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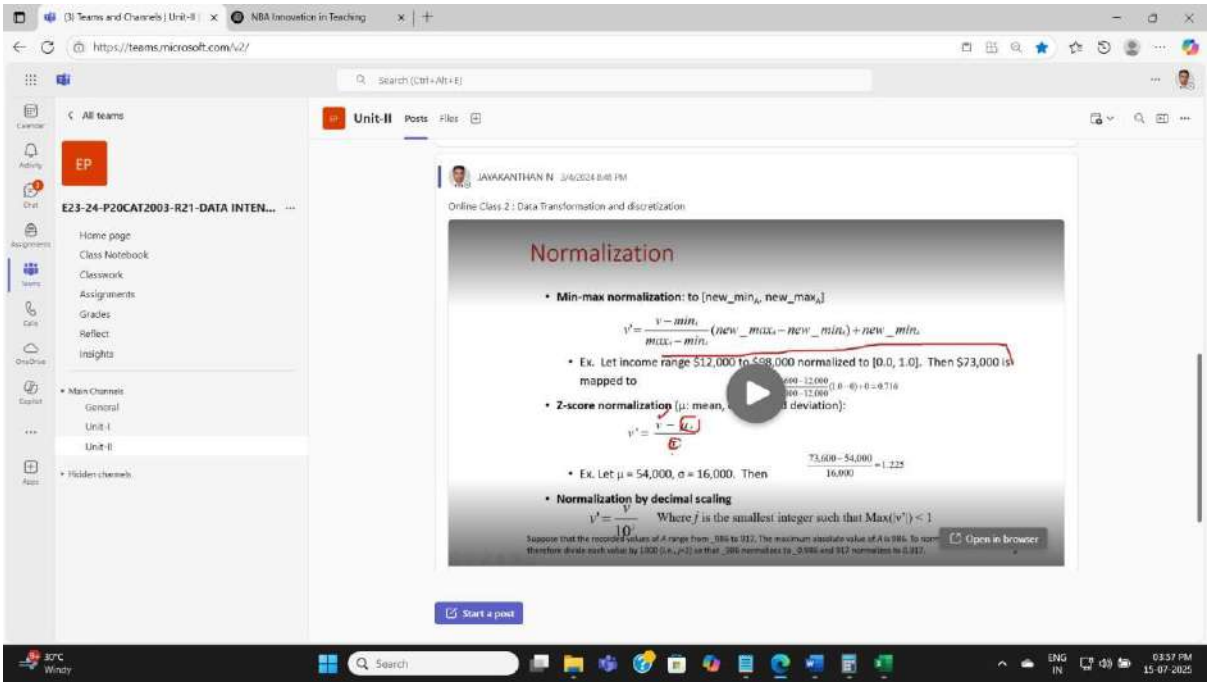
5.6 Innovation by Faculty in Teaching and Learning

Asynchronous video lectures

- Asynchronous video lectures have been effectively employed to enrich teaching and learning in the course **P20CAT2003 – Data Intensive Computing**. This approach enables flexible, self-paced learning and allows students to revisit complex topics for deeper comprehension. A series of well-structured video sessions were developed and shared via Microsoft Teams, covering both foundational and advanced topics such as **Data Types**, **Linear Regression with Example**, **FP-Growth Algorithm**, **Data Visualization**, and **Data Transformation and Discretization**. These lectures integrate clear explanations, real-world examples, and ICT-enabled content delivery to support diverse learning styles and reinforce conceptual clarity. In particular, the session on **Data Transformation and Discretization** significantly strengthened students' understanding of key data preprocessing techniques and contributed to improved performance in Unit II assessments. The integration of these asynchronous resources reflects a student-centred, technology-enhanced pedagogy aimed at improving academic outcomes.

Lecture Videos:

- **Data Types** – 2.Data Types.mp4
- **Linear Regression with Example** – 3.8.Linear regression with example.mp4
- **FP-Growth Algorithm** – 3.FP Growth algorithm.mp4
- **Data Visualization** – 3.FP Growth algorithm.mp4
- **Data Transformation and Discretization** – P20CAT2003 Data Intensive Computing_Data Transformation By Normalization.mp4



Asynchronous video lecture

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Smart Classroom Infrastructure

- The professional integration of smart classroom infrastructure—such as the Sense Board (Smart Board)—significantly enhances syllabus coverage, fosters interactive learning, and supports the effective delivery of complex technical content. By enabling dynamic visuals, real-time annotations, and step-by-step demonstrations, the Smart Board transforms conventional teaching methods into more engaging and impactful learning experiences. This technology-driven approach promotes deeper conceptual understanding, accommodates diverse learning styles, and encourages active participation, making it an effective tool for modern, student-centred education.

Enhancing Conceptual Learning through Smart Board Integration in the Classroom

ProtoSem

- MCA department students participated in ProtoSem, an experiential learning program by Forge Academy that fosters innovation and real-world problem-solving skills.

Cohort-Specific Events

- Students are grouped into various cohorts, such as Web Development, Artificial Intelligence, Data Science, Augmented Reality (AR), and Virtual Reality (VR), with skill enhancement activities like workshops conducted for them. These cohorts promote collaboration, real-world projects, and industry-led sessions, enhancing technical and problem-solving skills. This hands-on approach equips students with expertise in emerging technologies and prepares them for industry challenges.

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Comprehensive DevOps Training Program Organized by Web and Software develop Cohort from 24.12.2024 to 27.12.2024.

Cybersecurity Cohort hosted the "Coimbatore Chapter Combined Meetup" on December 21, 2024.

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The three-day Faculty Development Program titled "Accelerating Edge AI: From Concept to Deployment with Jetson Nano", organized by the IoT, Edge & UAV Cohort 21.12.2024.

- As part of our curriculum, the events like Blockchain yatra was conducted to explore the captivating Blockchain Story and its impact.

Bharat Blockchain Yatra on September 25, 2023,

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Self-Learning through MOOC Courses

- Students are encouraged to engage in self-learning through Massive Open Online Courses (MOOCs), which promote independent learning, enhance technical competencies, and provide exposure to global learning resources.

Innovative Online Learning Support

Faculty utilize online platforms to engage students in discussions, promote problem-solving, and provide continuous guidance beyond classroom sessions.

ICT Tools Integration

- ICT tools are effectively integrated into the teaching and learning process to foster innovation and enhance educational outcomes.

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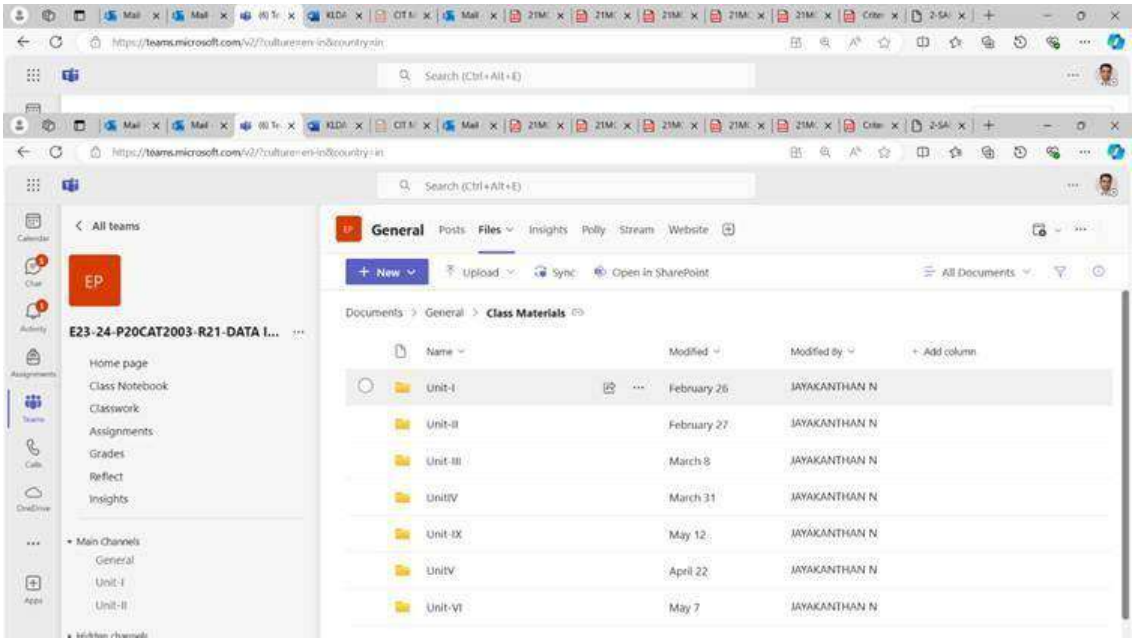
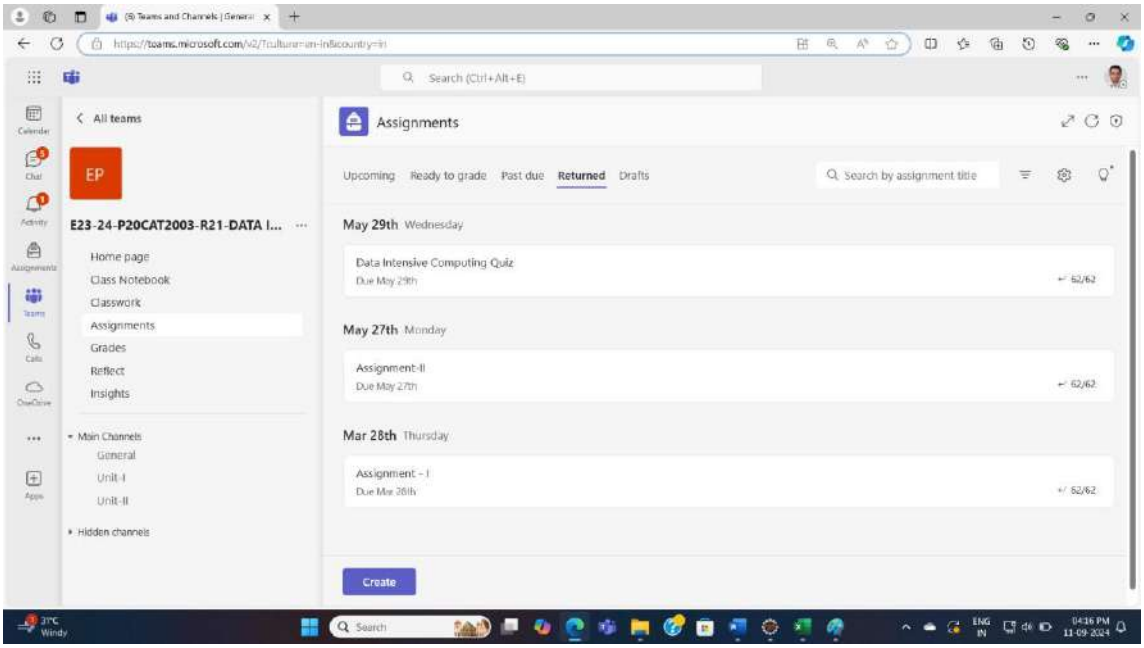
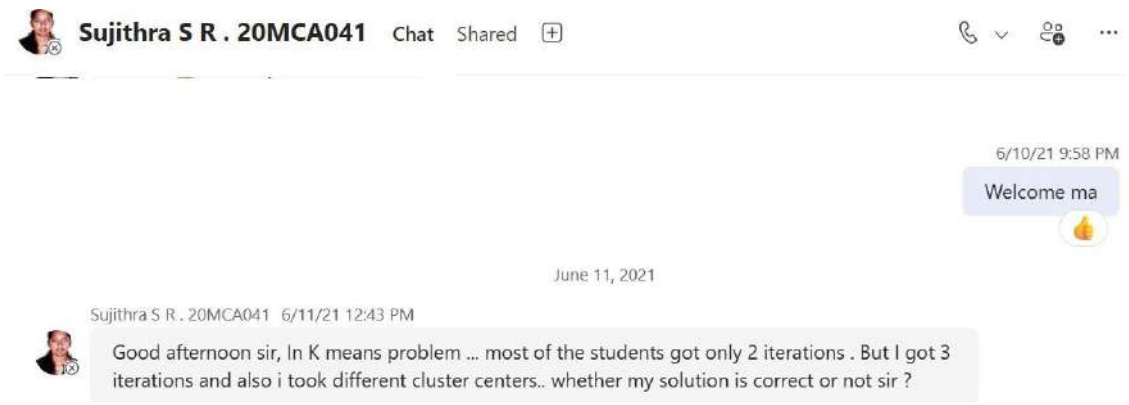


Posting the teaching materials to facilitate flipped classroom mode.



Posting of assignments and manage the submissions online



Interacting with students

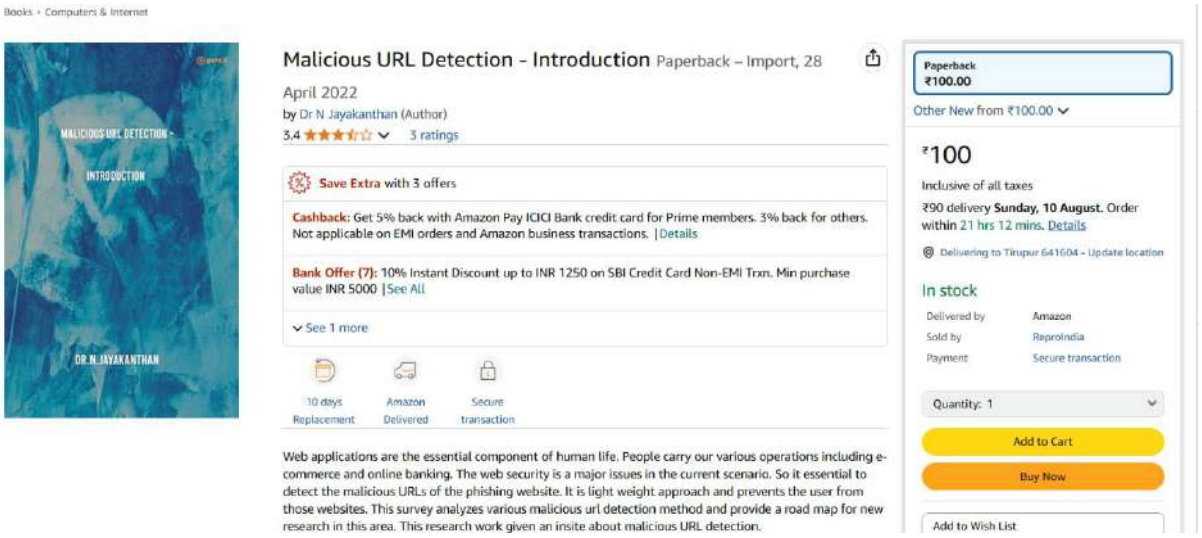
- Faculty incorporate real-world case studies into the curriculum, allowing students to analyze practical situations, apply theoretical knowledge, and develop problem-solving skills relevant to industry challenges.

- Faculty design instructional activities around realistic scenarios, encouraging students think critically, make informed decisions, and apply concepts to practical problem-solving.

Faculty Faculty-Authored Books

- To foster innovation in teaching and learning, Dr. N. Jayakanthan has authored a book titled ***"Malicious URL Detection – Introduction"***, published by **Pencil (One Point Six Technologies Pvt Ltd)** and available on **Amazon**. This book supports students in understanding and applying concepts of **cybersecurity, machine learning, and real-world threat detection**.

- The book is used as a **supplementary learning material** in relevant courses to:
  - Facilitate hands-on project development,
  - Promote interdisciplinary and self-paced learning,
  - Support curriculum enrichment with practical examples.
  - Amazon Listing:
    The book is officially listed on Amazon and can be accessed through the following link
    Buy Malicious URL Detection - Introduction Book Online at Low Prices in India | Malicious URL Detection - Introduction Reviews & Ratings - Amazon.in
- **Screenshots from Amazon:**
  - Book cover and listing



- Sample reviews and ratings

- As part of their academic contributions, **Ms. V. Jalaja Jayalakshmi, and Dr. C. Rajankrupa** have jointly authored the book titled *"Information Security"*, published as a **Perfect Paperback in January 2024** and listed on **Amazon**. The book offers comprehensive coverage of cybersecurity fundamentals, focusing on secure systems, data protection, and risk management practices.

  - The publication serves as a valuable academic resource and is integrated as supplementary learning material in relevant courses to:

  - Enhance students' understanding of information security frameworks and practices,
  - Encourage applied learning through real-time case studies and examples,
  - Promote self-paced and interdisciplinary learning approaches,
  - Contribute to curriculum enrichment with practical applications of cybersecurity concepts.

  - **Amazon Listing:**
    Buy *Information Security* Book Online at Low Prices in India | *Information Security* Reviews & Ratings - Amazon.in

- **Screenshots from Amazon:**

  - Amazon Listing:
    The book is officially listed on Amazon and can be accessed through the following link
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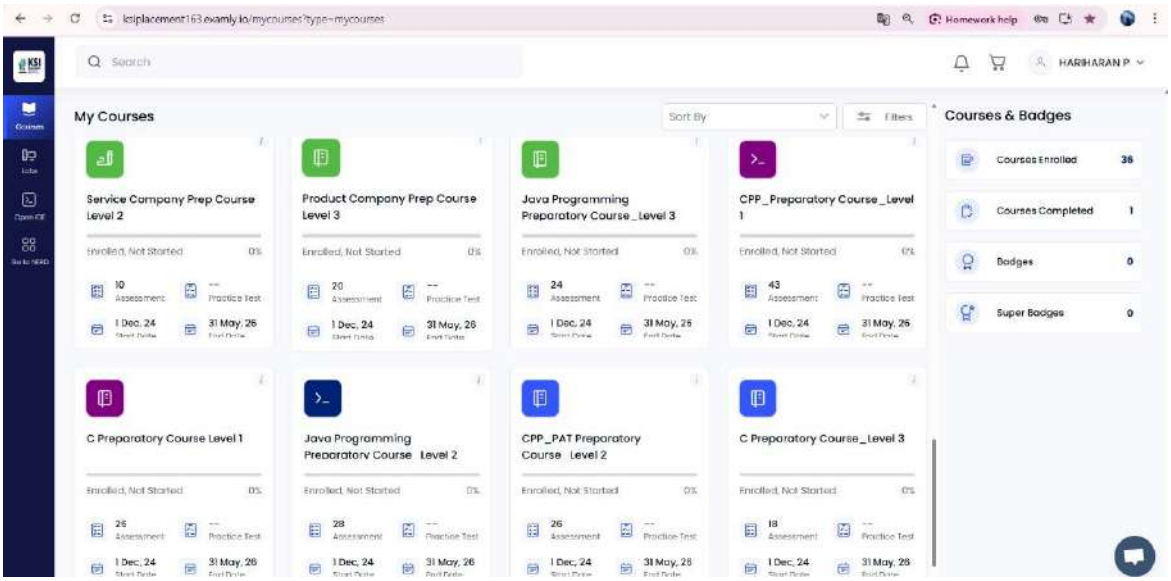
Iam Neo Portal

- The Iam Neo portal, offered through Placement Cell, provides innovative support that enhances MCA students' employability skills. It enables personalized assessments, mock tests, coding challenges, and company-specific placement papers, while AI-based proctoring and dashboards ensure integrity and continuous feedback. The platform also strengthens aptitude, soft skills, and domain knowledge, complementing classroom learning and improving placement readiness.



Innovation by Faculty in Teaching and Learning

Innovative Teaching and Learning

The field of Computer Science is rapidly evolving, requiring modern, technology- driven, and student-centered education. Innovative Teaching and Learning (ITL) integrates methods like flipped classrooms, blended learning, project-based learning and peer mentoring to enhance engagement and problem-solving skills. By fostering critical thinking, collaboration, and adaptability, ITL prepares MCA students for real-world challenges in software development and other emerging technologies. This approach transforms learning into an interactive, practical, and industry-relevant experience.

The innovative teaching learning methods followed by the faculty members are listed below

- **Blended Learning:** It refers to a learning approach that combines traditional face-to-face classroom teaching with online learning. In this model, students gain theoretical knowledge and domain-specific skills through online certification courses, complemented by in-class discussions, hands-on sessions, and faculty guidance. This hybrid format ensures flexibility, deeper understanding, and practical application of concepts, bridging the gap between academic learning and industry needs.

- **Flipped Class:** The faculty provide the materials to the students prior to the class. The students practice working before it is discussed in class. The teacher plays the role of the facilitator and helps the students to understand any complex concepts through small group discussions.
- **Project Based Learning:** Students are encouraged to undertake projects during their studies, allowing them to actively explore real-world problems and gain deeper insights. Faculty members provide guidance at various stages, offering timely inputs to support project development.
- **Lab taken to class:** Faculty members are encouraged to use Interactive Display Panel(IDP) to demonstrate practical concepts, installations, and implementations directly in the classroom, ensuring effective learning.
- **Peer Learning:** Students are encouraged to discuss the given problems among themself and guide each other to derive the solutions that leads to better understanding and problem-solving abilities.
- **Experiential Learning:** Students engage in experiential learning by solving real-world industry problems from , Wisework and Hyperverge under faculty guidance.

This hands-on approach enhances critical thinking, problem-solving, and industry readiness through practical application and reflection.

- **Lecture:** Faculty members explain concepts, principles, problem-solving approaches, and applications of the subject, fostering student interest and sparking creativity in applying the knowledge to real-world scenarios.
- **Group Discussion:** Faculty members organize and facilitate group discussions, encouraging students to express their views on various topics. This approach enhances communication, technical presentation skills, and critical thinking, fostering a collaborative learning environment.

The table below shows sample implementations of pedagogical initiatives conducted in the respective courses.

S.NO	Methodology	Course aligned	Remarks
1	Blended Learning	• P20CAP4701 Project Work • 24CAI507 -Automation and Artificial Intelligence	For Final year capstone projects, certificate courses are curated using Coursera's course builder to equip students with the relevant domain and technology required to address their problem statements. These courses provide students with exposure that integrates industry insights and cohort-based learning through Coursera. Students also complete certification courses aligned with the syllabus, ensuring that a module from the course content is effectively covered.
2	Project Based Learning	• P20CAP2702 Mini Project • P20CAI2603 Engineering Clinics	Students are encouraged to analyze and implement their ideas through project which prompts a deeper understanding of concepts through hands-on experience.
3	Flipped Classroom	• P20CAT2001 Software Engineering Methodologies and Quality Assurance	Learning materials were shared via a blog covering both foundational and advanced concepts. Students read the blog materials before class, gaining a basic understanding of the topic. During class, the instructor facilitated deeper engagement through discussions, addressing questions, and hosting group activities.
4	Lab Taken to class	• P20CAI3203- Cloud Application Development	Demonstration on lab exercises shown to students using interactive Display Panel (IDP). This helps students to understand the programming concepts effectively in the classroom.

5	Peer Learning	• P20CAT1002 Database Technologies • 24CAT504 Operating Systems	In Database Technologies peer learning activity, students worked in pairs where one focused on front-end design and the other handled back-end development, explaining their parts simultaneously. They later swapped roles to gain complete exposure to both areas. Finally, they collaborated to build a full-fledged application integrated with ODBC connectivity, enhancing both teamwork and technical skills. OS Peer Learning: Divided students into small groups. Assign each group a core OS topic (e.g., Process Scheduling, Memory Management, File Systems, Deadlocks). Each group prepares a short explanation or demo and teaches the rest of the class. Share OS-based numerical problems (e.g., CPU scheduling algorithms like FCFS, SJF, Round Robin). Students solve in pairs, compare results, and discuss differences.
6	Group Discussion	• 24CAI503 Object Oriented Programming	Group discussions on key Java programming concepts are organized and facilitated, encouraging students to express their views and share practical examples. This approach enhances communication, technical presentation skills, and critical thinking, fostering a collaborative learning environment in Java programming concepts.