King Fahd University of Petroleum and Minerals
Department of Mathematics and Statistics
Syllabus of Math 301-Term 162
Coordinator: Dr. Jamal Al-Smail

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

Week	Date	Sec.	Topics	Homework Problems
1	Feb 05-09	9.1	Vector Functions	1, 12, 19, 21, 26, 34, 41
		9.5	Directional Derivative	4, 6, 10, 14, 21, 24, 33
2	Feb 12-16	9.7	Curl and Divergence	2, 10, 17, 20, 27
		9.8	Line Integrals	2, 6, 11, 16,19, 28, 33
3	Feb 19-23	9.9	Independence of the Path	2, 10, 12, 18, 21, 26
		9.12	Green's Theorem	2,4,6,9,18,23,25
4	Feb 26-Mar 02	9.13	Surface Integrals	2,5,10, 18, 22, 25, 33
		9.14	Stokes' Theorem	1, 3, 6, 8, 13, 17
5	Mar 05-09	9.16	Divergence Theorem	2, 4, 7, 11, 14
		4.1	Definition of the Laplace transform	1, 5, 14, 26, 30, 37, 43
Major Exam I: Date: March 9, Material: 9.1 – 9.16				
6	Mar 12-16	4.2	The Inverse Transform and Transforms of Derivatives	2,10, 19, 22, 24, 32, 35
		4.3	Translation Theorems	2,8,13,20,24,31,37,48,55,63
7	Mar 19-23	4.4	Additional Operational Properties	1,10,16,22,27,31,38,46
		4.5	The Dirac Delta Function	1,4,8,12
8	Mar 26-30	12.1	Orthogonal Functions	2,6,11,13
		12.2	Fourier Series	1,6,12,17,20
Mid-term Break: April 02-06				
9	Apr 09-13	12.3	Fourier Cosine and Sine Series	1,8,12,16,25,35,38
10	Apr 16-20	12.5	Sturm-Liouville Theorem	2,4,6,12
Major Exam II: Date: April 18, Material: 4.1 -12.3				
11	Apr 23-27	12.6	Bessel and Legendre Series	2,4,6,8,15,20
		13.1	Separable Partial Differential Equations	2,8,12,16,22,26,27
12	Apr 30-May 04	13.3	Heat Equation	2,3,6
		13.4	Wave Equation	1,6,9,16,23
13	May 07-11	13.5	Laplace's Equation	2,4,7,10,14
		14.2	Problems in Cylindrical Coordinates	2,4,9,12
14	May 14-18	14.3	Problems in Spherical Coordinates	2,5,11,12
		15.2	Applications of the Laplace Transform	2,4, 10,14,18,24
15	May 21-25	15.4	Fourier Transforms	1,6,10,12,16
Final Exam :				

Instructor: M. Yousuf   **Office: Bldg.** 5/403, **Phone:** 7196, **Email:** myousuf@kfupm.edu.sa

Office Hours:

Sunday	Monday	Tuesday	Wednesday	Thursday
10:00 – 10:50		10:00 – 10:50		10:00 – 10:50
Also by appointment				

Grading Policy:

Exam I	25%	Final Exam	35%
Exam II	25%	Class work	15%

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

Learning Outcomes: Upon completion of this course, students will be able to

1. Recognize the vector fields, find their curl and divergence, and test whether they are conservative.

2. Evaluate the line integral along plane or space curves and the surface integral over surfaces in 3-space.

3. Use Green's, Stokes' and Divergence theorems to relate and evaluate different types of integral.

4. Evaluate the Laplace transform and inverse Laplace transform of a given function.

5. Apply the Laplace transform, inverse Laplace transform, and their operational properties to solve linear initial-value and boundary-value problems.

6. Find the Fourier series, the Fourier cosine and sine series, and the Bessel and Legendre series of a given function.

7. Find the eigenvalues and eigenfunctions for a given Sturm-Liouville boundary-value problem and state their orthogonality relation.

8. Solve separable partial differential equations.

9. Solve boundary-value problems involving the wave, heat and Laplace equations in various coordinate systems.

10. Evaluate the Fourier integral and the Fourier cosine and sine integrals of a given function.

11. Use the Fourier transform, inverse Fourier transform, and their operational properties to solve linear boundary-value problems