



List of Courses which focuses on Professional Ethics, Gender, Human Values, Environment & Sustainability and other value framework

Department : **Chemical Engineering**
Programme Name : **B.Tech.**

Academic Year : 2023-24

Courses which focuses on Professional Ethics, Gender, Human Values, Environment & Sustainability and other value framework:

Sr. No.	Course Code	Name of the Course
01.	FOUATC2	Environmental Science and Ecology
02.	LAUATC1	Indian Constitution
03.	CHUBTH2	Human Values and Ethics
04.	NSUBLS1	NSS
05.	CHUCTK2	Water Treatment and Management
06.	CHUDTO1	Energy and Environment
07.	CH306TMC02	Essence of Indian Knowledge Tradition
08.	CH407TPE42	Water Conservation & Management
09.	CH408TPE61	Environmental Engineering
10.	CH207TOE02	Waste to Energy
11.	CHPATP2	Advanced Wastewater Treatment Technology
12.	CHPBTP5	Industrial Pollution Control
13.	CHPBTO6	Waste to Energy
14.	LAPBTX4	Constitution of India



Scheme and Syllabus

SCHOOL OF STUDIES OF ENGINEERING AND TECHNOLOGY

Scheme of Teaching and Evaluation 2022-2023 (As per NEP-2020)
Choice Based Credit System (CBCS) and Outcome Based Education (OBE)
(Effective from the Academic Year 2022-2023)

I-SEMESTER BTech Mechanical/IP/Chemical/Civil Engineering										
S.N.	Course Code	Course Title	Teaching Hours/week			Examination				Credits
			Theory/lectures	Tutorial	Practical/ Drawing	Examination in Hours	CIA Marks	SEA Marks	Total Marks	
1	AMUATB1	Engineering Mathematics - A	3	1	-	03	40	60	100	4
2	CYUATB3	Engineering Chemistry	3	-	-	03	40	60	100	3
3	ECUATE4	Basic Electrical and Electronics Engineering	3	-	-	03	40	60	100	3
4	FOUATC2	Environmental Science and Ecology	2	-	-	03	40	60	100	2
5	CSUATE5	Computer Programming	3	-	-	03	40	60	100	3
6	LAUATC1	Indian Constitution	1	-	-	01	50	-	50	1
7	CYUALB3	Engineering Chemistry Laboratory	-	-	2	03	25	25	50	1
8	CSUALE5	Computer Programming Laboratory	-	-	2	03	25	25	50	1
9	IPUALL2	Engineering Workshop Practices	-	-	2	03	25	25	50	1
10	PEUALS2	Sports and Yoga	-	-	2	-	25	25	50	1
Total			15	1	08	25	350	400	750	20
Note: AM: Mathematics, PP: Physics, ME: Mechanical Engineering, IP: Industrial & Production Engineering, CE: Civil Engineering, CS: Computer Sc. & Engg., IT: Information Technology, PE: Physical Education, FO: Forestry, LA: Law, NS: NSS, U: Undergraduate, T: Theory, L: Laboratory,										
BASIC SCIENCE (B) 1. Mathematics – A 2. Physics 3. Chemistry 4. Mathematics - B		ENGINEERING SCIENCE (E) 1. Engineering Mechanics 2. Introduction to Information Technology 3. Basic Electrical Engineering 4. Basic Electrical and Electronics Engineering 5. Computer Programming 6. Basic Communication Engineering		SKILL ENHANCEMENT COURSE (L) 1. Engineering Graphics 2. Engineering Workshop Practices		HUMANITIES SCIENCE (H) 1. English for communication 2. Human Values and Ethics		MANDATORY COURSE (C) 1. Indian Constitution 2. Environmental Science & Ecology		EXTRA-CURRICULAR ACTIVITIES (S) 1. NSS 2. Sports and Yoga
Credit Definition: ➤ 1-hour lecture (L) per week per semester = 1Credit ➤ 1-hour tutorial (T) per week per semester = 1Credit ➤ 2-hour Practical/Drawing(P) per week per semester = 1 Credit				➤ Four credit courses are to be designed for 50 hours of Teaching-Learning process. ➤ Three credit courses are to be designed for 40 hours of Teaching-Learning process. ➤ Two credit courses are to be designed for 30 hours of Teaching-Learning process. ➤ One credit courses are to be designed for 15 hours of Teaching-Learning process Note: The above is applicable only to THEORY courses						



Scheme of Teaching and Evaluation 2022-2023 (As per NEP-2020)
Choice Based Credit System (CBCS) and Outcome Based Education (OBE)
(Effective from the Academic Year 2022-2023)

II-SEMESTER BTech Mechanical/IP/Chemical/Civil Engineering										
S.N.	Course Code	Course Title	Teaching Hours/week			Examination				Credits
			Theory lectures	Tutorial	Practical/ Drawing	Examination in Hours	CIA Marks	SEA Marks	Total Marks	
			L	T	P					
1	AMUBTB4	Engineering Mathematics-B	3	1	-	03	40	60	100	4
2	PPUBTB2	Engineering Physics	3	1	-	03	40	60	100	4
3	ITUBTE2	Introduction to Information Technology	3	-	-	03	40	60	100	3
4	ELUBTH1	English for Communication	3	-	-	03	40	60	100	3
5	CEUBTE1	Engineering Mechanics	3	-	-	03	40	60	100	3
6	ME UBTH2/CH UBTH2/ IP UBTH2/CEUBTH2	Human Values and Ethics	1	-	-	02	50	-	50	1
7	PPUBLB2	Engineering Physics Laboratory	-	-	2	03	25	25	50	1
8	CEUBLE1	Engineering Mechanics Laboratory	-	-	2	03	25	25	50	1
9	MEUBLL1	Engineering Graphics	1	-	3	03	25	25	50	3
10	NSUBLS1	NSS	-	-	2	01	25	25	50	1
Total			17	2	09	27	350	400	750	24
Note: AM-Mathematics, PP-Physics, ME: Mechanical Engineering, IP: Industrial & Production Engineering, CE: Civil Engineering, CS: Computer Sc. & Engg., IT: Information Technology, PE: Physical Education, NS: NSS, U: Undergraduate, T: Theory, L: Laboratory,										
BASIC SCIENCE (B)		ENGINEERING SCIENCE (E)		SKILL ENHANCEMENT COURSE (L)		HUMANITIES SCIENCE (H)		MANDATORY COURSE (C)		EXTRA-CURRICULAR ACTIVITIES (S)
1. Mathematics – A 2. Physics 3. Chemistry 4. Mathematics – B		1. Engineering Mechanics 2. Introduction to Information Technology 3. Basic Electrical Engineering 4. Basic Electrical and Electronics Engineering 5. Computer Programming 6. Basic Communication Engineering		1. Engineering Graphics 2. Engineering Workshop Practices		1. English for communication 2. Human Values and Ethics		1. Indian Constitution 2. Environmental Science & Ecology		1. NSS 2. Sports and Yoga



SCHOOL OF STUDIES OF ENGINEERING & TECHNOLOGY
GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.)
(A Central University Established by the Central University Ordinance 2009, No. 3 of 2009)

SCHEME FOR EXAMINATION (Effective from Session 2023-24)

B. TECH. (FOUR YEAR) DEGREE COURSE, CHEMICAL ENGINEERING

SECOND YEAR, THIRD SEMESTER (NEP)

S. No.	Subject Code	Subject Name	Periods			Evaluation Scheme			Credits
	THEORY					Sessional			
			L	T	P	CIA	SEA	TOTAL	
01.	CHUCTT1	Fluid Mechanics	3	1	0	40	60	100	4
02.	CHUCTT2	Chemical Engineering Thermodynamics	3	1	0	40	60	100	4
03.	CHUCTT3	Material & Energy Balances	3	0	0	40	60	100	3
04.	CHUCTK1	Process Utilities & Safety	3	0	0	40	60	100	3
	CHUCTK2	Water Treatment and Management							
05.	AMUCTE1	Mathematics-III	3	0	0	40	60	100	3
06.	CHUCTO1	Engineering Materials	3	0	0	40	60	100	3
	CEUCTO1	Green Buildings							
	MEUCTO1	Introduction to Thermodynamics							
	IPUCTO1	I. C. Engine							
	CSUCTO1	Data Structure With C++							
	ITUCTO1	Computer Organization & Architecture							
	ECUCTO1	Data Communication							
PRACTICAL									
01.	CHUCLT1	Basic Chemical Engineering Lab	0	0	2	25	25	50	1
02.	CHUCLT2	Fluid Mechanics Lab	0	0	2	25	25	50	1
Total			18	2	4	290	410	700	22

CIA – Continuous Internal Assessment
SEA – Semester End Assessment

Total Credits – 22
Total Marks – 700
Total Periods / Week - 24

CIA-Shall be two class test (CT) I & II each 15 marks, 05 marks for assignment, surprise test, quiz etc. and 05 marks attendance

CH-Chemical Engineering, CE-Civil Engineering, ME-Mechanical Engineering, IT-Information Technology
IP-Industrial and Mechanical Engineering, CSE-Computer Science & engineering,
EC-Electronics and Communication Engineering

BoS Held on 06-10-2023

[Signatures]



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SCHEME FOR EXAMINATION (Effective from Session 2023-24)

B. TECH. (FOUR YEAR) DEGREE COURSE, CHEMICAL ENGINEERING

SECOND YEAR, FOURTH SEMESTER (NEP)

S. No.	Subject Code	Subject Name	Periods			Evaluation Scheme			Credits
	THEORY					Sessional			
				L	T	P	CIA	SEA	
01.	CHUDTT1	Particle and Fluid Particle Operations	3	0	0	40	60	100	3
02.	CHUDTT2	Inorganic Chemical Technology*	3	0	0	40	60	100	3
03.	CHUDTT3	Numerical Methods in Chemical Engineering	3	0	0	40	60	100	3
04.	CHUDTK1	Process Instrumentation	3	0	0	40	60	100	3
	CHUDTK2	Fluidization Engineering							
05.	CHUDTO1	Energy and Environment	3	0	0	40	60	100	3
	CEUDTO1	Remote Sensing & GIS							
	MEUDTO1	Introduction to Fluid Mechanics							
	IPUDTO1	Automobile Engineering							
	CSUDTO1	Introduction to Information Science							
	ITUDTO1	Computer Network							
	ITUDTO2	Fundamentals of Python Programming							
	ECUDTO1	Introduction to Electronic Devices & Circuits							
	ESUDTO1	Effective Technical Communication							
PRACTICAL									
01.	CHUDLT1	Particle and Fluid Particle Operations Lab	0	0	2	25	25	50	1
02.	CHUDLT2	Numerical Methods in Chemical Engineering Lab	0	0	2	25	25	50	1
03.	CHUDPV1	Mini Project	0	0	4	50	50	100	2
Total			15	0	8	300	400	700	19

CIA – Continuous Internal Assessment
SEA – Semester End Assessment

Total Credits – 19
Total Marks – 700

Total Periods / Week - 23

CIA-Shall be two class test (CT) I & II each 15 marks, 05 marks for assignment, surprise test, quiz etc. and 05 marks attendance
CH-Chemical Engineering, CE-Civil Engineering, ME-Mechanical Engineering, IT-Information Technology
IP-Industrial and Mechanical Engineering, CSE-Computer Science & engineering,
EC-Electronics and Communication Engineering

BoS Held on 06-10-2023

(Signatures)



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SCHEME FOR EXAMINATION (Effective from session 2022-23)

B. TECH. (FOUR YEAR) DEGREE COURSE, CHEMICAL ENGINEERING

THIRD YEAR, SIXTH SEMESTER (AICTE)

S. No.	Subject Code	Subject Name	Periods			Evaluation Scheme			Credits
	THEORY					Sessional			
	L		T	P	IA	ESE	TOTAL		
01.	CH306TPC11	Mass Transfer-II	3	1	0	30	70	100	4
02.	CH306TPC12	Process Dynamics and Control	3	1	0	30	70	100	4
03.	CH306TPC13	Chemical Reaction Engineering-II	3	1	0	30	70	100	4
04.	CH306TPE3X		3	0	0	30	70	100	3
05.	CH306TMC02	Essence of Indian Knowledge Tradition	2	0	0	30	70	100	3
06.		Open Elective	3	0	0	30	70	100	3
PRACTICAL									
01.	CH306PPC07	Mass Transfer Lab	0	0	3	30	20	50	1.5
02.	CH306PPC08	Process Dynamics and Control Lab	0	0	3	30	20	50	1.5
Total			18	3	6	240	460	700	24

IA - Internal Assessment

Total Marks - 700

ESE - End Semester Examination

Total Periods / week - 27

Total Credits - 24

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SCHOOL OF STUDIES OF ENGINEERING & TECHNOLOGY
GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.)
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SCHEME FOR EXAMINATION (Effective from Session 2023-24)

B.TECH. (FOUR YEAR) DEGREE COURSE, CHEMICAL ENGINEERING

FOURTH YEAR, SEVENTH SEMESTER (AICTE-NEW)

S. No.	Subject Code	Subject Name	Periods			Evaluation Scheme			Credits
	THEORY					Sessional			
			L	T	P	IA	ESE	TOTAL	
01.	CH407TPC14	Process Equipment Design-II	3	0	0	30	70	100	3
02.	CH407TPC15	Transport Phenomena	3	0	0	30	70	100	3
03.	CH407TPE4X	Professional Elective-IV	3	0	0	30	70	100	3
04.	CH407TPE5X	Professional Elective-V	3	0	0	30	70	100	3
05.	XX207TOEXX	Open Elective-II	3	0	0	30	70	100	3
PRACTICAL									
01.	CH407PPC09	Vocational Training Viva cum Seminar	0	0	4	30	20	50	2
02.	CH407PPC10	Minor Project	0	0	6	30	20	50	3
Total			15		10	210	390	600	20

IA - Internal Assessment

Total Marks - 600

ESE - End Semester Examination

Total Periods / Week - 25

Total Credits - 20

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SCHEME FOR EXAMINATION (Effective from Session 2023-24)
B.TECH. (FOUR YEAR) DEGREE COURSE, CHEMICAL ENGINEERING
FOURTH YEAR, EIGHTH SEMESTER (AICTE-NEW)

S. No.	Subject Code	Subject Name	Periods			Evaluation Scheme			Credits
	THEORY					Sessional			
			L	T	P	IA	ESE	TOTAL	
01.	CH408TPC16	Process Equipment Design-III	3	1	0	30	70	100	4
02.	CH408TPE6X	Professional Elective-VI	3	0	0	30	70	100	3
03.	XX208TOEXX	Open Elective-III	3	0	0	30	70	100	3
PRACTICAL									
01.	CH408PPC11	Major Project	0	0	12	120	80	200	6
Total			9	1	12	210	290	500	16

IA – Internal Assessment

ESE - End Semester Examination

Total Credits – 16

Total Marks – 500

Total Periods / Week - 22

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SCHOOL OF STUDIES OF ENGINEERING & TECHNOLOGY
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DEPARTMENT OF CHEMICAL ENGINEERING
List of Professional Elective Courses (Seventh and Eighth Semester)

S.No.	Semester	Course No.	Subjects
01.	VII	CH407TPE41	New Separation Processes
02.		CH407TPE42	Water Conservation and Management
03.		CH407TPE43	Process Modeling and Simulation
01.	VII	CH407TPE51	Petroleum Refinery Engineering
02.		CH407TPE52	Process Utilities and Safety
03.		CH407TPE53	Design and Development of Catalyst
01.	VIII	CH408TPE61	Environmental Engineering
02.		CH408TPE62	Optimization Techniques
03.		CH408TPE63	Petrochemical Technology

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List of Open Elective Courses (Seventh and Eighth semester)

S.NO.	SEMESTER	COURSE NO.	SUBJECTS	DEPARTMENT CODE
01.	VII	CH207TOE02	WASTE TO ENERGY	CH
02.		ME207TOE02	PRINCIPLES OF MANAGEMENT	ME
03.		EC207TOE02	CMOS DIGITAL VLSI DESIGN	EC
04.		CE207TOE02	GREEN BUILDING AND SUSTAINABLE MATERIALS	CE
05.		IT207TOE02	MACHINE LEARNING	IT
06.		CS207TOE02	GIS & REMOTE SENSING	CS
07.		IP207TOE21	MANUFACTURING PROCESSES-I	IP
01.	VIII	CH208TOE03	PROJECT ENGINEERING ECONOMICS AND MANAGEMENT	CH
02.		ME208TOE03	SUPPLY CHAIN MANAGEMENT	ME
03.		EC208TOE03	INTRODUCTION TO IOT	EC
04.		CE208TOE03	INFRASTRUCTURE PLANNING AND MANAGEMENT	CE
05.		IT208TOE03	SOFT COMPUTING	IT
06.		CS208TOE03	ARTIFICIAL INTELLIGENCE	CS
07.		IP208TOE41	ADVANCED MANUFACTURING PROCESSES	IP

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DEPARTMENT OF CHEMICAL ENGINEERING
SCHOOL OF STUDIES OF ENGINEERING & TECHNOLOGY, GGV, BILASPUR, C.G.
(INDIA)

SCHEME OF EXAMINATION
M.TECH. CHEMICAL ENGINEERING

M.Tech. I-Semester

Sl.	Course Type/ Code	Subjects	Periods/Week			Evaluation			Credits
			L	T	P	IA	ESE	Total	
1.	CHPATT1	Advanced Heat Transfer	3	0	0	40	60	100	3
2.	CHPATT2	Advanced Separation Processes	3	0	0	40	60	100	3
3.	CHPATT3	Advanced Fluidization Engineering	3	0	0	40	60	100	3
4.	CHPATP1	Elective – I Advanced Reaction Engineering	3	0	0	40	60	100	3
	CHPATP2	Advanced Wastewater Treatment Technology							
	CHPATP3	Advanced Chemical Process Modeling							
5.	CHPATP4	Elective – II Advanced Process Control	3	0	0	40	60	100	3
	CHPATP5	Process Intensification							
	CHPATP6	Bioprocess Engineering							
6.	CHPALT1	Chemical Engineering Computational Lab	0	0	4	30	20	50	2
7.	CHPATC1	Research Methodology and IPR	2	0	0	-	50	50	2
Total								600	19

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M.Tech. II-Semester

Sl.	Course Type/ Code	Subjects	Periods/Week			Evaluation			Credits
			L	T	P	IA	ESE	Total	
1.	CHPBTT1	Advanced Transport Phenomena	3	0	0	40	60	100	3
2.	CHPBTT2	Chemical Reactor Design	3	0	0	40	60	100	3
3.	CHPBTP1 CHPBTP2 CHPBTP3	Elective - III Computational Fluid Dynamics Fuel Cell Technology Process Plant Design & Flow Sheeting	3	0	0	40	60	100	3
4.	CHPBTP4 CHPBTP5 CHPBTP6	Elective - IV Design & Development of Catalyst Industrial Pollution Control Safety Hazards & Risk Analysis	3	0	0	40	60	100	3
5	MSPBTO1 IPPBTO2 IPPBTO3 CEPBTO4 MEPBTO5 CHPBTO6 ECPBTO7 MCPBTO8	Open Elective 1. Business Analytics 2. Industrial Safety 3. Operations Research 4. Cost Management of Engineering Projects 5. Composite Materials 6. Waste to Energy 7. Internet of Things 8. MOOCs	3	0	0	40	60	100	3
6.	CHPBTL1	Advanced Chemical Engineering Lab	0	0	4	30	20	50	2
7.	CHPBPT1	Mini Project	0	0	4	30	20	50	2
8.	ELPBTX1 PEPBTX2 CEPBTX3 LAPBTX4	Audit Course/Value Added Course English for Research Paper Writing Stress Management by Yoga Disaster Management Constitution of India	2	0	0	0	0	0	0
Total								600	19

Note: Under MOOCs the students have to opt any subject other than Chemical Engineering from NPTEL/UGC SWAYAM

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SYLLABUS	(SEMESTER-I)	Periods/ Week			Internal Assessment (IA)				ESE	Grand Total	Credits
Subject Code:	FOUATC2	L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL			
Subject:	ENVIRONMENTAL SCIENCE AND ECOLOGY	2	-	-	15	15	10	40	60	100	02

Course Content

UNIT – I

Introduction: Environment - Components of Environment Ecosystem: Types & Structure of Ecosystem, Balanced ecosystem Human Activities – Food, Shelter, Economic & Social Security.
Definition, Scope and basic principles of ecology and environment, Fundamentals of Ecology and Ecosystem – Structural and Functional Components. Food chain & Food webs. Ecological pyramids; Energy flow

UNIT – II

Air Pollution & Automobile Pollution: Definition, Effects – Global Warming, Acid rain & Ozone layer depletion, controlling measures.

UNIT-III

Solid Waste Management, E - Waste Management & Biomedical Waste Management - Sources, Characteristics & Disposal methods.

UNIT – IV

Natural Resources, Water resources – Availability & Quality aspects, Water borne diseases & water induced diseases, Fluoride problem in drinking water, Mineral resources, Forest Wealth, Material Cycles – Carbon Cycle, Nitrogen Cycle & Sulphur Cycle.

UNIT-V

Energy – Different types of energy, Conventional sources & Non Conventional sources of energy: solar energy, Hydro electric energy, Wind Energy, Nuclear energy, Biomass & Biogas Fossil Fuels, Hydrogen as an alternative energy.

Text Books

1. Fundamentals of Ecology (3rd Ed.) 2001- MC Dash, Tata - McGraw Hill, New Delhi.
2. Introduction to Environmental Engg. (1991). - GM Masters, Prentice Hall of India.
3. Benny Joseph (2005), "Environmental Studies", Tata McGraw – Hill Publishing Company Limited.
4. R.J.Ranjit Daniels and Jagadish Krishnaswamy, (2009), "Environmental Studies", Wiley India Private Ltd., New Delhi.
5. R Rajagopalan, "Environmental Studies – From Crisis to Cure", Oxford University Press, 2005,
6. Aloka Debi, "Environmental Science and Engineering", Universities Press (India) Pvt. Ltd. 2012



SYLLABUS	(SEMESTER-I)	Periods/ Week			Internal Assessment (IA)				ESE	Grand Total	Credits
Subject Code:	LAUATC1	L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL			
Subject:	INDIAN CONSTITUTION	1	-	-	20	20	10	50	-	50	01

Course Learning Objectives:

- To the importance of preamble of the constitution of India.
- To understand the fundamental rights and duty as a citizen of India.
- To understand the functioning of union and state government and their inter-relationship.

Course Content:

UNIT 1: Introduction: Constitution-meaning of the term, Sources and constitutional theory, Features, Citizenship. Preamble.

UNIT 2: Fundamental Rights and Duties: Fundamental Rights, Fundamental Duties, Directive Principles of State Policy

UNIT 3: Union Government: Structure of Indian Union: Federalism, Centre-State relationship President: Role. Power and position, Prime Minister and council of ministers, Cabinet and Central Secretariat, Lok Sabha. Rajya Sabha

UNIT 4: State Government: Governor: Role and position, Chief Minister and council of ministers, State Secretariat

UNIT 5: Relationship between Centre and States: Distribution of Legislative Powers, Administrative Relations, Coordination between States

Textbooks/References:

- Constitution of India, V.N. Shukla
- The Constitutional Law of India, J.N. Pandey
- Indian Constitutional Law. M.P. Jain

Course Outcome: At the end of the course students will be able to:

- Describe the salient features of the Indian Constitution
- List the Fundamental Rights and Fundamental Duties of Indian citizens
- Describe the Directive Principles of State Policy and their significance



SYLLABUS	(SEMESTER-II)	Periods/ Week			Internal Assessment (IA)				ESE	Grand Total	Credits
Subject Code:	MEUBTH2 (for Mech) CHUBTH2 (for Chem) IPUBTH2 (for IPE) CEUBTH2 (for Civil)	L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL			
Subject:	HUMAN VALUES AND ETHICS	1	-	-	20	20	10	50	-	50	01

COURSE OBJECTIVE:

1. To create an awareness on Engineering Ethics and Human Values.
2. To understand social responsibility of an engineer.
3. To appreciate ethical dilemma while discharging duties in professional life.

COURSE OUTCOME:

On completion of this course, the students will be able to

1. Understand the significance of value inputs in a classroom and start applying them in their life and profession
2. Distinguish between values and skills, happiness and accumulation of physical facilities, the Self and the Body, Intention and Competence of an individual, etc.
3. Understand the role of a human being in ensuring harmony in society and nature.
4. Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work.

COURSE CONTENT:

UNIT I: Introduction to Value Education

1. Value Education, Definition, Concept and Need for Value Education.
2. The Content and Process of Value Education.
3. Basic Guidelines for Value Education.
4. Self exploration as a means of Value Education.
5. Happiness and Prosperity as parts of Value Education.

UNIT II: Harmony in the Human Being

1. Human Being is more than just the Body.
2. Harmony of the Self ('I') with the Body.
3. Understanding Myself as Co-existence of the Self and the Body.
4. Understanding Needs of the Self and the needs of the Body.
5. Understanding the activities in the Self and the activities in the Body.

UNIT III: Harmony in the Family and Society and Harmony in the Nature

1. Family as a basic unit of Human Interaction and Values in Relationships.
2. The Basics for Respect and today's Crisis: Affection, e, Guidance, Reverence, Glory, Gratitude and Love.
3. Comprehensive Human Goal: The Five Dimensions of Human Endeavour.
4. Harmony in Nature: The Four Orders in Nature.
5. The Holistic Perception of Harmony in Existence.

UNIT IV: Social Ethics

1. The Basics for Ethical Human Conduct.
2. Defects in Ethical Human Conduct.

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3. Holistic Alternative and Universal Order.
4. Universal Human Order and Ethical Conduct.
5. Human Rights violation and Social Disparities.

UNIT V: Professional Ethics

1. Value based Life and Profession.
2. Professional Ethics and Right Understanding.
3. Competence in Professional Ethics.
4. Issues in Professional Ethics – The Current Scenario.
5. Vision for Holistic Technologies, Production System and Management Models.

TEXT BOOKS

- 1.A.N.Tripathy, New Age International Publishers, 2003.
- 2.Bajpai. B. L. , , New Royal Book Co, Lucknow, Reprinted, 2004
- 3.Bertrand Russell Human Society in Ethics & Politics

REFERENCE BOOKS

- 1.Corliss Lamont, Philosophy of Humanism
- 2.Gaur. R.R. ,Sangal. R, Bagaria. G.P, A Foundation Course in Value Education, Excel Books, 2009.
- 3.Gaur. R.R. ,Sangal. R ,Bagaria. G.P, Teachers Manual Excel Books, 2009.
- 4.I.C. Sharma . Ethical Philosophy of India Nagin & co Julundhar
- 5.Mortimer. J. Adler, – Whatman has made of man
- 6.William Lilly Introduction to Ethic Allied Publisher

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NSS

SYLLABUS	(SEMESTER-II)	Periods/ Week			INTERNAL ASSESSMENT (IA)			ESE Viva/ Assessment	Grand total	Credits
Subject Code:	NSUBLS1	L	T	P	Attendance	Activities	TOTAL			
Subject:	NSS	-	-	2	5	20	25	25	50	01

S.N.	PROGRAM HEADS	HOURS/SEM
1	Cleaning program	06
2	Plantation	06
3	Health Camp/Special Days celebration	10
4	Awareness program/Ralley	06

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AUDTOI

Energy and Environment

[L:3, T:0, P:0]

Objectives

The objectives of this course are to introduce the basics of environment & ecosystem, different sources of pollution, its control measures and various energy resources. The course gives awareness about global environmental issues.

Contents:

Unit-I:

Introduction to Energy, Sources of Energy, Scenario of Energy, Conservation of Energy, Energy audit, Possibilities for energy storage or regeneration

Unit-II: Conventional and non-conventional energy sources and their uses. Fossil fuels - past, present & future, Remedies & alternatives for fossil fuels - Solar, Wind, Biomass, Hydrogen, Geothermal, Ocean and Hydro energy.

Unit-III: Components of environment and their relationship, impact of technology on environment, environmental degradation.

Global Environmental Issues: climate change, global warming, acid rain, ozone layer depletion, nuclear accidents, and holocaust; Social Issues and the Environment.

Unit-IV: Overview of Environmental Pollution: Sources, effects, and control measures.

Unit-V: Environmental Legislation: Environmental protection laws in India; Air (Prevention and Control of Pollution) Act; Water (Prevention and control of Pollution) Act; Issues involved in enforcement of environmental legislation; Public awareness; Case studies.

Suggested Text Books :

1. Textbook of Environmental Studies for Undergraduate Courses by ErachBharucha Second edition, 2013 Publisher: Universities Press (India) Private Ltd, Hyderabad.
2. Dr. Suresh K Damecha, Environmental Studies, S K Kataria & Sons, New Delhi.
3. R. Rajagopalan, Environmental Studies, Oxford University Press.
4. Robert A. Ristinen, Jack J. Kraushaar, Jeffrey Brack, Energy and the Environment, Wiley Publication

Reference Book:

1. Wright Richard and Nebal Bernard, Environmental studies, Prentice Hall, New Jersey.
2. U K Khare, Basics of Environmental Studies, Tata McGrawHill
3. Daniel B Botkin & Edward Akeller, Environmental Sciences, John Wiley & Sons

Course Outcome:

Students would be able

1. To comprehend components of environment and ecosystem and to get aware about environmental degradation.
2. To identify different types of pollutions and control measures.
3. To create awareness about global environmental issues.

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CHUCTK2

Water Treatment and Management

[L:3, T:0, P:0]

Objectives

- To introduce the water management principles related to process plants.
- To focus on the wastewater transport system and the theory for the wastewater treatment process.
- To analyze water quality parameters and their impact on human and environmental health.

Contents:

Unit I: Introduction to Water Treatment and Management, Importance of water treatment and management, Water cycle and its relevance to water management.

Unit II: Water Quality Assessment, Water quality parameters (physical, chemical, biological), Sampling techniques, water borne diseases and analysis methods.

Unit III: Drinking Water Standards and Regulations, water act, National and international drinking water standards, Regulatory frameworks and compliance.

Unit IV: Water Treatment Processes, Screening and pre-treatment b. Coagulation, flocculation, and sedimentation, Filtration (slow sand, rapid sand, membrane), Disinfection (chlorination, UV, ozone), Desalination and water softening.

Unit V: Sustainable Water Management, Water conservation and efficiency, Integrated water resource management, Rainwater harvesting and storm water management

Suggested Text Books :

- Water Conservation, Management and Analysis by V. Madireddi and Subba Rao, Read worthy Publications (Pvt) Ltd
- Protection and Conservation of, Water Resources by Hadrian F. Cook, John Wiley & Sons Inc.
- Water Resources, Conservation and Management by S.N. Chatterjee, Atlantic Publishers & Dist.
- P.C.Bansil "Water Management in India", Concept Publishing company, New Delhi, First Edition, 2004.
- G.S.Bridie and J.S.Bridie "Water Supply and Sanitary Engineering", Dhanpat Raj Publishing company (P) Ltd., New Delhi, 7th Edition, 2003.

Course Outcome:

Students would be able to

- Evaluate the performance of industrial boilers.
- Choose methods for waste minimization and water conservation.

CO-PO Mapping														PSO		
CO	PO													1	2	3
	1	2	3	4	5	6	7	8	9	10	11	12		1	2	3
CO1						2	2							1		
CO2						2	2							1		

Weightage : 1-Slightly; 2-Moderate; 3-Strongly

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CH306TMC02 Essence of Indian Knowledge Tradition [L:3, T:0, P:0]

Objectives:

- The course aims at imparting basic principles of thought process, reasoning and inferencing. Sustainability is at the core of Indian Traditional Knowledge Systems connecting society and nature.
- Holistic life style of Yogic-science and wisdom capsules in Sanskrit literature are also important in modern society with rapid technological advancements and societal disruptions.
- The course focuses on introduction to Indian Knowledge System, Indian perspective of modern scientific world-view and basic principles of Yoga and holistic health care system.

Content:

- Basic structure of Indian Knowledge System, Introduction to traditional knowledge, definition of traditional knowledge, nature and characteristics, scope and importance, kinds of traditional knowledge, Indigenous Knowledge (IK), characteristics.
- Modern Science and Indian Knowledge System.
- Traditional knowledge in different sectors; Traditional knowledge and engineering, Traditional medicine system, TK in agriculture.
- Protection of traditional knowledge, the need for protecting traditional knowledge significance of TK Protection, legal framework and TK; the scheduled tribes and other traditional forest dwellers (Recognition of Forest Rights) Act, 2006, plant varieties protection and farmer's rights act, 2001 (PPVFR Act); the biological diversity act 2002 and rules 2004, the protection of traditional knowledge bill, 2016

Suggested Text/Reference Books

1. V. Sivaramakrishna (Ed.), Cultural Heritage of India-Course Material, Bharatiya Vidya Bhavan, Mumbai, 5th Edition, 2014
2. Swami Jitatmanand, Modern Physics and Vedant, Bharatiya Vidya Bhavan
3. Fritzof Capra, Tao of Physics
4. Fritzof Capra, The wave of Life
5. V N Jha (Eng. Trans.), Tarkasangraha of Annam Bhatta, International Chinmay Foundation, Velliarnad, Amaku,am
6. Yoga Sutra of Patanjali, Ramakrishna Mission, Kolkatta
7. GN Jha (Eng. Trans.) Ed. R N Jha, Yoga-darshanam with Vyasa Bhashya, Vidyanidhi Prakasham, Delhi, 2016
8. RN Jha, Science of Consciousness Psychotherapy and Yoga Practices, Vidyanidhi Prakasham, Delhi, 2016
9. P R Sharma (English translation), Shodashang Hridayam

Course Outcomes:

Ability to understand , connect up and explain basics of Indian Traditional knowledge modern scientific perspective.

NA A

2



B.Tech. VII Semester

CH407TPE42

Water Conservation & Management

[L:3, T:0, P:0]

Objectives

1. To understand the importance of water resources and their role in sustainable development. 2. To identify and analyse various water conservation techniques and strategies. 3. To evaluate the environmental, social, and economic impacts of water management practices. 4. To apply mathematical and statistical methods to analyse water-related data and make informed decisions. 5. To demonstrate effective communication skills in presenting water conservation plans and projects.

Contents

Introduction; water cycle, water storage, water quality; water conservation in homes; water conservation in the work place; water management-water quality, controlling use and quality of water, water flow measurement, water quality control, testing water salinity, preserving water quality, minimising evaporation, water sanitation, water audits; water conservation in agriculture; water conservation in process industry; water conservation in construction industry; water conservation in service industry.

Suggested Text Books

1. Water Conservation, Management and Analysis by V. Madireddi and Subba Rao, Read worthy Publications (Pvt) Ltd
2. Protection and Conservation of, Water Resources by Hadrian F. Cook, John Wiley & Sons Inc.
3. Water Resources, Conservation and Management by S.N. Chatterjee, Atlantic Publishers & Dist.

Course Outcomes

Upon completion of this course, the students will be able to:

1. Apply scientific knowledge and principles to solve real-world problems. 2. Demonstrate understanding of environmental, social, and ethical responsibilities in professional practice. 3. Analyze and evaluate the impacts of engineering solutions in a global and societal context. 4. Apply research methods and tools to investigate complex problems. 5. Communicate effectively with diverse audiences.

CO-PO Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2				2	2						3		
CO2	3	2	2			2	2						3		
CO3		2	2	2		2	2						3		
CO4	3		2	2		2	2						3		
CO5		2			2	2	2						3		

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CH408TPE61

Environmental Engineering

[L:3, T:0, P:0]

Objectives

To understand the significant issues of environmental pollution and their control principals.

Contents

Unit I: Environmental Pollution and Its Effect: Environment and its components, Sources and type of pollutants, General effects on man, animal, vegetation and property.

Unit II: Air Pollution: Air quality criteria and standards, Ambient air sampling and analysis, Stack emission standards, Stack sampling and analysis, Meteorology and dispersion of air pollutants, Atmospheric lapse rate and stability, Plume behavior, Control of gaseous and particulate pollutants from mobile and stationary sources, air pollution acts.

Unit III: Water Pollution: Water quality criteria and effluent discharge standards, Domestic and industrial sources of waste water, Waste water sampling and analysis methods as per BIS specifications, Physico-chemical and biological methods of waste water treatment, Recovery of material from process effluents, water pollution acts.

Unit IV: Pollution Due to Hazardous Industrial Waste: Nature of hazardous waste materials from various chemical and allied Industries, Methods of disposal, destruction and reuse, nuclear wastes and their management. Solid waste from commercial, domestic and industrial sectors-composition and characterization, recycle, resource recovery and disposal.

Unit V: Environmental Pollution Management: Case studies of air and water pollution control in chemical industries.

Suggested Text Books:

1. Environmental Pollution Control Engineering by C. S. Rao, New Age International Ltd.
2. Environmental Engineering by N. N. Basak, Tata McGraw-Hill Pub. Co. Ltd.
3. Essentials of Environmental Studies by K. Joseph and R. Nagendran, Pearson Education (Singapore) Pvt. Ltd.

Course Outcome:

The students will be able

1. To explain environmental pollution and its effect.
2. To develop the understanding of air pollution and to describe methods of controlling of air pollution.
3. To analyze water quality, evaluate water pollution, and describe the control methods.
4. To analyze the characteristics of hazardous industrial waste and understand its handling and management.
5. To understand the application part through case studies.

CO-PO Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	1										3		
CO2	3	2	1	2		2							3		
CO3	3	2	1	2		2							3		
CO4	3	2	1	2		2							3		
CO5	3	2	2	1		2							3		

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CH207TOE02

B.Tech. VIII Semester
Waste to Energy

[L:3, T:0, P:0]

Contents

Unit I: Introduction to Energy from Waste: Classification of waste as fuel - Agro based, Forest residue, Industrial waste - MSW - Conversion devices - Incinerators, gasifiers, digestors

Unit II: Biomass Pyrolysis: Pyrolysis - Types, slow, fast - Manufacture of charcoal - Methods - Yields and application - Manufacture of pyrolytic oils and gases, yields and applications.

Unit III: Biomass Gasification: Gasifiers - Fixed bed system - Downdraft and updraft gasifiers - Fluidized bed gasifiers - Design, construction and operation - Gasifier burner arrangement for thermal heating - Gasifier engine arrangement and electrical power - Equilibrium and kinetic consideration in gasifier operation.

Unit IV: Biomass Combustion: Biomass stoves - Improved chullahs, types, some exotic designs, fixed bed combustors, Types, inclined grate combustors, Fluidized bed combustors, Design, construction and operation - Operation of all the above biomass combustors.

Unit V: Biogas: Properties of biogas (Calorific value and composition) - Biogas plant technology and status - Bio energy system - Design and constructional features - Biomass resources and their classification - Biomass conversion processes - Thermo chemical conversion - Direct combustion - biomass gasification - pyrolysis and liquefaction - biochemical conversion - anaerobic digestion - Types of biogas Plants - Applications - Alcohol production from biomass - Bio diesel production - Urban waste to energy conversion - Biomass energy programme in India.

References:

- Non-Conventional Energy, Desai, Ashok V., Wiley Eastern Ltd., 1990.
- Biogas Technology - A Practical Hand Book - Khandelwal, K. C. and Mahdi, S. S., Vol. I & II, Tata McGraw Hill Publishing Co. Ltd., 1983.
- Food, Feed and Fuel from Biomass, Challal, D. S., IBH Publishing Co. Pvt. Ltd., 1991.
- Biomass Conversion and Technology, C. Y. WereKo-Brobby and E. B. Hagan, John Wiley & Sons, 1996.

Course outcomes:

At the end of the course, students will be able to

- Classify the waste for fuel and identify the devices for conversion of waste to energy.
- Implement the Biomass Pyrolysis
- Evaluate the methods of Biomass Gasification and implement their applications.
- To design, construct and operation the Biomass Combustion devices.
- Classify biomass, apply the bio energy systems design and construction.

CO-PO Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	2	0	-	1	1	-	-	-	-	-	1	-	-
CO2	3	2	2	1	-	1	1	-	-	-	-	-	3	-	-
CO3	3	2	2	1	-	1	1	-	-	-	-	-	3	-	-
CO4	3	2	2	1	-	1	1	-	-	-	-	-	3	-	-

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SUBJECT CODE	SUBJECT NAME	L:T:P	CREDIT
CHPATP2	ADVANCED WASTEWATER TREATMENT TECHNOLOGY	3:0:0	3

Course Objective :

- It encompasses water and wastewater analytical and instrumental methods of analysis
- Design considerations of various unit operations and processes of water treatment facilities
- Learn aeration, sedimentation, coagulation and flocculation processes. Able to explain settling equations
- It also deals with biological sludge handling and treatment

Course Contents :

Introduction, Health and environment concern in wastewater management. Water quality: Definitions, characteristics and perspectives. The hydraulic cycle, Water quality, Physical, chemical and biological water quality parameters. Measurement of organic concentration, BOD, COD and TOC Test, reaction between BOD, COD, & TOC, Most probable number (MPN), Measurement of biological characteristics, Toxicity Test. Reactor used for transient of wastewater mass balance analysis, Modelling of ideal flow in reactor, Modelling of treatment process, Kinetic of processes, Process selection. Physical unit operations: Screening, mixing, Gravity separation, Primary sedimentation, Coagulation, Secondary treatment of waste water, adsorption. Biological waste water treatment, Micro-organism growth kinetics, modelling of suspended froth treatment process, Aerobic biological oxidation, Anaerobic process, heavy metal pollution remedies

Course Outcomes:

At the end of the course, the student will be able to:

- Explain the need for wastewater treatment, categorize the wastewater based on characteristics, and illustrate reactor types in wastewater treatment
- Understand and apply the design principles and criteria in designing units such as screen, grit chamber, primary settling tank. Establish bio-kinetic constants in the engineering design of wastewater treatment processes
- Describe the design criteria and design the suspended and attached growth biological wastewater treatment systems like activated sludge process, trickling filter
- Plan and perform aerobic and anaerobic treatment processes on both domestic wastewater and industrial effluent

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SUBJECT CODE	SUBJECT NAME	L:T:P	CREDIT
CHPBTP5	INDUSTRIAL POLLUTION CONTROL	3:0:0	3

Course Objective :

- To understand the importance of industrial pollution and its abatement
- To study the underlying principles of industrial pollution control
- To acquaint the students with case studies
- Student should be able to design complete treatment system

Course Content :

Air pollution Sources and Effects, Air pollution laws and standards; Air pollution sampling and measurement from point, non-point, line and area sources, analysis of air pollutants; Air pollution control methods and equipment, Design details of Particulate emission control equipments like Gravitational settling Chamber, Cyclone Separator, Fabric Filter, Electrostatic Precipitator, Wet scrubber; Case studies of a few industrial pollution control system. Sources, effects and laws of water pollution; BOD, COD; Waste water treatment, Design details of Primary Treatment methods like Pretreatment, Sedimentation, Floatation, Design aspects of Secondary Treatment methods like Activated Sludge Process, Trickling Filter. Design aspects of Advanced waste water treatment including Ion Exchanger, Reverse Osmosis, Electrodialysis, Advanced Biological Systems. Solid Waste Management, design calculation of disposal methods, Incineration, Hazardous Waste Management strategy and treatment methods, landfill closure and underground disposal.

Course Outcome :

After learning the course, the students will be able to:

1. Recognize the causes and effects of environmental pollution
2. Analyze the mechanism of proliferation of pollution
3. Develop methods for pollution abatement and waste minimization
4. Design treatment methods for gas, liquid and solid wastes

Texts Books :

- Schnelle K.B. and Brown C.A., Air Pollution Control Technology Handbook, CRC Press
- Peavy H.S., Rowe D.R. and Tchobanoglous G., Environment Engineering, McGraw-Hill

Reference Books :

- Trivedy R.K. and Goel P.K., An Introduction to Air Pollution, Technoscience Pub.
- Sengar D.S., Environmental Law, PHI
- B. Chawla, Jain A.K., Jain A.K., Waste Water Engineering

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Department of Chemical Engineering, GGV

M.Tech-2021-22

SUBJECT CODE	SUBJECT NAME	L:T:P	Credit
CHPBT06	WASTE TO ENERGY	3:0:0	3

Course Contents:

Introduction to Energy from Waste: Classification of waste as fuel - Agro based, Forest residue, Industrial waste. - MSW - Conversion devices - Incinerators, gasifiers, digestors Biomass Pyrolysis: Pyrolysis - Types, slow, fast - Manufacture of charcoal - Methods - Yields and application - Manufacture of pyrolytic oils and gases, yields and applications. Biomass Gasification: Gasifiers - Fixed bed system - Downdraft and updraft gasifiers - Fluidized bed gasifiers - Design, construction and operation - Gasifier burner arrangement for thermal heating - Gasifier engine arrangement and electrical power - Equilibrium and kinetic consideration in gasifier operation. Biomass Combustion: Biomass stoves - Improved chullahs, types, some exotic designs, fixed bed combustors, Types, inclined grate combustors, Fluidized bed combustors, Design, construction and operation - Operation of all the above biomass combustors. Biogas: Properties of biogas (Calorific value and composition) - Biogas plant technology and status - Bio energy system - Design and constructional features - Biomass resources and their classification - Biomass conversion processes - Thermo chemical conversion - Direct combustion - biomass gasification - pyrolysis and liquefaction - biochemical conversion - anaerobic digestion - Types of biogas Plants - Applications - Alcohol production from biomass, Bio diesel production - Urban waste to energy conversion - Biomass energy programme in India.

Course Outcomes:

At the end of the course, students will be able to

- 1 Classify the waste for fuel and identify the devices for conversion of waste to energy.
- 2 Implement the Biomass Pyrolysis
- 3 Evaluate the methods of Biomass Gasification and implement their applications.
- 4 To design, construct and operation the Biomass Combustion devices.
- 5 Classify biomass, apply the bio energy systems design and construction.

Reference Books:

- Desai, Ashok V., Non-Conventional Energy, Wiley Eastern Ltd., 1990.
- Khandelwal, K. C. and Mahdi, S. S., Biogas Technology - A Practical Hand Book - Vol. I & II, Tata McGraw Hill Publishing Co. Ltd., 1983.
- Challal, D. S. Food, Feed and Fuel from Biomass, IBH Publishing Co. Pvt. Ltd., 1991.
- C. Y. Were Ko-Brobby and E. B. Hagan, Biomass Conversion and Technology, John Wiley & Sons, 1996.

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Department of Chemical Engineering, GGV

M.Tech-2021-22

SUBJECT CODE	SUBJECT NAME	L:T:P	Audit
LAPBTX4	CONSTITUTION OF INDIA	2:0:0	2

Course Contents:

- History of Making of the Indian Constitution: History Drafting Committee, (Composition & Working).
- Philosophy of the Indian Constitution: Preamble, Salient Features
- Contours of Constitutional Rights & Duties: Fundamental Rights, Right to Equality, Right to Freedom, Right against Exploitation, Right to Freedom of Religion, Cultural and Educational Rights, Right to Constitutional Remedies, Directive Principles of State Policy, Fundamental Duties.
- Organs of Governance: Parliament, Composition, Qualifications and Disqualifications, Powers and Functions, Executive, President, Governor, Council of Ministers, Judiciary, appointment and Transfer of Judges, Qualifications, Powers and Functions.
- Local Administration: District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation. Pachayati raj: Introduction, PRI: ZilaPachayat. Elected officials and their roles, CEO ZilaPachayat: Position and role. Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy.
- 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.

Course Outcomes:

At the end of the course, students will be able to

- 1 Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
- 2 Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
- 3 Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.
- 4 Discuss the passage of the Hindu Code Bill of 1956.

Reference Books:

- The Constitution of India, 1950 (Bare Act), Government Publication.
- Dr. S. N. Busi, Dr. B. R. Ambedkar framing of Indian Constitution, 1st Edition, 2015.
- M. P. Jain, Indian Constitution Law, 7th Edn., Lexis Nexis, 2014.
- D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015.

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गुरु घासीदास विश्वविद्यालय
(केन्द्रीय विश्वविद्यालय अधिनियम 2009 क्र. 25 के अंतर्गत स्थापित केन्द्रीय विश्वविद्यालय)
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