CAMOSUN COLLEGE
School of Arts & Science
Department of Mathematics & Statistics

MATH-252-X01
Applied Differential Equations
Winter 2018

COURSE OUTLINE

The course description is online @ http://camosun.ca/learn/calendar/current/web/math.html

Ω *Please note: This outline will not be kept indefinitely. It is recommended students keep this outline for their records, especially to assist in transfer credit to post-secondary institutions.*

1. Instructor Information

(a)	**Instructor**	Josh Manzer
(b)	**Office hours**	Schedule posted on D2L and outside my office, or by appointment
(c)	**Location**	CBA 151 (Interurban) and Ewing 342A (Lansdowne)
(d)	**Phone**	250-370-4490 (Interurban) and 250-370-3303 (Lansdowne)
(e)	**E-mail**	ManzerJ@camosun.bc.ca
(f)	**Website**	D2L (online.camosun.ca)

2. Intended Learning Outcomes

Upon completion of this course a student will be able to:

1. Solve various types of first-order differential equations (DEs): separable, linear, exact, nth-degree, homogeneous, and Bernoulli.
2. Solve higher-order linear DEs using a variety of techniques including reduction of order, variation of parameters, and undetermined coefficients.
3. Model real-life phenomenon with DEs, including exponential growth and decay, falling bodies with and without air resistance, LCR circuits, and mass-spring systems.
4. Find a power series solution for a linear DE.
5. Use a Laplace transform and its properties to solve a linear IVP.
6. Solve systems of linear DEs using matrices.

3. Required Materials

(a) Textbook: Dennis G. Zill, *A First Course in Differential Equations with Modeling Applications*, 10th Edition. (The 9th Edition is also usable.)

(b) Calculator: Only regular scientific calculator (non-programmable, non-graphing) will be permitted for quizzes and exams. The use of other electronic devices such as cell phones, MP3 players, iPods, electronic translators, etc., during exams is not allowed.

4. Course Content and Schedule

Chapter 1: Introduction to Differential Equations
- Definitions and Terminology (section 1.1)
- Initial-Value Problems (section 1.2)

Chapter 2: First-Order Differential Equations
- Separable Variables (section 2.2)
- Linear Equations (section 2.3)
- Exact Equations (section 2.4)
- Solutions by Substitutions (section 2.5)

Chapter 3: Modeling with First-Order Differential Equations
- Linear Models (section 3.1)

Chapter 4: Higher-Order Differential Equations
- Preliminary Theory (section 4.1)
- Reduction of Order (section 4.2)
- Homogeneous Linear Equations with Constant Coefficients (section 4.3)
- Undetermined Coefficients: Superposition Approach (section 4.4)
- Variation of Parameters (section 4.6)
- Cauchy-Euler Equations (section 4.7)

Chapter 5: Modeling with Higher-Order Differential Equations
- Linear Models: Initial-Value Problems (section 5.1)

Chapter 6: Series Solutions of Linear Equations
- Solutions About Ordinary Points (section 6.2 in 10th Ed or section 6.1 in 9th Ed)

Chapter 7: Laplace Transforms
- Definition of the Laplace Transform (section 7.1)
- Inverse Transforms and Transforms of Derivatives (section 7.2)
- Operational Properties I (section 7.3)
- Operational Properties II (section 7.4)
- The Dirac Delta Function (section 7.5)

Chapter 8: Systems of Linear First-Order Differential Equations
- Preliminary Theory (section 8.1)
- Homogeneous Linear Systems (section 8.2)
- Nonhomogeneous Linear Systems: Variation of Parameters (8.3.2)

5. Basis of Student Assessment (Weighting)

(a) In-class Assignments (8%)

You are expected to participate in short assignments during class throughout the term, which will be submitted for marks.

(b) Tests (42%)

There will be 4 tests written in class, tentatively scheduled for Wednesday, January 31st; Wednesday, February 21st; Wednesday, March 14th; and Wednesday, April 4th. If you miss a test for a legitimate illness, accident or family affliction, you should notify me as soon as possible and provide supporting documentation. There will be no "make-up" tests. In the event of an excused absence, your mark or ranking on the final exam will replace the missing test.

(c) Final Exam (50%)

A comprehensive, 3-hour final exam will take place during the final exam period of April 16-21, 23-24. The specific date, time, and location will be announced on or about February 23. You must write the final exam at the scheduled time as per Camosun College's policy on final examinations. See camosun.ca/learn/calendar/current/procedures.html#academic.

6. Grading System
(Mark with "X" in box below to show appropriate approved grading system – see last page.)

| X | Standard Grading System (GPA) |

| | Competency Based Grading System |

7. **Recommended Materials to Assist Students to Succeed Throughout the Course**

- **Math Lab TEC 142:** You can get **free face-to-face tutoring** from the instructional assistants in the drop-in help centre. The hours are posted on the door and on the Math Department page http://camosun.ca/learn/programs/math/. The room is also available for you to study and work on math homework.

- **Important Dates:**

January 8	First day of class
January 22	Fee deadline
February 12	Family Day (no class)
February 13-16	Reading Break (no class)
March 14	Withdrawal deadline
March 30	Good Friday (no class)
April 2	Easter Monday (no class)
April 13	Last day of class
April 16-21, 23-24	Final exam period

8. **College Supports, Services and Policies**

Immediate, Urgent, or Emergency Support
If you or someone you know requires immediate, urgent, or emergency support (e.g. illness, injury, thoughts of suicide, sexual assault, etc.), **SEEK HELP**. Resource contacts @ http://camosun.ca/about/mental-health/emergency.html or http://camosun.ca/services/sexual-violence/get-support.html#urgent

College Services
Camosun offers a variety of health and academic support services, including counselling, dental, disability resource centre, help centre, learning skills, sexual violence support & education, library, and writing centre. For more information on each of these services, visit the **STUDENT SERVICES** link on the College website at http://camosun.ca/

College Policies
Camosun strives to provide clear, transparent, and easily accessible policies that exemplify the college's commitment to life-changing learning. It is the student's responsibility to become familiar with the content of College policies. Policies are available on the College website at http://camosun.ca/about/policies/. Education and academic policies include, but are not limited to, Academic Progress, Admission, Course Withdrawals, Standards for Awarding Credentials, Involuntary Health and Safety Leave of Absence, Prior Learning Assessment, Medical/Compassionate Withdrawal, Sexual Violence and Misconduct, Student Ancillary Fees, Student Appeals, Student Conduct, and Student Penalties and Fines.

A. GRADING SYSTEMS *http://camosun.ca/about/policies/index.html*

The following two grading systems are used at Camosun College:

1. Standard Grading System (GPA)

Percentage	Grade	Description	Grade Point Equivalency
90-100	A+		9
85-89	A		8
80-84	A-		7
77-79	B+		6
73-76	B		5
70-72	B-		4
65-69	C+		3
60-64	C		2
50-59	D		1
0-49	F	Minimum level has not been achieved.	0

2. Competency Based Grading System (Non GPA)

This grading system is based on satisfactory acquisition of defined skills or successful completion of the course learning outcomes

Grade	Description
COM	The student has met the goals, criteria, or competencies established for this course, practicum or field placement.
DST	The student has met and exceeded, above and beyond expectation, the goals, criteria, or competencies established for this course, practicum or field placement.
NC	The student has not met the goals, criteria or competencies established for this course, practicum or field placement.

B. Temporary Grades

Temporary grades are assigned for specific circumstances and will convert to a final grade according to the grading scheme being used in the course. See Grading Policy at http://camosun.ca/about/policies/index.html for information on conversion to final grades, and for additional information on student record and transcript notations.

Temporary Grade	Description
I	*Incomplete*: A temporary grade assigned when the requirements of a course have not yet been completed due to hardship or extenuating circumstances, such as illness or death in the family.
IP	*In progress*: A temporary grade assigned for courses that are designed to have an anticipated enrollment that extends beyond one term. No more than two IP grades will be assigned for the same course.
CW	*Compulsory Withdrawal*: A temporary grade assigned by a Dean when an instructor, after documenting the prescriptive strategies applied and consulting with peers, deems that a student is unsafe to self or others and must be removed from the lab, practicum, worksite, or field placement.