Coordinator: Prof. Nasser-eddine Tatar  
Course #: MATH 333  
Title: Methods of Applied Mathematics 1  
Textbook: Advanced Engineering Mathematics by Zill and Wright (Fifth Edition)

Course Description: Special functions. Bessel’s functions and Legendre polynomials. Vector analysis including vector fields, divergence, curl, line and surface integrals, Green’s, Gauss’ and Stokes’ theorems. Sturm-Liouville theory. Laplace transforms. Fourier series and transforms. Introduction to partial differential equations and boundary value problems in rectangular, cylindrical and spherical coordinates.

Prerequisite: MATH 202 or MATH 260

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Sections</th>
<th>Topics</th>
<th>Suggested Homework Problems</th>
</tr>
</thead>
</table>
| 1    | June 24-28   | 9.1, 9.5, 9.7, 9.8, 9.9 | Vector Functions  
The Directional Derivative  
Curl and Divergence  
Line Integral  
Independence of the Path | 1, 12, 16, 17, 21, 26, 33, 41  
2, 7, 9, 14, 17, 21, 23, 32, 29  
2, 6, 10, 14, 17, 22, 27  
2, 6, 8, 11, 16, 19, 24, 28, 33  
1, 10, 15, 18, 21, 26 |
|      | *June 30     | 9.12, 9.13, 9.14, 9.16 | Green’s Theorem  
Surface Integrals  
Stokes’ Theorem  
Divergence Theorem | 2, 4, 6, 9, 18, 23, 25  
2, 5, 10, 13, 18, 22, 25, 33  
1, 3, 6, 8, 13, 17  
2, 4, 7, 11, 14 |
| 3    | July 8-12    | 4.1, 4.2, 4.3, 4.4, 4.5 | Definition of the Laplace transform  
Inverse Transform, Transforms of Derivatives  
Translation Theorems  
Additional Operational Properties  
The Dirac Delta Function | 1, 5, 14, 26, 30, 37, 43  
2, 10, 19, 22, 24, 32, 35  
2, 8, 13, 20, 24, 31, 37, 48, 55, 63  
1, 10, 16, 22, 27, 31, 38, 46  
1, 4, 8, 12 |
| 4    | July 15-19   | 12.1, 12.2, 12.3, 12.5, 12.6 | Orthogonal Functions  
Fourier Series  
Fourier Cosine and Sine Series  
Sturm-Liouville Theorem  
Bessel and Legendre Series | 2, 6, 11, 13  
2, 4, 6, 12  
1, 6, 12, 17, 20  
1, 8, 12, 16, 25, 35, 38  
2, 4, 6, 8, 15, 20 |
Heat Equation  
Wave Equation  
Laplace’s Equation  
Problems in Cylindrical Coordinates | 2, 8, 12, 16, 22, 26, 27  
2, 3, 6  
1, 6, 9, 16, 23  
2, 4, 7, 10, 14  
2, 4, 9, 12 |
| 6    | July 29-Aug 2 | 14.3, 15.2, 15.4 | Problems in Spherical Coordinates  
Applications of the Laplace Transform  
Fourier Transforms | 2, 5, 11, 12  
2, 4, 10, 14, 18, 24  
1, 6, 10, 12, 16 |
| 7    | Aug 5-9      |           | Catch up and Review | |
*Normal Monday class:* June 30

**Grading Policy:**

<table>
<thead>
<tr>
<th>Exam</th>
<th>Percentage</th>
<th>Points</th>
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<tbody>
<tr>
<td>Exam I</td>
<td>25%</td>
<td>(100 pts)</td>
</tr>
<tr>
<td>Exam II</td>
<td>25%</td>
<td>(100 pts)</td>
</tr>
<tr>
<td>Final Exam</td>
<td>35%</td>
<td>(140 pts)</td>
</tr>
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Monday, Aug. 13 (8-11am)
Comprehensive