

Chhatrapati Sambhajinagar

An Autonomous Institute Affiliated to Dr. Babasaheb Ambedkar Marathwada University,

Chhatrapati Sambhajinagar, Maharashtra (India)

Second Year B. Tech Syllabus (Agricultural Engineering)

(NEP 2020 Based Curriculum)

WEF AY 2024-25





Abbreviations used in this document

AEC	Ability Enhancement Course
AED	Agricultural Engineering Department
CIE	Continuous Internal Evaluation
ELC	Experiential Learning Course
ESE	End-Semester Examination
HSSM	Humanities Social Science & Management
Hrs	Hours
ISE	In-Semester Examination
L	Lecture (Theory)
MDM	Multidisciplinary Minor
MIT	Maharashtra Institute of Technology
NEP	National Education Policy 2020
OEC	Open Elective Course
OJT	On-Job Training
P	Practical
PCC	Program Core Course
S3	Semester -III
S4	Semester -IV
T	Tutorial
TA	Teacher Assessment
UG	Under Graduate
VEC	Value Education Course
VSEC	Vocational and Skill Enhancement Course
WEF	With Effect From
Wk	Week

Chairman Board of Studies Agricultural Engineering MIT Aurangabad



Page 2 of 76



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Second Year B. Tech (Agricultural Engineering) Syllabus Structure WEF 2024-25 (NEP 2020 Based Curriculum)

Semester-III

Sr. No.	Course Cate- gory	Course Code	Course Title	L	Т	Р	Contact Hrs./Wk	Credits	ISE -I	ISE -II	CIE	TA	ESE / Oral	Total
			Orientatio	n Pro	ogra	m (2	Days)		0					
1	PCC	AED201	Farm Machinery and Equipment	3	-	2	3	3	15	15	10	10	50	100
2	PCC	AED202	Strength of Materials	2	-	-	2	2	15	15	10	10	50	100
3	PCC	AED203	Fluid Mechanics and Open Channel Hydraulics	2	S#8	-	2	2	15	15	10	10	50	100
4	MDM	AED211	Environment Impact Assessment	2	-	*	2	2	15	15	10	10	50	100
5	OEC	OEC241A TO OEC241F	Open Elective Course -1	3		-	3	3	15	15	10	10	50	100
6	HSSM	HSM201/ HSM202	Engineering Economics and Management / Innovation and Entrepreneurship	2	•		2	2	-	10	-	15	-	25
7	VEC	VEC201 / VEC202	Universal Human Values/ Environmental Studies	1		2	3	2		10	-	15	-	25
8	ELC	ELC221	Community Engagement Project	1.5	-	4	4	2	-		.70	25		25
9	OEC ^s	SEM222	Seminar	-	-	2	2	1	-	-	-	25	+	25
10	PCC	AED223	Strength of Materials Lab	-	-	2	2	1	-	-		25	25	50
11	PCC	AED224	Fluid Mechanics and Open Channel Hydraulics Lab			2	2	1	-			25	25	50
S3				15	-	12	27	21	75	95	50	180	300	700

Open Elective-1 Course Basket:

Course Code	Course Title	Name of Department offering the Course	§ Seminar (SEM222)
OEC241A	Introduction to Sociology	Basic Sciences & Humanities	Seminar to be
OEC241B	Technology for Rural Development	Civil Engineering	prepared and
OEC241C	Professional Ethics and Corporate Social Responsibility	Civil Engineering	presented on the
OEC241D	Constitution of India	Electrical Engineering	topics related to
OEC241E	Electrical, Fire and Vehicle Safety	Electrical Engineering	course opted as
OEC241F	Emotional Intelligence	Mechanical engineering	Open Elective -1.

As per the NEP 2020 guidelines, **Honor Degree** courses are offered by Department (**Major Discipline**), whereas the Minor Degree courses (referred as **Double Minor**) are offered by **another** department. **Honor Degree or Double Minor Degree is Optional**. The students those who fulfills the <u>eligibility norms</u> can enroll for it. The course curriculum and guidelines are given in a **separate Information Booklet**, **available at the Department**.

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Page 3 of 76

Syllabus of Second Year B.Tech. (Agricultural Engineering) w.e.f. 2024-25 (NEP 2020 Based Curriculum)

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Dean (Academics)
Maharashtra Institute of Technology,
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Chhatrapati Sambhajinagar, M.S.-431010

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sem	ester-IV	1			_		, ,						,	
Sr. No.	Course Cate- gory	Course Code	Course Title	L	Т	P	Contact Hrs./Wk	Credits	ISE -I	ISE -II	CIE	TA	ESE / Oral	Total
1	PCC	AED251	Soil and Water Conservation Engineering	3	-	-	3	3	15	15	10	10	50	100
2	PCC	AED252	Post Harvest Engineering	2	-	-	2	2	15	15	10	10	50	100
3	PCC	AED253	Irrigation and Drainage Engineering	2	-		2	2	15	15	10	10	50	100
4	MDM	AED261	Climate Change in Agriculture	2	+	-	2	2	15	15	10	10	50	100
5	OEC	OEC291A - OEC291H	Open Elective Course -2	2			2	2	15	15	10	10	50	100
6	HSSM	HSM201/ HSM202	Engineering Economics and Management / Innovation and Entrepreneurship	2	-	-	2	2	-	10	-	15	-	25
7	VEC	VEC201 / VEC202	Universal Human Values/ Environmental Studies	1	-	2	3	2	-	10		15	- 1	25
8	VSEC	VSE271	Professional English	1	-	2	3	2	-	10	-	15	-	25
9	AEC	AEC272	Personality and Leadership Development Skills		-	4	4	2	•		-	25	-	25
10	PCC	AED273	Post Harvest Engineering Lab	-	-	2	2	1	-	-	-	25	25	50
11	PCC	AED274	Irrigation and Drainage Engineering Lab			2	2	1			-	25	25	50
S4				15	-	12	27	21	75	105	50	170	300	700

Open Elective-2 Course Basket:

Course Code	Course Title	Name of Department offering the Course
OEC291A	Smart Agriculture Practices	Agricultural Engineering
OEC291B	Solid Waste Management	Civil Engineering
OEC291C	Data Communication	Computer Science and Engineering
OEC291D	E-Waste Management	Electronics and Computer Engineering
OEC291E	Programmable Logic Controller	Electrical Engineering
OEC291F	Information and Knowledge Management	Emerging Science and Technology
OEC291G	Renewable Energy Resources	Mechanical Engineering
OEC291H	Plastic Recycling	Plastic and Polymer Engineering

Students may opt for Exit after successful completion of Second Year provided s/he earns 8 additional credits through coursework (VSEC) and/or Internship/OJT during the summer vacation. S/he will be awarded a 2-Year UG Diploma in Agricultural Engineering. Details are available at the Department.

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Semester-III Detail Course Curriculum

Second Year B. Tech Syllabus (Agricultural Engineering)

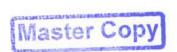
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Faculty of Science & Technology

Syllabus of Second Year B. Tech (Agricultural Engineering) (Semester III)

Course Category: PCC Course Code: AED201

Course: Farm Machinery and Equipment Teaching Scheme: Theory- 3 Hrs./week Credits: 3-0-0 In Semester Examination-I: 15 Marks In Semester Examination-II: 15Marks

Teacher Assessment: 10 Marks

Continuous Internal Evaluation: 10 Marks End Semester Examination: 50 Marks End Semester Examination (Duration): 2 Hrs.

Prerequisite

A Degree holder in Agricultural Engineering must know the agricultural operations, Control, maintenance and repair of different machines used in the agricultural sector.

1. To know the conventional & modern agricultural operations.

2. To impart student know-how about different farm machinery used in farms.

3. To know the Material of construction, working principles, adjustments, capacities and efficiencies of different farm machines.

4. To be able to calculate the cost of operation of different agricultural machines.

Introduction to farm mechanization — Scope, Merits, Limitations, Status of mechanization in the country and state - Classification of farm machines based on operation, power source, in relation to power unit etc. Power units/sources for farm machinery/implements, hitching systems and controls on farm machinery.

(06 Hrs)

Seedbed preparation operations and its classification - Concepts of deep tillage, rotary tillage and minimum tillage - Introduction to machines/implements used for primary and secondary tillage operations, Methods of ploughing, Indigenous plough, Mouldboard plough, and disc plough: functional components, type, constructional details, accessories and attachments. Horizontal suction, vertical suction of MB plough and Disc geometry of disc plough. Chisel plough and sub-soiler: functional components, type, constructional details, accessories and attachment.

(07 Hrs)

Secondary tillage implements- Forces acting on tillage implements, Draft measurement of tillage implements and calculation of power requirement for the tillage implements. Study of the cultivator, harrows, rotary tillers, levelling and paddling implements. Calculation of field capacity and field efficiency.

(06 Hrs)

Unit-IV

Unit-III

Objectives

Unit-I

Unit-II

Introduction to sowing, planting and transplanting equipment - Introduction to seed drills, no-till drills, and strip-till drills. Introduction to planters- bed planters and other planting equipment, rice transplanters, types of furrow openers, metering systems in drills and planters, Calibration of seed-drills/ planters and adjustments.

(08 Hrs)

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Page 7 of 76



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Unit-V	spray spray weed	vers, Types of nozzles – covers and chemical application ders – manual and powered ponents. Familiarization of fe	omponents and function rates. Introduction. Study of functional	ion, Calculations for cal to interculture equipment requirements of weeders	libration of nt - Use of
Unit-VI	mow hand equip	vesting and threshing- Prin stments of shear and impact ers, windrowers, reapers, re- ling equipment. Maize har oment— potato and ground shing mechanics and various	et-type cutting mecha aper binders and fora rvesting and shelling lnut digger. Cotton	nisms. Crop harvesting ge harvesters. Forage ch equipment, Root crop picking and Sugarcane	machinery: opping and harvesting harvester.
		combines. Cost analysis of f		Yower thresher, straw con	
				Publication	(06 Hrs)
	grain Sr.	combines. Cost analysis of t	farm machinery.		(06 Hrs)
References	grain Sr. No.	Title Elements of Agricultural	Author Dr. Jagdishwar	Publication	(06 Hrs
References	grain Sr. No.	Title Elements of Agricultural Engineering Principles of Agricultural	Author Dr. Jagdishwar Sahay A. M. Michel &	Publication Standard Publishers	(06 Hrs

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Faculty of Science & Technology

Syllabus of Second Year B. Tech (Agricultural Engineering) (Semester III)

Course Category: PCC Course Code: AED202

Course: Strength of Materials

Teaching Scheme: Theory: 2 Hrs./week

deformations.

Credits: 2-0-0

In Semester Examination-II: 15 Marks In Semester Examination-II: 15Marks

Teacher Assessment: 10 Marks

Continuous Internal Evaluation: 10 Marks End Semester Examination: 50 Marks

End Semester Examination (Duration): 02 Hrs.

Prerequisite	The purpose of the subject of Strength of Materials is to make the students aware of the limiting values of stresses, safe carrying stresses, and various mechanical properties of Materials.
Objectives	 To learn about the concept of stress, strain, and deformation of solids and the state of stress. To learn the bending moment, shear force, and the corresponding stress distribution for different types of beams. To know the concepts of strain energy, principal stress, and principal planes.
Unit-I	Simple Stresses and Strains: Mechanical properties of materials, Simple stress and strain, Stress-Strain Curve for Steel, Ductile Material, Brittle Material, Hooke's Law, Shearing Stresses, Bearing stresses, Composite sections, Statically Indeterminate Members, temperature stresses, lateral strains and linear strains, elastic constants, biaxial and triaxial

Unit-II

Shear Force and Bending Moment: Concept, Types of Supports, beam and loads, shear force and bending moments, Shear force and bending moment diagrams for statically determinate beams subjected to various loading conditions like UDL, UVL, bracket loads, point loads and moments, etc. SF and BM for sections with varying Young's modulus and moment of Inertia.

(05 Hrs)

05 Hrs)

Unit-III

Theory of simple bending: Pure bending, assumptions made in the theory of simple bending, neutral axis, a moment of resistance, section modulus, Flexural formula, and Filched Beam.

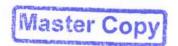
(04 Hrs)

Unit-IV

Shear Stress Distribution: Shear stress equation, Distribution of shear stress over rectangular, circular, and triangular sections, complementary shear, Direct and bending stresses: Direct Bending stress in a column. Core of section for rectangular, hallow rectangular, circular, and hallow circular section.

(04 Hrs)

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Page 9 of 76



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Unit-V	modul	y of Torsion: Torsional For lus, torsional stresses, Power is conditions.			
Unit-VI		ipal stresses and strains: (es on an inclined section of m).			of finding
	Sr. No.	Title	Author	Publication	Edition
References	1.	Strength of Materials	S. Ramamrutham	Dhanpatrai and Sons	14 th
References	2.	Strength of Materials	R.K. Bansal	Laxmi Publications	4 th
	3.	Mechanics of Materials	R. C. Hibbler	Pearson Education	4 th
	4.	Mechanics of Structure, vol-I	Junnarkar	Charotar	4 th

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Faculty of Science & Technology

Syllabus of Second Year B. Tech (Agricultural Engineering) (Semester III)

Course Category: PCC Course Code: AED203

Course: Fluid Mechanics and Open Channel

Hydraulics

Teaching Scheme: Theory: 02 Hrs./week

Credits: 2-0-0

In Semester Examination-I: 15 Marks In Semester Examination-II: 15Marks

Teacher Assessment: 10 Marks

Continuous Internal Evaluation: 10 Marks End Semester Examination: 50 Marks

reaching Sene	inc. Theory. 02 His./week	End Semester Examination: 50 Marks End Semester Examination (Duration): 02 Hrs.
Prerequisite	 Basic understanding of calculus and Familiarity with physics principles, Knowledge of basic engineering me 	especially fluid properties and mechanics.
Objectives	behaviors. 2. Develop skills to design and eva safety in water management.	f fluid mechanics to analyze and predict fluid flow luate hydraulic structures, ensuring efficiency and lve real-world engineering problems related to open ics.
Unit-I		d, units; Pressure and its measurement, Pascal's law, surfaces, the centre of pressure, pressure diagram, centre and metacentric height. (05 Hrs)
Unit-II	equation, path lines, streak lines and	and Eulerian description of fluid motion, continuity streamlines, stream function, velocity potential and n, rotation, circulation and vorticity, vortex motion. (05 Hrs)
Unit-III	siphon; Flow through orifices (measu	heorem, venturi meter, orifice meter and pitot tube, rement of discharge, measurement of time), flow es, flow over weirs, end contraction of rectangular s of nappe. (04 Hrs)
Unit-IV	and major hydraulic losses through p	general equation for head loss Darcy equation, minor pipes and fittings, flow through network of pipes,

Unit-V

Open channel design and hydraulics: Chezy's formula, best hydraulic section, velocity and pressure profiles in open channels, hydraulic jump; Discharge measurement in open channels: current meter.

Chezy's formula for loss of head in pipes, flow through simple and compound pipes,

(04 Hrs)

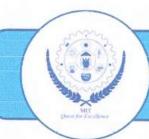
(04 Hrs)

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transmission of power through pipes.



Page 11 of 76



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Dimensional analysis and similitude: Rayleigh's method and Buckingham's 'pi' theorem, types of similarities, dimensionless numbers.

(04 Hrs)

	Sr. No.	Title	Author	Publication	Edition
	1.	A Textbook of Fluid Mechanics	Bansal R K. 2019.	Laxmi Publications, New Delhi	10 th
References	2.	Hydraulics, Fluid Mechanics & Hydraulic Machines.	Ramanathan S.	Dhanpat Rai & Sons, Delhi	16 th
	3.	Hydraulics, Fluid Mechanics and Hydraulic Machines.	Khurmi R S and Khurmi N.	S. Chand & Co. Ltd., New Delhi.	24 th
	4.	Hydraulics & Fluid Mechanics, including hydraulic machines.	Modi P N and Seth S M. 2017	Standard Book House, Delhi	24 th

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Faculty of Science & Technology Syllabus of Second Year B.Tech. (Agricultural Engineering) (Semester III)

Course Category: MDM Course Code: AED211

Course: Environment Impact Assessment Teaching Scheme: Theory: 2 Hrs./week Credits: 2-0-0
In Semester Examination-I: 15 Marks
In Semester Examination-II: 15Marks
Teacher Assessment: 10 Marks

Continuous Internal Evaluation: 10 Marks End Semester Examination: 50 Marks End Semester Examination (Duration): 2 Hr

	End Semester Examination (Duration): 2 Hrs.					
Prerequisite	Environmental science and concept of ecology.					
Objectives	 Students would overview the concepts, methods, issues, and various forms and stages of EIA process. Students will be able to examine the development of EIA in India and highlight the diversity of approach and impact of the EIA process. 					
Unit-I	Introduction and Evolution of EIA: Introduction to Environmental Impact Assessment, Origin of EIA, Stages in EIA, thorough discussion of steps in EIA. Establishments of Procedure: Legislative Option, Project Screening for EIA, Public Participation in EIA process. (02 Hrs)					
Unit-II	Impact Assessment: Background information, IA methods, environmental impact assessment methodology, documentation and selection process, environmental indices and indicators for describing the affected environment, and Life cycle assessment. (04 Hrs)					
Unit-III	Air and Noise Environment: Prediction and assessment of impact for air and noise environment, Basic information of air quality, identification of type and quantity of air pollutant, existing air quality and air quality standards, impact prediction and assessment, mitigation. Basic information of noise, existing noise levels and standards, prediction of noise levels and assessment of impact, mitigations. (05 Hrs)					
Unit-IV	Water and Soil Environment: Prediction and assessment of impact for water and so environment, Basic information of water quality (Surface water and groundwater), water quality standards, identification of impact, prediction of impact and assessment, mitigations Background information of soil environment, soil, and groundwater standards, prediction and assessment of impact for groundwater and soil, mitigations. (05 Hrs.					
Unit-V	Decision Methods for Evaluating Alternative: Public participation in environmental decision-making, Regulatory requirements, environmental impact assessment process, objectives of public participation, and verbal communication in EIA studies. (05 Hrs)					

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Page 13 of 76



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Unit-VI

Environmental Impact Assessment Report: Rapid and Comprehensive EIA, general structure of EIA document, Environmental management plan; post environmental monitoring. Latest EIA notification by Ministry of Environment and Forest (Govt. of India): Provisions in the EIA notification, Procedure for public hearing, post environmental monitoring, and obtaining Environmental clearance for construction projects.

(05 Hrs)

References	Sr. No.	Title	Author	Publication	Edition
	1.	Environmental Impact Assessment	Canter R.L.	Mc Graw Hill International	1 st
	2.	Environmental Impact Assessment Theory and Practice	Peter Watten (Eds.)	Unwin Hyman	2 nd
	3.	Environmental Impact Assessment	R.R. Barthwal	New Age International	1 St
	4.	Environmental Impact Analysis Handbook	John G. Rau and David C. Wooten	McGraw Hill Book Company	1 St

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Page 14 of 76



Faculty of Science & Technology

Syllabus of Second Year B.Tech. (All Branches) (Semester III)

Open Elective-1 offered by the Department of Basic Sciences and Humanities

Course Category: OEC Course Code: OEC241A

Course: Introduction to Sociology

Teaching Scheme: Theory: 03 Hrs./week

Credits: 3-0-0

In-Semester Examination -I: 15 Marks In-Semester Examination -II: 15Marks

Teacher Assessment: 10 Marks

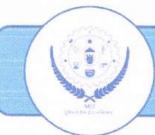
Continuous Internal Evaluation: 10 Marks

reaching sene	me. Theory. 05 His./week	End Semester Examination: 50 Marks End Semester Examination (Duration):02 Hrs.
Prerequisite	Communication Skills, critical thinking	skills.
Objectives	contexts. 3. Evaluate the impact of social factor 4. Analyze ethical issues related to en 5. Develop critical thinking skills for	theories and concepts. analyze social phenomena relevant to engineering s on engineering practices and outcomes.
Unit-I	science and its nature, Sociology as a mand early thinkers, perspectives in sociology and other sociology and other sociology.	n and subject matter of sociology, Sociology as a neans to establish social harmony, Scope of sociology ology, functionalist perspective, conflict perspective, ial sciences, society, evolution of societies, agrarian society, information society, tribal society, industrial (07 Hrs)
Unit-II	individual identity and behaviour,	ion and importance of socialization in shaping Primary socialization: Family, peers. Secondary and other social institutions, workplace, Cultural (06 Hrs)
Unit-III	and intersectionality, social institution institutions, need of an institution, of	cial stratification and mobility, Race, class, gender, ons (family, education, economy, politics), Social characteristics of institution, kinds of institutions, utions, difference between institution & community: n. (06 Hrs)
Unit-IV		ocial change, theories of change types of theories of offlict, factors of social change, resistance to change,

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Page 15 of 76



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Sociological Research Methods: Ethical Considerations in Sociological Research, Informed consent, confidentiality and anonymity, avoiding harm to participants, Research ethics review processes, Qualitative and Quantitative Research Methods, Ethnography, Participant observation, Interviews, Focus groups, Case studies, Surveys, Experiments, Content analysis, Secondary data analysis.

(07 Hrs)

Unit-VI

Engineering for Social Equity: Sociology of technology, Engineering ethics and social responsibility, Sociotechnical systems and their impacts, Introduction to the concept of the Bottom of the Pyramid (BoP) and its significance in global engineering. Ethical considerations in designing products and services for BoP markets. Innovative design approaches for affordability, accessibility, and sustainability in BoP contexts. Strategies for designing inclusive and equitable sociotechnical systems that prioritize human well-being and social justice. Sociological dimensions of emerging technologies (e.g., AI, biotechnology, renewable energy).

(07 Hrs)

References	Sr. No.	Title	Author	Publication	Edition
	1.	Sociology and Economics for Engineers	Premvir Kapoor	Khanna Book Publishing (2018)	1 st
	2.	Principles of Sociology - I	Dr. S.R Myneni	Allahabad law agency	2 nd

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Page 16 of 76



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Credits: 3-0-0

Faculty of Science & Technology

Syllabus of Second Year B.Tech. (All Branches) (Semester III)

Open Elective-1 offered by the Department of Civil Engineering

Course Category: OEC Course Code: OEC241B

Course: Technology for Rural Development Teaching Scheme: Theory: 03 Hrs./week In-Semester Examination -I: 15 Marks In-Semester Examination -II: 15Marks Teacher Assessment: 10 Marks

Continuous Internal Evaluation: 10 Marks End Semester Examination: 50 Marks

End Semester Examination (Duration): 02 Hrs.

	(
Prerequisite	No special requisites required
Objectives	 To understand the role of technology in the development of rural areas. To explore various technologies suitable for rural applications. To promote sustainable and inclusive development through technological interventions.
Unit-I	Introduction to Rural Development: Definition and scope of rural development Characteristics of rural areas in India Importance of rural development in national growth Government policies and programs for rural development. (06 Hrs.)
Unit-II	Agricultural Technologies: Advanced agricultural practices; Mechanization in agriculture Irrigation technologies Soil health and fertility management; post-harvest technologies. (06 Hrs
Unit-III	Renewable Energy Technologies: Solar energy: solar PV and thermal systems; Wind energy: small-scale wind turbines Biomass energy: biogas and biofuels; Micro-hydropowe systems; Implementation and case studies in rural areas. (07 Hrs.)
Unit-IV	Water and Sanitation Technologies: Safe drinking water technologies; Low-cos sanitation solutions; Water conservation techniques; Wastewater management; Community based approaches to water and sanitation. (06 Hrs
Unit-V	Advanced Irrigation Technologies: Automation in irrigation systems, Use of sensors and remote sensing in irrigation, Irrigation scheduling and management, Water-saving technologies and practices, Use of GIS in irrigation. (07 Hrs
Unit-VI	Rural empowerment: Causes of Rural Backwardness, Need for Rural technology Development and its Constraints, Rural Education with emphasis on Adult and Community Education, Development of Rural Women and Children- Status and Development Strategies. (07 Hrs



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	Sr. No.	Title	Author	Publication	Edition
	1	Rural Development: Principles, Policies, and Management	Singh, Katar	SAGE	1 st
References	2	Renewable Energy Engineering and Technology Principles and Practice	V. V. N. Kishore	TERI Press	1 st
	3	Rural Water Supply and Sanitation	Sharma J. K.	Adrent Publications and Distributors	5 th
	4	Irrigation Technology: Theory and Practice	S. B. Bhakar and Y. P. Rao	Agrotech Publishing Academy	2008
	5	Empowering Rural India: Experiments And Experiences	D. Sunder Raj, P. Siva Ram, R. Venkata Ravi	Kaniska Publishers Distributers	2006



Page 18 of 76

MIT Aurangabad (An Autonomous Institute)



Faculty of Science & Technology

Syllabus of Second Year B.Tech. (All Branches) (Semester III)

Open Elective-1 offered by the Department of Civil Engineering

Course Category: OEC Course Code: OEC241C

Course: Professional Ethics and Corporate Social

Responsibility

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Teaching Scheme: Theory: 03 Hrs./week

Credits: 3-0-0

In-Semester Examination -I: 15 Marks In-Semester Examination -II: 15Marks

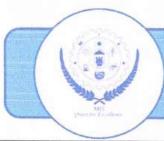
Teacher Assessment: 10 Marks

Continuous Internal Evaluation: 10 Marks End Semester Examination: 50 Marks

	•	End Semester Examination (Duration): 02 Hrs.
Prerequisite	No general prerequisites required	
Objectives	2. To identify, analyze, and resolve eth	fessional ethics in different organizational contexts. tical issues in business decision-making. Responsibilities and practices ine professional life
Unit-I		The Nature of Business Ethics; Ethical Issues in Blame; Utilitarianism: Weighing Social Costs and (06 Hrs)
Unit-II	Oligopolistic Competition; Oligopolies	ace: Perfect Competition; Monopoly Competition; s and Public Policy Professional Ethics and the and Resource Depletion; Ethics of Pollution Control ces. (07 Hrs)
Unit-III		tection: Markets and Consumer Protection; Contract consumers; Due Care Theory; Advertising Ethics; (06 Hrs)
Unit-IV		Responsibility: Concept, Scope & Relevance and Society. CSR and Indian Corporations- Lega Score Card, Future of CSR. (07 Hrs)
Unit-V		Sustainability: Potential Business Benefits-Triple management, Supplier relations; Criticisms and tion. (06 Hrs)
Unit-VI	Business in Sustainable Developm	Development: Sustainable Development, Role of ment, Sustainability Terminologies, Corporate and Corporate Social Responsibility, Government



Page 19 of 76



Chhatrapati Sambhajinagar

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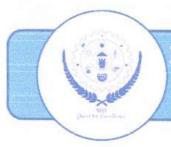
Role in improving Sustainability Reporting KYOSEI, Triple Bottom Line (TBL), Sustainability Reporting, Benefits of Sustainability Reporting, Global Reporting Initiative (GRI), Sustainability Reporting Framework Global Reporting Initiative (GRI) – Sustainability Reporting Guidelines UN Global Compact – Ten Principles, 2000, Sustainability Indices, Sustainability Reporting Framework in India, Challenges in Mainstreaming Sustainability Reporting.

(07 Hrs)

References	Sr. No.	Title	Author	Publication	Edition
	1	Business Ethics: Texts and Cases from the Indian Perspective	Ananda Das Gupta	Springer	1 st
	2	Business Ethics: Concepts and Cases	Manuel G. Velasquez.	Pearson	8 th
	3	Corporate Social Responsibility in India	Bidyut Chakrabarty	Routledge	1 st







Chhatrapati Sambhajinagar (An Automomeus-Institute)

Faculty of Science & Technology

Syllabus of Second Year B.Tech. (All Branches) (Semester III)

Open Elective-1 offered by the Department of Electrical Engineering

Course Category: OEC
Course Code: OEC241D

Course: Constitution of India

Teaching Scheme: Theory: 03 Hrs./week

Credits: 3-0-0

In-Semester Examination -I: 15 Marks In-Semester Examination -II: 15 Marks

Teacher Assessment: 10 Marks

Continuous Internal Evaluation: 10 Marks End Semester Examination: 50 Marks

End Semester Examination (Duration): 02 Hrs.

		End Semester Examination (Duration): 02 Hrs.
Prerequisite	No general prerequisites required	
Objectives	those to understand the most diversif it. 2. To make students aware of the t Parliamentary System.	es of constitutional development in India and hel fied legal document of India and philosophy behin theoretical and functional aspects of the India ards a basic understanding of the constitutional
Unit-I	Introduction to Constitution: Meaning Constitution; Brief Idea of Indian Constit	g and Concept of Indian Constitution; Nature of aution [Parts, Articles and Schedule]. (06 Hr.)
Unit-II	and most detailed Constitution of the Parliamentary system of Government; F	n: Written and Enacted Constitution; The longer the World; Rigidity and Flexible Constitution rederal system with unitary bias; Adult Franchise tic, Republic; Secularism; Directive Principles of damental Rights; Fundamental Duties.
Unit-III	Right to Freedom (Art19 to 22); Rig	ate (Art12); Right to Equality (Art14 to 18 th against Exploitation (Art23 & 24); Right theorities (Art29 & 30); Constitutional Remedie
Unit-IV		DPSPs): Meaning and Significance of Directiv P.S.P.; Relationship between F.Rs. and D.P.S.P. (07 Hrs
Unit-V	Executives Union Government the Pres State Government The Governor, Council	sident, Council of Ministers and Prime Minister of Ministers and Chief Minister. (06 Hrs

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Page 21 of 76



Chhatrapati Sambhajinagar

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Unit-VI

Election Commission: Election Commission: Role and Functioning; Chief Election Commissioner and Election Commissioners; State Election Commission: Role and Functioning; Institute and Bodies for the welfare of SC/ST/OBC and women.

(07 Hrs)

	Sr. No.	Title	Author	Publication	Edition
	1	Constitution of India, Bare Act.	Govt. of India.	Govt. of India.	49 th
References	2	Our Constitution (An Introduction of Indians Constitution and Constitutional Law	Subhash C. Kashyap	National Book Trust,	5 th
	3	Introduction to the Constitution of India	Basu D.D.	Lexis Nexis	21 st
	4	Indian Prime Minister	Sharma L.N.	Macmillan Company of India,	-
	5	Union Executive	Jain H.M.	Chaitanya Publishing House,	1 st
	6	Framing of Indian Constitution	Dr. S.N. Busi	New Age International Publisher	1 st

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Faculty of Science & Technology

Syllabus of Second Year B.Tech. (All Branches) (Semester III)

Open Elective-1 offered by the Department of Electrical Engineering

Course Category: OEC Course Code: OEC241E

Course: Electrical, Fire and Vehicle Safety Teaching Scheme: Theory: 03 Hrs./week Credits: 3-0-0
In-Semester Examination -I: 15 Marks
In-Semester Examination -II: 15Marks
Teacher Assessment: 10 Marks

Continuous Internal Evaluation: 10 Marks

me. Theory: 03 Hrs./week	End Semester Examination: 50 Marks End Semester Examination (Duration): 02 Hrs.	
 Basic understanding of physics and chemistry concepts Familiarity with engineering principles, including circuit theory Knowledge of automotive technology, including vehicle components and systems. 		
 Develop a comprehensive understanding of electrical safety principles and hazards. Analyze the causes and dynamics of fires and implement preventive measures. Examine safety protocols and regulations pertaining to vehicle electrical systems. Acquire practical skills in identifying, mitigating, and responding to safety risks. 		
OSHA Standards on Electrical Safety and Definitions, Objectives of Safety	d Safety Management: General Safety Provisions in Indian Electricity Rules, y, Basic Electrical Safety Rule as per OSHA, Terms and Security Measures, Effect of Electrical Current on ghting real-world examples of electrical fires and their	
Getting Electric Shock, Severity of El Its Effects, AC Shocks Versus DC Sho Overhead Transmission Lines, Preven	ocks, Occurrence of Electric Shock, Possibility of lectric Shock, Medical Analysis of Electric Shock and ocks, Shocks Due to Flashovers, Lightning Strokes on ation of Shocks, FIRST AID, Removal of Contact with tion, Schafer's Prone Pressure Method, Accident	
Class B fires, Class C Fires, Class D fi	Prevention: suses of initiation of fires, types of Fires Class A Fires, fires, Class E Fires, Fire Extinguishing techniques, Fire fres, Fire protection and loss prevention, step after (06 Hrs)	
	- Basic understanding of physics an - Familiarity with engineering prince - Knowledge of automotive technol 1. Develop a comprehensive underst 2. Analyze the causes and dynamics 3. Examine safety protocols and regularity 4. Acquire practical skills in identify Introduction to Electrical safety and General Background of Electricity, COSHA Standards on Electrical Safety and Definitions, Objectives of Safety the Human Body, Case studies highlig consequences. Electrical Shocks and their Prevention Primary and Secondary Electric shock Getting Electric Shock, Severity of Electring Electric Shocks Versus DC Shoverhead Transmission Lines, Prevent Live Conductor, Artificial Respirate Management and Safety Management. Introduction to Electrical Fire and Introduction, Terms and definition, call Class B fires, Class C Fires, Class D fired Hazard Analysis, Prevention of Firespirates.	

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Electrical Engineering

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Page 23 of 76

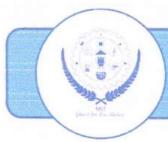


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Unit-IV	Fire Extinguisher and Fire Fighting System: Introduction, types of Fire Extinguisher, Water Fire Extinguisher, Foam Extinguishers, Dr. Powder and Carbon dioxide Extinguisher, Maintenance of Fire Extinguishers. Introduction to Fire Fighting System, types and Application, Fire Detection and Alarm System, Wate spray system. (07 Hrs.)						
Unit-V	Electronia Batter Safet	Introduction to Electric Vehicle and Safety: Electric Vehicle Architecture, Major Components, Types of Batteries, Lithium-Ion Batteries, Hazards in Electric Vehicle, Electric Motor safety, Power Electronics Circuits Safety, Safety at Charging Station. Case studies illustrating incidents of vehicle fires and lessons learned for prevention. (07 Hrs)					
Unit-VI	Introd Electronic regard	ew of Indian Electricity Rules and duction, Scope of IE Act and II rical Safety general Requirements ding First AID and Fire Fighting Sytandards.	Rules, Classifica as per IE Rules.	Indian Electricity	Installatio		
	Sr. No.	Title	Author	Publication	Edition		
	1.	Electrical Safety, Fire Safety Engineering & Safety Management	S. Rao	Khanna Publishers	4 th		
References	2.	Vehicle Battery Fires, Why They Happen and How they Happened	Gregory J. Barnett	SAE International Publication	1 st		
	3.	Electric Vehicle Technology Explained	James Larminie	John Wiley and sons	1 st		
	4.	Electric Vehicle Technology and Policy in India	Vishal Garg	Applied Science Publishers	1 st		
	5.	Practical Guide to Electrical Safety	R. K. Jain	Nabhi Publication	1 st		

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Faculty of Science & Technology

Syllabus of Second Year B.Tech. (All Branches) (Semester III)

Open Elective-1 offered by the Department of Mechanical Engineering

Course Category: OEC Course Code: OEC241F

Course: Emotional Intelligence

Teaching Scheme: Theory: 03 Hrs./week

Credits: 3-0-0

In-Semester Examination -I: 15 Marks In-Semester Examination -II: 15Marks

Teacher Assessment: 10 Marks

Continuous Internal Evaluation: 10 Marks End Semester Examination: 50 Marks

	End Semester Examination (Duration): 02 Hrs.		
Prerequisite			
Objectives	 To introduce the concept, models and components of emotional intelligence. To understand the significance of emotional intelligence in self-development and building effective relationships. 		
Unit-I	Introduction to Emotional Intelligence: Definition, Components of emotional intelligence, Introduction to emotions, Power emotions, Importance of emotional intelligence in personal life, define EQ, different between IQ and EQ, Theories of EI, Models of emotions. (06 H		
Unit-II	Understanding Emotions: The Brain and Emotion, The Relationship of Mood and Emotion, The Role of Emotion Organizational Health, Types of Emotions, Control of Emotions, Impulse Control Marshmallow Experiment- Negative and Positive Emotions, Emotion and Health, Temotional Brain & Amigdala Hijack. (06 H		
Unit-III	Emotional Intelligence Competence: Self-awareness, self-regulation, - Social Skills - Relationship Management- EI a Motivation. Emotional competence, Developing EI. (06 H		
Unit-IV	Managing Emotions: EI Assessment Tools, Emotional Intelligence and Psychological Adjustment, Issues in Anxiety, Stress, Depression, Anger, Self Esteem and Self-Management Empathy. Building a successful career using emotional intelligence, Handling stress and pressure in the workplace (07 Hrs.)		
Unit-V	EI Practice at Workplace: Emotional Intelligence and Decision Making, EI and Personality, Work Frustrations, EI a Work Performance, EI and Leadership, EI and Job Stress, EI and Information Processing		

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Page 25 of 76

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		and Communication, EI and views, career advancement and			(07 Hrs
Unit-VI	Proje	ects, Team dynamics and emotional Quality Management.			
	Sr. No.	Title	Author	Publication	Edition
References	1.	Emotional Intelligence: Why It can Matter More Than IQ	Daniel Goleman	Bantam Books	2012
	2.	Emotional Intelligence at Work: A Professional Guide	Daliph Singh	Response Books: New Delhi	2001
	3.	Emotional Intelligence in Everyday Life: A Scientific	Ciarruchi, J., Forgas, J. and	Taylor & Francis	2006

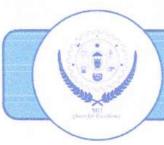
Inquiry

Emotional Intelligence 2.0

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Faculty of Science & Technology

Syllabus of Second Year B.Tech. (All Branches) (Semester III / IV)

Course Category: HSSM Course Code: HSM201

Course: Engineering Economics and Management

Credits: 2-0-0

In-Semester Examination-II: 10 Marks

Prerequisite	No general prerequisites required			
Objectives	 To introduce students to the fundamental principles of industrial management. To familiarize students with various aspects of industrial operations. To provide students with knowledge of real-world industrial management challenges. 			
Unit-I	Introduction to Engineering Economics: Introduction to Economics, Importance, ar scope of economics in engineering, Economic analysis and its role in project management Overview of economic principles and concepts relevant to engineering, Micro - and macro economics, economics of growth and development, Demand and supply analysis. (05 Hr			
Unit-II	Present value and future value analyst Diagrams, Categories & Computation,	ney: Interest rates, compounding, and discounting sis, Equivalent annual cost analysis. Cash Flow Calculations, Treatment of Salvage Value, Annuating Rate of Return, Incremental Analysis. (05 Hrs.)		
Unit-III	Lifecycle Costs, Budgets, Break-even Programming. Investment Analysis – N	Cost & Cost Control – Techniques, Types of Costs Analysis, Capital Budgeting, Application of Linea		
	value of money (present and future Elementary techniques.	e worth of cash flows). Business Forecasting		
Unit-IV	Elementary techniques.	e worth of cash flows). Business Forecasting (04 Hrs ganization, Elements of Organization, Types of		
Unit-IV Unit-V	Business Organization: Concept of org Business organization, Principles of Organizatio	ganization, Elements of Organization, Types of ganization, Organization structure. (04 Hrs.) (04 Hrs.) (04 Hrs.) (04 Hrs.) (15 Administration, Organization, Managerial skills ment Thought, Principles of Management, Function		

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Page 27 of 76



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	Sr. No.	Title	Author	Publication	Edition
	1.	Industrial Organization and Engineering Economics	T. R. Banga & S. C. Sharma	Khanna Publishers.	24 th
	2.	Industrial Engineering & Management	O. P. Khanna	Dhanpatrai Publications	8 th
References	3.	Essentials of Management	Harold Koontz (Author), Heinz Weihrich	McGraw-Hill Education	5 th
	4.	Human Resource Management: Text and Cases	K Aswathappa, Sadhna Dash	Tata McGraw-Hill	10 th
	5.	Marketing Management	G. Shainesh, Philip Kotler	McGraw-Hill Education	8 th

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Mechanical Engineering
MIT Aurangabad





Faculty of Science & Technology

Syllabus of Second Year B.Tech. (All Branches) (Semester III / IV)

Course Category: HSSM Course Code: HSM202

Course: Innovation and Entrepreneurship

Teaching Scheme: Theory: 02 Hrs./week

Credits: 2-0-0

In-Semester Examination-II: 10 Marks

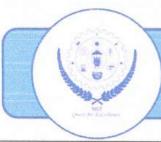
Teacher Assessment: 15 Marks

Prerequisite	There is no general prerequisite required		
Objectives	 Develop awareness about entrepreneurs and entrepreneurship. Describe the functions and characteristics of entrepreneurs and entrepreneurship. Discuss the concept of innovation and entrepreneurship. Identify concepts, principles, and strategies with reference to social entrepreneurship and social innovation. 		
Unit-I	Introduction to Entrepreneurship: Introduction, the concept of entrepreneurship, and social entrepreneurship, the definition of entrepreneurship, four types of entrepreneurships and entrepreneur, the importance of entrepreneurship, and characteristics of entrepreneurship. (04 Hrs)		
Unit-II	Innovation & Entrepreneurship: Definition of Innovation, Fundamentals of Innovation, Types of Innovation - Incremental, Disruptive, and Radical, The Innovation Process: from idea to execution The Innovation-Entrepreneurship Relationship, Entrepreneurial Mindset, Corporate Entrepreneurship, Social Impact Innovation. (04 Hrs)		
Unit-III	Creativity and Innovation: Foundations of Creativity and Innovations, Creative thinking process, Developing a creative mindset, Overcoming creative blocks, Exploring Types of Innovation through Case Studies (04 Hrs)		
Unit-IV	Entrepreneurship Development Process: Introduction, the process of entrepreneurship development, objectives of the entrepreneurship development program, the process of entrepreneurship development, entrepreneurship development, and start-up India, Indian entrepreneurship development challenges. (05 Hrs.)		
Unit-V	Entrepreneurship as Innovation and Problem-Solving: Entrepreneurs as problem solvers, innovations, and entrepreneurial ventures – global and Indian role of technology – e-commerce and social media, social entrepreneurship – concept. (04 Hrs)		

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Page 29 of 76



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Unit-VI

Social Entrepreneurship and Social Innovation: Understanding Social Entrepreneurship and Social Innovation, The Social Entrepreneurial Mindset and Skills, Identifying Social Needs and Opportunities, Social Enterprise Models, Funding Sources for Social Enterprises and Innovations, Impact Investing, and Social Venture Capital.

(05 Hrs)

	Sr. No.	Title	Author	Publication	Edition
	1.	Entrepreneurship	Robert Hisrich and Michael Peters	Tata Mc Graw- Hill	11th
	2.	Entrepreneurial Development	Vasant Desai	Himalaya Publishing House (1991)	-
	3.	Entrepreneurship – Strategies and Resources	Marc J Dollinger	Marsh Publications	4th
References	4.	The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail.	Christensen, C.M.	Harvard Business Review Press. (2016)	-
	5.	Social Entrepreneurship: What Everyone Needs to Know.	Bornstein, D., & Davis, S	Oxford University Press. (2010)	-
	6.	Impact Investing: Transforming How We Make Money While Making a Difference	Bugg-Levine, A., & Emerson, J.	Wiley (2011)	-
MOOC Courses Links	 https://onlinecourses.swayam2.ac.in/cec24_mg08/preview https://onlinecourses.nptel.ac.in/noc20_mg35/preview https://onlinecourses.nptel.ac.in/noc21_mg63/preview 				
Weblink	✓ h ✓ h	nttps://ebooks.inflibnet.ac.in/hsp nttps://ocw.mit.edu/collections/e nttps://www.youtube.com/playli- nttps://www.youtube.com/watch nttps://digitalleadership.com/blo	ntrepreneurship/ st?list=PLb5SyhPhDy ?v=0Hv-sMeNKGQ		

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	-	nce & Technology . (All Branches) (Semester III / IV)	
	ry: VEC	Credits: 1-0-1 In-Semester Examination-II: 10 Marks Teacher Assessment: 15 Marks	
Prerequisite	No general prerequisites are required		
Objectives	ensure sustained happiness and human beings. 2. To facilitate the development of personal and professional lives in 3. To highlight plausible implications.	ions of such a holistic understanding in terms al and mutually fulfilling human behavior, as	all eir of
Unit-I	Introduction to Value Education Understanding Value Education Self-exploration as the Process for Continuous Happiness and Prosp Fulfilment Right Understanding, Relationsh Happiness and Prosperity - Curre Method to Fulfil the Basic Human	ip and Physical Facility ent Scenario n Aspirations	
Unit-II	Harmony in the Human Being Understanding Human being as to Distinguishing between the Need The Body as an Instrument of the Understanding Harmony in the Substitution Harmony of the Self with the Body Programme to Ensure self-regular	he Co-existence of the Self and the Body s of the Self and the Body Self elf dy tion and Health	2 Hrs
Unit-III	Harmony in the Family Harmony in the Family - the Basic Unit of Human Interaction "Trust' - the Foundational Value in Relationship Respect' - as the Right Evaluation Values in Human-to-Human Relationship (02 Hr		
Unit-IV	 Harmony in the Society Other Feelings, Justice in Human Understanding Harmony in the S Vision for the Universal Human 	-to-Human Relationship ociety Order	2 Hrs)

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Page 31 of 76



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	Harmony in the Nature (Existence)
Unit-V	Understanding Harmony in the Nature
	 Interconnectedness, self-regulation and Mutual Fulfilment among the Four Orders of Nature
	Realizing Existence as Co-existence at All Levels
	The Holistic Perception of Harmony in Existence
	(02 Hrs)
	Implications of the Holistic Understanding - a Look at Professional Ethics
	Basis for Universal Human Values
	Definitiveness of (Ethical) Human Conduct
	 Professional Ethics in the light of Right Understanding
Unit-VI	A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order
	 Holistic Technologies, Production Systems and Management Models Typical Case Studies
	Strategies for Transition towards Value-based Life and Profession
	(03 Hrs)

	Sr. No.	Title	Author	Publication	Edition	
	1.	Science and Humanism	P.L. Dhar, RR Gaur	Commonwealth Publishers	1 st	
	2.	Jeevan Vidya: Ek Parichaya	Nagaraj	Jeevan Vidya Prakashan, Amarkantak	1999	
	3.	Human Values	A. N. Tripathy	New Age International Publishers	2003	
References	4.	Fundamentals of Ethics for Scientists & Engineers	E. G. Seebauer & Robert L. Berry	Oxford University Press	1 st	
	5.	Engineering Ethics and Human Values	M. Govindrajan, S. Natrajan & V.S. Senthil Kumar	Eastern Economy Edition, Prentice Hall of India Ltd.	1 st	
	6.	Foundations of Ethics and Management	B. P. Banerjee	Excel Books	2005	
	7	Indian Ethos and Modern Management	B. L. Bajpai	New Royal Book Co., Lucknow.	2004 Reprinted 2008	
	1. I	nttp://madhyasth-darshan.info/j	postulations/knowledg	ge/knowledge-of-humane-co	onduct/	
F D	2. https://www.youtube.com/channel/UCQxWr5QB_eZUnwxSwxXEkQw					
E-Resources	100	https://youtu.be/OgdNx0X9231 https://fdp-si.aicte-india.org/U		Maccione nhn		
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Page 32 of 76



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Faculty of Science & Technology Syllabus of Second Year B.Tech. (All Branches) (Semester III / IV)

Course Category: VEC Course Code: VEC202

(An Autonomous Institute)

Credits: 1-0-1

In-Semester Examination -II: 10 Marks

	me: Theory: 01 Hr/week, Practical: 02 Hrs/Week	Teacher Assessment: 15 Marks	
Prerequisite	Understanding of the Concept of Environment and ecos		
Objectives	 To study different types of natural resources. Knowledge and concept of biodiversity and its conservation. Basic knowledge and concept of causes, effects, and control of different types environmental pollution. To study population growth and its impact on the environment 		
Unit-I	Introduction to environmental studies and natural resources: Definition, scope a importance and need for public awareness. Natural resources: Forest resources: Use and over-exploitation, deforestation. Timber extraction. Water resources: Use and over-utilization of surface and ground water, floods, droug conflicts over water, dams benefits and problems. Mineral resources: Use and exploitation, environmental effects of extracting and us mineral resources.		
Unit-II	by agriculture and overgrazing, effect water logging, salinity. Energy reso renewable energy sources, and use of	ood resources: World food problems, changes caused sof modern agriculture, fertilizer-pesticide problems urces: Growing energy needs, renewable and non-falternate energy sources. Land resources: Land as a ed landslides, soil erosion, and desertification. (02 Hrs.)	
Unit-III	Ecosystems: Concept of an ecosystem. Structure and function of an ecosystem. Product consumers, and decomposers. Energy flow in the ecosystem. Ecological succession. For chains, food webs, and ecological pyramids. Introduction, types, characteristic feature structure, and function of the following ecosystems: Forest ecosystem, Grassla ecosystem, Desert ecosystem, and Aquatic ecosystems (ponds, streams, lakes, rive oceans, estuaries).		
Unit-IV	Biodiversity and its conservation: Introduction – Definition: genetic, species, ar ecosystem diversity. Biogeographical classification of India. Threats to biodiversity: habit loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of Ind Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity. (02 Hr		

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Page 33 of 76



Unit-V	Environmental Pollution: Definition, Cause, effects, and control measures of Ai pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Therma pollution, nuclear hazards, Role of an individual in the prevention of pollution. (03 Hrs				
Unit-VI	Social Issues and the Environment: From Unsustainable to sustainable development Urban problems related to energy. Climate change, global warming, acid rain, ozone laye depletion Environment Protection Act. Public awareness. (02 Hrs				
List of Exercise	2. S 3. S 4. C 5. P 6. S 7. A 8. V 9. C	study of a local hilly area to distudy of a forest area as an entitudy assignment on sustainable as study on landslide. Poster making on food chain, study of hotspots of biodiversity assignment on causes, effects Working out a plan of roof top case study on resettlement and ctivities such as dams, mining	vironmental asset. ble development goal, food web and ecologi ity in India as a mega and control measures o rainwater harvesting d rehabilitation of peo	'No Hunger'. cal pyramids. diversity nation. s of urban and industrial wa for a house.	
		isit to local polluted site	5, 010.		
	Sr.	risit to local polluted site	Author	Publication	Edition
9	Sr. No.			Publication Nidi Publ. Ltd. Bikaner (2001)	
3	No.	Title	Author	Nidi Publ. Ltd. Bikaner (2001) Mapin Publishing Pvt.	
References	No. 1.	Title Environmental Biology The Biodiversity of India Global Biodiversity Assessment	Author Agarwal, K.C.	Nidi Publ. Ltd. Bikaner (2001)	Edition -
References	No. 1. 2.	Title Environmental Biology The Biodiversity of India Global Biodiversity	Author Agarwal, K.C. Bharucha Erach Heywood, V.H &	Nidi Publ. Ltd. Bikaner (2001) Mapin Publishing Pvt. Ltd., Ahmedabad Cambridge Univ. Press	Edition -
References	No. 1. 2. 3.	Title Environmental Biology The Biodiversity of India Global Biodiversity Assessment Environmental Protection	Author Agarwal, K.C. Bharucha Erach Heywood, V.H & Waston Jadhav, H &	Nidi Publ. Ltd. Bikaner (2001) Mapin Publishing Pvt. Ltd., Ahmedabad Cambridge Univ. Press (1995) Himalaya Pub. House,	Edition - 1st

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Page 34 of 76



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Faculty of Science & Technology Syllabus of Second Year B.Tech. (All Branches) (Semester III)

Course Category: ELC Course Code: ELC221

Credits: 0-0-2

	munity Engagement Project eme: Practical: 04 Hrs/Week Teacher Assessment: 25 Marks			
Course Description	The "Community Engagement Project" course is designed to provide students with field-based learning experiences that integrate their theoretical knowledge of major discipline of engineering with real-life socio-economic issues. Students will engage in projects that address community needs, enhancing their understanding of the role of engineering in society and developing their problem-solving and communication skills.			
Objectives	 To expose students to socio-economic issues and challenges in society. To apply theoretical knowledge to develop practical solutions to real-life problems. To enhance students' communication, teamwork, and project management skills. To foster a sense of social responsibility and ethical awareness among students. 			
Learning Outcomes	By the end of the course, students will be able to: 1. Identify and analyze socio-economic issues in the community. 2. Apply engineering principles to propose and implement solutions to community problems. 3. Work effectively in teams to achieve project goals. 4. Communicate project findings and solutions effectively in written and oral forms. 5. Reflect on the social impact of their projects and their role as engineers in society.			
Implement ation guidelines	 A group of four students, under the guidance of faculty mentors, conduct a Socioeconomic Survey of the nearby area/ habitation. They will interact with people and conduct the survey using a structured questionnaire. The group of students will choose a topic related to their subject area relevant to their major discipline and conduct a Project which includes data collection and analysis and a conclusion/ solution on a selected problem. Students should submit a project report duly signed by the mentor. Assessment should be done by a mentor continuously (Rubrics based) 			
	1. Field Work and Engagement (40%)			

Assessment Methodology Quality and effectiveness of community engagement.

o Depth of data collection and analysis.

Ability to identify and understand community issues.

2. Project Implementation (30%)

Creativity and feasibility of proposed solutions.

Effectiveness of implementation.

o Adaptation and problem-solving during implementation.

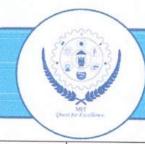
3. Reports and Documentation (20%)

Documentation of data, process, and outcomes.

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Page 35 of 76

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- Reflection on personal learning and project impact.
- 4. Presentation (10%)
 - o Clarity and effectiveness of oral presentation.
 - o Ability to communicate project findings and solutions.
 - Engagement with audience and response to questions.

Rubrics for Assessment:

	i e	1	1		
Criteria	Excellent (5)	Good (4)	Satisfactory (3)	Needs Improvement (2)	Inadequate (1)
Field Work and Engagement	Thorough and insightful engagement with the community. Extensive data collection and deep understanding of issues.	Effective engagement with the community. Adequate data collection and good understanding of issues.	Satisfactory engagement with the community. Basic data collection and understanding of issues.	Limited engagement with the community. Incomplete data collection and understanding of issues.	Minimal or no engagement with the community. Poor or no data collection and understanding of issues.
Project Implementation	Innovative and highly feasible solutions. Effective implementation with positive impact.	Creative and feasible solutions. Good implementation with noticeable impact.	Basic but feasible solutions. Satisfactory implementation with some impact.	Limited creativity in solutions. Ineffective implementation with minimal impact.	No feasible solutions. Poor or no implementation with no impact.
Reports and Documentation	Comprehensive and clear reports. Thorough documentation of process and outcomes. Reflective insights.	Clear and detailed reports. Good documentation of process and outcomes. Some reflective insights.	Adequate reports. Basic documentation of process and outcomes. Limited reflective insights.	Incomplete or unclear reports. Inadequate documentation of process and outcomes. Minimal reflective insights.	Poor or no reports. No documentation of process and outcomes. No reflective insights.
Presentation	Highly effective and engaging presentation. Clear communication of findings and solutions.	Effective presentation. Clear communication of findings and solutions.	Satisfactory presentation. Basic communication of findings and solutions.	Unclear or disorganized presentation. Limited communication of findings and solutions.	Poor or no presentation. Unable to communicate findings and solutions.

Suggested Reading Materials and Resources:

- 1. Book: "The Community Engagement Professional in Higher Education" by Lina D. Dostilio
- 2. Web Resources: IEEE Xplore Digital Library for research papers on community engagement projects. Also, refer websites of NGOs and community organizations for case studies and project ideas.

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Page 36 of 76



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Faculty of Science & Technology Syllabus of Second Year B.Tech. (All Branches) (Semester III)

Course Category: Seminar Course Code: SEM222

Course: Seminar

Teaching Scheme: Practical: 02 Hrs/Week

Credits: 0-0-1

Teacher Assessment: 25 Marks

Course Description

The Seminar course is designed to develop students' research, presentation, and communication skills through the preparation and presentation of seminars. The topics for the seminars will be related to the **Open Elective-1 Course chosen** by the students. Under the supervision of faculty, students will engage in independent research, organize their findings, and present them effectively to their peers and faculty members. This course aims to enhance students' ability to communicate complex ideas clearly and confidently, fostering a deeper understanding of their elective subjects.

The assessment for the Seminar course will be based on continuous evaluation of the following components:

- 1. Topic Selection and Proposal (20%)
 - o Relevance and appropriateness of the selected topic.
 - Clarity and feasibility of the seminar proposal.
- 2. Literature Review (20%)
 - Depth and thoroughness of the literature review.
 - Use of credible and relevant sources.

Assessment Methodology

- 3. Seminar Outline and Content Development (20%)
 - Logical organization and structure of the seminar.
 - o Clarity and coherence of the content.
 - Integration of theoretical concepts with practical examples.
- 4. Presentation Skills (20%)
 - o Clarity, confidence, and engagement during the presentation.
 - o Effective use of visual aids and multimedia.
 - o Ability to handle questions and engage in discussion.
- 5. Seminar Report (20%)
 - Quality and thoroughness of the written seminar paper.
 - o Proper formatting, citations, and adherence to guidelines.

Guidelines for Implementation:

- 1. Supervision and Guidance:
 - Faculty members will supervise the seminar preparation and presentation process.
 - Regular meetings will be scheduled for discussing progress and providing feedback.
- 2. Topic Selection:
 - Students will select topics related to their open elective courses.
 - o Topics must be approved by the supervising faculty.
- 3. Literature Review:
 - Students will conduct a thorough literature review using credible academic sources
 - o An annotated bibliography will be prepared as part of the assessment.
- 4. Seminar Preparation:
 - Students will develop a detailed outline and structure for their seminar.

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Page 37 of 76



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- Visual aids and multimedia tools will be used to enhance the presentation.
- 5. Presentation:
 - o Students will present their seminars to peers and faculty.
 - Each presentation will be followed by a Q&A session.
- 6. Final Submission:
 - A written seminar report summarizing the research and presentation will be submitted.
 - o Proper formatting and citation guidelines must be followed.

Rubrics for Assessment:

Criteria	Excellent (5)	Good (4)	Satisfactory (3)	Needs Improvement (2)	Inadequate (1)
Topic Selection and Proposal	Highly relevant and innovative topic. Clear and feasible proposal.	Relevant and clear topic. Feasible proposal with minor improvements needed.	Adequate topic. Proposal is clear but lacks innovation.	Topic relevance is questionable. Proposal lacks clarity and feasibility.	Irrelevant or inappropriate topic. Poor or no proposal.
Literature Review	Comprehensive and insightful review. Uses a wide range of credible sources.	Thorough review with mostly credible sources.	Adequate review with some credible sources. Basic synthesis of information.	Limited review with few credible sources. Weak synthesis and analysis.	Poor or no review with irrelevant or no credible sources. No synthesis or analysis.
Seminar Outline and Content Development	Clear, logical, and well-organized outline. Content is comprehensive and well-developed.	Good outline and organization. Content is clear with minor gaps.	Adequate outline with some organization. Content covers basic points.	Poorly organized outline. Content is incomplete or lacks coherence.	No clear outline. Content is disorganized and lacks substance.
Presentation Skills	Engaging, clear, and confident presentation. Effective use of visual aids. Handles Q&A expertly.	Clear and confident presentation. Good use of visual aids. Handles Q&A adequately.	Adequate presentation with some clarity issues. Basic use of visual aids. Manages Q&A with difficulty.	Unclear or hesitant presentation. Limited use of visual aids. Struggles with Q&A.	Poor or no presentation. Ineffective or no use of visual aids. Unable to handle Q&A.
Seminar Report	Thorough and well- written Report. Proper formatting and citations. Reflects deep understanding.	Good Report with minor errors. Mostly proper formatting and citations. Shows good understanding.	Adequate Report with some errors. Basic formatting and citations. Shows basic understanding.	Poorly written Report with many errors. Inadequate formatting and citations. Limited understanding.	No or very poorly written Report. Incorrect or no formatting and citations. Lacks understanding.

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Faculty of Science & Technology

Syllabus of Second Year B.Tech. (Agricultural Engineering) (Semester III)

Course Category: PCC Course Code: AED223

Course: Strength of Materials Lab

Teaching Scheme: Practical: 02 Hrs/Week

Credits: 0-0-1

Teacher Assessment: 25 Marks

End Semester Oral Examination: 25 Marks

Objectives

List of

Practical

- 1. To learn about the concept of stress, strain and deformation of solid and state of stress.
- To learn the bending moment, shear force and the corresponding stress distribution for different types of beams.
- 3. To know the concepts of strain energy, principal stress and principal planes.

•

- 1. Study of the universal testing machine.
- 2. Tension test on ductile materials like mild steel and TOR steel.
- 3. Flexural test on timber beam.
- 4. Shear test on metals.
- 5. Compressive Strength Test on Burnt Clay Building Bricks.
- 6. Water absorption test on burnt bricks.
- 7. Transverse test on flooring tiles.
- 8. Abrasion test on flooring tiles.
- 9. Impact tests on metals-Izod and Charpy.
- 10. Torsion test on steel.
- 11. Rockwell Hardness test.
- 12. Deflection of Beam.
- 13. Study the Buckling of a column.
- 14. Study the Defection of Spring

Note: A minimum of 10 practicals Should be performed.

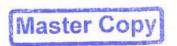
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		ence & Technology Agricultural Engineering) (Semester III)
Hyd		Credits: 0-0-1 Teacher Assessment: 25 Marks End Semester Oral Examination: 25 Marks
Objectives	 Understanding Fundamental Pr Application of Theoretical Kno Development of Experimental S 	wledge
List of Practical	flow, rotational flow 3. Determination of meta-centric 4. calibration of V-Notch 5. Calibration of rectangular notch 6. Determination of friction in pip 7. Determination of coefficient of 8. Verification of Bernoulli's theo 9. Determination of the coefficient 10. Determination of coefficient of 11. Measurement of velocity by cu 12. Determine the Reynolds number 13. Study of open channel flow: v	height hoses Gdischarge of venturi meter orem at of discharge for the mouthpiece Gdischarge for rectangular and triangular notch rrent meter er relocity distribution in open channels and determination gosity and Chezy's roughness coefficient

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Semester-IV Detail Course Curriculum

Second Year B. Tech Syllabus (Agricultural Engineering)

(NEP 2020 Based Curriculum)
WEF AY 2024-25





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Faculty of Science & Technology

Syllabus of Second Year B.Tech. (Agricultural Engineering) (Semester IV)

Course Category: PCC Course Code: AED 251

Course: Soil and Water Conservation Engineering

Teaching Scheme: Theory: 03 Hrs./week

Credits: 3-0-0

In-Semester Examination-I: 15 Marks In-Semester Examination-II: 15Marks Teacher Assessment: 10 Marks

Continuous Internal Evaluation: 10 Marks End Semester Examination: 50 Marks

End Semester Examination (Duration):02 Hrs.

Prerequisite	Basic knowledge about watershed hydrology and watershed
Objectives	Study of soil erosion problems caused by natural erosive agents. 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. (07 Hrs.)
Unit-II	Soil Loss Estimation - universal soil loss equation and modified soil loss equation determination of their various parameter's rainfall erosivity and erodibility, sedimentation in reservoirs and streams, estimation and measurement, sediment delivery ratio, trajefficiency. (07 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. (06 Hrs
Unit-IV	Erosion Control Measures- Agronomical measures - contour cropping, strip cropping mulching, wind erosion- mechanics, wind breaks and shelter belts, mechanical measures bunds - contour bunds, graded bunds. (07 Hrs
Unit-V	Terracing – functions, classifications, level and graded broad base terraces and thei design, bench terraces, layout procedure, terrace planning. (06 Hrs
Unit-VI	Grassed Waterways- basic terminologies, uses, applicability, design aspects, various cross sections, specifications and their design, numerical. (06 Hrs.)

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Page 43 of 76



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	Sr. No.	Title	Author	Publication	Edition
	1.	Manual of Soil & Water Conservation Engineering	Gurmel Singh, C. Venkataramanan, G. Sastry & B. P. Joshi	Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.	6 th
References	2.	Soil & Water Conservation Engineering	R. Suresh	Standard Publishers, New Delhi	4 th
	3.	Soil & Water Conservation Engineering	G. O. Schwab, D.D. Fangmeier, W. J. Elliot & R. K. Frevert	John Wiley & Sons, Inc. New York	3 rd

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Faculty of Science & Technology Syllabus of Second Year B.Tech. (Agricultural Engineering) (Semester IV)

Course Category: PCC Course Code: AED 252

Course: Post Harvest Engineering

Teaching Scheme: Theory: 02 Hrs./week

Credits: 2-0-0 In-Semester Examination-I: 15 Marks In-Semester Examination-II: 15Marks

Teacher Assessment: 10 Marks

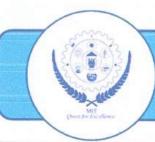
Continuous Internal Evaluation: 10 Marks End Semester Examination: 50 Marks

		End Semester Examination (Duration): 02 Hrs.
Prerequisite	Knowledge of basic engineering physics	
Objectives	quality and extending the shelf life of 2. Post-Harvest Technology: To learn applications in minimizing losses an	about various post-harvest technologies and their d maintaining product quality. nowledge on the methods of processing, packaging,
Unit-I	losses in agricultural commodities struct optimum stage of harvest, the impo	g of crops – objectives – post-harvest systems and ure, engineering properties of agricultural materials, ortance of loss reduction; Post-harvest handling Moisture content, RH measurement, air-grain (04 Hrs)
Unit-II	scalping, Grain grading system, Scre cleaner- and capacity, effectiveness of so magnetic, disc, spiral, pneumatic, inclin	Machinery for cleaning and grading, aspiration, tens and sieves-Types, classification, Air screen creens. Various types of separators- specific gravity, and draper, velvet roll, colour sorters, cyclone, the rformance index, hydrothermal treatment, and (04 Hrs)
Unit-III		Kick's law, Rittinger's law, procedure (crushing, action machinery: Jaw crusher, Hammer mill, Plate
Unit-IV	hysteresis effect, EMC determination. principles and theory, Thin layer and dec	und and equilibrium moisture content, isotherm, Psychrometric chart and its use in drying. Drying ep bed drying analysis, Falling rate and constant rate ng drying rate period. Drying equations, Mass and

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Page 45 of 76



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Unit-V

Material Handling: Introduction to different conveying equipment used for handling of grains, fruits and vegetables; Scope and importance of material handling devices Classification, principles of operation, conveyor system selection/design. Belt conveyor Principle, characteristics, relationship between belt speed and width, capacity, inclined belt conveyors, idler spacing, belt tension, drive tension, belt tripper. Chain conveyor -Principle of operation, advantages, disadvantages, capacity and speed, conveying chain. Screw conveyor Principle of operation, capacity, power, troughs, loading and discharge, inclined and vertical screw conveyors. Bucket elevator Principle, classification, operation, advantages, disadvantages, capacity, speed, bucket pickup, bucket discharge, relationship between belt speed, pickup and bucket discharge, buckets types, power requirement. Pneumatic conveying system types, air/product separators; Gravity conveyor design considerations, capacity and power requirement.

(04 Hrs)

Unit-VI

Principles and Practice of Storage: Importance of scientific storage systems, post-harvest physiology of semi-perishables and perishables. Damages Direct damages, indirect damages, causes of spoilage in storage (moisture, temperature, humidity, respiration loss, heat of respiration, sprouting), destructive agents (rodents, birds, insects, etc.), sources of infestation and control. Storage structures: Traditional storage structures, improved storage structures, modern storage structures; Farm silos Horizontal silos, tower silos, pit silos, trench silos, size and capacity of silos. Storage of perishables Cold storage controlled and modified atmospheric storage, hypobaric storage, evaporative cooling storage, conditions for storage of perishable products, control of temperature and relative humidity inside storage. Integrated Pest management for grain, fumigation and controlled atmosphere storage of food grains, Rodent Control.

(06 Hrs)

References	Sr. No.	Title	Author	Publication	Edition
	1.	Unit Operations of Agricultural Processing.	Sahay K. M. and K.K. Singh	Vikas Publishing House	2 nd
	2.	Post Harvest Technology of Cereals, Pulses and Oilseeds.	A. Chakraverty	Oxford & IBH Publishing	3rd
	3.	Unit operations in Food processing.	Earle, R. L.	Pergamon Press, New York.	2 nd
	4.	Agricultural Process Engineering.	Henderson, S.M., and Perry, R. L.	Chapman and hall, London	3 rd

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Page 46 of 76



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Faculty of Science & Technology Syllabus of Second Year B. Tech. (Agricultural Engineering) (Semester IV)

Course Category: PCC Course Code: AED 253

Course: Irrigation and Drainage Engineering

Teaching Scheme: Theory: 02 Hrs./week

Credits: 2-0-0

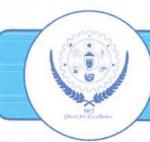
In-Semester Examination-I: 15 Marks In-Semester Examination-II: 15Marks

Teacher Assessment: 10 Marks

Continuous Internal Evaluation: 10 Marks End Semester Examination: 50 Marks

	End Semester Examination (Duration): 02 Hrs.		
Prerequisite	Importance of waterways and irrigation for the agricultural yield		
Objectives	 To understand the methods of irrigation and the impact on the agricultural fields. To understand the issue of drainage and the remedies of the same for improvements in the agricultural cases. 		
Unit-I	Irrigation— the purpose of irrigation, merits and demerits of irrigation, source of irrigation water, the present status of development and utilization of different water resources of the country, major and medium irrigation schemes of India, and the environmental impact of irrigation projects. Measurement of irrigation water: weir, flumes orifices and other methods like water-volumetric measurement, velocity area method, tracers etc. (04 Hrs)		
Unit-II	Open Channel Water Conveyance System: Design and lining of irrigation field channels on farm structures for water conveyance, control & distribution; Underground pipe conveyance system: components and design; Land grading; criteria for land leveling, land leveling design methods. (04 Hrs)		
Unit-III	Soil-Water-plant Relationship: soil properties influencing irrigation management, soil water movement, infiltration, soil water potential, soil moisture characteristics, soil moisture constants, measurement of soil moisture, moisture stress and plant response; Water requirement of crops: the concept of evapotranspiration (ET), measurement and estimation of ET, water and irrigation requirement of crops, depth of irrigation, frequency of irrigation, irrigation efficiencies. (05 Hrs)		
Unit-IV	Surface Methods of Water Application: border, check basin and furrow irrigation-adaptability, specifications, design considerations and hydraulic. (03 Hrs)		
Unit-V	Water Logging and Soil Salinity Causes and Impacts: familiarization with the state and the country's water logging and soil salinity problems. Land drainage: Definition, objectives, history, and importance in agriculture; Drainage requirement of crops - factors influencing drainage; Drainage criteria and types - agricultural drainage criterion, factors and formulation, drainage coefficient: meaning, determination method. (05 Hrs)		

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Unit-VI

Surface Drainage Systems: Random, parallel field, parallel open ditch, and bedding systems, determination of drainage coefficient, design of surface drainage systems - section, alignment, field structures, construction, and maintenance. Sub-surface drainage: Random drains, gridiron system, herringbone system, interceptor, and relief drains. Operation and maintenance, Derivation of Hooghoudt's and Ernst's drain spacing equations.

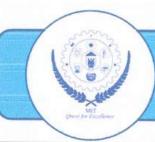
(05 Hrs)

References	Sr. No.	Title	Author	Publication	Edition
	1.	Principles of Agricultural Engineering Vol-II. 5th Edition.	Michael A M and Ojha T. P.	Jain Brothers Publication, New Delhi	2 nd
	2.	Irrigation: Theory and Practice.	Michael A M.	Vikas Publishing House, New Delhi.	2 nd
	3.	Land and Water Management Engineering	Murthy V. V. N. 2013.	Kalyani Publishers, New Delhi	6 th
	4.	Land Drainage, Principles, Methods and Applications.	Bhattacharya A K and Michael A M. 2013.	Vikas Publication House, Noida (UP).	1 st

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Agricultural Engineering
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Page 48 of 76



Chhatrapati Sambhajinagar
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Faculty of Science & Technology Syllabus of Second Year B.Tech. (Agricultural Engineering) (Semester IV)

Course Category: MDM Course Code: AED261

Course: Climate Change in Agriculture Teaching Scheme: Theory: 02 Hrs./week Credits: 2-0-0

In-Semester Examination-II: 15 Marks In-Semester Examination-II: 15Marks Teacher Assessment: 10 Marks

Continuous Internal Evaluation: 10 Marks End Semester Examination: 50 Marks

End Semester Examination (Duration): 02 Hrs

		End Semester Examination (Duration): 02 Hrs.
Prerequisite	Basic knowledge of environmental scien Fundamental understanding of agricultur	
Objectives	 To comprehend the effects of climat To learn and evaluate various strateg agricultural contexts. 	c change on agricultural systems and food security. gies for mitigating and adapting to climate change in agricultural practices and their implementation for
Unit-I		nition, causes, and consequences of climate change climate patterns; the greenhouse effect and globa (04 Hrs
Unit-II		ture: How climate change affects crop production, ease dynamics; case studies of affected regions and
Unit-III		Practices to reduce greenhouse gas emissions: sequestration, renewable energy use, and policy (04 Hrs)
Unit-IV		Techniques for adapting agricultural practices to iffication, irrigation management, soil conservation, (05 Hrs)
Unit-V		Overview of CSA, its principles, and practices; olicies and programs; case studies of CSA
Unit-VI		Climate: Predicting future climate scenarios and research and innovation in climate-resilient

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Agricultural Engineering

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Page 49 of 76



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	Sr. No.	Title	Author	Publication	Edition
	1.	Climate Change: The Science, Impacts and Solutions	A. Barrie Pittock	CSIRO Publishing	2 nd
	2.	Climate Change and Crop Production	Matthew P. Reynolds	CABI Publishing	1 st
References	3.	Climate Change Mitigation and Agriculture	Eva Wollenberg, M.L. Tapio-Bistrom, Michael Main	Earthscan Publications	1 st
	4	Adapting Agriculture to Climate Change	Chris Stokes, Mark Howden	CSIRO Publishing	1 st
	5	Climate-Smart Agriculture: Building Resilience to Climate Change	Leslie Lipper, Nancy McCarthy, David Zilberman, Solomon Asfaw, Giacomo Branca	Springer	1 st
	6.	Agriculture and Climate Beyond 2015	J.S. Samra, P.S. Minhas, Raj K. Gupta	Indian Council of Agricultural Research	1 st







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Faculty of Science & Technology

Syllabus of Second Year B.Tech. (All Branches) (Semester IV)

Open Elective-2 offered by the Department of Agricultural Engineering

Course Category: OEC Course Code: OEC291A

Course: Smart Agriculture Practices
Teaching Scheme: Theory: 02 Hrs./week

Credits: 2-0-0 In-Semester Examination-I: 15 Marks In-Semester Examination-II: 15Marks

Teacher Assessment: 10 Marks

Continuous Internal Evaluation: 10 Marks End Semester Examination: 50 Marks

End Semester Examination (Duration): 02 Hrs

	End Semester Examination (Duration): 02 Hrs.
Prerequisite	Fundamentals of agriculture and basic sciences knowledge required
Objectives	 To understand the concept and importance of smart agriculture. To learn about the technologies and practices used in smart agriculture. To explore the impact of smart agriculture on productivity and sustainability. To develop practical skills in using smart agriculture technologies.
Unit-1	Introduction to Smart Agriculture: Definition and scope of smart agriculture Benefits and challenges of smart agriculture: productivity, reduced resource wastage (water, fertilizers, etc.), improved decision-making through data analysis, and enhanced sustainability. Challenges include high initial costs, technological complexity, and the need for training and education.
	(04 Hrs)
Unit-II	Data Analytics in Agriculture: Basics of data analytics. Data analytics involves the process of collecting, processing, and analyzing data to extract useful information and insights.
	(04 Hrs)
Unit-III	Precision Agriculture: Principles and components of precision agriculture. Technologies used in precision agriculture: GPS for location-based data, GIS for spatial analysis, and remote sensing for monitoring crop health and environmental conditions. Precision agriculture applications: Variable rate technology allows for the precise application of inputs (fertilizers, pesticides) based on localized conditions, and site-specific management tailors farming practices to the specific needs of different areas within a field. (05 Hrs)
Unit-IV	Smart Irrigation Systems: Introduction to smart irrigation: Benefits and challenges of smart irrigation: Benefits include water savings, improved crop yields, and reduced labor costs. Challenges include high initial costs and the need for proper maintenance and monitoring.

Chairman Board of Studies Agricultural Engineering MIT Aurangabad



Page 51 of 76



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Unit-V	Smart Crop Management: Crop monitoring and management practices: Smart agriculture technologies such as drones, sensors, and data analytics are used to monitor crop health, detect diseases and pests, and optimize crop management practices. Crop health monitoring using smart technologies: Sensors and drones can be used to monitor crop health indicators such as leaf color, temperature, and humidity. Crop modeling and forecasting: Data from sensors and other sources can be used to develop crop models that predict yields, water requirements, and optimal planting times. These models help farmers make informed decisions about crop management. (05 Hrs)						
Unit-VI	Case Studies and Practical Applications: Real-world examples of smart agriculture practices: Case studies from around the world showcase how smart agriculture technologies are being used to improve farming practices, increase yields, and enhance sustainability. (04 Hrs)						
	Sr. No.	Title	Author	Publication	Edition		
	1.	Precision Agriculture Basics	Ancha Srinivasan	CRC Press	1 st		
References	2.	Internet of Things in Agriculture: Smart Agriculture	Ramesh K Sitaraman	Springer	1 st		
	3.	Data Analytics in Agriculture	Pierre C. Robert	Wiley	1 st		
	4.	Smart Agriculture: IoT, Robotics, and Big Data in Agriculture	Liege University	Elsevier	1 st		

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Page 52 of 76



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Credits: 2-0-0

Faculty of Science & Technology

Syllabus of Second Year B.Tech. (All Branches) (Semester IV)

Open Elective-2 offered by the Department of Civil Engineering

Course Category: OEC Course Code: OEC291B

Course: Solid Waste Management
Teaching Scheme: Theory: 02 Hrs./week

In-Semester Examination-I: 15 Marks In-Semester Examination-II: 15Marks Teacher Assessment: 10 Marks

Continuous Internal Evaluation: 10 Marks End Semester Examination: 50 Marks End Semester Examination (Duration): 02 Hrs.

Prerequisite Basic knowledge of concepts of economics.

1. Understanding the principles and functional elements of SWM
2. To know the way of generation of different kind of solid waste.
3. Effectively handling and shortening of waste. for recycle and energy transformation
4. Adopting suitable and efficient method of processing to get minimum disposable matter

5. Choosing the appropriate method of disposal and essential requirements6. Handling hazardous Waste and getting it stabilized

Unit-I

Introduction to Solid Waste Management: need and objectives, waste management hierarchy, functional elements, environmental impact of mismanagement. solid waste: sources, types, composition, sampling and characteristics quantities, physical, chemical and biological properties.

(04 Hrs)

Generation of Solid Waste: factors affecting, storage and collection: general considerations for waste storage at source, types of collection systems, transfer station: meaning, necessity, transportation of solid waste: means and methods, routing of vehicles.

(04 Hrs)

Unit-III Segregation & Material Recovery: objectives, stages of segregation, sorting operations, guidelines for sorting for materials recovery, e-waste management, biomedical waste management.

(05 Hrs)

Unit-IV

Waste Processing Technologies: composting, thermal conversion technologies incineration, treatment of biomedical wastes. energy recovery from solid waste: parameters affecting energy recovery, bio-methanation, fundamentals of thermal processing, pyrolysis, incineration, advantages and disadvantages of various technological options.

(05 Hrs)

Unit-V

Unit-II

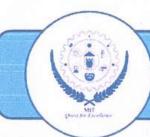
Disposal Terminology: origin of domestic solid wastes, the quantity of refuse & transportation of refuse, the economics of refuse collection. solid waste in industries, agricultural waste – its effect on the environment. solid waste handling methods, treatment & disposal of solid wastes. sanitary landfills leachate and latest methods. integrated solid waste management.

(04 Hrs)

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Page 53 of 76

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Unit-VI

Hazardous Waste Management: Types of hazardous waste (such as nuclear, biomedical, and industrial waste), problems and issues related to HWM, Need for HWM, Legislations on management and handling of HW, Hazardous Characteristics, reduction of wastes at source, Recycling and reuse, labeling and handling of hazardous wastes, incineration, solidification & stabilization of hazardous waste.

(04 Hrs)

References	Sr. No.	Title	Author	Publication	Edition
	1	Solid Waste Technology & Management, Volume 1 & 2	Christensen, H. T.	Wiley	2010
	2	The Practical Handbook of Compost Engineering	Haug, T. R.	Lewis Publishers	1993
	3	Landfill Bioreactor Design & Operation,	Reinhart, R. D. and Townsend, G. T.	CRC Press, 1997	1 st
	4	Handbook of Solid Waste Management	Tchobanoglous, G. and Kreith, F.	McGraw Hill, 2002	2 nd



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Faculty of Science & Technology Syllabus of Second Year B.Tech. (All Branches) (Semester IV)

Open Elective-2 offered by the Department of Computer Science and Engineering

Course Category: OEC Course Code: OEC291C Course: Data Communication

Teaching Scheme: Theory: 02 Hrs./week

Credits: 2-0-0

In-Semester Examination-I: 15 Marks In-Semester Examination-II: 15Marks

Teacher Assessment: 10 Marks

Continuous Internal Evaluation: 10 Marks End Semester Examination: 50 Marks

	End Semester Examination (Duration): 02 Hrs.
Prerequisite	Networking basics, Operating system, Internet, Wireless Communication
Objectives	 Understand data communication principles through practical examples and case studies. Evaluate the efficiency of data communication protocols by analyzing their asymptotic runtime complexity and identifying recurrence relations. Analyze and compare the effectiveness of different data communication methods, aiding in the selection of the most suitable solutions for contexts.
Unit-I	Introduction: Data Communications, Networks, Network Types, Internet History, Protocols and Standards Protocol Layering, TCP/IP Protocol suite, The OSI model, Addressing. (04 Hrs)
Unit-II	Data and Signals: Data and Signals: Analog and Digital, Periodic Analog Signal, Digital Signals, Transmission Impairment, Data Rate limits, Performance. (04 Hrs.)
Unit-III	Digital and Analog Transmission: Digital Transmission: Digital to Digital Conversion, Analog to Digital Conversion, Transmission Modes, Analog Transmission: Digital to Analog Conversion, Analog to Analog Conversion. (04 Hrs)
Unit-IV	Bandwidth Utilization and Switching: Bandwidth Utilization: Multiplexing, Spread Spectrum, Transmission Media: Guided Media, Unguided Media, switching: Circuit Switched Networks, Datagram Networks, Virtual Circuit Networks, Structure of a switch. (05 Hrs)
Unit-V	Error Detection and Correction: Introduction, Block Coding, Linear Block Codes, Cyclic Codes, Checksum Data Link Control: Data Link Control: Framing, Flow and Error Control, Protocols, Noiseless Channels, Noisy Channels, HDLC, Point to Point Protocol. (05 Hrs)

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Page 55 of 76



3.

Internet

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Unit-VI Unit-VI Channelization. Wired LANs: Ethernet, Wireless LANs: IEEE 802.11 and Bluetooth					
References	Sr. No.	Title	Author	Publication	Edition
	1.	Data Communications and Networking	Behrouz A. Forouzan	McGraw-Hill Forouzan Networking Series	4 th
	2.	Digital and Analog Communication Systems.	LEON W. Couch	Pearson	8 th
	3	Computer Networks and	Douglas E.	Degreen	5th

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Pearson



Faculty of Science & Technology

Syllabus of Second Year B.Tech. (All Branches) (Semester IV)

Open Elective-2 offered by the Department of Electronics and Computer Engineering

Course Category: OEC Course Code: OEC291D

Course: E-Waste Management

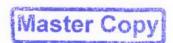
Teaching Scheme: Theory: 02 Hrs./week

Credits: 2-0-0

In Semester Examination-I: 15 Marks In Semester Examination-II: 15Marks Teacher Assessment: 10 Marks

Continuous Internal Evaluation: 10 Marks End Semester Examination: 50 Marks

		End Semester Examination (Duration): 02 Hrs.
Prerequisite	Knowledge of Reduce, Recycle and Reu	se
Objectives	 To understand the scenario of E-was Discuss key elements of E-waste ma Understand key terms related to E-w To reduce the adverse effects of E-resources, and aesthetics. 	magement
Unit-I	Electronics industry in India, E-waste g	bal scenario of e-waste, Growth of Electrical and eneration in India, Composition of e-waste, E-waste ces present in e-waste, Environmental and Health tement. (04 Hrs.)
Unit-II	(Management and Handling) Rules 20 compliance including roles and resp	ime for e-waste in India, the Hazardous Waste 03, E-waste Management Rules 2015, Regulatory consibility of different stakeholders – producer ed producer responsibility (EPR). Estimation and adia. (04 Hrs.)
Unit-III	burning, landfill; Recycling and recove	Historical methods of waste disposal – dumping ery technologies sorting, crushing, separation; Lif- action; Case study – optimal planning for compute (04 Hrs
Unit-IV	technologies, Guidelines for environmentally sound treatment techn	Management: Emerging recycling and recovery ronmentally sound management of e-waste ology for e-waste, Guidelines for establishment of ent facility, Case studies, and unique initiatives from





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Unit-V	(Mana	ste Rules: E-waste (Manage agement) rules 2016 –Salient ance for TSDF's.			
Unit-VI	Rotte	International Legislation: The dam Convention, Waste Electrical Convention, Restriction of Ha	cal and Electronic E	Equipment (WEEE), D	
	Sr. No.	Title	Author	Publication	Edition
References	1.	E-waste: implications, regulations, and management in India and current global best practices	Johri R.	TERI Press, New Delhi.	-
	2.	Electronics Waste (Toxicology and Public Health issues)	_	Elsevier	1 st
	3	Electronics Waste	Hester R.E. and	Science	2009



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Faculty of Science & Technology Syllabus of Second Year B. Tech. (All Branches) (Semester IV)

Open Elective-2 offered by the Department of Electrical Engineering

Course Category: OEC Course Code: OEC291E

Course: Programmable Logic Controller Teaching Scheme: Theory: 02 Hrs./week

Credits: 2-0-0 In-Semester Examination-I: 15 Marks In-Semester Examination-II: 15Marks Teacher Assessment: 10 Marks

Continuous Internal Evaluation: 10 Marks End Semester Examination: 50 Marks

		End Semester Examination (Duration): 02 Hrs.
Prerequisite	Basic understanding of electrical circuits with programming languages or logic di	s and industrial automation concepts. Familiarity agrams.
Objectives	 Characteristics of a PLC Know general PLC issues Understanding of PLC programming Understand and design basic input at Analysis and classification of the profession Interlocking process control Sequential process control Random process control Understand the operation of a PLC Understanding of Siemens PLC hard 	g and ladder logic. nd output wiring ocess control
Unit-I	PLC Fundamentals: Architectural Applications and Types, specifications,	Evolution of PLC, Block diagram of PLC's Manufacturers. (04 Hrs
Unit-II		supply, CPU, I/Os List, Communication bus Various ction Open-Circuit and Short-Circuit Tests Types of s, Wiring of the I/O devices.
Unit-III		e and logical: Programming instruction: AND, OR O / NC contacts, Edge detection instructions. Set (04 Hrs
Unit-IV	PLC Functions: Timer function, Comparison functions, Numbering system	Counter function, Arithmetic function, Number ms, and number conversion function. (04 Hrs
Unit-V		LC operations and applications of PLCs: Stepper C. motor, water level control, Traffic control

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Unit-VI

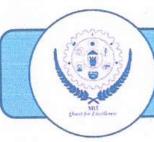
HMI: Architecture, types and specifications, Interfacing and Networking with PLC, SCADA: Introduction, features and applications.

(04 Hrs)

References	Sr. No.	Title	Author	Publication	Edition
	1.	Programmable Logic Controllers	John W. Webb, Ronald A. Reis	Prentice Hall of India Private	5 th
	2.	Programmable Logic Controllers: Programming Methods and Applications	John R. Hackworth, Fredrick D. Hackworth Jr	Pearson	5 th
	3.	Programmable Logic Controllers	William Bolton	Elsevier	4 th
	4.	Handbook of Industrial Automation	Richard L. Shell and Ernest L. Hall	McGraw Hill CRC press 2000	-

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Faculty of Science & Technology

Syllabus of Second Year B.Tech. (All Branches) (Semester IV)

Open Elective-2 offered by the Department of Emerging Science and Technology

Course Category: OEC Course Code: OEC291F

Course: Information and Knowledge Management

Teaching Scheme: Theory: 02 Hrs./week

Credits: 2-0-0

In-Semester Examination-I: 15 Marks In-Semester Examination-II: 15Marks Teacher Assessment: 10 Marks

Continuous Internal Evaluation: 10 Marks End Semester Examination: 50 Marks

		End Semester Examination (Duration): 02 Hrs.
Prerequisite	Computer Fundamentals	
Objectives	organizations. 2. To Gain knowledge of various knowledge management.	of information and knowledge management in theories and models related to information and capturing, organizing, and sharing information and
Unit-I	Management, Data Sources and Ty	owledge Management: Information and Knowledge rpes, Methods of Data Collection, Challenges in izational Data Management, Attributes of Data, The use, Planning for Data Management, Aspects of Data (04 Hrs
Unit-II	Systems and Conventions, Database	alysis: Organizing Information Using Organizationa Utilization for Content Organization and Analysis are Analysis Process, Comparison Between Raw and uniques to Facilitate Analysis. (04 Hrs
Unit-III	for Information Security, Short-term Backup, Best Practices to Avoid Information	d Managing Secure and Private Information, Policie Storage Solutions, Practical Aspects of Storage and rmation Loss, Preserving and Archiving Information trategies, including File Formats and Media Selection (05 Hrs
Unit-IV	Architecture, Constructing Information	ieval: Information Architecture, Types of Information Architecture for Analytics, Information Governance for Information Governance, Considerations for Dates for Information Security, Methods for Information (04 Hrs.)

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Page 61 of 76





Unit-V	Publ Ethic	rmation Publishing and Reuse: Slicly Sharing Information, Intellectual Considerations in Information ed Information.	al Property Rights a	nd Licensing f	for Datasets
Unit-VI	Syste (Har Scala Syste Open Mod	wledge Systems: Developing Recems, Understanding Knowledge Sydware Faults, Software Errors, Fability in Knowledge Management, Lems, Coping Strategies for Handrability, and Complexity, Overview of the Processing Strategies.	ystems Reliability, Fa Human Errors), Impo Load and Performance ling Load, Consider	actors Affecting ortance of Rel e Description in ations for Ma	Reliabilit iability an Knowledg intainability
	Sr.	Tial			(04 Hrs
	Sr. No.	Title	Author	Publication	(04 Hrs
		Title Information Management: Strategies for Gaining a Competitive Advantage with Data	Author William McKnight	Publication Pearson	
References	No.	Information Management: Strategies for Gaining a			Edition

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5.



Wiley

MIT Press

Margy Ross

Steven H. Spewak

and Steven C. Hill

Kimiz Dalkir

Page 62 of 76

3rd



Modeling Enterprise Architecture Planning:

Developing a Blueprint for Data,

Applications, and Technology Knowledge Management in

Theory and Practice



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Faculty of Science & Technology Syllabus of Second Year B.Tech. (All Branches) (Semester IV)

Open Elective-2 offered by the Department of Mechanical Engineering

Course Category: OEC Course Code: OEC291G

Course: Renewable Energy Resources
Teaching Scheme: Theory: 02 Hrs./week

Credits: 2-0-0

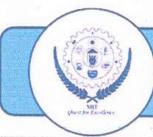
In-Semester Examination-I: 15 Marks In-Semester Examination-II: 15Marks Teacher Assessment: 10 Marks

Continuous Internal Evaluation: 10 Marks End Semester Examination: 50 Marks

me: Theory: 02 Hrs./week	End Semester Examination: 50 Marks End Semester Examination (Duration): 02 Hrs.
Basic understanding of concepts of phys	sics and thermodynamics.
alternatives available. 2. To get exposure to recent advances	in energy in the contemporary world. us energy and its potential.
in India and the world, Review of ener Introduction to energy policies and pr National Solar Mission, etc., Introduct	non-conventional energy sources, Energy Scenaric gy consumption pattern in various sectors in India rograms in India like International Solar Alliance tion to global climate change concerns like Clear arbon Fund Concept of Carbon credit, Variou
measurement of solar energy, Charac Applications of Solar Heating & Cool	s, Types of solar radiation collectors, Estimation and eteristics of Photovoltaic cells, Solar cell arrays ling Systems like Solar still, Solar cookers, Solang systems: Trombe wall, Solar power plant, Solar (04 Hrs
in India, Storage and Characterization biodiesel, R&D in biodiesel Energy Generation from Waste Ty	non-edible oil sources, Examples of biodiesel crop of biodiesel, Environmental and health effects o pes: Biochemical Conversion: Sources of energi idues; Aerobic & Anaerobic treatments, Factor
	alternatives available. 2. To get exposure to recent advances 3. To know about various miscellaneous Introduction: Introduction to types of in India and the world, Review of ener Introduction to energy policies and provided the National Solar Mission, etc., Introduct Development Mechanism [CDM], Cainternational protocols. Solar Energy Systems: Solar radiations measurement of solar energy, Characterizations of Solar Heating & Cooponds, Solar passive heating and cooling furnaces. Biofuels: Review of Indian edible and in India, Storage and Characterization biodiesel, R&D in biodiesel Energy Generation from Waste Tygeneration, Industrial waste, agro-resi

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Page 63 of 76



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WY	
U	nit-V

Geothermal Energy: Structure of earth, Geothermal Regions, Hot Springs. Hot Rocks, Hot Aquifers. Analytical methods to estimate thermal potential. Harnessing techniques, Electricity generating systems.

Direct Energy Conversion: Nuclear Fusion: Fusion, Fusion reaction, P-P cycle, Carbon cycle, Deuterium cycle, Condition for controlled fusion, Fuel cells and photovoltaic. Thermionic & thermoelectric generation, MHD generator.

(04 Hrs)

Unit-VI

Introduction to new energy technology: Hydrogen production - water splitting - electrolytic methods Chemical cycle - photo splitting - photo galvanic - photochemical. Application of Hydrogen Fuel for Vehicle, Introduction to Magneto Hydro Dynamic system (MHD) and Electro gas dynamics (EGD): principles and types.

(04 Hrs)

	Sr. No.	Title	Author	Publication	Edition
	1	Solar Energy-Principles of Thermal Collection & Storage	S. P. Sukhatme	TMH Publishing Co., New Delhi.	4 th
	2	Non-Conventional Energy Sources	G. D. Rai	Khanna publisher, New Delhi	6 th
	3	Non-Conventional Energy Resources	B. H. Khan	TMH New Delhi	3 rd
	4	Technology and Application of Biogas	Srivastava, Shukla and Ojha	Jain Brothers, New Delhi	1993
	5	Renewable Energy Resources- Basic Principles and Applications	G. N. Tiwari & M. K. Ghosal	Narosa Publications	2004
References	6	Biogas systems: Principles and Applications	Mital K.M	New Age International Publishers	1996
7	7	Basics of Solid & Hazardous Waste Management Technology	Shah, Kanti L.	Prentice Hall,	2007
	8	Engine for Biogas	Klaus VonMitzlaff	Friedr Vielveg and Sohn Braunschweig	1988
	9	Wind Power Plants: Theory and Design	Desire Le Gouriers	Pergamon Press	1982
	10	Solar Energy – Fundamentals and Applications	H. P. Garg and J. Prakash	Tata McGraw Hill	2000
	11	Solar Energy Thermal Processes	John A Duffie and William A Beckman	Wiley -Inter Science Publication, New York	1974

Additional References

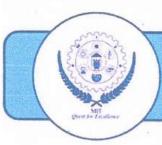
- https://isolaralliance.org/publications/annual-reports
- 2. https://mnre.gov.in/img/documents/uploads/file f-1618564141288.pdf
- 3. https://mnre.gov.in/knowledge-center/publication

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Page 64 of 76

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(All Branches) w.e.f. 2024-25 (NEP 2020 Based Curriculum)



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Faculty of Science & Technology Syllabus of Second Year B.Tech. (All Branches) (Semester IV)

Open Elective-2 offered by the Department of Plastic and Polymer Engineering

Course Category: OEC
Course Code: OEC291H
Course: Plastic Recycling

Teaching Scheme: Theory: 02 Hrs./week

Credits: 2-0-0
In-Semester Examination-I: 15 Marks
In-Semester Examination-II: 15Marks

Teacher Assessment: 10 Marks

Continuous Internal Evaluation: 10 Marks End Semester Examination: 50 Marks

End Semester Examination (Duration): 02 Hrs.

	End Schiester Examination (Duration): 02 Hrs.	
Prerequisite	Basic knowledge of polymeric materials, additives, and their properties.	
Objectives	To learn the basic concepts used in the recycling of polymers.	
Unit-I	Significance of Recycling: Introduction and classification of waste. Global polymproduction and consumption. Global polymer waste composition, quantities, and dispositional dentification of polymer for recycling. (04 Hi	
Unit-II	Recycling Process: Collection, sorting, and segregation of waste; Use of advance technologies such as artificial intelligence in sorting; recycling methods: primary secondary, tertiary, and quaternary recycling, landfilling. (05 Hrs.)	
Unit-III	Recycling Equipment/Machinery: Equipment for primary and secondary recycling shredder, granulator, pulverizer, shredder, cutter. Classification and types of reactors for tertiary recycling, use of x-ray photoelectron spectroscopy (XPS) in recycling, international standards in recycling. (04 Hrs.)	
Unit-IV	Recycling Techniques of Various Plastic and Rubber Products: PE/PP packaging film and woven sacks, PET bottles and films, PVC products, fiber-reinforced plastics (FRP), an rubber products, PP batteries. (04 Hrs	
Unit-V	Recycling of Plastics from Urban Waste: Physiochemical, mechanical, and rheological characteristics of recycled plastics, hydrolytic treatment of plastics waste containing paper mixed plastic waste and its processing, recycling extrusion, and additives used in polymer recycling. (05 Hrs.)	
Unit-VI	Recycled Plastics End Use Applications: Use of recycling plastics in food packaging, Use of recycled plastics in construction and architecture. Single-use plastics recycling healthcare plastic waste recycling. (04 Hrs	

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Page 65 of 76



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	Sr. No.	Title	Author	Publication	Edition
	1.	Plastics Fabrication and Recycling	Manas Chanda and Salil K. Roy	CRC Press	4 th
References	2.	Recycling of Polymers	Raju Francis	Wiley-VCH	1 st
References	3.	Mixed Plastic Recycling Technology	B. Hegberg, G. Brenniman	Noyes Data Corporation	1 st
	4.	Feedstock Recycling and pyrolysis of waste plastics	John Schiers & W. Kaminsky	John Wiley and Sons	1 st

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Faculty of Science & Technology

Syllabus of Second Year B. Tech. (All Branches) (Semester IV)

Course Category: HSSM Course Code: HSM201

Course: Engineering Economics and Management

Teaching Scheme: Theory: 2 Hrs./week

Credits: 2-0-0

In-Semester Examination-II: 10 Marks

Teacher Assessment: 15 Marks

Refer Page No. 27 and 28 for detail Syllabus

Faculty of Science & Technology

Syllabus of Second Year B.Tech. (All Branches) (Semester IV)

Course Category: HSSM Course Code: HSM202

Course: Innovation and Entrepreneurship
Teaching Scheme: Theory: 02 Hrs./week

Credits: 2-0-0

In-Semester Examination-II: 10 Marks

Teacher Assessment: 15 Marks

Refer Page No. 29 and 30 for detail Syllabus

Faculty of Science & Technology

Syllabus of Second Year B.Tech. (All Branches) (Semester IV)

Course Category: VEC Course Code: VEC201

Course: Universal Human Values

Teaching Scheme: Theory: 01 Hrs./week

Practical: 02 Hrs./Week

Credits: 1-0-1

In-Semester Examination-II: 10 Marks

Teacher Assessment: 15 Marks

Refer Page No. 31 and 32 for detail Syllabus

Faculty of Science & Technology

Syllabus of Second Year B.Tech. (All Branches) (Semester IV)

Course Category: **VEC**Course Code: VEC202

Course: Environmental Studies

Teaching Scheme: Theory: 01 Hr/week,

Practical: 02 Hrs/Week

Credits: 1-0-1

In-Semester Examination-II: 10 Marks

Teacher Assessment: 15 Marks

Refer Page No. 33 and 34 for detail Syllabus

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Agricultural Engineering
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Page 67 of 76

Syllabus of Second Year B. Tech. (All Branches) w.e.f. 2024-25 (NEP 2020 Based Curriculum)
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Faculty of Science & Technology Syllabus of Second Year B.Tech. (All Branches) (Semester IV)

Course Category: VSEC Course Code: VSE271 Course: Professional English

Teaching Scheme: Theory: 01 Hr./week

Credits: 1-0-1

In-Semester Examination-II: 10 Marks

Teacher Assessment: 15 Marks

Teaching Sche	me: Theory: 01 Hr./week Practical: 02 Hrs./Week	Teacher Assessment: 15 Marks
Prerequisite	Knowledge of the English Language, K	nowledge of LSRW techniques
Objectives	To utilize different strategies of read To understand various forms of surroundings during different communication si To construct an appropriate format an effective communicator.	siness etiquette in professional behavior ding and listening for effective communication f communication and demonstrate knowledge of
Unit-I		cation Process and its elements, verbal and nonverbal tion and strategies to overcome them, characteristics (02 Hrs)
Unit-II	The second secon	team building: Team formation, team dynamics, concept, strategies, Stress Management: types and (02 Hrs)
Unit-III	Receptive Skills of Language: Listening Skills: Purpose and importance of Listening different types of listening, barriers & strategies of effective listening Reading Skills: Purpose and importance, types, barriers & strategies of reading. (03 H	
Unit-IV	Oral Communication: Group Discussi	ion, Interview techniques, public speaking. (02 Hrs)
Unit-V	Writing Skills: Business Letters, drafting an email, Writing Job Applications Resulting Preparation, Writing reports.	

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Page 69 of 76



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Unit-VI

Professional Etiquettes: Introductions and First Impressions, E-mail etiquettes, telephone etiquettes, dining table etiquettes, corporate dressing.

(02 Hrs)

List of Exercise

- 1. Self-Introduction in formal situations.
- 2. Team Formation: Different stages of Team building
- 3. Book Review (English book) with PPT presentations
- 4. Enhancing Listening Skills: TED talks or audio lectures on theory syllabus topics
- 5. Mock Group discussions.
- 6. Formal PPT presentations
- 7. Mock Interviews (techniques and etiquette)
- 8. Cover letter and resume writing (format, styles, and strategies)
- 9. Telephonic conversation (Interview & Formal situations)
- 10. Dining Etiquettes (Manners and code of conduct)

	Sr. No.	Title	Author	Publication	Edition
	1.	Effective Technical Communication	M. Ashraf Rizvi	McGraw Hill Education	1 st
	2.	Communication Skills	Sanjay Kumar, Pushp Lata,	Oxford University Press	1 st
References	3.	How to Succeed in Group Discussions & Personal Interviews	Dr. S. K. Mandal	Jaico Publishing House	1 st
	4.	Excellence in Business Communication,	John Thill, Courtland Bovee	Pearson	12 th
	5.	The ACE of Soft Skills: Attitude, Communication and Etiquette for Success	Gopalswamy Ramesh	Pearson Education	1 st
	6.	Master of Business Etiquette	Cyrus M. Gonda	Embassy Books	2017

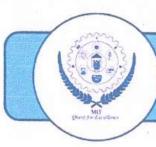
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Maharashtra Institute of Technology Chhatrapati Sambhajinagar

	Faculty of Science Syllabus of Second Year B.Tech	
Skill	AEC272 nality and Leadership Development	Credits: 0-0-2 Teacher Assessment: 25 Marks
Prerequisite	Nil	1
Objectives	 to succeed in the professional world. Empower students to effectively may writing, and professional networking. Prepare students for the job search research, effective job search technical. Foster a mindset of continuous leasuccess and adaptability in the evolvent. 	tket themselves through resume building, cover letters, the process by providing strategies for job market ques, and interview preparation. The process by providing strategies for job market ques, and interview preparation. The process by providing strategies for job market ques, and interview preparation.
	Activities to be performed in each ses	sion (session duration – 2 hrs.).
List of Practical	create a skills matrix. 2. Problem-Solving Challenge: Team problem, present their solutions, and 3. Industry Trends Research: Stude presentations summarizing their fin 4. Job Profile Analysis: In pairs, stude and present their analysis to the class 5. Goal Setting: Students set SMAR from peers. 6. Resume Building Workshop: Stude sample resumes, and draft their own 7. LinkedIn Profile Development: Streedback, and ensure completeness 8. Elevator Pitch Competition: Studen most compelling presentations, and 9. Internship Application Workshop review each other's materials, and review each other's materials.	ents analyse job profiles, compare and contrast them, is. T goals, create action plans, and receive feedback ents learn about resume writing best practices, review a resumes with guidance and feedback. Udents update their LinkedIn profiles, receive peer and professionalism. Its craft and deliver elevator pitches, compete for the receive feedback. Students draft effective internship applications, exceive guidance on researching opportunities. Interpretation of the participate in mock interviews, rotate through

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Page 71 of 76



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- 11. Hackathon Preparation Workshop: Students learn about hackathons, form teams, brainstorm project ideas, and begin planning for participation.
- 12. Project Competition Bootcamp: Students prepare for project competitions, form teams, brainstorm ideas, and develop prototypes or proposals for submission.
- Team Building Challenge: Split the batch into smaller teams for collaborative problemsolving tasks that emphasize communication and teamwork.
- 14. Mock Leadership Scenarios: Assign students roles in various leadership scenarios to practice decision-making, delegation, conflict resolution, and empathy.
- 15. Community Service Project Planning: Guide students in planning a community service project, allowing them to take on different leadership roles and develop project management skills while addressing real-world issues.
- Students will learn and solve problems related to fundamental numerical concepts, including the number system, LCM, HCF, and divisibility.
- 17. In this session, students will focus on percentages and ratios, learning to solve problems related to these concepts.
- 18. Students will delve into the application of time and work principles, solving problems that require understanding and application of these concepts.
- 19. This session will concentrate on profit and loss calculations, with students learning to solve related problems effectively.
- 20. Students will tackle problems related to determining ages, applying appropriate mathematical techniques to arrive at solutions.
- 21. Geometric concepts will be the focus of this session, with students learning about shapes, their properties, and perimeter calculations.
- 22. Arithmetic concepts like progressions and equations will be covered in this session, with students practicing solving problems based on these topics.
- 23. Students will review and consolidate their understanding of average and decimal fraction concepts, solving related problems to reinforce learning.
- 24. This session will cover the intricacies of calendar and clock problems, with students learning to solve such problems effectively.
- 25. Students will learn and solve problems based on word patterns and number series, honing their pattern recognition skills.
- 26. Logical reasoning basics will be covered in this session, with students learning and solving problems related to blood relations and coding-decoding.
- 27. Direction sense and symbols will be the focus of this session, with students learning to solve problems based on these concepts effectively.
- 28. Advanced logical reasoning skills will be developed in this session, with students tackling problems related to syllogism and logical puzzles.
- 29. Visual reasoning concepts will be explored in this session, with students learning to solve problems based on visual patterns effectively.
- 30. In the final session, students will engage in a comprehensive review of all topics covered in the course and participate in a mock test simulation to assess their understanding and readiness for placement exams.

Chairman Board of Studies Mechanical Engineering Master Copy

Page 72 of 76



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	Sr. No.	Title	Author	Publication	Edition
	1	What Color Is Your Parachute? 202X: A Practical Manual for Job-Hunters and Career-Changers	Richard N. Bolles	Ten Speed Press	-
	2	The Start-Up of You: Adapt to the Future, Invest in Yourself, and Transform Your Career	Reid Hoffman and Ben Casnocha	Crown Business	1 st
	3	Designing Your Life: How to Build a Well-Lived, Joyful Life	Bill Burnett and Dave Evans	Knopf	1 st
Reference	4	How to Win Friends and Influence People	Dale Carnegie	Simon & Schuster	-
Books, e- books, e- Journals	5	The 7 Habits of Highly Effective People: Powerful Lessons in Personal Change	Stephen R. Covey	Simon & Schuster	-
	6	Quantitative Aptitude for Competitive Examinations	Dr. R. S. Aggarwal,	S. Chand Publications	-
	7	A Modern Approach to Logical Reasoning	Dr. R. S. Aggarwal,	S. Chand Publications	-
	8	The Hands-on Guide to Analytical Reasoning and Logical Reasoning	Peeyush Bhardwaj	Arihant Publication	1 st
127	9	How to Prepare for Logical Reasoning	Arun Sharma	McGraw Hill Publication	-
E.	10	How to Prepare for Quantitative Aptitude	Arun Sharma	McGraw Hill Publication	-
Additional References	Coed:Kh	nkedIn Learning oursera X nan Academy decademy		- TO AN OWN VAL	

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Master Cop



(An Autonomous Institute)

Faculty of Science & Technology Syllabus of Second Year B.Tech. (Agricultural Engineering) (Semester IV)

Course Category: PCC Course Code: AED273

Course: Post Harvest Engineering Laboratory

Teaching Scheme: Practical: 02 Hrs/Week

Credits: 0-0-1

Teacher Assessment: 25 Marks

End Semester Oral Examination: 25 Marks

Objectives

List of

Practical

- 1. To develop practical skills in post-harvest engineering techniques such as moisture content determination, drying methods, and storage techniques.
- 2. To apply theoretical knowledge to real-world scenarios through practical experiments in seed cleaning, grading, and processing of cereals, pulses, and oilseeds.
- 3. To enhance problem-solving abilities in agricultural processing by exploring biogas technology, waste management, and ethical considerations in engineering and business communication.

2. Determination of drying curves

Determination of grain moisture content and numerical

- 3. Determination of relative humidity and use of a psychrometric chart and numerical
- 4. Study of EMC curves and numerical.
- Study of Air screen cleaner.
- 6. Study of Specific gravity separator.
- 7. Study of spiral separator.
- 8. Study of the indented separator.
- 9. Study of various types of grain dryers.
- 10. Study of hammer mill and attrition mill.
- 11. Study of rice mill.
- 12. Determination of fineness modulus and uniformity index.
- 13. Study of mixing equipment.
- 14. Study of bucket elevator.
- 15. Study of screw conveyor and belt conveyor.
- 16. Visit to rice mill, roller mill, dal mill and oil mill (any two)

Note: A minimum of 10 practicals Should be performed.

Chairman Board of Studies Agricultural Engineering MIT Aurangabad (An Autonomous Institute)





Chhatrapati Sambhajinagar
(An Autonomous Institute)

Faculty of Science & Technology Syllabus of Second Year B.Tech. (Agricultural Engineering) (Semester IV)

Course Category: PCC Course Code: AED274

Course: Irrigation and Drainage Engineering

Laboratory

Teaching Scheme: Practical: 02 Hrs/Week

Credits: 0-0-1

Teacher Assessment: 25 Marks

End Semester Oral Examination: 25 Marks

Objectives	To inculcate the practical knowledge of students regarding measurement, scheduling methods and efficiencies of irrigation.
List of Practical	 Measurement of irrigation water Design of underground pipeline system Measurement of infiltration rate Measurement of soil moisture by different soil moisture measuring instruments Computation of evaporation and transpiration Estimation of irrigation efficiencies Study of border irrigation system Study of furrow irrigation system design Field visit for Irrigation water resources and methods of irrigation Determination of chemical properties of soil and irrigation water Design of surface drainage systems and subsurface drainage systems. Determination of drainage coefficient Note: A minimum of 10 practicals Should be performed.

Chairman Board of Studies
Agricultural Engineering
MIT Aurangabad
(An Autonomous Institute)





Chhatrapati Sambhajinagar
(An Automomous Institute)

Brief about - Honor and Double Minor Degree program

As per the NEP 2020 guidelines, **Honor Degree** courses are **offered by Department (Major Discipline)**, whereas the Minor Degree courses (referred as **Double Minor**) are **offered by another department**. Honor Degree or Double Minor Degree is **Optional**. The students those who fulfills the eligibility norms can enroll for it. The Table 1 and 2 give the list of such programs.

Table 1: Honours Degree Programs

	Table 1. Honours Degree Programs				
Sr. No.	Name of Honours Degree Program	Offered by			
1	Smart Agritech	Agricultural Engineering			
2	Green Technology and Sustainable Environment	Civil Engineering			
3	Digital Media	Computer Science and Design			
4	Cloud Computing	Computer Science and Engineering			
5	Internet of Things	Electronics and Computer Engineering			
6	Electric Vehicles	Electrical Engineering			
7	Generative AI	Artificial Intelligence and Data Science			
8	Robotics and Automation	Mechanical Engineering			
9	Polymeric Materials	Plastic and Polymer Engineering			

Table 2: Minor Degree Programs

Sr. No.	Name of Minor Degree Program	Offered by
1	Advanced Agricultural Engineering	Agricultural Engineering
2	Sustainable Infrastructure and Smart Cities	Civil Engineering
3	Design Engineering	Computer Science and Design
4	Cyber Security	Computer Science and Engineering
5	Data Science	Electronics and Computer Engineering
6	Sustainable Energy Engineering	Electrical Engineering
7	Data Analytics	Artificial Intelligence and Data Science
8	Mechanical Engineering Systems and Automation	Mechanical Engineering
9	Polymeric Products and Project Economics	Plastic and Polymer Engineering

Student can opt for either Honor or Minor degree program at a time and not the both.

The course curriculum and guidelines are given in a separate Information Booklet, available at the Department.



Page 76 of 76

Syllabus of Second Year B.Tech. (Agricultural Engineering) w.e.f. 2024-25 (NEP 2020 Based Curriculum)



