Department of Computer Science and Engineering--Lesson Plan:

Course Title: Engineering Math IV	Course Code: MAT 203
Year/Semester: 2nd-3rd / 4th-5th	Section: CSE/EEE 4th Semester
Credit-Hours: 3	Instructions Hours: 39 (3-hrs./week)
Pre-requisite: MAT 107	Type: Allied
Session: Spring-2019	Instructor: N. U. M. AkramulKabir Khan
Class Schedule: See Published Routine	Room No.: Per Class Routine
Counseling Schedule: See Instructor's Routine	Phone No.: 0155 109 6166
Email Address: numakramulkabirkhan7@gmail.com	

Rationale: It is essential for the engineering/science students to develop strong analytic skills which can not be achieved without extending knowledge and skills obtained in the mathematics courses (MAT 105, MAT 107, MAT 201) and without including matrix methods in particular and Linear Algebra in general. This course is intended to build up strong bases of Laplace transforms, Fourier analysis, partial differential equations (P. D. E.), matrix, and Linear Algebra, as well as to include the experience of applications of its contents in the relevant courses of science/engineering.

Course Objectives:

1. This course enhances and broadens the contents covered in MAT 105, MAT 107, & MAT 201.
2. Toward the above goal, it develops the basic concepts of Laplace transforms, Fourier analysis, matrix, and Linear Algebra in their wide scopes, and of P. D. E in its relevant scopes.
3. While doing the above it builds up problem solving experience in each relevant topic along with the addition of application familiarity in the related areas of science/engineering. Etc.

Course Outcomes (COs): Students who have successfully completed this course should be able to:

CO 1. Solve typical simple and moderately complex problems of selected topics and of the linked topics of science/engineering courses of undergraduate programs;

CO 2. Enroll in the related more advanced courses of Mathematics; and

CO 3. Be creative and articulated in exerting/exhibiting efforts for solving related unusual/advanced problems.

Assessment: Attendance, home-woks/assignments, class-tests/quizzes, mid-term exam, and term-comprehensive final exam.

Marks Distribution:	
Description/Items	Marks (%)
Class Attendance/Participation	10
Class-Tests	10

Description/Items	Marks (%)
Assignments/Home-works	10
Mid-term Examination	20
Term-final (Comprehensive) Exam	50

Text Books:
(1) Laplace Transform: by M. R. Spigel, (2) Fourier Series and Boundary Value Problems: by Charchil, (3) Advanced Engineering Mathematics: by Peter V. O'Neil, (4) Linear Algebra: by AbdurRahman,

References:
(1) Linear Algebra & Its Applications: by David C. Lay, (2) An Introduction to Differential Equation and Tensor Analysis: by Syed Md. Farid, (3) Ordinary and Partial Differential Equations: by M D. Raisinghania,

1.5 Hours Class Period Schedule (tentative):

#	Topics Covered	Teaching Strategy	Course Outcome	Assesment Strategy
	Part-A: Laplace Transforms			
1	Laplace Transforms	Lecture, Assignments, Notes, Books, Help	1, 2, 3	Presence
2	Inverse Laplace Transforms, Laplace Transforms of Derivatives, & Initial Value Problems	As above	1, 2, 3	Presence
	Part-B: Fourier Analysis			
3	Fourier Series	As above	1, 2, 3	Presence
	Part-C: Partial Differential Equations (P. D. E.)			
4	Introduction: Non-trivial solution of Simple P. D. E.	As above	1, 2, 3	**HW-Quiz-1**
5	Derivation and Solution of Wave Equation	As above	1, 2, 3	Presence
6	Derivation and Solution of Wave Equation	As above	1, 2, 3	Presence
7	Derivation and Solution of Heat Equation	As above	1, 2, 3	Presence
8	Laplace's Equation and Poisson's Equation	As above	1, 2, 3	**HW-Quiz-2**
	Part-D: Linear Algebra			
9	Introduction to the Basics of Linear Algebra, Algebraic Structure	As above	1, 2, 3	Presence
10	Algebraic Group, Ring, Field; and Linear Space	As above	1, 2, 3	Presence
11	Subspace	As above	1, 2, 3	Presence
12	Subspace	As above	1, 2, 3	**Class-Test-1**
	Mid-term Examination			**M-T Exam**
13	Linear Combination, Linear Independence, Spans	As above	1, 2, 3	Presence
14	Linear Combination, Linear Independence, Spans	As above	1, 2, 3	Presence
15	(Vector Space) Basis & Dimension	As above	1, 2, 3	Presence
16	(Vector Space) Basis & Dimension	As above	1, 2, 3	**HW-Quiz-3**
17	Linear Transformation, Kernel, Nullity, Rank	As above	1, 2, 3	Presence
18	Linear Transformation, Kernel, Nullity, Rank	As above	1, 2, 3	Presence
19	Vector Space Homomorphism, Linear Functionals, Linear Operators, Dual Space	As above	1, 2, 3	Presence
20	Vector Space Homomorphism, Linear Functionals, Linear Operators, Dual Space	As above	1, 2, 3	**HW-Quiz-4**
	Part-E: Matrices			
21	Basic Binary Operations of Matrices, Special Matrices	As above	1, 2, 3	Presence
22	Elementary Row Operations and Elementary Matrices	As above	1, 2, 3	Presence
23	Reduced form of Matrix, Rank of Matrix	As above	1, 2, 3	Presence
24	Solution of System of Linear Equations, Homogeneous System in Vector Space Point of View, Non-homogeneous System of Linear Equations	As above	1, 2, 3	**Class-Test-2**

25	Solution of System of Linear Equations, Homogeneous System in Vector Space Point of View, Non-homogeneous System of Linear Equations	As above	1, 2, 3	Presence
26	Matrix Inverses, Eigenvalues and Eigenvectors	As above	1, 2, 3	Presence
27	Matrix Inverses, Eigenvalues and Eigenvectors	As above	1, 2, 3	Presence
	Final Exam			**Final Exam**

Course Teacher (DCSE) Class Start 2.9.19	Day	10.00 am - 10.30 am	10.30 am - 11.00 am	11.00 am - 11.30 am	11.30 am - 12.00 pm	12.00 pm - 12.30 pm	12.30 pm - 1.00 pm	1.00 pm - 1.30 pm	1.30 pm - 2.00 pm	2.00 pm - 2.30 pm	2.30 pm - 3.00 pm
N. U. M. Akramul Kabir Khan (AKK)	Saturday	MAT 203(V3) / EM-IV / AKK / 4th - A /504			MAT 203(V3) / EM-IV / AKK / 4th - B /508						
	Sunday				MAT 201(V3) / EM-III / AKK / 3rd /503			MAT 203(V3) / EM-IV / AKK / 4th - C /408			
	Monday	MAT 203(V3) / EM-IV / AKK / 4th - B /408			MAT 203(V3) / EM-IV / AKK / 4th - A /508						
	Tuesday				MAT 203(V3) / EM-IV / AKK / 4th - C /503				MAT 201 EM3 EEE 402		
	Wednesday	MAT 201(V3) / EM-III / AKK / 3rd /508					MAT 201 EM3 EEE-203				

N. U. M. Akramul
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