

MATH 1005 Differential Equations and Infinite Series for Engineering or Physics; Section A, Fall 2021

Instructor	Mark Blenkinsop
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Office Hours	There will be no formal office hours, so email is best. Any questions related to course operation should be emailed to the Professor. Any questions regarding tutorial, tests, assignments, or homework should be emailed to the TAs. (TA email addresses will be posted on BrightSpace).
Lectures	Zoom sessions will be held to review key topics, and to go over examples from the notes. These sessions will be recorded and posted on BrightSpace. During these sessions, the emphasis will be on completing examples, not explaining definitions (etc.). Please come prepared, but questions are always welcome!
Notes	Previous year's notes and additional content will be posted. The relevant portions must be reviewed prior to the associated Zoom session.
Zoom Sessions	Weekly Zoom Sessions will be held on a yet-to-be-determined schedule. They will be recorded and posted. Attendance is encouraged, but not required.
Tutorials	TAs will present tutorials from the Tutorial Manual every week. The <i>Tutorial Compendium</i> is a highly recommended resource - it is a record of all possible tutorial questions, with full solutions, you can possibly be asked!
Assignments	Assignments will be due at regular intervals throughout the term. Please note posting and due dates as they are announced.
Tests	Tests will be online, hosted on BrightSpace on October 15 th and November 26 th . They will be timed, but accessible for a 24 hours period. There will be no make up tests .
Textbook	<i>Ordinary Differential Equations And Infinite Series, 2nd Edition</i> , by Sam Melkonian, Top Hat Monocle (available as eBook from the Carleton University Bookstore).
Tutorial Manual	<i>The Tutorial Compendium for Differential Equations And Infinite Series, 2nd Edition</i> by Mark Blenkinsop, Prometheus Press (available as eBook - coming soon).
MS-LAP	Math & Stats Learning Assistance Program supports first year mathematics courses. It helps students achieve their goals by providing learning support and solutions to homework questions through assistance videos, available on BrightSpace
Grading	Assignments (3 in total, each worth 10%): 30% Tests (2 in total, each worth 20%): 40% Final Exam: 30%

Evaluation

- Scientific calculators and online calculators are permitted in this course, and it is worthwhile learning all functions they have to offer, however, direct copying of solutions of any kind is not permitted (see below).
- Tutorials are compulsory, but not graded. They form one of the best opportunities for learning, and are an integral part of overall understanding, and preparation for tests and the final exam. The listed Tutorial Compendium is a proven reference for students: It is a record of all tutorial questions **and** solutions you may face throughout the term, and serves as an excellent study guide. Tutorial manuals will be available in various formats (details TBA).
- Test(s) will be online, hosted on BrightSpace on the specified dates. They will be accessible for a 24 hours period, and will be timed. Please note that these dates **may or may not** coincide with scheduled lectures or tutorials. If the test is missed for valid reason, alternate arrangements will be made at the discretion of the Professor.
- Assignments are comprehensive: They are challenging, thorough, and encourage learning. You may seek outside assistance to solve problems, but direct copying of solutions of any kind is not permitted. Assignments must be submitted in pdf format - please familiarize yourself with scanning apps (e.g. CamScanner, etc.). Late submissions may be subject to penalty, at the discretion of the Professor. Please note all submission details as they are announced.
- All term grades must be resolved before the date of the final exam. Any changes after the fact will only be done at the discretion of the Professor.
- A 3-hour final examination will be held during the exam period, covering the entire course (e-proctoring software will **NOT be used**). The exam will be online, hosted on BrightSpace. The option of re-weighting any amount of the term towards the Final Exam is **NOT** available.

Conduct and Content Policies

- TAs are here to help! Anyone seeking assistance solving homework problems, tutorial topics, or assignment questions are encouraged to ask their TA.
- Zoom sessions will be held by the Professor on a weekly schedule (days and times TBA). They will be recorded and posted on BrightSpace. The objective is for students to have read the material in advance, so that the Zoom Session can be dedicated to **thoroughly solving examples live!**
- Violations of Carleton's Integrity Policy will be dealt with in a formal fashion. All suspected incidents will be forwarded to The Office of The Dean of Science. Students are expected to be familiar the Academic Integrity Policy.
- Plagiarism is a specific matter of Academic Integrity. Plagiarism includes reproducing or paraphrasing portions of someone else's published or unpublished material, regardless of the source, and presenting these as one's own without proper citation or reference to the original source. In mathematics, an answer **can not** be plagiarized, but the **presentation of its solution can!** Thus, copying answers from fellow students, online posts, or online calculators (such as Wolfram, Symbolab, etc.) is strictly prohibited.
- All classroom teaching and learning activities (lectures and tutorials), and online content is COPYRIGHTED. Students are encouraged to use the notes and download any and all course materials for their own educational use. However, students are NOT PERMITTED to post or share files externally, or distribute content in any way without permission.

Accommodation Policies

- Students entitled to academic accommodations in this course must register with the Paul Menton Centre (PMC) for a formal evaluation, and have a Letter of Accommodation sent to the Professor by their Coordinator. Any such student must confirm their needs with the Professor before the first test or assignment. Students who require accommodations only for the final exam must request accommodations by the last official day to withdraw from classes.
- All other accommodations will be followed in accordance with University policy, and administered by the Office of Equity Services.

Generalized List of Topics for MATH 1005

General Differential Equations:

General and classic forms
Initial Value Problems (IVP)
Orthogonal trajectories

First Order DE's:

Separable
Homogeneous
Linear (with integrating factors)
Bernoulli
Exact (with integrating factors)

Second Order DE's:

Homogeneous with constant coefficients
Homogeneous Cauchy-Euler
Method of undetermined coefficients (MUC) to solve non-homogeneous equations
Variation of parameters (VOP) to solve non-homogeneous equations

Systems of DE's:

Solving 2-dimensional systems
Real and complex root solutions

Sequences and Series:

General definitions
Sums and partial sums
Geometric series
Tests for convergence
Conditional vs. absolute convergence

Power Series:

Functions as power series (exponential function, sine, cosine, and sum of geometric series)
Radius and interval of convergence
Taylor Series (and MacLaurin Series) methods

Fourier Series:

Periodicity
Even and odd extensions
Full Fourier series (definitions and required formulas)
Sine Fourier series (definitions and required formulas)
Cosine Fourier series (definitions and required formulas)