



**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 : 2021-22***

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

Sr. No.	Course Code	Name of the Course
01.	LW201TMC01	Indian Constitution
02.	CH05TMC02	Constitution of India-Basic Feature and Fundamental Principles
03.	CH06TPE21	Environmental Engineering
04.	CH06TPE32	Fuel Combustion Energy Technology
05.	CH07TOE32	Water Conservation & Management



## Scheme and Syllabus

**SCHOOL OF STUDIES OF ENGINEERING & TECHNOLOGY  
GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.)  
(A CENTRAL UNIVERSITY)**

**CBCS-NEW, EVALUATION SCHEME**

**PROPOSED (W.E.F. SESSION 2020-21)**

**B. TECH. FIRST YEAR (SEMESTER- I)**

(Common for CH, CE, IPE, ME)

S.No.	COURSE No.	SUBJECT	PERIODS			EVALUATION SCHEME			CREDITS
			L	T	P	IA	ESE	SUB-TOTAL	
<b>THEORY</b>									
1.	MA201TBS01	MATHEMATICS-I	3	1	-	30	70	100	4
2.	CY201TBS02	CHEMISTRY	3	1	-	30	70	100	4
3.	CE201TES01	ENGINEERING MECHANICS	3	1	-	30	70	100	4
4.	CS201TES02	COMPUTER PROGRAMMING	3	0	-	30	70	100	3
5.	CM201TES03	BASIC CIVIL & MECHANICAL ENGINEERING	3	0	-	30	70	100	3
6.	LW201TMC01	INDIAN CONSTITUTION	2	0	-	-	-	-	-
<b>TOTAL</b>			<b>17</b>	<b>3</b>	<b>-</b>	<b>150</b>	<b>350</b>	<b>500</b>	<b>18</b>
<b>PRACTICALS</b>									
1.	CY201PBS01	CHEMISTRY LAB	-	-	2	30	20	50	1
2.	CE201PES01	ENGINEERING MECHANICS LAB	-	-	2	30	20	50	1
3.	CS201PES02	COMPUTER PROGRAMMING LAB	-	-	2	30	20	50	1
<b>TOTAL</b>			<b>-</b>	<b>-</b>	<b>6</b>	<b>90</b>	<b>60</b>	<b>150</b>	<b>3</b>
<b>GRAND TOTAL</b>			<b>17</b>	<b>3</b>	<b>6</b>	<b>240</b>	<b>410</b>	<b>650</b>	<b>21</b>

Total Credits:21

Total Contact Hours:26

Total Marks:650

L:LECTURE, T:TUTORIAL, P:PRACTICAL, IA : INTERNAL ASSESSMENT, ESE:END SEMESTER EXAMINATION

\*INTERNAL ASSESSMENT- Two Class Test of 15 Marks each will be conducted.



SYLLABUS	(SEMESTER-I)	Periods/Week			Internal Assessment ( IA)			ESE	Grand Total	Credits
		L	T	P	CT-I	CT-II	TOTAL			
<i>Subject Code:</i>	LW201TMC01	L	T	P	CT-I	CT-II	TOTAL	--	--	--
<i>Subject:</i>	INDIAN CONSTITUTION	2	0	-	-	-	-			

**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:**

1. Constitution of India, V.N. Shukla
2. The Constitutional Law of India, J.N. Pandey
3. 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



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SCHEME FOR EXAMINATION (Effective from session 2020-21)

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

THIRD YEAR, FIFTH SEMESTER (AICTE)

S. No.	Subject Code	Subject Name	Periods			Evaluation Scheme			Credits
			L	T	P	Sessional			
						IA	ESE	TOTAL	
01.	CH05TPC08	Heat Transfer	3	1	0	30	70	100	4
02.	CH05TPC09	Mass Transfer-I	3	1	0	30	70	100	4
03.	CH05TPC10	Chemical Reaction Engineering-I	3	1	0	30	70	100	4
04.	CH05TPE1X		3	0	0	30	70	100	3
05.	CH05TOE1X		3	0	0	30	70	100	3
06.	CH05TMC02	Constitution of India-Basic Features and Fundamental Principles	3	0	0	0	0	0	0
PRACTICAL									
01.	CH05PPC06	Heat Transfer Lab	0	0	3	30	20	50	1.5
02.	CH05PPC07	Mass Transfer-I Lab	0	0	3	30	20	50	1.5
03.	CH05PPC08	Chemical Reaction Engineering Lab	0	0	3	30	20	50	1.5
Total			18	3	9			650	22.5

IA - Internal Assessment

Total Marks - 650

ESE - End Semester Examination

Total Periods / week - 30

Total Credits - 22.5

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SCHEME FOR EXAMINATION (Effective from session 2020-21)

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

THIRD YEAR, SIXTH SEMESTER (AICTE)

S. No.	Subject Code	Subject Name	Periods			Evaluation Scheme			Credits
			L	T	P	Sessional			
						IA	ESE	TOTAL	
01.	CH06TPC11	Mass Transfer-II	3	1	0	30	70	100	4
02.	CH06TPC12	Process Dynamics and Control	3	1	0	30	70	100	4
03.	CH06TPC13	Process Equipment Design-I	3	1	0	30	70	100	4
04.	CH06TPE2X		3	0	0	30	70	100	3
05.	CH06TPE3X		3	0	0	30	70	100	3
06.	CH06TOE2X		3	0	0	30	70	100	3
PRACTICAL									
01.	CH06PPC09	Process Dynamics and Control Lab	0	0	3	30	20	50	1.5
02.	CH06PPC10	Mass Transfer-II Lab	0	0	3	30	20	50	1.5
Total			18	3	6			700	24

IA - Internal Assessment

Total Marks - 700

ESE - End Semester Examination

Total Periods / week - 27

Total Credits - 24

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DEPARTMENT OF CHEMICAL ENGINEERING

List of Professional Elective Courses (Fifth and Sixth semester)

S.No.	Semester	Course No.	Subjects
01.	V	CH05TPE11	Engineering Materials
02.		CH05TPE12	Organic Chemical Technology
03.		CH05TPE13	Polymer Technology
04.	VI	CH06TPE21	Environmental Engineering
05.		CH06TPE22	Fundamental of Biochemical Engineering
06.		CH06TPE31	Fertilizer Technology
07.		CH06TPE32	Fuel Combustion Energy Technology

List of Open Elective Courses (Fifth and Sixth semester)

S.No.	Semester	Course No.	Subjects
01.	V	CH05TOE11	Fluidization Engineering
02.		CH05TOE12	Financial Management
03.		CH05TOE13	Managerial Economics
04.		CH05TOE14	Financial Accounting and Costing
05.	VI	CH06TOE21	Process Utilities and Safety
06.		CH06TOE22	Enterprise Resource Planning
07.		CH06TOE23	Management Information System
08.		CH06TOE24	Six Sigma and DOE





CH05TMC02 Constitution of India-Basic Features and Fundamental Principles [L:3, T:0, P:0]

*Objectives*

The objective of the course is to provide an understanding of the main development and legacies of national movement and constitutional development in India, reasons for adopting a Parliamentary- federal system, the broad philosophy of the Constitution of India and the changing nature of Indian Political System. Challenges/ problems and issues concerning national integration and nation-building will also be discussed in the contemporary context aiming at developing a future vision for a better India.

**Contents:**

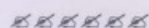
1. Meaning of the constitution law and constitutionalism.
2. Historical perspective of the Constitution of India.
3. Salient features and characteristics of the Constitution of India.
4. Scheme of the fundamental rights in Indian Constitution.
5. Right to Equality, Right to Freedom and Right to Life and Personal Liberty.
6. The scheme of the Fundamental Duties and its legal status.
7. The Directive Principles of State Policy-Its importance and implementation.
8. Federal structure and distribution of legislative and financial powers between the Union and the States.
9. Parliamentary Form of Government in India-The constitutional powers and status of the President of India.
10. Amendment Procedures in Constitution of India.
11. Emergency Provisions: National Emergency, President Rule, Financial Emergency.
12. Local Self Government – Constitutional Scheme in India.

**Suggested Text Books :**

1. The Idea of India by Sunil Khilnani, Penguin Books India Pvt. Ltd.
2. The Oxford Handbook of The Indian Constitution Edited by S. Choudhry, M. Khosla and P. B. Mehta, Oxford University Press.
3. Introduction to the Constitution of India by B. K. Sharma, PHI Learning Private Limited.
4. Transforming India: Challenges to the World's Largest Democracy by S. Bose, Harvard University Press.
5. Democracy and Discontent: India's Growing Crisis of Governability by A. Kohli, Cambridge University Press.

**Course Outcome:**

It will equip the students with the real understanding of our political system/ process in correct perspective and make them sit up and think for devising ways for better participation in the system with a view of making the governance and delivery system better for the common man who is often left unheard and unattended in our democratic setup besides generating a lot of dissatisfaction and difficulties for the system.





**CH6TPE21**

**Environmental Engineering**

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

**Objectives**

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

**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 behaviour, Control of gaseous and particulate pollutants from mobile and stationary sources.

**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.

**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:**

Students would be able to

1. Explain environmental pollution and its effect.
2. Describe methods of controlling of Water Pollution and Air Pollution.
3. Analyze the characteristics of hazardous industrial waste and its handling and management.
4. Explain case studies of air and water pollution control in chemical industries.





CH06TPE32 Fuel Combustion Energy Technology [L:3, T:0, P:0]

**Objectives**

To understand the basics of various types of solid, liquid and gaseous fuels, basic principles of their combustion processes, its appliances, the fundamentals of the applied sciences dealing with various types of conventional and non-conventional energy resources.

**Contents:**

**Unit-I:** Solid Fuel : Classification of fuel, Origin, Composition, Characteristics and analysis of coal washing & storage of coal, Physical & chemical processing of coal, Various classification systems of coal briquetting, Carbonization, Gasification of coal. Liquid fuels: Origin, composition, characteristics and classification of crude oil, crude oil processing cracking and reforming, storage and handling of liquid fuel. Gaseous fuel: Classification of gaseous fuel, Natural gas, Coal gas, Coke oven and blast furnace gas, producer gas, water and Carburetted water gas

**Unit-II:** Fuel Combustion Calculation: Fundamentals of various combustion calculations with numerical examples.

**Unit-III:** Combustion Process: General Principles of combustion, Flame, Draught, Limits of In flammability, Types of combustion Process- Surface, Submerged, Pulsating, Slow combustion.

**Unit-IV:** Energy Conservation: Energy consumption pattern in various sectors, various ways of energy conservation in various process industries including petroleum.

**Unit-V:** Non - Conventional Energy Technologies : General principles with applications and technology of Biomass Energy, Solar Energy, Geothermal Energy, Wind Energy, Nuclear Energy, Hydal, Tidal and Ocean Energy.

**Suggested Text Books :**

1. Elements of Fuel Combustion & Energy Engineering by S.N. Saha, Dhanpat Rai Publication Co. Pvt. Ltd. New Delhi.
2. Fuels and Combustion by S. Sarkar, Orient Longman, Hyderabad.

**Course Outcome:**

Students would be able to

1. Analyze solid, liquid, gaseous fuels and their characterization.
2. Compute fuel combustion calculation in industries with recommendation of better combustion processes in relation to better efficiency and pollution control technologies.
3. Study and recommend the various energy conservation routes in various industries.
4. Study and recommend the alternative sources of energies including the renewable energies in view of energy conservation to utilize them effectively.



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SCHEME FOR EXAMINATION (Effective from Session 2021-22)  
B.TECH.-(FOUR YEAR) DEGREE COURSE, CHEMICAL ENGINEERING  
FINAL YEAR, SEVENTH SEMESTER (AICTE)

S. No.	Subject Code	Subject Name	Periods			Evaluation Scheme			Credits
			L	T	P	Sessional			
THEORY					IA	ESE	TOTAL		
01.	CH07TPC14	Process Equipment Design - II	3	1	0	30	70	100	4
02.	CH07TPC15	Chemical Reaction Engineering - II	3	1	0	30	70	100	4
03.	CH07TPC16	Transport Phenomena	3	1	0	30	70	100	4
04.	CH07TPE4X		3	0	0	30	70	100	3
05.	CH07TOE3X		3	0	0	30	70	100	3
PRACTICAL									
01.	CH07PPC11	Minor Project	0	0	3	30	20	50	1.5
02.	CH07PPC12	Seminar	0	0	3	30	20	50	1.5
<b>Total</b>			<b>15</b>	<b>3</b>	<b>6</b>			<b>600</b>	<b>21</b>

List of Open Elective Courses (Seventh and Eighth semester) (AICTE)

S. No.	Semester	Course No.	Subject
01.	VII	CH07TOE31	Process Modelling & Simulation
02.		CH07TOE32	Water Conservation & Management
03.	VIII	CH08TOE41	Optimization Techniques
04.		CH08TOE42	Project Engineering Economics & Management





B.Tech. VII Semester

CH07TOE32

Water Conservation & Management

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

*Objectives*

To introduce the water management principles related to process plants.

*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: (a) evaluate the performance of industrial boilers and furnaces; (b) identify the scope for recycle and reuse of water; (c) choose methods for waste minimization and water conservation.