MATH 1172 (24060) - ENGINEERING MATHEMATICS A, SPRING 2021

Contents

1. General course outline and what this is about

You can find the general course outline of the main campus course here. I only recommend that you look at the additional material and the sample exams there, as assessments and course policies are specific to this course section. You can find this information below, together with a brief course description, and a few tips on how to succeed in this class. Check out the "Course resources" section as well.

I will refer you to this syllabus whenever you have a question that can find an answer here. I have put effort in trying to make this syllabus helpful and useful for you, so you should try to read it.

2. Course information

Course Instructor: Marco Vergura. (You can call me "Marco".)
Email: vergura.1@osu.edu

Course Period: The courses runs from January 11 to Apr 21.
Time & Place: Classes will be **MF 11.10 am-12.30 pm, and W 10.20 am - 12.25 pm online, via Zoom**. Check the announcement "Online classes" on Carmen for instructions and details on how Zoom's classes will work.
Office hours: **M 9-10 am, T 4.30-5.30 pm and F 1.45-2.45 pm via Zoom**. Office hours will start on January 12. **No appointments are needed.**

Prerequisites: A grade of C- or above in 1114 (114), 1151, 1156, 1161.xx, 152.xx, 161.xx, or 161.01H. Not open to students with credit for 1152, 1534 (153.xx), or 1544 (154), or for any Math class numbered 1172 or above, or for any quarter-system Math class numbered 254.xx or above. Not open to students majoring in Math, pre-Actuarial Science, or Actuarial Science. This course is available for EM credit.

Textbook: Ximera, Calculus 2. This is a free ebook that is available on Carmen, under "Files".

3. Course description & GEC Information

his mathematics course can be used, depending on your degree program, to satisfy the Quantitative and Logical Skills category of the General Education Requirement (GEC).The goals and learning objectives for this category, and also for this course, are the following.

- **Goals**: To master the essentials of Integral Calculus and its applications, and to develop the computational and problem solving skills for that purpose.
- **Learning outcomes**: To understand the basic techniques and applications of Integral Calculus, including applications of integration, integration techniques, sequences and series, Taylor series and their applications, working with parametric equations and polar coordinates, developing the component description of vectors, working with functions of several variables.

4. Assessments

The assessments for this course will be as follows. (You can find more details about the various assessments after the grading scale.)

Assessment	**Description**	**Points**
Homework	Five homework assignments	25 per assignment, for a maximum of 100 points: the grade of the lowest-scored assignment will be dropped.
Periodic Exams	Four take-home exams	90 per exam, for a maximum of 270 points: the grade of the lowest-scored exam will be dropped.
Final exam	One comprehensive take-home final exam, covering all the topics of the course	130
Total	**4/5 Homework assignments + 3/4 Exams + Final Exam**	**500**

This is the tentative **grading scale** that we will use. Adjustments **might** be made at the end of the term. **Grades are final, non-negotiable and will not be discussed, in any case, via email**.

Grade	**Range**	**Grade**	**Range**
A	$448 - 500$ (90%)	A-	$434 - 447$ (87%)
B+	$414 - 433$ (83%)	B	$398 - 413$ (80%)
B-	$381 - 397$ (77%)	C+	$364 - 380$ (73%)
C	$348 - 363$ (70%)	C-	$334 - 347$ (67%)
D+	$314 - 333$ (63%)	D	$295 - 313$ (59%)
E	$0 - 294$		

Here are more details about the various assessments.

Homework. Each homework assignment will be made **available on Wednesday** (via Carmen/Canvas) and will be **due on Friday of the week after within 11.05 am**. (Holidays might change the due date.) Submit your homework on Carmen through the "Assignment" tab. You can write your assignment on paper, and then upload pictures of it, **as a single .pdf file**, or you can complete your assignment through a writing software on a tablet (e.g., via Notability), and upload the generated .pdf file. Your paper(s) should contain the headline:

"Math 1172, Assignment #, First and last name"

Write legibly: I will not mark what I can not read. A detailed submission schedule can be found in the weekly outline below. The general policy is that **no late assignments will be accepted**, but see the "Course policies" for more details.

The main purpose of these assignments is **feedback**. You will receive feedback based on the work you show, and I will use the results of these assignments to have a better idea of the level of understanding of the class. Because of this, it is paramount that **the homework contains your work and your work only**. If you submit an assignment made or thought by others (including the Internet), not only you are committing academic misconduct, but, more importantly, the feedback you will receive will be useless, because it will not be addressing your misconceptions and mistakes. Furthermore, this will likely result in you doing worse on, or failing, the various exams. You can still talk with your classmates or with me about the homework assignments, but, ultimately, you should be the one sitting down and solving the exercises.

In line with the above feedback intent, **you will be able to receive a perfect score** (25/25) **even if your assignment is not perfect**, that is, even if make a computation mistake or two. What I want to see is a balance between a certain **degree of accuracy** and a **meaningful effort** in solving these exercises. (Note the word meaningful.)

Periodic Exams. The periodic exams are scheduled on the following days.

- **Exam 1: Friday, Jan 29.** Book sections covered: $1 - 5$.
- **Exam 2: Friday, Feb 19.** Book sections covered: $7 - 14$.
- **Exam 3: Friday, March 12.** Book sections covered: $15 - 23$.
- **Exam 4: Monday, Apr 5.** Book sections covered: $24 - 30$.

(Book sections covered per exam might change, depending on the actual lectures' pace.) Each exam will be **a 24-hr, open-book, take-home exams, on which you pledge your honor to work on your own**. Exams will be available on Carmen at 11.05 am on the scheduled days, and will have to be submitted through the "Assignments" tab by 11.10 am the day after. The exams will consist of exercises similar, or related, to the exercises that we solve in class, the exercises in the homework, and the suggested exercises. Thus, the best way to prepare for these exams is to **do the suggested exercises/homework and come to classes**. For full credits, you need to show all your work. See the "Course policies" section for missed exams policies.

Final Exam. The final exam will be **cumulative**, covering all topics of the course. The final exam will be a **48-hr, open-book, take-home exam, on which you pledge your honor to work on your own**. The final exam will be made **available on Tuesday, April 27 at 10.20 am and it will be due on Thursday, April 29 at 10.20 am**. On Wednesday, April 28, 10.20 am - 12.05 pm, I will be available on Zoom should you have any questions about the exams' exercises.

5. Weekly outline

You will find below a tentative breakdown of the course content. Changes to this schedule are likely to happen.I will **keep a lecture diary with the topics covered in each class on Carmen/Canvas, which you should consult regularly**. We will be covering **A LOT** of topics: keep up with them.

Week #	**Description**	**Assessments**	**Book sections**
1 (Jan 11-15)	Review of integration, area between curves, solids of revolution.	None	$1-3$
2 (Jan 19-22)	Solids of revolution, length of curves.	Homework 1 due (Jan 22)	$4,5$
3 (Jan 25-29)	Integration by parts, trigonometric integrals, trigonometric substitution.	Exam 1 (Jan 29)	$7-9$
4 (Feb 1-5)	Trigonometric substitution, partial fractions.	None	$9-10$
5 (Feb 8-12)	Improper integrals, sequences and limits of sequences, sums of sequences.	Homework 2 due (Feb 12)	$11-14$
6 (Feb 15-19)	Convergence tests, approximating functions with polynomials.	Exam 2 (Feb 19)	$15-17$
7 (Feb 22-26)	Power series, Taylor series.	None	$18-21$
8 (Mar 1-5)	Parametric curves, polar coordinates.	Homework 3 due (Mar 5)	$21-23$
9 (Mar 8-12)	Polar coordinates, vectors.	Exam 3 (Mar 12)	$24-27$

Week #	Description	Assessments	Book sections
10 (Mar 15-19)	Dot and cross products, lines and curves in space(s)	None	$28-30$
11 (Mar 22-26)	Vector-valued functions, parametrizing by arc-length.	Homework 4 due (Mar 26)	$31-32$
12 (Mar 29 - Apr 2)	Normal vectors, functions of several variables	None	$33-34$
13 (Apr 5-9)	Limits and continuity, partial derivatives and gradients.	Exam 5 (Apr 5)	$35-36$
14 (Apr 12-16)	Differentiability and tangent planes, chain rules for directional derivatives.	Homework 5 due (Apr 16)	$37-38$
15 (Apr 19-23)	Review.	None	

6. Course policies

In-class expectations. Class attendance is not compulsory, but I highly suggest you to come to classes, especially so that you can ask questions on the spot as we introduce new topics. Classes will be recorded and, on Carmen, you will be provided with a video and audio recording, an audio-only recording, and a .pdf file that puts together all the whiteboard screens I will write during each class. You **are responsible for the content of every class you miss**: come talk to me during office hours after you have put some serious effort to make up for the topics you missed.

Academic integrity. In this course, all the assessments are supposed to **show your work only**. Distance-learning is not an excuse for cheating. **If a suspect of cheating arises, I will proceed to report it as needed**. (See the "University Policies" section below.)

Accommodations and make-ups. You will be accommodated for a missed or late assessment if and only if **you have a valid excuse** (illness, including illness of people you need to take care of, compassionate reasons, sudden changes in work shifts, etc.). A missed or late assessment without a valid excuse will result in a score of zero for that assessment. If a valid reason applies, these are the kinds of accommodations you can expect for each type of assessment.

- **Homework assignments.** Missed homework assignments will generally result in a grade of 0. (Recall that only 4 out of 5 homework assignments will count towards your final grade.) If it is viable, an extension to the submission deadline might be given: if you think you have a legitimate reason for an extension, let me know **before the homework's deadline**.
- **Periodic exams.** The final exam score will be used as your score for a missed exam. If it is viable, an extension to the submission deadline might be given: if you think you have a legitimate reason for an extension, let me know **before the exam deadline**.
- **Final exam.** Submission extensions might be given.

As soon as you know there is an issue with meeting a deadline, please notify me. In particular, it should be **before the exam in question**, except in case of emergency.

Office hours. Office hours give you the opportunity to **ask questions about the course material and about exercises**. You should feel free to ask me about anything related to the course that is unclear to you. If you have issues with an exercise, it is a good idea to first try to solve the exercise by yourself and show me your work, so that my explanations can be more focused and targeted. **Solutions to homework will not be given during office hours**, but we can still discuss about the topics covered in the homework exercises, and look at similar exercises.

Communications. I will only reply to OSU email addresses or to messages sent via Carmen (preferred). Write "Math 1172" on the subject line, if you are sending an email outside of Carmen. **I will send out communications about the course via the Carmen inbox, so you should check your account every day**.

7. University policies

Disability Statement. Students with disabilities that have been certified by Student Life Disabilities Services (SLDS) will be appropriately accommodated and should inform the instructor as soon as possible of their needs. SLDS contact information: (740) 366-9441; Warner Center 226.

Mental Health Statement. As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. The Ohio State University offers services to assist you with addressing these and other concerns you may be experiencing. If you or someone you know are suffering from any of the aforementioned conditions, you can learn more about the broad range of confidential mental health services available on campus via the Office of Student Life's Counseling and Consultation Service (CCS) by visiting `ccs.osu.edu` or calling 614-292-5766. CCS is located on the 4th Floor of the Younkin Success Center and 10th Floor of Lincoln Tower. You can reach an on call counselor when CCS is closed at 614-292-5766 and 24 hour emergency help is also available through the 24/7 National Suicide Prevention Hotline at 1-800-273-TALK or at `suicidepreventionlifeline.org`.

Academic Misconduct. It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-48.7). For additional information, see the Code of Student Conduct.

Diversity, Equity, and Inclusion at OSU. The Ohio State University affirms the importance and value of diversity in the student body. Our programs and curricula reflect our multicultural society and global economy and seek to provide opportunities for students to learn more about persons who are different from them. We are committed to maintaining a community that recognizes and values the inherent worth and dignity of every person; fosters sensitivity, understanding, and mutual respect among each member of our community; and encourages each individual to strive to reach their own potential. Discrimination against any individual based upon protected status, which is defined as age, color, disability, gender identity or expression, national origin, race, ethnicity, religion, sex, sexual orientation, or veteran status, is prohibited. If you should have a complaint or concern, please utilize the following list to notify the appropriate contact: https://newark.osu.edu/students/complaint-and-concern.html

8. Course resources

There is a webpage for the course on Carmen/Canvas. The main resources you will find there are the following.

(1) **A copy of this syllabus.**

(2) **A lecture diary**, containing information about what is covered during each class, what I expect to cover in the next class (so that you can read up topics in advance), and the due date of each homework assignment.

(3) **Lecture notes**. I will upload lecture notes on the topics we cover in class. (Each lecture note might include the topics of more than one class.) These notes cover the same topics as the book, and refer to the various book's sections so you might consult the book rather than the notes, if that works better for you. The notes will contain **"Practice problems"**: we will do some of them in class, while the remaining problems are simply more exercises for you. Here is how you should approach these notes.

   (a) **First, you come to class and take notes**. Taking notes helps your learning process, and you can organize the material in a way that makes the most sense to you.
   (b) At home, you **compare and integrate your notes with the online ones**, paying particular attention to the parts of your notes that you find less clear or more confusing, and to the solved exercises. As you go through the online notes, you can do the **practice problems** that were not done in class.
   (c) Finally, you **compare and integrate your revised notes with the textbook**, to see if there is anything missing, or anything that makes more sense to you as written in the book rather than as done in class.

(4) A series of files containing **practice exercises** (taken from the course catalogue from the main Campus). You need to **first review your lecture notes** as established above, and **then attempt the exercises** for the corresponding sections. Do not reverse the order of these operations, at least if you care about doing well in this course.

(5) The **text and solutions of each homework assignment**, as they become available.

(6) The **text and solutions of each exam**.

9. How to Help Yourself Learn

Learning new topics in Math and being a University student is often challenging, but no worries, you will get through it! Here are some tips that can help your learning process.

- **Keep up with classes.** The topics that will be covered in this course build one on the other and they can easily feel overwhelming if you do not dedicate enough time to **study these topics as you encounter them**. If you do not keep up, you will not be able to follow lectures. Students that work at a consistent pace throughout the term and do self-directed exploration of topics tend to achieve better results in university-level mathematics courses. Attending classes as well as being attentive and asking for explanations during lectures are great ways to make sure you **dedicate profitable time to your learning**. Keeping up with classes includes **doing your homework assignments**.
- **Do the suggested exercises.** In order for you to accumulate enough expertise in the various topics and consolidate your understanding, it is fundamental that you do enough exercises to test your knowledge. This is the reason why you should do as many exercises as needed to make sure you are comfortable with the material — and, after that, do a few more of them. Note that the point is not for you to learn how to solve exercises by heart, but to gain sufficient experience in finding solutions.
- **Learn from your mistakes.** Learning does not come without misconceptions and mistakes. Not only mistakes are completely fine (I make them too!), but overcoming them often leads to a deeper level of knowledge. Learning to understand why a mistake is such is also the reason why **you should try to solve an exercise by yourself before asking for help** (see below), so that the answers and the feedback you receive can be targeted to solve the specific problems you encountered.
- **Seek Help.** There is no reason to struggle with topics on your own when there are plenty of options to help you in your studying! First of all, you are more than welcome to ask me questions about specific aspects of a class during the class itself or at the end of it. For more general concerns or questions that require longer explanations, you can come see me during my office hours. On top of the help I can give you, you can check out the **Math center**.
- **Check the additional University resources for students:**
  - The Ohio State University Wexner Medical Center's Cornavirus Outbreak site includes the latest information about COVID-19 as well as guidance for students, faculty and staff.
  - The Keep Learning site includes tips and resources to help students make the shift to online learning, addressing strategies for success as well as technology tools.

– The Office of Student Life's "We Are Here For You" page includes several resources to support students' mental, physical and financial health