

**Course Syllabus (Section A)**  
**Department of Engineering Mathematics & Internetworking**  
MATH 1290 (online)  
Engineering Mathematics II  
Winter 2021

- Instructor:** Dr. Edward Yao, Edward.Yao@Dal.Ca  
Office: O'Brien Hall Room 210, Sexton Campus. Tel: 902-494-3921
- Lectures:** Video-recorded lectures will be posted on Brightspace (asynchronous) – see Schedule
- Tutorials:** Video-recoded tutorials will be posted on Brightspace (asynchronous) – see Schedule
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### Course Description

This course is a sequel to MATH 1280.03. All topics of MATH 1010.03 are covered, but in greater depth. This course also introduces the students to the application of mathematics in engineering problems.

### Course Prerequisites

MATH 1280.03

### Learning Objectives

- Develop students' conceptual understanding of single variable functions in terms of integration applications and techniques, differential equations (elementary), sequences and series, and parametric and polar curves.
- Train students to efficiently perform fundamental calculations involved in these topics.
- Introduce engineering-related applications of this knowledge and skills.

### Learning Outcomes

1. Effectively write mathematical solutions in a clear and concise manner.
2. Demonstrate ability to think critically by recognizing patterns and, determining and using appropriate techniques for solving a variety of integration and differentiation problems.
3. Demonstrate ability to think critically by setting up and solving application problems involving definite integrals.
4. Demonstrate an intuitive and computational understanding for calculus applications by solving a variety of problems from physics, engineering, and mathematics.

### Course Materials

#### Textbook

Calculus - Early Transcendentals - third edition by Briggs and Cochran. This text covers both single (Chapters 1- 12) and multiple (Chapters 13 – 17) variable calculus topics. Specifically, it is used in MATH 1280 (Chapters 1- 5), **MATH 1290 (Chapters 6 – 12)** and as a reference for ENGM 2101 (Vector Calculus) (Chapters 13 - 17), a must-have for taking both MATH 1280 and **MATH 1290**. An eText of its

single variable calculus can be purchased through Dalhousie University Bookstore at [Dalhousie University Bookstore](#). Please note: MyLab Math is not required for both MATH 1280 and **MATH 1290**.

### Web Resources

See Brightspace for the course syllabus, announcements, video-recorded lectures and tutorials, assignment problems and solutions, quiz answers, attending live Collaborate Ultra Q & A sessions conducted by TA's, posting questions on the Discussions Board, submitting course deliverables, etc. Log in using your Dal NetID. You should see a link to the course MATH 1290.

### Course Assessment

Component	Weight (% of final grade)	Date
<i>Assignments</i>		
Assignment 1 (Parts A-D)	2%	January 18
Assignment 2 (Parts A-D)	2%	January 25
Assignment 3 (Parts A-C)	2%	February 1
Assignment 4 (Parts A-B)	2%	February 8
Assignment 5 (Parts A-C)	2%	February 22
Assignment 6 (Parts A-C)	2%	March 1
Assignment 7 (Parts A-C)	2%	March 8
Assignment 8 (Parts A-C)	2%	March 15
Assignment 9 (Parts A-C)	2%	March 22
Assignment 10 (Parts A-D)	2%	April 5
<i>Quizzes</i>		
Quiz 1	20%	February 4
Quiz 2	20%	March 4
Quiz 3	20%	March 18
Quiz 4	20%	April 8
<i>(Final exam)</i>		

Quiz 4, i.e., the last Quiz, is treated as the final exam for this course.

### Conversion of numerical grades to Final Letter Grades follows the Dalhousie Common Grade Scale

A+ (90-100)	B+ (77-79)	C+ (65-69)	D	(50-54)
A (85-89)	B (73-76)	C (60-64)	F	(<50)
A- (80-84)	B- (70-72)	C- (55-59)		

## Course Policies

### Assignments

All ten Assignments count. No late assignments will be accepted. Assignments must be submitted in a single PDF with a required assignment cover sheet by 13:35 on the due dates. Assignments missing a required cover sheet will not be marked. Assignments must be completed independently. Copying of others' assignment work is strictly forbidden. Please use the **Student Absence Reporting** link given in the Course Syllabus (Section B) for any *legitimately* late or missed assignments up to a maximum of two times. Upon approved by the Associate Dean's Office, the missed work will be granted a waiver.

**Subset-marking policy** is adopted for all Assignments.

### Quizzes

All four Quizzes count. All four Quizzes are timed. No late quizzes will be accepted. No calculators of any kind are allowed for quizzes except for those specified. Quizzes must be submitted in a single PDF with required cover sheets by the deadlines. Quizzes must be completed independently. Chegg.com and the like on-line tutoring services are strictly forbidden to access during any of the given 24-hour quiz periods. Please use the **Student Absence Reporting** link given in the Course Syllabus (Section B) for any *legitimately* late or missed quizzes. If missed one quiz and upon approved by the Associate Dean's Office, the missed quiz will be replaced by a comprehensive test being held on Wednesday April 7 only. If missed multiple quizzes during the term, the student(s) will be reported to the Associate Dean's Office for its final academic decision.

## Course Content

### Course Outline

1. Applications of integration: regions between curves, volume by slicing and shells, length of curves, surface area, physical applications. (Chapter 6)
2. Logarithmic and exponential functions: exponential models. (Chapter 7)
3. Integration techniques: integration by parts, trigonometric integrals, trigonometric substitutions, partial fractions, numerical integration, improper integrals. (Chapter 8)
4. Differential equations (elementary): direction field and Euler's method, separable differential equations, special first-order linear differential equations, modeling with differential equations. (Chapter 9)
5. Sequences and infinite series: sequences, infinite series, the divergence, integral, comparison, ratio, and root tests, alternating series. (Chapter 10).
6. Power series: approximating functions with polynomials, properties of power series, Taylor series, working with Taylor series. (Chapter 11)
7. Parametric and polar curves: parametric equations, polar coordinates, calculus in polar coordinates. (Chapter 12)

### Schedule

Instruction:

1. Video-recorded lectures will be released on Brightspace at 13: 35 on MWF as per on-line academic timetable. Video-recorded tutorials will be released only on MF between 18:00 – 24:00.

2. Not all sections in Chapters 6 – 12 are covered in the lectures. They are Sections 6.1, 7.1, 7.3, 8.1, 8.6, 8.7, and 12.4. These sections are assigned as reading materials. There will be no tutorials and assignments for these sections.
3. Live Collaborate Ultra Q & A sessions conducted by three TA's are held on Wednesdays and Fridays in three timeslots: morning session 9:00 – 10:00, afternoon session 16:00 – 17:00, and evening session 21:00 – 22:00. Students are free to join any of these sessions. Please note: Q & A sessions are not tutorials and attendance are not mandatory.
4. Times mentioned hereby are referred to Atlantic Time – Halifax, Canada.

Week	Date	Material re Lecture, Tutorial, and Assignment
1	Jan 6	Introduction to MATH1290
	Jan 8	LEC-01: Sec 6.2 Regions Between Curves (pages 416 – 420)  Assignment 1 (Part A): Sec 6.2 10, 20, 30 TUT-01: Sec 6.2 9, 19, 29  No Q/A sessions for Week 1
2	Jan 11	LEC-02: Sec 6.3 Volume by Slicing (pages 425 – 434)  Assignment 1 (Part B): Sec 6.3 26, 28, 52 TUT-02: Sec 6.3 25, 27, 49
	Jan 13	LEC-03: Sec 6.4 Volume by Shells (pages 439 – 447)  Assignment 1 (Part C): Sec 6.4 36, 48  Q/A sessions open
	Jan 15	LEC-04: Sec 6.5 Length of Curves (pages 451 – 455) Sec 6.6 Surface Area (pages 457 – 462)  Assignment 1 (Part D): Sec 6.5 18 TUT-03: Sec 6.4 37, 47 Sec 6.5 17  Assignment 2 (Part A): Sec 6.6 16  Q/A sessions open  Jan 15: Last day to drop winter term courses with no financial implications







		<p>Assignment 7 (Part C): Sec 10.5 21, 44  TUT-15: Sec 10.4 9, 17, 31, 41  Sec 10.5 20, 43</p> <p>Q/A sessions open</p>
9	<p>Mar 8</p> <p>Mar 10</p> <p>Mar 12</p>	<p>Assignment 6 returning, Assignment 7 (including Parts A - C) due</p> <p>LEC-22: Sec 10.6 Alternating Series (pages 688 – 694)</p> <p>Assignment 8 (Part A): Sec 10.6 16, 26, 34, 52, 58  TUT-16: Sec 10.6 17, 19, 33, 55, 60</p> <p>LEC-23: Sec 10.7 The Ratio and Root Tests (pages 696 – 700)</p> <p>Assignment 8 (Part B): Sec 10.7 16, 26, 44</p> <p>Q/A sessions open</p> <p>LEC-24: Sec 10.8 Choosing a Convergent Test (pages 700 – 701)</p> <p>Assignment 8 (Part C): Sec 10.8 14, 44  TUT-17: Sec 10.7 17, 25, 43  Sec 10.8 13, 33</p> <p>Q/A sessions open</p>
10	<p>Mar 15</p> <p>Mar 17</p> <p>Mar 18</p>	<p>Assignment 7 returning, Assignment 8 (including Parts A - C) due, Quiz 3 Info sheet and Quiz 3_Demo video released</p> <p>LEC-25: Sec 11.1 Approximating Functions with Polynomials (pages 708 – 718)</p> <p>Assignment 9 (Part A): Sec 11.1 10, 38, 42, 60  TUT-18: Sec 11.1 9, 37, 41, 59</p> <p>LEC-26: Sec 11.2 Properties of Power Series (pages 722 – 729)</p> <p>Assignment 9 (Part B): Sec 11.2 12, 18, 34, 44, 54, 62, 70</p> <p>Q/A sessions open</p> <p><b>Quiz 3 (00:01 am – 11:59 pm)</b></p>



	Mar 19	<p>LEC-27: Sec 11.3 Taylor Series (pages 731 – 740)</p> <p>Assignment 9 (Part C): Sec 11.3 10, 46, 56  TUT-19: Sec 11.2 13, 19, 33, 41, 51, 61, 71  Sec 11.3 13, 47, 53</p> <p>Q/A sessions open</p>
11	<p>Mar 22</p> <p>Mar 24</p> <p>Mar 26</p>	<p>Assignment 8 returning, Assignment 9 (including Parts A - C) due</p> <p>LEC-28: Sec 11.4 Working with Taylor Series (pages 742 – 747)</p> <p>Assignment 10 (Part A): Sec 11.4 8, 34, 38, 64  TUT-20: Sec 11.4 9, 33, 37, 63</p> <p>LEC-29: Sec 12.1 Parametric Equations (pages 753 – 763)</p> <p>Assignment 10 (Part B): Sec 12.1 18, 42, 54, 76, 78, 82</p> <p>Q/A sessions open</p> <p>LEC-30: Sec 12.2 Polar Coordinates (pages 767 – 775)</p> <p>Assignment 10 (Part C): Sec 12.2 12, 26, 34, 48, 58  TUT-21: Sec 12.1 17, 41, 55, 73, 77, 81  Sec 12.2 13</p> <p>Q/A sessions open</p>
12	<p>Mar 29</p> <p>Mar 31</p> <p>Apr 2</p>	<p>LEC-31 Sec 12.3 Calculus in Polar Coordinates (pages 779 – 785)</p> <p>Assignment 10 (Part D): Sec 12.3 26, 38, 68  TUT-22: Sec 12.2 25, 33, 45, 57  Sec 12.3 25, 39, 67</p> <p>No lecture  Q/A sessions open (no more Q/A sessions after Mar 31)</p> <p>Good Friday, University closed</p>
13	Apr 5	<p>Assignment 10 (including Parts A - D) due, Quiz 4 Info sheet and Quiz 4_Demo video released</p> <p>No lecture</p>



	Apr 7	No lecture
	<b>Apr 8</b>	<b>Quiz 4 (00:01 am – 11:59 pm)</b> Assignment 10 returning  Apr 8: Last day to drop winter term classes with a “W”