## Course Information

**Course #:** MATH 301  
**Title:** Methods of Applied Mathematics  
**Textbook:** Advanced Engineering Mathematics by Zill and Wright (Fifth Edition)

## Syllabus

### Coordinator: Dr. Muhammad Yousuf

#### Course Overview
- **Semester:** II: 2014-2015(142)
- **Topics Covered:**
  - Vector Functions
  - Curl and Divergence
  - Independence of the Path
  - Surface Integrals
  - Divergence Theorem
  - Inverse Transform, Transforms of Derivatives
  - Orthogonal Functions
  - Heat Equation
  - Laplace’s Equation
  - Problems in Spherical Coordinates
  - Fourier Methods

### Schedule

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<tr>
<th>Week</th>
<th>Date</th>
<th>Topics</th>
<th>Suggested Homework Problems</th>
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| 1    | Jan 25 - 29| 9.1 Vector Functions  
9.5 The Directional Derivative | 1,12,16,17,21,26,33, 41  
2,7,9,14,17,21,23,32,29 |
| 2    | Feb 1 - 5  | 9.7 Curl and Divergence  
9.8 Line Integrals | 2,6,10,14,1722,27  
2,6,8,11,16,19,24,28,33 |
| 3    | Feb 8 – 12 | 9.9 Independence of the Path  
9.12 Green’s Theorem | 1,10,15,18,21,26  
2,4,6,9,18,23,25 |
| 4    | Feb 15 – 19| 9.13 Surface Integrals  
9.14 Stokes’ Theorem | 2,5,10,13,18,22,25,33  
1,3,6,8,13,17 |
| 5    | Feb 22 – 26| 9.16 Divergence Theorem  
4.1 Definition of the Laplace transform | 2,4,7,11,14  
1,5,14,26,30,37,43 |
|      |            | **Major Exam I : Will be announced later** |
| 6    | March 1 – 5| 4.2 Inverse Transform, Transforms of Derivatives  
4.3 Translation Theorems | 2,10,19,22,24,32,35  
2,8,13,20,24,31,37,48,55,63 |
| 7    | March 8 – 12| 4.4 Additional Operational Properties  
4.5 The Dirac Delta Function | 1,10,16,22,27,31,38,46  
1,4,8,12 |
| 8    | March 15–19| 12.1 Orthogonal Functions  
12.2 Fourier Series | 2,6,11,13  
1,6,12,17,20 |
|      |            | **Midterm Vacation:** March 22 – 26, 2015 |
| 9    | March 29 – April 2 | 12.3 Fourier Cosine and Sine Series | 1,8,12,16,25,35,38 |
| 10   | April 5 – 9 | 12.5 Sturm-Liouville Theorem | 2,4,6,12 |
| 11   | April 12–16| 12.6 Bessel and Legendre Series  
13.1 Separable Partial Differential Equations | 2,4,6,8,15,20  
2,8,12,16,22,26,27 |
|      |            | **Major Exam II : Saturday, April 04, 2015, 11:00 AM – 01:00 PM** |
| 12   | April 19–23| 13.3 Heat Equation  
13.4 Wave Equation | 2,3,6  
1,6,9,16,23 |
| 13   | April 26 – 30| 13.5 Laplace’s Equation  
14.2 Problems in Cylindrical Coordinates | 2,4,7,10,14  
2,4,9,12 |
| 14   | May 3 – 7  | 14.3 Problems in Spherical Coordinates  
15.2 Applications of the Laplace Transform | 2,5,11,12  
2,4,10,14,18,24 |
| 15   | May 10 – 14| 15.3 Fourier Integral  
15.4 Fourier Transforms | 1,4,10  
1,6,10,12,16 |
|      |            | **Final Exam : Wednesday, May 20, 2015, 08:00AM** |
Grading Policy:

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<tbody>
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<td>Exam I</td>
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<td>Exam II</td>
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<tr>
<td>Final Exam</td>
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<tr>
<td>Class work</td>
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Attendance:

Attendance is compulsory. KFUPM policy with respect to attendance will be strictly enforced. Any student accumulating 9 unexcused absences will be awarded DN Grade in the course.