CSE400 – Fundamentals of Probability in Computing

Lecture 3: Introduction to Probability Theory

Instructor: Dr. Dhaval Patel, PhD
Course: CSE400 – Fundamentals of Probability in Computing
Institution: SEAS, Ahmedabad University, Ahmedabad, Gujarat, India
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1. Lecture Context and Purpose

This lecture is part of the CSE400 course titled *Fundamentals of Probability in Computing*. The lecture formally introduces the course structure, motivation, and administrative framework before proceeding to probability theory in subsequent lectures. The logical flow strictly follows the lecture slides.

2. Course Identification

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

3. Instructor Information

- Name: Dr. Dhaval Patel, PhD
- Role: Instructor
- Office: Faculty Office, Room 210
- Faculty Profile: SEAS, Ahmedabad University
- Email: dhaval.patel@ahduni.edu.in
- Areas of Interest:
  - xG Networks
  - Applied ML / DL / RL / AutoML
  - Intelligent Transportation Systems
  - Life Sciences
  - Behaviour Modelling using AI

4. Course Team Structure

The course is supported by a team consisting of senior and junior undergraduate teaching assistants.

4.1 Teaching Assistants

- Deep Patel
  - BTech CSE (3rd Year)
  - Research Area: Reinforcement Learning and Pinching Antenna Systems
  - Email: deep.p4@ahduni.edu.in
- Prapti Patel
  - BTech CSE (4th Year)
  - Research Areas:
    - Smart sensing frameworks using Kolmogorov–Arnold Networks for 5G
    - Fourier analysis-based sensing for 5G and beyond
  - Email: prapti.p@ahduni.edu.in
- Raj Koticha
  - BTech CSE (4th Year)
  - Research Area: Multi-agent reinforcement learning for resource management in NR-V2X platooning
  - Email: raj.k1@ahduni.edu.in
- Ritu Patel
  - BTech CSE (4th Year)
  - Research Area: Intelligent Transportation Systems
  - Email: rituben.p@ahduni.edu.in
- Rushi Moliya
  - BTech CSE (4th Year)
  - Research Areas:
    - UAV deployment optimization
    - Multi-UAV energy-efficient sensing
  - Email: rushi.m@ahduni.edu.in
- Ura Modi
  - BTech CSE (3rd Year)
  - Research Area: Pinching Antenna Systems
  - Email: ura.m@ahduni.edu.in

5. Learning Philosophy

5.1 Growth Mindset

The lecture emphasizes the importance of adopting a growth mindset, characterized by:

- Viewing failure as an opportunity to grow
- Willingness to try new things
- Belief that abilities can be developed through effort
- Treating feedback as constructive

5.2 Fixed Mindset (Contrast)

In contrast, a fixed mindset includes:

- Viewing failure as a limitation of ability
- Avoidance of challenges
- Belief that abilities are static

6. Course Motivation

6.1 Why Study CSE400?

The motivation for learning probability is introduced using:

- Daily life conversations as intuitive examples of probabilistic reasoning

6.2 Engineering Applications

Probability theory is motivated through applications in:

- Speech Recognition
- Radar Systems
- Communication Networks

7. Active Learning Platform

7.1 Campuswire

Campuswire is used as the primary active learning and communication platform.

Purposes:

- Anonymous participation
- Back-channel communication during lectures
- Collaborative problem solving
- Real-time feedback through polling
- Direct messaging with instructor and TAs

Course Sections:

- Section 1: Campuswire link provided in slides
- Section 2: Campuswire link provided in slides

8. Lecture Schedule

8.1 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

8.2 TA Hours

- Mode: In-person / Online
- Timings: To be announced

9. Instructor Interaction Guidelines

- Queries should be posted on Campuswire
- Contact hours available 24×7 through Campuswire
- Direct messages allowed for private discussions
- External engagement opportunities include UGRP-8 (2026)

10. Assessment Overview

10.1 Project Component

- Weightage: 30%

10.2 Project Milestones

- M1: Team formation and problem formulation
- M2: Mathematical modeling
- M3: Coding and simulation
- M4: Inference and randomized algorithms
- M5: Algorithm application and comparison
- M6: Bounds derivation and final analysis

11. Scribe Requirement

Lecture scribes are a formal course requirement.

- Two groups per lecture will prepare a scribe
- Minimum length: 8–10 pages
- Content must strictly reflect lecture material

12. End of Lecture

The lecture concludes with an open Q&A session.

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