TENTATIVE OUTLINE

MATH 1005 Differential Equations and Infinite Series for Engineering or Physics; Section C and D, Fall 2022

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Office Hours There will be no set office hours, so speaking to me before or after class 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 Held **in-person** at the posted lecture times in Azrieli Theatre. We will review key topics and go over examples from the notes. During these sessions, the emphasis will be on completing examples, not explaining definitions (and the like), so please come prepared, BUT: **Any and all of your questions are always welcome!**

Notes **Previous year's** notes and additional content will be posted on BrightSpace. The relevant portions must be reviewed prior to associated lectures - you will be notified!

Tutorials Start on or after September 16th, held in-person at the posted times and locations. Room assignments will be communicated before the first tutorial. TAs will present tutorials from the Tutorial Manual every week. The *Tutorial Compendium* is a highly recommended resource - it is a record of all possible tutorial questions, with full solutions, you can possibly be asked!

Tests Tests will be held **in-person** during tutorial on dates **to be determined**. There will be **no make up tests**.

Textbook *Ordinary Differential Equations And Infinite Series, 2nd Edition*, by Sam Melkonian, Top Hat Monocle (available as eBook from the Carleton University Bookstore, hardcover from Haven Books).

Tutorial Manual *The Tutorial Compendium for Differential Equations And Infinite Series, 2nd Edition* by Mark Blenkinsop, Prometheus Press (available from the Professor).

Grading

Tests (best 3 out of 4, each worth 15%):	45%
Final Exam:	55%

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 - plagiarism).

• Tutorials are compulsory. 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. In fact, content in tutorial is testable - just like lecture content. 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).

• Tests will be held in-person during tutorial on the specified dates. The outline may indicate a **Best Test Scheme**, so no reason is required for missing a test within these parameters. No make up tests will be offered for any reason!

• (**NOT APPLICABLE TO MATH 1005**) 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. Late submissions may be subject to penalty, at the discretion of the Professor. No assignments will be accepted once solutions are made public. Please note all submission details as they are announced.

• A 3-hour final examination will be held during the exam period, covering the entire course. The exam will be **in-person**, and no online alternative can be offered. The option of re-weighting any amount of the term towards the Final Exam is **NOT** available.

Conduct and Content Policies

• COVID has put stresses on many of us, and left many things uncertain. In particular, I, the Professor, have little kids, and they are obviously my priority. Please keep all of these kinds of factors in mind as we navigate through this course.

• TAs are here to help! Anyone seeking assistance solving homework problems, tutorial topics, or assigned questions are encouraged to ask their TA – they can likely respond faster, and be more available for one-on-one help than the Professor.

• The Professor, the TAs, and all students have the Right to Disconnect. None of us can expect 24/7 responses from anyone else. Only under certain circumstances would urgent matters be communicated, and they will be clearly marked.

• 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.

• **Copyright violation** is another specific matter of Academic Integrity. 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 it can be applied to any evaluation element (test, assignment, exam, etc.).

• 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)