Part 0: Course Introduction

21MAT311: Mathematics For Intelligent Systems - 6

Prepared by

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Contents

About the Faculty

- **Abhijith M S**
- Assistant Professor, School of AI, Amrita Vishwa Vidyapeetham.
- Post Doc from IISC Bangalore, M.Tech and PhD in Mechanical Engineering from IIT Hyderabad
- Research interests broadly include computational fluid dynamics, physics informed machine learning and thermal sciences.
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21MAT311 - Syllabus

- **Linear Algebra with Calculs - 6:** Learning from Data: The Construction of Deep Neural Networks, CNNs, Backpropagation and Chain Rule, Hyper Parameters, The world of Machine learning.
- **Statistics and Probability -6:** Expectation-Maximization, Variational Inference, Variational Learning, Support Vector Machines, Neural Networks, Bayesian Modelling.
- **Calculus -6:** Kalman Filter, Optimal Sensor based Control, Full state Feedback of Cartpole Pendulum, Robust Control and Frequency Domain Techniques, Balanced Models for control, Data driven control.

Evaluation pattern

- Assignment - 1 *(covers Modules 1 and 2)* (Weightage - 20%)
- Assignment - 2 *(covers Module 3)* (Weightage - 10%)

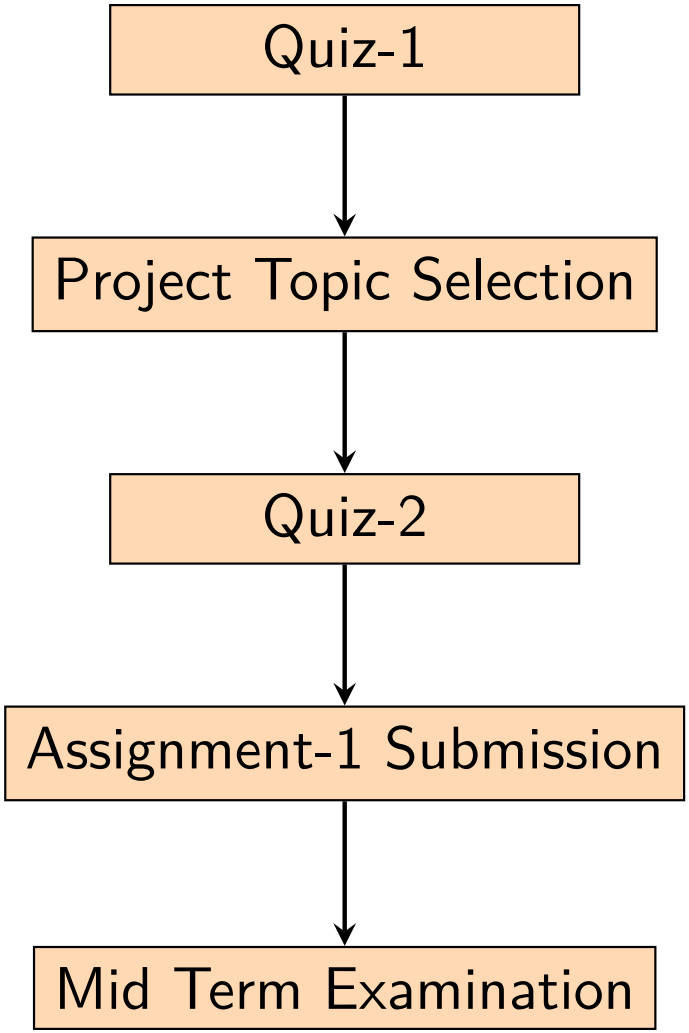
- Quiz - 1
- Quiz - 2 **Best Two Marks: Total Weightage (20 %)**
- Quiz - 3

- Mid-Term Examination (Weightage - 20%)

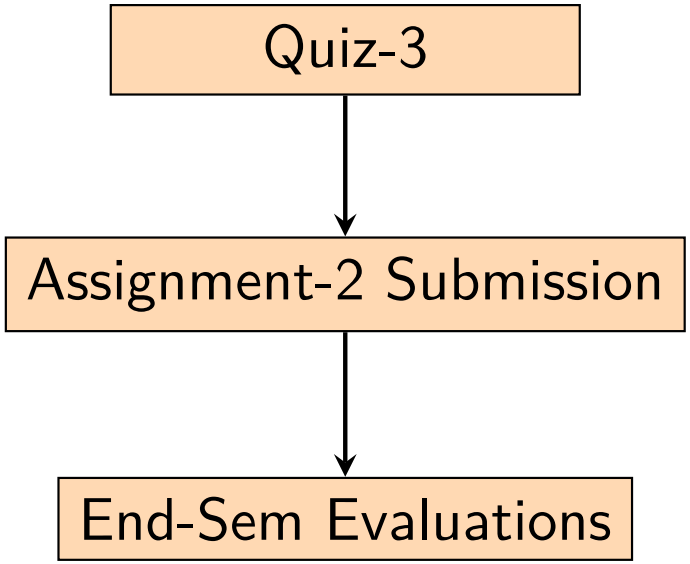
- End Sem/ Term Project Evaluation (Weightage - 30%)

Timeline

- Phase-1 (Start of the semester to Mid-Term Examination)



- Phase-2 (Mid-Term Examination to The end of the Semester)



Resources

Click here to find the shared OneDrive folder containing the following:

- Lecture Notes & Presentations
- Text Books
- Video-Lectures-And-Materials-From-Web
- Assignment-1-Problems (Date of Submission: 5th March, 2023).
- Assignment-2-Problems (will be updated after the Mid-Term Exam)

Textbooks for Reference

- Steve Brunton and Nathan Kutz, 'Data Driven Science and Engineering', Cambridge University Press, 2018
- Kevin Murphy and Francis Bach,'Machine Learning: A Probabilistic Perspective', Penguin Publishers, 2012
- Gilbert Strang, 'Linear algebra and learning from data', Wellesley-Cambridge Press, 2019.
- Andreas C. Muller and Sarah Guido, 'Introduction to machine learning with Python: a guide for data scientists', O'Reilly Media Inc., 2016.

Reminders

- Bring your laptops regularly to the class as the course includes programming.
- Maintain a classwork notebook for this course.
- Submit all assignments on time and attend all tests/examinations.
- Remember that the presentations, code and other study materials I share may contain mistakes (typographical to factual). Make fact checking a habit.
- I consider the presentations I prepare as mere teaching aids, refer the prescribed textbooks for a complete understanding of the concepts.

Your attention matters a lot to me . . . !