Koneru Lakshmaiah Education Foundation
(Category -1, Deemed to be University estd. u/s. 3 of the UGC Act, 1956)
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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

PROGRAM: M. TECH - EMBEDDED SYSTEMS

2024-25

MAPPING OF COURSE OUTCOMES

2024-2025 (SEMESTER -1)

SI.NO	COURSE CODE	COURSE NAME	Cos	COURSE OUTCOME
1	23EC51B2	Internet of Things Architecture and Protocols	1	Apply the concepts of IoT Architecture, Reference model, and IoT enabling technologies.
			2	Apply the logical design of IoT systems and communication technologies.
			3	Apply IoT networking protocols and Authentication Protocols for the IoT Application layer.
			4	Apply IoT protocols and programming concepts for real-world problems.
2	23ES5101	Embedded Controllers & SOCs	1	Apply the concept of embedded system, microcontroller, different components of a microcontroller, and their interactions.
			2	Get familiarized with the programming environment to develop embedded solutions.
			3	Program ARM microcontroller to perform various tasks.
			4	Apply the key concepts of embedded systems such as I/O, timers, interrupts, and interaction with peripheral devices.

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3	23EC5101	Wireless Communication and Data Networks	1	To Apply the importance of Spreading Sequences and Multiuser systems
			2	To Apply the importance of Multicarrier in present Communication Systems
			3	To Apply the concepts of MIMO Systems, Spatial Multiplexing, and the importance of Ultra-Wideband Communications
			4	To Apply the basic concept of mobile ad hoc networks and Wireless LAN Wi-Fi and IEEE 802.11 Standard Bluetooth and IEEE 802.15 Standards
4	23EC5104	Artificial Intelligence and Machine Learning	1	Applying of basic search algorithms
			2	Study and applications of ANN and deep learning
			3	Application of various ML techniques of kMeans, kNN, SVM and GMM
			4	Apply various advanced computing methods

Elective – 1

SI.NO	COURSE CODE	COURSE NAME	Cos	COURSE OUTCOME
1	23ES51A1	IIoT 4.0 for Automation in Industries	1	Knowledge of theory and practice related to Industrial IoT Systems
			2	Ability to identify, formulate and solve engineering problems by using Industrial IoT
			3	Knowledge of the design and analysis of Cyber-Physical System
			4	Ability to implement real field problems by gaining knowledge of Industrial applications with IoT capability.
2	23ES51A2	Energy Harvesting Technologies for IoT	1	Apply the concepts of renewable energy systems and energy harvesting for WSN.

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			2	Apply the solar energy harvesting technologies and designing solar power systems for IoT. protocols for standards
			3	Apply mechanical energy harvesting technology for WSN and design a system for real-world problems
			4	Apply Electromagnetic energy harvesting technologies for small-power applications and current research on hybrid systems.
3	23ES51A3	Advanced Embedded System Design	1	Apply the ARM Cortex-M4 architecture of embedded systems
			2	Apply the onboard protocols used in the Embedded system and testing and debugging.
			3	Design concepts needed to build an embedded system using RTOS
			4	Analyze the insights of RTOS internal design and implementation
4	23ES51A4	Data Management and Security	1	Applying of database systems and architecture, data models, and declarative query languages
			2	Apply and characterize modern techniques of database information security threats and techniques for database security assessment
			3	analyse information in a database to identify information security incidents
			4	Tools for database management systems monitoring

Elective – 2

SI.NO	COURSE CODE	COURSE NAME	Cos	COURSE OUTCOME
1	23EC51B1	Human Machine Interface & Brain- Machine Interface	1	Applying the basics of HMI: Asimov's Laws, GUI Design, Aesthetics, Developments in Bio-Chips, Heuristics.
			2	Applying the HMI Technologies such as GMOs Models, CMN-GOMS,

				Fitts Laws, Hick-Hyman Laws, Norman's 7 Principles.
			3	Applying the concept of Brainwaves & BMI
			4	Analyzing Humanoids & HMI/BMI Applications: Hierarchical Task] Analysis, Dialog Design, Use of FEM
2	23EC51B2	Data Bases, Data Modeling & Data Structure	1	Applying of database systems and architecture, and data models.
			2	Apply and characterize modern techniques of database information.
			3	Apply the concept of database to identify information and ER Modelling.
			4	Apply the concurrency control, recovery, security, and indexing for the real-time data
3	23ES51B3	Computer Vision & Applications	1	Implement fundamental image processing techniques required for computer vision.
			2	Apply Hough Transform for line, circle, and ellipse detections
			3	Apply 3D vision techniques. Implement motion-related techniques; develop applications using computer vision techniques.
			4	Applys motion analysis. To study some applications of computer vision algorithms.
4	23EC51Q2	System on Chip Design	1	Acquire knowledge about Top-down SoC design flow
			2	Apply the system-level design of communication networks.
			3	Apply system-level design and analyze MPSoC concepts
			4	Acquire knowledge about NoC

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5	23IE3149	SEMINAR		Enhancing verbal delivery, body language, PowerPoint skills, structuring of the presentation, engaging audience, tone of presentation for the overall improvement of individual presentation skills.
6	23TS51I1	TECHNICAL SKILLING - I		Enhancing the system design and modeling capabilities through visualization of scientific theories and concepts while building and developing the capabilities of designing a new system by altering and implementing new algorithms and methods through visualization tools.
2024-25 (Semester II)				
1	23ES5202	Wireless Sensor Network and Security	1	Apply the fundamentals of wireless sensor networks and the various protocols at various layers.
			2	Apply MAC Protocols and sensor networks application.
			3	Apply the issues pertaining to sensor networks and the challenges involved in managing a sensor network.
			4	Identify security threats in wireless networks and design strategies to manage network security
2	23ES5203	IoT Cloud computing	1	Apply the concepts of IoT system architecture, important IoT features, and platforms
			2	Distinguish the cloud computing architecture, web services, and related services

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			3	Apply the cloud computing platforms such as Microsoft Azure and Google Cloud Platform (GCP)
			4	Analyze the security in cloud computing, the significance of Fog computing and green cloud
3	23ES5204	Big data Analytics for IoT	1	Big Data Science and Machine Intelligence
			2	Machine Learning for Big Data in Healthcare Applications
			3	Apache Hadoop and Apache Spark
			4	Data Analytics using Azure
4	23ES5205	IoT System Design Techniques	1	Apply various building blocks and working of state-of-the-art IoT systems and IoT system design enabling technologies.
			2	Apply the Real-world design constraints and design and develop the system with Hardware and software tools.
			3	Apply the Product Design and Development process and gain enough insights to conceive and build IoT systems on their own
			4	Apply the design concepts for Industrial IoT and Health Care applications.
Elective-3				
1	23ES51C1	Edge Computing and Mobile Applications	1	Apply various Edge computing scenarios and case studies.
			2	Apply the Edge computing Architectures and protocols.
			3	Develops mobile computing and standardized hardware and software platforms.

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			4	Apply the Edge concepts for Mobile application development.
2	23ES51C2	5G NR - Next Generation Wireless Technologies	1	Apply the 5G New Radio and Road map to 5G, Pillars of 5G New Multicarrier Modulation schemes.
			2	Apply the massive MIMO technologies for 5G and investigate the schemes of pre-coding, channels, and communications on machine and device to device
			3	Applying the 5G technology to Millimeter-wave communication and transceiver architecture
			4	Applying the concepts of 5G on vehicular communication, architectures of intelligent vehicles.
3	23RA51C1	Adaptive motion control systems for automation and robotics	1	Apply the Principles and design concepts of various adaptive control Mechanisms.
			2	Apply the Principles and design concepts of Autonomous Tracked Robots
			3	Apply the Principles and design concepts of Motion Vision and Motion estimation
			4	Apply the Principles and design of Optimization for Motion Control Systems

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4	23RA51D1	Optimization algorithms for autonomous systems	1	Apply Machine Learning based Optimization models for various problem-specific solutions.
			2	Apply evolutionary programming and strategies in engineering aspects.
			3	Design Mathematical Models of Genetic Algorithms fitness functions.
			4	Apply and analysis of advanced autonomous optimization techniques.
Elective-4				
1	23EC51D4	Block Chain & Cyber Security	1	Apply emerging abstract models for Blockchain Technology
			2	Analyze the concept of bitcoin and the mathematical background behind it
			3	Apply the tools for Applying the background of cryptocurrencies
			4	Identify major research challenges and technical gaps existing between theory and practice in the cryptocurrency domain
2	23RA51D2	Automotive Electronics & Avionics	1	Acquire the fundamental knowledge of automotive electronics.
			2	Explore and conjugate the emerging technologies utilized to assist Autonomous Vehicles.
			3	Analyze Electronics Embedded to Automotive Electronics and autonomous Vehicles

			4	Acquire the basic knowledge of aviation technology.
3	23EC51D1	FPGA-Based Wireless System Design	1	Apply basic concepts of software-defined radio
			2	Analysis of FPGA Speed, Area & Power
			3	Acquire knowledge of advanced encryption standards
			4	Apply the FPGA for wireless system application
4	23ES51D4	Cyber Physical Systems	1	Apply the basics of cyber physical systems.
			2	Enumerates several fields where cyber-physical systems are widely used.
			3	Design and develop robotics algorithms and cyber physical systems
			4	Apply modern tools to develop CPS applications
5	23IE5250	TERM PAPER	1	Enhancing the skill sets in research by recognizing and identifying problems, exploring/defining the problem by gathering information, formulation of the research objectives, and addressing the problem through scientific process and methods.
6	23TS52I2	TECHNICAL SKILLING-II	1	Enhancing the system design and modeling capabilities through visualization of scientific theories and concepts while building and developing the capabilities of designing a new system by altering and implementing new algorithms and methods through visualization tools.

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