CSE400 – Fundamentals of Probability in Computing

Lecture 3: Introduction to Probability Theory

Name: Maitri Lad **Enrollnment no.:** AU2440146

January 13, 2026

1 Course Identification and Context

- **Course Code:** CSE400
- **Course Title:** Fundamentals of Probability in Computing
- **Lecture Number:** 3
- **Lecture Theme:** Introduction to Probability Theory

This lecture primarily establishes:

- Course structure and logistics
- Motivation for studying probability
- Engineering relevance
- Project structure and evaluation
- Research orientation (UGRP and MICxN Lab)

Note: No formal probability definitions, axioms, theorems or derivations are introduced in this lecture.

2 Motivational Slides

2.1 Quote on Excellence

> "Good is the enemy of great. That's why so few things become great." – James C. Collins

Purpose: Motivational framing for learning and performance expectations.

2.2 Growth Mindset

Statements shown under Growth Mindset:

- Failure is an opportunity to grow
- I like to try new things
- I can learn to do anything I want
- Challenges help me grow

- My effort and attitude determine my abilities
- Feedback is constructive
- I am inspired by the success of others

2.3 Fixed Mindset (Contrast)

Statements shown under Fixed Mindset:

- Failure is the limit of my abilities
- I'm either good at it or I'm not
- My abilities are unchanging
- I don't like to be challenged
- My potential is predetermined
- When I'm frustrated, I give up
- I stick to what I know

Purpose: Establishing expected learning attitude for the course.

3 Lecture Outline (Part 1)

3.1 CSE400: General Course Information

- Team
- Active learning platform: Campuswire
- Schedule
- Grading

3.2 Why Should We Learn CSE400?

Example mentioned:

- Daily life conversations

3.3 Engineering Applications

Applications listed:

- Speech Recognition
- System Radar System
- Communication Network

4 Course Team Details

4.1 Instructor

- **Name:** Dr. Dhaval Patel
- **Role:** Instructor
- **Office:** Faculty Office (Room–210)
- **Faculty Profile:** Ahmedabad University SEAS website
- **Email:** dhaval.patel@ahduni.edu.in

Research Areas:

- xG Networks
- Applied ML / DL / RL / AutoML
- Intelligent Transportation Systems
- Life Sciences
- Behaviour Modelling using AI

4.2 Teaching Assistants and Team Members

- Deep Patel – BTech CSE (3rd Year)
- Prapti Patel – BTech CSE (4th Year)
- Raj Koticha – BTech CSE (4th Year)
- Ritu Patel – BTech CSE (4th Year)
- Rushi Moliya – BTech CSE (4th Year)
- Ura Modi – BTech CSE (3rd Year)

(Each member's ongoing research area is specified in the slides.)

5 Active Learning and Class Discussion

5.1 Course Website

- Section–1: Campuswire course link
- Section–2: Campuswire course link

5.2 Campuswire: Purpose and Usage

- Build confidence by anonymous participation and back-channel communication
- Collaborative and active learning
- Real-time feedback through polling
- Direct personal communication with instructor/TAs via DM

6 Course Schedule

6.1 Lecture Sessions

Section–1

- Time: 9:30 AM – 11:00 AM
- Days: Tuesday, Thursday
- Venue: GICT Room–136

Section–2

- Time: 1:00 PM – 2:30 PM
- Days: Tuesday, Thursday
- Venue: GICT Room–137

6.2 TA Hours

- Mode: In-person / Online
- Timings: Yet to be finalized (to be announced)

7 Communication with Instructor

7.1 Discussion and Difficulty Sessions

- Contact hours: 24×7 via Campuswire
- Best practice: Post queries on Campuswire
- Private discussion: Use DM if more time is needed
- External engagement:
  - UGRP–8 (2026)
  - Offline projects
  - Counseling / informal discussion ("Cup of tea for 10 min")
- Communication via official email

7.2 Important Note

- LaTeX tutorial and assignment submission guidelines will be followed

8 Project Component (Weightage: 30%)

8.1 Project Kickoff

- Weightage: 30%
- Team formation deadline: 17 January 2026 (EOD)

8.2 Project Execution Guidelines

Milestones (M1–M6):

- Concept Evolution Maps
- Scribe: Process & Decision-Making
- Multimodal Artifacts
- Question-Driven Artifacts
- Collaboration & Team Dynamics Artifacts
- Final bounds, analysis, and compiled deliverables

Deliverables:

- Code
- Reports
- Videos (as specified)

Assessment:

- Before and after mid-semester
- Project viva at end of course

8.3 Project Kickstart Flow

- **M1:** Team formation, area identification, background, motivation, problem formulation
- **M2:** Mathematical modeling
  - Random Variables (RV)
  - PMF / PDF
  - CDF
  - Multivariate RVs
  - Joint PMF / PDF / CDF
- **M3:** Coding – simulation and computation
- **M4:** Inference using randomized algorithms
- **M5:** Randomized algorithms and comparison with deterministic algorithms
- **M6:** Bounds, analysis, final submission

9 Submission Types

9.1 Submission #1 – Concept Evolution Maps

- Tools: Miro, Draw.io

9.2 Submission #2 – Scribe (Learning Reflection Logs)

Types:

- Lecture Scribes
- Project Scribes

Key requirements:

- Assigned groups per lecture
- 8–10 pages minimum
- Reflect lecture content
- Include decision logs, constraints, alternatives, trade-offs

9.3 Submission #3 – Multimodal Artifacts

- Video duration: 10–15 minutes per milestone
- Focus on content, not editing
- Explain milestone and simulations

10 Undergraduate Research Programme (UGRP)

10.1 Purpose of UGRP

- T-shaped engineer model
- Multidisciplinary learning
- Experiential and research-driven approach

10.2 MICxN Research Lab Overview

- Networks
- IoT / IoV / IoBNT
- Data Science
- AI
- Modern computer systems

10.3 Research Outcomes and Collaborations

- Industry projects
- International collaborations
- Conference publications
- Awards and recognitions
- Alumni placements

11 End of Lecture

- Open Q&A session
- Contact: dhaval.patel@ahduni.edu.in

Source

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