CSE400 – Project Kickoff

Weightage: 30%

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1 Project Team Formation

- **Deadline:**
  - 17th January 2026, Saturday – End of Day

2 Project Execution Guidelines

- **Overall Weightage:**
  - 30%
- **Major Milestones:**
  - Total of **6 milestones (M1–M6)**
  - **One submission per group per milestone**
- **Milestone Components:**
  1. **Concept Evolution Maps**
  2. **Scribe: Process & Decision-Making**
     - Decision Logs (Why X over Y?)
     - Constraints
     - Alternatives considered
     - Final decision
     - Evidence used
     - Trade-off matrices (Cost vs. Performance vs. Risk)
  3. **Multimodal Artifacts (Video / Audio / Visual)**
     - Think-Aloud Videos
     - One-Minute Insight Videos
     - Project Demo
  4. **Question-Driven Artifacts**
     - Probing depth of understanding
  5. **Collaboration & Team Dynamics Artifacts**
- **Deliverables:**
  - Codes, reports, videos, etc., as and when specified
- **Team Assessment:**
  - Before mid-semester

  - After mid-semester

- **Project Viva and Final Submission:**
  - Towards the end of the course

3 Project Kickstart and Milestone Structure

M1: Kickstart

- Team formation
- Area identification
- Background
- Motivation
- Problem formulation

M2: Mathematical Modeling

- Mathematical modelling of the selected problem in **any domain**
- Topics include:
  - Random Variables (RV)
  - PMF / PDF
  - CDF
  - Multivariate Random Variables
  - Joint PMF / PDF / CDF

M3: Coding

- Simulation
- Computation

M4: Inference

- Choose a randomized algorithm
- Understand the algorithm
- Code the algorithm

M5: Randomized Algorithms

- Apply the randomized algorithm to the domain problem
- Obtain results
- New inferences in comparison to deterministic algorithms

M6: Derivation and Analysis

- Derive bounds
- Perform analysis
- Compile and submit final deliverables

4 Submission #1 – Concept Evolution Maps

- **Tools:**
  - Miro Concept Map Tool
  - diagrams.net (draw.io)

5 Submission #2 – Scribe: Learning Reflection Logs

- **Tools:**
  - Strictly specified by the course
- **Types of Scribes:**
  - Lecture Scribes
  - Project Scribes
- **Lecture Scribes:**
  - Every lecture: 2 groups assigned
  - Reflect lecture content
  - Include additional examples from foreign textbooks
  - Minimum length: 8–10 pages
- **Project Scribe Content:**
  - Process and decision-making
  - Decision logs (Why X over Y?)
  - Constraints
  - Alternatives considered
  - Final decision
  - Evidence used
  - Trade-off matrices (Cost vs. Performance vs. Risk)
- **Submission Frequency:**
  - Total of 6 submissions
  - Bi-weekly mode
  - Each submission answers specific project-related questions

6 Submission #3 – Multimodal Artifacts

- **Formats:** Video / Audio / Visual
- **Expectations:** Content quality prioritized over editing skills
- **Requirements:**
  - One video per milestone
  - Duration: 10–15 minutes
  - Explanation of milestone work
  - Coding simulation if applicable
- **Presentation Tools:**
  - PowerPoint or Google Slides
  - Any screen-recording tool
- **Artifact Types:**
  - Think-Aloud Videos
  - One-Minute Insight Videos
  - Project Demo

7 Introduction to UGRP (2026–2027)

- **Founder Referenced:**
  - Dr. BJ Fogg
  - Founder of the Behavior Design Lab, Stanford University

8 Rationale for UGRP

- Reference to:
  - Tranquillo, Joe. *"The T-shaped Engineer"*, Journal of Engineering Education Transformations, 30(4), 2017
- **IBM Concept of the T-Shaped Individual:**
  - Vertical bar: Depth in a single technical discipline
  - Horizontal bar: Ability to apply knowledge across disciplines and work with others

9 Philosophy for UGRP

- Multidisciplinary:
  - Arts
  - Science
  - Management
- Experiential Learning
- Research Driven
- **4D Model:**
  - Discover
  - Design
  - Develop
  - Deliver
- **Breadth Areas:**
  - CS and CSE
  - Data Science and Applied Artificial Intelligence
  - Modern Computer System Design (Hardware and Software)
  - Networks and IoT / IoBNT / IoV

10 Current Industry and Research Activities

- 5G-enabled Intelligent Transportation Systems (ITS) Testbed in Gujarat
- AI-based ITS solutions
- Ongoing DST-GUJCOST Project
- Components include:
  - V2X communication between OBU and RSU
  - SDK testing
  - Sensor data collection
  - In-car dashboard development
- Research areas:
  - Deep learning-based crash prevention
  - Deep reinforcement learning-based smart signaling
  - mmWave beam prediction
  - C-V2X and Wi-Fi coexistence frameworks

11 International Bilateral Collaborations

- Collaborators from:
  - University of Liverpool
  - University of Manchester
  - A*STAR Singapore
  - Boston College
  - Monash University
  - UTAR Malaysia
  - University of Oulu
  - Tokyo University of Agriculture and Technology
  - Qatar University
  - University of York
  - Nanyang Technological University

12 MICxN Research Lab – Alumni and Outcomes

- Alumni working at:
  - Amazon
  - Google
  - Intel
  - American Express
  - EXL
  - LexisNexis Risk Solutions
  - Simplify Healthcare
- Publications in:
  - IEEE PIMRC
  - IEEE Transactions on Vehicular Technology
  - IEEE Access

13 Undergraduate Research Programme Outcomes

- Accepted papers at:
  - COMSNETS
  - NCC
- Awards:
  - Best Paper Award
  - Best UG Presentation Award

14 MICxN Research Lab – Current Students

- UG Thesis Scholars
- BTEP Students
- Research areas include:
  - Spectrum sensing
  - O-RAN
  - 6G ISAC
  - UAV
  - Wi-Fi sensing
  - Antenna design

15 Conclusion

- Open Q & A Session
- Contact:
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