Program: MBA Tech (Computer Engineering)					Semester: VIII	
Course: Capstone Project					Code : 702EE0C004	
Teaching Scheme					Evaluation Scheme	
Lecture (Hours per week)	Practical (Hours per week)	Tutorial (Hours per week)	Credit	Internal Continuous Assessment (ICA) (Marks -100)		Term End Examinations (TEE) (Marks - --)
0	10	0	5	Marks Scaled to 100		-----

Pre-requisite: Knowledge of all core and elective courses completed till 3rd year.

Course Objective

The capstone project is designed to provide a culminating design experience to the final-year students' learning with essentially required hands-on experience to ensure that they graduate with the required practical and soft skills. The course aims to encourage students to think critically, solve challenging problems, do a feasibility study and develop written and oral communication skills, teamwork and planning. The students may also work in interdisciplinary areas which will help broaden their scope and learning in different domains.

Course Outcomes

After completion of the course, students will be able to -

1. Select an appropriate problem statement after reviewing the literature and identifying the research gaps.
2. Formulate the different use cases/feasible design model.
3. Implement the prototype/proof of concept, test and validate the results.
4. Manage a team project.
5. Summarize the topic into a technical report.

Syllabus

A student is required to carry out elaborated project work. The project may be either design and fabrication work or a simulation and synthesis of a problem/system, and develop algorithms and verify feasibility of implementation. At the end of the semester students will be required to submit a report detailing the literature review, design problem formulation, analysis functional simulation and synthesis, work plan and work done and present his/her work carried out before examiners.

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Program: B Tech / MBA Tech [Data Science, Artificial Intelligence, Computer Engineering], B Tech [AI and ML, AI and DS, Computer Science, CSE (DS) 311 (VT)]				Semester : VI/ VII/VIII/ V-VII	
Course: Big Data Analytics				**Code:** 702DB0C029	
Teaching Scheme				Evaluation Scheme	
Lecture (Hours per week)	**Practical (Hours per week)**	**Tutorial (Hours per week)**	**Credit**	**Internal Continuous Assessment (ICA) (Marks - 50)**	**Term End Examinations (TEE) (Marks- 100)**
2	2	0	3	Marks Scaled to 50	Marks Scaled to 50

Pre-requisite: Programming Knowledge

Course Objective

The aim of the course is to introduce the concept of Big Data in Data Science. It will provide information on the procedure to analyze, process and extract information from datasets that are both voluminous and complex. It will outline how big data technologies can be harnessed by businesses to study emerging challenges and engage in better decision making

Course Outcomes

After completion of the course, students will be able to –
1. Explain the process of Big Data storage, processing, visualization, and application on workplaces and research environments
2. Develop new approaches to Social Analytics and Security issues on Big Data
3. Create and set-up a Hadoop cluster for handling big data and distributed file system and computing

Detailed Syllabus

Unit	Description	Duration
1.	**Introduction to Big Data** Types of Digital Data, Introduction to Big Data, Big Data Analytics, History of Hadoop, Apache Hadoop, Analysing Data with Unix tools, Analysing Data with Hadoop, Hadoop Streaming, Hadoop Echo System	02
2.	**HDFS (Hadoop Distributed File System)** The Design of HDFS, HDFS Concepts, Command Line Interface, Hadoop file system interfaces, Data flow, Data Ingest with Flume and Scoop and Hadoop archives, Hadoop I/O: Compression, Serialization, Avro and File-Based Data structures	03
3.	**Map Reduce** Anatomy of a Map Reduce Job Run, Failures, Job Scheduling, Shuffle and Sort, Task Execution, Map Reduce Types and Formats, Map Reduce Features.	03
4.	**Hadoop Eco System** Pig: Introduction to PIG, Execution Modes of Pig, Comparison of Pig with Databases, Grunt, Pig Latin, User Defined Functions, Data Processing operators. Hive: Hive Shell, Hive Services, Hive Metastore, Comparison with Traditional Databases, HiveQL, Tables, Querying Data and User Defined Functions. Hbase: HBasics, Concepts, Clients, Example, Hbase Versus RDBMS. Big SQL : Introduction	05

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5.	**Data Visualization in Big Data** Need for visualization, creating visualization, Existing Visualization Techniques, Big Data Visualization Challenges Techniques, visualizing big data, Key techniques, Visual Analysis of Big Data	04
6.	**Big Data Analytics Algorithms** Collaborative filtering, Classification, Clustering, text data mining, Basic concepts in text retrieval, Information retrieval models, Implementation of a search engine, Evaluation of search engines, Advanced search engine technologies.	07
7.	**Application of Big data** Spatial-temporal data, financial data, big multimedia data, big medical/health data and big scientific data	06
Total		30

Text Books
1. Subhashini Chellappan, Seema Acharya,*Big Data and Analytics*, 2nd Edition, Wiley, 2019.
2. G. Sudha Sadasivam , R. Thirumahal ,*BIG DATA ANALYTICS*, 1st Edition, Oxford University Press, 2020.

Reference Books
1. Trevor Hastie,*The Elements Of Statistical Learning: Data Mining, Inference, And Prediction*, 2nd Edition, Springer, 2017.
2. Ahmed F. Zobaa , Trevor J. Bihl, *Big Data Analytics in Future Power Systems*, 1st Edition, CRC Press, 2018.
3. C.S.R. Prabhu, Aneesh Sreevallabh Chivukula, Aditya Mogadala , Rohit Ghosh (Author), L.M. Jenila Livingston, *Big Data Analytics: Systems, Algorithms, Applications*, 2nd Edition, Springer, 2020.

Laboratory Work

8 to 10 programming exercises (and a practicum) based on the syllabus.

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Program: B Tech/MBA Tech (IT, Computer Engineering), B Tech (AI and ML, AI and DS), BTI (EXTC)				Semester: V,VI,VII,VIII,XII	
Course: Cyber Forensics				Code: 702IT0E024	
Teaching Scheme				Evaluation Scheme	
Lecture (Hours per week)	Practical (Hours per week)	Tutorial (Hours per week)	Credit	Internal Continuous Assessment (ICA) (Marks - 50)	Term End Examinations (TEE) (Marks - 100)
2	2	0	3	Marks Scaled to 50	Marks Scaled to 50

Prerequisite: Basic Knowledge of Computer Network, Operating Systems and programming

Course Objective

This course is an introduction to the field of cyber forensics. This course introduces various aspects of cyber forensics to the students. Students will learn about various methods, tools and techniques to perform forensic operations on a given media.

Course Outcomes

After completion of the course, students would be able to-

1. Describe Windows and Linux File systems
2. Perform various forensics operations on a given media
3. Describe various professional, ethical and legal issues related to cyber forensics

Detailed Syllabus

Unit	Description	Duration
1	**Introduction to cybercrime and cyber forensics** Definition of cybercrime, type and classification of cybercrimes, Overview of cyber forensics, forensic process, types of investigations, digital evidence, data acquisition and forensic imaging, digital forensic tools, and Incident Response	6
2	**File System Analysis** Understanding file systems, booting process, disk drives and solid-state devices, FAT and NTFS file systems, partition table and MFT, understanding whole disk encryption, Windows registry, file structure of ext4.	6
3	**Data Analysis** Preparation for forensic analysis, data carving, recovering graphics files and header analysis, email and internet activity analysis, data hiding techniques, malware analysis	6
4	**Network Forensics** Overview, analyzing network traffic, network-based evidence, investigating routers.	4
5	**Mobile Device Forensics** Mobile phone basics, inside mobile devices, acquisition procedure for mobile devices, mobile forensic tools.	2
6	**Legal, Professional and Ethical issues** Cyber laws in India, various ethical dilemma, professional conduct, and report writing	4
7	**Case Study**	2

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	Total	30

Text Books
1. B. Nelson, A. Phillips, and C. Steuart, *Guide to Computer Forensics and Investigations*, 6th Edition, Cengage, 2019.
2. N. Jain and D. R. Kalbande, *Digital Forensic: The Fascinating World of Digital Evidences*, Wiley India, 2019.

Reference Books
1. Dejey and S. Murugan, *Cyber Forensics*, 1st Edition, Oxford University Press, 2018.
2. C. Easttom, *System Forensics, Investigation, and Response*, 3rd Edition, J B Learning, 2019.
3. N. Reddy, *Practical Cyber Forensics*, 1st Edition, Apress, 2019.

Laboratory Work
8 to 10 Programming exercises based on the syllabus.

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Program: B Tech (Mechatronics Engineering, AI and ML, Artificial Intelligence, Computer Engineering, CSE (DS)) MBA Tech (Artificial Intelligence & Computer Engineering)				Semester: V/ VI/VII/VIII	
Course: Robotic Process Automation				**Code:** 702MH0E015	
Teaching Scheme				**Evaluation Scheme**	
Lecture (Hours per week)	**Practical (Hours per week)**	**Tutorial (Hours per week)**	**Credit**	**Internal Continuous Assessment (ICA)** **(Marks - 50)**	**Term End Examinations (TEE)** **(Marks - 100)**
2	2	0	3	Marks Scaled to 50	Marks Scaled to 50

Prerequisite: - NIL

Course Objective

The course aims to provide a comprehensive understanding of Robotic Process Automation (RPA) by covering its foundational concepts and advanced applications. Students will gain insight into the historical development and evolution of RPA, along with a deep appreciation for the benefits and challenges of its implementation. By delving into RPA tools and their features, students will learn to harness workflow automation, create apps, grasp the distinctions between attended and unattended bots, and comprehend the symbiotic relationship between RPA and Artificial Intelligence (AI).

Course Outcomes

After completion of the course, students will be able to -

1. Demonstrate understanding of fundamental RPA concepts, historical evolution, benefits and process analysis and selection
2. Analyze RPA tools, design bot workflows, and apply decision-making strategies, constructing optimized automation processes
3. Create user-centric app interfaces, develop integrated app functionalities aligned with RPA workflows, and deploy applications within operational frameworks
4. Evaluate ethical considerations, including data security and privacy, ensuring compliant RPA implementations, and making informed decisions regarding automation practices.

Detailed Syllabus

Unit	Description	Duration
1	**Introduction and Fundamental concepts of Robotic Process Automation (RPA)** Understanding the basics of RPA, Historical context and evolution of RPA, Benefits and challenges of implementing RPA, RPA tools and their features, Workflow automation using RPA, Understanding bots and their types (attended vs. unattended), Role of Artificial Intelligence and Machine Learning in RPA	**04**
2	**Process Analysis and Selection for Automation** Identifying suitable processes for automation, Assessing process feasibility and complexity, Process documentation and mapping, ROI analysis for RPA implementation, Process mining techniques in process analysis.	**04**
3	**Building RPA Bots** Basics of bot creation and configuration, Designing bot workflows using flowcharts, Implementing decision-making and branching in bots, Using variables and data types in RPA, Version control and change management for bots.	**06**
4	**Advanced RPA Concepts** Integrating with APIs and web services, Automating email communication and document processing, Handling unstructured data using OCR (Optical Character Recognition), Advanced error handling and recovery strategies, Using triggers and event-based automation.	**06**

5	**App Creation, Deployment and Maintenance Using RPA** Introduction to app creation with RPA, Designing user interfaces for apps, Integrating app functionalities with RPA workflows, Implementing app navigation and user interactions, Creating app prototypes using low-code platforms, Monitoring and optimizing app performance, Handling updates and maintenance of deployed apps, User feedback and continuous improvement in apps, Scaling app deployment for enterprise use.	**06**
6	**Ethical and Security Considerations** Data security and privacy in RPA and app creation, Ensuring compliance with regulations and standards, Ethical considerations in RPA implementation.	**02**
7	**Future Trends in RPA and App Creation** Emerging technologies and their impact on RPA, Predictions for the future of automation and app development, RPA in the era of hyperautomation, Exploring AI-powered RPA and its potential, The role of bots in shaping the future of work, Human-Automation Collaboration.	**02**
	Total	**30**

Text Books
1. T. Taulli, *The Robotic Process Automation Handbook*, 1st Edition, Apress, 2021.
2. R. Murdoch, *Robotic Process Automation*, 1st Edition, Independently Published, 2018.

Reference Books
1. N. Mullakara and A. K. Asokan, *Robotic Process Automation Projects*, 1st Edition, Packt Publishing Limited, 2020.
2. A. M. Tripathi, *Learning Robotic Process Automation*, 1st edition, Packt Publishing Limited, 2018.

Laboratory Work
8 to 10 experiments (and a practicum where applicable) based on the syllabus.

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(Head of the Department)