

S-25 March, 2013 AC after Circulars from Circular No.153 & onwards - 60 -

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY
CIRCULAR NO. ACAD / NP / T.Y. B.Tech. / Syllabi / 184 / 2013

It is hereby informed to all concerned that, the syllabus prepared by the Boards of Studies, Committee and recommended by the Faculty of Engineering and Technology, the Hon'ble Vice-Chancellor has accepted the following **REVISED SYLLABI in all Braches of T.Y. B.TECH.** on behalf of the **Academic Council Under Section-14(7) of the Maharashtra Universities Act, 1994** as appended herewith :-

Sr. No.	Revised Syllabi
[1]	Third Year B.Tech. [CIVIL],
[2]	Third Year B.Tech. [MECHANICAL],
[3]	Third Year B.Tech. [ELECTRONICS & TELECOMMUNICATION ENGINEERING],
[4]	Third Year B.Tech. [COMPUTER SCIENCE & ENGINEERING],
[5]	Third Year B.Tech. [AGRICULTURAL ENGINEERING],
[6]	Third Year B.Tech. [PLASTICS AND POLYMER ENGINEERING],
[7]	Third Year B.Tech. [INSTRUMENTATION & CONTROL ENGINEERING],
[8]	Third Year B.Tech. [PRODUCTION],

This is effective from the Academic Year 2013-2014 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. ACAD/ NP/ T.Y.B.TECH./
 2013/14059-67

Date:- 15-06-2013.

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(Signature)
 Director, 15-06-2013

**Board of College and
 University Development.**

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 the above all syllabi on University Website [www.bamu.net].**

Copy to :-

- 1] The Controller of Examinations,
- 2] The Superintendent, [Engineering Unit],
- 3] The Programmer [Computer Unit-1] Examinations,
- 4] The Programmer [Computer Unit-2] Examinations,
- 5] The Superintendent, [Eligibility Unit],
- 6] The Director, [E-Suvidha Kendra], in-front of Registrar's Quarter,
 Dr. Babasaheb Ambedkar Marathwada University,
- 7] The Record Keeper,
 Dr. Babasaheb Ambedkar Marathwada University.

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**DR. BABASAHEB AMBEDKAR
MARATHWADA UNIVERSITY,
AURANGABAD.**



Revised Syllabus of

THIRD YEAR

B.TECH.

AGRICULTURAL ENGINEERING

[Effective from the Academic Year 2013-14 & onwards]

PROPOSED
SCHEME AND DETAILED SYLLABUS
of
T. Y. B. Tech. Agricultural Engineering

FOUR YEAR DEGREE COURSE IN ENGINEERING & TECHNOLOGY



DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

G. S. Mandal's
Maharashtra Institute of Technology, Aurangabad
Proposed Revised Syllabus Structure 2013-14
Third Year B. Tech. (Agricultural Engineering)

Sub No.	SEMESTER-V	Contact Hrs / Week				Examination Scheme						
	Subject	L	T	P	Total	CT	TH	TA	P	Total	Credits	Duration of Theory Exam
AED301	Watershed Hydrology & Management	3	1	-	4	20	80	-	-	100	4	3 Hrs
AED302	Irrigation Engineering	3	1	-	4	20	80	-	-	100	4	3 Hrs
AED303	Engineering Properties of Biological Materials	3	1	-	4	20	80	-	-	100	4	3 Hrs
AED304	Kinematics of Machine	4	-	-	4	20	80	-	-	100	4	3 Hrs
AED305	Crop Process Engineering	4	-	-	4	20	80	-	-	100	4	3 Hrs
AED306	Agricultural Structures	2	-	-	2	10	40	-	-	50	2	2 Hrs
AED321	Lab-I (Watershed Hydrology & Management)	-	-	2	2	-	-	25	25	50	1	
AED322	Lab-II (Irrigation Engineering)	-	-	2	2	-	-	25	25	50	1	
AED323	Lab-III (Engineering Properties of Biological Materials)	-	-	2	2	-	-	25	25	50	1	
AED324	Lab-IV (Kinematics of Machine)	-	-	2	2	-	-	50	-	50	1	
AED325	Lab-V (Seminar)	-	-	2	2	-	-	50	-	50	1	
	Total of Semester-V	19	3	10	32	110	440	175	75	800	27	

Sub No.	SEMESTER-VI	Contact Hrs / Week				Examination Scheme						
	Subject	L	T	P	Total	CT	TH	TA	P	Total	Credits	Duration of Theory Exam
AED351	Soil & Water Conservation Engineering	3	1	-	4	20	80	-	-	100	4	3 Hrs
AED352	Drying & Storage Engineering	3	1	-	4	20	80	-	-	100	4	3 Hrs
AED353	Food Engineering	4	-	-	4	20	80	-	-	100	4	3 Hrs
AED354	Machine Design	4	-	-	4	20	80	-	-	100	4	3 Hrs
AED391 AED392 AED393	Elective-I Command Area Development Remote Sensing & GIS Application Green House Technology	3	1	-	4	20	80	-	-	100	4	3 Hrs
AED355	Drainage Engineering	2	-	-	2	10	40	-	-	50	2	2 Hrs
AED371	Lab-VI (Soil & Water Conservation Engineering)	-	-	2	2	-	-	25	25	50	1	
AED372	Lab-VII (Drying & Storage Engineering)	-	-	2	2	-	-	25	25	50	1	
AED373	Lab-VIII (Food Engineering)	-	-	2	2	-	-	25	25	50	1	
AED374	Lab-IX (Field Operation & Maintenance of Tractor & Farm Machinery)	-	-	2	2	-	-	50	-	50	1	
AED375	Lab-X (Project-I)	-	-	2	2	-	-	50	-	50	1	
	Total of Semester-VI	19	3	10	32	110	440	175	75	800	27	
	Grand Total of V & VI	38	6	20	64	220	880	350	150	1600	54	

L: Lecture hours per week T: Tutorial hours per week P: Practical hours per week CT: Class Test
TH: University Theory Examination TA: Teachers Assessment P: Practical/Oral Examination

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Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Engineering & Technology) Syllabus of T. Y. B. Tech. Semester-V	
Code No.: AED 301 Teaching Scheme: 04Hrs/week Theory: 03Hrs/week Tutorial: 01Hr/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. <ol style="list-style-type: none"> 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) (06 Hrs.)
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) (12 Hrs.)
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) (12 Hrs.)
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) (08 Hrs.)
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) (12 Hrs.)
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) (10 Hrs.)
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 Engineering & Technology) Syllabus of T. Y.B. Tech. Semester-V	
Code No.: AED 302 Teaching Scheme: 04Hrs/week Theory: 03Hrs/week Tutorial: 01Hr/week Credits: 04	Title: Irrigation 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 <ol style="list-style-type: none"> 1. To introduce the students about various irrigation practices & irrigation management 2. To analyze and design various irrigation systems 3. To inculcate the knowledge about irrigation structures with design 4. To study soil-water-plant relationship and irrigation scheduling
Unit-I :	Irrigation Terminologies, India's water impact of irrigation on Human Environment, some major and medium irrigation schemes of India, Water resources utilization, purpose of irrigation, sources of irrigation water, present status of development and utilization of different water resources of the country, Economics of water resources utilization (Descriptive) (08 Hrs.)
Unit-II :	Measurement of irrigation water-Units, Methods of water measurements, weir, notches, flumes and orifices and other methods (Descriptive & Analytical) (10 Hrs)
Unit-III :	Water conveyance and Control- Design of irrigation field channels, underground pipe conveyance system, irrigation structures, channel lining (Descriptive & Analytical) (12 Hrs.)
Unit-IV :	Land Levelling- criteria, layout, grading, different design methods and estimation of earth work and cost, Problems, Equipments for land grading & layout (Descriptive & Analytical) (10 Hrs.)
Unit-V :	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) (12 Hrs.)
Unit-VI :	Water application Methods- Classification, Surface and Subsurface methods of irrigation with design, adaptabilities, sprinkler and drip irrigation methods, merits, demerits, selection and Design, cost estimation (Descriptive & Analytical) (08 Hrs.)
Reference Books:	<ol style="list-style-type: none"> 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. Sprinkler & Trickle Irrigation by Jack Killer & Ron D. Bilesnger. 5. Drip Irrigation, Third Edition, WALMI Aurangabad. 6. Drainage Engineering by J. N. Luthin, Willey Eastern Publication, New Delhi.

Section A: Includes Unit I, II and III; **Section B:** Includes Unit IV, V & 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 Engineering & Technology) Syllabus of T. Y.B. Tech. Semester-V	
Code No.: AED 303 Teaching Scheme: 04Hrs/week Theory: 03Hrs/week Tutorial: 01Hr/week Credits: 04	Title: Engineering Properties of Biological Materials Class Test: 20 Marks Theory Examination (Duration): 03 Hrs Theory Examination (Marks): 80
Objectives	: The course covers the principles of biological material and their relationship with the design of engineering processes dealing with the biological materials. The specific objectives of course are: <ol style="list-style-type: none"> 1. Identify, define and explain the different physical (rheological, thermal, electrical and moisture related) properties of biological materials. 2. Learn to design and conduct experiments for measuring different properties of biological material as well as to analyze and interpret data. 3. Identify the relevant physical properties and use then to design a system, component or engineering processes to meet desire needs. Learn techniques, skill and modern engineering tools necessary for the engineering practices
Unit-I	: Importance of engineering properties of biological materials, Study of different physical and thermal characteristics of important biological materials like shape, size, volume, density, roundness, sphericity, surface area, specific heat, thermal conductivity, thermal diffusivity, etc. (Descriptive & Analytical) (12 Hrs)
Unit-II	: Measurement of colour, flavour, turbidity, consistency, viscosity, texture and their relationship with food quality and composition. (Descriptive & Analytical) (08 Hrs)
Unit-III	: Rheological characteristics like stress, strain time effects, rheological models and their equations. Aerodynamic characteristics and frictional properties. (Descriptive & Analytical) (10 Hrs)
Unit-IV	: Thermodynamic properties of food in dehydration-Introduction, Thermodynamic of food-water system, dehydration principals and processes. (Descriptive & Analytical) (10 Hrs)
Unit-V	: Electrical conductivity of foods-introduction, theory of electrolytic conductivity, effect of temperature, effect of electric field strength, effect of ingredients, methods of measurement of electrical conductivity. (Descriptive & Analytical) (10 Hrs)
Unit-VI	: Concept, objectives and need of quality, methods of quality control, sampling; purpose, sampling techniques, requirements and sampling procedures for liquid, powdered and granular materials, sensory and panel selection methods. Food Laws and Regulations in India (FSSAI-2006), HACCP (Hazard analysis and critical control point) and ISO 9000 Series.(Descriptive & Analytical) (10Hrs)
Reference Books:	: <ol style="list-style-type: none"> 1. Unit Operations of Agricultural Processing by Sahay and Singh-, Vikas Publishing House Pvt. Ltd. New Delhi 2. M. A. Rao, Syed S. H. Rizvi and Ashim K. Datta, Engineering Properties of Foods, Third Edition, Taylor and Francis Group. 3. Post harvest technology of Cereals, Pulses and Oilseeds by Chakravarti A. OxfordPublishing.

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 Engineering & Technology) Syllabus of T. Y.B. Tech. Semester-V	
Code No.: AED 304 Teaching Scheme: 04Hrs/week Theory: 04 Hrs/week Tutorial: 00 Hr/week Credits:04	Title: Kinematics 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. 5. Develop ability to come up with innovative ideas in design of various farm machineries
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) (12 Hrs)
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) (10 Hrs)
Unit-III	: Flywheel:-Turning moment diagrams, co-efficient of fluctuation of speed and energy, mass of flywheel, flywheel applications. (Descriptive & Analytical) (8 Hrs)
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) (10 Hrs)
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) (10 Hrs)
Unit-VI	: Balancing: - Balancing of rotating masses in one and different planes. Partial primary balancing of reciprocating Masses. (Descriptive & Analytical) (10 Hrs)
Reference Books:	: <ol style="list-style-type: none"> 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 & 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 Engineering & Technology) Syllabus of T. Y.B. Tech. Semester-V	
Code No.: AED305 Teaching Scheme: 04Hrs/week Theory: 04 Hrs/week Tutorial: 00 Hr/week Credits: 04	Title: Crop Process Engineering Class Test: 20 Marks Theory Examination (Duration): 03 Hrs Theory Examination (Marks): 80
Objectives	1. To study the concepts and practice of crop processing 2. Preliminary design skills for crop processing equipment or components 3. To prepare students professionally in an industry context
Unit-I	Scope, importance, principles and methods of food processing. Processing of farm crops: cereals, pulses, oil seeds, fiber crops, fruits and vegetables and their products for food and feed. (Descriptive & Analytical) (10Hrs)
Unit-II	Principal of size reduction, grain shape, size reduction machines; crushers, grinders, cutting machines etc. - operation, efficiency and power requirement – Rittinger's, Kick's and Bond's equation, fineness modulus. Pressure drop during filtration.(Descriptive & Analytical) (10Hrs)
Unit-III	Theory of mixing, types of mixtures for dry and paste materials, rate of mixing and power requirement, mixing index. (Descriptive & Analytical) (10Hrs)
Unit-IV	Theory of separation, size and un-sized separation, types of separators, size of screens, sieve analysis, capacity and effectiveness of screens, pneumatic separation. (Descriptive & Analytical) (10Hrs)
Unit-V	Theory of filtration, study of different types of filters, rate of filtration, Scope & importance of material handling devices. (Descriptive & Analytical) (10Hrs)
Unit-VI	Study of different types of material handling systems; belt, chain and screw conveyor, bucket elevator, pneumatic conveying, Design consideration, capacity and power requirement. (Descriptive & Analytical) (10Hrs)
Reference Books:	1. Unit Operations of Agricultural Processing by Sahay and Singh, Vikas Publishing House Pvt. Ltd. New Delhi 2. Food Processing Technology- Principles and Practices, Second Edition, PJ Fellows, CRC Wood Head Publishing Limited, Cambridge England 3. Post harvest technology of Cereals, Pulses and Oilseeds by Chakravarti A. Oxford Publishing.

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 Engineering & Technology) Syllabus of T. Y.B. Tech. Semester-V	
Code No.: AED306 Teaching Scheme: Theory : 2 hrs/week Tutorial : 0 hr/week Credits : 2	Title: Agricultural Structures Class Test : 10 Marks Theory Examination (Duration) : 2 Hrs. Theory Examination (Marks): 40 Marks.
Objectives	: In continuation with application of knowledge of other engineering fields, an 'Agroneer' should aware with the design of various agricultural structures. Keeping this in view, current subject is designed for 1. Familiarization with agricultural structure requirement in field 2. Design of various farmsteads like farm house, septic tanks, dairy barns, poultry houses and various storage structures.
Unit-I	: Planning and layout of farmstead-Introduction, location arrangement, size, Farm residence planning, Sanitation, Septic tank location and design for small family, Design, construction and cost estimation of agricultural structures (Descriptive & Analytical) (10 Hrs)
Unit-II	: Sources of water supply- norms of water supply for human being and animals, drinking water standards and water treatment suitable to rural community (Descriptive & Analytical) (05 Hrs)
Unit-III	: Animal shelters- Dairy barn, types, barn equipments, Poultry house, requirements, types, poultry equipments, Sheep housing, Construction details, building material and their properties (Descriptive & Analytical) (07 Hrs)
Unit-IV	: Storage structures- silo, types, design, Feed storage , storage structures for semi perishables, Farm machinery storage and space requirement, Farm workshop properties (Descriptive & Analytical) (08 Hrs)
Reference Books:	: 1. Principles of Agricultural Engineering, Vol.-I, by T. P. Ojha & A. M. Michael, Jain Brothers Publication, New Delhi 2. Farm Structures in India by A. A. Vasavada, Indian Council of Agricultural Research Publication. 3. Farm Structures, Vol. 7, Published by National Lumber Manufacturers Association-Trade Extension Department, University of Wisconsin, Madison. 4. Farm Structures by Karl John Theodore Ekblaw, The Macmillan Company Publication

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

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.
4. 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 Engineering & Technology) Syllabus of T. Y.B. Tech. Semester-V	
Code No: AED321	
Title: Lab-I (Watershed Hydrology & Management)	
Teaching Scheme: 2 Hrs	
Practical (external) + TA (Internal)	
Teachers Assessment : 25 Marks External Examination: 25 Marks Credits: 1	
Course Objectives	: 1. To study the measurements techniques of Hydro-meteorological parameters. 2. To study the fundamental requirement of hydrological projects 3. The subject also intends to make the student familiar about watershed parameters, development and management
List of Practicals (Minimum ten experiments to be performed)	: 1. Study of different types of rain gauges. 2. Determination of Average depth of Rainfall 3. Analysis of rainfall data 4. Study of various types of evaporimeters and estimation of evaporation 5. Study of various catchment characteristics 6. Estimation of Peak runoff rate by Rational method 7. Estimation of peak runoff rate by CN method 8. Development of DRH from runoff data 9. Development of UH from DRH 10. Study of Stage level recorder and Current meter 11. Study of sunshine recorder 12. Graphical analysis of flood routing 13. Visit to meteorological observatory
List of 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 4. 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.

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

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Engineering & Technology) Syllabus of T. Y.B. Tech. Semester-V		
Code No: AED322		
Title: Lab-II (Irrigation Engineering)		
Teaching Scheme: 2 Hrs		Teachers Assessment : 25 Marks
Practical (external) + TA (Internal)		External Examination: 25 Marks Credits: 1
Course Objectives	:	To inculcate the practical knowledge of student regarding measurement, scheduling, methods and efficiencies of irrigation.
List of Practicals (Minimum ten experiments to be performed)	:	<ol style="list-style-type: none"> 1. Measurement of irrigation water 2. Land grading exercises 3. Design of underground pipe line system 4. Measurement of infiltration rate 5. Measurement of soil moisture by different soil moisture measuring instruments 6. Computation of evaporation and transpiration 7. Estimation of irrigation efficiencies 8. Study of border irrigation system 9. Study of furrow irrigation system design 10. Measurement of uniformity coefficient of sprinkler irrigation method 11. Measurement of uniformity coefficient of drip irrigation method 12. Field problems and remedial measures for sprinkler and drip irrigation method 13. Field visit for Irrigation water resources and methods of irrigation
List of Reference Books	:	<ol style="list-style-type: none"> 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. Sprinkler & Trickle Irrigation by Jack Killer & Ron D. Bilesnger. 5. Drip Irrigation, Third Edition, WALMI Aurangabad. 6. Drainage Engineering by J. N. Luthin, Willey Eastern, New Delhi.

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

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

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Engineering & Technology) Syllabus of T. Y.B. Tech. Semester-V	
Code No: AED323	
Title: Lab-III (Engineering Properties of Biological Material)	
Teaching Scheme: 2 Hrs	
Practical (external) + TA (Internal)	
Teachers Assessment : 25 Marks External Examination: 25 Marks Credits: 1	
Course Objectives	<ol style="list-style-type: none"> 1. To understand various rheological properties of fruits and vegetables 2. To study the grain separation techniques 3. To understand the engineering properties for processing purpose practically
List of Practicals (Minimum ten experiments to be performed)	<ol style="list-style-type: none"> 1. To find the shape and size of grains and fruits and vegetables. 2. To study the bulk density and angle of repose of grains. 3. To study the particle density/true density and porosity of solid grains. 4. To find out the co-efficient of external and internal friction of different crops 5. To study the separating behaviour of a grain sample in a vertical wind tunner (Aspirator column). 6. To find the thermal conductivity of different grains. 7. To study specific heat of some food grains. 8. To define cooking quality of rice. 9. To define impurities and invisible stress cracks in grains. 10. Preparation of a ready reckoner of change in unit weight of food grains as affected by change in its moisture content (w.b.) (5% - 25%). 11. Determination of hardness of food material. 12. Visit to food processing plant
List of Reference Books	<ol style="list-style-type: none"> 1. Unit Operations of Agricultural Processing by Sahay and Singh-, Vikas Publishing House Pvt. Ltd. New Delhi 2. M. A. Rao, Syed S. H. Rizvi and Ashim K. Datta, Engineering Properties of Foods, Third Edition, Taylor and Francis Group. 3. Post harvest technology of Cereals, Pulses and Oilseeds by Chakravarti A. Oxford Publishing.

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

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

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Engineering & Technology) Syllabus of T. Y.B. Tech. Semester-V		
Code No.:AED324		
Title: Lab-IV (Kinematics of Machine)		
Teaching Scheme: 2 Hrs Practical/TA(Internal)		Teachers Assessment : 50 Marks Credits: 1
Course 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 Practicals (Minimum ten experiments to be performed)	:	<ol style="list-style-type: none"> 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.
List of Reference Books		<ol style="list-style-type: none"> 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. Rattam

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

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

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Engineering & Technology) Syllabus of T. Y.B. Tech. Semester-V	
Code No: AED325	
Title: Lab-V (Seminar) Teaching Scheme: 2 Hrs Practical/TA (Internal)	Teachers Assessment : 50 Marks Credits: 1
Course Objectives	: <ol style="list-style-type: none"> 1. To create awareness amongst pre final year students for latest technological Aspects. 2. To improve presentation and communication skills. 3. To inculcate qualities of team work and team spirit. 4. To motivate for research work in the respective areas. 5. To have common platform where interaction between various groups of students will take place on the various advanced and emerging topics of technology. 6. To improve skills related to search on the internet. 7. To realize importance of basic technological aspects.

Guidelines for students and faculty

1. Seminar topics may be chosen by the students with advice from the guide/Industry persons, which shall be finalized by guide and approved by concerned head of the department. Students are to be exposed to the following aspects of the seminar presentation.
 - a. Literature Survey / Review
 - b. Organization of the material
 - c. Preparing for presentation
 - d. Technical writing
2. Each student is required to-
 - a. Submit one page synopsis before the seminar talk for display on the notice board and
 - b. Give a 20 minutes presentation through OHP, PC, and Slide projector followed by a 10 minute question answer session.
3. For award of Sessional marks:
 - a. 25 marks - based on the assessment done by internal guide during semester and the involvement of student in the work assigned related to the seminar topic
 - b. Remaining 25 marks based on the examination at final presentation. Student is to be examined on the basis of an oral and written presentation by at least two examiners, one of them shall be guide and other as an external examiner appointed by the principal of the institute.

Seminar Report Format

1. The Seminar Report shall be typed on A-4 size white bond paper.
2. Typing shall be with spacing of 1.5 using one side of the paper.
3. Margins :-(i) Left 37.5 mm.
(ii) Right, top and bottom 25 mm.
4. Binding: - Hard with golden embossing on the front cover of brown colour
5. Front cover of hard bound report: - It should be identical to first title page.
6. Default font size TNR-12
7. Format for title page (First Page) (Centre justified)

Report of Seminar (TNR-14, Bold)

In (TNR-12)

{Title}(TNR-18, Bold)

By (TNR-12)

{Name of student}(TNR-16, Bold)

(Roll No:) (TNR-12)

Submitted in partial fulfillment of the requirement for (TNR-12)

Degree of Bachelor of Technology (Branch Name) (TNR-14, Bold)

of (TNR-12)

Dr. Babasaheb Ambedkar Marathwada University,

Aurangabad. (TNR-14, Bold)

Department of _____ Engineering, (TNR-14, Bold)

Maharashtra Institute of Technology, (TNR-16, Bold)

Aurangabad. (TNR-14, Bold)

200 - 200 (Academic Year) (TNR 14)

Format for Certification page (Second page)

CERTIFICATE (TNR-16, Bold)

This is to certify that the Seminar Report (TNR-12)

Submitted by (TNR-12)

(Name of Student) (TNR-14, Bold)

(Roll No: __) (TNR-12)

Is completed as per the requirement of the Dr. Babasaheb Ambedkar Marathwada University, Aurangabad in partial fulfillment of (TNR-12)

Degree of Bachelor of Technology (Branch Name) (TNR-14, Bold)

For the academic Year 20__ - 20__(TNR-12)

(Name)

(Name)

(Name)

Guide

Head of Department

Principal (TNR -12, Bold)

8. The third page will be certificate issued by the industry regarding the completion of Seminar if applicable.
9. The fourth page would be for acknowledgement, which would be followed by index page (Fifth page).
10. Sketches should be drawn on separate sheet (minimum A4 size) and be inserted at proper places. The sketches should be drawn in black ink and be numbered.
11. Tables should preferably type in the text only.
12. The mathematical symbol should be typed or neatly written so as to match darkness of the text.
13. The last item on the index should be references.
14. Page number must appear on the right hand top corner of each page starting after index page.
15. The contents of the seminar can be decided by the internal guide / department and student.
16. Minimum number of copies = 5 Copies (Central Library + Department + Internal Guide + External Examiner + Student). The copy of External Examiner will be submitted by the student after completion of Seminar.

SAMPLE COPY

Report of Seminar

in

Remote Sensing through Satellite System

by

Mr. Ajit M. Kure

(Roll No: T3103)

Submitted in partial fulfillment of the requirement for

Degree of Bachelor of Technology (Agricultural Engineering),

of

Dr. Babasaheb Ambedkar Marathwada University

Aurangabad

Department of Agricultural Engineering,

Maharashtra Institute of Technology,

Aurangabad.

2013 - 2014

SAMPLE COPY

CERTIFICATE

This is to certify that the Seminar Report

Submitted by

Mr. Ajit M. Kure

(Roll No: T3103)

Is completed as per the requirement of the Dr. Babasaheb Ambedkar Marathwada University,
Aurangabad in partial fulfillment of

Degree of Bachelor of Technology

(Agricultural Engineering)

For the academic Year 2013-14

(Name)

Guide

(Name)

Head of Department

(Name)

Principal

General Attributes

- Chapter heading -All Capital—TNR 14 Font (Bold)
- Heading –All Capital- TNR 12 Font (Bold)
- Subheading--Title case- TNR12 Font (Bold)
- Text – TNR11 Font
- Title of the Report should not be more than two lines
- Page numbers are at right hand corner at ½ inch from right and top side.
- Page number should be allotted only from Chapter no. 1 onwards.

References

Last chapter of the report is references including the addresses of websites.

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

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Engineering & Technology) Syllabus of T. Y.B. Tech. (Agricultural Engineering) Semester-VI	
Code No.: AED351 Teaching Scheme: 04Hrs/week Theory: 03Hrs/week Tutorial: 01Hr/week Credits:04	Title: Soil & 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 <ol style="list-style-type: none"> 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) (12 Hrs)
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) (08 Hrs)
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) (10 Hrs)
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) (12 Hrs)
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) (08 Hrs)
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) (10 Hrs)
Reference Books:	: <ol style="list-style-type: none"> 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 Engineering & Technology) Syllabus of T. Y.B. Tech. Semester-VI	
Code No.: AED352 Teaching Scheme: 04Hrs/week Theory: 03Hrs/week Tutorial: 01Hr/week Credits: 04	Title: Drying & Storage Engineering Class Test: 20 Marks Theory Examination (Duration): 03 Hrs Theory Examination (Marks): 80
Objectives	<ol style="list-style-type: none"> 1. To learn the principles of drying of crops 2. To develop practical insights into the layout of on-farm drying and storage facilities 3. To understand different storage techniques
Unit-I	Moisture content and methods for determination, importance of EMC and methods of its determination, EMC curve and EMC model, principle of drying, theory of diffusion, mechanism of drying- falling rate, constant rate, thin layer, deep bed and their analysis, critical moisture content, drying models, calculation of drying air temperature and air flow rate, air pressure within the grain bed, Shred's and Hukill's curve, different methods of drying including puff drying, foam mat drying, freeze drying, etc. (Descriptive & Analytical) (12 Hrs)
Unit-II	Study of different types of dryers- performance, energy utilization pattern and efficiency, study of drying and dehydration of agricultural products. (Descriptive & Analytical) (08 Hrs)
Unit-III	Types and causes of spoilage in storage, conditions for storage of perishable products, functional requirements of storage, control of temperature and relative humidity inside storage, calculation of refrigeration load; modified atmospheric storage and control of its environment, air movement inside the storage. (Descriptive & Analytical) (10 Hrs)
Unit-IV	Storage of grains: destructive agents, respiration of grains, moisture and temperature changes in stored grains; conditioning of environment inside storage through natural ventilation, mechanical ventilation, artificial drying, grain storage structures such as Bukhari, Morai, Kothar, silo, CAP, warehouse - design and control of environment. (Descriptive & Analytical) (12 Hrs)
Unit-V	Storage of cereal grains and their products, storage of seeds, hermetically sealed and air-cooled storages- refrigerated, controlled atmosphere, modified atmospheric and frozen storages. (Descriptive & Analytical) (10 Hrs)
Unit-VI	Storage condition for various fruits and vegetables under cold and CA storage system. Economic, aspects of storage. (Descriptive & Analytical) (08 Hrs)
Reference Books:	<ol style="list-style-type: none"> 1. Automatic control of food manufacturing by McFarlane Ian, Applied Science Publishers, London. 2. Controlled atmosphere storage of grains by Shejbal, J. Elsevier Scientific Publishing Co. London 3. Design and Operation of Cold Storages in Developing Countries ,FAO Publications, Rome 4. Unit Operations of Agricultural Processing by Sahay and Singh, Vikas Publishing House Pvt. Ltd. New Delhi 5. Post harvest technology of Cereals, Pulses and Oilseeds by Chakravarti A. Oxford Publishing. 6. Food Science by Norman and Potter

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 Engineering & Technology) Syllabus of T. Y.B. Tech. Semester- VI	
Code No.: AED353 Teaching Scheme: 04Hrs/week Theory: 04 Hrs/week Tutorial: 00Hr/week Credits:04	Title: Food Engineering Class Test: 20 Marks Theory Examination (Duration): 03 Hrs Theory Examination (Marks): 80
Objectives	: The overall objectives of the food engineering course is 1. To provide fundamental engineering concepts, principles and skills necessary to understand the outcomes of commercial food processes as well as to design food process systems. 2. Consideration of the heat, refrigeration and rheology principles that apply to all food processing systems.
Unit-I	: Applications of unit operations to the food industry, analytical processing concepts with regards to mass and energy balances, equipment involved in the commercially important food processing methods and unit operations; value addition to cereals like rice, wheat etc. (Descriptive & Analytical) (10Hrs)
Unit-II	: Extrusion Technology: Introduction and terminology, Function and advantages of extruder technology, Selecting an extruder, General design features, Segmented screw/barrel single-screw 'wet' extruders, Dry extruders, Interrupted flight extruders, Twin-screw extruder, Single- vs. twin-screw extruder. (Descriptive & Analytical) (10 Hrs)
Unit-III	: Basic principles of evaporators, construction and operation, Different types of evaporators used in dairy industry, Calculation of heat transfer area and water requirement of condensers, Basic concepts of multiple effect evaporators, Operations and various feeding systems, Economy of operation, Thermo processor and MVR system, Care and maintenance of evaporators.(Descriptive & Analytical) (10 Hrs)
Unit-IV	: Process equipment for thermal processing-evaporation, dehydration, drying, blanching, pasteurization, distillation, mechanical separation-filtration, sieving, centrifugation, sedimentation, mechanical handling-conveying and elevation, mixing, kneading, blending.(Descriptive & Analytical) (10 Hrs)
Unit-V	: Cold Preservation and Processing: Distinction between refrigeration and freezing, refrigeration and cool storage, changes in food during refrigerated storage, Food Freezing Methods: Air Freezing, immersion freezing (immersion freezing with cryogenic liquid), indirect contact freezing and Plank's equation. (Descriptive & Analytical) (10 Hrs)
Unit-VI	: Physical, chemical and biological methods of food preservation, changes undergone by the food components during processing, evaporation, drying, freezing juice extraction, filtration, membrane separation, thermal processing, plant utilities requirement.(Descriptive & Analytical) (10 Hrs)
Reference Books:	: 1. Food Science by Norman and Potter 2. Introduction to Food Engineering by R. Paul Singh and Dennis R. Heldman, Academic Press 3. Fruits and Vegetable Preservation, Principles and Practices by RP Srivastava and Sanjeev Kumar, International Book Distribution Company, Lucknow

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 Engineering & Technology) Syllabus of T. Y.B. Tech. Semester-VI	
Code No.: AED354 Teaching Scheme: 04Hrs/week Theory: 04 Hrs/week Tutorial: 00Hr/week Credits:04	Title: Machine Design Class Test: 20 Marks Theory Examination (Duration): 03 Hrs Theory Examination (Marks): 80
Objectives	: As an 'Agroneer has to deal with various farm machineries utilized in farm mechanization, he must aware about design principals of operations, design consideration, material of construction and power transmission in agricultural machines. Present subject is designed to accomplish following objectives. <ol style="list-style-type: none"> 1. To apply the concepts of stress analysis, theories of failure and material science to analyze, design and/or select commonly used machine components with ergonomic consideration. 2. To illustrate to students the variety of mechanical components available and emphasize the need to continue learning. 3. To teach students how to apply mechanical engineering design theory to identify and quantify machine elements in the design of commonly used agricultural machines.
Unit-I	: Introduction: Design process, Steps of design process. Aesthetic and Ergonomic Consideration in Design: Appearances, functional requirements, design of display and controls. (Descriptive & Analytical) (03 Hrs)
Unit-II	: Design considerations: Basic Design equation, Induced and design stress, factor of safety. Simple stress situation: Tensile, Compressive, shear and bearing stresses acting one at time and induced due to direct loading, Bending and twisting and design equation related to them. Effect of combined stresses: Different possible combinations such as Direct and Bending Stresses, Normal and Shear Stresses, Principal Stresses, Maximum Shear Stress and design equations using them, e.g. C- Clamp, frame, screw press frame etc. (Descriptive & Analytical) (10 Hrs)
Unit-III	: Selection of Material: Basics of selection I.S.S. and Designation of commonly used materials such as steel cast iron, aluminum, brass, bronze and other bearing materials, principal of local quality. Theories of failure : Maximum Principal, stress, Maximum shear stress, maximum strain, maximum total strain energy and maximum energy of distortion theories of failure, their statements and derivations of design equations and applications compression. (Descriptive & Analytical) (09 Hrs)
Unit-IV	: Design of components under simple stresses: Design of cotters, pins, levers, keys shafts subjected to only twisting, bolts Subjected to only direct loading, shearing and tension. Design of simple assemblies subjected to simple stresses such as Cotter and Knuckle joint, rigid & Flexible Couplings. (Descriptive & Analytical) (08 Hrs)
Unit-V	: Fatigue Loading: Endurance test S.N diagram, endurance limit. Soderberg diagram, Goodman diagram and equation for design under fluctuating load Modified, Low cycle and high cycle fatigue, Life and load relationship during high cycle fatigue. Designing for definite life, Basquins equations. Designing for variable combined stresses. Notch sensitivity stress concentration methods to improve fatigue strength Interpretation of brittle fracture. Miners equation of cumulative damage, short time testing. (Descriptive & Analytical) (06 Hrs)
Unit-VI	: Design of Power Screw: Types of threads used, standards square, trapezoidal and Acme, efficiency of screw, Use of maximum shear stress, maximum energy of distortions theory, buckling of screw, materials, single and multi start differential and right and left handed type, efficiency in power screw, self locking of power screw. Screw jack & Lead Screw (Descriptive & Analytical) (10 Hrs)
Unit- VII	: Design of Welded Joints: welded joints, types, symbols, methods to reduce the distortion and warping in welding, stress concentration, strength of arc welds subjected to direct, bending and twisting loads. (Descriptive & Analytical) (06 Hrs)
Unit VIII	: Springs: Functions, types and spring rate, closed coil helical spring, design equation, Wahl's correction factor, springs in parallel and series, variable loading, effect of end turns, surging of compression springs, optimum design, springs with non circular sections, leaf springs design equation, construction, extra full length leaves, stress equations, torsion springs, design equations. (Descriptive & Analytical) (08 Hrs)
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.
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Section A: Includes Unit I, II, III and IV; **Section B:** Includes Unit V, VI, VIII and VIII.

Pattern of Question Paper:

The Eight/six units in the syllabus shall be divided in two equal parts i.e. 4/3 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 Engineering & Technology) Syllabus of T. Y.B. Tech Semester- VI	
Code No.: AED391 Teaching Scheme: 04Hrs/week Theory: 03Hrs/week Tutorial: 01Hr/week Credits : 4	Title: Elective-I (Command Area Development) Class Test: 20 Marks Theory Examination (Duration): 03 Hrs Theory Examination (Marks): 80
Objectives	: As an 'Agroneer' the student must aware with various structures used in command area development. Present syllabus pertaining with following objectives 1. Design of specific discharge for canal irrigation system 2. Design of canal sections by various approaches 3. Hydraulic designs of canal outlets, Falls, Aqueducts, Siphon etc. 4. Awareness about Command Area Development
Unit-I	: Introduction, Necessity of irrigation in India, Advantages, Disadvantages, Techniques of water distribution in farm, irrigation water quality. crop water requirement, duty and delta (Descriptive & Analytical) (08Hrs)
Unit-II	: Major, medium and minor irrigation projects their comparative performance, development and utilization of water resources. Basic concepts of command area - definition, need, scope, and development approaches: historical perspective, command area development authorities, interaction/collaboration of irrigation water use efficiency and agricultural production. Farmer's participation in command area development. (Descriptive & Analytical) (10 Hrs)
Unit-III	: Canal Irrigation System: Description of components of irrigation canal system, their functions, planning and layout of canal irrigation system, distribution system for canal irrigation, Terminologies, preliminary design procedure for irrigation channel for required capacity, channel losses. (Descriptive & Analytical) (12 Hrs)
Unit-IV	: Design of Irrigation channels: Sediment load, mechanics of sediment transport, threshold motion, Design of non-scouring channels, Design of stable channels in India, Regime channel Kennedy and Lacey's theory, Maintenance of Irrigation channels, Lining of canals, Advantages, justification, design of lined canal and economics, lining types, construction, uses. (Descriptive & Analytical) (12 Hrs)
Unit-V	: Diversion head works: Weir and barrage, Diversion head work layout, hydraulic jump and its usefulness in the design of irrigation structures, canal falls, types, design of canal falls, canal regulators, modules and other canal structures. (Descriptive & Analytical) (10 Hrs)
Unit-VI	: Cross Drainage works, types, selection, aqueducts and siphons, design considerations for cross drainage work, Irrigation revenue, methods of pricing, economics of water rates in India, Recommendations from pricing committee of Irrigation water. (Descriptive & Analytical) (08Hrs)
Reference Books:	: 1. Irrigation Engineering and Hydraulic structures by S. K. Garg, Khanna publication, New Delhi. 2. Irrigation-Theory and Practice by A. M. Michael, vikas publishing House, Delhi 2. 3. Land & Water Management Engineering by V. V. N. Murthy, Kalyani Publisher, New Delhi. 4. Water and Land Management Institute (WALMI), Aurangabad, Publication No. 20 5. Water and Land Management Institute (WALMI), Aurangabad, Publication No. 22

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 Engineering & Technology) Syllabus of T. Y.B. Tech. Semester- VI	
Code No.: AED392 Teaching Scheme: 04Hrs/week Theory: 03Hrs/week Tutorial: 01Hr/week Credits : 4	Title: Elective-I (Remote Sensing & GIS Applications) 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 <ol style="list-style-type: none"> 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) (10 Hrs)
Unit-II	Electromagnetic radiation: Electromagnetic energy, energy interaction with atmosphere and earth surface, resolutions in remote sensing (10Hrs)
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) (10 Hrs)
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) (10 Hrs)
Unit-V	Geographical Information System: History of development of GIS definition, basic components, GIS input data and output product, general application. (Descriptive & Analytical) (10 Hrs)
Unit-VI	GIS data: type, representation, source, data sets, acquisition, data structure, data base management systems (DBMS), GIS application. (Descriptive & Analytical) (10 Hrs)
Reference Books:	<ol style="list-style-type: none"> 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 4. 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 Engineering & Technology) Syllabus of T. Y.B. Tech. Semester- VI	
Code No.: AED393 Teaching Scheme: 04Hrs/week Theory: 03Hrs/week Tutorial: 01Hr/week Credits : 4	Title: Elective-I (Green House Technology) Class Test: 20 Marks Theory Examination (Duration): 03 Hrs Theory Examination (Marks): 80
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) (10 Hrs)
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) (12 Hrs)
Unit-III	: Green house effect-Introduction, principle of green house effect, greenhouse gas, effect of greenhouse gas in agriculture. (Descriptive) (08 Hrs)
Unit-IV	: Environmental factors-plant response to greenhouse environment, light, temperature, relative humidity, carbon dioxide, greenhouse ventilation and computerized control system. (Descriptive & Analytical) (10 Hrs)
Unit-V	: 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) (8 Hrs)
Unit-VI	: 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) (12 Hrs)
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 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 Engineering & Technology) Syllabus of T. Y.B. Tech. Semester-VI	
Code No.: AED355 Teaching Scheme: 04Hrs/week Theory: 02Hrs/week Tutorial: 0 Hr/week Credits : 2	Title: Drainage Engineering Class Test: 10 Marks Theory Examination (Duration): 02 Hrs Theory Examination (Marks): 40
Objectives	Water availability for agriculture is reducing day by day due to rapid industrialization, population explosion, erratic and unequal rainfall, exploitation of natural resources during green revolution period. Considering the situation present syllabus is designed with following objectives <ol style="list-style-type: none"> 1. To create awareness about sustainability of irrigated agriculture 2. To scientifically design and install suitable drainage system for reclamation of problematic soil 3. To bridge the gap between created water resources and reutilization in qualitative and quantitative terms
Unit-I	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) (08 Hrs)
Unit-II	Surface drainage: Surface drainage system and components, factors affecting drainage, types of land requiring drainage, design consideration for surface drainage, design of surface drainage system, design of open drains, hydrologic and hydraulic design of open drain. Surface drainage for flat and sloping areas. (Descriptive & Analytical) (07 Hrs)
Unit-III	Subsurface drainage system: General consideration, factors influencing subsurface drainage design, system design procedure, Subsurface drainage design (steady state equation, Hooghoutdt's equation for spacing drain, Ernst equation, steady and unsteady state equation, Glover-Dumm Eq., De Zeeuw-Hellinga Eq.) Design of subsurface drainage system. Hydraulic design of subsurface drain. Drainage material, Types of drainage (random, herringbone, Gridiron, interceptor and relief drainage). Drain envelops, installation of drainage system, Layout, construction and installation of drains, Supplemental drainage structure. (Drainage Outlet types, surface water inlet, sedimentation basin, controlled drainage structure, relief pipes and breathers, artesian relief well, manhole.) (Descriptive & Analytical) (10 Hrs)
Unit-IV	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. (Descriptive & Analytical) (05 Hrs)
Reference Books:	<ol style="list-style-type: none"> 1. Agricultural Drainage: principles and Practices by U. S. Kadam, R. T. Thokal, S. D. Gorantiwar & A. G. Powar, Westville Publishing House, New Delhi 2. Drainage Engineering by J. M. Luthin, Huntington publication, NewYork 3. Drainage Engineering by Daniel William Murphy 4. Engineering for Agricultural Drainage by Harry Burgess Roe and Q. C. Ayers, McGram-Hill Publication, University of Michigan. 5. Drainage Design by P. Smart & J. G. Herbertson, Blackie & sons ltd, Newyork 6. Flood Control & Drainage Engineering by S. N. Ghosh

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.
4. 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 Engineering & Technology) Syllabus of T. Y.B. Tech. Semester-VI		
Code No: AED371		
Title: Lab-VI (Soil & Water Conservation Engineering)		
Teaching Scheme: 2 Hrs		Teachers Assessment : 25 Marks External Examination: 25 Marks
Practical(external) + TA (Internal)		Credits: 1
Course 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 <ol style="list-style-type: none"> 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 Practical's (Minimum ten experiments to be performed)	:	<ol style="list-style-type: none"> 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
List of Reference Books	:	<ol style="list-style-type: none"> 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.

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

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Engineering & Technology) Syllabus of T. Y.B. Tech. Semester-VI	
Code No: AED372	
Title: Lab-VI (Drying & Storage Engineering)	
Teaching Scheme: 2 Hrs	
Teachers Assessment : 25 Marks External Examination: 25 Marks	
Practical(external) + TA (Internal)	
Credits: 1	
Course Objectives	<ol style="list-style-type: none"> 1. To learn about various Drying and storage characteristics of grains 2. To study the grain handling during storage 3. To study design of various storage structures
List of Practical's (Minimum ten experiments to be performed)	<ol style="list-style-type: none"> 1. Study of mechanics of bulk solids affecting cleaning, drying and storage of grains 2. Measurement of moisture content during drying and aeration 3. Measurement of relative humidity during drying and aeration using different techniques 4. Measurement of air velocity during drying and aeration 5. Drying characteristic and determination of drying constant 6. Determination of EMC and ERH 7. Study of various types of dryers 8. To study the effect of relative humidity and temperature on grains stored in gunny bags 9. Design and layout of commercial bag storage facilities 10. Design and layout of commercial bulk storage facilities 11. Study of different domestic storage structures 12. Visit to commercial handling and storage facilities for grains.
List of Reference Books	<ol style="list-style-type: none"> 1. Automatic control of food manufacturing by McFarlane Ian, Applied Science Publishers, London. 2. Controlled atmosphere storage of grains by Shejbal, J.. Elsevier Scientific Publishing Co. London 3. Design and Operation of Cold Storages in Developing Countries ,FAO Publications, Rome 4. Unit Operations of Agricultural Processing by Sahay and Singh, Vikas Publishing House Pvt. Ltd. New Delhi 5. Post harvest technology of Cereals, Pulses and Oilseeds by Chakravarti A. Oxford Publishing. 6. Food Science by Norman and Potter

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

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

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Engineering & Technology) Syllabus of T. Y.B. Tech. Semester-VI	
Code No:AED373	
Title: Lab-VI (Food Engineering)	
Teaching Scheme: 2 Hrs	
Teachers Assessment : 25 Marks External Examination: 25 Marks	
Practical(external) + TA (Internal)	
Credits: 1	
Course Objectives	<ol style="list-style-type: none"> 1. To study various machineries and equipments used in processing industries of food 2. To get familiarize with various operations performed by processing industries 3. To study value addition in processed product of food industry
List of Practical's (Minimum ten experiments to be performed)	<ol style="list-style-type: none"> 1. Study of different cleaners and graders used in agro processing industries; 2. Familiarization with operation and performance of machinery and equipments of Satake rice milling unit of 500 kg/hr 3. Development of Value added products from fruits and vegetables 4. Development of unfermented fruit beverages 5. Planning and layout of roller wheat flour milling & rice milling 6. Flow process diagram and study of various models of the machines used in a Food Industry 7. Study of separators 8. Study of evaporators 9. Study of freezers 10. Estimation of refrigeration requirements in dairy & food plant 11. Visit to Food industry/flour mill/Visit to fruit/vegetable processing plants
List of Reference Books	<ol style="list-style-type: none"> 1. Food Science by Norman and Potter 2. Introduction to Food Engineering by R. Paul Singh and Dennis R. Heldman, Academic Press 3. Fruits and Vegetable Preservation, Principles and Practices by R P Srivastava and Sanjeev Kumar, International Book Distribution Company, Lucknow

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

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

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Engineering & Technology) Syllabus of T. Y.B. Tech. Semester-VI	
Code No: AED374	
Title: Lab- IX (Field Operation and Maintenance of Tractor & Farm Machinery)	
Teaching Scheme: 2 Hrs	
Teachers Assessment : 50 Marks	
TA (Internal)	
Credits: 1	
Course Objectives	: An 'Agroneer' performs deep study of tractor and farm machineries theoretically. To understand actual field practices made through tractor, current subject designed as part of their curriculum pertaining following objectives. <ol style="list-style-type: none"> 1. To understand various systems of tractor related with power transmission, fuel supply, lubrication, electrical, cooling, hydraulic etc. 2. To study actual field practices performed by tractor to drive farm implements and machineries
List of Practicals (Minimum ten experiments to be performed)	: <ol style="list-style-type: none"> 1. Introduction to various systems of a tractor (viz. fuel, lubrication, cooling, electrical, transmission, hydraulic and final drive system). 2. Familiarisation with tractor controls and learning procedure of tractor starting and stopping. 3. Driving of tractor in forward and reverse gears. 4. Driving safety rules. Hitching, adjustments, settings and field operation of farm machinery. 5. Familiarisation with different makes & models of 4- wheeled tractors. 6. Familiarisation with instrumentation panel & controls; 7. Road signs, traffic rules, road safety, driving & parking of tractor 8. Tractor driving practice with two wheeled tractor trailer forward & reverse; 9. Study and practising the hitching and dehitching of implements; 10. Study operation and field adjustments of M.B. plough & disk plough; 11. Field operation of trailing & mounted disk harrow; 12. Field operation and adjustments of seed drill/planter/sprayer
List of Reference Books	: <ol style="list-style-type: none"> 1. Principles of Agricultural Engineering by A. M. Michel & T.P. Ojha Vol. - I. Jain Brothers, New Delhi. 2. Practical Agricultural Engineering by Ghosh and Swain Vol. - I & II. Naya Prakash 206, Bidhar Sarani, Kolkata. 3. Tractors and their Power Units by E.L. Barger, J.B. Liljedahl, W.M. Carleton, E.G. Mokibben. Wiley Eastern Private Ltd., New Delhi. 4. Elements of Agricultural Engineering by Jagdiswar Sahay Vol. - I & II. Agro Book Agency, New Area, Jakkanpur, Patna – 1. 5. Principles of Farm Machinery by R A Kepner, Roy Bainer; E L Barger

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

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

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Engineering & Technology) Syllabus of T. Y.B. Tech. Semester-VI	
Code No: AED375	
Title: Lab-IX (Project-I) Teaching Scheme: 2 Hrs Practical/TA (Internal)	
Teachers Assessment : 50 Marks Credits: 1	
Course Objectives	: The practical implementation of theoretical knowledge gained during your study to till date is important for Engineering Education. The student should be able implement their ideas/real time industrial problem/ current application of their engineering branch which they have studied in curriculum. This will definitely help in building the confidence in the student what he has learnt theoretically. The dependent study of the state of the art topics in a broad area of his/her specialization.

Guidelines for students and faculty:

1. Students have to finalize their project title based on Industrial Assignments.
2. The projects selected should be such so as to ensure the satisfaction of the urgent need to establish a direct link between education, national development and productivity and thus reduce the gap between the world of work and the world of study. The term work will consist of a report prepared by the student on the project allotted to them.
3. Project topics may be chosen by the student or group of students (maximum 3 students) with advice from the faculty members.
4. To design a project at adequate scale level for the following applications- It may be based (i) Entirely on study and analysis of a typical Instrumentation and Control System, (ii) Experimental verification, or (iii) Design, fabrication, testing and calibration of an Instrumentation system. The software based project can be considered based on its application for instrumentation and control purpose. The students are required to submit the report based on project work done.
5. Use appropriate tools (Microsoft Word/Latex) for the preparation of the report.
6. Each student/group is required to-
 - c. Submit a one page synopsis before the project talk for display on the notice board in the first week of their academic semester.
 - d. Give a 10 minutes presentation through OHP, PC, and Slide projector followed by a 10 minute discussion in the second week of their academic semester.
 - e. Submit a report on the project topic with a list of required hardware, software or other equipment for executing the project in the third week of their academic semester.
 - f. Start working on the project and submit initial development and CPM/PERT planning drawing in the fourth week of their academic semester.
 - g. Preparation of PCB layout, wiring diagram, purchase of components, software demo, flowchart, algorithm, program/code, assembling, testing, etc. should be submitted by student/s within next five/Six weeks and minimum one page report should be there for each major activity.
 - h. Overall assembling, wiring, code writing, testing, commissioning, should completed within next two weeks.
 - i. At the last but one week of end of academic semester the internal assessment of project will be done by panel of internal faculties and they will decide marks out 25 marks for term work (TA).
 - j. In the last week, student/group will submit final project report to guide and thereafter guide will finalize marks out of the remaining 25 marks for term work (TA).
7. Projects are to be scheduled in the weekly scheduled time-table during the semester and any change in schedule should be discouraged.
8. Every assigned faculty/s should maintain separate file for evaluating progress of each student or group.
9. Award 50 TA, Sessional marks based on the assessment done by internal guide and panel during semester and the involvement of student/group in the work assigned related to the topic and its application.
10. The format and other guidelines for the purpose of the Project Submission in hard bound copies should be as follows,

- Report Structure

Index/Contents/Intent

List of Abbreviations

List of Figures

List of Graphs

List of Tables

and List of if any other inclusion

1. Introduction

2. Literature survey

3. System development

4. Performance analysis

5. Conclusions

References

Appendices

Acknowledgement

1. INTRODUCTION

1.1 Introduction

1.2 Necessity

1.3 Objectives

1.4 Theme

1.5 Organization

2. LITERATURE SURVEY

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

3. SYSTEM DEVELOPMENT

Model Development

Analytical

Computational

Experimental

Mathematical

Statistical

(Out of above methods at least one method is to be used for the model development Some mathematical treatment or related information is required to be embodied)

4. PERFORMANCE ANALYSIS

Analysis of system developed either by at least two methods depending upon depth of standard

These methods normally used are Analytical /Computational/Statistical/Experimental/ or Mathematical

Results at various stages may be compared with various inputs

Output at various stages with same waveforms or signals or related information/parameters

Comparison of above results by at least two methods and justification for the differences or error in with theory or earlier published results

5. CONCLUSIONS

5.1 Conclusions

5.2 Future Scope

5.3 Applications

Contributions (if any,)

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

References

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

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

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

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

Appendices

Related data or specifications or referred charts, details computer code/program, *etc.* (1 Page)

Expression of gratitude and thankfulness for helping in completion of the said task with name

Signed by the candidate

- General Guidelines

Text should be printed on front and correct side of the watermark on quality bond paper

Paper size- A4, 75 to 85 gsm paper

Left Margin-1.5"

Right Margin-3/4"

Top Margin-1"

Bottom Margin-1"

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

Report Heading -All Capital—16 Font

Chapter heading -All Capital—14 Font

Subchapter –title case-12 Font

Sub-Subchapter –First Alphabet Capital case-12 Font

Page numbers for Index/Contents/Intent should be in roman

Title of the Report should not be more than two lines

Text pages should be in times new roman

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

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

Suitable flap with name of the candidate, Department and Institute name and symbol can be used with nylon strip.

For more information and sample of hard copy please contact the respective Head of the Department