

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY



CIRCULAR NO.SU/Engg./B.Tech./41/2022

It is hereby inform to all concerned that, the syllabi recommended by the Dean, Faculty of Science & Technology, the Hon'ble Vice-Chancellor **has accepted revised following syllabi of Bachelor of Technology Final Year (VII & VIII semester) in accordance with Choice Based Credit & Grading System as per guidelines of AICTE** in his emergency powers under section 12(7) of the Maharashtra Public Universities Act, 2016 on behalf of the Academic Council as appended herewith.

Sr.No.	Syllabi as per CBC & GS
[1]	B.Tech. [Civil Engineering],
[2]	B.Tech. [Mechanical Engineering],
[3]	B.Tech. [Plastic and Polymer Engineering],
[4]	B.Tech. [Electronics and Telecommunication Engineering],
[5]	B.Tech. [Electrical Engineering],
[6]	B.Tech. [Computer Science & Engineering].
[7]	B.Tech.[Agricultural Engineering]

This is effective from the Academic Year 2022-23 and onwards.

All concerned are requested to note the contents of this circular and bring the notice to the students, teachers and staff for their information and necessary action.

University Campus,
Aurangabad-431 004.
REF.NO.SU/2022/ 15213-22
Date:- 11.11.2022.

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(Signature)
Deputy Registrar,
Academic Section

Copy forwarded with compliments to :-

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Dr. Babasaheb Ambedkar Marathwada University,
- 2] **The Director, University Network & Information Centre, UNIC, with a request to upload this Circular on University Website.**

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**Dr. Babasaheb Ambedkar Marathwada University,
Aurangabad-431004**



**Revised Syllabus of Final Year Bachelor of
Technology**

**Electronics and Telecommunication Engineering
(VII & VIII Semester)**

Under Choice Based Credit System (CBCS)

Under Faculty of Science and Technology

(Effective from 2022-23 and onwards)

FACULTY OF SCIENCE AND TECHNOLOGY

Syllabus Structure w.e.f. 2022-2023 (Choice Based Credit System)

Final Year B. Tech. (Electronics and Telecommunication Engineering)

Semester-VII

Course Code	Course Name	Teaching Scheme (Hours/Week)			Examination Scheme and Marks							Credits			
		Theory	Tutorial	Practical	MSE-I	MSE-II	TA	ESE	TW	PR/OR	Total	TH	TUT	TW/PR	Total
ETC401	Wireless and Mobile communication	3	-	-	15	15	10	60	-	-	100	3	-	-	3
ETC402	Image Processing and Machine Vision	3	-	-	15	15	10	60	-	-	100	3	-	-	3
ETC403	Computer networks and Security	3	-	-	15	15	10	60	-	-	100	3	-	-	3
ETC441-ETC443	Professional Elective Course-IV	3	-	-	15	15	10	60	-	-	100	3	-	-	3
	Open Elective-III	3	-	-	15	15	10	60	-	-	100	3	-	-	3
ETC421	Lab : Wireless and Mobile communication	-	-	2	-	-	-	-	-	25	25	-	-	1	1
ETC422	Lab : Image Processing and Machine Vision	-	-	2	-	-	-	-	-	25	25	-	-	1	1
ETC423	Lab : Computer networks and Security	-	-	2	-	-	-	-	50	-	50	-	-	1	1
ETC424	Major Project-II	-	-	8	-	-	-	-	50	50	100	-	-	4	4
		15	-	14	75	75	50	300	100	100	700	15	-	7	22

Semester-VIII

Course Code	Course Name	Teaching Scheme (Hours/Week)			Examination Scheme and Marks							Credits			
		Theory	Tutorial	Practical	MSE-I	MSE-II	TA	ESE	TW	PR/OR	Total	TH	TUT	TW/PR	Total
ETC471	Internship	-	-	-	-	-	-	-	300	300	600	-	-	20	20

MSE- Mid Semester Exam, ESE- End Semester Examination, TH-Theory, OR- Oral, TA-Teacher Assessment, TW- Term Work, PR- Practical, Tut- Tutorial

Professional Elective Course-IV

Group A	Group B	Group C
ETC441:Cloud Computing	ETC442:Artificial Intelligence and Machine learning	ETC443:Radar and Satellite Communication

Dr. V. A. More

(Dr. S. N. Pawar)

Dr. Harish Jable

Faculty of Science & Techn
Dr. Babasaheb Ambedkar Mara
University, Aurangabad

Open Elective-III Courses

Sr. No.	Name of course	Department	Course code
1.	Ecology and Environmental Pollution	Agricultural Engineering	AED431
2.	Town Planning	Civil Engineering	CED431
3.	Big Data Analytics	Computer Science and Engineering	CSE431
4.	Battery Management System	Electrical Engineering	EED431
5.	Data Science	Electronics and Telecommunications Engineering	ETC431
6.	Modern Management Techniques	Mechanical Engineering	MED431
7.	Packaging Technology	Plastic and Polymer Engineering	PPE431


 31/11/22
 Dean
 Faculty of Science & Technology
 Dr. Babasaheb Ambedkar Marathwada University, Aurangabad


 Dr. V. A. More. (Dr. S. N. Pawar)


 Dr. H. N. S. More

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Science & Technology) Syllabus of Final year B. Tech. (Electronics and Telecommunication Engineering) Semester-VII	
Course Code: ETC401 Course: Wireless and Mobile communication. Teaching Scheme: Theory: 36Hrs/week	Credits: 3-0-0 Mid Semester Examination-I: 15 Marks Mid Semester Examination-II: 15 Marks Teacher Assessment: 10 Marks End Semester Examination: 60 Marks End Semester Examination (Duration):3Hrs
Prerequisite	Digital communication
Objectives	1. To introduce concept of wireless and cellular mobile communications, 2. To introduce concepts of mobile radio propagation & equalization techniques. 3. To introduce recent trends in mobile technologies 4. To provide an overview of Wireless Communication networks & standards.
Unit-I	Fundamentals of Communication: Fundamentals of Wireless communication, Advantages, Limitations and Applications, Frequency Spectrum, Introduction to types of Wireless Communication with Applications , Cognitive radio WLAN, WPAN (6 Hrs)
Unit-II	Cellular Concept & GSM fundamentals: Introduction to basic cellular telephone system, Frequency Reuse, Channel assignment strategies, Handoff strategies Interference and System Capacity. GSM: System Architecture, Radio Subsystem, Channel Types, GSM frame structure (6 Hrs)
Unit-III	Mobile radio propagation: Introduction to radio propagation, three basic propagation mechanisms: reflection, diffraction, scattering; practical link budget design using path loss model, indoor and outdoor propagation models, penetration into building, small scale and large scale fading (6 Hrs)
Unit-IV	Equalization, Diversity and channel coding: Fundamentals of equalization , adaptive equalizers, non linear equalizer, Diversity techniques, RAKE receiver, interleaving, Coding, VOCODERS, Linear Predictive Coders (6 Hrs)
Unit-V	Evolution of Mobile Technologies Evolution of Mobile Generation and its comparison(GSM & CDMA) Overview of LTE :LTE basics , LTE frame structure, LTE Design parameters with Standardization and Architecture of LTE. Overview of 5 G Networks : Comparison of 4G and 5G technology, Opportunities and requirements in 5G network, (6 Hrs)
Unit-VI	Wireless Sensor Networks and Standards: Wireless Sensor Network Architecture, WSN Network Topologies, routing in wireless sensor networks, security issues , need and its types, Applications of Wireless Sensor Networks, Wireless Standards: IS-54 and IS-136 standard (6 Hrs)

References	Sr. No.	Title	Author	Publication	Edition
	1.	Wireless communications	Rappaport, T.S	Pearson Education, 2010.	Second Edition
	2.	Wireless Communications	Andreas.F. Molisch	John Wiley – India, 2006.	
	3.	Wireless & Cellular communications	Dr.Sanjay Sharma	KATSON Books	3rd edition 2015
	4.	Wireless Sensor Networks: Technology and Applications	Mohammad Matin (ed.),	Publisher: InTech , 2012	first

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Science & Technology) Syllabus of final year B.Tech (Electronics and Telecommunication Engineering) Semester-VII	
Course Code: ETC402 Course: Image Processing and Machine Vision Teaching Scheme: Theory: 3 Hrs/week	Credits: 3-0-0 Mid Semester Examination-I: 15 Marks Mid Semester Examination-II: 15 Marks Teacher Assessment: 10 Marks End Semester Examination: 60 Marks End Semester Examination (Duration): 3 Hrs
Prerequisite	Basic Skills of Linear Algebra, Probability Theory and a decent coding skill in a modern language like Matlab and Python preferred.
Objectives	The objective of this course is to introduce the students to the fundamental techniques and algorithms used for acquiring, processing and extracting useful information from digital images.
Steps in Digital Image Processing – Components – Elements of Visual Perception	
Unit-I	– Image Sensing and Acquisition – Image Sampling and Quantization – Relationships between pixels. Color image fundamentals - RGB, HSI models, Two-dimensional mathematical preliminaries, 2D transforms (6 Hrs)
Unit-II	Spatial Domain: Gray level transformations – Histogram processing – Basics of Spatial Filtering– Smoothing and Sharpening Spatial Filtering, Frequency Domain: Introduction to Fourier Transform– Smoothing and Sharpening frequency domain filters , Color image enhancement (6 Hrs)
Unit-III	Image Restoration - degradation model, Properties, Noise models – Mean Filters – Order Statistics – Adaptive filters – Band reject Filters – Band pass Filters – Notch Filters – Optimum Notch Filtering – Inverse Filtering – Wiener filtering (6 Hrs)
Unit-IV	Edge detection, Edge linking via Hough transform – Thresholding - Region based segmentation – Region growing – Region splitting and merging. Morphological processing- erosion and dilation, Segmentation by morphological watersheds – basic concepts – Dam construction – Watershed segmentation algorithm. (6 Hrs)
Unit-V	Motion Detection & Estimation :Motion Estimation, Background subtraction and modeling , Differential motion analysis methods , Optical flow, Analysis based on correspondence of interest points, Detection of specific motion patterns, Video

	tracking, Motion models to aid tracking (6 Hrs)				
Unit-VI	Object Recognition : Knowledge representation, Statistical pattern recognition, Neural nets, Syntactic pattern recognition, Recognition as graph matching, Optimization techniques in recognition, PCA, Shape prior recognition (6 Hrs)				
References	Sr. No.	Title	Author	Publication	Edition
	1.	Computer Vision-A Modern Approach	D. Forsyth & J. Ponce,	Pearson Education	2
	2.	Digital Image Processing	R. C. Gonzalez, R. E. Woods	Prentice Hall 2008.	3
	3.	Computer Vision- Algorithms & Applications	Richard Szeliski,	Springer	1
	4.	Computer Vision and Image Processing: Fundamentals and Applications	M.K. Bhuyan	CRC Press	USA, ISBN 9780815 370840 - CAT# K33814 7

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Science & Technology) Syllabus of final year B.Tech (Electronics and Telecommunication Engineering) Semester-VII	
Course Code: ETC403 Course: Computer Networks and Security Teaching Scheme: Theory: 3 Hrs/week	Credits: 3-0-0 Mid Semester Examination-I: 15 Marks Mid Semester Examination-II: 15 Marks Teacher Assessment: 10 Marks Term Work: 50 Marks End Semester Examination: 60 Marks End Semester Examination (Duration): 3 Hrs
Prerequisite	Digital Communication, Information theory and coding.
Objectives	1. To interpret the layering concepts in computer networks. 2. To understand internals of protocols such as SMTP, TCP, UDP, IP 3. To study different security techniques & its algorithms.
	Introduction to Computer Networks :
Unit-I	Components of Communication Networks, topologies, LAN, MAN, WAN. Overview of network model: ISO - OSI and TCP/IP. Network design issues, service primitives and relationships of services to protocols. (6 Hrs)
Unit-II	Physical Layer & Data Link Layer : Communication Media: Twisted pair, coaxial cables, fiber optic cables, Wireless Communication. Circuit switching, message switching, packet switching network, framing, error detection and correction, CRC, Elementary protocols – stop and wait, Stop and wait ARQ, Go-Back-N, Selective repeat, Sliding window. (6 Hrs)
Unit-III	Networks ,Transport Layer, Application layer : Virtual circuits, and datagram networks, Routing algorithms, Congestion control. Quality of Services Transport layer services and principles. FTP,DNS, Voice over IP, Video on demand (6 Hrs)
Unit-IV	TCP/IP Protocol Suite : IP Addressing classes, static, dynamic (DHCP), Ipv4 ,Ipv6, SMTP, SNMP, ICMP, IGMP, ARP, RARP (6 Hrs)
Unit-V	Overview of Network Security: Fundamentals, security services, attacks, overview of cryptography Substitution ciphers, transposition ciphers, Authentication protocols, Authentication based on a shared secret key, Diffie Hellman key exchange, Authentication based

	on KDC, Authentication using Kerberos (6 Hrs)				
Unit-VI	Digital signatures & IP security : Symmetric key signatures, public key signatures, message digests, MD-5, SHA-1, public key infrastructures, IPSec protocols, VPN. (6 Hrs)				
References	Sr. No.	Title	Author	Publication	Edition
	1.	Computer Networks	A.S.Tanenbaum,	PHI	III
	2.	Data Communications & Networking	Behrouz A Forouzan	TMH	II
	3.	Data & Computer Communication	William Stalling	Pearson	1
	4.	Cryptography & Network Security	William Stalling	Pearson	1

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Science & Technology) Final Year B. Tech. (Electronics and Telecommunication Engineering) Semester-VII	
Course Code: ETC441 Course: : Professional Elective Courses-IV- Cloud Computing Teaching Scheme: Theory: 03Hrs	Credits: 3-0-0 Mid Semester Examination-I: 15 Marks Mid Semester Examination-II: 15 Marks Teacher Assessment: 10 Marks End Semester Examination: 60 Marks End Semester Examination (Duration): 3 Hrs
Prerequisite	Basics of Computer Networks
Objectives	1. To understand cloud computing basics. 2. To study the basic service models of cloud computing. 3. To understand the basics of virtualization. 4. To study the concept of Openstack.
Unit-I	Introduction Introduction to Cloud, The Emergence of Cloud Computing, Grid Computing Vs Cloud Computing, Benefits of Using a Cloud Model, Key Characteristics of Cloud Computing, Challenges for the Cloud. (6Hrs)
Unit-II	Cloud Service Models Infrastructure as a Service (IaaS), Introduction to IaaS, Amazon EC2 -Renting, EC2 Compute Unit, Platform and Storage, Pricing, Customers, Eucalyptus. Platform as a Service (PaaS), Introduction to PaaS, Service Oriented Architecture (SOA). Cloud Platform and Management, Google App Engine, Salesforce.com platform. Software as a Service (SaaS), Introduction to SaaS, Web services. (6Hrs)
Unit-III	Collaborations Collaborating on Calendars, Schedules and Task Management, online Planning and Task Management, collaborating on Event Management, collaborating on Contact Management, and collaborating on Word Processing Collaborating on Databases – Storing and Sharing Files. (6Hrs)
Unit-IV	Virtualization Basics of Virtualization , virtualization Types- desktop virtualization, Network virtualization, server and Machine virtualization, storage virtualization, operating system virtualization and its advantages, Virtual machine, basics-taxonomy of Virtual machines, process virtual machines, system virtual machines, Hypervisor. (6Hrs)
Unit-V	Introduction to OpenStack OpenStack architecture, OpenStack terminologies, Object storage, Block storage,

	Networking service and Metering service. (6Hrs)				
Unit-VI	Openstack Components Introduction, Horizon-Dashboard details, Keystone- different services, Nova, Cinder, Neutron, Swift, Glance, Ceilometer, Heat. (6Hrs)				
References	Sr. No.	Title	Author	Publication	Edition
	1	Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online	Michael Miller	Que publishing	-
	2	Professional Xen Virtualization	William von Hagen	WROX publication	-
	3	Virtual Machines: Versatile Platforms for Systems and Processes (The Morgan Kaufmann Series in Computer Architecture and Design)	Jim Smith, Ravi Nair	-	1 st Edition
	4	Enterprise Cloud Computing: Technology, Architecture, Applications	Dr Gautam Shroff	Cambridge	

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Science & Technology) Syllabus of final year B.Tech (Electronics and Telecommunication Engineering) Semester-VII	
Course Code: ETC 442 Course: Professional Elective Course-IV Artificial Intelligence and Machine learning Teaching Scheme: Theory: 3 Hrs/week	Credits: 3-0-0 Mid Semester Examination-I: 15 Marks Mid Semester Examination-II: 15 Marks Teacher Assessment: 10 Marks End Semester Examination: 60 Marks End Semester Examination (Duration): 03 Hrs
Prerequisite	NA
Objectives	1. Understanding Human learning aspects. 2. To develop AI algorithms to implement learning operations. . 3. Provide understanding of the techniques, mathematical concepts, and algorithm used in machines learning.
Unit-I	Introduction to Artificial Intelligent: History, Foundations, Problem solving with AI, AI Applications in various fields, Learning aspects in AI, Intelligent Agents, types of Agents (6 Hrs)
Unit-II	Advanced in AI : Search Techniques: Uninformed search, heuristic search, adversarial search and game trees; Solution of constraint satisfaction problems using search, Hill Climbing, Best First Search. (6 Hrs)
Unit-III	Knowledge Representation: Representation and mapping, Knowledge Based Agent, First Order Predicate Logic, Forward and Backward Chaining, development of expert system. (6 Hrs)
Unit-IV	Introduction of Machine Learning: Basic Concept and Examples of Machine Learning with applications, Cross-Validation techniques. Concepts of Machine learning: Supervised, unsupervised learning System (4 Hrs)
Unit-V	Machine learning algorithms: Linear Regression (with one variable and multiple variables), Gradient Descent, Classification (Logistic Regression, Over fitting, Artificial Neural Networks (Perceptrons, Multilayer networks) Unsupervised learning: Clustering K-means (6 Hrs)

Unit-VI	Clustering and Classification: Distance measures clustering methods Iterative distance-based clustering; Dealing with continuous, categorical values in K-Means Constructing a hierarchical cluster K-Models, Bayes Classifier Model Assumptions, Probability estimation Required data processing M-estimates, Feature selection. (8 Hrs)				
References	Sr. No.	Title	Author	Publication	Edition
	1.	Machine Learning.. First Edition, McGraw- Hill, 1997	Tom Mitchell	Mc-Graw hill	First Edition
	2.	Artificial Intelligence	Elaine Rich and Kevin Knight		Third Edition
	3.	Artificial Intelligence A Modern Approach —	Stuart J. Russell and Peter	Pearson Education	Second Edition"

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Science & Technology) Syllabus of final year B.Tech (Electronics and Telecommunication Engineering) Semester-VII						
Course Code: ETC443 Course: Professional Elective Course-IV Radar and Satellite Communication Teaching Scheme: Theory: 3 Hrs/week			Credits: 3-0-0 Mid Semester Examination-I: 15 Marks Mid Semester Examination-II: 15 Marks Teacher Assessment:10 Marks End Semester Examination: 60 Marks End Semester Examination (Duration): 3 Hrs			
Prerequisite		Communication Systems, Microwave communication				
Objectives		1. To study- • Radar Basics. • Types of Radar 2. Satellite subsystems & application				
Unit-I		Introduction To Radar System: Basic Principle, Block Diagram and Operation of Radar, Range Equation PRF's and Range Ambiguities, Applications of Radar. (6 Hrs)				
Unit-II		Doppler Radar: Doppler effect, CW Radar and its limitations, FMCW Radar, MTI Radar, The delay-line canceler. (6 Hrs)				
Unit-III		Tracking Techniques: Tracking with Radar, Sequential Lobing, Conical Scan, MonoPulse Range Tracking System, Tracking with Surveillance Radar. (6 Hrs)				
Unit-IV		Introduction to Satellite Communication: Elements of Satellite Communication, Orbital aspects, Kepler's Law, frequency bands used in Satellite Communication, the procedure of locating the satellite in orbit, Geostationary & other orbits. (6 Hrs)				
Unit-V		Satellite Sub System & Satellite Launch: Structure of a Satellite, Satellite Telemetry, Tracking & command subsystems Transponder Structure, Solar Panel design for Power Management, Attitude & Orbit control system, Launch Vehicles, Launch Process. (6 Hrs)				
Unit-VI		Earth Station and satellite applications: Transmit Chain, and Receive chain LNA, HPA, losses in Satellite Communication, VSAT System, Remote Scanning, Weather Forecasting, Satellite Phones. (6Hrs)				
References		Sr. No.	Title	Author	Publication	Edition
		1.	Introduction to Radar Systems	Merill Skolnik	TMH publication	I
		2.	Satellite Communication	Pratt and Boston	TMH	I

	3.	Fundamentals of Satellite Communication	K.N.Raja Rao	PHI.	II
	4.	Satellite Communication Systems	W.L.Pritchard and R.Nelson	Pearson	I

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Science & Technology) Syllabus of B. Tech Final Year (All) Semester-VII	
Course Code: AED431 Course: Open Elective-III Ecology and Environmental Pollution Teaching Scheme: Theory: 03 Hrs/week	Credits: 3-0-0 Mid Semester Examination-I: 15 Marks Mid Semester Examination-II: 15 Marks Teacher Assessment: 10 Marks End Semester Examination: 60 Marks End Semester Examination (Duration): 3 Hrs
Prerequisite	Concept of ecology and types of pollution
Objectives	1. To impart knowledge of ecological applications 2. To impart knowledge of environment and different types of pollution 3. To impart knowledge of pollution analysis and instrumentation
Unit-I	Principles of Ecology: Definition Principles and Scope of Ecology – Energy Flows, Ecological Pyramids, Types and Diversity, Food Chains and Food Webs. Homeostasis – Theories of Limiting Factors Ecological Succession – Population and Communities- Reproductive Strategies- r and k Factors. Community Ecology- Structure, Species Diversity and Species Interaction. (4 Hrs)
Unit-II	Ecosystem Ecology: Ecosystem- Structure- Components (Abiotic and biotic) and Functions of an Ecosystem. Ecosystem Types and Diversity- Terrestrial and Aquatic (Fresh water and Marine) Ecosystems. Ecotones - Concept of Edge Effect, Ecological Niche- Classification Biomes - General Relationships Landscapes and Biomes – Climatic factors - Bio-geographical Regions of the World and Modern Biogeography. (6 Hrs)
Unit-III	Ecological Applications: Sustainable Development- Ecological Sustainability- Organic Farming, Bio fertilizers and Bio pesticides - Integrated Pest Management (IPM) - Biological Monitoring of the Environment- Indicator species - Ecosystem Development- Theory of Human Ecology, Ecology of Space Travel- Types of Life Supporting Systems- Exobiology. (6 Hrs)
Unit-IV	Atmosphere Structure of Atmosphere: Temperature Profile – Influence of Meteorological factors on Air Pollution – Air Pollutants: Oxides of Sulphur – Oxides of Nitrogen – Carbon monoxide – Particulate matter, Dispersion and impacts – Photochemical smog – Green house effect – Ozone depletion – Acid

	Rains – Sources of noise pollution, measurement of noise and standards – impacts of Air Pollution on human health and structures. (6 Hrs)				
Unit-V	Hydrosphere and Lithosphere Classification of water and Water bodies – Abnormal properties of water – Water cycle Water Quality Parameters – Water Pollution – Sources – Classification, nature and Toxicology of water pollutants: Trace metals – Lead – Mercury – Zinc – Cadmium – Organic substances – Pesticides – Oil surfactants – Nutrients – Phosphates – Nitrates – Eutrophication – Ground water pollution – Ocean Pollution by toxic wastes – Ecological and Economic impacts of water pollution. Soil: Texture – Composition and distribution – Land use Classification and Patterns – Impacts of land use on soil ecology – Ecological and Economic impacts of soil erosion and soil pollution. (8 Hrs)				
Unit-VI	Pollution Analysis and Instrumentation: Principles of Sampling of Air, Water and Soil: Samplers and Sampling Techniques – Analysis of Pollutants: Titrimetry – Gravimetry – Spectrophotometry – Chromatography and Flame techniques. Instrumentation: Instruments for specific parameters – Principles and Applications of UV – VIS Spectrophotometer – Flame Photometer – Atomic Absorption Spectrophotometer – Gas Chromatography – GLC – HPLC – Instrumentation for Weather monitoring (6 Hrs)				
Reference Books:	Sr. No.	Title	Author	Publication	Edition
	1	Environmental Sciences	Turk J and Turk A.	Saunders College Pub	1984 3rd Edn.
	2	Fundamentals of Ecology	Odum E. P.	W. B. Saunders Company London	1971 3rd Edn.
	3	Environmental Pollution	Laurent Hodges	Holt McDougal	1977 2nd Revised Edn.
	4	Environmental Pollution Control Engineering	C.S. Rao	John Wiley & Sons	1992

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(Faculty of Science & Technology)

Syllabus of B. Tech Final Year (All) Semester-VII

Course Code: CED431 Course: Open Elective –III Town Planning Teaching Scheme: Theory: 3 Hrs/week		Credits: 3-0-0 Mid Semester Examination-I: 15 Marks Mid Semester Examination-II: 15 Marks Teacher Assessment: 10 Marks End Semester Examination: 60 Marks End Semester Examination (Duration): 3 Hrs
Prerequisite	Basic of Urban Planning and Development	
Objectives	1. The course is intended to provide the students an overview and understanding of Town Planning. 2. To study history & ancient planning in India. 3. To study origin and growth of towns.	
Unit-I	Introduction: Necessity and scope of Town planning, Brief History Greek and Roman Town, Planning in Ancient India, Indus valley Civilization Vedic and Harappan period. Principals of Town Planning, Development of Towns, Elements of towns. (06 Hrs)	
Unit-II	Levels of planning process: Town planning survey, Data collection and analysis, Growth Pattern, Development plan, Master Plan, Regional Plan, Zoning. (06 Hrs)	
Unit-III	Housing: Importance of housing, Demand for houses, Requirements, Rural Housing, Village Planning, Low-cost Housing, Agencies for Housing, Functions of CIDCO, HUDCO, MHADA, HDFC, Housing problems in India. (06 Hrs)	
Unit-IV	Town Planning Scheme: Concept, Preparation of town planning scheme, Relation with Development plan, Original Plot, Final plot, Semi Final Plot, Local Area Plan-Concept, objective, methods of Preparation, Case studies in India, Re-planning of Existing Towns. (06 Hrs)	
Unit-V	History of Architecture: Principle, Types of Architecture (Greek Egyptian Roman styles), Building Byelaws: Objective, Principles, Aspect, Prospect, Importance. (06 Hrs)	

Unit-VI	Acts: Land Acquisition Act, Necessity, and procedure of Acquisition, MRTTP Act, RTI and RTS Act, URDPFI. Urban Road Development: Objectives Requirements, Classification, Types. (06 Hrs)				
Reference Books:	Sr. No.	Title	Author	Publication	Edition
	1	Town Planning	S. C. Rangwala	Charotar	21 st Edn.
	2	Fundamentals of Town Planning	G. K. Hirasakar	Dhanpat Rai Publication	2 nd Edn.
	3	Textbook of Town Planning	G.K. Bandopadhyaya	Charotar	2 nd Edn.

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(Faculty of Science & Technology)

Syllabus of B. Tech Final Year (All) Semester-VII

Course Code: CSE431		Credits: 3-0-0
Course: Open Elective -III- Big Data Analytics		Mid Semester Examination-I: 15 Marks
Teaching Scheme:		Mid Semester Examination-II: 15 Marks
Theory: 03Hrs/week		Teacher Assessment: 10 Marks
		End Semester Examination: 60 Marks
		End Semester Examination (Duration): 3 Hrs
Prerequisite	Knowledge of Programming Language (Java preferably), SQL	
Objectives	1. To understand the Big Data Platform and its Use cases 2. To understand the basics of Apache Hadoop and HDFS 3. To apply analytics on Structured, Unstructured Data	
	FUNDAMENTALS OF BIG DATA	
Unit-I	The Evolution of Data Management, Understanding the Waves of Managing Data, Defining Big Data, Four Vs, Big Data Management Architecture. Big Data Types: Defining Structured Data, Defining Unstructured Data, Big Data Applications. (6 Hrs)	
Unit-II	BIG DATA TECHNOLOGY LANDSCAPE Big Data Technology Components: Exploring the Big Data Stack, Virtualization, Understanding the Basics of Virtualization, Managing Virtualization with the Hypervisor, Abstraction and Virtualization, Implementing Virtualization to Work with Big Data. (6 Hrs)	
Unit-III	DATA ANALYTICS Predictive Analytics: Linear Regression, Logistic Regression, Decision Trees, Descriptive Analytics: Association Rules, Sequence Rules, Segmentation, Social Network Analytics: Social Network Definitions, Social Network Metrics, Social Network Learning, Relational Neighbor Classifier, Business Process Analytics. (6 Hrs)	
Unit-IV	HADOOP AND MAP REDUCE History of Hadoop, Analyzing Data with Hadoop, Hadoop Streaming, Hadoop Echo	

	System, Hadoop Storage, Common Hadoop Shell commands, Hadoop Architecture, Hadoop MapReduce Paradigm: Map and Reduce tasks , Job Scheduling, Shuffle and Sort, Task Execution, Map Reduce Types and Formats. (6 Hrs)				
Unit-V	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 Sqoop and Hadoop archives, Hadoop I/O: Compression, Serialization, Avro and File-Based Data structures. (6 Hrs)				
Unit-VI	HADOOP ECOSYSTEM 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 :HBase Basics, Concepts, Clients, Example, Hbase Versus RDBMS. (6 Hrs)				
Reference	Sr. No.	Title	Author	Publication	Edition
Books:	1.	Big Data Analytics	Seema Acharya, Subhasini Chellappan	Wiley	2 nd Edn.
	2.	Hadoop: The Definitive Guide	Tom White	O'reilly Media	3 rd Edn.
	3.	Analytics in a Big Data World: The Essential Guide to Data Science and its Applications	Bart Baesens	Wiley	2014

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

(Faculty of Science & Technology)

Syllabus of final year B. Tech (All) Semester-VII

Course Code: EED431	Credits: 3-0-0
Course: Open Elective III – Battery Management System	Mid Semester Examination-I: 15 Marks
Teaching Scheme:	Mid Semester Examination-II: 15 Marks
Theory: 03 Hrs/week	Teacher Assessment: 10 Marks
	End Semester Examination: 60 Marks
	End Semester Examination (Duration):03 Hrs
Prerequisite	
Objectives	The objective of this course is to introduce learner to batteries, its parameters, modelling and charging requirements. The course will help learner to develop battery management algorithms for batteries.
Unit-I	Introduction: Introduction to Battery Management System, Cells & Batteries, Nominal voltage and capacity, C rate, Energy and power, Cells connected in series, Cells connected in parallel. (5 Hrs)
Unit-II	Battery cell: Electrochemical and lithium-ion cells, Rechargeable cell, Charging and Discharging Process, Overcharge and Undercharge, Modes of Charging. (6 Hrs)
Unit-III	Battery Management System Requirement: Introduction and BMS functionality, Battery pack topology, BMS Functionality, Voltage Sensing, Temperature Sensing, Current Sensing, BMS Functionality, High-voltage contactor control, Isolation sensing, Thermal control, Protection, Communication Interface, Range estimation, State of charge estimation, Cell total energy and cell total power. (7 Hrs)
Unit-IV	Battery State Parameters: State of Charge (SoC), estimation of SOC , voltage-based methods to estimate SOC, Model-based state estimation, Battery Health Estimation, State of Health Definition (SoH), State of function definition (SoF), Charge acceptance (CA).

	Classification of Soc, SoH Estimation Methods. (6 Hrs)				
Unit-V	Cell Balancing and aging: Battery Cell Balancing. Causes of Imbalance in Battery Cells. Classification Systems for Balancing Methods- Static Methods, Dynamic methods. Lithium-ion aging: Negative electrode, Lithium-ion aging: Positive electrode, Cell Balancing, Causes of imbalance, Circuits for balancing (7 Hrs)				
Unit-VI	Design of battery BMS: Design principles of battery BMS, Effect of distance, load, and force on battery life and BMS, energy balancing with multi-battery system. (5 Hrs)				
Reference Books:	Sr. No.	Title	Author	Publication	Edition
	5.	Battery management systems	Plett, Gregory L	Volume I: Battery modeling. Artech House	2015
	6.	Battery management systems	Plett, Gregory L	Volume II: Battery modeling. Artech House	2015
	7.	Battery Management Systems -Design by Modelling	Bergveld, H.J., Kruijt, W.S., Notten, P.H.L	Philips Research Book Series	2002
	8.	Battery Management Systems for Large Lithium-ion Battery Packs	Davide Andrea	Artech House	2010
	9.	Battery management systems: Accurate state-of-charge indication for battery-powered applications	Pop, Valer, et al.	Vol. 9. Springer Science & Business Media,	2008

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Syllabus of B. Tech Final Year (All) Semester-VII

Course Code: ETC431 Course: Open Elective-III Data Science Teaching Scheme: Theory: 3 Hrs/week		Credits: 3-0-0 Mid Semester Examination-I: 15 Marks Mid Semester Examination-II: 15 Marks Teacher Assessment: 10 Marks End Semester Examination: 60 Marks End Semester Examination (Duration): 3 Hrs
Prerequisite	Programming Concepts, Data Structure, Basic Linear Algebra, Basic Probability and Statistics.	
Objectives	1. Give an introduction to data science and its applications. 2. Understand use of statistics in data science 3. Use data science to analyze large and unstructured data with different tools.	
Unit-I	Introduction: Introduction, Terminologies in data science, Applications of Data science, Data science and Development , datafication, current landscape of perspective. Role of Data science in AI and ML. (6 Hrs)	
Unit-II	Statistical Inference and Exploratory data analysis: Statistical modelling, probability distributions, fitting a model, Populations and samples, Basic Tools (Plots, Graphs and summary statistics) of EDA, philosophy of EDA, the data science process, Case Study. Introduction to R. (6 Hrs)	
Unit-III	Machine Learning Algorithm and its Usage: Linear Regression, k-nearest Neighbors(k-NN), k-means. Spam filtering, naïve Bayes and its application for spam filtering, Data Wrangling: Tools and API for scrapping the web. (6 Hrs)	
Unit-IV	Feature Generation and Selection: Feature generations algorithms, feature selection algorithms: filters, wrappers,	

	decision trees, random forest. Algorithmic ingredients of a recommendation engine, dimensionality reduction, singular value decomposition, principal component analysis. (6 Hrs)				
Unit-V	Mining Social Network: Social Networks as graphs, clustering of graphs, direct discoveries of communities in graphs, portioning of graphs, neighbourhood properties of graphs. Illustration with an example. (6 Hrs)				
Unit-VI	Data visualization and ethical issues: Basic principles, ideas and tools for data visualization, creation of visualization for complex data set. Aesthetics in data visualization, software's used for data visualization, Case study. Privacy, security and ethics of data science. (6 Hrs)				
Reference Books:	Sr. No.	Title	Author	Publication	Edition
	1.	Doing Data Science:			
		Straight Talk from The Frontline	Cathy O'Neil and Rachel Schutt	O'Reilly Media, Inc	3 rd Edn.
	2.	Mining of Massive Datasets. v2.1	Jure Leskovek, Anand Rajaraman and Jeffrey Ullman	Cambridge University Press	1 st Edn.
	3.	Learning: A Probabilistic Perspective	Kevin P. Murphy	MIT Press	2 nd Edn.
	4.	Data Science for Business: What You Need to Know about Data Mining and Data-analytic Thinking.	Foster Provost and Tom Fawcett	O'Reilly Media, Inc	1 st Edn.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Science & Technology) Syllabus of B. Tech Final Year (All) Semester-VII	
Course Code: AED431 Course: Open Elective-III Modern Management Techniques Teaching Scheme: Theory: 03 Hrs/week	Credits: 3-0-0 Mid Semester Examination-I: 15 Marks Mid Semester Examination-II: 15 Marks Teacher Assessment: 10 Marks End Semester Examination: 60 Marks End Semester Examination (Duration): 3 Hrs
Prerequisites	: 1.Knowledge of basic concepts of manufacturing processes
Objectives	: 1) To understand the concepts of modern management to enhance creativity 2)To understand the significance of TPM & SCM
Unit-I	: Value Engineering: Value-types, Value analysis, Value Engineering, Value Control, FAST analysis DARSARI method (06 Hrs)
Unit-II	: Supply Chain Management: Introduction, Decision Phases in Supply Chain, Process view of a supply chain importance of supply Chain Flows. New Customer – Supplier relationship –Supplier selection, purchasing, JIT in Supply Chain, E-Business and the Supplier Chain. (06 Hrs)
Unit-III	: Methods Engineering: Continuous method improvement, waste, type of waste elimination. KAIZEN Improvement versus Innovation, Finding & Implementing improvements-PDCA cycle, Five -Why Process. Process Reengineering. Ensuring Correct method of working POKAYOKE. Workplace layout & work station design, single minute exchange of dies, material handling system. (06 Hrs)
Unit-IV	: Lean Manufacturing: Introduction Definition, distinctive features, mall-Lot Production, setup- time Reduction, Maintaining and Improving Equipment .Pull production system .Focused factories and group technology, work cells and Cellular Manufacturing Standard Operation. (06 Hrs)
Unit-V	: Total Productive Maintenance: Introduction, Definition, Distinctive features, Four developments striving for overall equipment effectiveness, the five TPM development activities the twelve steps of TPM, stages of TPM development. (06 Hrs)
Unit-VI	: Management Information System Data, Information, Needs of computer based

		introduction system Definition & concept of MIS and Data processing, need of database, Role of MIS in organization Impact of MIS on function of organization. (06 Hrs)			
Reference Books:	Sr. No.	Title	Author	Publication	Edition
	1	Industrial Engineering & Production Management	Maratand Telsang	S. Chand	3 rd Edn.
	2	Techniques of Value Analysis & Engineering	I.D. Miles	McGraw-Hill	3 rd Edn.
	3	Kaizen	Masaaki Imai	McGraw-Hill Education	1986
	4	Pokayoke	Hiroyuki Hirmaao	Productivity Press, Cambridge	1994
	5	Management Information System	W.S. Jawadekar	TMH	4 th Edn.
	6	Supply Chain Management	Sunil Chopra, Peter Meindl	Pearson Education	6 th Edn.
	7	Competitive Manufacturing Management	John M. Nicholas	TMH	1997
	8	Management Information System, Conceptual foundation, Structure & Development	Gordon Davis , Margrethe Olson	McGraw Hill Education	2017
	9	Industrial Engineering & Production & Operations Management	Sanjay S.Patil Nanadkumar Hukkeri	Electrotech Publications	3 rd Edn.
Additional References:	:	1. https://onlinecourses.nptel.ac.in/noc21_ge20/preview 2. https://onlinecourses.nptel.ac.in/noc22_cs97/preview 3. https://onlinecourses.nptel.ac.in/noc22_cs89/preview 4. https://onlinecourses.nptel.ac.in/noc22_cs73/preview			

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Syllabus of B. Tech Final Year (All) Semester-VII

Course Code: PPE431 Course: Open Elective-III: Packaging Technology Teaching Scheme: Theory: 3 Hrs/week		Credits: 3-0-0 Mid Semester Examination-I: 15 Marks Mid Semester Examination-II: 15 Marks Teacher Assessment: 10 Marks End Semester Examination: 60 Marks End Semester Examination (Duration): 3 Hrs
Prerequisite	Basic knowledge of Polymeric Materials, Processing and Testing.	
Objectives	1. To impart knowledge and skills related to packaging system for various products. 2. To understand the concepts of materials, machinery used and testing of packaging material.	
	Introduction:	
Unit-I	Packaging history, need and evolution, elements, approach, functions of packaging, advantages of plastic packaging, applications. Elements of package design, importance of a good design, packaging hazards and their control. (6 Hrs)	
Unit-II	Plastic packaging materials: Selection criteria, origin, types, properties, applications and limitations of plastic packaging materials, bio-degradable material. Packaging wastes and its management. (6 Hrs)	
Unit-III	Packaging forms: Bottle, strip, skin, blister, shrink box, vacuum, gas, CAP, MAP, tubes, woven sack etc. (6 Hrs)	
Unit-IV	Specialty packages: Aseptic, tetra, types of pouches/sack, stand up pouch, retort pouch, gusseted pouch, 2-seal, 3 side sealed pouch. Flexible packaging, forms of flexible packaging. Wrapping, form-fill-seal (FFS), sealing methods, metalising. (6 Hrs)	
Unit-V	Food and agro-based packaging: Requirements and their selection for raw and processed foods, meat, fish, poultry,	

	eggs, milk and dairy products, fruits and vegetables, cereal grains and baked food products, beverages, snacks, ready to eat food, packaging of horticultural crops. Packaging of drugs and cosmetics. (6 Hrs)				
Unit-VI	Printing: Surface treatment, printing processes, printing inks. Packaging quality control: Criteria, physical, chemical, mechanical test procedure for packaging materials & packaged products. (6 Hrs)				
Reference Books:	Sr. No.	Title	Author	Publication	Edition
	1.	Understanding Plastic Packaging Technology	Susan E. M. Seleke	Hanser publications - Munich	1 st Edn.
	2.	Plastics in Packaging	A.S. Althalye	Tata Mc Graw Hill publishing Co. Ltd., New Delhi.	1 st Edn.
	3.	Food Packaging Technology Handbook	NIIR	Asia-Pacific publication.	1 st Edn.
	4.	Package Engineering	Honlon J. F.	Mc Graw Hill	1 st Edn.
	5.	Plastics Packaging	Turtle Ivor	Pira International	1 st Edn.
	6.	Handbook of Packaging-Plastics	A. S. Althalye	Multi-tech Plastics publishing Co. Mumbai.	1 st Edn.
	7.	The Wiley Encyclopedia of Packaging Technology	Kit L. Yam	John Wiley & Sons Inc. Publication	2009
	8.	The Packaging User's Handbook	F. A. Paine	Blackie Academic & Professional.	1 st Edn.

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Syllabus of final year B. Tech. (Electronics and Telecommunication Engineering) Semester-VII

Course Code: ETC421 Course: Lab :Wireless and Mobile Communication Teaching Scheme: Practical: 2 Hrs/week		Credits: 0-0-1 PR/OR:25 Marks			
Prerequisite	Knowledge of Basic Communication				
Objectives	1. To study the working of GSM trans receiver 2. To study the modulation used in GSM and CDMA. 3. To Study the AT commands				
List of Practical's	1. To identify the Basic blocks of the Mobile phone (Transmitter, Receiver, and Base band control Section). 2. To study the detection & working of SIM card in GSM handset 3. To Study and observe Transmitted/Received RF signal. 4. To Study and observe Transmitted (I & Q) /Received (I & Q) signals constellations. 5. Study and analyze the Buzzer in 4G LTE Smart Phone TechBook. 6. To study and Analyze the Vibrator in 4G LTE Smart Phone Techbook 7. Study of switch faults in User Interface Section of 4G LTE Smart Phone Tech Book 8. Study and analyze the Power Management Unit in 4G LTE Smart Phone Tech Book 9. To study AT commands using GSM trainer module 10. To study General Packet Radio Receiver				
List of Equipments /Instruments	1.4G LTE Smart Phone Tech Book 2.CRO/DSO 3.Function Generator 4.Power Supply				
References	Sr. No.	Title	Author	Publication	Edition
	1	Wireless communications	Rappaport,T.S	Pearson Education, 2010.	Second Edition
	2	Wireless Communications	Andreas.F. Molisch	John Wiley – India, 2006.	
	3	Wireless & Cellular communications	Dr.Sanjay Sharma	KATSON Books	3rd Edition 2015
	4	Wireless Sensor Networks: Technology and Applications	Mohammad Matin (ed.),	Publisher: InTech , 2012	First

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Syllabus of final year B. Tech. (Electronics and Telecommunication Engineering) Semester-VII

Course Code: ETC 422

Course: Lab : **Image Processing and Machine Vision****Teaching Scheme:**

Practical: 2 Hrs/week

Credits: 0-0-1

PR/OR: 25 Marks

Prerequisite

Image Fundamentals, Signal & Systems, Linear Algebra, Vector Algebra & A decent coding skill in a modern language like Matlab / Python / LabView preferred.

Objectives

The objective of Image Processing and Machine Vision is to transform an image into digital form and perform certain operations on it in order to obtain specific models or to extract useful information from the image.

List of Practical

1. Perform basic Operations on Images.
2. Plot Histogram of Image and perform Histogram Equalization.
3. Perform Image Enhancement.
4. Perform Colour Images processing.
5. Calculate Boundary features of an image.
6. Perform Image Thresholding, Sampling & Quantization.
7. Perform Image Transformation.
8. Perform Video Enhancement.
9. Perform Video Segmentation.
10. Detect an object in an Image / Video.

List of Equipment /Instruments

Matlab Software / Python Open Source / LabView

References	Sr. No.	Title	Author	Publication	Edition
	1	Computer Vision-A Modern Approach	D. Forsyth & J. Ponce,	Pearson Education	2
	2	Digital Image Processing	R. C. Gonzalez, R. E. Woods	Prentice Hall 2008.	3
	3	Computer Vision- Algorithms & Applications	Richard Szeliski,	Springer	1
	4	Computer Vision and Image Processing: Fundamentals and Applications	M.K. Bhuyan	CRC Press	USA, ISBN 9780815 370840 - CAT# K33814 7

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Science & Technology) Syllabus of final year B. Tech. (Electronics and Telecommunication Engineering) Semester-VII					
Course Code: ETC 423 Course: Lab : Computer Networks and Security Teaching Scheme: Practical: 2 Hrs/week			Credits: 0-0-1 TW:50 Marks		
Prerequisite		Digital Communication, Information Theory and Coding			
Objectives		In this laboratory students will learn various aspects of computer network and security issues using simulation tools			
List of Practical		1. Study of LAN transmission Medias, topologies, interconnection devices. 2. Study of web page design using HTML. 3. To study ISO-OSI model using simulation tools. 4. To study TCP/IP model using simulation tools. 5. To study LAN and its specifications 6. Design and analysis of network and backbone using simulation tools. 7. Study of Address Resolution Protocol. 8. Study of FTP & SMTP, SNMP protocols. 9. To study error detection and correction code. 10. Study of Digital Signatures.			
List of Equipment /Instruments		Cisco Packet Tracer, Cryptool, Network simulator			
References	Sr. No.	Title	Author	Publication	Edition
	1	Computer Networks	A.S.Tanenbaum,	PHI	III
	2	Data Communications & Networking	Behrouz A Forouzan	TMH	II
	3	Data & Computer Communication	William Stalling	Pearson	1
	4	Cryptography & Network Security	William Stalling	Pearson	1

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Syllabus of Final Year B. Tech. (Electronics and Telecommunication Engineering) Semester VII

Code No: ETC424

Title: Project-II

Teaching Scheme:

Term Work (Marks): 50

Practicals: 08 Hrs/week

Credits: 04

Practical Examination (Marks): 50

Course Objectives	:	• The practical implementation of theoretical knowledge gained during the study to till date is important for engineering education. The student should be able implement their ideas/real time industrial problem / current application of their engineering branch which they have studied in curriculum. • To motivate students for creativity.
		• To create awareness regarding latest technology • To have common platform for interaction about emerging technology. • To inculcate qualities of team work. • To explore related information using books, research papers, journals & websites. • To improve presentation and communication skills.
List of Practicals	:	Guidelines For Students And Faculty: 1. Students shall complete the Project-II in continuation of the work planned in third year under the course Project-I 2. Each student/group is required to- a. Submit a report with latest status of the project work. b. Give a 10 minutes presentation through OHP, PC, and Slide projector followed by a 10 minute discussion in the second week of their academic semester. c. Submit a report on the project topic with a list of required hardware, software

	or other equipment for executing the project in the third week of their academic semester. d. Start working on the project and submit initial development and CPM/PERT planning drawing in the fourth week of their academic semester. e. Preparation of PCB layout, wiring diagram, purchase of components, software demo, flowchart, algorithm, program/code, assembling, testing, etc. should be submitted by student/s within next five/Six weeks and minimum one page report should be there for each major activity. f. Overall assembling, wiring, code writing, testing, commissioning along with performance analysis, should be completed within next two weeks. g. In the last week, student/group will submit final project report to the guide. 3. Every assigned faculty/s should maintain record of progress of each student or group.
	The format and other guidelines for the purpose of the Project Submission in hard bound copies should be as follows, REPORT STRUCTURE Index/Contents/Intent List of Figures List of Tables List of Symbols / Abbreviations 1. Introduction 2. Literature survey 3. System development 4. Performance analysis 5. Conclusions References

	Appendices Acknowledgement
	1. INTRODUCTION 1.1 Introduction 1.2 Necessity 1.3 Objectives 1.4 Theme 1.5 Organization 2. LITERATURE SURVEY
	Literature Survey Related information available in standard Books, Journals, Transactions, Internet Websites <i>etc.</i> till date (More emphasis on last three to five years) 3. SYSTEM DEVELOPMENT Model Development • Mechanical / Fabricated • Analytical • Computational • Experimental • Mathematical • Software (out of above methods at least one method is to be used for the model development) Some mathematical treatment or related information is required to be embodied 4. PERFORMANCE ANALYSIS

- Analysis of system developed either by at least two methods depending upon depth of standard
- These methods normally used are Analytical /Computational/Statistical/Experimental/ or Mathematical
- Results at various stages may be compared with various inputs
- Output at various stages with same waveforms or signals or related information/parameters
- Comparison of above results by at least two methods and justification for the differences or error in with theory or earlier published results

5. CONCLUSIONS

5.1 Conclusions

5.2 Future Scope

5.3 Applications

Contributions (if any,)

The innovative work/invention/new ideas generated from the analysis of the work which can be taken from the conclusions

REFERENCES

- Author, "Title", Name of Journal/Transactions/ Book, Edition/Volume, Publisher, Year of Publication, page to page (pp.__).

These references must be reflected in text at appropriate places in square bracket

In case of web pages complete web page address with assessing date has to be enlisted

List of references should be as per use in the text of the report

APPENDICES

	Related data or specifications or referred charts, details computer code/program, <i>etc.</i> ACKNOWLEDGEMENTS Expression of gratitude and thankfulness for helping in completion of the said task with name & signed by the candidate
	• General Guidelines Text should be printed on front and correct side of the watermark on quality bond paper Paper size- A4, 75 to 85 gsm paper Left Margin-1.5" Right Margin-3/4" Top Margin-1" Bottom Margin-1" • Pagination First page of every chapter need not be printed but counted, second page onwards page number to printed at bottom center place. All Greek words must be italic Report Heading -ALL CAPITAL—16 Font Chapter heading -ALL CAPITAL—14 Font Subchapter –Title Case-12 Font Sub-Subchapter –First Alphabet Capital case-12 Font Page numbers for Index/Contents/Intent should be in roman All text should be in times new roman Cover page should have complete symbol of institute Suitable flap (bookmark) with name of the candidate, Department and Institute name

		and symbol can be used with nylon strip.
		For more information and sample of hard copy please contact the respective Head of the Department.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

(Faculty of Science and Technology)

Syllabus of Final Year B. Tech. (Electronics and Telecommunication Engineering) Semester VIII

Code No: ETC471

Title: Internship

Teaching Scheme:

Term Work (Marks): 300

Credits: 20

Practical Examination (Marks): 300

Rationale	(a)	The techniques and processes of production of goods and services do not demand only technical skills, but also a cluster or conglomerate of skills. A significant part of which is related to the total humanistic growth of the man. Such conglomerate skills technical and humanistic cannot obviously be acquired through pure academic learning of concepts in formalized and institutional courses and in isolation of the actual work situation. It, therefore, naturally follows that no technical education will be complete till it has two components, one learning of concepts vis-a vis acquiring conceptual skill and other application of the concepts in real work situation vis-a vis acquiring manipulative or practicing skills. Technical education needs to have a complement of learning of the techniques of applying the concepts within the industry and business.
Objectives	(b)	1) The students of B.Tech course shall get an opportunity to work on live problems of the industry. 2) He/She shall apply his learning concepts in the real work situation. 3) He/She shall get an exposure to the industrial environment and thereby enable himself/herself to appreciate the other related aspects of industry viz, human, economic, commercial and regulatory. 4) He/She shall identify career paths taking into account their individual strengths and aptitude. 5) He/She shall contribute for the achievement of economic goals and aspirations of the industry and our country as a whole.
	(c)	The curriculum for B.Tech students of Final Year Course of Part-II shall consist of; 1) Inplant training for a period of one full term, and the period of the term shall be as prescribed by the university from time to time 2) A project on live problems of the industry shall be undertaken by the student/group of students undergoing training in the same establishment.

		3) The term work shall consist of the inplant training record-daily diary, work diary, progress report, a record containing the literature survey in the field of appropriate branch of Engineering, a preliminary report related to project work etc. 4) Seminars will be arranged after successful completion of period specified in the scheme of semester VIII of B.Tech. The date and times will be decided according to the convenience of guide and student.
	(d)	Memorandum of understanding: Maharashtra Institute of Technology, Aurangabad will enter into an agreement with the industry through 'Memorandum of Understanding' for creating facilities of inplant training in the appropriate branch of Engineering according to the Course Curriculum and keep this agreement for a period of 10 years to foster a healthy industry- institute interaction for mutual benefits of both.
		Admission to inplant training: No student will be deputed for inplant training unless he produces testimonial of having kept one term for the subject under B Tech Semester –VIII of final year course satisfactorily in Maharashtra Institute of Technology after passing the TY B Tech Examination (in the appropriate branch).
		Period of inplant training: The period of Inplant training will be the period of one term for the subject under B Tech course semester-VIII, which will be notified by Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.
		Contract of Inplant Training : • The student of Maharashtra Institute of Technology shall enter into a contract of inplant training with the employing industry. • The inplant training shall be deemed to have commenced on the date, on which the contract of inplant training has been entered into. • Every contract of inplant training will contain the Terms and Conditions to be agreed by both the parties. • Every contract of inplant training shall be registered with the Maharashtra Institute of Technology within 15 days from entering into the contract.
		Violation of contract: Where an employer, with whom a contract for inplant training has been entered into, is for any reason, unable to fulfill his obligation under the contract, the contract end with the consent of Maharashtra Institute of Technology. It is agreed between the employer, the student and any other employer that the student shall be engaged as an "inplant

		trainee” under the other employer till the expiry period of the inplant training. The agreement on registration with Maharashtra Institute of Technology shall be deemed to be the contract of inplant training between the student and other employer, and from the date of such registration, the contract of inplant training with the first employer shall terminate and no obligation under that contract shall be enforceable at the instance of any party to contract against the other party thereto.
		Termination of Contract: The contract of inplant training shall terminate on the expiry of the period of inplant training. Either party to the contract of inplant training make an application to Maharashtra Institute of Technology, Aurangabad for the termination of the contract. After considering the content of the application, and objection, Maharashtra Institute of Technology by order in writing, will terminate the contract, if it is satisfied that the parties to the contract have/has failed to carry out the Terms and Conditions of the contract.
		Provided that where a contract is terminated- • For the failure on the part of the Employer, Maharashtra Institute of Technology will depute students to another Employer for providing facilities of inplant training to the remaining period of training. • For the failure on the part of the student, the student will not be allowed to continue his/her inplant training in that term. The student shall be deputed for inplant training in the next coming term.
		Expectation from the Employer / Industry / Establishment: The following expectations are derived for effective inplant training. 1. To provide legitimate facilities for the training and learning of all the processes. 2. To guide the student for understanding a project of immense importance to industry and to help him/her for his/her career advancement.
		Obligation of Students: • To learn his/her subject field in Engineering or Technology conscientiously and diligently at his place of training. • To carry out all orders of his Employer and the Superior in the establishment. • To abide by the Rules and Regulations of the Industry/Establishment in all matters of conduct and discipline. • To carry out the obligation under the contract of inplant training. • The student shall maintain a report of his work during the period of his inplant training in a proforma (form no: 2) made available in Annexure.

		Except in case of extreme urgency, the B.Tech student shall submit an application for all other leaves except the medical leave to the Manager/Gen. Manager (Personnel) of the concerned industry, where he is undergoing an inplant training and obtain sanction before the leave is taken. In case of Medical Leave, he shall submit an application to Maharashtra Institute of Technology, Aurangabad. The shortage in attendance will be subjected to extending the period of inplant training in which case, the student may not be allowed to appear for the test, project seminar and assessment of term work etc. which will be held immediately after successful completion of the inplant training.
		Maintenance of Record: Every student of B.Tech course shall maintain a daily record of the work done by him/her relating to the inplant training in the proforma (Annexure).
		Industry Sponsored Student Projects: The scheme envisages working out suitable programme for B.Tech students. They are required to complete their inplant training in a given period. During this period, they shall be familiar with the understanding of the shop process and activities. The students can be asked to solve the mini-shop problem, which will make them think and try out short experiments as an improvement in the process, tools and equipment. The student here is not expected to acquire the skills in operating machines values. He should appreciate the application of theory learnt. The students in a group alone can undertake a project of immense importance for the benefit of the industry and also useful for the students for their advancement of career. Industry staff and Maharashtra Institute of Technology faculty can plan in advance to effectively complete the practical training with the project for preliminary studies on the floor. The projects should aim mainly- - Cost reduction - Reducing cycle time - Enhancing productivity - Energy conservation measures - Process Improvement technique - Inventory control - Quality control Technique - Improvement in Material handling system - Bottlenecks in material flow system and so on. - Live problems in the industry. - Application development using electronics related knowledge.

		- Identifying and solving social problems using electronics and telecommunication knowledge. - Design and development in the fields of electronics and telecommunication.
		What will form a good project? Through the project, it is hoped to provide the students an exciting experience in solving line problems under practical constraints. Hence it is desired that the project should be a well-defined problem, which can be completed and implemented within the project period. It may be a problem, evolving analysis, design, fabrication and / or testing.
		Time Schedule for the Project: The following time schedule should be planned by each student or groups of students, who undertake the project. - Proposal to be received before specified date. - Project acceptance before. - Commencement of the project. - Completion of the project.
		Commitment on the part of the Institute: - Providing a faculty member to supervise the project. - Providing the Institute facilities to complete the project. - Coordinator from industry will be invited to participate in the stage wise assessment of the students performance.
		Assistance for completion of the Project: All the projects undertaken by the students are time bound. Although, every attempt results may not be achieved within the period available for the student. In such cases, the services of the associated faculty members can be sought for the completion of the same on mutually agreed terms.
		Monitoring of Inplant Training: The B.Tech students are expected to follow all the rules and discipline of the industry. However, because of other academic requirements and the nature of the project, the student may have to work in other places outside the industry. The faculty and Industry supervisor will work out a suitable arrangement to review the progress of the work from time to time. Maharashtra Institute of Technology, Aurangabad will monitor the progress of inplant training in association with industry authority.
		Conduct and Discipline: In all matters of the conduct and discipline, B.Tech student shall be governed by the

		rules and regulations (applicable to employees of the corresponding category) in the Establishment, where he/she is undergoing a training.
		B.Tech Students are Trainees and not Workers: • Every B.Tech student undergoing an inplant training in the respective branch of Engineering & Technology in any Establishment shall be treated as a trainee and not a worker and- • The provision of any law with respect to labour will not apply to such a trainee.
		Settlement of Disputes: Any disagreement or dispute between an industry and a B.Tech student trainee arising out of the contract of inplant training shall be resolved both by Maharashtra Institute of Technology and the industry with mutual cooperation. The decision of both Maharashtra Institute of Technology and the industry shall be final.
		Holding of Test and Grant of Certificate: The progress in inplant training of every student shall be assessed by the industry and Maharashtra Institute of Technology faculty from time to time.
		Every B.Tech student undergoing an inplant training shall be issued a certificate of Proficiency on completion of his training to the satisfaction of the industry.
		Offer of Stipend / Other Welfare Activities and Employment: It shall not be obligatory on the part of the Employer / Industry to offer any stipend and other welfare amenities available, if any, to the students of B.Tech courses undergoing an inplant training. However, if the industry desirous to do so, it will be a privilege for the students and also for Maharashtra Institute of Technology in view of the bonding of better understanding and cooperation forever.
	(e)	PRACTICAL EXAMINATION The Practical examination will be conducted after successful completion of the inplant training for which guide will be internal examiner and external examiner will be appointed by the university. The date of practical examination will be same for the students of a branch and will be notified by the university. The assessment of the practical examination shall consist of 1. Seminar Performance 2. An oral on the project work done. 3. Assessment of the term work / report.