CS 6015: Linear Algebra and Random Processes

July-Nov 2023
'E' Slot; CS15
Dr. Harish (SSB 415)
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Updated on August 3, 2023

Note: Course related communications will be on IITM Moodle site (CS6015) and instructor webpage.

1 Learning Outcomes

- To understand the geometry of vector spaces and linear transformations.

- To recognize where tools from linear algebra can apply and apply them efficiently.

- To understand the concepts of randomness and probability.

- Recognize and apply basic concepts from probability.

2 Course prerequisite(s)

Masters and graduate students with basic math knowledge.

3 Classroom Mode

Traditional Lectures, with one 60-minute tutorial slot per week. Tutorial problems have to be solved in class.

4 Textbooks

1. Gilbert Strang. Linear Algebra and its Applications.

2. Bertsekas and Tsitsiklis. Introduction to Probability.

3. Grimmett and Stirzaker. Probability and Random Processes.

5 Helpful video references

Essence of linear algebra by 3Blue1Brown : https://www.3blue1brown.com/topics/linear-algebra

Linear algebra MIT OCW lectures by Prof. Gilbert Strang :
https://ocw.mit.edu/courses/18-06sc-linear-algebra-fall-2011/

6 Course Requirements

You are *required* to attend all the lectures. If you miss any of them it is your responsibility to find out what went on during the classes and to collect any materials that may be handed out.

Class participation is strongly encouraged to demonstrate an appropriate level of understanding of the material being discussed in the class. Regular feedback from the class regarding the lectures will be very much appreciated.

7 Planned Syllabus

The following topics will be covered, but not necessarily in the order listed below:

1. Vector spaces

2. Linear equations

3. Orthogonality

4. Eigen values and vectors

5. Probability

6. Discrete and continuous random variables

7. Joint, marginals and conditionals.

8. Multivariate Normal.

8 Tentative Grading Policy

The following allocation of points and time-line is tentative. These may change during the semester.

Mini quiz 1	10%	Aug 10, 8AM
Mini quiz 2	10%	Aug 24, 8AM
Mid sem	30%	Sep 22, 5PM
Mini quiz 3	10%	Oct 5, 8AM
Mini quiz 4	10%	Oct 19, 8AM
Final	30%	Nov 23

9 Teaching Assistants

Name	email
Aoukshana	CS22M019@smail.iitm.ac.in
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10 Academic Honesty

Academic honesty is expected from each student participating in the course. NO sharing (willing, unwilling, knowing, unknowing) of assignment code between students, submission of downloaded code (from the Internet, Campus LAN, or anywhere else) is allowed.

Academic violations will be handled by IITM Senate Discipline and Welfare (DISCO) Committee. Typically, the first violation instance will result in ZERO marks for the corresponding component of the Course Grade and a drop of one- penalty in overall course grade. The second instance of code copying will result in a 'U' Course Grade and/or other penalties. The DISCO Committee can also impose additional penalties.

Please protect your Moodle account password. Do not share it with ANYONE. Do not share your academic disk drive space on the Campus LAN.