Differential Equations and Infinite Series for Engineering or Physics (Math 1005 F, Fall 2020)

Instructor: Dr. Moussa Larbani

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Class Times: Monday & Wednesday 18:05 - 19:25  culearn
Tutorial Times: Wednesday 19:35 - 20:25  culearn
Office Hours: Wednesday 13:30 - 15:30  culearn
Or by appointment.

Classes will be online and asynchronous. The office hours start by Sept. 16.

Marking Scheme

<table>
<thead>
<tr>
<th></th>
<th>Assignment</th>
<th>11 (count best 8 out of 11)</th>
<th>20%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>In Tutorial Tests</td>
<td>4</td>
<td>40%</td>
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<tr>
<td></td>
<td>Final Exam</td>
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<td>40%</td>
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</tbody>
</table>

Text Book

Ordinary Differential Equations and Infinite Series. 2nd Edition Sam Melkonian. Nelson Publishing. (Hard copies available at the Carleton University Bookstore.)
<table>
<thead>
<tr>
<th>Week</th>
<th>Sections</th>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>Sec 1.1, 2.1, 2.3</td>
<td>Basic concepts, Separable equations, first-order Linear equations.</td>
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<tr>
<td>Week 2</td>
<td>Sec 2.2, 2.4, 2.5</td>
<td>Functions of two variables, Partial derivatives, The Chain Rule, Exact equations, Bernoulli’s equation, Homogeneous equations.</td>
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<tr>
<td>Week 3</td>
<td>Sec 3.1, 3.2</td>
<td>Homogeneous linear equations with constant coefficients, Cauchy-Euler equations, reduction of order.</td>
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<tr>
<td>Week 4</td>
<td>Sec 3.3</td>
<td>Nonhomogeneous linear equations, method of undetermined coefficients, variation of parameters.</td>
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<tr>
<td>Week 5</td>
<td>Sec 5.1</td>
<td>Linear systems.</td>
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<tr>
<td>Week 6</td>
<td>Sec 6.1</td>
<td>Linear systems, Sequences.</td>
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<tr>
<td>Week 7</td>
<td>Sec 6.2</td>
<td>The integral test, p-series, estimation of sums, The comparison tests.</td>
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<tr>
<td>Week 8</td>
<td>Sec 7.1</td>
<td>Alternating series, The ratio and root tests.</td>
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<tr>
<td>Week 9</td>
<td>Sec 7.2</td>
<td>Taylor polynomials and approximations, Power series.</td>
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<tr>
<td>Week 10</td>
<td>Sec 8.1</td>
<td>Representation of functions as power series, Taylor and Maclaurin series.</td>
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<tr>
<td>Week 11</td>
<td>Sec 8.2</td>
<td>Fourier series.</td>
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<tr>
<td>Week 12</td>
<td>Review</td>
<td>Fourier series. &amp; Review</td>
</tr>
</tbody>
</table>
- **Tutorial**: You are required to attend all tutorials.
  - During the tutorial, the TA will go through examples of some challenging questions that appear on the assignments/tests.
  - First day of tutorials is September 18, 2020.
- There will be **11 online assignments**.
  - Assignments are due each Friday at 11:59pm.
  - No late assignments will be accepted. No E-mail submission is accepted.
  - You need to submit a pdf file to cuLearn. Detailed instruction will be given in the assignment.
  - In case some students have difficulty to submit their assignment electronically, you may try these two apps: CamScanner and TapScanner. These apps can help you scan your assignment with a smart phone.
- **Online Tutorial Tests** will be **four 50-minutes, closed book** tests given during regular class time on **Wednesdays**, 18:05- 19:25, *on Sept. 30, Oct 14, Oct. 28, Nov 18, 2020*.
  - You are expected to take all the tests. **No makeup, early, or delayed tests.**
  - If you maintain at least 40% on every test, the lowest test will be dropped. The average of the best 3 tests will be used to determine the test component of your final mark 40%.
  - Students must bring their student card to each test, quiz and exam and place it on the desk where it is visible.
- **Checking the Test/Assignment Grades:**
  - It is your responsibility to make sure that your test/quiz marks are recorded correctly by visiting cuLearn.
  - Deadline to make any corrections on your test/quiz marks is within one week when you receive them.
Final Exam will be 3-hours, closed book exam based on wholeterm (cumulative).

- The questions will be like those seen on the tests, tutorials, and in the homework assignments.

- It is the responsibility of each student to be available at the time of the examination. Particularly, travel plans for the examination period in December 2020 should not be made until the examination schedule is published.

- Students wishing to see their examination papers must make an appointment within three weeks of the examination to do this. This examination review is for educational purposes only and NOT for negotiation of your grade. Please remember that we do not change your grade based on your needs (such as scholarships, etc.).

Passing Conditions: Students who fail to achieve a term mark of at least 40% OR fail to achieve a minimum mark of 40% on the final exam will automatically be assigned a grade of F in the course. Exceptions to this rule may be made at the discretion of the instructors.

Missing test:

- Students who must miss a test must inform me prior to the test and provide supporting documentation within one business day of the test date. If you provide adequate documentation (doctor’s note, etc.), then the weighting of that test will be placed on the final exam, otherwise a mark of 0 will be given for the test/quiz.

- The total weight of missing test transferred to final exam must be less than 20% of total mark.

Homework: Selected exercises, mainly from the text, will be posted on cuLearn. These exercises are not to be handed in and will not be graded. However, to succeed in the course it is absolutely essential that you do the exercises on a regular basis.

Calculators: Only non-programmable calculators are allowed for tests and the final exam. I reserve the right to confiscate any calculator during a test or final exam.
- **Course Information**: All course related materials (slides, assignments, solutions, grades, announcements) will be posted on cuLearn.
  
  - It is highly recommended that you print the course materials as we will be discussing the content presented in these materials.
  
  - It is your responsibility to keep up with information announced in class, on cuLearn, or sent to your Carleton e-mail account.

- **E-mail**: According to Carleton University policy under the Freedom of Information of Privacy Act (FIPPA), Please use your Carleton account ONLY for all course related email, and write your course code Math 1005 F on the subject line.

- **Copyright**: All course related materials (including slides, PDFs, assignments, solutions, and tests) are intended for personal use only and MAY NOT be reproduced or redistributed without prior written consent of the author(s).

- **Please be aware by registering in this course that you acknowledge that this course may use online proctoring tools**. These online proctoring tools could require you to identify yourself via webcam. Additionally, while you are completing the proctored exam, your activities will be monitored. This could include direct observation via webcam and by screen recording software. Evidence of academic misconduct during an exam will be treated seriously.

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### University Policies

- **Academic Integrity**: Students are required to be familiar with Section 10 of the Academic Regulations of Carleton University.
  
  - All tests, assignments, quizzes, and exams are to be done independently.
  
  - **Academic dishonesty in any form will not be tolerated**.
  
  - Students who violate the standards of academic integrity during a test/examination will receive a grade of zero for that test/examination and will be required to meet with the Associate Dean of Science for further disciplinary action.
Students with disabilities requiring academic accommodations in this course must contact a coordinator at the Paul Menton Centre for Students with Disabilities to complete the necessary Letters of Accommodation. After registering with the PMC, make an appointment to meet and discuss your needs with me in order to make the necessary arrangements as early in the term as possible. Please note the deadline for submitting completed forms to the Paul Mention Centre is Nov 13, 2020. For more details visit the PMC website.

Pregnancy obligation: write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit the Equity Services website.

Religious obligation: write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit the Equity Services website.

Math Tutorial Center: There is a mathematics and statistics help centre located at 1160 HP. For information visit the website http://www5.carleton.ca/math/handbook-2/tutorial-centre/

MS-LAP: Online support is available for this course through MS-LAP. You should automatically be registered in MS-LAP via CuLearn. You have access to online tutorial videos free of charge. For more information and tutorials on how to access MS-LAP, please see: https://carleton.ca/math/math-learning-assistance-program/

Withdrawal: The last day for academic withdrawal from the course is December 11, 2020.

For more information, please visit Dates and Deadlines.
The End

Last modified: Sunday 23rd August, 2020, 10:00 AM.