Walchand Institute of Technology, Solapur
(An Autonomous Institute)

Affiliated to
Punyashlok Ahilyadevi Holkar Solapur University, Solapur

Choice Based Credit System (CBCS)

Structure and Syllabus
for
Final Year B.Tech. Electronics and Telecommunication Engineering
W.E.F. 2025-26

HEAD
Electronics & Telecommunication Department
Walchand Institute of Technology
SOLAPUR - 413006

WIT SOLAPUR

Dr. Mrs. M. A. Nirgude
Dean Academics

Department of Electronics and Telecommunication Engineering

Vision

- To be a distinguished center for nurturing the holistic development of competent young engineers in the electronics and allied field.

Mission

- **M1:** To inculcate and stimulate Electronics & allied Engineering proficiency amongst students through quality education and innovative educational practices.
- **M2:** To create engineering professionals with social consciousness.
- **M3:** To foster technical skills of students through creativity and critical thinking.
- **M4:** To enhance soft skill set of students which is crucial for career success through effectual training.

Department of Electronics and Telecommunication Engineering

Program Educational Objectives (PEOs)

- **PEO 1:** Graduates will exhibit strong fundamental knowledge and technical skills in Electronics and Telecommunication Engineering and allied fields.
- **PEO 2:** Graduates will manifest technological progression, hardware & software skills to fabricate sustainable, energy efficient and futuristic solutions to pursue successful professional careers in multidisciplinary fields.
- **PEO 3:** Graduates will demonstrate professional ethics, effective communication, teamwork, leadership qualities and ability to relate engineering issues to broader social context along with lifelong learning.

Knowledge and Attitude Profile (WK)

WK1	A systematic, theory-based understanding of the natural sciences applicable to the discipline and awareness of relevant social sciences.
WK2	Conceptually-based mathematics, numerical analysis, data analysis, statistics and formal aspects of computer and information science to support detailed analysis and modelling applicable to the discipline.
WK3	A systematic, theory-based formulation of engineering fundamentals required in the engineering discipline.
WK4	Engineering specialist knowledge that provides theoretical frameworks and bodies of knowledge for the accepted practice areas in the engineering discipline; much is at the forefront of the discipline.
WK5	Knowledge, including efficient resource use, environmental impacts, whole-life cost, re-use of resources, net zero carbon, and similar concepts, that supports engineering design and operations in a practice area.
WK6	Knowledge of engineering practice (technology) in the practice areas in the engineering discipline.
WK7	Knowledge of the role of engineering in society and identified issues in engineering practice in the discipline, such as the professional responsibility of an engineer to public safety and sustainable development.
WK8	Engagement with selected knowledge in the current research literature of the discipline, awareness of the power of critical thinking and creative approaches to evaluate emerging issues.
WK9	Ethics, inclusive behavior and conduct. Knowledge of professional ethics, responsibilities, and norms of engineering practice. Awareness of the need for diversity by reason of ethnicity, gender, age, physical ability etc. with mutual understanding and respect, and of inclusive attitudes.

Program Outcomes (POs)	
PO 1	**Engineering Knowledge:** Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop to the solution of complex engineering problems.
PO 2	**Problem Analysis:** Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)
PO 3	**Design/Development of Solutions:** Design creative solutions for complex engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required. (WK5)
PO 4	**Conduct Investigations of Complex Problems:** Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions. (WK8).
PO 5	**Engineering Tool Usage:** Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. (WK2 and WK6)
PO 6	**The Engineer and The World:** Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment. (WK1, WK5, and WK7).
PO 7	**Ethics:** Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)
PO 8	**Individual and Collaborative Team work:** Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.
PO 9	**Communication:** Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning difference
PO 10	**Project Management and Finance:** Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.
PO 11	**Life-long Learning:** Recognize the need for, and have the preparation and ability for i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change. (WK8)

Program Specific Outcomes (PSOs)

- **PSO 1:** Graduates will be able to attain a solid foundation in Electronics and Telecommunication Engineering with an ability to function in multidisciplinary environment.
- **PSO 2:** Graduates will be able to use techniques and skills to design, analyze, synthesize, and simulate Electronics and Telecommunication Engineering components and systems.
- **PSO 3:** Graduate will be capable of developing programs in Assembly, High level and HDL languages using contemporary tools for software development.

Department of
Electronics and Telecommunication Engineering

Legends Used

L	Lecture Hours / week
T	Tutorial Hours / week
P	Practical Hours / week
FA	Formative Assessment
SA	Summative Assessment
ESE	End Semester Examination
ISE	In Semester Evaluation
ICA	Internal Continuous Assessment
POE	Practical and Oral Exam
OE	Oral Exam
MOOC	Massive Open Online Course
HSS	Humanity and Social Science
NPTEL	National Programme on Technology Enhanced Learning
F.Y.	First Year
S.Y.	Second Year
T.Y.	Third Year
B. Tech.	Bachelor of Technology

Department of Electronics and Telecommunication Engineering

Course Code Format

2	2	E	T	U/P	2	C	C	1	T/L
Year of syllabus revision		Program Code		U-Under Graduate, P-Post Graduate	Semester No./ Year1/2/3/… 8	Course Type		Course Serial No. 1-9	T-Theory, L-Lab session A-Tutorial P-Programming / Design

Program Code	
ET	Electronics and Telecommunication Engineering
Course Type	
BS	Basic Science
ES	Engineering Science
HU	Humanities & Social Science
MC	Mandatory Course
CC	Core Compulsory Course
SN*	Self-Learning **N*** *indicates the serial number of electives offered in the respective category*
EN*	Core Elective **N*** *indicates the serial number of electives offered in the respective category*
ON*	Open Elective **N*** *indicates the serial number of electives offered in the respective category*
SK	Skill Based Course
SM	Seminar
MP	Mini project
PR	Project
IN	Internship

Sample Course Code	
22ETU7CC1T	Networking and Security

Department of Electronics and Telecommunication Engineering

B. Tech. Semester VII

Course Code	Name of Course	Engagement Hours			Credits	SA		FA		Total
		L	T	P		Theory	OE/ POE	ISE	ICA	
22ETU7CC1T	Networking and Security	3		-	3	60		40		100
22ETU7CC1A	Networking and Security (Tutorial)		1		1				25	25
22ETU7EN*2T	Core Elective II	3		-	3	60		40		100
22ETU7EN*2A	Core Elective II (Tutorial)		1	-	1				25	25
22ETU7EN*3T	Core Elective III	3	-	-	3	60		40	-	100
22ETU7CC4T	CMOS Technology	3	-	-	3	60		40	-	100
	Sub Total	**12**	**2**		**14**	**240**		**160**	**50**	**450**
	Laboratory Courses									
22ETU7EN*3L	Core Elective III Lab	-	-	2	1	-			25	25
22ETU7CC4L	CMOS Technology Lab	-	-	2	1	-	25		25	50
22ETU7PR5L	Project Phase I	-	-	8	4	-	50		100	150
	Sub Total	**-**		**12**	**6**		**75**	**-**	**150**	**225**
	Grand Total	**12**	**2**	**12**	**20**	**315**		**160**	**200**	**675**

Department of Electronics and Telecommunication Engineering

B. Tech. Semester VIII

Course Code	Name of Course	Engagement Hours			Credits	SA		FA		Total
		L	T	P		Theory	OE/ POE	ISE	ICA	
22ETU8PR1L	Project Phase II			4*	2		50		50	100
22ETU8IN2L	Internship / On Job Training (OJT)	-	-	20*	10		100		100	200
	Grand Total	**0**	**0**	**24**	**12**		**150**		**150**	**300**

Note:

- N* indicates the serial number of electives offered in the respective category
- ## indicates program code of offering Program
- Core Elective II at Final year B. Tech. E&TC Engineering, Semester VII

22ETU7EN*2T Core Elective II List

List of Core Electives II offered to students pursuing Honors in the Internet of Things	
Course Code	**Course Title**
22ETU7E12T	Programmable ICs and ASIC
22ETU7E22T	Mobile and Satellite Communication

List of Core Electives II offered to all other students	
Course Code	**Course Title**
22ETU7E12T	Programmable ICs and ASIC
22ETU7E22T	Mobile and Satellite Communication
22ETU7E32T	Internet of Things

- Core Elective III at Final year B. Tech. E&TC Engineering, Semester VII

22ETU7EN*3T Core Elective III List

List of Core Electives III offered to students pursuing Honors in the Internet of Things	
Course Code	**Course Title**
22ETU7E13T	Business Intelligence
22ETU7E23T	Microwave Engineering

List of Core Electives III offered to all other students	
Course Code	**Course Title**
22ETU7E13T	Business Intelligence
22ETU7E23T	Microwave Engineering
22ETU7E33T	Cloud Technology

- Internship / On Job Training (OJT) :
  a. Students may complete an internship / On Job Training (OJT) of a minimum of two months duration at the industry during Final Year Sem VIII.
  b. The Industry shall appoint a Supervisor to assess the performance of the student and share the same with the departmental supervisor for the fulfilment of ICA marks
  c. The student shall prepare a report of the work completed at the Industry duly endorsed by the industry Supervisor and submit the same as an Internship report.
  d. The ESE for Internship / On Job Training (OJT) shall be conducted by the departmental supervisor in the presence of an external industry or academic expert

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Final Year B.Tech. (Electronics and Telecommunication Engineering), Semester-VII

22ETU7CC1T: Networking and Security

Teaching Scheme		**Examination Scheme**	
Lectures	3 Hours/week	**ESE**	60 Marks
Tutorial	1 Hours/week	**ISE**	40 Marks
Credits	4	**ICA**	25 Marks

Introduction:

This course introduces TCP/IP and ISO OSI protocol layers and their functionality. Also, introduces various encryption technologies to secure data.

Course Prerequisite:

This course requires basic understanding of digital signals and fundamentals of networking.

Course Objectives:

1. To make students gain a comprehensive understanding of data communication principles, network types, topologies, and the OSI and TCP/IP model
2. To make students Develop proficiency in the concepts and protocols to implement efficient and reliable communication networks.
3. To make students explore fundamental concepts of computer security, classical encryption techniques, block ciphers, and encryption standards
4. To make students aware of classical and modern encryption techniques, for secure data transmission and ensure confidentiality, integrity, and authenticity in communication networks.

Course Outcomes:

At the end of the course, students will be able to

1. Demonstrate a comprehensive understanding of data communication principles, network architectures.
2. Explore protocols enabling us to analyze and evaluate different types of networks effectively.
3. Equipped with the knowledge necessary to assess and implement network security measures effectively.
4. Describe classical and modern encryption techniques, key management and distribution enabling to design and implement secure communication systems.

Unit – I	**Data Communication and Network**	**7 Hours**

Data Communication, Network- Need, Types (LAN, MAN, WAN), Topologies, Layer communication, OSI model, TCP/IP Suite, Network Devices at each layer (RS232, MODEM, Repeaters, Switches, bridges, routers, gateway).

Unit – II	Physical and Data Link Layer	8 Hours
Physical Layer- Circuit Switched network, packet switching **Data Link Layer**- Introduction, Framing, Link layer addressing, Error detection- parity check, checksum, CRC; Error correction – Hamming code		
Unit – III	**Network Layer & Transport Layer**	**9 Hours**
Network Layer – Network layer services, packet switching, IPv4 addresses, Routing protocols – distance vector, link state routing; Network layer protocols-IP, ICMPv4 **Transport Layer**- Introduction, Transport Layer protocols, UDP, TCP; Sliding window protocols – Go back N, selective repeat protocols; Piggybacking.		
Unit – IV	**Security Fundamentals**	**7 Hours**
Computer Security Concepts: The OSI Security Architecture, Security Attacks, Security Services, Security Mechanisms, A Model for Network Security. **Classical Encryption Techniques:** Symmetric Cipher Model, Cryptography. **Substitution Techniques:** Caesar Cipher, Mono alphabetic Ciphers, Play fair Cipher, Hill Cipher, Poly alphabetic Ciphers, Transposition Techniques, Rotor Machines, Steganography.		
Unit – V	**Block Ciphers and the Data Encryption Standard**	**8 Hours**
Traditional Block Cipher Structure: Stream Ciphers and Block Ciphers, Motivation for the Feistel Cipher Structure, Feistel Cipher. **Data Encryption Standard:** DES Encryption, DES Decryption, The Strength of DES. **Public-Key Cryptography and RSA:** Principles of Public Key Cryptosystem, RSA: Description of the Algorithm, Computational Aspects, Security of RSA.		
Unit – VI	**Key Management and Distribution**	**6 Hours**
Symmetric Key Distribution Using Symmetric Encryption, Symmetric Key Distribution Using Asymmetric Encryption, Distribution of Public Keys, X.509 Certificates, Public-Key Infrastructure.		
Internal Continuous Assessment (ICA): ICA consists of minimum eight assignment/tutorial based upon above syllabus		
Text Books		
1. Data communication and Networking 5E -B. A. Forouzan,5th Edition Mc-Graw Hill Education. 2. TCP/IP protocol suit- B.A. Forouzan, 4th Edition Tata Mc Graw hill Publication. 3. Computer networks- Andrew S. Tanenbaum. 4. Computer Security: Principles and Practices- William Stallings, Pearson Publication 5. Cryptography and Network Security- Atul Kahate, Tata McGrawhill 6. Network Security and Cryptography- Bernard Menezes, Cengage Learning		

Reference Books

1. Internetworking TCP/IP Principal, Protocol and Architecture -Douglas Comer- Wesley
2. TCP/IP Illustrated, The Protocols – W. Richard Slevens, G. Gabrani –PE pub.
3. Data and computer communication – William Stallings. - PE pub.
4. Cryptography and Network Security – Behrouz A Forouzan, , McGraw Hill Publications
5. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives - Nina Godbole.
6. Cisco: Fundamentals of Network Security Companion Guide (Cisco Networking Academy program)

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Final Year B.Tech. (Electronics and Telecommunication Engineering), Semester-VII

22ETU7E12T: Core Elective II - Programmable ICs and ASIC

Teaching Scheme		**Examination Scheme**	
Lectures	3 Hours/week	**ESE**	60 Marks
Tutorial	1 Hours/week	**ISE**	40 Marks
Credits	4	**ICA**	25 Marks

Introduction:

This course provides a deep understanding of programmable ASICs, FPGA-based systems, SoC design principles and Complex Programmable Logic Device (CPLD), equipping with valuable skills for advanced electronic engineering applications.

Course Prerequisite:

This course requires knowledge of Digital Devices, CMOS logic.

Course Objectives:

1. To make students learn the concept of ASIC and its library cell design.
2. To make students examine Programmable ASIC Logic and I/O Cells for design of various memory devices.
3. To make students analyze features, Boolean function implementation, architecture of CPLD.
4. To make students explore FPGA systems, architectures, types, logic design, I/O, and key commercial devices.
5. To make students comprehend SOC design concepts and its applications.

Course Outcomes:

At the end of the course, students will be able to

1. Explain different types of ASICs and its library cell design.
2. Describe the architecture of programmable ASIC Logic and I/O Cells.
3. Implement Boolean functions using different Programmable Logic Devices.
4. Comprehend the architecture of FPGA for implementation of digital design.
5. Explore the applications of SoC in specific domains.

Unit – I	**Introduction to ASIC**	**8 Hours**

Types of ASICs, ASIC Design flow, ASIC library cell design: Transistor as resistors, Transistor parasitic capacitance, Logical Effort, Library architecture, Gate array design, standard cell design.

Unit – II	Programmable ASICs	8 Hours
Antifuse, SRAM, EPROM, EEPROM based ASICs. Programmable ASIC logic cells and I/O cells. Programmable interconnects.		
Unit – III	**Programmable Logic Devices**	**10 Hours**
ROM, PLA, PAL, PLD, PGA – Features, Implementation of Boolean functions using PLDs, CPLD architecture, Commercial CPLD Devices: Xilinx XC9500, Altera Max7000.		
Unit – IV	**FPGA based system**	**10 Hours**
Basic concept, Digital Design and FPGA, FPGA Fabrics: FPGA Organization and architecture and its description, Static RAM based FPGA, Permanent FPGA, Chip I/O, Circuit design of FPGA, Logic implementation of FPGA architecture, Commercial FPGA Devices: Altera Flex 10k, Actel ACT -Xilinx LCA.		
Unit – V	**SOC Design**	**6 Hours**
Voice over IP SOC - Intellectual Property – SOC Design challenges- Methodology and design-FPGA to ASIC conversion – Design for integration-SOC verification-Set top box SOC.		

Internal Continuous Assessment (ICA):
ICA consists of a minimum eight assignment/tutorial based upon the above syllabus.

Text Books

1. Application Specific Integrated Circuits, by M. J. S. Smith, Pearson Education.
2. FPGA-Based System Design, by Wayne Wolf, Prentice Hall PTR.
3. Digital Design Using Field Programmable Gate Arrays, by Pak K. Chan & S. Mourad, PTR Prentice Hall .

Reference Books

1. Digital Integrated Circuits, Rabey, Chandrakasan, Nikolic, Pearson Education.
2. From ASICs to SOCs: A Practical Approach, by Farzad Nekoogar and Faranak Nekoogar, Prentice Hall PTR.
3. Principles of CMOS VLSI Design, Neil Weste, Kamran Eshraghian, Addison Wesley/Pearson Education.
4. Modern VLSI Design, Wayne Wolf , Kamran Eshraghian, Prentice Hall,.
5. Essentials of VLSI Circuits and Systems, Ehraghian, Dauglas A. Pucknell and Sholeh Eshraghiam, – PHI, EEE.

WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR
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Final Year B.Tech. (Electronics and Telecommunication Engineering), Semester-VII

22ETU7E22T: Core Elective II - Mobile and Satellite Communication

Teaching Scheme		**Examination Scheme**	
Lectures	3 Hours/week	**ESE**	60 Marks
Tutorial	1 Hours/week	**ISE**	40 Marks
Credits	4	**ICA**	25 Marks

Introduction:

This course provides comprehensive understanding of mobile communication, cellular concepts and practical applications in modern systems.

Course Prerequisite:

This course requires basic knowledge of telecommunications and networking concepts along with an understanding of digital signal processing and RF engineering fundamentals.

Course Objectives:

1. To introduce students' cellular communication principles
2. To impart knowledge of 4G (LTE), and 5G architectures and their technological advancements.
3. To make students analyze orbital mechanics and explain satellite subsystems.
4. To introduce students to satellite communication systems and their applications in modern navigation.

Course Outcomes:

At the end of the course, students will be able to

1. Apply cellular communication principles to calculate frequency reuse factor and co-channel reuse distance.
2. Compare 4G (LTE) and 5G architectures and their technological advancement.
3. Analyze orbital mechanics and explicate satellite subsystems.
4. Describe satellite communication systems and their applications in modern navigation.

Unit – I	**Introduction to Mobile Communication and Cellular Concepts**	**8 Hours**

Block Diagram, Data Technologies, Mobile and wireless devices, cellular concept, frequency reuse, channel assignment, hand-off and multiple access technologies.

Unit – II	**Digital Cellular Mobile Systems**	**7 Hours**
GSM-Services and features of GSM, Radio Subsystems, channel type, frame structure, CDMA-(IS-95) frequency and channel specification, forward and reverse CDMA channels, GPRS**.**		
Unit – III	**4G (LTE) & 5G Next Generation Technology**	**7 Hours**
Introduction to 4G, LTE Architecture, Elements of LTE- EPS, LTE Radio / air interface Modulation and features, LTE Channels, Introduction to 5G, 5G CN Architecture, Radio/air interface, features.		
Unit – IV	**Orbital Mechanics and Launchers**	**7 Hours**
Orbital Mechanics, Look angle determination, Orbital perturbations, Orbital determination, Launchers and Launch Vehicles, Orbital effects in communication system performance.		
Unit – V	**Satellites**	**7 Hours**
Satellite Subsystems, Attitude and control systems (AOCS), Telemetry, Tracking, Command and Monitoring, Power systems, Communication subsystems, Satellite antennas, Equipment reliability and space qualification.		
Unit – VI	**Satellite Systems**	**8 Hours**
Overview of VSAT Systems, Network Architecture. Low Earth Orbit and Non-Geo-Stationary Satellite Systems**:** Orbit considerations, Coverage and frequency Consideration, Operational NGSO constellation design: Iridium, Teledesic Home Satellite TV, Digital DBS TV, Satellite Radio Broadcasting Radio and Satellite Navigation, GPS Position Location Principles, GPS Receivers and codes.		
Internal Continuous Assessment (ICA): ICA consists of minimum eight assignment/tutorial based upon above syllabus.		
Text Books		
1. Wireless Communications (principles and practices) by Theodore S. Rappaport, Prentice Hall of India. 2. Satellite Communication by Dennis Roody, McGraw hill. 3. Satellite Communications by Timothy Pratt, Charles Bostian, Jeremy Allnutt John Wiley & Sons 4. Satellite communication by Monojit Mitra (PHI).		
Reference Books		
1. Mobile Communications by Jochen Schiller, Pearson Education. 2. Mobile and personal communication Systems and Services by Raj Pandya, Prentice Hall of India. 3. Wireless and Mobile Networks by Dr Sunilkumar S. Manv, Wiley India. 4. 5G NR: The Next Generation Wireless Access Technology by Erik Dahlman, Stefan Parkvall, Johan Skold.		

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Final Year B.Tech. (Electronics and Telecommunication Engineering), Semester-VII

22ETU7E32T: Core Elective II - Internet of Things

Teaching Scheme		**Examination Scheme**	
Lectures	3 Hours/week	**ESE**	60 Marks
Tutorial	1 Hours/week	**ISE**	40 Marks
Credits	4	**ICA**	25 Marks

Introduction:

The Internet of Things (IoT) continues to revolutionize how systems interact, monitor, and make decisions across sectors. With the rapid integration of connected devices in everyday applications, industry now demands professionals who can not only understand IoT concepts but also build and deploy practical solutions. This revised syllabus emphasizes hands-on learning through real-world tools, cloud platforms like AWS and Azure, sensor integration, and protocol implementation. It prepares final-year engineering students to bridge the gap between theory and practice, empowering them to develop secure, scalable, and intelligent IoT applications in domains such as smart homes, agriculture, energy, healthcare, and industrial automation.

Course Prerequisite:

This course requires basic knowledge of electronics and communication principles, familiarity with programming languages such as Python or C, Understanding of basic networking concepts.

Course Objectives:

1. Provide a comprehensive understanding of the fundamental concepts and definitions of IoT.
2. Explain various industry standards and communication protocols used in IoT through practical exploration.
3. To introduce sensor interfacing and the architecture of IoT systems, including security and data management using hands-on activities.
4. Guide students in designing, implementing, and deploying real-world IoT solutions using AWS IoT and Azure IoT platforms.

Course Outcomes:

At the end of the course, students will be able to:

1. Describe the basic concepts and characteristics of IoT through applied examples.
2. Implement industry standards, IoT communication protocols, and architecture via practical tasks.
3. Demonstrate hands-on knowledge of sensor interfacing, data management, and security in IoT systems.
4. Design end-to-end IoT solutions using AWS IoT and Azure IoT platforms.

Unit – I	Practical Foundations of IoT and Communication Protocols	10 Hours
Definition and Characteristics of IoT with practical examples, Evolution and Applications of IoT using live case studies, IoT Enabling Technologies, Overview of IoT Standards and Protocols, IoT Reference Architecture and Communication Models, Hands-on with MQTT, HTTP, and CoAP using Mosquitto Broker and Node-RED, Lab: Build a basic Publisher/Subscriber IoT system using Python and MQTT.		
Unit – II	**Sensor Interfacing and IoT Architecture**	**10 Hours**
Types of Sensors and Actuators with real device handling, Sensor Selection Criteria and Calibration Techniques, Hands-on: Interfacing Sensors digital sensors with microcontrollers, Data Acquisition and Local Storage using Microcontrollers, IoT Architecture Layers: Perception, Network, Middleware, Application Edge, Fog, and Cloud Computing with real-world examples.		
Unit – III	**Security and Data Management in IoT**	**10 Hours**
IoT Data Collection, Cleaning, and Storage – Hands-on using CSV/SQLite, Security Issues in IoT and Real-world Attacks, Authentication, Encryption, and Secure Communication Practices, Privacy and Ethical Considerations in IoT Deployment, Case Studies of IoT Applications in Smart Homes, Health, and Industry.		
Unit – IV	**Practical Implementation using AWS IoT and Azure IoT**	**15 Hours**
Introduction to AWS IoT Core and Azure IoT Hub, Account setup, device provisioning, and policy configuration (AWS/Azure), ESP32 Sensor Data Integration with AWS IoT and Azure IoT, Data Streaming and Visualization using AWS IoT Analytics and Azure IoT Central, Device Shadow, Rules Engine, and Messaging Services, End-to-End Project: IoT Device to Cloud to Dashboard Implementation.		

Internal Continuous Assessment (ICA):
ICA consists of minimum eight assignment/tutorial based upon above syllabus

Text Books

1. Internet of Things: A Hands-On Approach by Arshdeep Bahga and Vijay Madisetti, 1st Edition, VPT.
2. Learning Internet of Things by Peter Waher, 1st or 2nd Edition, Packt Publishing

Reference Books

1. IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things by David Hanes et al., Cisco Press
2. Getting Started with the Internet of Things by Cuno Pfister, O'Reilly Media – great for sensor-to-cloud pipeline example

e-resources

1. Coursera - Introduction to the Internet of Things (IoT)- https://www.coursera.org/learn/iot
2. AWS IoT Documentation - https://docs.aws.amazon.com/iot/index.html
3. Azure IoT Documentation - https://learn.microsoft.com/en-us/azure/iot-hub/
4. edX - The Internet of Things (IoT) - https://www.edx.org/course/the-internet-of-things
5. Mosquitto MQTT Broker Documentation- https://mosquitto.org/documentation/

6. Node-RED Documentation – https://nodered.org/docs/
7. Udemy - IoT Automation using Raspberry Pi https://www.udemy.com/course/raspberry-pi-and-the-internet-of-things/
8. LinkedIn Learning - IoT Foundations: Fundamentals - https://www.linkedin.com/learning/iot-foundations-fundamentals/
9. Tinkercad Circuits – https://www.tinkercad.com/circuits
10. ThingSpeak IoT Platform - https://thingspeak.com/
11. Edge Impulse (TinyML & Edge AI) - https://www.edgeimpulse.com/

WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR
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Final Year B.Tech. (Electronics and Telecommunication Engineering), Semester-VII

22ETU7E13T: Core Elective III - Business Intelligence

Teaching Scheme		**Examination Scheme**	
Lectures	3 Hours/week	**ESE**	60 Marks
Practical	2 Hours/week	**ISE**	40 Marks
Credits	4	**ICA**	25 Marks

Introduction:

This course introduces basic components of Business Intelligence environments, discuss business analytics, data mining, data visualization, data tools and infrastructure and describe various applications of BI.

Course Prerequisite:

This course requires knowledge of basic types of data, data preprocessing methods, data cleaning and features extractions techniques.

Course Objectives:

1. To Introduce students with the basic components that make a business intelligence environment.
2. To Discuss the structure of the decision-making process
3. To explain the mathematical model for business intelligence.
4. To introduce different visualization tools and techniques for data representation and report preparation.
5. To discuss various applications of Business Intelligence

Course Outcomes:

At the end of the course, students will be able to

1. Describe the basic components of the BI environment.
2. Use ETL and BI tools for the decision support system.
3. Apply data mining techniques for data analysis.
4. Apply different visualization tools for report generation and explicate components of business performance measurement systems.
5. Illustrate various applications of Business Intelligence.

Unit – I	**Introduction to Business Intelligence**	**8 Hours**

Effective and timely decisions, role of mathematical models, BI architectures, ethics on BI, Introduction to data warehouse, architecture, OLAP

Unit – II	**Decision Support System**	**7 Hours**
Representation of decision-making system, evolution of information system, definition and development of decision support system, mathematical models for decision-making.		
Unit – III	**Data Warehousing and Data Mining**	**7 Hours**
Definition and architecture of Data warehouse, Cubes and multidimensional analysis, Definition and applications of data mining, data mining process, analysis methodologies.		
Unit – IV	**Business Reporting, Visual Analytics and Business Performance Management**	**8 Hours**
Business reporting definitions and concepts, data and information visualization, different types of charts and graphs, data visualization and visual analytics, performance dashboards, business performance management, performance measurement, balanced scorecards, Six Sigma as a performance measurement system.		
Unit – V	**BI applications: Marketing Models**	**7 Hours**
Relational marketing, Salesforce management, Marketing models case studies.		
Unit – VI	**BI applications: Logistic and Production Marketing Models**	**7 Hours**
Supply chain optimization, optimization models for logistics planning, revenue management system, Logistics business case studies.		
Internal Continuous Assessment (ICA): ICA consists of minimum eight experiments based upon above syllabus and a case study		
Text Books		
1. Business Intelligence Data mining and optimization for Decision making by Carlo Vercellis, ISBN:978-81-265-4188-1, Wiley Publication. 2. Business Intelligence and Analytics: Systems for Decision Support by Efraim Turban, Ramesh Sharda, Dursun Delen by Pearson Education, Ltd 3. Data Mining and Business Intelligence by S.K. Shinde and Uddagiri Chandrashekhar 4. Data Mining for Business Intelligence by Galit Shmueli, Nitin Patel, Peter Bruce, Wiley Publications		
Reference Books		
1. Data Warehousing in the Real World – Anahory & Murray, Pearson Edt 2. Data Warehousing Fundamentals – Ponniah [Wiley Publication]		

WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR
(An Autonomous Institute)

Final Year B.Tech. (Electronics and Telecommunication Engineering), Semester-VII

22ETU7E23T: Core Elective III - Microwave Engineering

Teaching Scheme		**Examination Scheme**	
Lectures	3 Hours/week	**ESE**	60 Marks
Practical	2 Hours/week	**ISE**	40 Marks
Credits	4	**ICA**	25 Marks

Introduction:

This course introduces the importance of microwave engineering as emerging technology to be used for communication applications. It constitutes generation, transmission, and measurement of various parameters dealing with microwave frequency. The performance analysis is carried out using microwave network analysis.

Course Prerequisite:

This course requires knowledge of Electromagnetic Field Theory.

Course Objectives:

1. To make students aware about Microwave communication and its importance.
2. To identify different microwave components and its performance using network techniques.
3. To list various methods of microwave generation and transmission using active and passive components.
4. To familiarize about measurement of various microwave parameters.

Course Outcomes:

At the end of the course, students will be able to

1. Calculate the parameters, properties of transmission lines and explain the significance of microwaves.
2. Formulate the wave equation in the wave guide for analysis.
3. Analyze different parameters of microwave components in microwave applications.
4. Describe the working principles of all the microwave tubes and solid-state devices.
5. Choose a suitable microwave measurement instrument and carry out the required measurements.

Unit – I	**Transmission lines**	**8 Hours**

Transmission line sections as circuit elements, Transmission line equations using field theory and circuit theory, transmission line primary constants (R,L,C,G) and secondary constants (Z0, γ), Transmission line parameters (VSWR, Reflection coefficient, transmission coefficient), Smith Chart and solution of transmission line problems using Smith Chart, Microwave frequency band, Characteristics and applications, Microwave hazards of microwaves.

Unit – II	**Rectangular Waveguide**	**8 Hours**
Comparison between Transmission Line and Waveguide, Wave equations in Rectangular co-ordinates, TE/TM mode analysis, Waveguide parameters (fc, λc, λg, Vp, Vg) Relation between Vp and Vg, Power transmission in Rectangular Waveguide.		
Unit – III	**Microwave Components**	**8 Hours**
Introduction to S parameters, **Multi port junctions -** Construction and operation of E-plane, H-plane, Magic Tee and Directional Coupler, S matrix for E-Plane Tee, H-Plane Tee, Magic Tee and Directional Coupler. **Non reciprocal devices** – Faraday's rotation - Construction and operation of Isolator and Circulator.		
Unit – IV	**Microwave Solid State Devices**	**6 Hours**
Limitations of conventional semiconductor devices, Principle of operation, specifications and applications of - Varactor diode, PIN diode, Tunnel diode, Gunn Diode, IMPATT, TRAPATT diode.		
Unit – V	**Microwave Tubes**	**10 Hours**
Limitations of conventional tubes **O-type tubes**: **Two cavity Klystron**: Construction and principle of operation, velocity modulation and bunching process Applegate diagram. **Reflex Klystron**: Construction and principle of operation, velocity modulation and bunching process, Applegate diagram. **M-type tubes**: Magnetron: Construction and Principle of operation of 8 cavity cylindrical magnetron, zero and PI mode operation **Slow wave devices**: Types of slow wave structure, Helix TWT: Construction and principle of operation.		
Unit – VI	**Microwave Measurements**	**5 Hours**
Measurement of power, frequency, attenuation, phase shift, VSWR.		
Internal Continuous Assessment (ICA): ICA consists of a minimum of eight experiments performed on the above syllabus.		
Text Books		
1. Microwave Devices and Circuits, Samuel Y. Liao, 3rd edition, Pearson 2. Microwave Engineering, David M. Pozar, Fourth edition, Wiley publications. 3. Microwave and Radar engineering, M. Kulkarni, 3rd edition, Umesh Publications		
Reference Books		
1. Foundations for Microwave Engineering by Robert Collin, Wiley publications 2. Microwave Engineering (Passive Circuit) by Peter Rizzi, Pearson Education 3. Basic Microwave Techniques and Laboratory Manual, M L Sisodia& G S Raghuvanshi, New age international (P) Limited, Publishers		

WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR
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Final Year B.Tech. (Electronics and Telecommunication Engineering), Semester-VII

22ETU7E33T: Core Elective III - Cloud Technology

Teaching Scheme		**Examination Scheme**	
Lectures	3 Hours/week	**ESE**	60 Marks
Practical	2 Hours/week	**ISE**	40 Marks
Credits	4	**ICA**	25 Marks

Introduction:

Cloud technology revolutionizes how businesses and individuals manage data, applications, and services. This course introduces final-year engineering students to the foundational concepts and technologies of cloud computing. It aims to provide a comprehensive understanding of cloud service models, deployment models, virtualization, security, and emerging trends. Mastery of cloud technology is essential for leveraging its potential in modern engineering solutions.

Course Prerequisite:

This course requires basic understanding of computer networks and operating systems, familiarity with programming concepts and data management.

Course Objectives:

1. Provide a comprehensive overview of cloud computing, including its history, characteristics, and service models.
2. Explain various cloud deployment models and the considerations for selecting them.
3. Teach the concepts of virtualization and containerization and their importance in cloud environments.
4. Introduce cloud security, cloud storage, networking fundamentals, and emerging trends in cloud technology.

Course Outcomes:

At the end of the course, students will be able to

1. Explain the fundamentals of cloud computing, including service models and key industry players.
2. Describe cloud deployment models and analyze real-world case studies.
3. Utilize virtualization and containerization technologies in cloud environments.
4. Explicate cloud security, cloud storage, networking, and emerging trends, and apply best practices for ensuring cloud security

Unit – I	**Introduction to Cloud Computing**	**10 Hours**

Overview of cloud computing, historical context and evolution, characteristics and advantages of cloud computing, cloud service models (IaaS, PaaS, SaaS), key players in the cloud computing industry.

Unit – II	Cloud Deployment Models	10 Hours
Public cloud, private cloud, hybrid cloud, community cloud and multi-cloud strategies, considerations for selecting deployment models, case studies of real-world deployments.		
Unit – III	**Virtualization and Containerization**	**10 Hours**
Concepts of virtualization and containerization, virtual machines vs. containers, benefits and challenges of virtualization and containerization in cloud environments, tools and platforms for managing virtualized and containerized environments.		
Unit – IV	**Cloud Security, Storage, and Emerging Trends**	**15 Hours**
Importance of security in cloud computing, threats and vulnerabilities in cloud environments, identity and access management (IAM), data encryption and privacy, compliance and regulatory considerations, best practices for ensuring cloud security; Overview of cloud storage services, object storage vs. block storage, content delivery networks (CDNs), networking fundamentals in cloud environments, software- defined networking (SDN), scalability and elasticity in cloud networking; Emerging trends: edge computing, fog computing, serverless computing, AI and ML in the cloud, blockchain technology in cloud computing, green computing and sustainability in cloud infrastructure.		
Internal Continuous Assessment (ICA): ICA consists of minimum eight experiments based upon above syllabus		
Text Books		
1. Cloud Computing: Concepts, Technology & Architecture, by Thomas Erl, Ricardo Puttini, and Zaigham Mahmood, Prentice Hall. 2. Cloud Computing: Principles and Paradigms, by Rajkumar Buyya, James Broberg, and Andrzej Goscinski, Wiley		
Reference Books		
1. Architecting the Cloud: Design Decisions for Cloud Computing Service Models (SaaS, PaaS, and IaaS)" by Michael J. Kavis, Wiley 2. Mastering Cloud Computing: Foundations and Applications Programming, by Rajkumar Buyya, Christian Vecchiola, and Thamarai Selvi, Morgan Kaufmann		
e-Resources		
1. Amazon Web Services (AWS) Documentation 2. Microsoft Azure Documentation 3. Google Cloud Platform (GCP) Documentation 4. Coursera - Cloud Computing Courses 5. Udemy - Cloud Computing Courses		

WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR
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Final Year B.Tech. (Electronics and Telecommunication Engineering), Semester-VII

22ETU7CC4T: CMOS Technology

Teaching Scheme		**Examination Scheme**	
Lectures	3 Hours/week	**ESE**	60 Marks
Practical	2 Hours/week	**ISE**	40 Marks
Credits	4	**ICA**	25 Marks
		POE	25 Marks

Introduction:

This course introduces how to design, simulate and test logic circuits using different CMOS Logic Design. It also describes the design of sequential logic circuits and timing issues present in the implementation of the logic circuits applications.

Course Prerequisite:

This course requires knowledge of Digital Devices, combinational and sequential logic circuit design and simulation.

Course Objectives:

1. To make student learn EDA Tools for CMOS Logic Design and simulation.
2. To enable student to design CMOS Logic based design modules for combinational logic circuits.
3. To enable student to design CMOS Logic based design modules for sequential logic circuits.
4. To acquaint students to timing issues, arithmetic and memory module design and testing

Course Outcomes:

At the end of the course, students will be able to

1. Describe MOS transistor theory and behavior of E-MOSFET.
2. Apply design process rules for CMOS circuit layout design.
3. Analyze combinational circuits using CMOS Logic structures.
4. Analyze sequential circuits using CMOS Logic structures and Timing issues in digital circuits.
5. Design arithmetic and memory building blocks using CMOS technology.

Unit – I	**MOS Transistor Theory**	**8 Hours**

Physical structure of MOS transistor, accumulation, depletion & inversion modes, MOS device design equations, second order effects, Static and dynamic behavior of CMOS inverter, power and energy delay, Technology scaling, impact of technology scaling on inverter.

Unit – II	**Circuit Design Processes**	**6 Hours**

MOS Layers, Stick Diagrams, Design Rules and Layouts – Lambda based design and other rules.

Unit – III	CMOS Logic Structures for Combinational Logic Design	10 Hours
Static CMOS design- complementary CMOS, Implementation of Boolean Expressions using CMOS Logic, Ratioed logic and pass transistor logic; Dynamic CMOS design- dynamic logic basic principle, speed and power dissipation, issues in dynamic design, cascading dynamic gates, comparison of static and dynamic designs in CMOS.		
Unit – IV	**CMOS Logic Structures for Sequential Logic Design**	**8 Hours**
Static latches and registers- the bistability principle, multiplexer-based latches, Master-slave edge triggered register, low voltage static latches, static SR flip flops, dynamic latches and registers dynamic transmission-gate edge triggered registers, C2MOS- A clock- skew insensitive approach, true single-phase clocked register (TSPCR).		
Unit – V	**Timing Issues in Digital Circuits**	**4 Hours**
Synchronous design- clock skew, jitter, clock distribution, latch-based clocking, synchronizers and arbiters, using PLL for clock synchronization.		
Unit – VI	**Designing Arithmetic and Memory Building Blocks**	**6 Hours**
Designing fast adders, designing fast multipliers, designing other arithmetic building blocks, designing ROMs, DRAMs & SRAMs.		
Internal Continuous Assessment (ICA): ICA consists of minimum of eight experiments based on above syllabus using any EDA software tool suggested.		
Text Books		
1. Digital Integrated Circuits, Rabey, Chandrakasan, Nikolic, Pearson Education 2. CMOS VLSI design, Neil H. E. Weste, David Harris, Ayan Banerjee, Pearson Education.		
Reference Books		
1. CMOS digital integrated circuits, Analysis and Design, Sung-Mo Kang, Yusuf Leblebici, TATA McGRAW Hill 2. Principles of CMOS VLSI Design, Neil Weste, Kamran Eshraghian, Addison Wesley/Pearson Education 3. Modern VLSI Design , Wayne Wolf,, 2nd Edition, Prentice Hall 4. Essentials of VLSI Circuits and Systems – Kamran Ehraghian, Dauglas A. Pucknell and Sholeh Eshraghiam, PHI, EEE		

WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR
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Final Year B.Tech. (Electronics and Telecommunication Engineering), Semester-VII

22ETU7PR5L: Project Phase I

Teaching Scheme		**Examination Scheme**	
Lectures		**ESE**	-
Practical	8 Hours/week	**ICA**	100 Marks
Credits	4	**POE**	50 Marks

Introduction:

Project-based learning is a well-established educational paradigm gaining increasing importance today. To align with this approach, a project course is integrated into the final year curriculum, spanning both semesters. In this course, students work in teams to undertake a project, allowing them to showcase their abilities and develop expertise in their chosen areas of interest. The projects can involve both hardware and software, with a strong emphasis on design and research aspects. Additionally, effective verbal and written communication is a crucial skill for engineering graduates in various contexts. This course aims to cultivate these essential communication skills as well.

Course Prerequisite:

A student must possess both technical competency and effective teamwork skills to successfully contribute to a project. This includes adept knowledge of hardware and software architecture, as well as associated programming skills. Additionally, the student should have strong technical report writing and presentation abilities.

Course Objectives:

1. To expose students to the electronics and software engineering industries, enabling them to identify problem areas and formulate problem statements.
2. To equip students with the ability to design electronic and software systems that address the identified problems
3. To develop students' skills in designing the hardware and software architecture for their projects.
4. To train students in writing technical specifications and project documentation for their chosen problems

Course Outcomes:

After completing the course, students will be able to

1. Conduct a comprehensive literature review to identify a project that addresses societal and environmental needs for sustainable development.
2. Develop a detailed project plan, including a timeline and an estimated budget.
3. Utilize engineering expertise to design the implementation architecture required for the project.
4. Exhibit teamwork and presentation skills by preparing thorough reports and delivering presentations, while adhering to professional ethical standards.

Guidelines:

1. The student will finalize the project after obtaining approval from their guide and submit a synopsis along with a presentation.
2. The student should prepare the project design.
3. The project synopsis should ideally include an abstract, literature survey, problem definition, and proposed system and design.
4. The student will need to present his/her work on the project design implemented and submit project phase -I report with details of implementation methodology, results and discussion.

WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR
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Final Year B.Tech. (Electronics and Telecommunication Engineering), Semester-VIII

22ETU8PR1L: Project Phase II

Teaching Scheme		**Examination Scheme**	
Lectures		**ESE**	-
Practical	4 Hours/week	**ICA**	50 Marks
Credits	2	**POE**	50 Marks

Introduction:

Project-based learning is a well-established educational paradigm gaining increasing importance today. To align with this approach, a project course is integrated into the final year curriculum, spanning both semesters. In this course, students work in teams to undertake a project, allowing them to showcase their abilities and develop expertise in their chosen areas of interest. The projects can involve both hardware and software, with a strong emphasis on design and research aspects. Additionally, effective verbal and written communication is a crucial skill for engineering graduates in various contexts. This course aims to cultivate these essential communication skills as well.

Course Prerequisite:

A student must possess both technical competency and effective teamwork skills to successfully contribute to a project. This includes adept knowledge of hardware and software architecture, as well as associated programming skills. Additionally, the student should have strong technical report writing and presentation abilities.

Course Objectives:

1. To make student apply design concept, prepare detailed planning to solve problem undertaken
2. To make student to evaluate and analyze performance of the proposed solution to the problem undertaken
3. To make student aware of his responsibilities working in a team to provide time bound solutions to the problem
4. To make student write technical specifications, project document over problem undertaken.
5. To make student demonstrate a sound technical presentation of their selected project topic.
6. To make student aware of different software tools and soft-skills required to practice at various stages of project execution.

Course Outcomes:

After completing the course, students will be able to

1. Apply different design concepts to plan solution to the problem undertaken
2. Evaluate performance and detailed analysis of outcome of the proposed solution for the problem undertaken
3. Work in project group following work ethics
4. Communicate with engineers and the community at large
5. Demonstrate the knowledge, skills and attitudes of a professional engineer.
6. Select and use proper programming solution, simulator and necessary soft skills to provide solution to problem undertaken.

Guidelines:

The objective of Project- II is to enable the student to extend further the investigative study taken up under Project-I, either fully practical or involving both theoretical and practical work, under the guidance of a supervisor from the department alone or jointly with a Supervisor drawn from R&D laboratory/Industry. This is expected to provide a good training for the student(s) in R&D work and technical leadership.

The assignment normally includes:

1. In depth study of the topic assigned in the light of the report prepared under project-I
2. Review and finalization of the approach to the problem relating to the assigned topic
3. Detailed analysis/modelling/simulation/design/problem solving/experiment as needed
4. Final development of product/process, testing, results, conclusions and future directions
5. Preparing a paper for conference presentation/publication in journals and for project competition, if possible.
6. Preparing a project document in the standard format for being evaluated by the department.
7. Final Oral presentation and demonstration of project before a departmental and evaluation committee

WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR
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Final Year B.Tech. (Electronics and Telecommunication Engineering), Semester-VIII

22ETU8IN2L: Internship / On Job Training (OJT)

Teaching Scheme		**Examination Scheme**	
Lectures		**ESE**	-
Practical	20 Hours/week	**ICA**	100 Marks
Credits	10	**OE**	100 Marks

Introduction:

Internships / On Job Training serve as crucial educational and career development experiences, offering hands-on learning in specific fields or disciplines. They play a significant role in equipping individuals with essential industry skills, awareness of professional practices, and familiarity with organizational culture. Typically, structured and short-term, internships / On Job Training provide supervised training centered on particular tasks or projects, adhering to defined timelines.

Course Prerequisite:

This requires knowledge of core and multidisciplinary concepts, basic knowledge of tools and technologies, problem solving and analytical thinking skills, communication skills, teamwork and collaboration skills.

Course Objectives:

1. To provide students with hands-on experience in industrial environments, essential for developing industry-ready professionals.
2. To equip students with real-time technical and managerial skills necessary for their future careers.
3. To familiarize students with various materials, processes, products, and software applications, emphasizing quality control principles.
4. To introduce students to engineering ethics and responsibilities in professional practice.
5. To explore the social, economic, and administrative factors that impact industrial organizations' working environment.

Course Outcomes:

After completing the course, students will be able to

1. Develop professional competence through an internship experience.
2. Apply academic knowledge effectively in both personal and professional environment.
3. Expand their professional network and gain exposure to potential future employers.
4. Demonstrate the application of professional and societal ethics in their daily lives.
5. Explore their career goals and align them with personal aspirations

Guidelines:

Internship / On Job Training (OJT):

Engineering internships are intended to provide students with an opportunity to apply theoretical knowledge from academics to the realities of the field work/training. The following guidelines are proposed to give academic credit for the internship undergone as a part of the Final Year Engineering curriculum.

1. Students may undergo internship related to engineering with Small/ Medium / Large scale industries to make themselves ready for the industry either in online or offline mode.
2. Students may complete an Internship / On Job Training (OJT) of a minimum of two months duration at the industry during Final Year Sem VIII.
3. The industry shall appoint a Supervisor to assess the performance of the student and share the same with the departmental supervisor for the fulfilment of ICA marks
4. Interns can have communication with their internal guide or HOD if required during the internship period.
5. During the internship, the student will present a seminar in online /offline mode based on training to the internal guide.
6. The student shall prepare a report of the work completed at the industry duly endorsed by the industry supervisor and submit the same as an internship report.
7. The total ICA marks shall be submitted by the internal guide including the assessment received by the industry supervisor.
8. The End Semester Oral Examination for Internship / On Job Training (OJT) shall be conducted by the departmental supervisor in the presence of an external industry or academic expert.