

# Syllabus –Math 285 – Differential Equations

## Cuyamaca College/Math Department Spring 2018

**Instructor:** Lamia Raffo

**Section:** 7030/ 3 units

**Lecture:** MW 12:30 – 1:45pm

**Room:** H – 113

**Office Hours:** M - TH 9:15 am – 9:45 am,  
MW 2:00 – 3:00 & TTH 1:30 pm – 2:00 pm

**Email:** [lamia.raffo@gcccd.edu](mailto:lamia.raffo@gcccd.edu)

**Canvas**

**website:** <https://www.cuyamaca.edu/academics/canvas/default.aspx>

**Office:** H – 117

**Class Key:** cuyamaca 1234 8350

### Course Description:

This course is an introduction to ordinary differential equations including both quantitative and qualitative methods as well as applications from a variety of disciplines. Introduces the theoretical aspects of differential equations, including establishing when solution(s) exist, and techniques for obtaining solutions, including series solutions, singular points, Laplace transforms and linear systems. CSU, CSU GE, IGETC, UC

**Length of class:** 16 weeks/ 3 hours lecture

### Prerequisites:

Math 280 or equivalent with a grade of C or better.

### Course Content

- 1) Solutions of ordinary differential equations
- 2) First order DE including separable, homogeneous, exact, and linear
- 3) Existence and uniqueness of solutions
- 4) Applications of first order differential equations such as circuits, mixture problems, population modeling, orthogonal trajectories, and slope fields
- 5) Second order and higher order linear differential equations
- 6) Fundamental solutions, independence, Wronskian
- 7) Nonhomogeneous equations
- 8) Applications of higher order differential equations such as the harmonic oscillator and circuits
- 9) Variation of parameters
- 10) Laplace Transforms
- 11) Series Solutions
- 12) Systems of Ordinary differential equations

### COURSE MATERIALS

- 1) Text (**Optional**): Zill, Dennis G. First Course in Differential Equations with modeling applications. 11<sup>th</sup> edition. Brooks/Cole, 2011.
- 2) Webassign access code (**Required**)

Any information above may change at the discretion of the instructor at any time.  
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\*\*If students want a printed text (optional) along with webassign access code (required) then choose option a

- a. Bundle: A First Course in Differential Equations with Modeling Applications, Loose-leaf Version, 11th + Enhanced WebAssign Printed Access Card **9781337604994**

\*\*If students want only the access code (which is required) then choose option b

- b. Here is an overview of the WebAssign resources within WebAssign for this book:

<https://www.webassign.net/features/textbooks/zilldiffeqmodap11/details.html?l=search>

- 3) Supplemental (optional): Zill, Dennis. Differential Equations (with Modeling Application– Study Solutions Manual). 11th ed. Brooks/Cole, 2011.
- 4) A **scientific calculator** and/or **Graphing Calculator** are **required**. The Mathematics Department of Cuyamaca College highly recommends and supports the use of Texas Instruments Graphing Calculators. For this course in particular, I would recommend the use of a TI-83, TI-84 plus.

\*\*\* The department has set in place a new policy for the Library’s calculator loan program. They will be distributed to students based on financial aid first. Students have until Wednesday, January 31<sup>rd</sup> at closing time for the library to put their names on a list at the Reference Desk.

**IMPORTANT DATES:**

January 29 - February 9	Program Adjustment (Last day to add classes/Last day to drop and qualify for a refund and to drop without receiving a “W”).
February 12	Census Day (Semester length Classes)
February 19	<b>Holiday (Washington's Birthday)</b>
March 2	Last Day to <a href="#">Apply for P/NP</a> (semester length classes)
March 24	End of First 8-weeks Session
<b>March 26 - March 31</b>	<b>Spring Recess</b>
April 27	Last day to drop with a “W”. (It is the student’s responsibility to take care of any administrative procedures involved in dropping should he/she stop attending class.)
May 28	<b>Holiday (Memorial Day)</b>
May 29 - June 4	<b>Final Examinations</b>
<b>Monday, June 4<sup>th</sup></b>	<b>Final Exam from 11:45 am – 1:45 pm</b>

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You can see the Spring 2018 academic calendar in its entirety at <http://www.cuyamaca.edu/current-students/academic-calendars/default.aspx>

### **Tutoring:**

If you feel you need more help than I or other classmates can offer, then it is highly recommended that you utilize the free math tutoring services available in the STEM Achievement Center (Tutoring Center). You can register for “IS 198” (free registration; you don’t have to pay for it) which allows you to log in to the system after 24 hours of registration. You must log in and out each time you use the STEM Center regardless of the hours you have accumulated (this is for state reporting). The hours for the center is 9:00 am – 6:00 pm MTWTh, and Friday 9:00 am – 2:00 pm. *Please understand these hours are subject to budget restrictions and may change.*

### **Additional Support:** <https://www.cuyamaca.edu/academics/canvas/default.aspx>

You have a **Canvas account** for Math 285 with links to the syllabus, all handouts, notes, group work sheets, Exams study guide, important announcements, checking grades, etc...

Use the gray menu panel to the left to check your browser’s compatibility and check that the necessary plug-ins are installed use this link <http://www.cuyamaca.edu/helpdesk/>

**Homework:** It is imperative that you read the material in your textbook before it is covered in class and complete the homework assignments in a timely and responsible manner. You can request no more than two homework extensions for the semester (none after the Exam which covers the material); However, I will drop your two lowest scores (the last two homework assignments **cannot be dropped**) (The two dropped scores are there for emergency situations). Homework assignments will be done via Webassign; and they are graded automatically. Homework assignments are due by 11:59 pm on Sunday.

**Quizzes:** Each week you may have a short homework quiz on webassign; each will open after class and is due by 11:59 pm on Sunday. The quizzes will be open-book, open-notes. The problems will be lifted DIRECTLY from the previous week’s assigned homework or similar. In addition, you may have an in-class quiz which is a closed-book, closed-notes quiz. There are **no extension** requests for quizzes but I will drop one of your lowest *HW Quizzes scores*. Each quiz is worth 10 points.

**Group Work/Projects:** Students are expected to solve problems and work together with other students in groups on some special assignments, class work, and projects. Each group work is worth 10 points.

**Exams:** Expect three exams. **No makeups**. You will be allowed to use a graphing calculator on some of the exams and the final. The exams will consist of problems that look similar to the chapter’s homework assignments as well as “concept” problems that require you to “synthesize” the material learned and relate it to other topics covered.

### **Final Exam:**

The **comprehensive** final exam is scheduled for **Monday, June 4<sup>th</sup>, 2018** from 11:45 to 1:45 pm.

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## Evaluation:

Exams	45%
Quizzes	10%
Homework	15%
Group Work	10%
Final examination	20%

A grading system will be used for final grades.

90% to 100% = A

80% to 89.9% = B

70% to 79.9% = C

60% to 69.9% = D

below 60% = F

Any students seeking an "I" (incomplete) for a grade must file a petition with me citing "unforeseeable, emergency, and justifiable" reasons for this grade.

## Student Learning Outcomes:

Upon successful completion of this course students will be able to:

- 1) Create and analyze mathematical models using ordinary differential equations;
- 2) Identify the type of a given differential equation and select and apply the appropriate analytical technique for finding the solution of first order and selected higher order ordinary differential equations;
- 3) Apply the existence and uniqueness theorems for ordinary differential equations;
- 4) Find power series solutions to ordinary differential equations;
- 5) Determine the Laplace Transform and inverse Laplace Transform of functions; and
- 6) Solve Linear Systems of ordinary differential equations.

## Class Policies:

- All cell phones must either be **turned off or completely silent** (vibrate mode is not silent) during class time. They are not allowed on desks during lecture and exams at all.
- Math is not a spectator's sport. A student *may* be dropped for four or more absences but the **student is ultimately responsible** for **officially withdrawing** from the course. If absences become a problem, please come and speak with me.
- If you are caught cheating (using cellphone or notes during an exam) or plagiarizing, you will earn a '0' on that assignment. If it happens a second time, you will earn a '0' on that assignment and I will report it.
- You are responsible for getting class notes and any schedule changes or other announcements on days missed from the class. Any changes and announcements will be posted on **Canvas** web site.
- You are expected to be courteous to each other and to the instructor. You will be asked to leave the class for display of behavior the instructor deems as disruptive to the learning environment. You are encouraged to establish study partners with whom you may study and prepare for exams.

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- You are responsible for your own learning. You should strive to make sense of mathematics. Do not settle for rules and formulas unless those rules and formulas are constructed while trying to make sense of mathematics, or, if from other sources, are fully understood. You should expect me to provide the learning environment and the opportunities you need in order to learn in this manner.
- You are expected to work actively with your peers, sharing, taking and giving, listening and explaining, questioning and answering. You are responsible for being prepared for participation in class discussions and in group work, and for assisting your peers to come to an understanding of mathematics.

**ACCOMIDATIONS FOR STUDENTS WITH DISABILITIES:** Academic accommodations are available for students with disabilities. Please identify yourself to me (after class) and/or to **Disabled Students Programs & Services** staff so that the appropriate accommodations can be ensured. If you suspect you have a learning disability or need services for any other type of disability, contact the **Disabled Students Programs & Services (DSP&S)** Office, **A-113**, at the **Student Services One-Stop Center** or call **(619) 660-4239**.

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**Note:** You must earn a minimum of 70% in your overall grade in this class, and you must earn at least a “D” on your final exam in order to receive a Passing Grade.

### Math 285; Class Schedule (Tentative) Spring 2018

Week #	Monday	Wednesday
1	1/29 Introduce the course Start 1.1 Definitions	1/31 Finish 1.1 Definitions
2	2/05 1.2 Initial Value Problems	2/07 1.3 Models
3	2/12 2.2 Separable Eq's	2/14 2.3 Linear Equations
4	2/19 <b>Holiday</b>	2/21 2.4 Exact Equations
5	2/26 2.5 Substitution	2/28 3.1 Linear Models
6	3/05 Catch Up and Review	3/07 <b>Exam 1</b>
7	3/12 4.1, 4.2 Reduction of Order	3/14 4.2 Reduction of Order
8	3/19 4.3 Homogeneous DE	3/21 4.5 Undetermined Coefficients Annihilator Approach
9	<b>Spring Break</b> 3/26 – 3/31	<b>Spring Break</b> 3/26 – 3/31
10	4/02 4.6 Variation of Parameters	4/04 4.7 Cauchy-Euler Equations
11	4/09 4.9 Solving Systems of DE by Elimination	4/11 6.1 Review of Power Series
12	4/16 6.2 Solutions About Ordinary Points	4/18 6.3 Solutions About Singular Points
13	4/23 Catch Up and Review	4/25 <b>Exam 2</b>
14	4/30 7.1 Definition of the Laplace Transform	5/02 7.1, 7.2 Inverse Transforms and Transforms of Derivatives
15	5/07 7.2 Inverse Transforms and Transforms	5/09 7.3
16	5/14 7.4 Operational Properties II	5/16 Catch Up and Review
17	5/21 <b>Exam 3</b>	5/23 7.4 Operational Properties II

**Final Examinations**

**No regular class meetings**

**May 29 – June 4**

**Final Exam**

**Monday, June 4<sup>th</sup> 11:45 am – 1:45 pm**

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