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Course Outline –Fall 2017
MAT 216: Linear Algebra and Fourier Analysis (Mathematics IV)–Section 001

Class Schedule

Day	*Time*
Sun	03.30 $p.m - 04.50$ $p.m$
Tue	03.30 $p.m - 04.50$ $p.m$

Counseling Hours

Day	*Time*
Sun	02.20 $p.m - 03.20$ $p.m$
Tue	02.20 $p.m - 03.20$ $p.m$

1 Course Contents

Part - I :- Linear Algebra : System of linear equations, Solution of linear equations , Matrices , inverse matrix , Method of finding Inverse matrix , Vector spaces and subspaces , Linear independence and dependence , Basis and dimension , Rank and nullity, Normal and canonical forms , linear transformation , Eigenvalues and eigenvectors.

Part - II :- Vector Calculus : Scalars and vectors , Transformation of coordinates , Jacobian , Multiple Integrals , Line Integral , Surface Integral , Volume Integral , Gradient , Divergence and Curl of a point Function , Greens theorem , Gauss's theorem , Stroke's theorem .

Part -III:- Fourier Analysis : Real and Complex form , Finite Fourier transform , Fourier integral , Fourier transforms and their uses in solving boundary value problems .

2 Recommended Books

1. Elementary Linear Algebra -Howard Anton and Chris Rorres , 8th ed.
2. Calculus -Howard Anton (7-th edition)
3. Mathematical Methods By Md. Abdur Rahman
4. Fourier Series and Boundary Value Problems by James Ward Brown and Ruel V.

3 Learning Outcomes

After completing this course a student is able to know

1. basic ideas of Linear Algebra;
2. methods and techniques of proving basic theorems on linear algebra;

3. to solve critically the problems based on multivariate calculus;
4. fourier transformation and its properties:
5. devise and apply mathematical solutions globally;

4 Course Webpage

You can download lectures, Tutorial sheet/Assignment from \\TSR\FALL\MNS\MFA\MAT 216

5 Course Evaluation

We will follow the evaluation process of BRACU. The performance of the students will be evaluated throughout the semester by class tests/quizzes (average of best 3 out of 4), assignments and midterm exams. End of semester evaluation includes comprehensive final exams etc. Numerical scores earned by a students in tests , exams, assignments etc are cumulated and converted to exact grades at the end of the semester.A Student should not be absent from quizzes, test etc. No makeup quiz exam will be arranged. Zero will be given for missed quizzes, class test etc.Mathematics is inherently a participatory activity. Doing the homework assignments, or in other words, doing the math yourself is very important to your success in mathematics.

5.1 Marks Distribution

Class Test	25
Class Attendance	5
Mid	20
Final	50
Total	100

6 Lecture Plan

Lec.No.	Topic
01	System of linear equations , Gaussain elimination method
02	Matrices , Matrix operations , Gaussain elimination using matrices
03	Inverse matrix , Method of finding inverse matrix
04	Geometric vector , Vector spaces and subspaces **QUIZ 1**
05	Linear independence and dependence , Basis and dimension
06	Review of the previous lectures
07	Rank and nullity
08	Linear transformation
09	Eigenvalues and eigenvectors
10	Diagonalization
11	Review of the previous lectures **QUIZ 2**
12	Double integrals
13	**M**IDTERM EXAM(Tentative)
14	Triple integrals
15	Line integral , surface integral
16	Volume integrals
17	Problems related to line and surface integrals **QUIZ 3**
18	Gradient , Divergence and curl of a point function
19	Green's theorem . Stoke's theorem
20	Divergence theorem or Gauss's theorem
21	Transformation of coordinates , Jacobian
22	Fourier Analysis : Real and complex form **QUIZ 4**.
23	Fourier integrals
24	**F**ourier transform
25	Fourier transforms and their application in solving boundary value problems

There will be changes of lecture plans according to the progress of the students