

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY**CIRCULAR NO.SU/Engg./T.Y.B.Tech./63/2018**

It is hereby informed to all concerned that, the syllabi prepared by the Board of Studies & recommended by the Dean, Faculty of Science & Technology, the Academic Council at its meeting held on 30 June & 02 July 2018 has accepted the following syllabi in accordance with Choice Based Credits & Grading System for all Branches T.Y.B.Tech under the Faculty of Science & Technology as enclosed herewith.

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

This is effective from the Academic Year 2018-2019 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/T.Y.B.TECH./2018/

Date:- 03-07-2018. /10486-96

*

*

*

*

*

*

6/7/18
Deputy Registrar,
Syllabus Section.

Copy forwarded with compliments to :-

- 1] The Principals, affiliated 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.

Copy to :-

- 1] The Director, Board of Examinations & Evaluation,
- 2] The Section Officer,[Engineering Unit] Examination Branch,
- 3] The Section officer, [Eligibility Unit],
- 4] The Programmer [Computer Unit-1] Examinations,
- 5] The Programmer [Computer Unit-2] Examinations,
- 6] The In-charge, [E-Suvidha Kendra],
- 7] The Public Relation Officer,
- 8] The Record Keeper,

SCHEME AND DETAILED SYLLABUS

of

T. Y. B. Tech. Agricultural Engineering

FOUR YEAR DEGREE COURSE IN ENGINEERING & TECHNOLOGY



DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

FACULTY OF ENGINEERING AND TECHNOLOGY

Revised Structure w.e.f. 2018-2019

T.Y. B. Tech. (Agricultural Engineering)

Sub Code / Faculty Name	SEMESTER-V	Contact Hrs / Week				Examination Scheme						
	Subject	L	T	P	Total	CT	TH	TW	Pr	Total	Credits	Duration of Theory Exam
AED301	Watershed Hydrology and Management	4	-	-	4	20	80	-	-	100	4	3 Hrs
AED302	Theory of Machine	4	-	-	4	20	80	-	-	100	4	3 Hrs
AED303	Irrigation and Drainage Engineering	4	-	-	4	20	80	-	-	100	4	3 Hrs
AED304	Heat and Mass Transfer	4	-	-	4	20	80	-	-	100	4	3 Hrs
AED305	Renewable Energy Sources	4	-	-	4	20	80	-	-	100	4	3 Hrs
AED341-343	Elective II	2	-	-	2	10	40	-	-	50	2	2 Hrs
AED321	Lab-I: Watershed Hydrology and Management	-	-	2	2	-	-	25	25	50	1	
AED322	Lab-II: Irrigation and Drainage Engineering	-	-	2	2	-	-	25	25	50	1	
AED323	Lab-III: Heat and Mass Transfer	-	-	2	2	-	-	25	25	50	1	
AED324	Lab-IV: Theory of Machine	-	-	2	2	-	-	50	-	50	1	
AED325	Minor Project	-	-	2	2	-	-	50	-	50	1	
	Total of semester-V	22	-	10	32	110	440	175	75	800	27	

Sub Code / Faculty Name	SEMESTER-VI	Contact Hrs / Week				Examination Scheme						
		L	T	P	Total	CT	TH	TW	Pr	Total	Credits	Duration of Theory Exam
AED351	Soil and Water Conservation Engineering-I	4	-	-	4	20	80	-	-	100	4	3 Hrs
AED352	Machine Design	4	-	-	4	20	80	-	-	100	4	3 Hrs
AED353	Micro Irrigation System Design	4	-	-	4	20	80	-	-	100	4	3 Hrs
BSH354	Industrial Management (All)	4	-	-	4	20	80	-	-	100	4	3 Hrs
*	Open Elective-I	4	-	-	4	20	80	-	-	100	4	3 Hrs
AED354	Food Quality and Sensory Evaluation	2	-	-	2	10	40	-	-	50	2	2 Hrs
AED371	Lab-I: Soil and Water Conservation Engineering-I	-	-	2	2	-	-	25	25	50	1	
AED372	Lab-II: Machine Design	-	-	2	2	-	-	25	25	50	1	
AED373	Lab-III: Micro Irrigation System Design	-	-	2	2	-	-	25	25	50	1	
AED374	Lab-IV: Analytical Techniques	-	-	2	2	-	-	50	-	50	1	
AED375	Project-I	-	-	2	2	-	-	-	50	50	1	
**	#Audit Course-I	2			2							
	Total of semester-VI	24	-	10	34	110	440	125	125	800	27	
	Grand Total of V& VI									1600	54	

L: Lecture hours per week T: Tutorial hours per week

P: Practical hours per week CT: Class Test

TH: University Theory Examination TW: Term Work

P: Practical/Oral Examination

Elective II: Green House Technology (AED341)

Agricultural Mechatronics (AED342)

Food Process and Preservation (AED343)

#Note: Interested students can opt for any one of the audit course offered by various departments.

*For Audit course, audit pass (NP) and audit fail (NF) grades will be awarded

***Open Elective-I Courses**

Sr. No.	Name of Course	Department	Course code
1	Remote Sensing and GIS	AED	AED381
2	Professional Ethics and Cyber Security	CSED	CSE381
3	Design for Environment	CED	CED381
4	Robotics and Automation	EED	EED381
5	Internet of Things	ETC	ETC381
6	Costing and Financial Management	MED	MED381
7	Introduction to Nano Technology	PPED	PPE381

****Audit –I Courses**

Sr. No.	Name of Course	Department	Course code
1	Japanese Language module	BSH	BSH801
2	Cyber Crime and Law	CSED	CSE801
3	Road Safety Management	CED	CED801
4	Value Education	BSH	BSH802
5	Smart Cities	ETC	ETC801
6	Rural Community Engagement	MED	MED801
7	German Language Module	BSH	BSH803

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
(Faculty of Science & Technology)
Syllabus of T. Y. B. Tech. Semester-V

Code No.: AED 301
Teaching Scheme: 04Hrs/week
Theory: 04Hrs/week
Tutorial: 00 Hr/week
Credits:04

Title: Watershed Hydrology & Management
Class Test: 20 Marks
Theory Examination (Duration): 03 Hrs
Theory Examination (Marks): 80

Objectives	:	Hydrology, a branch of earth science, dealing with occurrence, distribution and disposal of water on earth surface. This course is design by keep in view following objectives. 1. To refine the understanding of the patterns and processes of water movement, storage and transformation in the environment. 2. To study the influence of weather in transformation and movement of water on the earth's surface. 3. To study measurement techniques, data sources, analytical methods and theories used to understand flows of water on the earth's surface for watershed management.
Unit-I	:	Introduction- Basic terminologies, scope of hydrology hydrologic cycle, various hydrological data required for hydrological projects. (Descriptive) [8 Hours]
Unit-II	:	Precipitation - forms, types of precipitation, rainfall measurement, mass curve, hyetograph, mean rainfall depth estimation methods, DAD curve, frequency analysis of point rainfall, plotting position, estimation of missing data, consistency of rainfall records. (Descriptive & Analytical) [8 Hours]
Unit-III	:	Water loss Estimation- interception, infiltration, evaporation, transpiration, Evapotranspiration - estimation and measurement. Geomorphology of watersheds - stream number, stream length, stream area, stream slope and Horton's laws (Descriptive & Analytical) [8 Hours]
Unit-IV	:	Runoff - factors affecting, measurement, stage and velocity, rating curve, extension of rating curve, estimation of peak runoff rate- rational method, Cook's method, SCS method and volume by Curve Number method.(Descriptive & Analytical) [8 Hours]
Unit-V	:	Hydrograph- Basic terminologies, components, base flow separation, unit hydrograph theory - unit hydrograph of different durations, dimensionless unit hydrograph, distribution hydrograph, synthetic unit hydrograph, uses and limitations of unit hydrograph. (Descriptive & Analytical) [8 Hours]
Unit-VI	:	Flood Routing-head water flood control methods, graphical methods of reservoir flood routing, hydrology of dry land areas – drought and its classification. Introduction to watershed management and planning. (Descriptive & Analytical) [8 Hours]
Reference Books:	:	1. Engineering Hydrology by K. Subramanya, Publisher-Tata McGraw Hill book Co. 2. Hydrology-Principles, Analysis, Design by H. M. Raghunath, Publisher-New Age International Pvt. Ltd. 3. Soil & Water Conservation Engineering by R. Suresh, Standard Publishers, New Delhi 4. Applied Hydrology by K. N. Mutreja, Publisher-Tata McGraw Hill book Co. New Delhi

Section A: Includes Unit I, II and III; **Section B:** Includes Unit IV, V and VI.

Pattern of Question Paper:

The six/four units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each. The Question no.1 and 6 should be of objective nature.
4. Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
(Faculty of Science & Technology)
Syllabus of T. Y. B. Tech. Semester-V

Code No.: AED 302
Teaching Scheme: 04Hrs/week
Theory: 04Hrs/week
Tutorial: 00 Hr/week
Credits:04

Title: Theory of Machine
Class Test: 20 Marks
Theory Examination (Duration): 03 Hrs
Theory Examination (Marks): 80

Objectives	:	1. Know different machine elements and mechanisms. 2. Understand Kinematics and Dynamics of different machines and mechanisms. 3. Select Suitable Drives and Mechanisms for a particular application. 4. Appreciate concept of balancing and Vibration.
Unit-I	:	Simple Mechanisms and It's motion Analysis: - Elements, links, pairs, kinematics chain, and mechanisms. Classification of pairs and mechanisms. Lower and higher pairs. Four bar chain, slider crank chain and their inversions. Velocity analysis of mechanisms with less than six links using relative velocity method. Acceleration analysis of mechanisms with less than four links using relative acceleration method. (Descriptive & Analytical) [8 Hours]
Unit-II	:	Gears and Gear trains: - Types of gears. Involute profile for gear teeth. Spur gear and it's nomenclature. Introduction to helical, spiral, bevel and worm gear. Gear trains - Simple, compound, reverted, and epicyclic trains. Determining velocity ratio by tabular method. (Descriptive & Analytical) [8 Hours]
Unit-III	:	Flywheel:-Turning moment diagrams, co-efficient of fluctuation of speed and energy, mass of flywheel, flywheel applications. (Descriptive & Analytical) [8 Hours]
Unit-IV	:	Friction: - Types of friction, laws of dry friction. Friction of pivots and collars. Single disc, multiple disc, and cone clutches. Rolling friction, anti friction bearings. (Descriptive & Analytical) [8 Hours]
Unit-V	:	Governors: - Types of governors, constructional details and analysis of Watt, Porter, Hartnell governors. Effect of friction, controlling force curves. Sensitiveness, stability, hunting, isochronisms, governor effort and power.(Descriptive & Analytical) [8 Hours]
Unit-VI	:	Balancing: - Balancing of rotating masses in one and different planes. Partial primary balancing of reciprocating Masses. (Descriptive & Analytical) [8 Hours]
Reference Books:	:	1. Theory of Machines by Ballaney 2. Theory of Machines by T. Bevan 3. Theory of Machines by Shigley 4. A text book of Theory of Machines by J. S. Brar and R. K. Bansal 5. Theory of Machines by S. S. Rattan.

Section A: Includes Unit I, II and III; **Section B:** Includes Unit IV, V and VI.

Pattern of Question Paper:

The six/four units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each. The Question no.1 and 6 should be of objective nature.
4. Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
(Faculty of Science & Technology)
Syllabus of T. Y. B. Tech. Semester-V

Code No.: AED 303
Teaching Scheme: 04Hrs/week
Theory: 04Hrs/week
Tutorial: 00 Hr/week
Credits:04

Title: Irrigation and Drainage Engineering
Class Test: 20 Marks
Theory Examination (Duration): 03 Hrs
Theory Examination (Marks): 80

Objectives	:	Water is required for agriculture. Sometimes this requirement is fulfilled by rain, but there are some dry areas where water application to crop is possible only through irrigation. The present study is designed by keeping following objectives in view - To introduce the students about various irrigation practices & irrigation management - To analyze and design various irrigation systems - To inculcate the knowledge about irrigation structures with design - To study soil-water-plant relationship and irrigation scheduling
Unit-I	:	Irrigation Terminologies, Water resources utilization, purpose of irrigation, sources of irrigation water, present status of development and utilization of different water resources of the country. Measurement of irrigation water-Units, Methods of water measurements, weir, notches, flumes and orifices and other methods (Descriptive & Analytical) [8 Hours]
Unit-II	:	Water conveyance and Control- Design of irrigation field channels, underground pipe conveyance system, irrigation structures, channel lining (Descriptive & Analytical) [8 Hours]
Unit-III	:	Soil-Plant-water relationships - Properties influencing Irrigation, Soil water relation, soil water movement in different conditions, infiltration, soil moisture Characteristics, measurements, plant structure, Terminologies, Evaporation, Potential Evapotranspiration, Net and gross irrigation requirement, Irrigation Efficiency, Irrigation Scheduling & Water management (Descriptive & Analytical) [8 Hours]
Unit-IV	:	Water application Methods- Classification, Surface and Subsurface methods of irrigation with design, adaptabilities, its merits, demerits, selection and Design, cost estimation (Descriptive & Analytical) (08 Hrs)
Unit-V	:	Irrigated agriculture, soil salinity and drainage. Causes and effect of water logging, water logging prevention and control, need for land drainage. Inter-relation of irrigation and drainage, formulating drainage criteria under steady and unsteady state and on basis of dynamic equilibrium concept. Reuse of drainage water, Drainage problem of the state. (Descriptive & Analytical) [8 Hours]
Unit-VI	:	Surface And Subsurface drainage: Surface drainage system and components, factors affecting drainage, types of land requiring drainage, design consideration for surface drainage, design of surface drainage system. Special Drainage systems: mole drains, vertical drainage, bio drainage. Salt accumulation and its causes, influence of salt on physical properties of soil, Reclamation and management of salt affected soils, Leaching requirement. Economic aspects of drainage. [8 Hours]
Reference Books:	:	- Irrigation Theory & Practice by A.M. Michael, Vikas pub. House, Delhi - Irrigation Hydraulics by Dr. Radhey Lal, Saroj Prakashan, Allahabad - Land & Water Management Engineering by V. V. N. Murthy, Kalyani Pub. New Delhi - Drainage Engineering by J. N. Luthin, Willey Eastern Publication, New Delhi - Agricultural Drainage: principles and Practices by U. S. Kadam, R. T. Thokal, S. D. Gorantiwar & A. G. Powar, Westville Publishing House, New Delhi

Section A: Includes Unit I, II and III; **Section B:** Includes Unit IV, V and VI.

Pattern of Question Paper:

The six/four units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

- Minimum ten questions
- Five questions in each section
- Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each. The Question no.1 and 6 should be of objective nature.
- Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
(Faculty of Science & Technology)
Syllabus of T. Y. B. Tech. Semester-V

Code No.: AED 304
Teaching Scheme: 04Hrs/week
Theory: 04Hrs/week
Tutorial: 00 Hr/week
Credits:04

Title: Heat and Mass Transfer
Class Test: 20 Marks
Theory Examination (Duration): 03 Hrs
Theory Examination (Marks): 80

Objectives	:	1. The subject intends to make aware about fundamental laws and modes of heat and mass transfer for application in agricultural processing. 2. It also includes the need of refrigeration for perishable commodities of agriculture and its application to increase the shelf life of fruits and vegetables
Unit-I	:	Introduction: Modes of heat transfer, Fourier's law of heat conduction, Stefan-Boltzman law, Newton's law of cooling, Electrical analogy, Thermal conductivity of materials & measurement. [8 Hours]
Unit-II	:	Conduction: General differential equation of conduction. One dimensional steady state conduction through plane and composite walls, tubes and spheres. Insulation materials, critical thickness of insulation. [8 Hours]
Unit-III	:	Convection: Free and forced convection, Heat transfer coefficient in convection. Dimensional analysis of free convection, Laminar forced convection on a flat plate and in a tube, combined free and forced convection, Steady state molecular diffusion in fluids at rest and in laminar flow. [8 Hours]
Unit-IV	:	Radiation: Introduction, absorptivity, reflectivity and transmissivity of radiation, Black body and monochromatic radiation, Planck's law, Kirchoff's law, grey bodies and emissive power, solid angle, intensity of radiation. [8 Hours]
Unit-V	:	Heat Exchanger: Types of heat exchangers, fouling factor, log mean temperature difference, Heat exchanger analysis restricted to parallel and counter flow heat exchangers. Mass Transfer: Fick's law, mass transfer coefficients, Types of mass transfer [8 Hours]
Unit-VI	:	Thermodynamic cycles, mechanical vapour compression refrigeration, properties of refrigerants, thermodynamic cycle, calculations of single stage saturation and actual cycles, two stage cycles and cascade refrigeration system, heat pump. Compressors, expansion valves, evaporators and condensers, absorption system of refrigeration, ice manufacture. [8 Hours]
Reference Books:	:	1. Thermal Engineering by P. L. Ballaney 2. Thermal Engineering by Domkundwar 3. Engineering Thermodynamics by P. K. Nag 4. Engineering Thermodynamics by T. P. Roy & Choudhary

Section A: Includes Unit I, II and III; **Section B:** Includes Unit IV, V and VI.

Pattern of Question Paper:

The six/four units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each. The Question no.1 and 6 should be of objective nature.
4. Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
(Faculty of Science & Technology)
Syllabus of T. Y. B. Tech. Semester-V

Code No.: AED 305
Teaching Scheme: 04Hrs/week
Theory: 04Hrs/week
Tutorial: 00 Hr/week
Credits:04

Title: Renewable Energy Sources
Class Test: 20 Marks
Theory Examination (Duration): 03 Hrs
Theory Examination (Marks): 80

Objectives	:	1. Agricultural Engineering students must be introduced with various renewable energy sources. 2. Utilization of these sources can be increased in agriculture field. 3. Understand various forms of renewable energy, bio-conversion processes, production of the biomass and various energy potential with current status
Unit-I	:	Introduction to convention & non conventional energy sources, status of energy related to India & world. Solar energy: introduction, solar constant, determination of solar time, measurement, solar gadgets. [8 Hours]
Unit-II	:	Biogas: introduction, aerobic & anaerobic respirations, Types, specifications, working, applications [8 Hours]
Unit-III	:	Biomass & Biofuels: classifications & its detail [8 Hours]
Unit-IV	:	Gasifiers: introduction, types of Gasifiers [8 Hours]
Unit-V	:	Wind Energy: wind energy potential, measurement & various types of wind mills [8 Hours]
Unit-VI	:	Economic analysis: introduction, cost analysis, Environmental Impacts: natural cycle, impacts, remedial measures [8 Hours]
Reference Books:	:	1. Fundamentals of Renewable Energy Sources by G. N. Tiwari and M. K. Ghosal 2. Solar Energy Utilization by G. D. Rai 3. Renewable Energy Sources by J. W. Twidell and A. Weir 4. Solar Energy: Principles of thermal collection and Storage by S. P. Sukhatme 5. Non conventional energy Sources by G. D. Rai

Section A: Includes Unit I, II and III; **Section B:** Includes Unit IV, V and VI.

Pattern of Question Paper:

The six/four units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each. The Question no.1 and 6 should be of objective nature.

Two questions of 15 marks each from remaining questions from each section A and B be asked to solve

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

(Faculty of Science & Technology)
Syllabus of T. Y. B. Tech. Semester-V

Code No.: AED 341

Teaching Scheme: 04Hrs/week

Theory: 02Hrs/week

Tutorial: 00 Hr/week

Credits:02

Title: Elective II Green House Technology

Class Test: 10 Marks

Theory Examination (Duration): 02 Hrs

Theory Examination (Marks): 40

Objectives	:	In view of day- by day increasing population and decrease in cultivated land, it is very important to enhance the agricultural production. In this sense it is important to apply advance technology like greenhouse for getting more from same piece of land. Present syllabus dealing with 1. Design & Construction of Greenhouse 2. Cost estimation for Greenhouse 3. Techno-economic feasibility of Greenhouse
Unit-I	:	Introduction- History and development of greenhouse, scope of greenhouse technology, its applications in various field, Classifications of green house, advantages of greenhouse. (Descriptive) [6 Hours]
Unit-II	:	Design of Greenhouse-site selection and orientation, structural design, planning and layouts, requirements for construction, green house covering materials, construction of typical greenhouse, design criteria of construction, construction of typical glass greenhouse, construction of pipe framed greenhouse. (Descriptive & Analytical) [6 Hours]
Unit-III	:	Systems in greenhouse- Greenhouse irrigation, rules of watering, hand watering, perimeter watering, overhead sprinklers, boom watering, drip irrigation, advanced protected agricultural systems such as plastic mulches, row cover, liquid hydroponics and aggregate hydroponics, fertigation, humidification, Economics of greenhouse production. (Descriptive & Analytical) [6 Hours]
Unit-IV	:	Environmental factors-plant response to greenhouse environment, light, temperature, relative humidity, carbon dioxide, greenhouse ventilation and computerized control system. Environmental requirements- Greenhouse cooling, greenhouse heating, temperature requirement of horticultural crops, light requirements and control methods for crops, pest and diseases control, integrated pest management. (Descriptive & Analytical) [6 Hours]
Reference Books:	:	1. Greenhouse-Technology and Management by K. Radha Manohar and C. Igathinathane, B. S. Publications, Hyderabad 2. Greenhouse operation management by Paul V. Nelson, Resort publication Co. Inc, Vergnina 3. Greenhouse management by J. J. Hanan, W. D. Holley & K. L. Glodberry, Berilin Hidelherge New York

Section A: Includes Unit I, II and III; **Section B:** Includes Unit IV, V and VI.

Pattern of Question Paper:

The six/four units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 40 marks Paper:

1. Minimum eight questions
2. Three questions in each section
3. Question no 1 from section A and Question no 5 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for six marks each.

The Question no.1 and 6 should be of objective nature.

Two questions of 07 marks each from remaining questions from each section A and B be asked to solve

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
(Faculty of Science & Technology)
Syllabus of T. Y. B. Tech. Semester-V

Code No.: AED 342
Teaching Scheme: 04Hrs/week
Theory: 02Hrs/week
Tutorial: 00 Hr/week
Credits:02

Title: Elective II Agricultural Mechatronics
Class Test: 10 Marks
Theory Examination (Duration): 02 Hrs
Theory Examination (Marks): 40

Objectives	:	- To study need of Mechatronics - To study Mechatronics system components - To study interfacing of various components in Mechatronics system - To study various Mechatronics sub-systems - To understand interfacing concepts, Electro Mechanical Systems and the related terms
Unit-I	:	Introduction and Mechatronics system model: Introduction to Mechatronics system, Role of each component in working of the system. Element of Mechatronics system-mechanical system (sensor/actuators) signal conditioning (amplifier-filters), Need of signal conditioning, Graphical Display (LED, LCD) [6 Hours]
Unit-II	:	Sensors and Signal Conditioning: Definition and Classification, Principle, construction and working of Linear displacement and rotational Displacement sensors, Acceleration sensors, Force measurement, Temperature measurement, proximity sensors, Vision sensors [6 Hours]
Unit-III	:	Data Acquisition: Analog to digital conversion, resolution and quantization, A to D conversion, D to A conversion, Introduction to micro controllers and microprocessors .Programmable Logic Controller(PLC): Introduction-Basic structure, Input/Output Processing-Programming, Ladder Diagrams, [6 Hours]
Unit-IV	:	Actuators & Display devices: Electro-mechanical Actuators, Electrical Machines (Stepper & servo motors), Piezoelectric actuators, Hydraulic & Pneumatic actuation system, MEMS actuators,. Selection of sensor, Selection of actuator, Selection of a PLC [6 Hours]
Reference Books:	:	- David G. Alicator, Michal B. Histand, Introduction to mechatronics and measurement system. Mechatronics, HMT. - Curtis Johnson, Process Control Instrumentation Technology. - Hassan Saeed, Automatic Control system, New India Publication. - Krishna Kant, Computer Based Industrial Control.

Section A: Includes Unit I, II and III; **Section B:** Includes Unit IV, V and VI.

Pattern of Question Paper:

The six/four units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 40 marks Paper:

- Minimum eight questions
- Three questions in each section
- Question no 1 from section A and Question no 5 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for six marks each.

The Question no.1 and 6 should be of objective nature.

Two questions of 07 marks each from remaining questions from each section A and B be asked to solve

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
(Faculty of Science & Technology)
Syllabus of T. Y. B. Tech. Semester-V

Code No.: AED 343

Teaching Scheme: 04Hrs/week

Theory: 02Hrs/week

Tutorial: 00 Hr/week

Credits:02

Title: Elective II Food Process and Preservation Engineering

Class Test: 10 Marks

Theory Examination (Duration): 02 Hrs

Theory Examination (Marks): 40

Objectives	:	1. To know about unit operations in food industry 2. To study the different preservation methods 3. To extend the shelf life of food product
Unit-I	:	Introduction: Defining food; classification of food; constituents of foods; food processing; food preservation; food spoilage – introduction, causes of food spoilage, food poisoning, food-borne intoxication, food-borne infection [6 Hours]
Unit-II	:	Thermal processing,- Low temperature preservation chilling, freezing, dehydration, addition of preservatives and food additives, irradiation, fermentation, hurdle technology, intermediate moisture foods. High Temperature Preservation: Introduction; blanching; pasteurization; sterilization; canning. [6 Hours]
Unit-III	:	Drying, dehydration and concentration: Introduction; purpose; water activity and relative humidity; factors affecting rate of drying and dehydration; drying methods; changes during drying and dehydration; different driers; Food irradiation: Introduction; radiation sources; measurement of radiation dose; mechanism of action; type of irradiation; factors affecting food irradiation; effect of irradiation. [6 Hours]
Unit-IV	:	Preservation using sugar, salt and acids: Sugar – Introduction, factors affecting osmotic pressure of sugar solution, foods preserved using sugar, Preservation by use of chemicals: Introduction; objectives; factors affecting antimicrobial activity of preservatives; type of chemical preservatives; sulphur dioxide, benzoic acid, etc Food standards and quality maintenance: FPO, PFA, Agmark, ISI, HACCP, food plant sanitation and cleaning in place (CIP) in industry. [6 Hours]
Reference Books:	:	1. Preservation of Fruits & Vegetables by Girdhari Lal, G. S. Siddappa, G. L. Tandon, Indian Council of Agricultural Research, Publications 1986 2. Food Processing Technology: Principles and Practice, P. Fellows, CRC Press, 2000 3. Food Processing Handbook, Brennan JG, John Wiley & Sons, 2012 4. Food Science, Potter NN and Hotchkiss JH, Springer Science & Business Media

Section A: Includes Unit I, II and III; **Section B:** Includes Unit IV, V and VI.

Pattern of Question Paper:

The six/four units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 40 marks Paper:

1. Minimum eight questions
2. Three questions in each section
3. Question no 1 from section A and Question no 5 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for six marks each.

The Question no.1 and 6 should be of objective nature.

Two questions of 07 marks each from remaining questions from each section A and B be asked to solve

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
(Faculty of Science & Technology)
Syllabus of T. Y. B. Tech. Semester-V

Code No.: AED-321
Practical: 02Hrs/week
Credits:01

Title: Lab-I Watershed Hydrology and Management
Teachers Assessment : 25 Marks
External Examination: 25 Marks

Objectives	:	The practical examination shall consist of performing an experiment, based on the practical work done during the course, the record of the experiments submitted by the candidate and viva-voce based on the syllabus
List of Practical's (Minimum ten experiments to be performed)	:	1. Study of different types of rain gauges 2. Analysis of rainfall data and estimation of average rainfall 3. Determination of average depth of rainfall and frequency analysis 4. Study of stage level recorders and current meters 5. Study and use of sunshine recorder 6. Study of various types of Evaporimeters and estimation of evaporation. 7. Study of various catchment characteristics 8. Estimation of peak runoff rate by rational method 9. Estimation of runoff volume by CN method 10. Development of DRH from stage hydrograph 11. Development of UH from DRH 12. Graphical analysis of flood routing 13. Visit to meteorological observatory
Reference Books:	:	1. Engineering Hydrology by K. Subramanya, Publisher Tata McGraw Hill book Co 2. Hydrology-Principles, Analysis, Design by H. M. Raghunath, Publisher New Age International Pvt. Ltd 3. Applied Hydrology by K. N. Mutreja, Publisher Tata McGraw Hill book Co. New Delhi

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

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

The assessment of practical examination shall be on the following criteria:

The practical examination shall consist of performing an experiment based on the practical work done during the course, the record of the experiments submitted by the candidate and viva -voce based on the syllabus

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
(Faculty of Science & Technology)
Syllabus of T. Y. B. Tech. Semester-V

Code No.: AED-322
Practical: 02Hrs/week
Credits:01

Title: Lab-II Irrigation and Drainage Engineering
Teachers Assessment : 25 Marks
External Examination: 25 Marks

Objectives	:	To inculcate the practical knowledge of student regarding measurement, scheduling, methods and efficiencies of irrigation.
List of Practical's (Minimum ten experiments to be performed)	:	1. Measurement of irrigation water 2. Design of underground pipe line system 3. Measurement of infiltration rate 4. Measurement of soil moisture by different soil moisture measuring instruments 5. Computation of evaporation and transpiration 6. Estimation of irrigation efficiencies 7. Study of border irrigation system 8. Study of furrow irrigation system design 9. Field visit for Irrigation water resources and methods of irrigation 10. Determination of chemical properties of soil and irrigation water 11. Design of surface drainage systems and subsurface drainage systems Determination of drainage coefficient
Reference Books:	:	1. Irrigation Theory & Practice by A.M. Michael, Vikas pub. House, Delhi. 2. Land & Water Management Engineering by V. V. N. Murthy, Kalyani Pub. New Delhi. 3. Irrigation Hydraulics by Dr. Radhey Lal , Saroj Prakashan, Allahabad. 4. Drainage Engineering by J. N. Luthin, Willey Eastern, New Delhi.

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

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

The assessment of practical examination shall be on the following criteria:

The practical examination shall consist of performing an experiment based on the practical work done during the course, the record of the experiments submitted by the candidate and viva -voce based on the syllabus

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
(Faculty of Science & Technology)
Syllabus of T. Y. B. Tech. Semester-V

Code No.: AED-323
Practical: 02Hrs/week
Credits:01

Title: Lab-III Heat and Mass Transfer
Teachers Assessment : 25 Marks
External Examination: 25 Marks

Objectives	:	The objectives of Heat & Mass Transfer laboratory is 1. To demonstrate the concepts discussed in the Heat & Mass Transfer course. 2. To experimentally determine thermal conductivity and heat transfer coefficient through various materials. 3. To experimentally measure effectiveness of heat exchangers. 4. To conduct performance tests on refrigeration & air conditioning systems
List of Practical's (Minimum ten experiments to be performed)	:	01 Heat transfer through composite wall setup 02 Thermal conductivity of insulating powder setup 03 Thermal conductivity of metal bar setup 04 Emissivity measurement setup 05 Stefan Boltzmann apparatus 06 Natural convection setup 07 Forced convection setup 08 Pin-Fin Apparatus 09 Parallel flow and counter flow heat exchanger
Reference Books:	:	1. A textbook of Heat & Mass transfer, Tirumaleshwar, Pearson education 2006 2. Heat transfer-A basic approach, Ozisik, Tata McGraw Hill 2002. 3. Heat transfer, P.K. Nag, Tata McGraw Hill 2002. 4. Heat transfer, a practical approach, Yunus A- Cengel Tata Mc Graw Hill.

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

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

The assessment of practical examination shall be on the following criteria:

The practical examination shall consist of performing an experiment based on the practical work done during the course, the record of the experiments submitted by the candidate and viva -voce based on the syllabus

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
(Faculty of Science & Technology)
Syllabus of T. Y. B. Tech. Semester-V

Code No.: AED-324
Practical: 02Hrs/week
Credits:01

Title: Lab-IV Theory of Machine
Teachers Assessment : 50 Marks
External Examination: 00 Marks

Objectives	:	The knowledge of various machine components in relation with functional use, design and various design calculations, which are essential in design of agricultural machineries, following experiments are incorporated in syllabus
List of Practical's (Minimum ten experiments to be performed)	:	1. Demonstration in mechanisms study using models 2. Analysis of 4-bar mechanism, slides crank mechanism and their inversions 3. Complete velocity and acceleration analysis (Graphical or Analytical) of few practical linkage mechanisms 4. Study of gears and gear trains and motion analysis of some practical complex compound gear train 5. Motion analysis Epicyclic gear trains using tabular and formula methods; 6. To design a compound gear train and epicyclic gear train for a desired speed ratio 7. To study the flywheel and governor action in laboratory 8. Study on the cam follower demonstration machine for follower displacement as a function of cam rotation angle and phenomenon of follower jump 9. Demonstration of static and dynamic balancing in the laboratory 10. Calculations on balancing a multi rotor unbalanced system by putting masses in two different planers. 11. Industrial visit
Reference Books:	:	1. Theory of Machines by Ballaney 2. Theory of Machines by T. Bevan 3. Theory of Machines by Shigley 4. Theory of Machines by S. S. Rattan

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

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

The assessment of practical examination shall be on the following criteria:

The practical examination shall consist of performing an experiment based on the practical work done during the course, the record of the experiments submitted by the candidate and viva -voce based on the syllabus

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
(Faculty of Science & Technology)
Syllabus of T. Y. B. Tech. Semester-V

Code No.: AED-325
Practical: 02Hrs/week
Credits:01

Title: Minor Project
Term Work : 50 Marks

Objectives	:	1. To plan for various activities of the project and distribute the work amongst team members. 2. To develop the ability to define and design the problem and lead to its accomplishment with proper planning. 3. To understand the importance of document design by compiling Technical Report on the Minor Project work carried out. 4. To develop student's abilities to transmit technical information clearly and test the same by delivery of Seminar based on the Minor Project.
Guidelines		1. Students should select a problem which addresses some basic home, office or other real life applications. 2. Projects which will address the social issues will be given due weightage. 3. It is desirable that the systems developed by the students have some novel features. 4. The batch size shall not exceed TWO students per batch. 5. The students have to select a suitable problem, design, prepare the drawings, produce the components, assemble and commission the project. 6. Institute may arrange demonstration with poster presentation of all mini projects developed by the students at the end of semester. 7. At the end of the semester, the students have to prepare and present 20-25 pages project report. 8. Final evaluation shall be based on continuous internal assessment followed by Viva-Voce.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
(Faculty of Science & Technology)
Syllabus of T. Y. B. Tech. Semester-VI

Code No.: AED 351
Teaching Scheme: 04Hrs/week
Theory: 04Hrs/week
Tutorial: 00 Hr/week
Credits:04

Title: Soil and Water Conservation Engineering
Class Test: 20 Marks
Theory Examination (Duration): 03 Hrs
Theory Examination (Marks): 80

Objectives	:	Soil & Water Conservation Engineering is the application of engineering and biological principles to the solution of soil & Water management problems. Sound soil & water conservation is based on the full integration of engineering, atmospheric, plant and soil science. Agricultural engineering, because of their training in soils, plants and other basic agricultural subjects, in addition to their engineering background, are well suited to integrate these sciences. By keeping this in view, present syllabus incorporated with following objective 1. Study of soil erosion problems caused by natural erosive agents 2. To study various agronomical and mechanical measures for control soil & water conservation
Unit-I	:	Soil erosion – problems of soil erosion, basic terminologies, causes, types and agents of soil erosion, Factors affecting, water and wind erosion, mechanics of water erosion, classification of water erosion, splash, sheet, rill, gully & stream bank erosion, wind erosion- mechanics, introduction to control measures- vegetative, mechanical measures. (Descriptive & Analytical) [8 Hours]
Unit-II	:	Soil loss estimation - universal soil loss equation and modified soil loss equation, determination of their various parameters rainfall erosivity and erodibility, sedimentation in reservoirs and streams, estimation and measurement, sediment delivery ratio, trap efficiency. (Descriptive & Analytical) [8 Hours]
Unit-III	:	Gully Erosion - gullies and their classification, stages of gully development, principles of gully control, gully control measures, temporary and permanent gully control structures. (Descriptive & Analytical) [8 Hours]
Unit-IV	:	Erosion control measures- Agronomical measures - contour cropping, strip cropping, mulching, wind breaks and shelter belts, mechanical measures - bunds - contour bunds, graded bunds and their design. (Descriptive & Analytical) [8 Hours]
Unit-V	:	Terracing – functions, classifications, level and graded broad base terraces and their design, bench terraces and their design, layout procedure, terrace planning. (Descriptive & Analytical) [8 Hours]
Unit-VI	:	Grassed water ways- uses, various cross sections, specifications and their design, introduction to water harvesting techniques, introduction to stream water quality and pollution. (Descriptive & Analytical) [8 Hours]
Reference Books:	:	1. Soil & Water Conservation Engineering by R. Suresh 2. Manual of Soil & Water Conservation Engineering by Gurmel singh, C. Venkataramanan, G. Sastry & B. P. Joshi, Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi. 3. Soil Conservation by N. Hudson 4. Soil & Water Conservation Engineering by G. o Schwab, D. D. Fangmeier, W. J. Elliot & R. K. Frevert, John Wiley & Sons, Inc. New York

Section A: Includes Unit I, II and III; **Section B:** Includes Unit IV, V and VI.

Pattern of Question Paper:

The six/four units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each. The Question no.1 and 6 should be of objective nature.
4. Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
(Faculty of Science & Technology)
Syllabus of T. Y. B. Tech. Semester-VI

Code No.: AED 352
Teaching Scheme: 04Hrs/week
Theory: 04Hrs/week
Tutorial: 00 Hr/week
Credits:04

Title: Machine Design
Class Test: 20 Marks
Theory Examination (Duration): 03 Hrs
Theory Examination (Marks): 80

Objectives	:	Agroneers must able to design various agricultural machines. They must aware about principles of operation, design considerations, materials of construction and power transmission in agricultural machines through various basic components used in designing agricultural machines. For proper understanding of design processes and developing creativity for designing the various components such as pins, levers, keys, shafts, splines, Cotter and Knuckle joint, couplings etc., present course is included
Unit-I	:	Fundamental Aspect of Design: The meaning of design, Engineering design, Phases of design, design classification, Aesthetic, Ergonomic & general design consideration, material properties & selection of materials. Types of loads and stresses: Stress strain diagram, Factor of safety direct stresses, bending stresses, Necessity of Theories of failure, Two dimensional stress condition, Different theories of failure and combined stresses. Design of C-clamp and C-frame [8 Hours]
Unit-II	:	Design against static loading: Design of Cotter joint single and double cotter joint. Design of knuckle joint. Design of shaft, keys and coupling: Shafts subjected to bending and torsion, types of keys and their design, design of rigid and flexible couplings. [8 Hours]
Unit-III	:	Design of screw and fasteners: Design of bolted and threaded joints, design of power screws, introduction to recirculating ball screw. [8 Hours]
Unit-IV	:	Design against fluctuating load: Stress concentration, fatigue failure, endurance limit, notch sensitivity, Goodman, Soderberg diagrams, and modified Goodman diagram, fatigue design under combined stresses. [8 Hours]
Unit-V	:	Design of welded and riveted joint: Types of welded joints, eccentrically loaded joints, and welded joints subjected to bending moment. Types of riveted joints, Types of failure of riveted joints, Strength equation. Eccentrically loaded joints. [8 Hours]
Unit-VI	:	Design of belt: Introduction, types & materials. Flat belt: Length of belt (open & cross), slip & creep belt, velocity ratio, centrifugal tension. initial tension, ratio of limiting tension, stresses in belt, condition for maximum power V-belt Construction of V-belt, ratio of limiting tension, selection of V-belt from manufacture catalogue Chain & rope drive [8 Hours]
Reference Books:	:	1. Design of machine element by J.E Shigley, TMH Publication. 2. Design of machine element by M.F. Spotts, Prentice hall publication 3. Machine Design by Shaum Series, TMH Publication. 4. Machine Design by V.B. Bhandari, TMH Publication. 5. Machine Design by Pandya and Shah, Charotar Publication. 6. Machine Design by R.S. Khurmi, Eurasia Publishing House. 7. Machine Design by S.G. Kulkarni, TMH Publication

Section A: Includes Unit I, II and III; **Section B:** Includes Unit IV, V and VI.

Pattern of Question Paper:

The six/four units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each. The Question no.1 and 6 should be of objective nature.
4. Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
(Faculty of Science & Technology)
Syllabus of T. Y. B. Tech. Semester-VI

Code No.: AED 353
Teaching Scheme: 04Hrs/week
Theory: 04Hrs/week
Tutorial: 00 Hr/week
Credits:04

Title: Micro Irrigation System Design
Class Test: 20 Marks
Theory Examination (Duration): 03 Hrs
Theory Examination (Marks): 80

Objectives	:	1. To stress the importance of micro-irrigation methods, design and operation of sprinkler & drip irrigation methods. 2. To emphasis the adoption of micro-irrigation in field & the economics aspects of management
Unit-I	:	Past, present and future need of micro-irrigation systems, Role of Govt. for the promotion of micro irrigation in India, Merits and demerits of micro-irrigation system, (Descriptive & Analytical) [8 Hours]
Unit-II	:	Types and components of micro-irrigation system, Micro-irrigation system- design, design synthesis, Installation and maintenance. (Descriptive & Analytical) [8 Hours]
Unit-III	:	Sprinkler irrigation - types, planning factors, uniformity and efficiency, Layout Design-laying pipeline, hydraulic lateral, sub-mains and main line design, pump and power unit selection.(Descriptive & Analytical) [8 Hours]
Unit-IV	:	Drip irrigation – potential, automation, crops suitability. Fertigation – Fertilizer application criteria, suitability of fertilizer compounds, fertilizer mixing, injection duration, rate and frequency, capacity of fertilizer tank. (Descriptive & Analytical) [8 Hours]
Unit-V	:	Quality control in micro-irrigation components, design and maintenance of polyhouse, prospects, waste land development – hills, semi-arid, coastal areas, water scarce areas, Benefit and Cost analysis (Descriptive & Analytical) [8 Hours]
Unit-VI	:	Design of micro-irrigation system for orchard, row crop, hilly terraced land. (Descriptive & Analytical) [8 Hours]
Reference Books:	:	1. Irrigation Theory and Practices by A. M. Michael, Vikas publishing house, New Delhi 2. Sprinkle and Trickle Irrigation by Keller, J. and R.D. Bliesner. 1990, Van Nostrand Reinhold. New York. 3. Irrigation System Design - an Engineering Approach by Cuenca, R.H. 1989, Prentice Hall, Englewood Cliffs, NJ

Section A: Includes Unit I, II and III; **Section B:** Includes Unit IV, V and VI.

Pattern of Question Paper:

The six/four units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each. The Question no.1 and 6 should be of objective nature.
4. Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
(Faculty of Science & Technology)
Syllabus of T. Y. B. Tech. Semester-VI

Code No.: BSH 354
Teaching Scheme: 04Hrs/week
Theory: 04Hrs/week
Tutorial: 00 Hr/week
Credits:04

Title: Industrial Management (All)
Class Test: 20 Marks
Theory Examination (Duration): 03 Hrs
Theory Examination (Marks): 80

Course Objectives	:	1. Students should understand concept of management 2. Students should understand human resource management, production management, marketing management, financial management and quality management 3. Students should understand modern management techniques
Unit-I	:	Basics of Management: Introduction, Definition of Management, Characteristics of management, functions of Management – planning, Organizing, Staffing, Directing, Coordinating, Controlling, Motivation, Communication, Decision Making, Principles of management – F. W. Taylor, Henry Fayol, Elton Mayo, Administration and Management, Nature of Management, Levels of Management, Managerial skills, managerial roles, Forms of organization, Line, Line-staff etc. Forms of ownership – Partnership, Proprietorship, joint stock, cooperative society, Government sector etc., concept of globalization. [8 Hours]
Unit-II	:	Human Resource Management: Objectives of HRM, Strategic importance of HRM, Challenges to HR Professionals, Roles and responsibilities of HR professionals, Human resources planning, talent acquisition, recruitment and selection, Career Planning & Management, Training & Development, discipline and disciplinary action, executive development, need and benefits of good HR policy [8 Hours]
Unit-III	:	Purchase & Stores Management: Materials Function, Purchasing or Procurement, buying techniques, purchase procedure, vendor selection, vendor rating. Stores management: Introduction to Stores Management, Stores and material control, Receipt and issue of Materials, Concept of inventory control & its objectives, EOQ, ABC analysis, Material Requirement Planning. [8 Hours]
Unit-IV	:	Production and Quality Management: Types of production, Functions of Production Planning & Control, Plant location and layout, Method Study. Inspection, types of inspection, difference between inspection and quality control, sampling inspection statistical quality control, quality circles, reliability concept. [8 Hours]
Unit-V	:	Marketing Management & Financial Management: Marketing Management: Introduction, the sales concept, sales vs marketing, market research, sales forecasting, and channels of distribution, pricing. Financial Management: Introduction to financial management, types of capital, sources of finance, assets and Liabilities, factors affecting requirement of working capital, return on investment. [8 Hours]
Unit-VI	:	Modern Management Techniques: Kaizen, Flexible Manufacturing System, Just in Time, Lean Manufacturing, Total Productive Maintenance, Supply Chain Management, Agile Manufacturing, Six Sigma, Management Information System. [8 Hours]
Reference Books:	:	1. O P Khanna, “Industrial Engineering and Management”, 2nd Edition, Dhanpat Rai, 2004. 2. Korgaonkar M.G. ‘Just In Time Manufacturing’, Laxmi Publication. 3. Besterfield Dale H., Besterfield Carol, Total Quality Management 3rd Edn. 4. Chopra Sunil, Meindl Peter, Kalra D.V., Supply Chain Management : Strategy Planning & Operation 6th Edn., Pearson. 5. S. S. Patil & N K Hukeri, Industrial Engineering and Production and Operations Management, Electrotech Publication 6. S. Sadagopan, Management Information System, PHI Learning. 7. Craig W Baird, The six Sigma Manual for small and Medium Business.

Section A: Includes Unit I, II and III; **Section B:** Includes Unit IV, V and VI.

Pattern of Question Paper:

The six/four units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each. The Question no.1 and 6 should be of objective nature.
4. Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
(Faculty of Science & Technology)
Syllabus of T. Y. B. Tech. Semester-VI

Code No.: AED381

Teaching Scheme: 04Hrs/week

Theory: 04Hrs/week

Tutorial: 00 Hr/week

Credits:04

Title: Open Elective- Remote sensing and Geographic Information System

Class Test: 20 Marks

Theory Examination (Duration): 03 Hrs

Theory Examination (Marks): 80

Objectives	:	To develop applications of environmental remote sensing and GIS which can directly enhance service delivery on land use management, ground water management/prospects, agriculture, forestry, food and water security, disaster management. Present subject is designed for fulfillment of following objectives 1. To understand the fundamental principles and applications of Remote Sensing and Geographical Information Systems. 2. To increase awareness about RS and GIS among students for various researches pertaining to watershed management 3. To describe how geographical information is used and managed
Unit-I	:	Remote Sensing: Definition, Historical Development, remote sensing system, Multi concept of remote sensing. Advantages and disadvantages in remote sensing, general applications of remote sensing (Descriptive & Analytical) [8 Hours]
Unit-II	:	Electromagnetic radiation: Electromagnetic energy, energy interaction with atmosphere and earth surface, resolutions in remote sensing [8 Hours]
Unit-III	:	Sensors and Platforms: Classification, Land observation satellites, Weather satellites, Satellite data reception, transmission and processing, Data products, Standard products, Digital data products, (Descriptive & Analytical) [8 Hours]
Unit-IV	:	Image interpretation: Procedure, elements, techniques, equipments for image interpretation, basic principles of image interpretation, factors governing the quality of an image, factors governing interpretability, visibility of objects, digital image processing, digital image, steps, remote sensing in agriculture progress and prospects, microwave radiometry for monitoring agriculture crops and hydrologic forecasting, aerial photo interpretation for water resources development and soil Conservation survey. (Descriptive & Analytical) [8 Hours]
Unit-V	:	Geographical Information System: History of development of GIS definition, basic components, GIS input data and output product, general application. (Descriptive & Analytical) [8 Hours]
Unit-VI	:	GIS data: type, representation, source, data sets, acquisition, data structure, data base management systems (DBMS), GIS application. (Descriptive & Analytical) [8 Hours]
Reference Books:	:	1. Remote sensing and Geographical Information System by A. M. Chandra & S. K. Ghosh, Narosa Publishing House, New Delhi 2. Remote Sensing- Principals and Applications by B. C. Panda, Viva book Publication, New Delhi 3. Basics of Remote Sensing & GIS by S. Kumar, an online book published by Laxmi Publications, New Delhi Remote Sensing & GIS by Basudeb Bhatta, an online book published by OUP India

Section A: Includes Unit I, II and III; **Section B:** Includes Unit IV, V and VI.

Pattern of Question Paper:

The six/four units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each. The Question no.1 and 6 should be of objective nature.
4. Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.

Dr.Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Science and Technology) Syllabus of T.Y.B. Tech. (Computer Science and Engineering) Semester-VI Code No.: CSE 381 Teaching Scheme:04 Hours per week Theory: 04 Hours per week Tutorial: Credits:04 Title: Open Elective-I Professional Ethics and Cyber Security Class Test: 20 Theory Examination (Duration): 03 Hours Theory Examination (Marks): 80	
Objectives	1. To make students familiar with the fundamental concepts of computer ethics. 2. To know the linkage between computer, professional ethics and ethical decision making 3.To know the ethical concepts and ethical theories 4. To Know the privacy and cyberspace 5. To know concept of cyber security. 6. To know the practice of administrating using Cyber Security.
Unit-I	: Introduction: Why Computer Ethics? The Standard Account: New Possibilities, a Vacuum of Policies, Conceptual Muddles• An Update to the Standard Account. Ethical Decision making: Ethical dilemma, Guidelines for dilemma(Formal and Informal), Solving ethical dilemma , Socio technical Computer Ethics, Micro- and Macro-Level Analysis , Intellectual Property: Copy right, Trade mark, Trade Secret, Patent [8Hours]
Unit-II	: Professional Ethics, Codes of Conduct, and Moral Responsibility Professional Ethics: Profession, Professional, Computer/ IT Professional , Computer/IT Professionals Special Moral Responsibilities: Safety-Critical Software, Professional Codes of Ethics and Codes of Conduct: Purpose of Professional Codes, Criticisms of Professional Codes, Defending Professional Codes, Conflicts of Professional Responsibility: Employee Loyalty and Whistle-Blowing , Whistle-Blowing Issues, Strategy for Understanding Professional Responsibility [8Hours]
Unit-III	: Ethical Concepts and Ethical Theories: Establishing and Justifying A Moral System Ethics and Morality: Morality, Rules and Principles of a Moral System, Ethical Theories: Consequence-Based :Utilitarianism , Duty-Based: Deontology, Contract-Based , Rights-Based Contract , Character-Based : Moral Person vs. Following Moral Rules, Acquiring the “Correct” Habits , Integrating Aspects of Classical Ethical Theories into a Single Comprehensive Theory: Moor’s Just-Consequentiality Theory and Its Application to Cyber technology. [8Hours]
Unit-IV	: PRIVACY AND CYBERSPACE Cyber technology Unique or Special, Personal Privacy: Accessibility Privacy, Decisional Privacy, Informational Privacy, Comprehensive Account of Privacy, Privacy as “Contextual Integrity”, Privacy Important: Intrinsic Value, Social Value. Gathering Personal Data: Dataveillance Techniques, Internet Cookies , RFID Technology, Cyber technology and Government Surveillance, Exchanging Personal Data: Merging Computerized Records, Matching Computerized Records . Protecting Personal Privacy in Public Space: Search Engines and the Disclosure of Personal Information, Accessing Online Public Records. [8Hours]
Unit-V	: Security Basics Security Basics: Introduction, Elements of Information security, Security Policy, Techniques, steps, Categories, Operational Model of Network Security, Basic Terminologies in Network Security. Intrusion and Firewall: Introduction, Intrusion detection, IDS: Need, Methods, Types of IDS, Password Management, Limitations and Challenges, Firewall Introduction, Characteristics and types, Benefits and limitations. Trusted Systems, Access Control. [8Hours]
Unit-VI	: Security perspective of Hacking and its counter majors Remote connectivity and VoIP hacking, Wireless Hacking, Mobile Hacking, Hacking Hardware, Application and data Hacking, Mobile Hacking, Counter majors: General Strategies, Example Scenario’s: Desktop, Servers, Networks, Web, Database, Mobile. [8Hours]
Reference Books:	: 1 . Computer Ethics by Deborah Johnson 4th edition 2. Ethics and Technology Controversies, Questions, and Strategies for Ethical Computing by HERMAN T. TAVANI, 4 th Edition, Wiley publication 3. Dr. V.K. Pachghare, Cryptography and Information Security, 4. Nina Godbole,Sunit Belapure, Cyber Security,Wiley India,

Section A: Includes Unit I, II and III; **Section B:** Includes Unit IV, V and VI.

Pattern of Question Paper:

The six/four units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions.
2. Five questions in each section.
3. Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each. The Question no.1 and 6 should be of objective nature.

Two questions of 15 marks each from remaining questions from each section A and B be asked to solve

Dr.Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Science & Technology) Syllabus of T. Y. B. Tech. (Civil Engineering) Semester-VI		
Code No.: CED381 Teaching Scheme: 04Hrs/week Theory: 04Hrs/week Credits:04		Title: Open Elective: Design for Environment Class Test (Marks): 20 Theory Examination (Duration): 03 Hrs Theory Examination (Marks): 80
Objectives	:	This course has been designed to teach about environmental engineering, energy and economy through the use of case studies, computer software tools, and seminars from the point of view of sustainable development and changing societal, industrial demands. Case studies provide the basis for group projects as well as individual
Unit-I	:	Review of physical, chemical, ecological, and economic principles used to examine interactions between humans and the natural environment. Modeling concepts, applications in all engineering domains [7 Hours]
Unit-II	:	Mass balance concepts are applied to ecology, chemical kinetics, hydrology, and transportation; energy balance concepts are applied to design, ecology, and climate change; and economic and life cycle concepts are applied to resource evaluation and engineering design. [7 Hours]
Unit-III	:	Design for Environment (DfE) concepts, applications, and Case studies [10 Hours]
Unit-IV	:	Assessment, Monitoring and control of Rural, Urban and Industrial Pollutions using CDTs [8 Hours]
Unit-V	:	Numerical models are used to integrate concepts and to assess environmental impacts of human activities. Problem sets involve development of MATLAB and GIS models for engineering applications in all domains. [8 Hours]
Unit-VI	:	Emphasis on the principles of infrastructure planning with a focus on appropriate and sustainable technologies incorporating technical, socio-cultural, public health, and economic factors into the planning and design of urban, industrial systems. [8 Hours]
Reference Books:	:	Ecological Water Quality (Water Treatment and Reuse) – Kostas Voudouris and Dimitra Voutsas. Wastewater Engineering- Metcalf and Eddy, McGraw Hill Publication. MATLAB for Engineering Application- Williams J. Palm, Tata McGraw Hill Publication. Application of GIS and Remote Sensing in Environmental Management- S. A. Abbasi, DPH Publications. Harte, John "Consider a Cylindrical Cow: More Adventures in Environmental Problem Solving." Mill Valley, CA: University Science Books, 2001. Fay, James A., and Dan S. Golomb. Energy and the Environment. New York, NY: Oxford University Press, 2002 Etter, Dolores. Introduction to MATLAB for Engineers and Scientists. Upper Saddle River, NJ: Prentice Hall, 1996 Etter, Dolores, David Kuncicky, and Holly Moore, "Engineering Problem Solving with MATLAB" . Upper Saddle River, NJ: Prentice Hall, 2006. Howard S. Peavy, Donald R. Rowe, George Tchobanoglous "Environmental Engineering" Mcgraw Higher Ed. ISBN: 9789351340263

Section A: Includes Unit I, II and III; **Section B:** Includes Unit IV, V and VI.

Pattern of Question Paper:

The six/four units in the syllabus shall be divided in two equal parts i.e. 3/2 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions.
2. Five questions in each section.
3. Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each. The Question no.1 and 6 should be of objective nature.
4. Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

(Faculty of Science & Technology)

Syllabus of T. Y. B. Tech. (Electrical Engineering) Semester-VI

Code No.: EED381

Teaching Scheme: 4 hrs/week

Theory: 4 hrs/week

Credits:4

Title: Open Elective-I: Robotics and Automation**Class Test (Marks): 20****Theory Examination (Duration): 3 Hours****Theory Examination (Marks): 80**

Objectives	:	1. Describe the history and early beginnings of automated manufacturing & Robotics. Ability to recognize industrial control problems. 2. Aims to Develop understanding Robotics Components. 3. Apply creative approaches to practical applications, identify technological opportunities in robotics. 4. An over view of technology of advanced topics such as CNC Machines, Human Robot Interaction. 5. The ability to provide Automation solution.				
Unit-I	:	Introduction to Automation: Types of Automation; Architecture of Industrial Automation Systems, Advantages and limitations of Automation, Effects of modern developments in automation on global competitiveness. Introduction of CNC Machines: Basics and need of CNC machines, NC, CNC and DNC (Direct NC) systems, Structure of NC systems, Applications of CNC machines in manufacturing, Advantages of CNC machines. [8Hours]				
Unit-II	:	Robotics: Robot anatomy-Definition, law of robotics, History and Terminology of Robotics-Accuracy and repeatability of Robotics-Simple problems Specifications of Robot-Speed of Robot-Robot joints and links-Robot classifications-Architecture of robotic systems-Robot Drive systems Hydraulic, Pneumatic and Electric system. [8 Hours]				
Unit-III	:	Robot Transformation, Sensors & End effectors: Transformation types: 2D, 3D. Translation- Homogeneous coordinates multiple transformation-Simple problems. Sensors in robot – Touch sensors-Tactile sensor – Proximity and range sensors Robotic vision sensor-Force sensor-Light sensors, Pressure sensors End effectors : Mechanical grippers-Slider crank mechanism, Screw type, Rotary actuators, cam type-Magnetic grippers- Vacuum grippers-Air operated grippers-Gripper force analysis-Gripper design-Simple problems. [8Hours]				
Unit-IV	:	Kinematics: Rigid body Kinematics, Inverse Kinematics, Rotation matrix, Homogenous transformation matrix, Denavit - Hartenberg convention, Euler angles, RPY representation, Direct and inverse Kinematics for industrial robots for position and orientation Redundancy, Manipulator, Jacobian Joint, End effector, velocity – direct and inverse velocity analysis. Control: Individual joint computed torque. [8Hours]				
Unit-V	:	Dynamics: Lagrangian Dynamics, link inertia tensor and manipulator inertia tensor, Newton-Euler Dynamics of Robot, Newton-Euler formulation for RR & RP manipulators, Dynamics of systems of Interacting Rigid Bodies, D-H Convention, Trajectory planning for Flexible Robot, Cubic polynomial linear segments with parabolic blending, static force and moment transformation, solvability, stiffness, Singularities. [8 Hours]				
Unit-VI	:	Robot Control & Applications 6L Control approaches: oscillatory based time varying control law, control law based on vector field orientation approach. Advanced strategies of control: conventional aerial vehicle, Bidirectional X4-flyer. Applications of Fuzzy Logic and Neural network in Robot Control, Neural controllers, Implementation of Fuzzy controllers: Trajectory tracking controller. Applications of Robotic system: complex control system, vision system in complex control system. Human Robot Interaction: Architecture. [8 Hours]				
Text books	:	Sr. No.	Title	Author	Publication	Edition
		1	Robotics And Automation Handbook	Thomas R. Kurfess,	CRC Press	2004, ISBN 0-8493-1804-1
		2	Robot Motion and Control(Recent Developments)	M.Thoma & M. Morari		2018
Reference Books		3	Welding Robots -Technology, System Issues and Applications	J. Norberto Pires, Altino Loureiro and Gunnar Bölmsjö	Springer-Verlag	2006, ISBN-10:185233953 5
		4	Robotics : Designing the Mechanisms for Automated Machinery	Ben-Zion Sandler,	Academic Press,	2nd ed.1999

Section A: Includes Unit I, II and III; **Section B:** Includes Unit IV, V and VI.

Pattern of Question Paper:

The six units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions.
2. Five questions in each section.
3. Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each. The Question no.1 and 6 should be of objective nature.
4. Two questions of 15 marks each from remaining questions from each section A and B be asked to solve

Dr.Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Science & Technology) Syllabus of T. Y. B. Tech. (Electronics and Telecommunication Engineering) Semester-VI Code No.: ETC 381 Teaching Scheme: 04Hrs/week Theory: 04Hrs/week Credits:04 Title: Open Elective-I: Internet of Things Class Test (Marks): 20 Theory Examination (Duration): 03 Hours Theory Examination (Marks): 80		
Prerequisites	:	Python Fundamentals, basics of electronics, Networking fundamentals, WWW terminology
Objectives	:	1. To understand IOT value chain structure (device, data cloud), application areas and technologies involved 2. To understand IOT sensors and technological challenges faces by IoT devices. 3. Explore and learn about Internet of things with the help of projects
Unit-I	:	Introduction to IoT: Definition of IOT- Evolution of IOT and related terms, hardware, software, network stack for IoT, Business Scope, SAAS Model, Industry 4.0. [8Hours]
Unit-II	:	Elements of IoT: Introduction to elements of IOT, Basic Architecture of an IOT application sensors, and Actuators – Edge Networking (WSN) – Gateways – IOT Communication Model – WPAN and LPWA, 6LoPAN, Sigfox, Introduction to basis looping and conditional statements, basics of HTML. . [8Hours]
Unit-III	:	IoT Sensors: Node MCU ESP 8266- hardware specification, GPIO programming, WIFI connectivity programming, Access Point Programming. . [8Hours]
Unit-IV	:	Communication and Connectivity Technologies: Introduction to: TCP/IP, UDP, NTP, MQTT, Network and Sockets, WIFI. Cloud Computing in IOT - IOT Communication Model – Cloud Connectivity, Things speak, '100', HCR. . [8Hours]
Unit-V	:	Data Analytics and IOT Platforms: Basics of statistics, Descriptive statistics and probability distributions. Big Data Analytics - Hadoop, Data Visualization – radar charts, – IOT Platforms- Microsoft Azure and Amazon Web Services, IBM Watson, Google Home and Amazon's Alexa . [8Hours]
Unit-VI	:	Preparing IoT Projects (Creating the sensor project with Node MCU ESP 8266 - Sensor libraries - Interacting with the hardware, Internal representation of sensor values - Persisting data - External representation of sensor values - Exporting sensor data - Creating the actuator project Hardware - Interfacing the hardware - Creating a controller - Representing sensor values - Parsing sensor data - Calculating control states. [8Hours]
Reference Books:	:	Text Books: 4. The Internet of Things: Applications and Protocols, Wiley publications. Author(s): Oliver Hersent, David Boswarthick, Omar Elloumi 5. Architecting the Internet of Things, Springer publications. Author(s): Dieter Uckelmann, Mark Harrison, Florian Michahelles 6. Internet of Things with Arduino Cookbook, Packt Publications. Author(s): Marco Schwartz Reference Books: • Internet of Things and Data Analytics, Wiley Publications

Section A: Includes Unit I, II and III; **Section B:** Includes Unit IV, V and VI.

Pattern of Question Paper:

The six/four units in the syllabus shall be divided in two equal parts i.e. 3/2 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions.
2. Five questions in each section.
3. Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each. The Question no.1 and 6 should be of objective nature.
4. Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Science & Technology) Syllabus of T. Y. B. Tech. (All) Semester-VI	
Course Code: MED 381 Teaching Scheme: 04 Hrs/week Theory: 04 Hrs/week Credits: 04	Course: Open Elective: Costing and Financial Management Class Test: 20 marks Theory Examination (Duration): 03 Hours Theory Examination (Marks): 80
Objectives	: 1. To understand the basic concepts and processes used to determine product costs, 2. To be able to analyze and evaluate information for cost ascertainment, planning, control and decision making, and 3. To develop ability to analyze and interpret various tools of financial analysis and planning, 4. To gain knowledge of management and financing of working capital, 5. To understand concepts relating to financing and investment decisions
Unit-I	: Costing Methods of costing and elements of cost. Material Cost Different methods of pricing of issue of materials. Labour Cost Different methods, wages and incentive plans. Principles of good remunerating system, labour turnover. Depreciation Concept, importance and different methods of depreciation [8Hours]
Unit-II	: Overheads Classification, collection of overheads, Primary and Secondary apportionment of overheads, absorption of overheads- Machine hour and labour hour rate. Under and over absorption of overheads. [8Hours]
Unit-III	: Standard costing: Concept, development and use of standard costing, variance analysis. Marginal Costing Use of Marginal Costing in decision-making. Capital Budgeting Control of Capital Expenditure, techniques of capital budgeting –Pay Back Method, Accounting rate of return, Internal Rate of Return, DCF, Net Present Value and profitability index. [8Hours]
Unit-IV	: Introduction To Financial Management Concept of business finance, Goals & objectives of financial management, Sources of financing - LONG TERM: shares, debentures, term loans, lease & hire purchase, retained earnings, public deposits, bonds (Types, features & utility), SHORT TERM: bank finance, commercial paper, trade credit & bills discounting, INTERNAL: Retained earnings, Cost of Capital & Means of Finance. [8Hours]
Unit-V	: Financial Statement Preparation, analysis & Interpretation Preparation of financial statement and Profit & Loss Account, Balance Sheet. Ratio Analysis Classification, Ratio Analysis and its limitations, Index Statement & Common Size Statement. [8Hours]
Unit-VI	: Working Capital Management Concept & design of Working Capital, types of working capital, sources of working capital, Time value of money, definition of cost and capital, Cash management, creditors management, debtors management. [8 Hours]
Text Books	: 1. Bhattacharya A. K., “Principles and Practice of Cost Accounting”, Prentice Hall India. 2. B K Bhar, “Cost Accounting – Methods and Problems”, Academic Publishers 3. Khan M. Y., Jain P. K., “Financial Management”, Tata McGraw Hill 4. Pariasamy P., “Financial , Cost & Management Accounting”, HH Publication
Reference Books	: 1. Colin Drury, “Management and Cost Accounting”, English Language Book Society, Chapman and Hall London. 2. Tulsian P. C., “Financial Management”, S. Chand.

Section A: Includes Unit I, II and III; **Section B:** Includes Unit IV, V and VI.

Pattern of Question Paper:

The six/four units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

- Minimum ten questions
- Five questions in each section
- Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each. The Question no.1 and 6 should be of objective nature.
- Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
(Faculty of Science & Technology)
Syllabus of T. Y. B. Tech. (Plastic and Polymer Engineering) Semester-VI

Code No.: PPE 381
Teaching Scheme: 4 hrs/week
Theory: 4 hrs/week
Credits:4

Title: Open Elective-I: Introduction to Nanotechnology
Class Test (Marks): 20
Theory Examination (Duration): 3 hrs
Theory Examination (Marks): 80

Objectives	:	1. To study the introduction to nanomaterials and the factors affecting it. 2. To study the types and synthesis methods of nanomaterials. 3. To study the characterizations and properties of nanomaterials. 4. To study the different applications of nanomaterials.
Unit-I	:	Introduction: Introduction to nanotechnology, conventional micro vs. nano-material properties, role of size in properties of nano-materials, length scale and surface to volume concept, and uniqueness of nanostructured materials; health hazards and handling of nanomaterials. [8 Hours]
Unit-II	:	A) Types of Nano-Materials: Montmorillonite, Layer double hydroxide (LDH), Carbon nanofibers (CNFs) – vapour grown carbon fibers (VGCFs), Polyhedral Oligomeric Sisoquioxane (POSS), Carbon nanotubes, Nanosilica, Nanoaluminium oxide, Nanotitanium oxide, Nano-hybrids . B) Synthesis: Bottom-up and Top-down approach for nano materials synthesis, Methods: Ball Milling, Chemical vapor deposition, Pressure vapor deposition, Ultrasound assisted, Minimulsion, Microemulsion, Nanoemulsion, Hydrothermal, Sol-gel, Miscellaneous techniques. [8 Hours]
Unit-III	:	Properties of Nanomaterials in terms of Structure Property Relationship: Thermal properties, Mechanical properties, Gas barrier properties, Flame retardant properties, Electrical and electrochemical properties, Electronic properties, Optical properties, Magnetic properties, Biodegradable properties, Antimicrobial properties, Catalytic properties. [8 Hours]
Unit-IV	:	Preparation of Polymer Nanocomposites: Solution intercalation, Melt intercalation, Roll Milling, Emulsion Polymerization, In-Situ Polymerization. [6 Hours]
Unit-V	:	Characterization of Nanomaterials and Nanocomposites: X ray diffraction (XRD), Dynamic light scattering (DLS), Scanning electron microscopy (SEM), Transmission electron microscopy (TEM), Energy dispersive x-ray spectroscopy (EDS), Atomic force microscopy (AFM), Small angle X ray scattering (SAXS), Differential scanning calorimetry (DSC), Thermo gravimetric analysis (TGA). [10 Hours]
Unit-VI	:	Application of Nanomaterials and Nanocomposites: Biomedical-Drug delivery, Bone replacement; Sensors – gas sensor, Metal adsorption and recovery, Bio-molecule detectors; Energy storage and conversion - Super capacitors, Solar cells, Energy generators; Electronics; Self cleaning & Self healing paints, Nano-engineering of cement-based materials, Agricultural Nanotechnologies. [8 Hours]
Reference books	:	1. Polymer Nanocomposites Processing, Characterization, and Applications by Joseph H. Koo, McGraw-Hill Nanoscience and Technology Series 2006 2. Encyclopedia of Nanoscience and Nanotechnology by Hari singh Nalwa, American Scientific publishers 3. Nanoparticle Technology Handbook by M Hosokawa, K Nogi, M Naito, T Yokoyama, Elsevier 4. The Science of Nanotechnology: An introductory text by Luanne Tilstra et al. Nova Science Publishers, Inc

Section A: Includes Unit I, II and III; **Section B:** Includes Unit IV, V and VI.

Pattern of Question Paper:

The six units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for 10 marks each. The Question no.1 and 6 should be of objective nature.
4. Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
(Faculty of Science & Technology)
Syllabus of T. Y. B. Tech. Semester-VI

Code No.: AED 354
Teaching Scheme: 02Hrs/week
Theory: 02Hrs/week
Tutorial: 00 Hr/week
Credits:02

Title: Food Quality and Sensory Evaluation
Class Test: 10 Marks
Theory Examination (Duration): 02 Hrs
Theory Examination (Marks): 40

Objectives	:	1. To get acquainted with quality aspect of food 2. Understand the role of colour, texture, viscosity in food quality 3. To classify the quality parameters
Unit-I	:	Food quality and its role in food industry, need of quality control, factors affecting quality control, Quality attributes, dominant and hidden attributes. (06 Hrs)
Unit-II	:	Color: Role of colors in quality spectra, different types of colour, measuring instruments; Viscosity – types of fluids, different viscometers to measure viscosity; Consistency – methods used to measure consistency or product difference between viscosity and consistency; Size and shape - Method to find shape and size of food and food products, Defects: Classification, genetic- physiological defects- Structural, off color, character, entomological Defectsholes, Scars, lesions, off coloring, curled leaves, pathological defects, Mechanical defects, Extraneous or foreign material defects, (06 Hrs)
Unit-III	:	Texture: Classification, role of firmness, yielding quality, juiciness, chewiness, fibrousness, grittiness, mealiness, stickiness, measurement of texture, Flavour: Definition and its role in food quality; Taste: Classification, taste qualities, relative intensity, reaction time, effect of disease, temperature. (06 Hrs)
Unit-IV	:	Food qualities: Soil, field practices, harvesting practices, procedures, packaging, transportation, storage, conditions, processing conditions, packaging and storage conditions of finished products, Sensory evaluation: Definition, classification and methods, sensory evaluation of different products. (06 Hrs)
Reference Books:	:	1. Fundamentals of Quality Control for Food Industry by Krammer and Twigg, Avi Publishing Company, 1966 2. Quality Control in Food Industry by Krammer and Twigg, Avi Publishing Company, 1966 3. Quality Control in Food Industry by Herschdoerfer, Elsevier, 2012 4. Sensory Evaluation Techniques, Civillie and Carr, CRC Press, 2015

Section A: Includes Unit I, II and III; **Section B:** Includes Unit IV, V and VI.

Pattern of Question Paper:

The six/four units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 40 marks Paper:

1. Minimum eight questions
2. Three questions in each section
3. Question no 1 from section A and Question no 5 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for six marks each.

The Question no.1 and 6 should be of objective nature.

Two questions of 07 marks each from remaining questions from each section A and B be asked to solve

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
(Faculty of Science & Technology)
Syllabus of T. Y. B. Tech. Semester-VI

Code No.: AED-371
Practical: 02Hrs/week
Credits:01

Title: Lab-I: Soil and Water Conservation Engineering-I
Teachers Assessment : 25 Marks
External Examination: 25 Marks

Objectives	:	Soil and water conservation engineering practically deals with study of various erosion problems, erosive agents and various control measures. Keeping this in view current syllabus providing students 1. Various soil loss estimation methods caused due to erosion 2. Study and design of various agronomical and mechanical erosion control measures 3. Study of water harvesting techniques
List of Practicals (Minimum ten experiments to be performed)	:	1. Study of soil loss measurement techniques. 2. Problems on Universal Soil Loss Equation (USLE) 3. Computation of erosion index from rainfall data 4. Determination of sediment concentration through oven dry method 5. Study of various gully erosion control structures 6. Study of agronomical erosion control measures (Shelter belts & Wind Breaks) 7. Design of contour bunding system 8. Design of graded bunding system 9. Design of various types of bench terracing systems 10. Design of vegetative waterways 11. Study of water harvesting techniques 12. Field visit to water harvesting structures
Reference Books:	:	1. Soil & Water Conservation Engineering by R. Suresh 2. Manual of Soil & Water Conservation Engineering by Gurmel singh, C. Venkataramanan, G. Sastry & B. P. Joshi, Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi. 3. Soil Conservation by N. Hudson 4. Soil & Water Conservation Engineering by G. o Schwab, D. D. Fangmeier, W. J. Elliot & R. K. Frevert, John Wiley & Sons, Inc. New York

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

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

The assessment of practical examination shall be on the following criteria:

The practical examination shall consist of performing an experiment based on the practical work done during the course, the record of the experiments submitted by the candidate and viva -voce based on the syllabus

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
(Faculty of Science & Technology)
Syllabus of T. Y. B. Tech. Semester-VI

Code No.: AED-372
Practical: 02Hrs/week
Credits:01

Title: Lab-II: Machine Design
Teachers Assessment : 25 Marks
External Examination: 25 Marks

Objectives	:	Agroneers must able to design various agricultural machines. They must aware about principles of operation, design considerations, materials of construction and power transmission in agricultural machines through various basic components used in designing agricultural machines. For proper understanding of design processes and developing creativity for designing the various components such as pins, levers, keys, shafts, splines, Cotter and Knuckle joint, couplings etc., present course is included
List of Practical's (Minimum ten experiments to be performed)	:	1. Design and Drawing sheet (Details and assembly) on any one of the following: Cotter Joint, Knuckle Joint, Lever loaded safety valve or spring loaded safety valve 2. Design and Drawing sheet(Details and assembly) on any one of the following: Rigid or Flexible coupling, Bolted or welded joint subjected to eccentric loading. 3. Design and Drawing sheet(Details and assembly) on any one of the following: Screw jack, C- Clamp B. 4. Design and Drawing sheet(Details and assembly) on any one of the following: Flat Belt Drives, V belt drives, Chain drives, Rope drives 5. Use of software tool AutoCADfor drafting of any one details and assembly of above Assignments • Design process, Aesthetic and Ergonomic Consideration in Design. • Design considerations • Selection of Material: • Theories of failure • Fatigue Loading • Design of Power Screw • Springs
Reference Books:	:	1. Design of machine element by J .E Shigley, TMH Publication. 2. Design of machine element by M.F. Spotts, Prentice hall publication 3. Machine Design by Shaum Series, TMH Publication. 4. Machine Design by V.B. Bhandari, TMH Publication. 5. Machine Design by Pandya and Shah, Charotar Publication. 6. Machine Design by R.S. Khurmi, Eurasia Publishing House. 7. Machine Design by S.G. Kulkarni, TMH Publication.

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

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

The assessment of practical examination shall be on the following criteria:

The practical examination shall consist of performing an experiment based on the practical work done during the course, the record of the experiments submitted by the candidate and viva -voce based on the syllabus

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
(Faculty of Science & Technology)
Syllabus of T. Y. B. Tech. Semester-VI

Code No.: AED-373
Practical: 02Hrs/week
Credits:01

Title: Lab-III Micro Irrigation System Design
Teachers Assessment : 25 Marks
External Examination: 25 Marks

Objectives	:	1. To inculcate the practical knowledge of student regarding measurement, scheduling, methods and efficiencies of irrigation. 2. Familiarization with various components of micro-irrigation systems with their functions 3. To study the design of micro-irrigation system for row, orchard, terraced crops 4. To study the repair & maintenance of components of trickle & sprinkler irrigation system of micro-irrigation
List of Practical's (Minimum ten experiments to be performed)	:	1. Study of different types of micro-irrigation systems and components 2. Field visit of micro-irrigation system 3. Study of water filtration unit; Discharge measurement study of different micro irrigation systems. 4. Study of water distribution and uniformity coefficient. 5. Study of wetted front and moisture distribution under various sources of micro irrigation system 6. Design of micro-irrigation system for an orchard. 7. Design of micro-irrigation system for row crops 8. Design of spray type micro-irrigation system. 9. Design of micro-irrigation system for hilly terraced land. 10. Study of automation in micro-irrigation system. 11. Study of micro-climate inside a Polyhouse. 12. Study of maintenance and cleaning of different components of various systems. 13. Design of sprinkler irrigation system; Design of landscape irrigation system. 14. Measurement of irrigation water
Reference Books:	:	1. Irrigation theory and practices by A. M. Michael, Vikas publishing house, New Delhi. 2. Keller, J. and R.D. Bliesner. 1990. Sprinkle and Trickle Irrigation. Van Nostrand Reinhold. New York. 652 pages. 3. Cuenca, R.H. 1989. Irrigation system design - an engineering approach. Prentice Hall, Englewood Cliffs, NJ. 4. ASAE. 1988. Standards 298, American Society of Agricultural Engineers, St. Joseph, Michigan. 32nd Edition. A more recent edition is available at the science reference desk. S671 A32 SciRef. 5. Natural Resource Conservation Service. National Engineering Handbook. Section 15. Chapter 2 Irrigation Water Requirements; Chapter 7 Trickle Irrigation; Chapter 11 Sprinkle Irrigation. United States Department of Agriculture

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

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

The assessment of practical examination shall be on the following criteria:

The practical examination shall consist of performing an experiment based on the practical work done during the course, the record of the experiments submitted by the candidate and viva -voce based on the syllabus

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
(Faculty of Science & Technology)
Syllabus of T. Y. B. Tech. Semester-VI

Code No.: AED-374
Practical: 02Hrs/week
Credits:01

Title: Lab-IV Analytical Techniques
Teachers Assessment : 50 Marks
External Examination: 00 Marks

Objectives	:	1. To get knowledge of various sophisticated analytical equipments used in food, pharmacy, environmental sectors. 2. To go through hands on training for analytical instruments
List of Practical's (Minimum ten experiments to be performed)	:	1. To study heavy metal analysis of food samples by ICPOES 2. To analyse the food samples using colorimetric techniques 3. To prepare samples in wet chemistry laboratory 4. To study sensory analysis of food samples by using different methods 5. To study GC-MS operations 6. To study HPLC operations 7. To study UV spectrophotometer operations 8. To study textural parameters of food samples 9. To determine proximate composition of food 10. To determine calorific value of sample
Reference Books:	:	1. Handbook of Food Analysis Instruments by Semih Ötles, CRC Press, Boca Raton, FL, USA. 2009 2. Food Analysis by S. Suzanne Nielsen, 3rd Ed. Kluwer Academic, New York, USA. 2003 3. Official methods of analysis of AOAC International by AOAC, 17th Ed. Gaithersburg, MD, USA, Association of Analytical Communities, 2003 4. Instrumental Methods of Food Analysis by Macleod AJ, Elek Sci. Marcel Dekker. 1973 5. Handbook of Analysis and Quality Control for Fruit and Vegetable Products by Ranganna S. 2nd Ed. Tata-McGraw-Hill. 2001

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

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

The assessment of practical examination shall be on the following criteria:

The practical examination shall consist of performing an experiment based on the practical work done during the course, the record of the experiments submitted by the candidate and viva -voce based on the syllabus

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
(Faculty of Science & Technology)
Syllabus of T. Y. B. Tech. Semester-VI

Code No.: AED-375
Teaching Scheme: 02Hrs/week
Credits:01

Title: Project-I

External Examination: 50 Marks

Objectives	:	The Projects in the undergraduate study of engineering aims at developing in the student, knowledge and skills to match the current and projected needs of industry, society or user systems and to create social awareness and professional attitudes. Apart from monitoring the engineering processes and maintenance of engineering work, machines and equipments, an engineer has to do investigate survey, collect data, refer handbooks/datasheets, prepare estimates and design the systems.
Guidelines		• The completion of project is to be carried out in two semesters i.e. in T.Y. Sem. VI and final year B. Tech Sem. VII. • The students shall form project group of maximum 3 students for within department projects and maximum of 6 students in case of interdepartmental projects of their choice. • The students groups shall collect the information on the topic/area of interest and submit brief synopsis to Project Coordinator. • The Project Coordinator shall allot the Project Guide depending upon the area or specialization of eligible faculty members from the department. • The individual student from the project group shall maintain the project diary and update weekly by taking remark of respective guide. • The industry sponsored projects and inter departmental projects shall be encouraged and in case of inter departmental projects, students of maximum 3 different departments/disciplines shall work together by forming the group. The guide allotment and internal/external assessment of such groups shall be done by the respective departments. • The projects addressing issues related to environmental, rural development and societal issues shall be preferred. • The selected project shall help to promote participation in government approved schemes like Unnat Maharashtra Abhiyaan (UMA) and Unnat Bharat Abhiyaan (UBA). • The students shall aim to promote their project work in project exhibitions/competitions, paper presentation/publication in reputed journals and conferences. • The relevance of project and implementation including details of attainment of POs and PSOs addressed through the projects with justification must be clearly stated. Phases of Project Part- I: Phase I: Problem Identification, Literature survey, data collection, deciding scope of topic and objectives of the project. Phase II: Confirmation of block diagram or layout of the proposed project. Phase III: Submission of small report of project work.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

(Faculty of Science and Technology)

Syllabus of T.Y.B. Tech. (Electronics and Telecommunication Engineering) Semester-VI

Code No.: BSH801

Title: Audit I: Japanese Language module

Teaching Scheme: 02 Hours per week

Examination Scheme

Theory: 02 Hours per week

Total Marks: 50 (Continuous Assessment)

Objectives	• Students will be able to apply communicative Japanese Grammar in communication. • Students will be able to enhance the level of Japanese vocabulary. • Students will be able to pronounce and articulate words as well as sentences accurately. • Students will be able to understand and apply Japanese language eventually. • Students will be able to develop Japanese language skills. • Students will be able to manage situational communication in Japanese.
Unit-I	: Introduction - Introduction - Numbers - Days, Months, Dates [5 Hours]
Unit-II	: Grammar - Verb and verb forms - Present and Past Tense [5 Hours]
Unit-III	: Communication - Introduction of Japanese script - Dialogues (Shopping, in the restaurant) - Themes: Family, my city, my country, my friend [10 Hours]

List of Reference	Sr. No.	Title	Author	Publication
Books	1	Japanese Kanji for Beginners	Timothy G. Stout and Kaori Hakone	Tuttle Publishing
	2	Essential Japanese Grammar: A Comprehensive Guide to Contemporary Usage	Masahiro Tanimori and Eriko Sato Ph.D.	Tuttle Publishing
	3	15-Minute Japanese: Learn in Just 12 Weeks	D.K. Goel and Rajesh Goel	Amazon.in
	4	Oxford Japanese Grammar and Verbs (Dictionary)	Bunt Jonathan	Oxford Publication
	5	Read and write Japanese scripts: Teach yourself	Helen Gilhooly	Teach Yourself
	6	Complete Japanese Beginner to Intermediate Book and Audio Course: Learn to read, write, speak and understand a new language with Teach Yourself	Helen Gilhooly	Teach Yourself

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Science and Technology) Syllabus of T. Y. B. Tech. Semester-VI Code No.: CSE 801 Teaching Scheme: 02 Hrs/ week Theory: 02 Hrs/week Title: Audit-I Cyber crime and law Examination Scheme Total Marks: 50 (Continuous Assessment)	
Objectives	• To introduce the cyber world and cyber law in general. • To enhance the understanding of problems arising out of online transactions and provide them to find solutions. • To examine the effects of cyber crime through the experiences of victims and law enforcement. • To Know the technologies that stand behind certain cyber crimes. • To identify and analyze statutory, regulatory, constitutional, and organizational laws that affect the information technology professional. • To distinguish between Copyright Law, Patent Law and Trademarks.
Unit-I	: Introduction Overview of Computer and Web Technology, Need for Cyber Law, Cyber Jurisprudence at International and Indian Level
Unit-II	: Jurisdictional Aspects in Cyber Law Issues of jurisdiction in cyberspace, Types of jurisdiction, The Test evolved, Minimum Contacts Theory, Sliding Scale Theory, Jurisdiction under IT Act, 2000. [4 Hours]
Unit-III	: Cyber Crimes & Legal Framework Cyber Crimes against Individuals, Institution and State, Hacking, Digital Forgery, Cyber Stalking/Harassment, Identity Theft & Fraud, Cyber Terrorism, Right to Privacy and Data Protection on Internet, Different offences under IT Act, 2000 [4 Hours]
Unit-IV	: Digital signature and Electronic Signature and Data Protection Concept of public key and private key, Certification authorities and their role, Creation and authentication of digital signature, Concept of electronic signature certificates, Electronic Governance [4 Hours]
Unit-V	: E Contracting & E Commerce Salient features of E-contract, Formation of E-contract and types, E-mail Contracting, Indian Approach on E-contracts, E-commerce-Salient Features and advantages, Models of E-commerce like B2B, B2C, Indian Laws on E-commerce [4 Hours]
Unit-VI	: Intellectual Property Issues in Cyber Space Copyright Law, Patent Law, Trademarks & Domain Names Related issues, Dispute Resolution in Cyberspace [4 Hours]
Reference Books:	: 1. Karnika Seth, Computers, Internet and New Technology Laws, Lexis Nexis Butterworths Wadhwa Nagpur. 2. Chris Reed & John Angel, Computer Law, OUP, New York, (2007). 3. Cyber Crime An Introduction by Prasad R.S. 4. Cyber Laws by Ed. Kumar Krishna

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Science and Technology) Syllabus of T. Y. B. Tech. Semester-VI Code No.: CED 801 Teaching Scheme: 02 Hrs/week Theory: 02 Hrs/week Course Title: Audit-I Road Safety Management Audit Examination Scheme Total Marks: 50 (Continuous Assessment)		
Course Objectives	:	To acquire knowledge and understanding of the road environment. To inculcate decision making and behavioural skills necessary to survive in the road environment. To impart knowledge and understanding of the causes and consequences of accidents. To understand roles and responsibilities in ensuring road safety.
Unit-I	:	Introduction to Road Safety & Planning. Road traffic accidents scenario in India and in world. Road Safety and its importance. Traffic Rules and Driving Behaviour. Characteristics of accidents, accidents vs. crash. Need of Road Safety. Awareness about rules and regulations of traffic. Assisting Traffic control authorities. Multidisciplinary approach to planning for traffic safety and injury control. Vulnerable road users: crashes related to pedestrian and bicyclists, their safety, provision for disabled. [4 Hours]
Unit-II	:	Traffic Signs, signals & traffic furniture & Role of traffic signals. Warning, cautioning & Informing sign. Location of Road sign, Traffic signals. Road Marking: Colour of road marking, kerb marking, night driving aid, traffic light signals. Types of Signals. Road safety tips for different categories of Road users. Causes of accidents, prevention & 1st aid to accident victim. Rules on road. Necessity of traffic lights. Major violations leading to accidents. [4 Hours]
Unit-III	:	Responsibility of Road accidents and Safety measures. People responsible for accident prevention: Police, Politicians, Community members, Policy makers, Teachers, Parents, Infrastructure authorities, Drivers and Official road safety body. Reasons of students/ children have accidents. 4 E's of Accidents Prevention: 1. Engineering - by altering the environment 2. Enforcement - by imposing laws 3. Encouragement - by the use of publicity campaigns 4. Education - by gaining and using knowledge. [4 Hours]
Unit-IV	:	Road Safety Education & Events. Introduction to Road Safety Education. 5 P's of Road safety education: 1. Pre-school road safety education 2. Practical rather than theory education 3. Principles of own development about road safety education 4. Presentations on road safety education 5. Place for road safety education in syllabus. Discussions on efforts done by Government on Road Safety. Workshop on Road Safety week/ Organization of seminar on Road Safety. [4 Hours]
Unit-V	:	Traffic Flow Analysis. Macroscopic, Microscopic & Mesoscopic approach Types of Flow, Traffic stream characteristics ,Space, Time diagram, Relationship between speed, flow & density, Level of service & capacity analysis, Shockwave theory. [4 Hours]
Unit-VI	:	Road Safety Audit. Global & Local perspective, Road safety issues, Road safety programmes, types of RSA, planning, design, construction & operation stage audits ,Methodology , Road safety audit measures. [4 Hours]
Text Books	:	1. Traffic Flow Theory & Control- D. R. Drew- McGraw Hill, New York, 1968. 2. Traffic Engineering and Transport Planning- L.R. Kadiyali- Khanna Publishers, New Delhi, 2002. 3. Transportation Engineering-An Introduction- C. J. Khisty- Prentice-Hall, NJ, 2005 4. Traffic Flow Fundamentals- A. D. May- Prentice – Hall, Inc., New Jersey, 1990. 5 Highways- Traffic Planning & Engineering- C. A. O'Flaherty- Edward Arnold, UK 6. Traffic Engineering – Theory & Practice- L. J. Pignataro- John Wiley, 1985. 7. Highway Traffic Analysis and Design, R. J. Salter, N. D. Hounsel- Macmillan, London, 1996. 8. Traffic Engineering & Transport Planning- L. R. Kadiyali- Khanna Publishers, 2003.

Section A: Includes Unit I, II and III;

Section B: Includes Unit IV, V and VI.

Pattern of Question Paper:-

The six/four units in syllabus shall be divide in two equal parts i.e.3 units respectively. Question paper shall be set having two sections A & B. Section-A question shall be on first part & section question on second part. Question paper should cover entire syllabus.

For 40 marks paper:-

1. Minimum eight questions.
2. Four question in each section.
3. Question no.1 from section A & Question no. 5 from section-B made compulsory & should cover complete syllabus of the respective section& should be set for six marks each. The question no.1 & 5 should be of objective nature.
4. Two question of 07 marks each from remaining question, from each section A & B asked to solve.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Science and Technology) Syllabus of T. Y. B. Tech. Semester-VI Code No.: BSH 802 Teaching Scheme: 02 Hrs/week Theory: 02 Hrs/week Course Title: Audit-I Value Education Examination Scheme Total Marks: 50 (Continuous Assessment)	
Course Objectives	: The students will be able to: • Understand the need of values and its classification in contemporary society. • Appreciate the values needed for peaceful society like democratic, secular, and socialist etc. • Become aware of role of education in building value as dynamic social reality. • Know the importance of value education towards personal, national and global development.
Unit-I	: Introduction to Value Education: Value Education, Purpose of Value Education as specifying the present deterioration in the value system in the fast changing world trends. [4 Hours]
Unit-II	: Importance of Values in Life: What is a Value system? What kinds of values need to be inculcated? Eg.. Ethical, moral and spiritual instead of materialistic values, value inculcation, trend of values such as a permissive culture. [4 Hours]
Unit-III	: Character Building: Advantages of good character, importance of trust, honesty, integrity, morality, and reliability as qualities of a good character. Building Relationship-Group Behaviour, limitations of a relationship. How to be a better person, better manager and better Engineer? [4 Hours]
Unit-IV	: The Purpose of Life & Education: Meaning, purpose of one's life, Destination success - why are you here? How to make everyday worth living? [4 Hours]
Unit-V	: Values For Personal Life & Professional Life: Self sovereignty-Discernment-Decision making-Self-actualization, Caring-Patience-Honesty-Forgiveness, Competence-Co-operation-Perseverance, Flexibility-Reliability-Tolerance-Unity- Knowledge Thirst, Sincerity in Profession, Regularity, Punctuality, Faith [4 Hours]
Unit-VI	: Value Education towards National and Global Development: • Constitutional Values: Sovereign, Democracy, Socialism, Secularism, Equality, Justice, Liberty, Freedom, Fraternity • Social Values: Pity and Probity, Self-Control, Universal Brotherhood. • Religious and Moral Values: Tolerance, Wisdom, character. • Aesthetic Values: Love and Appreciation of literature, fine arts and respect for the same. • Environmental Ethical Values • National Integration and international understanding. • Need of Humanistic value for espouse peace in the society • Conflict of cross-cultural influences, cross-border education [4 Hours]
Reference:	: 1. Sharma, S.P. Moral and Value Education; Principles and Practices, Kanishka publishers, 2013. 2. Kiruba Charles & V. Arul Selvi. Value Education: Neelkamal Publications, New Delhi, 2012. 3. Passi, B.K. and Singh, P. Value Education. National Psychological Corporation, Agra. 2004. 4. Chitakra, M.G.: Education and Human Values, A.P.H. Publishing Corporation, New Delhi. 2003. 5. Monica J. Taylor. Values in Education and Education in Value. Routledge. 1996. 6. Neil Postman. The End of Education: Redefining the Value of School. Vintage publisher. 1996. 7. http://cbseportal.com/exam/e-books/download-free-ncert-e-book-education-for-values-in-school-a-framework\ 8. http://cbseacademic.in/web_material/ValueEdu/Value%20Education%20Kits.pdf

Dr.Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Science & Technology) Syllabus of T. Y. B. Tech. Semester-VI Code No.: ETC 801 Teaching Scheme:02 Hours per week Theory: 02 Hours per week Title: Audit Course-I Smart Cities Examination Scheme Total Marks: 50 (Continuous Assessment)		
Objectives	:	- To identify urban problems. - To study Effective and feasible ways to coordinate urban technologies. - To study models and methods for effective implementation of Smart Cities. - To study new technologies for Communication and Dissemination. - To study new forms of Urban Governance and Organization.
Unit-I		Understanding Inclusive Planning Definition and components; urban consultations; basic principles of urban consultation, process of urban consultations; urban strategic planning, good urban governance, subsidiarity, equity, efficiency, transparency and accountability, civic engagement and citizenship, security; valuing difference and working with diversity; livable cities [4 Hours]
Unit-II		Participatory Planning Process and Policies, Programmes and Legislation Methods, role of stakeholders (including civil society organizations), etc.; Related Acts, Five year plans, policies and programmes at various levels [4 Hours]
Unit-III		Smart Cities Innovation economy (Innovation in industries, clusters, districts of a city; Knowledge workforce: Education and employment; Creation of knowledge-intensive companies) [4 Hours]
Unit-IV		Smart Cities Urban Infrastructure (Transport, Energy/ Utilities, protection of the environment and safety); Governance(Administration services to citizens, participatory and direct democracy, services to the citizen, quality of life) [4 Hours]
Unit-V		Planning interventions –I Inclusive zoning, development and building regulations, Slum Improvement; drafting strategic urban development plans – objectives and key actors; planning framework for actions, process of drafting the plan, key considerations. [4 Hours]
Unit-VI		Planning interventions –II Urban design and decision-making; city transport for all; water supply and sanitation, urban disaster management, management through decentralization [4 Hours]
Reference Books:	:	- Jo Beall (1997); "A city for all: valuing differences and working with diversity"; Zed books limited, London (ISBN: 1-85649-477-2) - UN-Habitat; "Inclusive and sustainable urban planning: a guide for municipalities"; Volume 3: Urban Development Planning (2007); United Nations Human Settlements Programme (ISBN: 978-92-1-132024-4) - Arup Mitra; "Insights into inclusive growth, employment and wellbeing in India"; Springer (2013), New Delhi (ISBN: 978-81-322-0655-2) - William J. V. Neill (2004); "Urban Planning and cultural identity"; Routledge, London (ISBN: 0-415-19747-3) - John S. Pipkin, Mark E. La Gory, Judith R. Balu (Editors); "Remaking the city: Social science perspective on urban design"; State University of New York Press, Albany (ISBN: 0-87395-678-8) - Giffinger, Rudolf; Christian Fertner; Hans Kramar; Robert Kalasek; Nataša Pichler-Milanovic; Evert Meijers (2007). "Smart cities – Ranking of European medium-sized cities". Smart Cities. Vienna: Centre of Regional Science "Draft Concept Note on Smart City Scheme". Government of India - Ministry of Urban Development (http://indiansmartcities.in/downloads/CONCEPT_NOTE_-3.12.2014_REVISD_AND_LATEST_.pdf)

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Science & Technology) Syllabus of T. Y. B. Tech. Semester-VI		
Code No.: MED801 Teaching Scheme:02 Hrs/week Theory: 02 Hrs/week		Title: Audit Course-I Rural Community Engagement Examination Scheme Total Marks: 50 (Continuous Assessment)
Objectives	:	- To provide practical opportunities for students for participation in rural community mobilization, service engagement and empowerment activities. - To promote preparation of strategies for building resilience and community responding system in nutrition, water, food safety and healthcare.
Unit-I	:	Dynamics Of Rural Society, Panchayat Raj System: Social, Economic, Political and Cultural Community Goal Setting : SAGY, MPLADS, UMA and UBA [4 Hours]
Unit-II		Approaches and Methods, Community Project Proposal and Project Management, Concept and Steps, Thematic Maps, Social Map Transect Walk, Seasonal Map, Natural and Human Resource Mapping and Management, Ethnographic Research [4 Hours]
Unit-III		Vulnerability, Rural Resilience - Risk Reduction, Role and Responsibilities Rehabilitation: Social, Physical and Psychological Aspect Increasing Efficiency in Water, Energy, Sanitation and Waste (Solid and Liquid) Management [4 Hours]
Unit-IV		Engagement With School for Competency Enhancement/Health Centre/Panchayat/Gram Sabha/SHGs Awareness: Rural Health Management, Indigenous or Folk Medicine and Hygiene/ Sports/ Rights/ Policies and Programs/ Transparency/Corruption/Social Benefits, addressing Issue In inclusive and Inclusive Identification of Beneficiaries, Improving Implementation Efficiencies While Plugging Leakages In Benefits Scheme, Direct Benefit Transfer [4 Hours]
Unit-V		Making of Gram Panchayat Development Plan Including Aspects and Process of Preparation of Village Disaster Management Plan [4 Hours]
Unit-VI		Village Livelihoods, Rural Tourism, Entrepreneurship, Appropriate Technology Access Including Digitized Transaction. [4 Hours]
Reference Books:	:	- Katar Singh "Rural development- Principles, Policies and Management" SAGE Publication 1999. - Agoramoorthy Govindaswamy "Sadguru Model of Rural Development: Elevates Food Security and Ease Poverty" Daya Publishing House, a division of Astral International Pvt. Limited, 2016 V. Gopalkrishnan Asari "Technological Change for Rural Development in India". B.R. Publisher - B.S. Gautam "Cooperatives And Rural Development In India" Radha Publications

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

(Faculty of Science and Technology)

Syllabus of T.Y.B. Tech. (Electronics and Telecommunication Engineering) Semester-VI

Code No.: BSH803

Title: Audit I: German Language Module

Teaching Scheme: 02 Hours per week

Examination Scheme

Theory: 02 Hours per week

Total Marks: 50 (Continuous Assessment)

Objectives	• Students will be able to apply communicative German Grammar in communication. • Students will be able to enhance the level of German vocabulary. • Students will be able to pronounce and articulate words as well as sentences accurately. • Students will be able to understand and apply German language eventually. • Students will be able to develop German language skills. • Students will be able to manage situational communication in German. .			
Unit-I	:	Introduction - Self –Introduction - Nos. up to 10,000 - Weekdays, Months - Date and Time - Greetings [5 Hours]		
Unit-II	:	Vocabulary - My house - My family - Daily routine - Hobbies - Food [5 Hours]		
Unit-III	:	Grammar - Verb forms (Present Tense) - Articles - Possessive pronouns - Auxiliary verbs - Wh-Questions / Yes-No Questions - Past-Tense of haben and sein [10 Hours]		
List of	Sr. No.	Title	Author	Publication

Reference Books	1	German Made Simple: Learn to speak and understand German quickly and easily	Arnold Leitner PhD	Namrata's Amazon.in
	2	The Everything Learning German Book: Speak, write, and understand basic German in no time	Edward Swick	Adams Media
	3	Langenscheidt German in 30 Days	Von Angelika G. Beck	Langenscheidt
	4	Complete German Beginner to Intermediate Book and Audio Course: Learn to read, write, speak and understand a new language with Teach Yourself	<u>Heiner Schenke</u>	The McGraw Hill
	5	German: How to Speak and Write It (Beginners' Guides)	Joseph Rosenberg	Repro Books
	6	Collins Easy Learning – Collins Easy Learning German Grammar and Practice	Collins	Collins