

Advanced Machine Learning (CS60073)

Instructor: **Debaditya Roy**

TA: **Kousik Das, Bibhudatta
Bhanja**



Course Overview

You are expected to know:

- Linear Algebra
- Basic Probability (fundamentals will be revised)

Topics to be covered (tentative)

- Basics of Probability
- Probabilistic Models & Bayesian Inference
- Conditional Models
- Latent Variable Models
- Variational Inference (VI)
- Gaussian Processes
- Generative Adversarial Networks (GANs)
- Diffusion Models
- Language Models (LLMs)

Assignments and evaluation

Penalty for copying

- Everything you submit should be your own work
 - Using LLMs and copy-pasting the assignments is discouraged
 - Instructor/TA will ask you to explain the entire assignment, if you cannot explain then penalty applies.
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- Submission of assignments via Moodle



Moodle Access link

Marks Distribution (tentative)

- Assignments: 20-30%
- Class Test: 5-10%
- Mid Semester: 20%
- End Semester: 50%
- Attendance: 5%

Student enrollment key - **Stud@AML\$**

References

- Murphy, K. P. (2025). Probabilistic Machine Learning: An Introduction. MIT press. <https://probml.github.io/pml-book/book1.html>
- Bishop, C. M. (2006). Pattern recognition and machine learning by Christopher M. Bishop. Springer Science+ Business Media, LLC. <https://www.microsoft.com/en-us/research/wp-content/uploads/2006/01/Bishop-Pattern-Recognition-and-Machine-Learning-2006.pdf>
- Deep learning (Vol. 1).Bengio, Y., Goodfellow, I., & Courville, A. (2017). Cambridge, MA, USA: MIT press. <https://www.deeplearningbook.org/>

Software Installation

- Install **Miniforge** <https://github.com/conda-forge/miniforge>
- **Miniforge** provides a python environment for you to work and install packages
- Install Visual Studio Code as IDE
<https://code.visualstudio.com/>
- Install packages such as Jupyter notebook, Numpy, Pytorch and others.