Course Instructor: Dr. J. Harnad, Office: LB 901-25 (SGW), Phone: 514-848-2424, Ext. 3242

Office Hours: Thursdays, 10:00-11:30 AM.

Prerequisites: MATH 264/265 or an equivalent multivariable calculus course. MAST 330 or an equivalent course in ordinary differential equations.


Assignments: Assignments are very important as they indicate the level of difficulty of the problems that the students are expected to solve and understand. Therefore, every effort should be made to do and understand them independently. The assignments will be corrected and a representative sample graded, with solution sets posted weekly. These grades together are worth a maximum of 10%.

Use of Computer Algebra System: It is optional but much recommended to install and use Maple or Mathematica. These computer tools can be used to verify and illustrate any analytical results you get while doing your assignment problems.

Calculators: Electronic communication devices (including cell phones) are not allowed in examination rooms. Only “Faculty Approved Calculators” (SHARP EL-531 or CASIO FX-300MS) are allowed in examination rooms during mid-term and final.

Test: A midterm test covering the first seven weeks will be given in week 8, worth 30% of the total grade.

Final Grade: The highest of the following:
- 100% final exam.
- 30% midterm, 10% assignments, and 60% final exam.

If the grading scheme for this course includes graded assignments, a reasonable and representative subset of each assignment may be graded. Students will not be told in advance which subset of the assigned problems will be marked and should therefore attempt all assigned problems.
### Approximate schedule of topics

<table>
<thead>
<tr>
<th>Week</th>
<th>Chapters</th>
<th>Topics</th>
<th>Assignments (Numbering: 9th edition)</th>
<th>Due date</th>
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</thead>
<tbody>
<tr>
<td>1. Jan. 9, 11</td>
<td>2.</td>
<td>First Order PDE’s: Linear PDE’s, constant coefficients, variable coefficients; higher dimensions.</td>
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<td>2. Jan. 16, 18</td>
<td>3.</td>
<td>The heat equation in 1 D; uniqueness, maximum principle, boundary conditions</td>
<td>1.</td>
<td>Jan. 23 (assignment 1)</td>
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<td>Midterm break</td>
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<td>7. Feb. 27, Mar. 1</td>
<td>5.</td>
<td>The wave equation in 1D. Boundary conditions; fixed or free ends; solution by Fourier series; Method of images.</td>
<td>6.</td>
<td>Mar. 8 (assignment 6)</td>
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<td>Date(s)</td>
<td>Topic(s)</td>
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<td>11. Mar. 27, 29</td>
<td>6. Laplace’s equation in 2D; complex variables, conjugate harmonic functions, conformal mapping</td>
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<td>12. April 3, 5</td>
<td>7. Fourier transforms and complex Fourier series; properties of Fourier transforms; convolution products; inversion problem, Parsefal’s equality; applications to PDE’s; heat problems for finite and semi-infinite rods</td>
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<td>13. April 10, 12</td>
<td>7. Fourier transforms and complex Fourier series; properties of Fourier transforms; convolution products; inversion problem, Parsefal’s equality; applications to PDE’s; heat problems for finite and semi-infinite rods</td>
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**Academic Integrity and the Academic Code of Conduct**

This course is governed by Concordia University’s policies on Academic Integrity and the Academic Code of Conduct as set forth in the Undergraduate Calendar and the Graduate Calendar. Students are expected to familiarize themselves with these policies and conduct themselves accordingly. “Concordia University has several resources available to students to better understand and uphold academic integrity. Concordia’s website on academic integrity can be found at the following address, which also includes links to each Faculty and the School of Graduate Studies: concordia.ca/students/academic-integrity.” [Undergraduate Calendar, Sec 17.10.2]