MTH201 2021-2022 (SEMESTER I); FCH

INSTRUCTOR: SANTOSH NADIMPALLI

In this course, we will study finite dimensional vector spaces. The following list of topics will be covered:

(1) Fields and vector spaces
(2) Linear transformations
(3) Linear span, bases
(4) Matrices associated to linear transformations
(5) Trace
(6) Row and Column operations, and solutions to linear equations
(7) Some group theory
(8) Bilinear forms and isometries
(9) Witt decompositions
(10) Bilinear forms over real numbers
(11) Determinants via multilinear forms
(12) Spectral theory, eigenvalues, eigenspaces
(13) Jordan canonial form and Rational canonical form.
(14) Spectral theory of symmetric and normal operators
(15) Singular value decomposition
(16) Geometry of subspaces
(17) The rest of the lectures will concentrate on solving problems.

Live lectures will be given via zoom link Monday, Wednesday and Friday, from 5:10 PM to 6 PM. I will upload these recording on Mookit platform. Zoom link will be posted on the official Mookit webpage of the course.

Tutorial will be taken every Tuesday, from 5:10 PM to 6 PM, via the same Zoom link. I will assign some problems before hand to be discussed during tutorial session.

Grading will be based on midsem and endsem exams only. Midsem will consist of forty percent weightage and endsem the rest of it. Midsem will be a take home exam, ideally you will have a day to submit your answers. Duration of Endsem exam is 3 hours.

About letter grades, $A*$ is reserved for outstanding performance in the course, I reserve the right to give this grade based on overall performance: in exams, during tutorial sessions and active participation during the course. All other grades are based on exam scores only. The grade A will be given for top 10 percentage of students. Next B grade will be given to top 15 percent of students, Next 45 percentage of students get C. The rest get grades $D/E/F$ based on pass mark cutoff at the end and institute regulations for online teaching. Generally, to get a grade I expect that the student gets a minimum of 30 points out of 100 points (40 points for midsem and 60 for endsem).

References

(1) "Finite dimensional vector spaces" By Paul Halmos.
(2) "Algebra" by M.Artin (the second edition).

I will upload lecture notes after each lecture on my webpage. I will not strictly follow any of these books.

Date: August 1, 2021.