upon successful completion of this course, students should be able to:

1. utilize problem-solving techniques to engage problems without being provided with a template, (MA1) (MA2)
2. collaborate effectively within a group to communicate mathematics, (MA2)
3. read and interpret mathematical information, (MA2)
4. communicate mathematical information in lay-language, (MA2)
5. model and solve real situations via differential equations and systems, (MA1) (MA2)
6. solve and approximate solutions to differential equations and systems using analytic, numeric, and graphical methods. (MA1) (MA2)

AAOT/ASOT GENERAL EDUCATION OUTCOMES

COURSE OUTLINE MAPPING CHART

Mark outcomes addressed by the course:

- Mark "C" if this course completely addresses the outcome. Students who successfully complete this course are likely to have attained this learning outcome.
- Mark "S" if this course substantially addresses the outcome. More than one course is required for the outcome to be completely addressed. Students who successfully complete all of the required courses are likely to have attained this learning outcome.
- Mark "P" if this course partially addresses the outcome. Students will have been exposed to the outcome as part of the class, but the class is not a primary means for attaining the outcome and assessment for general education purposes may not be necessary.

As a result of completing the AAOT/ASOT general education requirements, students will be able to:

WR: Writing Outcomes

1. Read actively, think critically, and write purposefully and capably for academic and, in some cases, professional audiences.

2. Locate, evaluate, and ethically utilize information to communicate effectively.

3. Demonstrate appropriate reasoning in response to complex issues.

SP: Speech/Oral Communication Outcomes

1. Engage in ethical communication processes that accomplish goals.

2. Respond to the needs of diverse audiences and contexts.

3. Build and manage relationships.

MA: Mathematics Outcomes:

C 1. Use appropriate mathematics to solve problems.

C 2. Recognize which mathematical concepts are applicable to a scenario, apply appropriate mathematics and technology in its analysis, and then accurately interpret, validate, and communicate the results.

AL: Arts and Letters Outcomes

1. Interpret and engage in the Arts & Letters, making use of the creative process to enrich the quality of life.

2. Critically analyze values and ethics within range of human experience and expression to engage more fully in local and global issues.

SS: Social Science Outcomes

1. Apply analytical skills to social phenomena in order to understand human behavior.

2. Apply knowledge and experience to foster personal growth and better appreciate the diverse social world in which we live.

SC: Science or Computer Science Outcomes

1. Gather, comprehend, and communicate scientific and technical information in order to explore ideas, models, and solutions and generate further questions.

2. Apply scientific and technical modes of inquiry, individually, and collaboratively, to critically examine the influence of scientific and technical knowledge on human society and the environment.

3. Assess the strengths and weaknesses of scientific studies and critically examine the influence of scientific and technical knowledge on human society and the environment.

Outcomes Assessment Strategies:

✓ **General Examination**

✓ **Other Assessment Tools**: Assignments

Major Topic Outline:

1. First-order differential equations.
a. Modeling.
b. Separation of variables.
c. Slope fields.
d. Euler's method.
e. Equilibria and the phase line.
f. Linear differential equations.
2. First-order systems of differential equations.
a. Modeling via systems.
b. The geometry of systems.
c. Analytic methods for special systems.
d. Euler's method for systems.
3. Linear systems of differential equations.
a. Properties.
b. Straight-line solutions.
c. Phase planes for systems with real eigenvalues.
d. Complex eigenvalues.
e. Repeated and zero eigenvalues.
f. Second-order linear equations.
g. Damped simple harmonic motion.
h. The trace-determinant plane.
4. Forcing and resonance.
a. Forced oscillators.
b. Sinusoidal oscillators.
c. Undamped forcing and resonance.
5. Laplace transforms.
a. Laplace transforms introduction.
b. Discontinuous functions.
c. Second-order equations.

Does the content of this class relate to job skills in any of the following areas:

1. Increased energy efficiency	**No**
2. Produce renewable energy	**No**
3. Prevent environmental degradation	**No**
4. Clean up natural environment	**No**
5. Supports green services	**No**

Percent of course: 0%

Section #2 Course Transferability

Concern over students taking many courses that do not have a high transfer value has led to increasing attention to the transferability of LDC courses. The state currently requires us to certify that at least one OUS school will accept a new LDC course in transfer. Faculty should communicate with colleagues at one or more OUS schools to ascertain how the course will transfer by answering these questions.

1. Is there an equivalent lower division course at the University?
2. Will a department accept the course for its major or minor requirements?
3. Will the course be accepted as part of the University's distribution requirements?

If a course transfers as an elective only, it may still be accepted or approved as an LDC course, depending on the nature of the course, though it will likely not be eligible for Gen Ed status.

Which OUS schools will the course transfer to? (Check all that apply)

✓ **EOU (Eastern Oregon University)**
✓ **OIT (Oregon Institute of Technology)**
✓ **OSU (Oregon State University)**
✓ **OSU-Cascade**
✓ **PSU (Portland State University)**
✓ **SOU (Southern Oregon University)**
✓ **UO (University of Oregon)**
✓ **WOU (Western Oregon University)**

Identify comparable course(s) at OUS school(s)

How does it transfer? (Check all that apply)

✓ **required or support for major**
✓ **general education or distribution requirement**
✓ **general elective**
:

Provide evidence of transferability: (minimum one, more preferred)

✓ **Other. Please explain.**

Because it is listed as a general education course for the AAOT, it will transfer to all state universities in Oregon.

First term to be offered:

Next available term after approval
: