

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 :-

- 1] **The Principal of all concerned Colleges,**
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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- 1] **The Director, Board of Examinations & Evaluation, Dr.BAMU,A'bad.**
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**Dr. Babasaheb Ambedkar Marathwada University,
Aurangabad-431004**



Revised Syllabus of Final Year Bachelor of Technology

Agricultural 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. (Agricultural 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
AED401	Soil and Water Conservation Engineering-II	3	-	-	15	15	10	60	-	-	100	3	-	-	3
AED402	Groundwater, Wells & Pumps	3	-	-	15	15	10	60	-	-	100	3	-	-	3
AED403	Farm Power and Machinery management	3	-	-	15	15	10	60	-	-	100	3	-	-	3
AED441- AED443	Professional Elective Course-IV	3	-	-	15	15	10	60	-	-	100	3	-	-	3
AED431	Open Elective-III	3	-	-	15	15	10	60	-	-	100	3	-	-	3
AED421	Lab 1: Soil and Water Conservation Engineering-II	-	-	2	-	-	-	-	-	25	25	-	-	1	1
AED422	Lab 2: Groundwater, Wells & Pumps	-	-	2	-	-	-	-	-	25	25	-	-	1	1
AED423	Lab 3: Farm Power and Machinery management	-	-	2	-	-	-	-	50	-	50	-	-	1	1
AED 424	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
AED471	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-IV (Final Year, Semester-I)	
Agriculture Business Management and Trade	AED441
Agriculture Economics and Farm Management	AED442
Seed Process Technology	AED443


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Open Elective-III (Final Year, Semester-I)		
Ecology and Environmental Pollution	Agricultural Engineering	AED431
Town Planning	Civil Engineering	CED431
Big Data Analytics	Computer Science and Engineering	CSE431
Battery Management System	Electrical Engineering	EED431
Data Science	Electronics and Telecommunications Engineering	ETC431
Modern Management Techniques	Mechanical Engineering	MED431
Packaging Technology	Plastic and Polymer Engineering	PPE431


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 Dr. Santosh Bhosle

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Science & Technology) Syllabus of Final Year B. Tech. (Agricultural Engineering) Semester VII	
Course Code: AED 401 Course: Soil and Water Conservation Engineering-II 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	Soil erosion, Sedimentation and basics of soil water conservation.
Objectives	1. Awareness of problems of soil erosion and various achievements in this regard. 2. Soil and water conservation programmes. 3. Design of some permanent soil and water conservation structures. 4. Design of Earthen embankments and farm ponds. 5. Sedimentation analysis of reservoirs.
Unit-I	Soil erosion problems and achievements in India, Soil and water conservation programmes and achievements, National land resources regions. (06 Hrs.)
Unit-II	Water Resources Development- Earthen Embankments, design of small Earthen Embankments, Farm ponds, types, Components, site selection, Design of pond embankment. Seepage losses in ponds, Dug out ponds, Design and site selection for dugout ponds. Nala Bunding- location and execution. (6 Hrs.)
Unit-III	Earthen Dam- Types, Design criteria, Design of earthen dam, Causes of Failure, Retaining wall- Types, Design of masonry retaining wall. (6 Hrs.)
Unit-IV	Land Use Capability Classification- Soil survey, mapping unit, soil and land use capability classifications, Identification of classes in the field, land use capability classification. (6 Hrs.)
Unit-V	Erosion control structure Design-Hydrologic, hydraulic and structural design, design and estimation of Drop spillway, Drop inlet Spillway and Chute spillway with site selection and adaptabilities. (6 Hrs.)
Unit-VI	Reservoir Sedimentation- Sources of Sedimentation, factors affecting yield of sedimentation, types of load, sediment transportation, bed load estimation, sediment distribution in reservoir, factors affecting distribution pattern, estimation of sediment distribution, Rates of sedimentation, Reservoir sediment control. (6 Hrs.)
Reference Books:	1. Gurnel Singh, C. Venkataramanan, G. Sastry & B. P. Joshi. Manual of Soil & Water Conservation Practices by Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi. 2. R. Suresh, Soil & Water Conservation Engineering. Standard Publisher Distributors, New Delhi. 3. G. O. Schwab, R. K. Frevert, T. W. Edminster and K. K. Barnes. Soil & Water Conservation Engineering 4. V. V. N. Murthy. Land & Water Management Engineering Kalyani Pub. New Delhi.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Science & Technology) Syllabus of Final Year B. Tech. (Agricultural Engineering) Semester VII	
Course Code: AED 402 Course: Ground Water, Wells and Pumps 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	Ground water Sources.
Objectives	1. To study the groundwater hydraulics 2. To study the wells, bore wells and well development. 3. To study of design characteristics of various pumping systems with its working
Unit-I	Ground water resources: Types of water bearing formations, Types of water, Artificial ground water recharge, Ground water exploration techniques, aquifer characteristics, Ground water pollution, Types of wells. (06 Hrs)
Unit-II	Well Hydraulics: Basic terminologies, Theories for steady and unsteady state of flow to wells in confined and unconfined aquifers, well interference. (06 Hrs)
Unit-III	Irrigation wells: Design of open wells & tube wells, Well screens, gravel packs, Equipments and procedures for construction of open wells and tube wells, methods of drilling of wells, percussion, rotary, reverse rotary, design of assembly and gravel pack, installation of well screen. (06 Hrs)
Unit-IV	Pumping Systems: Water lifting devices, classification of pumps, Positive & variable displacement pumps, Pump characteristics, Centrifugal pumps: component parts, principle of operation, priming, Classification, selection, installation, maintenance & trouble shooting and design of centrifugal pumps (06 Hrs)
Unit-V	Vertical turbine pump: characteristics, installation, operation, maintenance, trouble shooting and performance characteristics of submersible pump and propeller pump. (06 Hrs)
Unit-VI	Pump selection: Criteria & procedures, power requirements, efficiencies curves, performance curves, effect of speed on head capacity and power capacity (06 Hrs)
Reference Books:	1. Irrigation Theory and Practices, A. M. Michael, Vikas publishing house, New Delhi 2. Water, Well and Pump Engineering, A. M. Michael & S. D. Khepar, Tata Mc Graw-Hill pub. Co. Ltd, New Delhi. 3. Ground Water Hydrology, Raghunath H.M., New-Age International

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Science & Technology) Syllabus of Final Year B. Tech. (Agricultural Engineering) Semester VII	
Course Code: AED 403 Course: Farm Power and Machinery Management 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	Basic knowledge about Farm Power Sources Farm Machinery and different Farm Operations
Objectives	1. To select appropriate machinery (number, size, etc.) for a given production process 2. To match machine size and capacities for a given production area 3. To formulate comparative cost analysis for machinery management 4. To Compare machinery management operations with or without maintenance
Unit-I	The role of mechanization and its relationship to productivity, employment, social and Technological change (6 Hours)
Unit-II	Performance and power analysis; cost analysis of machinery: fixed cost and variable costs, effect of inflation on cost. (6 Hours)
Unit-III	Selection of optimum machinery and Replacement criteria; Break-even analysis, reliability and cash flow problems. (6 Hours)
Unit-IV	Mechanization Planning; case studies of agricultural mechanization in India. (6 Hours)
Unit-V	Selecting the Best Alternatives, Reliability and Management Tools for Machinery Management, Tools for Machinery Management at Various Industries (6 Hours)
Unit-VI	Human Engineering aspects and gender studies. (6 Hours)
Reference Books:	1. Barger, E.L., Liledahl, J.B., Carleton, W.M. and Mckibben, E.G. (1978). Tractor and their power units. Wiley Eastern pvt. Ltd, New York 2. Donnel Hunt. Farm Machinery and management. Iowa State University Press, Ames, USA. 3. Kepner, R.A., Bainer Roy, and Barges, E.C. (1978). Principals of Farm Machinery, CBS Publishers and Distributors, Delhi-17

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Science & Technology) Syllabus of Final Year B. Tech. (Agricultural Engineering) Semester VII	
Course Code: AED 441 Course: Professional Elective-IV Agribusiness Management and Trades 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	Importance of management and Concept of trade.
Objectives	1 To include hands-on experiences with applying modern economic and business principles involved in the organization, operation, and management of agricultural businesses including the production and marketing of agricultural products and services 2. To participate in personal and community leadership development activities
Unit-I	Management Concepts & Principle: Basic Concepts of Management, Management and Manager, Managerial Environment, Decision Making Process. Management Functions: Planning, Organizing, Staffing, Leading and Leadership, Controlling (6 Hours)
Unit-II	Marketing Management: Concepts of Marketing, Marketing Environment, Product Development and Product Lifecycle, Product Pricing and Pricing Strategies, Distribution Decisions, Promotional Decisions (6 Hours)
Unit-III	Concepts and application of management principles to agribusiness: Nature and Characteristics of Agribusiness, Agro-based Industries in India, Agricultural Supply Chain Management, Strategic Management in Agribusiness, Risk Management in Agribusiness, Contract Farming, ICT in Agribusiness(6 Hours)
Unit-IV	Production, Consumption, Processing and Marketing of Agricultural Products: Agricultural Produce, Agricultural Marketing Functions, Classification of Markets ,Agricultural Market Functionaries , Regulated Agricultural Markets , Cooperative Agricultural Marketing , Producer Surplus of Agricultural Commodities, Market Integration and Marketing Efficiency ,Marketing cost-margins-price spreads , Food Processing Sector in India (6 Hours)
Unit-V	Meaning & Theories of International Trade: Meaning and Concept of International Business ,Absolute Advantage Theory of International Trade, Comparative Advantage Theory of International Trade (6 Hours)
Unit-VI	WTO provisions for trade in agricultural and food commodities: Understanding the WTO , Agreements under WTO , Agreement on Agriculture ,Food Safety Issues under WTO (6 Hours)
Reference Books:	1. A Text Book of Agri-Business Management.A. C Broadway,A. A Broadway Kalyani Publishers, Ludhiana/New Delhi 2. Agribusiness Management W. David Downey and John K Trocke Mc Graw Hill Book Co. New Delhi/ New York 3. Agricultural Marketing in India. S. S Acharya,N. L Aggarwal Oxford & IBH Publishing Co., New Delhi. 4.ICAR e-course (www.icar.org.in)

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Science & Technology) Syllabus of Final Year B. Tech. (Agricultural Engineering) Semester VII	
Course Code: AED 442 Course: Professional Elective- IV Agricultural Economics and Farm Management 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 general economics.
Objectives	To prepare a student with the modified & scientific knowledge of farm economic analysis and agricultural business assets
Unit-I	Introduction: Basic terminologies, concepts of economics, scope of economics, microeconomics & macroeconomics, price, value. (Descriptive & Analytical) (6 Hrs.)
Unit-II	Law of demand and market supply, factors governing supply, law of supply, markets & price determination under different market situations. (Descriptive & Analytical) (6 Hrs.)
Unit-III	Meaning & scope & importance of farm management, farm planning and budgeting. (Descriptive & Analytical) (6 Hrs.)
Unit-IV	Depreciation and methods of calculating depreciation cost of cultivation and cost of production, economic size holding, economic feasibility of agricultural projects, BC ratio, IRR, payback period, NPR. (Descriptive & Analytical) (6 Hrs.)
Unit-V	Problems related to farm mechanization, management of land, labour, capital, farm machinery and irrigation system, measures of farm efficiencies, government policy in sector of agriculture & finance, sources of farm finance. (Descriptive & Analytical) (6 Hrs.)
Unit-VI	Basics of agricultural business management including planning, organizing, controlling, leading, forecasting. (Descriptive & Analytical) (6 Hrs.)
Reference Books:	1. S. S. Joshi and T. R. Kapur Fundamentals of Farm Business Management 2. S.P. Dhondyal. Farm Management 3. K. K. Dewett. Elementary Economics 4. M. L. Seth. Principles of Economics 5. Agrawal and Bansal. Agricultural Production in India 6. R. L. Joshi. Principles & Practices of Marketing in India

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Science & Technology) Syllabus of Final Year B. Tech. (Agricultural Engineering) Semester VII	
Course Code: AED 443 Course: Professional Elective- IV Seed Process Technology 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	Seed and its types.
Objectives	To prepare a student with the modified & scientific knowledge of farm economic analysis and agricultural business assets
Unit-I	Seed definition, seed quality concept and criteria, seed technology definition, seed technology role and goals. (6 Hrs.)
Unit-II	Harvesting of seeds, drying of seeds, storage of raw seeds, seed treatment before planting, Seed processing – seed processing plant layout planning, types of layout.(6 Hrs.)
Unit-III	Seed drying – advantages, methods of drying, types of seed dryers for heated air drying, wagon drying, bag drying, box drying (6 Hrs.)
Unit-IV	Seed cleaning and upgrading – principles of cleaning seeds, methods of cleaning seeds, air screen machine, disc separator, indented cylinder separator, inclined draper, velvet roll separator, magnetic separator (6 Hrs.)
Unit-V	Seed treatment – benefits, types, seed treating products, formulation of fungicidal material, equipment for seed treatment, precaution in seed treatment (6 Hrs.)
Unit-VI	Seed Testing Procedures for Quality Assessment, World Trade Organization – Protection of Plant Varieties and Farmers Rights Act – Intellectual Property Rights – Plant Breeder's Right, PBR in India, Benefits of PBR (6 Hrs.)
Reference Books:	1. Seed Technology by Rattan Lal Agrawal 2. Seed Processing by Gregg, NSC 3. Principles and practices of seed processing storage by Justic and Bass 4. Unit operation of Agricultural Processing by Sahay and Singh

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Science & Technology) Syllabus of Final Year B. Tech. (Agricultural Engineering) Semester VII	
Course Code: AED 431 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:	1. Turk J and Turk A. 1984 Environmental Sciences 3rd Edn. Saunders College Publications. Seed Processing by Gregg, NSC 2. Odum E. P. 1971 Fundamentals of Ecology 3rd Edn. W. B. Saunders Company London 3. Laurent Hodges – Environmental Pollution 4. C.S. Rao – Environmental Science and Engineering

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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, MRTPL 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	
Unit-I	FUNDAMENTALS OF BIG DATA 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 ECHO SYATEM Pig :Introduction to PIG, Execution Modes of Pig, Comparison of Pig with Databases, Grunt, Pig Latin, User Defined Functions, Data Processing operators. Hive :Hive Shell, Hive Services, Hive Metastore, Comparison with Traditional Databases, HiveQL, Tables, Querying Data and User Defined Functions. Hbase :HBasics, Concepts, Clients, Example, Hbase Versus RDBMS. (6 Hrs)				
Reference Books:	Sr. No.	Title	Author	Publication	Edition
	1.	Big Data Analytics	Seema Acharya, Subhasini Chellappan	Wiley	2 nd Edn.
	2.	Hadoop: The Definitive Guide	Tom White	O'reily Media	3 rd Edn.
	3.	Analytics in a Big Data World: The Essential Guide to Data Science and its Applications	Bart Baesens	Wiley	2014

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(Faculty of Science & Technology)

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

Course Code: EED431 Course: Open Elective III – Battery Management System 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): 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)	

	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
	1.	Battery management systems	Plett, Gregory L	Volume I: Battery modeling. Artech House	2015
	2.	Battery management systems	Plett, Gregory L	Volume II: Battery modeling. Artech House	2015
	3.	Battery Management Systems -Design by Modelling	Bergveld, H.J., Kruijt, W.S., Notten, P.H.L	Philips Research Book Series	2002
	4.	Battery Management Systems for Large Lithium-ion Battery Packs	Davide Andrea	Artech House	2010
	5.	Battery management systems: Accurate state-of-charge indication for battery-powered applications	Pop, Valer, et al.	Vol. 9. Springer Science & Business Media,	2008

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

(Faculty of Science & Technology)

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		Credits: 3-0-0
Course: Open Elective-III		Mid Semester Examination-I: 15 Marks
Modern Management Techniques		Mid Semester Examination-II: 15 Marks
Teaching Scheme:		Teacher Assessment: 10 Marks
Theory: 03 Hrs/week		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			

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

(Faculty of Science & Technology)

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

Course Code: PPE431		Credits: 3-0-0
Course: Open Elective-III: Packaging Technology		Mid Semester Examination-I: 15 Marks
Teaching Scheme:		Mid Semester Examination-II: 15 Marks
Theory: 3 Hrs/week		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.	
Unit-I	Introduction: 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.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Science & Technology) Syllabus of Final Year B. Tech. (Agricultural Engineering) Semester VII	
Course Code: AED 421	Credits (T-Tu-Pr/Tw): 0-0-1
Course: Lab I: Soil and Water Conservation Engineering-II	Practical: 25 Marks
Teaching Scheme: Practical: 2 Hrs/week	
Objectives	: 1. Awareness of problems of soil erosion and various achievements in this regard. 2. Soil and water conservation programmes. 3. Design of some permanent soil and water conservation structures. 4. Design of Earthen embankments and farm ponds. 5. Sedimentation analysis of reservoirs.
List of practicals (minimum ten experiments to be performed)	: 1. Study of Soil and water conservation programs and achievements in India 2. Design of farm pond 3. Design of earthen embankments (fill volume) 4. Design of earthen embankment (Storage capacity) 5. Design of Earthen dam 6. Design of retaining wall 7. Hydraulic design of a straight drop spillway 8. Hydraulic design of a drop inlet spillway 9. Hydraulic design of a chute spillway 10. Design of water harvesting structures 11. Study of Bed load estimation methods of reservoir 12. Cost estimation of structures 13. Visit to site of Soil and water conservation structures
(Any 10 number of practical to be performed from the given list)	

The assessment of term work shall be done on the basis of the following.

- Continuous assessment
- Performing the experiments in the laboratory
- Oral examination conducted on the syllabus and term work mentioned above.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Science & Technology) Syllabus of Final Year B. Tech. (Agricultural Engineering) Semester VII	
Course Code: AED 422	Credits (T-Tu-Pr/Tw): 0-0-1
Course: Lab II: Ground Water, Wells and Pumps	Practical: 25 Marks
Teaching Scheme:	
Practical: 2 Hrs/week	
Objectives	: 1. To study the groundwater hydraulics 2. To study the wells, bore wells and well development. 3. To study of design characteristics of various pumping systems with its working
List of practicals (minimum ten experiments to be performed)	: 1. Determination of Hydraulic properties of steady state flow to wells in unconfined aquifers 2. Determination of Hydraulic properties of steady state flow to wells in confined aquifers 3. Unsteady state flow to wells in unconfined aquifers 4. Unsteady state flow to wells in confined aquifers 5. Study of artificial recharge of ground water 6. Verification of Darcy's Law 7. Estimation of aquifer parameters by various methods 8. Study of determination of hydraulic properties of wells 9. Study of different drilling equipments 10. Estimation of specific yield and specific retention 11. Well design under confined and unconfined conditions 12. Study of radial flow and mixed flow centrifugal pumps 13. Installation and testing of centrifugal pump and study of cavitations. 14. Study of turbine and propeller pumps 15. Study of performance characteristics of hydraulic ram 16. Study and testing of submersible pump
(Any 10 number of practical to be performed from the given list)	

The assessment of term work shall be done on the basis of the following.

- Continuous assessment
- Performing the experiments in the laboratory
- Oral examination conducted on the syllabus and term work mentioned above.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Science & Technology) Syllabus of Final Year B. Tech. (Agricultural Engineering) Semester VII	
Course Code: AED 423 Course: Lab III: Farm Power and Machinery Management Teaching Scheme: Practical: 2 Hrs/week	Credits (T-Tu-Pr/Tw): 0-0-1 Term Work: 50 Marks
Objectives	: 1. To select appropriate machinery (number, size, etc.) for a given production process 2. To match machine size and capacities for a given production area 3. To formulate comparative cost analysis for machinery management 4. To Compare machinery management operations with or without maintenance
List of practicals (minimum ten experiments to be performed)	: 1. Review of Management Science and Units of Conversions 2. Measuring Machine Capacity and Improving Field Efficiency 3. Matching Machine Size and Capacity 4. Estimating Energy and Power requirements 5. Estimating Fixed Costs, Variable and Total Costs 6. Reliability and Management Tools for Machinery Management 7. Selection of equipment, replacement, break-even analysis, time value of money etc. 8. Design of farm mechanization plan for different farm size and cropping pattern. 9. Case studies of agricultural mechanization in India 10. Presentation of seminar on topic assigned related to farm machinery management 11. Visit to farm for understanding farm machineries 12. Testing of farm machinery
(Any 10 number of practical to be performed from the given list)	

The assessment of term work shall be done on the basis of the following.

- Continuous assessment
- Performing the experiments in the laboratory
- Oral examination conducted on the syllabus and term work mentioned above.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Science & Technology) Syllabus of Final Year B. Tech. (Agricultural Engineering) Semester VII		
Course Code: AED 424 Course: Lab: Major Project-II Teaching Scheme: Practical: 8 Hrs/week		Credits: 0-0-4 Term Work: 50 Marks Practical: 50 Marks
Objectives	:	1. 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. 2. To motivate students for creativity. 3. To create awareness regarding latest technology 4. To have common platform for interaction about emerging technology. 5. To inculcate qualities of team work. 6. To explore related information using books, research papers, journals & websites. 7. To improve presentation and communication skills.

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 Abbreviations

List of Figures

List of Graphs

List of Tables

and List of if any other inclusion

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

Related information available in standard Books, Journals, Transactions, Internet Websites *etc.* till date (More emphasis on last three to five years)

3. SYSTEM DEVELOPMENT/METHODOLOGY

Model Development

Analytical

Computational

Experimental

Mathematical

Statistical

(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, etc.

(1 Page)

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 & White paper

Left Margin-1.5"

Right Margin-3/4"

Top Margin-1"

Bottom Margin-1"

- First page of first chapter need not be printed anywhere, second page onwards at right hand corner at ½ inch from right and top side from second chapter onwards starting page number of chapter should be printed at bottom center place report total pages – around.

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

Title of the Report should not be more than two lines

Text pages should be in times new roman

The page of the Index/Contents/Intent heading should be below the words for appropriate sub chapter or sub-sub chapter as shown in sample copy

Cover page should have (Mission statement of Institute) in inverted commas, Symbol of Institute, Name of Department, and Institute

Suitable flap 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 & Technology) Syllabus of Final Year B. Tech. (Agricultural Engineering) Semester VIII		
Course Code: AED 471 Course: Lab: Internship		Credits: 0-0-20 Term Work: 300 Marks Practical: 300 Marks
Objectives	:	1. 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. 2. To motivate students for creativity. 3. To create awareness regarding latest technology. 4. To inculcate qualities of team work. 5. To improve presentation and communication skills.

a) **Rationale:**

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.

b) **Objectives:**

- 1) The students of B. Tech course shall get an opportunity to work on live problems of the industry.
- 2) He /She shall apply 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 Semester -VIII shall consist of;

- 1) Internship 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 Internship 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.

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) General Provisions, Rules and Regulation of Internship

1. Definition

- 1) Internship means a course of training in any industry or establishment undergone in pursuance of memorandum of understanding between industry and institute and under the prescribed terms and conditions of Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.
- 2) Institute means an academic Institution of higher learning associated and admitted under the privileges of university, i.e. Maharashtra Institute of Technology (An Autonomous Institute), Aurangabad-431010 Permanently affiliated to Dr. Babasaheb Ambedkar Marathwada University, Aurangabad-431004.
- 3) Industry means any industry or business in which any trade, occupation or subject field in engineering or technology may be specified as a designated trade.
- 4) Establishment includes research organizations (like IITs, NITs, National Laboratories or research center/organization as recognized by Central Govt. / State Govt. / University) or any other organization of repute with the permission of Head of the institute.
- 5) University means any of the universities mentioned in the schedule of Maharashtra University Act, 1994 i.e. Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.
- 6) Collaboration means collaborative academic activity of the Institute with industry.
- 7) Student means a B.Tech. Course student.

2. Memorandum of understanding:

Maharashtra Institute of Technology (An Autonomous Institute), Aurangabad-431010 will enter into an agreement with the industry through 'Memorandum of Understanding' for creating facilities of Internship 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.

3. Admission to Internship:

No student will be deputed for Internship unless he/she produces testimonial of having kept one term for the subject under B.Tech. of final year course satisfactorily in Maharashtra Institute of Technology, Aurangabad.

4. Period of Internship:

The period of Internship 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-431004.

5. Contract of Internship:

- 1) The student of Maharashtra Institute of Technology, Aurangabad shall enter into a contract of Internship with the employing industry.
- 2) The Internship shall be deemed to have commenced on the date, on which the contract of Internship has been entered into.
- 3) Every contract of Internship will contain the Terms and Conditions to be agreed by both the parties. Every contract of Internship shall be registered with the Maharashtra Institute of Technology within 15 days from entering into the contract.

6. Violation of contract:

Where an employer, with whom a contract for Internship 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, Aurangabad. It is agreed between the employer, the student and any other employer that the student shall be engaged as an "**Internship trainee**" under the other employer till the expiry period of the Internship. The agreement on registration with Maharashtra Institute of Technology shall be deemed to be the contract of Internship between the student and other employer, and from the date of such registration, the contract of Internship 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.

7. Termination of Contract:

- a. The contract of Internship shall terminate on the expiry of the period of Internship.
 - either party to the contract of Internship make an application to Maharashtra Institute of Technology, Aurangabad for the termination of the contract.
 - c. 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-
- 1) For the failure on the part of the Employer, Maharashtra Institute of Technology will depute students to another Employer for providing facilities of Internship 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 internship in that term. The student shall be deputed for Internship in the next coming term

8. Expectation from the Employer / Industry / Establishment:

The following expectations are derived for effective Internship.

- 1) To provide legitimate facilities for the training and learning of all the processes.
- To guide the student for understanding a project of immense importance to industry and to help him/her for his/her career advancement.

9. Obligation of Students:

- 1) Student must maintain a minimum attendance of 90% of total working days for the period of Internship.
- 2) To learn his/her subject field in Engineering or Technology consciously and diligently at his place of training.
- 3) To carry out all orders of his/her Employer and the Superior in the establishment.
- 4) To abide by the Rules and Regulations of the Industry/Establishment in all matters of conduct and discipline.
- 5) The student shall maintain a report of his work during the period of his Internship 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 Internship 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 Internship 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 Internship.

10. Maintenance of Record:

Every student of B.Tech. course shall maintain a daily record of the work done by him/her relating to the Internship in the proforma (Annexure).

11. Industry Sponsored Student Projects:

The scheme envisages working out suitable programme for B.Tech. students. They are required to complete their internship 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 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-

- 1) Cost reduction
- 2) Enhancing productivity
- 3) Development/Improvement/ Effective use of Software's/ Systems
- 4) Energy conservation measures
- 5) Process Improvement technique
- 6) Application Development
- 7) Plastic and Polymer working
- 8) Hardware/ Software
- 9) Agro engineering and so on.

12. 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.

13. Time Schedule for the Project:

The following time schedule should be planned by each student or groups of students, who undertake the project.

- 1) Proposal to be received before specified date.
- 2) Project acceptance before.
- 3) Commencement of the project.
- 4) Completion of the project.

14. Commitment on the part of the Institute:

- 1) Providing a faculty member to supervise the project.
- 2) Providing the Institute facilities to complete the project.
- 3) Coordinator from industry will be invited to participate in the stage wise assessment of the students performance.

15. 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.

16. Monitoring of Internship:

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 Internship in association with industry authority.

17. 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.

18. B.Tech. Students are Trainees and not Workers:

- 1) Every B.Tech. student undergoing an Internship in the respective branch of Engineering & Technology in any Establishment shall be treated as a trainee and not a worker and-
- 2) The provision of any law with respect to labour will not apply to such a trainee.

19. Settlement of Disputes:

Any disagreement or dispute between an industry and a B.Tech. student trainee arising out of the contract of Internship 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.

20. Holding of Test and Grant of Certificate:

The progress in Internship 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 Internship shall be issued a certificate of Proficiency on completion of his/her training to the satisfaction of the industry.

21. 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 Internship. However, if the industry desirous to do so 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 Internship 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.