

Y22 HANDBOOK

B.Tech 2023-24 Admitted Batch Category wise Course Structure

Sl No	Course Code	Course Title	Category	L	T	P	S	Cr	CH	Pre-requisite
1	23UC0017	INDIAN KNOWLEDGE SYSTEM-VEDIC MATHEMATICS	AUC	0	0	0	2	0	2	
2	23UC0018	FUNDAMENTALS OF MATHEMATICS (Bi.P.C)	AUC	3	0	0	0	0	3	
3	22UC0011	GENDER & SOCIAL EQUALITY	AUC	2	0	0	0	0	2	
4	23UC0019	ESSENCE OF INDIAN KNOWLEDGE TRADITION	AUC	2	0	0	0	0	2	
5	22UC0008	INDIAN CONSTITUTION	AUC	2	0	0	0	0	2	
6	22UC0009	ECOLOGY & ENVIRONMENT	AUC	2	0	0	0	0	2	NIL
7	22UC0020	INDIAN KNOWLEDGE SYSTEM-ENGINEERING ELECTIVE	AUC	2	0	0	0	0	2	
8	22UC1101	INTEGRATED PROFESSIONAL ENGLISH	HAS	0	0	4	0	2	4	NIL
9	22UC1202	ENGLISH PROFICIENCY	HAS	0	0	4	0	2	4	NIL
10	22UC2103	ESSENTIAL SKILLS FOR EMPLOYABILITY	HAS	0	0	4	0	2	4	NIL
11	22UC2204	CORPORATE READINESS SKILLS	HAS	0	0	4	0	2	4	NIL
12	22UC0010	UNIVERSAL HUMAN VALUES & PROFESSIONAL ETHICS	HAS	2	0	0	0	2	2	NIL
13	22UC1203	DESIGN THINKING FOR INNOVATION	HAS	0	0	4	0	2	4	NIL
14	22UC0012	INNOVATION MANAGEMENT	HAS	0	0	4	0	2	4	DTI
15	23UC0021	SOCIAL IMMERSIVE LEARNING – 1	SIL	0	0	0	4	1	4	
16	23UC0022	SOCIAL IMMERSIVE LEARNING – 2	SIL	0	0	0	4	1	4	
17	23UC0023	SOCIAL IMMERSIVE LERANING – 3	SIL	0	0	0	4	1	4	
18	23UC0024	SOCIAL IMMERSIVE LEARNING – 4	SIL	0	0	0	4	1	4	
19	23UC0025	SOCIAL IMMERSIVE LEARNING – 5	SIL	0	0	0	4	1	4	
20		MANAGEMENT ELECTIVE	HAS	2	0	0	0	2	2	NIL

21		FOREIGN LANGUAGE ELECTIVE	HAS	2	0	0	0	2	2	NIL
22		MATHEMATICS ELECTIVE – 1	BSC	2	2	0	0	4	4	NIL
23		MATHEMATICS ELECTIVE – 2	BSC	2	2	0	0	4	4	NIL
24		MATHEMATICS ELECTIVE - 3	BSC	2	2	0	0	4	4	MFE
25		MATHEMATICS ELECTIVE - 4	BSC	2	2	0	0	4	4	MFE
26	22CE1201	ENGINEERING GEOLOGY-SCE-1	BSC	3	0	2	0	4	5	NIL
27	22CY1001	ENGINEERING CHEMISTRY -SCE-2	BSC	3	0	2	0	4	5	NIL
28	23SC1101	COMPUTATIONAL THINKING FOR STRUCTURED DESIGN	ESC	3	0	2	4	5	9	NIL
29	23SC1202	DATA STRUCTURES	ESC	2	0	2	4	4	8	CTSD
30	22ME1103	DESIGN TOOLS WORKSHOP (ME)	ESC	0	0	4	0	2	4	NIL
31	23ME1004	WORKSHOP PRACTICES FOR ENGINEERS (ME)	ESC	0	0	4	0	2	4	NIL
32	23ME1002	ENGINEERING GRAPHICS (ME)	ESC	0	0	4	0	2	4	NIL
33	22CS1201	OBJECT ORIENTED PROGRAMMING	ESC	2	0	2	0	3	4	NIL
34	23ME1001	ENGINEERING MECHANICS (ME)	ESC	3	0	0	0	3	3	ES-1/ES-2
35	22CE2102	FLUID MECHANICS & HYDRAULIC MACHINES	ESC	3	0	2	0	4	5	NIL
36	22UC3108	PROBLEM SOLVING & REASONING SKILLS - 1	ESC	0	0	0	4	1	4	NIL
37	22UC3209	PROBLEM SOLVING & REASONING SKILLS - 2	ESC	0	0	0	4	1	4	NIL
38	22AD2001R	DATA DRIVEN ARTIFICIAL INTELUGENT SYSTEMS	PCC	2	0	2	0	3	4	CTSD
39	22AD2001A	DATA DRIVEN ARTIFICIAL INTELUGENT SYSTEMS	PCC	3	0	4	0	5	7	CTSD
40	22AD2001P	DATA DRIVEN ARTIFICIAL INTELUGENT SYSTEMS	PCC	3	0	4	0	5	7	CTSD
40	22ME2106	SOLID MECHANICS	PCC	3	0	2	0	4	5	EM
41	22ME2106A	SOLID MECHANICS	PCC	4	0	4	0	6	8	EM
42	22ME2106P	SOLID MECHANICS	PCC	4	0	4	0	6	8	EM
43	22CE2103	SURVEYING	PCC	2	0	0	4	3	6	NIL

44	22CE2103A	SURVEYING	PCC	3	0	2	4	5	9	NIL
45	22CE2103P	SURVEYING	PCC	3	0	2	4	5	9	NIL
46	22CE2204	BUILDING MATERIALS, PLANNING & DRAWING	PCC	3	0	2	0	4	5	NIL
47	22CE2205	STRUCTURAL ANALYSIS	PCC	3	1	0	0	4	4	BMPD
48	22CE2206	CONCRETE TECHNOLOGY	PCC	2	0	2	0	3	4	BMPD
49	22CE2207	GEOTECHNICAL ENGINEERING	PCC	3	0	2	0	4	5	NIL
50	22CE2207A	GEOTECHNICAL ENGINEERING	PCC	4	0	4	0	6	8	NIL
51	22CE2207P	GEOTECHNICAL ENGINEERING	PCC	4	0	4	0	6	8	NIL
52	22CE3109	ENVIRONMENTAL ENGINEERING	PCC	2	0	2	0	3	4	NIL
53	22CE3109A	ENVIRONMENTAL ENGINEERING	PCC	3	0	4	0	5	7	NIL
54	22CE3109P	ENVIRONMENTAL ENGINEERING	PCC	3	0	4	0	5	7	NIL
55	22CE3211	TRANSPORTATION ENGINEERING	PCC	3	0	2	0	4	5	NIL
56	22CE3211A	TRANSPORTATION ENGINEERING	PCC	4	0	4	0	6	8	NIL
57	22CE3211P	TRANSPORTATION ENGINEERING	PCC	4	0	4	0	6	8	NIL
58	22CE3108	DESIGN OF REINFORCED CONCRETE STRUCTURES	PCC	3	0	2	0	4	5	SA
59	22CE3108A	DESIGN OF REINFORCED CONCRETE STRUCTURES	PCC	4	0	4	0	6	8	SA
60	22CE3108P	DESIGN OF REINFORCED CONCRETE STRUCTURES	PCC	4	0	4	0	6	8	SA
61	22CE3210	QUANTITY SURVEYING & ESTIMATION	PCC	2	0	2	0	3	4	SUR
62	22CE3210A	QUANTITY SURVEYING & ESTIMATION	PCC	3	0	4	0	5	7	SUR
63	22CE3210P	QUANTITY SURVEYING & ESTIMATION	PCC	3	0	4	0	5	7	SUR
64		FLEXI-CORE 1 (WATER RESOURCES ENGINEERING)	PCC	2	0	2	0	3	4	Relevant Course
65		FLEXI-CORE 2 (DESIGN OF STEEL STRUCTURES)	PCC	2	0	2	0	3	4	Relevant Course
66		FLEXI-CORE 3 (CONSTRUCTION PLANNING & MANAGEMENT)	PCC	3	0	0	0	3	3	Relevant Course
67		SDP1 (VISUALIZATION & MODELLING FOR ENGINEERING DESIGN)	SDC	0	0	2	4	2	6	Relevant Course

68		SDP1 (VISUALIZATION & MODELLING FOR ENGINEERING DESIGN)	SDC	0	0	6	4	4	10	Relevant Course
69		SDP1 (VISUALIZATION & MODELLING FOR ENGINEERING DESIGN)	SDC	0	0	6	4	4	10	Relevant Course
70		SDP2 (BUILDING INFORMATION MODELLING)	SDC	0	0	2	4	2	6	Relevant Course
71		SDP2 (BUILDING INFORMATION MODELLING)	SDC	0	0	6	4	4	10	Relevant Course
72		SDP2 (BUILDING INFORMATION MODELLING)	SDC	0	0	6	4	0	10	Relevant Course
73		SDP3 (ANALYSIS & DESIGN OF MULTI-STORIED STRUCTURES USING ETABS)	SDC	0	0	2	4	2	6	Relevant Course
74		SDP3 (ANALYSIS & DESIGN OF MULTI-STORIED STRUCTURES USING ETABS)	SDC	0	0	6	4	4	10	Relevant Course
75		SDP3 (ANALYSIS & DESIGN OF MULTI-STORIED STRUCTURES USING ETABS)	SDC	0	0	6	4	0	10	Relevant Course
76		SDP-4 (SPECIALISATION)	SDC	0	0	2	4	2	6	Relevant Course
77		SDP-4 (SPECIALISATION)	SDC	0	0	6	4	4	10	Relevant Course
78		SDP-4 (SPECIALISATION)	SDC	0	0	6	4	4	10	Relevant Course
79		SDP-4 (MINOR MULTI DISCIPLINARY)	SDC	0	0	6	4	4	10	Relevant Course
80		TOOL BASED LEARNING – 1	SDC	0	0	0	4	0	4	Relevant Course
81		TOOL BASED LEARNING – 2	SDC	0	0	0	4	0	4	Relevant Course
82		PROFESSIONAL ELECTIVE – 1	PEC	2	0	2	4	4	8	Relevant Course
83		PROFESSIONAL ELECTIVE – 1	PEC	3	0	4	4	6	11	Relevant Course
84		PROFESSIONAL ELECTIVE – 1	PEC	3	0	4	4	6	11	Relevant Course
85		PROFESSIONAL ELECTIVE – 2	PEC	2	0	2	0	3	4	Relevant Course
86		PROFESSIONAL ELECTIVE – 2	PEC	3	0	4	0	5	7	Relevant Course
87		PROFESSIONAL ELECTIVE – 2	PEC	3	0	4	0	5	7	Relevant Course
88		PROFESSIONAL ELECTIVE – 3	PEC	2	0	2	4	4	8	Relevant Course
89		PROFESSIONAL ELECTIVE – 3	PEC	3	0	4	4	6	11	Relevant Course

90		PROFESSIONAL ELECTIVE – 3	PEC	3	0	4	4	6	11	Relevant Course
91		PROFESSIONAL ELECTIVE – 4	PEC	3	0	0	0	3	3	Relevant Course
92		PROFESSIONAL ELECTIVE – 5	PEC	2	0	2	0	3	4	Relevant Course
93		PROFESSIONAL ELECTIVE – 5	PEC	4	0	2	0	5	6	Relevant Course
94		PROFESSIONAL ELECTIVE – 5	PEC	4	0	2	0	5	6	Relevant Course
95	22IE2040	SOCIAL INTERNSHIP	PRI	0	0	0	4	0	4	Relevant Course
96	22IE3041	TECHNICAL INTERNSHIP	PRI	0	0	0	8	0	8	Relevant Course
97	22IE4043	RESEARCH INTERNSHIP	PRI	0	0	0	8	0	8	Relevant Course
98	22IE3042	RESEARCH SEMINAR	PRI	0	0	2	4	2	6	Relevant Course
100	22IE3043	TERM PAPER	PRI	0	0	4	0	2	4	Relevant Course
101	22IE4053R	ENGINEERING CAPSTONE PROJECT - PHASE 1	PRI	0	0	6	12	6	18	Relevant Course
102	22IE4053A	ENGINEERING CAPSTONE PROJECT - PHASE 1	PRI	0	0	8	18	8	24	Relevant Course
103	22IE4054R	ENGINEERING CAPSTONE PROJECT - PHASE 2	PRI	0	0	6	12	6	18	Relevant Course
104	22IE4054R	ENGINEERING CAPSTONE PROJECT - PHASE 2	PRI	0	0	8	18	8	24	Relevant Course
105	22IE4048	ENGINEERING PROJECT	PRI	0	0	6	12	6	18	Relevant Course
106	22IE4051	INDUSTRIAL INTERNSHIP-PHASE-1	PRI	0	0	0	24	6	24	Relevant Course
107	22IE4052	INDUSTRIAL INTERNSHIP-PHASE-2	PRI	0	0	0	24	6	24	Relevant Course
108	22IE4042	INDUSTRIAL INTERNSHIP	PRI	0	0	0	24	6	24	Relevant Course
109		OPEN ELECTIVE – 1	OEC	3	0	0	0	3	3	Relevant Course
110		OPEN ELECTIVE – 2	OEC	3	0	0	0	3	3	Relevant Course
101		OPEN ELECTIVE – 3	OEC	3	0	0	0	3	3	Relevant Course
102		VALUE ADDED COURSE – 1	VAC	0	0	0	8	0	0	Relevant Course
103		VALUE ADDED COURSE – 2	VAC	0	0	0	8	0	0	Relevant Course
104		VALUE ADDED COURSE – 3	VAC	0	0	0	8	0	0	Relevant Course

105	HONORS/HON S-RES	VALUE ADDED COURSE – 4	VAC	0	0	0	8	0	0	Relevant Course
106		SPORTS / YOGA CERTIFICATION	VAC	0	0	0	8	0	0	Relevant Course
Total Credits								170		

Y23 Course vs Program Outcomes

Sl No	Course Code	Course Title	Category	L	T	P	S	Cr	PO												PSO	
									1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	23UC0017	INDIAN KNOWLEDGE SYSTEM-VEDIC MATHEMATICS	AUC	0	0	0	2	0	3	3												
2	23UC0018	FUNDAMENTALS OF MATHEMATICS (Bi.P.C)	AUC	3	0	0	0	0					2									
3	22UC0011	GENDER & SOCIAL EQUALITY	AUC	2	0	0	0	0		2		2		3				3				
4	23UC0019	ESSENCE OF INDIAN KNOWLEDGE TRADITION	AUC	2	0	0	0	0	3													
5	22UC0008	INDIAN CONSTITUTION	AUC	2	0	0	0	0						3								
6	22UC0009	ECOLOGY & ENVIRONMENT	AUC	2	0	0	0	0						2	3							
7	22UC0020	INDIAN KNOWLEDGE SYSTEM-ENGINEERING ELECTIVE	AUC	2	0	0	0	0	1	1	2	2		3						3	3	
8	22UC1101	INTEGRATED PROFESSIONAL ENGLISH	HAS	0	0	4	0	2									1	3			1	
9	22UC1202	ENGLISH PROFICIENCY	HAS	0	0	4	0	2									1	3			1	
10	22UC2103	ESSENTIAL SKILLS FOR EMPLOYABILITY	HAS	0	0	4	0	2				2	3									
11	22UC2204	CORPORATE READINESS SKILLS	HAS	0	0	4	0	2										2		3		
12	22UC0010	UNIVERSAL HUMAN VALUES & PROFESSIONAL ETHICS	HAS	2	0	0	0	2	1			1	1					3				
13	22UC1203	DESIGN THINKING FOR INNOVATION	HAS	0	0	4	0	2		2	2		3	3	3	3						
14	22UC0012	INNOVATION MANAGEMENT	HAS	0	0	4	0	2		1	2	3	2					3	3			
15	23UC0021	SOCIAL IMMERSIVE LEARNING – 1	SIL	0	0	0	4	1										3	3	3	1	
16	23UC0022	SOCIAL IMMERSIVE LEARNING – 2	SIL	0	0	0	4	1										3		3	1	
17	23UC0023	SOCIAL IMMERSIVE LERANING – 3	SIL	0	0	0	4	1	2	3	3	3	3	3		2	2		2		3	2

[illegible]

109	23CE3213P	ADVANCED FOUNDATION ENGINEERING	WRE&E E	3	0	4	4	6														
110	23CE4215	INTELLIGENT TRANSPORTATION SYSTEMS		2	0	2	0	3														
111	23CE4216	GROUND IMPROVEMENT TECHNIQUES		2	0	2	0	3														
112	23CE5213R	PAVEMENT MATERIALS &DESIGN		2	0	2	3	4														
113	23CE5213A	PAVEMENT MATERIALS &DESIGN		3	0	4	4	4														
114	23CE5213P	PAVEMENT MATERIALS &DESIGN		3	0	4	4	6														
115	23CE6215	URBAN TRANSPORTATION SYSTEMS PLANNING.		3	0	0	0	3														
116	23CE6216	GEOTECHNICAL EARTHQUAKE ENGINEERING		3	0	0	0	3														
117	23CE7215	TRAFFIC ENGINEERING AND MANAGEMENT		2	0	2	0	3														
118	23CE7216	DESIGN OF EARTH RETAINING STRUCTURES		2	0	2	0	3														
119	23CE3214R	RIVER ENGINEERING		2	0	2	4	4														
120	23CE3214A	RIVER ENGINEERING		3	0	4	4	6														
121	23CE3214P	RIVER ENGINEERING		3	0	4	4	6														
122	23CE4217	SOLID WASTE MANAGEMENT AND LANDFILLS		2	0	2	0	3														
123	23CE4218	DESIGN OF HYDRAULIC STRUCTURES		2	0	2	0	3														
124	23CE5214R	WATER RESOURCES FIELD METHODS		2	0	2	3	4														
125	23CE5214A	WATER RESOURCES FIELD METHODS		3	0	4	4	4														
126	23CE5214P	WATER RESOURCES FIELD METHODS		3	0	4	4	6														
127	23CE5214	WATER RESOURCES FIELD METHODS	3	0	0	0	3															
128	23CE6217	URBAN WATER HYDROLOGY AND HYDRAULICS	3	0	0	0	3															
129	23CE6218	ENVIRONMENTAL IMPACT ASSESSMENT AND LIFE CYCLE ANALYSES	2	0	2	0	3															
123	23CE7217	PHYSICO-CHEMICAL PROCESSES FOR WATER AND WASTEWATER TREATMENT	2	0	2	0	3															
131	22IE2040	SOCIAL INTERNSHIP		0	0	0	4	0	2	3	3	3	3	3		2	2		2		3	3

Indian knowledge System with Vedic Mathematics (INKSVM)

COURSE CODE	23UC0017	MODE	OFFLINE	LTPS	0-0-0-2	PRE-REQUISITE	NIL
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Course Outcomes

CO#	CO Description	BTL	PO/PSO Mapping
CO1	List all the 16 sutras in Vedic Mathematics, Using Vedic mathematics sutras to perform basic arithmetic operations and solve system of linear equations	2	PO1
CO2	Develop reasoning ,problem solving skills and critical thinking skills by using Shakuntala Devi Puzzles.	3	PO2

Syllabus

Module 1	the basics of 16 vedic sutras along with sub sutras and gain a knowledge about the indian knowledge system and the contribution of indian mathematicians to world,the usual multiplication by EkadhikenPurvena, to perform basic arithmetic operations(addition , division, subtraction, multiplication) of large numbers and able to solve system of linear equations of by Vedic methods Nikhilam NavatacharamamDasatah, Antyayoradaskaepi methods.
Module 2	Perform the reasoning and aptitude topic problems along with Shakuntala Devi Puzzles.

Reference Books:

Sl No	Title	Author(s)	Publisher	Year
1	A Modern Introduction to Ancient Indian Mathematics	S. K. Kapoor	LOTUS PRESS EDITION	
2	Vedic Mathematics Made Easy	DHAWAL BHATIYA	Jaico Publishing, New Delhi	
3	GENERAL APTITUDE AND REASONING	R S AGRWAL	SChand Publications	
4	Vedic Mathematics - Modern Research Methods	TIWARI P.	Cumpus Books International	

Mapped Global Certifications:

Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
1	Mathematics in India - From Vedic Period to Modern Time	NPTEL	Y	ONLINE	SWAYAM PORTAL	https://nptel.ac.in/courses/111101080
2	Reasoning = Computation	NPTEL	Y	ONLINE	SWAYAM PORTAL	https://www.youtube.com/watch?v=aDPu39j-mBY

Tools used in Practical / Skill:

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
	NA		

Evaluation Components:

Evaluation	Component	Weightage	Total
In-Sem Formative	CONTINUOUS EVALUATION	30	40
	ALM	10	
In-Sem Summative	LAB IN SEM-1	20	20
End-Sem Summative	QUESTION AND ANSWERS	40	40

GENDER AND SOCIAL EQUALITY (GSE)

COURSE CODE	22UC0011	MODE	OFFLINE	LTPS	2-0-0-0	PRE-REQUISITE	
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Course Outcomes

CO#	CO Description	BTL	PO Mapping
CO1	Students will have developed a better understanding of important issues related to gender in contemporary India	2	PO2
CO2	Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through group discussions.	3	PO4
CO3	Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.	4	PO6
CO4	Students will acquire insight into the gendered division of labour and its relation to politics and economics.	4	PO10

Syllabus

Module 1	UNDERSTANDING GENDER: Socialization: Making Women, Making Men, Preparing for Womanhood, Growing up Male, First lessons in Caste, Different Masculinities. GENDER AND BIOLOGY: Missing Women: Sex Selection and Its Consequences, Declining Sex Ratio. Demographic Consequences. Gender Spectrum: Beyond the Binary Two or Many? Struggles with Discrimination.
Module 2	GENDER AND LABOUR: Housework: The Invisible Labor, Women's work: Its politics and Economics, Fact and Fiction. Unrecognized and Unaccounted work. Additional Reading: Wages and Conditions of Work.
Module 3	ISSUES OF VIOLENCE: Sexual Harassment: Say No! Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment, Domestic Violence: Speaking Out, Is Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives. Additional Reading: New Forums for Justice. Thinking about Sexual Violence.
Module 4	GENDER: CO - EXISTENCE : Just Relationships: Being Together as Equals Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers.

Reference Books:

Sl No	Title	Author(s)	Publisher	Year
1	A World of Equals: A Textbook on Gender	<i>Edited by: Susie Tharu; A. Suneetha; Uma Maheswari Bhrugubanda</i>	Orient BlackSwan	
2	Seeing Like A Feminist	Menon Nivedita, Nivedita Menon	Penguin Zubaan	

3	Gender Sensitization: Issues and Challenges	Dr Raj Pal Singh, Dr Anupama Sihag	Raj Publications	
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Global Certifications:

Mapped Global Certifications:						
Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
1	Global Gender Policy Certificate	The George Washington University				https://elliott.gwu.edu/global-gender-policy

Tools used in Practical / Skill:

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
1	NA		

Evaluation Components:

Evaluation	Component	Weightage	Total
In-Sem Formative	ALM	10	20
	HOME ASSIGNMENTS	10	
In-Sem Summative	IN SEM-1	20	40
	IN SEM-2	20	
End-Sem Summative	END SEMESTER	40	40

INDIAN CONSTITUTION (IC)

COURSE CODE	22UC0008	MODE	R	LTPS	2-0-0-0	PRE-REQUISITE	Nil
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Course Outcomes

CO#	CO Description	BTL	PO Mapping
CO1	To acquire knowledge of the historical developments that culminated in the drafting of the Indian Constitution	2	PO6
CO2	To understand the basic features of the Indian Constitution	2	PO6
CO3	To understand the structure of the Federal Government as defined by the Indian Constitution	2	PO6
CO4	To understand the Indian Judicial System and Election System of India.	2	PO6

Syllabus

Module 1	Making of the Constitution: A brief analysis of National Movement, Constitutional Development with reference to Government of India Act 1909, 1919, 1935 and Indian Independence Act 1947
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Module 2	The Constituent Assembly of India. Basic features of the Indian Constitution and the Preamble, Fundamental Rights, Directive Principles of State Policy Fundamental Duties Government of the Union:
Module 3	The Union Executive – the President and the Vice-President – The Council of Ministers and the Prime Minister – Powers and functions The Union legislature – The Parliament – The Lok Sabha and the Rajya Sabha, Composition, powers and functions – the role of the Speaker. Government of the State: The Governor – the Council of Ministers and the Chief Minister Powers and Functions, The State Legislature – composition, powers and functions
Module 4	The Indian Judicial System: the Supreme Court and the High Court's – composition, Jurisdiction and functions. judicial review, Judicial activism, Independence of Judiciary In India. Election Commission: Role and Functioning, Chief Election Commissioner and Election Commissioners

Reference Books:

Sl No	Title	Author(s)	Publisher	Year
1	Indian Polity	Laxmikanth	McGraw Hill Edge	7th Edition
2	Indian Administration	Subhash Kashyap	NATIONAL BOOKS TRUST	2017
3	Constitution of India	Shukla V.N.	Eastern Book Company	2019
4	The Indian Constitution:	Granville Austin	Oxford	1999
5	Indian Constitutional Law'	M.P. Jain	Lexi Nexis	2018

Global Certifications:

Mapped Global Certifications:

Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
1	NA					

Tools used in Practical / Skill:

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
1	NA		

Evaluation Components:

Evaluation	Component	Weightage	Total
In-Sem Formative	ALM	10	20
	Home Assignment	10	
In-Sem Summative	Sem-in 1 (Online MCQ)	20	40
	Sem-in 2 (Online MCQ)	20	
End-Sem Summative	End Sem Exam (Online MCQ)	40	40

ECOLOGY & ENVIRONMENT (EE)

COURSE CODE	22UC0009	MODE	General	LTPS	2-0-0-0	PRE-REQUISITE	NIL
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Course Outcomes

CO#	CO Description	BTL	PO Mapping
CO1	Define to articulate basic understanding of the importance of Environmental education and conservation of natural resources. conservation of natural resources and Energy resources.	2	PO 7
CO2	Understand concepts of ecosystems and learn methods for conservation of habitats and biodiversity.	2	PO 7
CO3	Identify critically about individual roles in prevention of pollution. An Environmental Studies will be enabled to do independent research on human interactions with the environment.	2	PO 7
CO4	Recognize the knowledge on environmental legislation, disaster management and EIA process.	2	PO 6

Syllabus

Module 1	The Multidisciplinary nature of Environmental Studies: Introduction to Environment: Definition – scope – importance –Multidisciplinary nature of Environmental Studies, Need for public awareness. Institutions and people in Environment. Natural Resources: Renewable and Non-Renewable Resources: Forest resources: Uses –Deforestation–causes, effects and impacts, Afforestation Programmes-Socio-forestry, Agro-forestry, Vanasamrakshana programmes, Mining its impact on environment: mining, dams and their effects on forests and tribal people. . Water resources: Distribution of surface and ground water, Aquifers, – floods – drought – conflicts over water, dams - benefits and problems, Water conservation – rainwater harvesting – watershed management, Cloud seeding Mineral resources: Use – exploitation – environmental effects –. Food resources: Changes in agricultural methodologies, comparison between old and new methods of farming, Green Revolution, Environmental Impact Assessment of conversion of agricultural lands– effects of modern agriculture, Drip Irrigation – fertilizer-pesticide problems, Eutrophication, Vermicompost – waterlogging, Blue baby syndrome – Energy resources: Growing energy needs – renewable and non-renewable energy sources – Solar, wind, geothermal, tidal, bio energies . Land resources: Land as a resource – land degradation-. Soil erosion: Importance of soil, Types of soil erosion, Causes and effects of soil erosion. How to control soil erosion. Role of an individual in conservation of natural resources
Module 2	Ecosystems: Concept of an ecosystem: Structure and function of an ecosystem -Producers – consumers – decomposers with examples, Energy flow in the ecosystem – Ecological succession– Food chains – food webs and ecological pyramids. Types of ecosystems. characteristic features, structure and function of the following ecosystem a Forest ecosystem b. Grassland ecosystem c. Desert ecosystem e. Aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries). Biodiversity and its Conservation: Introduction – Introduction — Definition: genetic, species and ecosystem diversity. • Biogeographical

	classification of India • Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values Biodiversity at global, National, and local levels • India as a mega-diversity nation • Hotspots of biodiversity. • Threats to biodiversity: habitat loss, poaching of wildlife, man- wildlife conflicts. • Endangered and endemic species of India • Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.
Module 3	Environmental Pollution: Definition •Causes, effects and control measures of - a. Air pollution b. Water pollution c. Soil pollution d. Marine pollution. e. Noise pollution f. Thermal pollution g. Nuclear hazards • Solid waste Management Causes, effects and control measures of urban and industrial wastes. • Role of an individual in prevention of pollution. Pollution case studies. • Disaster management floods, earthquake, cyclone and landslides. Social Issues and the Environment • From Unsustainable to Sustainable development • Urban problems related to energy • Water conservation. rainwater harvesting, watershed management Resettlement and rehabilitation of people its problems and concerns. Case studies.
Module 4	Environmental ethics issues and possible solutions. Climate change. global warm acid rain, ozone layer depletion. nuclear accidents and holocaust. Case studies. Wasteland reclamation. •Environmental Protection Act, Air (Prevention and Control of Pollution) Act Water (Prevention and control of Pollution) Act • Wildlife Protection Act • Forest Conservation Act • Issues involved in enforcement of environmental legislation. • Public awareness. : Human Population and the Environment • Population growth, • Population explosion Family Welfare Programme. • Environment and human health. • Human Rights. Value Education. • HIV /AIDS. • Case Studies.

Reference Books:

Sl No	Title	Author(s)	Publisher	Year
1	Textbook of Environmental Studies	Erach Bharucha	Universities Press (India) Pvt Ltd	2010
2	Environmental Studies	Benny Joseph	Tata McGraw Hill	2009
3	Textbook of Environmental Studies	Deeksha Deve and S.S. Kateswa	Cengage learning India pvt ltd	2009
4	Environmental Studies	Anubha Kaushik, C.P. Kaushik	New Age International	2007

Global Certifications:

Mapped Global Certifications:

Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
1	NA	NA	NA	NA	NA	NA

Tools used in Practical / Skill:

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
1	NA	NA	NA

Evaluation Components:

Evaluation	Component	Weightage	Total
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In-Sem Formative	Active Learning	10	25
	Home Assignment & Textbook	10	
	Attendance	5	
In-Sem Summative	In-Sem 1	17.5	35
	In-Sem 2	17.5	
End-Sem Summative	End-Sem Exam (Paper Based)	40	40

ESSENCE OF INDIAN KNOWLEDGE TRADITION (EIKC)

COURSE CODE	23UC0019	MODE	R	LTPS	2-0-0-0	PRE-REQUISITE	NIL
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Course Outcomes

CO#	CO Description	BTL	PO Mapping
CO1	To understand the concepts of Indian traditional knowledge	2	PO1
CO2	To develop the outstanding knowledge on Indian administration	2	PO1
CO3	To understand the importance of traditional culture and knowledge	2	PO1
CO4	To know the impact of western culture on Indian society	2	PO1

Syllabus

Module 1	Indian Knowledge System – An Introduction Number System and Units of Measurements Mathematics, Astronomy Concept of Culture- Culture and Civilization- General Characteristics of Indian culture Importance of Culture-Unity in Diversity
Module 2	Evolution of Indian Administration Arthashastra and Kautilya Sapthanga theory Traditions and Culture through the Ages
Module 3	Fundamental Unity of Harappa and Vedic Culture Jainism and Buddhism Mauryan Period Gupta Period-Pallavas and Cholas, Vijayanagar Period-Art Architecture and Literature
Module 4	Rise of the West and its impact on India- Social and Religious reformers in the 18th and 19th centuries- Press and growth of modern Indian literature- Rise of Indian Cinema-Indian Independence

Reference Books:

Sl No	Title	Author(s)	Publisher	Year
1	Indian heritage, culture, Art and Culture	Madhukumar Bhagat	GKP Publishers	2019
2	Traditional Knowledge System in India,	Amit Jha,	Springer	2009.

Global Certifications:

Mapped Global Certifications:						
Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
1		SWAYAM	Y		NPTEL	https://onlinecourses.swayam2.ac.in/imb23_mg53/preview

Tools used in Practical / Skill:

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
1	NA		

Evaluation Components:

Evaluation	Component	Weightage	Total
In-Sem Formative	ALM	10	20
	HA	10	
In-Sem Summative	TEST 1-MCQ	20	40
	TEST 2-MCQ	20	
End-Sem Summative	END SEM-MCQ	40	40

INTEGRATED PROFESSIONAL ENGLISH (IPE)

COURSE CODE	23UC1101	MODE	R	LTPS	0-0-4-0	PRE-REQUISITE	NIL
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Course Outcomes

CO#	CO Description	BTL	PO Mapping
CO1	Understanding the language Mechanics in Basic Grammar & Interactive Listening & Speaking	2	PO9 & PO10 PSO 1
CO2	Applying Integrated Reading skills & Techniques of Writing	3	PO9 & PO10 PSO 1

Syllabus

Module 1	A. Discuss people you admire (review of tenses, Character adjectives) Discuss a challenge (Questions, Trying and succeeding)C. Explain what to do and check understanding (Rapid Speech)D. Give advice on avoiding danger
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	(Future time clauses and conditionals) Breaking off a conversation, Explaining and checking understanding.E. Discuss dangerous situations (Narrative tenses, Expressions with 'get')F. Give and respond to compliments (Intonation in Question Tags, Agreeing using question tags; giving compliments and responding)
Module 2	Discuss ability and achievement (Multi-word verbs, Ability and achievement) Discuss sports activities and issues (present perfect and present perfect continuous, words connected with sports). C. Make careful suggestions (Keeping to the topic of the conversation; Making careful suggestions) D. Discuss events that changed your life (used to and would, cause and result)
Module 3	A. Discuss choices, discuss changes (infinitives and ing forms, the passive) B. Introduce requests and say you are grateful (Consonant sounds) C. Discuss living in cities (too / enough; so / such, Describing life in cities) D. Discuss changes to a home (Causative have / get Film and TV; Houses) E. Imagine how things could be (Stress in compound nouns) F. Discuss personal finance (First and second conditionals)
Module 4	A. Discuss moral dilemmas and crime (Third conditional; should have + past participle), Stressed and unstressed words; Sound and spelling B. Discuss new inventions (Relative clauses), Discuss people's lives and achievements Reported speech; Reporting verbs, verbs describing thought and knowledge. C. Express uncertainty (Linking and intrusion, Clarifying a misunderstanding) D. Speculate about the past (Past modals of deduction Adjectives with prefixes) E. Discuss life achievements (Wishes and regrets, Verbs of effort) F. Describe how you felt (Consonant clusters, describing how you felt; Interrupting and announcing news)

Reference Books:

Sl No	Title	Author(s)	Publisher	Year
1	EMPOWER	Andrian Doff, Craig Thaine, Herbert Puchta, Jeff Stranks, Peter Lewis-Jones	Cambridge University Press	2022
2	PRACTICAL ENGLISH USAGE, 4TH EDN: Michael Swan's guide to problems in English (Practical English Usage, 4th edition)	Michael Swan	OXFORD	2022
3	Word Power Made Easy	Norman Lewis	OXFORD	2022

Global Certifications:

Mapped Global Certifications:						
Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
1	Linguaskills	Cambridge University	Yes	Online	Cambridge University	https://www.cambridgeenglish.org/exams-and-tests/linguaskill/

Tools used in Practical / Skill:

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
1	Padlet		OPEN SOURCE
2	Lexipedia		OPEN SOURCE

Evaluation Components:

Evaluation	Component	Weightage	Total
In-Sem Formative	Quiz	12.5	
	Project Continuous Evaluation	12.5	
			25
In-Sem Summative	Sem-in 1	17.5	
	Sem-in 2	17.5	
			35
End-Sem Summative	Closed Book Exam/Paper Based		40

ENGLISH PROFICIENCY (EP)

COURSE CODE	23UC1202	MODE	R	LTPS	0-0-4-0	PRE-REQUISITE	NIL
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Course Outcomes

CO#	CO Description	BTL	PO Mapping
CO1	Understanding Language Mechanics in advanced Grammar and advanced Communicative Listening & Speaking	2	PO9,10 PSO 1
CO2	Applying the advanced Reading techniques and Advanced Techniques of Writing	3	PO9,10 PSO 1

Syllabus

Module 1	A. Talk about learning a second language (adverbs and adverbial language learning noun forms, word stress and noun forms with – <i>tion</i> and <i>-ity</i>) B. Describe extreme sensory experiences (Comparison, multi-word verbs, C. Talk about crime and punishment (relative clauses) D. Talk about using instinct and reason (noun phrases); Express yourself in an inexact way. E. Describe photos and hobbies (simple and continuous verbs and adjectives) F. Idioms: body parts, movement, landscapes, crime and feelings
Module 2	A. Talk about plans, intentions, and arrangements (intentions and arrangements, verbs of movement); Give advice (advising a friend about a problem) B. Emphasis positive and negative experiences by describing journeys and landscapes; architecture and buildings (future in the past, narrative tenses, ellipsis, and substitutions) C. Listen to Job Profiles. Talk about job requirements and fair pay (obligation, necessity, and permission) D. Listen to/Tell a descriptive narrative – a personal story (participle clauses) E. Emphasis opinions about the digital age- explain how you would overcome a hypothetical problem. F. Describe sleeping habits, routines, lifestyles and life expectancy (gerunds, infinitives and conditionals)
Module 3	A. Paraphrasing and summarising B. Read and talk about memories and remembering (structures with have and get) C. Speculate about inventions and technology (compound adjectives) D. City life and urban space (reflexive and reciprocal pronouns, verbs with re-) E. Superstitions and rituals (passive reporting verbs) F. Read a review, report, and recommendation of a committee.
Module 4	A. Write a web forum post (expressing opinions) B. Write a report and travel review. C. Write a profile article (read an Interview of a celebrity and write an article) D. Write an essay: opinion essay and discussion essay. E. Write an application e-mail. F. Write promotional material using persuasive language.

Reference Books:

Sl No	Title	Author(s)	Publisher	Year
1	Empower 3rd Edition	Andrian Doff, Craig Thaine, Herbert Puchta, Jeff Stranks, Peter Lewis-Jones	Cambridge	2022
2	The Cambridge Guide to English Usage	Pam Peters	Cambridge	2020

3	Academic English	Letty Chan	Hong Kong : Hong Kong University Press ; London : Eurospan distributor	2021
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Global Certifications:

Mapped Global Certifications:

Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
1	Lingua Skills Business	Cambridge university	y	online	Cambridge university	https://www.cambridgeenglish.org/exams-and-tests/linguaskill/information-about-the-test/test-formats-and-task-types/

Tools used in Practical / Skill:

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
1	padlet		Open source
2	lexipedia		Open source

Evaluation Components:

Evaluation	Component	Weightage	Total
In-Sem Formative	Quiz	12.5	
	Project continuous evaluation	12.5	
			25
In-Sem Summative	Sem in 1	17.5	
	Sem in 2	17.5	
			35
End-Sem Summative	Closed book/paper based exam		40

ESSENTIAL SKILLS FOR EMPLOYABILITY (ESE)

COURSE CODE	22UC2103	MODE	R	LTPS	0-0-4-0	PRE-REQUISITE	NA
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Course Outcomes

CO#	CO Description	BTL	PO Mapping
CO1	Developing basic grammar Identify and organize sentence structures based on grammar.	2	PO10
CO2	Develop effective interpersonal skills, cultivate a positive attitude, apply positive self-talk techniques, and use SWOC analysis to enhance employability.	2	PO9
CO3	Develop drafting skills through Cloze Test, Passage completion, E-mail writing, Paragraph writing, Essay writing	3	PO10

CO4	Develop effective communication skills through JAM and extempore, describing products and processes through JAM and extempore, demonstrating proper email and phone etiquette, and improving listening skills to enhance personal and professional relationships.	2	PO 12
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Syllabus

Module 1	Grammar:: Tenses, Voice, Reported Speech, Spotting Errors, Sentence Improvement, Sentence Rearrangement
Module 2	SWOC, Self-awareness, Attitude, Self-Confidence & Positive Self-Talk, Grooming, Intrapersonal skills and Interpersonal Skills.
Module 3	Writing Skills: Cloze Test, Passage completion, E-mail writing, Paragraph writing, Essay writing
Module 4	Speaking from the script through JAM & Extempore, Product & Process Description through JAM & Extempore, Transactional Analysis, Persuasion & Negotiation, Etiquettes (E-Mail & Phone), Listening Skills.

Reference Books:

Sl No	Title	Author(s)	Publisher	Year
1	Objective English for Competitive Examination	Hari Mohan Prasad and Uma Sinha.	McGraw Hill	2017
2	English Language Communication Skills, C	Cengage		2014
3	Bridging the Softskills Gap	Bruce Tulgan	Jossey-Bass	2015
4	The Soft skills Book-The Key Difference to Becoming Highly Effective & Valued	Dan White	LID Publishing	2121

Global Certifications:

Mapped Global Certifications:

Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
1		LINGUA SKILLS	yes	online	CAMBRIDGE UNIVERSITY	https://www.cambridgeenglish.org/exams-and-tests/qualifications/business/

2		IELTS	yes	online	BRITISH COUNCIL	https://www.britishcouncil.in/teacher-training/masterclass-ielts-trainers
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Tools used in Practical / Skill:

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
1	LINGUA SKILLS INTERMEDIATE	CAMBRIDGE UNIVERSITY	https://www.cambridgeenglish.org/exams-and-tests/qualifications/business/
2	LINGUA SKILLS VANTAGE	CAMBRIDGE UNIVERSITY	https://www.cambridgeenglish.org/exams-and-tests/qualifications/business/

Evaluation Components:

Evaluation	Component	Weightage	Total
In-Sem Formative	Lab weekly exercise	12.5	25
	Group Discussion (CO2)	6.25	
	Quiz (CO4)	6.25	
In-Sem Summative	Project Evaluation	8.75	35
	Sem in -1	8.75	
	Exercise	8.75	
	Semester In Exam II	8.75	
End-Sem Summative	End Semester Exam (online MCQ)	40	40

CORPORATE READINESS SKILLS (CRS)

COURSE CODE		MODE	R	LTPS	0-0-4-0	PRE-REQUISITE	ESE
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Course Outcomes

CO#	CO Description	BTL	PO Mapping
CO1	Extend word power for developing effective speaking and writing skills	3	PO10, PO12
CO2	Apply Interpersonal Skills in day-to-day life	3	PO10, PO12
CO3	Differentiate and enhance critical and general reading skills	3	PO10, PO12
CO4	Demonstrate necessary skills to be employable	3	PO10, PO12

Syllabus

Module 1	Verbal Ability: Synonyms and Antonyms, Sentence Completion, Idioms & Phrases, One Word Substitutes, Analogies, Spellings, Selecting words, Sentence Formation.
Module 2	Life Skills: Goal Setting, Team Building, Leadership, Time Management, Managing Stress, Work Ethics.
Module 3	Reading Skills: Reading Comprehension and Types of Questions and Critical Reading .
Module 4	Employability Skills: Empathy, Assertiveness, Group Discussion, CV, Video Resume and Interview Skills.

Reference Books:

Sl No	Title	Author(s)	Publisher	Year
1	The 7 Habits of Highly Effective College Students: Succeeding in College...and in Life	Covey, Stephen R.	Franklin Covey	2014
2	The Complete Guide to Mastering Soft Skills for Workplace Success	Adams, John	Adams Media	2019
3	Objective English for Competitive Examination	Hari Mohan Prasad, Uma Sinha	McGraw Hill Education	2017
4	The Business Student's Handbook: Skills for Study and Employment	Fisher, Julie and Bailey, Peter	Cengage Learning	2017
5	Writing Tools: 55 Essential Strategies for Every Writer	Roy Peter Clark	Little, Brown and Company	2006

Global Certifications:

Mapped Global Certifications:

Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
1		LINGUA SKILLS	YES	ONLINE	CAMBRIDGE UNIVERSITY	https://www.cambridgeenglish.org/exams-and-tests/qualifications/business/
2		IELTS	YES	ONLINE	BRITISH COUNCIL	https://www.britishcouncil.in/teach/teacher-training/masterclass-ielts-trainers

Tools used in Practical / Skill:

S. No.	Tool Name	Parent Industry	Open Source/ Commercial
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1	LINGUA SKILLS INTERMEDIATE	CAMBRIDGE UNIVERSITY	https://www.cambridgeenglish.org/exams-and-tests/qualifications/business/
2	LINGUA SKILLS VANTAGE	CAMBRIDGE UNIVERSITY	https://www.cambridgeenglish.org/exams-and-tests/qualifications/business/

Evaluation Components:

Evaluation	Component	Weightage	Total
In-Sem Formative	Lab Weekly Exercise/ Continuous Evaluation	12.5	
	Project Continuous Evaluation	12.5	25
In-Sem Summative	Semester in Exam-I	17.5	
	Semester in Exam-II	17.5	35
End-Sem Summative	Viva	10	
	Exercise	25	
	Report	5	40

Universal Human Values and Professional Ethics (UHV&PE)

COURSE CODE	22UC0010	MODE	Offline	LTPS	2-0-0-0	PRE-REQUISITE	
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Course Outcomes

CO#	CO Description	BTL	PO Mapping
CO1	Understand and analyse the essentials of human values and skills, self exploration, happiness and prosperity.	2	PO1
CO2	Evaluate coexistence of the “I” with the body.	3	PO4
CO3	Identify and associate the holistic perception of harmony at all levels of existence.	4	PO5
CO4	Develop appropriate technologies and management patterns to create harmony in professional and personal lives.	4	PO10

Syllabus

Module 1	Introduction to Value Education: Understanding Value Education, Self-exploration as the Process for Value Education, Continuous Happiness and Prosperity - The Basic Human Aspirations, Right Understanding, Relationship and Physical Facilities, Happiness and Prosperity – Current Scenario, Method to fulfil the Basic Human Aspirations.
Module 2	Harmony in the Human Being: Understanding the Human Being as Co-existence of Self (‘I’) and Body, Discriminating between the Needs of the Self and the Body, The Body as an Instrument of ‘I’, Understand Harmony in the Self (‘I’), Harmony of the Self (‘I’) with the Body, Program to Ensure Sanyam and Svasthya.

Module 3	Harmony in the Family and Society: Harmony in the Family - the Basic Unit of Human Interaction, Values in Human-to-Human Relationships, 'Trust' – the Foundational Value in Relationships, 'Respect' – as the Right Evaluation, Understand Harmony in the Society, Vision for the Universal Human Order.
Module 4	Harmony in the Nature (Existence): Understand Harmony in the Nature, Interconnectedness, Self-regulation and Mutual Fulfillment among the Four Orders of Nature, Realizing 'Existence is Co-existence' at All Levels, The Holistic Perception of Harmony in Existence.

Reference Books:

Sl No	Title	Author(s)	Publisher	Year
1	A FOUNDATION COURSE IN HUMAN VALUES & PROFESSIONAL ETHICS	R.R. Gaur, R. Sangal, G.P. Bagaria	Excel Books, New Delhi	1996
2	UNIVERSAL HUMAN VALUES AND PROFESSIONAL ETHICS	Dr. ARCHANA CHAUDHARY	Book Rivers	2001
3	UNIVERSAL HUMAN VALUES AND PROFESSIONAL ETHICS	Dr. Ritu Soryan	katson print	2001
4	HUMAN VALUES AND PROFESSIONAL ETHICS	B.S.Raghavan	S. Chand	2004

Global Certifications:

Mapped Global Certifications:

Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
1		AICTE	Yes	Online	AICTE	https://www.uhv.org.in/

Tools used in Practical / Skill:

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
1	NA		

Evaluation Components:

Evaluation	Component	Weightage	Total
In-Sem Formative	ALMs	10	10
	Home assignments	10	10
In-Sem Summative	Sem in 1	20	20
	Sem in 2	20	20
End-Sem	END SEMESTER	40	40

Summative			
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Design Thinking and Innovation (DTI)

COURSE CODE	22UC1203	MODE	R	LTPS	0-0-4-0	PRE-REQUISITE	Nil
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Course Outcomes

CO#	CO Description	BTL	PO/PSO Mapping
CO1	Understand the importance of Design thinking mindset for identifying contextualized problems	2	PO2, PO6
CO2	Analyze the problem statement by empathizing with user	4	PO3, PO7
CO3	Develop ideation and test the prototypes made	3	PO5, PO7
CO4	Explore the fundamentals of entrepreneurship skills for transforming the challenge into an opportunity	2	PO5, PO8

Syllabus

Module 1	Introduction to Design Thinking and Innovation • Introduction to design thinking and its principles • Learning, listening, observation, dialogue, and reading in the context of design thinking • Design definitions and stories: desirability, feasibility, viability, mystery, heuristics, algorithm, requirements, patterns, connect, blind spots • Laws of Design Thinking: less is more, last 2% equals 200%, theory of prioritization • Design mind: definitions, 5 forces of growth (SEPIA), 5 frictional forces (DCAFE), 3 capacity levers (VAL)
Module 2	Design Thinking Process • Overview of the design thinking process • Design thinking for contextualized problem-solving • Incorporating sustainable development goals into design thinking • Design framework (L0) • Empathy research: understanding user needs and perspectives • Persona development: creating user profiles • Customer journey mapping: visualizing user experiences • Define phase: asking the right questions and problem statement formulation

Module 3	Ideation and Prototyping • Ideation techniques: brainstorming and generating creative ideas • Identifying patterns and anti-patterns in ideation • Evaluation of ideas using different criteria (10/100/1000 gm) • Prototyping and testing: translating ideas into tangible prototypes
Module 4	Entrepreneurial Innovation • Introduction to innovation management • Basics of business models and their role in innovation • Financial estimation for innovation projects • Pitch decks: creating persuasive presentations for innovation • Considerations for intellectual property rights (IPR) in innovation

Reference Books:

Sl No	Title	Author(s)	Publisher	Year
1	Design Thinking in Classroom	David Lee	Ulysses Press	2018
2	The Art of Innovation Lessons in Creativity from IDEO	Tom Kelley	IDEO	2001
3	The Design Thinking <i>Play Book</i>	Michael Lewrick, Patrick Link & Larry Leifer	Wiley Press	2018
4	Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation	Tim Brown	Harper Business	2009
5	Unmukt-Science and Art of Design Thinking	Arun Jain	Arun Jain and School of Design Thinking	2019

Global Certifications:

Mapped Global Certifications:						
Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
1	Certified Design Thinking Professional (CDTP)	Global innovative Institute	Y	Written	Global innovative Institute	https://www.gini.org/cdtp
2	Design Thinking for Innovation	University of Virginia	Y	Online	Coursera	https://www.coursera.org/learn/uva-darden-design-thinking-innovation
3	IBM Enterprise		N		IBM	

	Design thinking	IBM		Online		https://www.ibm.com/design/thinking/page/courses/Practitioner
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Tools used in Practical / Skill:

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
	NA		

Evaluation Components:

Evaluation	Component	Weightage	Total
In-Sem Formative	Active Participation (Breakout Activities)	10	60
	Continuous Evaluation Project (Work in Progress)	30	
	Quiz	20	
End-Sem Summative	SEM-End Project	40	40

Innovation Management (IM)

COURSE CODE	22UC0012	MODE	R	LTPS	0-0-4-0	PRE-REQUISITE	Nil
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Course Outcomes

CO#	CO Description	BTL	PO/PSO Mapping
CO1	Develop value proposition for the problem identified	3	PO2, PO3, PO11
CO2	Build MVP for the solution developed	3	PO3, PO5, PO11
CO3	Devise go to market strategy	4	PO2, PO4, PO11
CO4	Create a Pitch-deck with funding strategy	6	PO5, PO10, PO11

Syllabus

Module 1	Problem Identification and Opportunity Discovery - Conduct Opportunity Discovery: Learn techniques to identify potential opportunities in the market and explore new ideas. - Problem Validation: Understand how to validate the identified problems by gathering data, conducting market research, and analyzing customer needs. - Sharpen the Problem Pitch: Develop effective pitching skills to communicate the identified problem clearly and persuasively.
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Module 2	Customer and Markets - Identify the Market Type: Learn about different market types such as B2B, B2C, and C2C, and understand their characteristics and dynamics. - Explore Market Segments: Discover various customer segments within a target market and identify their unique needs and preferences. - Determine Market Positioning: Define the positioning strategy for a product or service to differentiate it from competitors and attract the target market. - Create Customer Persona: Develop detailed profiles of target customers, including demographics, behaviors, and preferences.
Module 3	Creating a Compelling Value Proposition - Craft your Core Value Proposition: Define the unique value your product or service offers to customers and how it solves their problems or fulfills their needs. - Create Sustainable Differentiation Strategy: Identify and implement strategies to create sustainable competitive advantages over competitors. - Deliver Value: Explore techniques for delivering value to customers, including customer experience design, service delivery, and product innovation.
Module 4	Competitive Advantage - Identify Competitors: Analyze the competitive landscape and identify direct and indirect competitors. - Identify Critical Product Features: Determine the key features and attributes that will differentiate your product or service in the market. - Conduct Feature Ranking: Prioritize and rank product features based on their importance and impact on customer satisfaction and market success.
Module 5	Business Model and MVP Development - Build and Test a Business Model: Develop and refine a business model that outlines the key elements of your venture, such as revenue streams, cost structure, and customer acquisition channels. - Pivot or Persevere: Learn how to assess and adapt your business model based on market feedback and changing circumstances. - Identify the Riskiest Assumptions: Identify the assumptions underlying your business model and test them systematically to mitigate risks. - Build your MVP: Develop a minimum viable product (MVP) or prototype to test with early adopters and gather feedback for further iteration and improvement.

Reference Books

Sl	Title	Author(s)	Publisher	Year
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No				
1	"The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses"	Eric Ries	Crown Publishing Group	2011
2	"Value Proposition Design: How to Create Products and Services Customers Want"	Alexander Osterwalder, Yves Pigneur, Gregory Bernarda, Alan Smith	Wiley	2014
3	"The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail"	Clayton M. Christensen	Harvard Business Review Press	1997
4	"Disciplined Entrepreneurship: 24 Steps to a Successful Startup"	Bill Aulet	Wiley	2013
5	"The Startup Owner's Manual: The Step-by-Step Guide for Building a Great Company"	Steve Blank, Bob Dorf	K&S Ranch Inc.	2012

Global Certifications

Mapped Global Certifications:						
Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
1	Certified Innovation Professional (CInP)	Global innovative Institute	Y	Written	Global innovative Institute	https://www.gini.org/cinp

Tools used in Practical / Skill

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
1	NA		

Evaluation Component:

Evaluation	Component	Weightage	Total
In-Sem Formative	Active Participation (Breakout Activities)	10	60
	Continuous Evaluation Project (Work in Progress)	30	
	Quiz	20	
End-Sem Summative	SEM-End Project	40	40

FRENCH LANGUAGE (FLG)

COURSE CODE	22FL3054	MODE	R	LTPS	2-0-0-0	PRE-REQUISITE	NIL
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Course Outcomes

CO#	CO Description	BTL	PO Mapping
CO1	Acquire a working knowledge of the basic elements of the French language viz. letters, vowels, accents, articles, useful expressions, etc.	2	PO10
CO2	Frame questions and respond in the affirmative or negative with être and avoir and form plurals	3	PO10
CO3	Understand and apply the adjectives and essential verbs.	3	PO10
CO4	Comprehend and use in speech, vocabulary, reading, questions and answers on passages pertaining to monuments of France	3	PO10

Syllabus

Module 1	L'Alphabet et les Voyelles, Les Accents, Les Noms, Le Pluriel, Les Articles Indéfinis, Les Articles Définis, Les Expressions Utiles, Les Nombres Cardinaux, Les Nombres Ordinaux, Les Jours de la Semaine, Les Mois de l'Année,
Module 2	Le temps (Quelle heure est-il ?) Les Pronoms Personnels (Sujets), L'Interrogatif, Le Négatif, Le Verbe Être – Forme Affirmatif, Forme Interrogatif, Le Verbe Avoir – Forme Affirmatif, Forme Interrogatif, Les Prépositions.
Module 3	Les Articles Contractés, Les Adjectifs Qualificatifs, Les Adjectifs Possessifs, Les Adjectifs Démonstratifs, Les Verbes de Premier Groupe, Deuxième groupe, Troisième groupe Les Verbes Irréguliers.
Module 4	Les animaux Les pays et les nationalités Les parties du corps Le Futur proche. Le passe recent

	La famille Présentez-vous ?
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Reference Books:

Sl No	Title	Author(s)	Publisher	Year
1	Le Nouvel Esprit, Méthode de Français,	Meenal Tiwari	Langers international private limited	2016
2	Cours de Langue et de Civilisation Françaises, Tome Un	G.Mauger Blue	publié par Hachette.	2011
3	Dondo Modern French Course écrit par Mathurin Dondo, Publié par OUP.	Mathurin marius Dondo	Oxford	1997
4	Grammaire progressive du Français	Maia Gregoire	CLE international	2020

Global Certifications: NA

Mapped Global Certifications:						
Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
	NA					

Tools used in Practical / Skill: NA

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
	NA		

Evaluation Components:

Evaluation	Component	Weightage	Total
In-Sem Formative	ALM	10	20
	Home Assignment and text book	10	
In-Sem Summative	Semester in Exam-I	20	40
	Semester in Exam-II	20	
End-Sem Summative	End semester Exam	40	40

GERMAN LANGUAGE (GLG)

COURSE CODE	22FL3055	MODE	R	LTPS	2-0-0-0	PRE-REQUISITE	NIL
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Course Outcomes

CO#	CO Description	BTL	PO Mapping
CO1	Understand the German language Basic Proficiency: Students will develop and apply a solid foundation in German, allowing them to introduce themselves, engage in basic conversations, and understand everyday expressions.	3	PO10
CO2	Determine the German Vocabulary and Grammar: Students will learn essential vocabulary and grasp German grammar rules, enabling them to construct simple sentences accurately.	3	PO10
CO3	Comprehensive Reading and Listening practices: Students will comprehend basic written and spoken German, understanding short texts, signs, and following straightforward conversations.	3	PO10
CO4	Examining and interpreting the German Cultural Awareness: Students will gain insights into German-speaking countries' culture, enhancing their ability to communicate respectfully and appreciate the customs and traditions.	3	PO10

Syllabus

Module 1	Begrüssing – Alfabet-die Zahlen- die Addition-die Subtraktion-die Division-die Multiplikation - Personal Pronomen - sein form - haben form - der Infinitiv - Konjugation im Präsens
Module 2	Die Artikel – bestimmter Artikel – unbestimmter Artikel – Verneinung – Konjugation im Perfekt..Partizip II -Future
Module 3	Präpositionen – W-Frage - possessiv Pronomen - deutsche 4 Fälle – wohnen – die Familie
Module 4	Orientierung - Farben – Wochen, Monaten, Jahren, Jahreszeiten, - Einkaufen, Urlaub machen, sport, Gesundheit

Reference Books:

Sl No	Title	Author(s)	Publisher	Year
1	Studio d A1, Deutsch als Fremdsprache	Cornelsen/Goyal SaaB	Goyal Publishers and Distributors(P) Ltd. New Delhi 110007	2004
2	Netzwerk for A1,	Stefanie Dengler Paul Rusch Helen Schmitz Tamka Siener	Goyal Publishers and Distributors(P) Ltd. New Delhi 110007	2018
3	Deutsch ganz leicht A1, A German selfstudy course for beginners	Huebner	Goyal Publishers and Distributors(P) Ltd. New Delhi 110007	2018

4	Collins, easy learning German Grammar & Practice	collins	Collins	2014
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Global Certifications:

Mapped Global Certifications:						
Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
		NA				

Tools used in Practical / Skill:

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
	NA		

Evaluation Components:

Evaluation	Component	Weightage	Total
In-Sem Formative	ALM	10	20
	Home Assignment and text book	10	
In-Sem Summative	Semester in Exam-I	20	40
	Semester in Exam-II	20	
End-Sem Summative	End semester Exam	40	40

JAPANESE LANGUAGE (JLG)

COURSE CODE	22FL3058	MODE	R	LTPS	2-0-0-0	PRE-REQUISITE	NIL
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Course Outcomes

CO#	CO Description	BTL	PO Mapping
CO1	Understand the Japanese language Basic Proficiency	2	PO10
CO2	Determine the Japanese Vocabulary and Grammar	3	PO10
CO3	Examine and interpret Japan Cultural Awareness	3	PO10
CO4	Comprehensive Reading and Listening practice and apply the language skills	3	PO10

Syllabus

Module 1	1.1 Introduce about Japanese and its alphabets writing system (hiragana, katakana, kanji). (日本語について) 1.2 Greeting あいさつ. 1.3 Vocabulary ごい 1.4 numbers 数字. 1.5 Weekdays, Months, dates. (平日、月、) 1.6 Time. (時間)
Module 2	2.1 Tenses- Past tense, Present, Future Tense. (過去形、現在形) 2.2 Verbs – first form, second form and third form. (同士) 2.3 daily based Conversation. (会話) 2.4 name of transportation (vehicles). (乗り物) 2.5 feelings. (気持ち) 2.6 Japanese culture. (日本文化)
Module 3	3.1 Family relationships (家族) 3.2 Healthcare Body parts. 3.3 countries name, and nationalities. 国の名前 3.4 National holidays. 国の休み 3.5 Foods and vegetables. 3.6 classroom instructions.
Module 4	4.1 Animals. 動物の名前. 4.2 Shopping. 買い物 4.3 Colours. 色の名前 4.4 Hobbies 趣味 4.5 listening practice skills. ちょかい 4.6 Passage reading ability. どっかい 4.7 Self-Introduction. じこうしょじゃい

Reference Books:

Sl No	Title	Author(s)	Publisher	Year
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1	Minna No Nihongo- N5 Level	Japan Foundation	Goyal Publisher	2018
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Global Certifications: NA

Mapped Global Certifications:						
Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
		NA				

Tools used in Practical / Skill: NA

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
	NA		

Evaluation Components:

Evaluation	Component	Weightage	Total
In-Sem Formative	ALM	10	20
	Home Assignment and text book	10	
In-Sem Summative	Semester in Exam-I	20	40
	Semester in Exam-II	20	
End-Sem Summative	End semester Exam	40	40

Linear Algebra and Calculus for Engineers (LACE)

COURSE CODE	23MT1001	MODE	Regular	LTPS	2-2-0-0	PRE-REQUISITE	NIL
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Course Outcomes

CO#	CO Description	BTL	PO Mapping
CO1	Apply matrix algebra to the real-world problems - engineering, physical and biological sciences, finance and economics.	3	PO1
CO2	Apply multivariate differential calculus to find extremum of functions and solve differential equations.	3	PO1
CO3	Solve improper integrals using beta and gamma functions and evaluate double and triple integrals in 2-D and 3-D geometry.	3	PO1
CO4	Make use of vector differentiation and integration, solve the real-world problems.	3	PO1, PO5

Syllabus

Module 1	Introduction to Matrix theory: Row echelon form and rank of a matrix, Systems of linear equations, Solution by Gauss elimination, LU-Decomposition, Eigen values and eigen vectors. Diagonalization of matrices, quadratic forms and their canonical forms.
Module 2	Multivariate Differential calculus: Partial derivatives, Jacobian, total differentiation and their applications, chain rule, Taylor's series for function of two variables, maxima and minima of functions of two variables, Lagrange's method of undetermined multipliers. Differential Equations: Mathematical models used in differential equations. Second and higher-order differential equations, along with the methods of solutions and their applications.
Module 3	Multivariate Integral Calculus: Improper integrals, Beta, Gamma functions and their relationship. Line integrals- length of the arc, double and triple integrals and applications to area, volume, mass & moment of inertia. Change of order of integration, change of variables in polar, cylindrical and spherical polar coordinates.
Module 4	Vector Calculus: Scalar and vector point functions, Gradient, Directional Derivative, Divergence and Curl, Evaluation of line integrals, Introduction to Greens and Stoke's theorems and their applications.

Text Books :

Sl No	Title	Author(s)	Publisher	Year
1	Advanced Engineering Mathematics	Erwin Kreyszig	John Willey & Sons, New Delhi, India.	10th edition, 2010,

Reference Books:

Sl No	Title	Author(s)	Publisher	Year
1	Higher Engineering Mathematics	B.S. Grewal	Khanna, New Delhi, India.	42Edition, 2012

Global Certifications:

Mapped Global Certifications:						
Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
1	Mathematics for Engineers Specialization	Coursera	Y	Online Objective	Coursera	https://www.coursera.org/specializations/mathematics-engineers

2	Advanced Matrix Theory and Linear Algebra for Engineers	IISc Bangalore	Y	Online Objective	NPTEL	https://nptel.ac.in/courses/111108066
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Tools used in Practical / Skill:

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
1	--	--	--
2	--	--	--

Evaluation Components:

Evaluation	Component	Weightage	Total
In-Sem Formative	ALM	8	24
	Tutorial	8	
	Home Assignment and Textbook	8	
In-Sem Summative	Semester in Exam-I	18	36
	Semester in Exam-II	18	
End-Sem Summative	End Semester Exam	40	40

MATHEMATICAL MODELING AND NUMERICAL METHODS (MM&NM)

COURSE CODE	22MT2003	MODE	R	LTPS	2-2-0-0	PRE-REQUISITE	NIL
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Course Outcomes

CO#	CO Description	BTL	PO Mapping
CO1	Apply mathematical methods to model the phenomena into first and higher-order differential equations and obtain the solutions.	3	PO1
CO2	Apply Lagrange's and Charpit's method and solve first order partial differential equations. Apply method of separation of variables and finite difference method to solve one dimensional wave and heat equations and two-dimensional Laplace equations	3	PO1
CO3	Apply Numerical methods for obtaining the unknown value from the given data points.	3	PO1
CO4	Apply numerical techniques to solve the ordinary differential equations.	3	PO1

Syllabus

Module 1	Definitions and terminology and mathematical models used in differential equations. First-order and higher-order differential equations, along with the methods of solutions and their applications.
Module 2	Formation of partial differential equations, solutions of first order linear and nonlinear PDEs by Lagrange method, solution of second order PDEs by method of separation of variables i.e., one dimensional wave and heat equations, Laplace equation in two dimensions. Solving Laplace equation by finite difference method.
Module 3	Solution of algebraic and transcendental equations: Bisection method and Newton –Raphson method. Finite differences: Forward, Backward, Central differences, Shift operators, average operator and relations between the difference operators. Interpolation: Lagrange's and Newton's divided difference formulas.
Module 4	Taylor's, Euler's, Modified Euler's and Runge-Kutta method of fourth order.

Reference Books:

Sl No	Title	Author(s)	Publisher	Year
1	Advanced Engineering Mathematics	Erwin Kreyszig	John Wiley & Sons, Inc	2015
2	Advanced Engineering Mathematics	M.K.Jain, S.R.K.Iyengar and R.K.Jain,	New age international publishers(5 th Edn), New Delhi	
3	Applied Numerical methods with MATLAB for Engineers and Scientists.	Steven C, Chapra	Tata McGraw-Hill (3 rd edn.)	2012
4	Higher Engineering Mathematics	Dr. B.S. Grewal,	Khanna Pub, NewDelhi.	2017

Global Certifications:

Mapped Global Certifications:

Sl No	Title	Certification Provider	Procure d (Y/ N)	Format of the Exam	Exam Provider	URL of the Certification
1	Mathematical modelling: Analysis and Applications	NPTEL	YES	ONLINE	NPTEL	https://archive.nptel.ac.in/courses/111/107/111107113/
2	Numerical Methods for Engineers	COURSERA	YES	ONLINE	COURSERA	https://www.coursera.org/learn/numerical-methods-engineers

Tools used in Practical / Skill: NIL

Sl No	Tool Name	Parent Industry	Open Source/ Commercial

Evaluation Components:

Evaluation	Component	Weightage	Total
In-Sem Formative	ALMs	8	24
	Tutorial	8	
	Home Assignment and Book.	8	
In-Sem Summative	In-Sem Exam-I	18	36
	In-Sem Exam-II	18	
End-Sem Summative	END SEM EXAM	40	40

COMPLEX ANALYSIS AND TRANSFORM TECHNIQUES (CATT)

COURSE CODE	22MT2008	MODE	R	LTPS	2-2-0-0	PRE-REQUISITE	NIL
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Course Outcomes

CO#	CO Description	BTL	PO Mapping
CO1	Apply Cauchy-Riemann equations to test the analyticity of a complex function and Compute the complex integrals, using Cauchy theorem and Cauchy Integral formulae	3	PO1
CO2	Represent analytic functions as Taylor, Maclaurine and Laurent series expansions and compute real and complex integrals using the Residue theorem. Also transform complex functions using bilinear transformation	3	PO1
CO3	Compute Fourier transforms using integrals and solve differential equations	3	PO1
CO4	Apply Z- transforms to solve difference equations	3	PO1

Syllabus

Module 1	Complex Functions: analytic functions, Cauchy-Riemann equations, Conformal mapping, Cauchy integral theorem, Cauchy integral formula.
Module 2	Power series: Taylor series, Laurent series, zeros, singularities, residues and evaluation of real integrals.
Module 3	Fourier integrals, Fourier sine and cosine integrals, Complex form of Fourier integral representation, Fourier transform, Fourier transform of derivatives and integrals, Fourier sine and cosine transforms and their properties, Convolution theorem, Application of Fourier transforms to Boundary Value Problems.
Module 4	Z-transform and inverse Z-transform of elementary functions, Shifting theorems, Convolution theorem, Initial and final value theorem, Application of Z-transforms to solve difference equations.

Reference Books:

Sl No	Title	Author(s)	Publisher	Year
1	Advanced Engineering Mathematics	Erwin Kreyszig	John Wiley & Sons, Inc	2015
2	Advanced Engineering Mathematics	Jain, R. K. and Iyenger, S. R. K.,	Narosa Publishing House	
3	Higher Engineering Mathematics	Dr. B.S. Grewal,	Khanna Pub, New Delhi.	2017

Global Certifications:

Mapped Global Certifications:

Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
1	Complex Analysis	NPTEL	YES	ONLINE	NPTEL	https://archive.nptel.ac.in/courses/11/103/111103070/
2	Introduction to complex analysis	COURSE ERA	YES	ONLINE	COURSE ERA	https://www.coursera.org/learn/complex-analysis?utm_source=gg&utm_medium=sem&utm_campaign=B2C_INDIA__branded_FTCOF_courseraplus_arste_PMax&utm_content=Degree&campaignid=19607944793&adgroupid=&device=c&keyword=&matchtype=&network=x&devicemodel=&adposition=&creativeid=&hide_mobile_promo=&gclid=EAiaIQobChMIu_Cqn-rl_wIV05lmAh06zQKiEAAYASA AEgJQ5_D_BwE

Tools used in Practical / Skill: NIL

Sl No	Tool Name	Parent Industry	Open Source/ Commercial

Evaluation Components:

Evaluation	Component	Weightage	Total
In-Sem Formative	ALMs	8	24
	Tutorial	8	
	Home Assignment and Textbook	8	
In-Sem Summative	In-Sem Exam-I	18	36
	In-Sem Exam-II	18	
End-Sem Summative	END SEM EXAM	40	40

PROBABILITY, STATISTICS & QUEUEING THEORY(PSQT)

COURSE CODE	22MT2005	MODE	R	LTPS	2-2-0-0	PRE-REQUISITE	NIL
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Course Outcomes

CO#	CO Description	BTL	PO Mapping
CO1	To understand the importance of probabilistic concepts in a wide spectrum of problems arising in engineering applied science	PO2, PSO1	3
CO2	Identify the relationship between variables using correlation and regression techniques	PO1,PO2,PSO1	4
CO3	Explain the role of Statistical tests of significance in solving real world engineering problems	PO2, PSO1	3
CO4	To formulate Stochastic process in terms of Markov chains and solve problems in queueing systems, and networks	PO2, PSO1	4

Syllabus

Module 1	Introduction to Probability: Sample Space and Events, Probabilities Defined on Events, Conditional Probabilities, Independent Events, Bayes Formula, Random Variables, Probability Distribution Function, Cumulative Distribution Function, Discrete Random Variables: Bernoulli, Binomial, and Poisson process.
Module 2	Continuous Random Variables: Uniform, Exponential and Normal Random Variables Expectation of a Random Variable : Discrete and Continuous Case Expectation of Function of a Random Variable: Higher Order Moments, Variance, Standard Deviation Jointly Distributed Random Variables: Joint Distribution Functions, Independent Random Variables. Measures of central tendency: Mean, Median, Mode, Measure of Dispersion: Variance, Standard deviation, coefficient of variation. Correlation and Linear regression.
Module 3	Sample and population, Confidence limits and intervals, Statistical tests of significance: Null and Alternate Hypothesis, t-test, Chi Square Test, ANOVA.
Module 4	Introduction to queues, measures of system performance, characteristics of queueing systems. Stochastic processes overview, discrete-time Markov chains, Continuous-time Markov chain, birth-death processes, Poisson process and exponential distribution, Birth-death queueing systems, Non-birth-death Markovian queueing systems, Queueing networks.

Reference Books:

Sl No	Title	Author(s)	Publisher	Year
1	An Introduction to Probability Theory and Its Applications:	William Feller	Wiley & Sons	1991
2	Fundamentals of Queueing Theory, 4th Edition.	D. Gross, J.F. Shortle, J.M. Thompson, and	Wiley	2008

		C.M. Harris,		
3	Probability and Statistics for Engineers and Scientists	Ronald E. Walpole, Sharon L. Myers and Keying Ye	8 th Edition Pearson Hub	2008
4	“Probability and Statistics”	Rukmangadachari E. and E. Keshava Reddy	First Edition Pearson Hub	2015
5	Probability & Statistics for engineers	Dr. J. Ravichandran	WILEY-INDIA	2010

Global Certifications:

Mapped Global Certifications:

Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
1	Statistical Business Analyst	SAS	Y	PROCTORED	SAS	https://www.sas.com/en_us/certification/exam-integrity.html
2	IBM Data Science Professional	COURSE ERA	Y	PROCTORED	COURSEERA	https://www.coursera.org/professional-certificates/ibm-data-science

Tools used in Practical / Skill:

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
1	SAS	SAS	OPEN SOURCE

Evaluation Components:

Evaluation	Component	Weightage	Total
In-Sem Formative	Active Learning	8	24
	Home Assignments	8	
	Tutorial Continuous Evaluation	8	
In-Sem Summative	In-Sem 1	18	36
	In-Sem 2	18	
End-Sem Summative	End-Sem Exam	40	40

Optimization Techniques (OT)

COURSE CODE	22MT2011	MODE	R	LTPS	2-2-0-0	PRE-REQUISITE	Nil
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Course Outcomes

CO#	CO Description	BTL	PO/PSO Mapping
CO1	Identify Optimum solutions for various single objective problems using Linear Programming models	3	PO1, PO5, PSO2
CO2	Identify Optimum Solutions through Transportation and Assignment models	3	PO1, PO3, PSO2
CO3	Identify Optimum Solutions through Game theory, DPP, Queuing theory & Simulation models	3	PO1, PO3, PSO2
CO4	Solve project management problems using CPM, PERT and inventory	3	PO1, PO3, PSO2

Syllabus

Module 1	Linear Programming Problem: Introduction to Operations Research, Models, Scope, limitations, applications of OR. Introduction, Graphical method, Simplex method, Big M method, Two phase method, multiple solutions, infeasible solutions, unbounded solution, degeneracy, Dual Simplex method.
Module 2	Transportation: Introduction, methods of feasible solution, optimality test, Degeneracy in transportation problem, unbalanced transportation problem. Assignment Problem: Introduction, Hungarian method, travelling salesman problem.
Module 3	Queueing Theory: Introduction, single channel, Poisson arrival, exponential service time with finite population and infinite population. Dynamic Programming – Introduction, Bellman's principle of optimality, application to shortest route problem.
Module 4	Project Management by CPM/PERT: Introduction, simple network techniques, construction rules of drawing, Fulkerson's rule, Critical path method (CPM) – floats, critical path, project duration. PERT – Introduction, different time estimates, expected time, variance, expected project duration and probability of completion.

Reference Books:

Sl No	Title	Author(s)	Publisher	Year
1	Introduction to Operations Research	F.S.Hiller, G.J.Liberman	Tata McGraw Hill Education (India) Pvt. Ltd.	2017

2	Operations Research – An Introduction	Hamdy.A.Taha	Pearson Education	2017
3	Operations Research-Theory, Methods & Applications	S.D. Sharma	Kedar Nath Ram Nath.	2017
4	Operations Research	R. Paneerselvam	PHI	2006

Global Certifications:

Mapped Global Certifications:						
Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
1	Python	IBM	Y	Online MCQ	Etrain	https://courses.etrain.skillsnetwork.site/

Tools used in Practical / Skill:

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
1	NA		

Evaluation Components:

Evaluation	Component	Weightage	Total
In-Sem Formative	Active Learning	8	24
	Home Assignments	8	
	Tutorial Continuous Evaluation	8	
In-Sem Summative	In-Sem 1	18	36
	In-Sem 2	18	
End-Sem Summative	End-Sem Exam (Paper Based)	40	40

ENGINEERING GEOLOGY

COURSE CODE	22CE1201	MODE	R	LTPS	3-0-2-0	PRE-REQUISITE	Nil
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Course Outcomes

CO#	CO Description	BTL	PO/PSO Mapping
CO1	To Understand the significance of engineering geology, basics of geological processes that modify the surface of the earth, earthquakes, landslides.	2	PO3, Po7, PSO2
CO2	Understand the basics of minerals and rocks, geological structures exhibited by rocks and their influence,	3	PO3, Po7, PSO2
CO3	Apply the geological conditions to identify suitable site for civil engineering projects.	3	PO3, Po7, PSO2
CO4	Apply the geological conditions to identify potential sites for groundwater, sites for dam and reservoir and tunnels	3	PO3, Po7, PSO2

Co5	Apply the geological conditions for suitability of the site for a major civil engineering project	3	PO3, Po7, PSO3
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Syllabus

Module 1:	Introduction: Importance of geology from Civil engineering point of view, Physical Geology: Introduction; Weathering Process, types of weathering and its importance in civil engineering; Soil formation, Soil profile, soil conservation measures; Geological action of Rivers, stages in a river system, features of river erosion and deposition. Earthquakes And Seismic Hazards: Terminology; Classification, Causes and effects of earthquakes; seismic waves, measuring instruments, seismic zones of India, Seismic belts, seismic hazards in India; Civil Engineering considerations in seismic areas. A step towards urban earthquake vulnerability reduction. Land Slides: Classification; Causes and effects of Landslides; Preventive measures of Landslides.
Module 2:	Mineralogy: Definition of mineral; physical properties of minerals. Study of common rock forming minerals - Quartz, Feldspar, Muscovite, Asbestos calcite, Talc, Kaolin Petrology: Introduction; Rock Cycle, major rock types, formation of Igneous rocks; Structures of Igneous rocks. Formation of Sedimentary rocks; Structures of Sedimentary Rocks. agents of metamorphism, Structures of Metamorphic rocks, distinction of major rock types, Engineering Properties of Rocks: Different Engineering property of rocks. Description of some important Rocks – Granite - Basalt – Dolerite – Sand Stone – Lime Stone – Shale – Laterite - Granite gneiss – schist – Marble – K hondalite – Charnockite. Structural Geology: Introduction; Strike and Dip; Outcrop. Parts and classification of Folds; Faults; Joints; and their importance in Civil Engineering constructions
Module 3:	Site Investigation Techniques For Civil Engineering Projects: Introduction, Different stages of site investigation, toposheets/topographic maps; Geological maps and their interpretation in site investigation; Geophysics in civil engineering, electrical resistivity investigations, seismic survey, remote sensing, Geographical information systems and their application
Module 4:	Ground Water: sources of ground water, factors controlling ground water, water bearing properties of rocks and soils, types of aquifers, exploration of ground water Dams: Dams terminology; Types of dams and suitable foundations; guidelines for major dam and reservoir investigations; Tunnels: Purpose of tunneling; types of tunnels, tunnels and underground excavations – methods of site selection, tunnel excavation in various rock types, geological problems, Geology of some tunnel sites;

Reference Books

Sl No	Title	Author(s)	Publisher	Year
1	Engineering Geology	D. Venkat Reddy	Vikas Publishing House Pvt. Ltd., Noida	2020
2	Engineering and General Geology	Parbin Singh	S. K. Kataria & Sons	2019
3	Engineering Geology and Geo techniques	Krynine and Judd,	Mc Graw Hill Book Company.	2018
4	Principles of Engineering Geology	Subinoy Gangopadhyay	Oxford University Press	2019
5	A text Book of Engineering Geology	N. Chennakesavulu	Macmillan India Ltd., Delhi.	2020
6	Rock Mechanics for Engineers	KVGK Gokhale,	B.S. Publications, Hyderabad	2018

Global Certifications:

Mapped Global Certifications:

Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
1	NA	NA	NA	NA	NA	NA

Tools used in Practical / Skill:

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
1	Experimentation and inferencing	Lab	University Lab

Evaluation Components:

Evaluation	Component	Weightage	Total
In-Sem Formative	Active Learning	8	22
	Home Assignments	7	
	Practical Continuous Evaluation	7	
In-Sem Summative	In-Sem 1	15	38
	In-Sem 2	15	
	Practical In-Sem	8	
End-Sem Summative	End-Sem Exam (Paper Based)	24	40
	Lab End-Sem Exam	16	

Engineering Chemistry

COURSE CODE	23CY1001	MODE	General	LTPS	3-0-2-0	PRE-REQUISITE	NIL
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Course Outcomes

CO#	CO Description	BTL	PO Mapping
CO1	Apply the operation of electrochemical systems to produce electric energy and storage devices.	3	PO 1, PO 6
CO2	Use the fundamental aspects of electrochemistry and materials science relevant to corrosion phenomena.	3	PO 1, PO 2, PO 6
CO3	Examine water quality and apply appropriate purification technique for intended problem.	3	PO 1, PO 2, PO 7
CO4	Employ the fundamental principles and general properties of materials in various engineering applications.	3	PO 1, PO 3, PO 6
CO5	Analyse the data, develop skills in chemical analysis and their application in engineering.	4	PO 1, PO 3, PO 7

Syllabus

Module 1	Electrochemistry: Single electrode potential and its measurement, Electrochemical cells, EMF series, Nernst equation, Cell emf measurement, Reversible and irreversible cells, Concentration cells, Reference Electrodes- Determination of pH using glass electrode. Gas Sensors: Capacitance Manometer and Mass Spectrometer. Batteries: Chemistry, construction, and engineering aspects of Primary (mercury battery) and secondary (lead-Acid cell, Ni-Metal hydride cell, Lithium cells) and fuel cells– Hydrogen–Oxygen fuel cell, methanol fuel cell advantages of fuel cell.
Module 2	CORROSION & ITS CONTROL: Causes and different types of corrosion and effects of corrosion. Theories of corrosion– Chemical, Electrochemical corrosion, Pitting corrosion, stress corrosion, Galvanic corrosion. Factors affecting corrosion– Nature of metal, galvanic series, over voltage, purity of metal, nature of oxide film, nature of corrosion product. Nature of environment- effect of temperature, effect of pH, Humidity, effect of oxidant. Cathodic protection, sacrificial anode, impressed current cathode, electroplating.
Module 3	WATER Technology: Introduction, Hardness: Causes, expression of hardness –units – types of hardness, estimation of temporary and permanent hardness of water, numerical problems. Alkalinity and estimation of alkalinity of water, numerical problems. Boiler troubles – Scale & sludge formation, caustic embrittlement, Boiler corrosion, priming & foaming. Softening of water: Internal and external treatments -Lime soda, Ion exchange process. Desalination-reverse osmosis and electrodialysis.
Module 4	Molecules and Materials: polymers- Types of polymerization-Mechanisms, Plastics – Thermoplastic resins and thermosetting resins -Preparation, properties and engineering applications of polyethylene, PVC, Teflon, Bakelite, Urea Formaldehyde. Conducting Polymers: Polyacetylene, polyaniline,

	conduction, doping and applications. Carbon nano tubes and Applications.
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Reference Books:

Sl No	Title	Author(s)	Publisher	Year
1	Engineering Chemistry	Jain & Jain	Dhanpat Rai Publishing Company	2015
2	Chemistry in Engineering and Technology	J C Kuriacose & J Rajaram,	Tata McGraw Hill	2001
3	Chemistry for Engineers	Rajesh Agnihotri	Wiley	2014
4	Engineering Chemistry: Fundamentals and Applications	Shikha Agarwal	Cambridge University Press	2016

Global Certifications:

Mapped Global Certifications:						
Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
1	NA	NA	NA	NA	NA	NA

Tools used in Practical / Skill:

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
1	NA	NA	NA

Evaluation Components:

Evaluation	Component	Weightage	Total
In-Sem Formative	Active Learning	8	22
	Home Assignment & Textbook	7	
	Practical Continuous Evaluation	7	
In-Sem Summative	In-Sem 1	15	38
	In-Sem 2	15	
	Practical In-Sem	8	
End-Sem Summative	End-Sem Exam (Paper Based)	24	40
	Lab End-Sem Exam	16	

COMPUTATIONAL THINKING FOR STRUCTURED DESIGN (CTSD)

COURSE CODE	23SC1101	MODE	R	LTPS	3-0-2-4 (R)	PRE-REQUISITE	Nil
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Course Outcomes

CO#	CO Description	BTL	PO Mapping
CO1	Develop and apply logical building blocks to solve real world problems	3	PO1, PO2
CO2	Apply computational thinking for designing solutions	3	PO1, PO2
CO3	Develop and apply the CRUD operations on arrays	3	PO1, PO2
CO4	Apply CRUD operations on Linear Data Structures	3	PO4
CO5	Apply the structured programming paradigm with logic building skills on Basic and Linear Data Structures for solving real world problems	3	PO1, PO2, PO4, PSO1
CO6	Skill the students in such a way that students will be able to develop logic that help them to create programs as well as applications in C	3	PO1, PO2, PO4

Syllabus

Module 1	Structured Programming Paradigm: Problem Solving Approach, Algorithms and Algorithm Analysis, Program Development Steps, Structure of C Program, Pre-Processor Directives, Design of Building Blocks for solving real world problems: Modularization: Functions, Scope of Variables and Storage classes, Data Types: Primitive, Extended and Derived Including Pointers, Operators: Types of operators, Precedence, Associativity, Formatted I/O, Decision Making using conditional statements.
Module 2	Definite and indefinite Iterative statements. Recursion, logic building using complex building blocks, Bitwise operators, Redirecting I/O: Files and File Operations.
Module 3	Command line arguments, CRUD operations on Basic Data Structures: Basic Data Structure: Arrays, 2-D Arrays, Dynamic Memory Allocation Searching: Linear Search and Binary Search Sorting: Bubble Sort.
Module 4	CRUD operations on Linear Data Structures: Stacks, Queues, Single Linked List, Introduction to nonlinear data structures.

Reference Books:

Sl No	Title	Author(s)	Publisher	Year
1	The C Programming Language: ANSI C Version	Brian W. Kernighan, Dennis M. Ritchie	Prentice-Hall/Pearson Education-2005	2005
2	Fundamentals of Data structures in C	Horowitz, Sahni, Anderson Freed	Pearson Education	1993

3	Data structures and Program Design in C	Robert Kruse, C. L. Tondo, Bruce Leung, Shashi Mogalla.	Pearson Education	2006
4	Programming in ANSI C	E. Balagurusamy	Tata McGraw-Hill Education, Edition	2019
5	Programming in ANSI C	Mark Allen Weiss	Pearson Education	2014

Global Certifications:

Mapped Global Certifications:						
Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
1	C Programming Language Certified Associate	C++ institute	Yes	Online/Multiple Choice	Pearson Vue	https://cppinstitute.org/cla-exam-syllabus

Tools used in Practical / Skill:

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
1	Dev C++	Software Development	Open Source
2	Coding platforms	Skill development	Open Source

Evaluation Components:

Evaluation	Component	Weightage	Total
In-Sem Formative	Home Assignments	5	22
	Quiz	5	
	Global Challenges Participation	2	
	Practical Continuous Evaluation	5	
	Skill Continuous Evaluation	5	
In-Sem Summative	In-Sem 1	12	38
	In-Sem 2	12	
	Practical In-Sem	7	
	Skill In-Sem	7	
End-Sem Summative	End-Sem Exam (Paper Based)	24	40
	Lab End-Sem Exam	8	
	Skill End-Sem Exam	8	

DATA STRUCTURES (DS)

COURSE CODE	23SC1202	MODE	R	LTPS	2-0-2-4 (R)	PRE-REQUISITE	CTSD
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Course Outcomes

CO#	CO Description	BTL	PO Mapping
CO1	Understand various sorting algorithms and analyse the efficiency of the algorithms.	4	PO1, PO2
CO2	Implement and evaluate Linear Data Structures and Demonstrate their applications.	4	PO2, PO3, PO1
CO3	Implement and evaluate tree data structures and understand hashing techniques	4	PO1, PO2, PO3
CO4	Understand graph data structures and apply graphs to solve problems	3	PO1, PO2
CO5	Design, Develop and evaluate common practical applications for linear and nonlinear data structures.	4	PO7, PO10, PO9
CO6	Skill the students in such a way that students will be able to develop logic that help them to create programs on both linear and non-linear data structures and its applications.	3	PO7, PO9, PO10

Syllabus

Module 1	Understand various sorting algorithms and analyse the efficiency of the algorithms.
Module 2	Implement and evaluate Linear Data Structures and Demonstrate their applications.
Module 3	Implement and evaluate tree data structures and understand hashing techniques
Module 4	Understand graph data structures and apply graphs to solve problems

Reference Books:

Sl No	Title	Author(s)	Publisher	Year
1	Data Structures and Algorithms	A.V.Aho, J. E. Hopcroft, and J. D. Ullman	Pearson Education"	2003
2	Fundamentals of data structures in C	Horowitz, Sahni, Anderson Freed	Pearson Education"	2007
3	Data Structures	R. F. Gilberg, B. A. Forouzan,	Thomson India Edition	2004
4	Data Structures & Program Design in C	Robert Kruse, C.L. Tondo, Bruce Leung, Shashi Mogalla	Thomson India Edition	2007

Global Certifications:

Mapped Global Certifications:

Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
1						

Tools used in Practical / Skill:

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
1	Dev C++	Software Development	Open Source
2	Online GDB	Software Development	Open Source
3	Coding platforms	Skill development	Open Source

Evaluation Components:

Evaluation	Component	Weightage	Total
In-Sem Formative	Active Learning	4	20
	Home Assignments	2	
	Global Challenges Participation	2	
	Practical Continuous Evaluation	6	
	Skill Continuous Evaluation	6	
In-Sem Summative	In-Sem 1	12	40
	In-Sem 2	12	
	Practical In-Sem	8	
	Skill In-Sem	8	
End-Sem Summative	End-Sem Exam (Paper Based)	24	40
	Lab End-Sem Exam	8	
	Skill End-Sem Exam	8	

Design Tools Workshop (DTW)

COURSE CODE	22ME1103	MODE	R	LTPS	0-0-4-0	PRE-REQUISITE	NIL
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Course Outcomes

CO#	CO Description	BTL	PO Mapping
CO1	Demonstrate proficiency in typing sentence , paragraph , report , presentations along spread sheets using office tools, LaTeX tools and PowerBI	2	PSO2,PO5
CO2	Build a static website and blog with using html along with Special features of HTML5, CSS and Javascript	3	PO10,PO5
CO3	Develop a virtual environment with cospace and construct a marker based Augmented Reality and create a 3D terrain	3	PSO1,PO3

CO4	Utilising the softwares of Autodesk Fusion 360 and the same can be printed in 3D printer as physical prototype, Fundamentals of electrical circuit: Ohms law, KCL and KVL law	3	PSO1,PO3
CO5	<CO for Practical – can be deleted otherwise>		
CO6	<CO for Skill – can be deleted otherwise>		

Syllabus

Module 1	Office management and documentation
Module 2	Basics of Web Development
Module 3	Augmented Reality, Virtual Reality, Mixed Reality and Extended Reality
Module 4	Conceptual Design, Modelling and Prototyping

Reference Books:

Sl No	Title	Author(s)	Publisher	Year
1	MS-Office		Laxmi Publications Pvt Limited	2008
2	LaTeX Cookbook	Kottwitz, Stefan	Packt Publishing	2015
3	HTML & CSS: Design and Build Web Sites	Duckett, Jon	Wiley	2011
4	3D Printing: Understanding Additive Manufacturing	Thurn, Laura, et al	Carl Hanser Verlag GmbH & Company KG	2018
5	Augmented Reality and Virtual Reality: New Trends in Immersive Technology		Springer International Publishing	2021

Global Certifications:

Mapped Global Certifications:						
Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
1	Fusion 360	Autodesk	Y	Online	Certiport	www.certiport.com
2	Power BI Data	Microsoft	Y	Online	Microsoft	https://learn.microsoft.com/en-us/certifications/exams/pl-

	Analyst					300/
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Tools used in Practical / Skill:

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
1	Office	Microsoft	Commercial
2	Overleaf	Overleaf	Open source
3	Power BI	Microsoft	Commercial
4	Notepad++	Notepad++	Open source
5	Cospaces	Cospacesedu	Open source
6	Fusion 360	Microsoft	Commercial
7	Tinkercad	Microsoft	Commercial

Evaluation Components:

Evaluation	Component	Weightage	Total
In-Sem Formative	Practical Continuous Evaluation	15	25
	Project Continuous Evaluation	10	
In-Sem Summative	In-Sem 1	17.5	35
	In-Sem 2	17.5	
End-Sem Summative	Lab End-Sem Exam	40	40

WORKSHOP PRACTICES FOR ENGINEERS (WPFE)

COURSE CODE	23ME1004	MODE	R	LTPS	0-0-4-0	PRE- REQUISITE	NIL
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Course Outcomes

CO#	CO Description	BTL	PO/PSO Mapping
CO1	Prepare different components using Carpentry, Tin-smithy trade	2	PSO2,PO5
CO2	Basic electrical engineering knowledge for house wiring practice	3	PO10,PO5
CO3	Prepare different components using various manufacturing techniques	3	PSO1,PO3
CO4	Perform various machining operations	3	PSO1,PO3

Syllabus

Module 1	Carpentry (simple exercise in wood working, pattern making)
Module 2	Fitting operations & power tools.

Module 3	Electrical & Electronics, Sheet metal working, Welding (arc welding & gas welding and gas cutting), brazing, Plastic moulding, glass cutting.
Module 4	Manufacturing Methods: casting, forming, machining, joining, advanced manufacturing Methods. CNC machining, Additive manufacturing.

Reference Books:

Sl No	Title	Author(s)	Publisher	Year
1	Elements of Workshop Technology	Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K.	Media promoters and publishers private limited, Mumbai.	3rd Edition
2	Production drawing	K.L.Narayana and P.Kannaiah	New Age International	2nd Edition
3	Processes and Materials of Manufacture	Roy A. Lindberg	Prentice Hall India	4 th edition

Global Certifications:

Mapped Global Certifications:						
Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
1	Fusion 360	Autodesk	Y	Online	Certipoint	https://www.autodesk.in/campaigns/education/fusion-360-education?mktvar002=4246615 SEM 12898498478 125502127390 kwd-

Tools used in Practical / Skill:

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
1	Carpentry	Carpentry	Commercial
2	Fitting	Fitting	Commercial
3	Sheet metal	Sheet metal	Commercial
4	Welding	Welding	Commercial
5	CNC machine	CNC machine	Commercial
6	Tinkercad	Microsoft	Commercial

Evaluation Components:

Evaluation	Component	Weightage	Total
In-Sem Formative	Practical Continuous Evaluation	15	25
	Project Continuous Evaluation	10	
In-Sem Summative	In-Sem 1	17.5	35
	In-Sem 2	17.5	
End-Sem	Lab End-Sem Exam	40	40

Summative			
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Engineering Graphics (EG)

COURSE CODE	23ME1002	MODE	R	LTPS	0-0-4-0	PRE-REQUISITE	NIL
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Course Outcomes

CO#	CO Description	BTL	PO Mapping
CO1	Model Engineering Curves in engineering Practice, Conic sections and special curves, scales both manually and using computer aided design tool (CAD).	2	PO1, PO5& PSO1
CO2	Project points, lines and planes in first angle third angle both manually and using CAD.	3	PO1, PO5& PSO1
CO3	Project solids and generate the sectional views of solids, development of surfaces of regular solids both manually and using CAD.	3	PO1, PO5 & PSO1
CO4	Convert orthographic projections to create isometric view and isometric view to orthographic projection both manually and using CAD.	3	PO1. PO5, PSO1

Syllabus

Module 1	Introduction to Engineering Drawing: Principles of Engineering Graphics and their significance – Drawing Instruments and their Use- Conventions in Drawing – Lettering – Conic Sections: Ellipse, Parabola, Hyperbola and Rectangular Hyperbola – oblong, concentric method. Special Curves: Cycloid, Epicycloids, Hypocycloid, and Involute. Scales: Plain and Vernier scales.
Module 2	Projection of Lines, points and Projections of Planes: First and Third Angle Projections of Points and Lines inclined to planes, True lengths, traces. Constructions, Projections of regular planes inclined to both planes.
Module 3	Projections of Solids and Developments of surfaces: Projections of Regular solids inclined to one plane. Sections and Sectional Views: Right Regular Solids - Prism, Cylinder, Pyramid, Cone. Surface development of right regular solids – Prisms, Cylinder, Pyramid cone and their parts. Understand the fundamentals of modelling and design for manufacturing
Module 4	Orthographic Projection in First Angle Projection and Isometric Projections: Principles of Orthographic Projections- conventions - Principles of Isometric Projection- Isometric Scale- Isometric view conventions- Isometric View of Lines, Plane Figures, and simple problems. Transformation of Projections: Conversion of Isometric Views to Orthographic Views – Conventions. Analyse manufacturing processes and their impact on product design. Utilize Fusion 360 software for computer-aided design (CAD) modeling and visualization

Reference Books:

Sl No	Title	Author(s)	Publisher	Year
1	Engineering Drawing	N.D.Bhat/ Charotar	Pearson Education	2019
2	Engineering Graphics,	Agrawal B. &Agrawal C. M	TMH Publication.	2012
3	Fundamentals of Engineering Drawing	.W.J. Luzadder and J.M. Duff	PHI learning	1978
4	Visualization, Modeling, and Graphics for Engineering Design	D.K. Lieu and S.A. Sorby	Cengage Learning	2015
5	Engineering Graphics With Autocad	D. M. Kulkarni, A. P. Rastogi, A. K. Sarkar	PHI Learning	2009

Global Certifications:

Mapped Global Certifications:

Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
1	Fusion 360	AutoDesk	Y	Online	AutoDesk	https://www.autodesk.in/campaigns/education/fusion-360

Tools used in Practical / Skill:

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
1	AUTOCAD	AUTODESK	Open Source

Evaluation Components:

Evaluation	Component	Weightage	Total
In-Sem Formative	Practical Continuous Evaluation	12.5	25
	Project Continuous Evaluation	12.5	
In-Sem Summative	In-Sem 1	17.5	35
	In-Sem 2	17.5	
End-Sem Summative	Lab End-Sem Exam	40	40

OBJECT ORIENTED PROGRAMMING (OOP)

COURSE CODE	23AD1202	MODE	R	LTPS	2-0-2-0 (R)	PRE-REQUISITE	Nil
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Course Outcomes

CO#	CO Description	BTL	PO Mapping
CO1	Apply the concepts of Basic Data types, Operators, Decision and Looping Control Statements, Strings	3	PO3, PO5
CO2	Apply the concepts of Lists, Tuples, Dictionaries. Functions, Modules, Class, Object, OOPS principles.	3	PO3, PO5
CO3	Apply Concepts of OOP principles, classes and objects, Call by value vs. Call by reference, recursion, and Nested classes	3	PO3, PO5
CO4	Apply Concepts of Files, Interfaces, Packages, Threads	3	PO3, PO5
CO5	Design, implement, and evaluate Python programs using basic data types, variables, expressions, conditional statements, loops, functions, built-in data structures, object-oriented programming concepts, Python libraries and modules, debugging techniques, and file I/O to solve programming problems.	4	PO7, PO9, PO10, PSO1
CO6	Apply object-oriented programming concepts to write programs and Analyses requirements and design to implement lab-based project with SDLC in a group of students	4	PO7, PO9, PO10, PSO1

Syllabus

Module 1	Python interpreter and interactive mode: values and types: int, float, Boolean, string, and list, variables, expressions, statements, tuple assignment, precedence of operators, comments .Conditionals: Boolean values and operators, conditional (if), alternative (if-else), chained conditional (if-elif-else); Iteration: state, while, for, break, continue, pass; Strings: string slices, immutability, string functions and methods, string module
Module 2	Fruitful functions: functions, function definition and use, flow of execution, parameters and arguments return values, parameters, local and global scope, recursion; List, Tuples, Set, Dictionary data types, Classes, Object: command line arguments, Class, object, methods, constructors, OOP's principles.
Module 3	Polymorphism: Static and Dynamic Polymorphism (Overloading, Overriding), Inheritance – Super classes- sub classes –Protected members – constructors in sub classes, Super keyword, Encapsulation: Data Encapsulation and Data Abstraction, Object as argument and return value: Call by value vs. Call by reference, recursion, and Nested classes.
Module 4	Files, Interfaces, Packages, and Threads: Introduction To files: Create, Read Write, Append, Delete Interfaces – defining an interface, implementing interface, differences between classes and interfaces and extending interfaces, Packages, importing packages, differences between classes and interfaces, Implementing & Applying interface. Exception Exceptions – exception hierarchy – throwing and catching exceptions – built-in exceptions, creating own exceptions fundamentals, Threads: Difference between multi-threading and Multitasking, Different Thread objects.

Reference Books:

Sl No	Title	Author(s)	Publisher	Year
1	Think Python: How to Think like a Computer Scientist	Allen B. Downey	O'Reilly Publishers, 2016	2016
2	Python for Programmers	Paul Deitel and Harvey Deitel	Pearson Education	2021
3	Python: The Complete Reference	Martin C. Brown	Mc-Graw Hill, 2018	2018
4	Python 3 Object-oriented Programming	Dusty Phillips	Packet Publishing	2010

Global Certifications:

Mapped Global Certifications:						
Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
1	PC AP	Python Institute	Yes	Objective Type	Pearson Vue	https://pythoninstitute.org/pcap

Tools used in Practical / Skill:

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
1	IDLE	Software Development	Open Source
2	Pycharm (Community Version)	Software Development	Open Source
3	Coding platforms	Skill development	Open Source

Evaluation Components:

Evaluation	Component	Weightage	Total
In-Sem Formative	Home Assignments	6	24
	Quiz	6	
	Global Challenges Participation	4	
	Practical Continuous Evaluation	8	
In-Sem Summative	In-Sem 1	12	36
	In-Sem 2	12	
	Practical In-Sem	12	
End-Sem Summative	End-Sem Exam (Paper Based)	26	40
	Lab End-Sem Exam	14	

Engineering Mechanics (EM)

COURSE CODE	23ME1001	MODE	Regular	LTPS	3-0-0-0	PRE-REQUISITE	Nil
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Course Outcomes

CO#	CO Description	BTL	PO Mapping
CO1	Apply the concept of forces, governing static equations and analyse planar system of forces.	3	PO1
CO2	Use analytical techniques for analysing forces in statically determinate structures.	4	PO1
CO3	Apply the concepts of planar and non-planar system of parallel forces and estimate the moment of inertia for lamina and material bodies.	3	PO2
CO4	Apply fundamental concepts of kinematics and kinetics of particles to solve simple practical problems.	4	PO2

Syllabus

Module 1	Introduction, Basic concepts, Laws of motion, Principle of Transmissibility of forces, Resultant of a force system, force laws, Resultant of two dimensional concurrent and Non- Concurrent Force systems, Free body diagrams, Applications. Equilibrium of Rigid bodies– Equilibrium and Equations of Equilibrium, Lami's theorem, Type of supports and their reactions, Moments and couples, Varignon's theorem, Resultant moment and applications
Module 2	SPATIAL FORCE SYSTEM & TRUSSES: Spatial force systems – Forces in space, resultant and equilibrium of spatial force system. Truss Analysis-Trusses -Assumptions involved in the Method of joints and sections.
Module 3	FRICITION AND PROPERTIES OF AREAS: Friction: Introduction, Laws of Coulomb Friction, Equilibrium of Bodies involving Dry-friction, Applications- ladder friction, wedge friction. CENTRIOD AND MOMENT OF INERTIA: Centroid, Centre of gravity, Moment of inertia - Area and Mass- polar moment of inertia, Parallel axis theorem.
Module 4	KINEMATICS OF RIGID BODY: Introduction, Plane Motion of Rigid Body, Velocity and Acceleration under Translation and Rotational motion. Virtual Work: Introduction - Principle of virtual work - Equilibrium of ideal systems. KINETICS OF RIGID BODY: Introduction, Force, Mass and Acceleration, Work and Energy, Impulse and Momentum, D'Alembert's Principles and Dynamic Equilibrium.

Reference Books:

Sl No	Title	Author(s)	Publisher	Year
1	Engineering Mechanics	Timoshenko, D. Young, J Rao	Tata McGraw Hill	2013
2	Engineering Mechanics: Statics and Dynamics	Statics and Dynamics by A K Tayal	Umesh publications	2008
3	Engineering Mechanics: Statics and Dynamics	R C Hibbeler	Pearson	2015
4	Engineering Mechanics	Irving H. Shames	Prentice-Hall	2005
5	Vector Mechanics for Engineers (in SI units) Statics & Dynamics	F. P. Beer and E.R. Johnston	Mc Graw Hill Publications	2017
6	Engineering Mechanics (Statics)	J L Meriam and L G Kraige	Wiley student edition	2018

Global Certifications:

Mapped Global Certifications:						
Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
1		Nil				

Tools used in Practical / Skill:

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
1	Nil		

Evaluation Components:

Evaluation	Component	Weightage	Total
In-Sem Formative	Active Learning	8	24
	Home Assignments	8	
	Quiz	8	
In-Sem Summative	In-Sem 1	18	36
	In-Sem 2	18	
End-Sem Summative	End-Sem Exam (Paper Based)	40	40

FLUID MECHANICS & HYDRAULIC MACHINES (FMHM)

COURSE CODE	22CE2102	MODE	R	LTPS	3-0-2-0	PRE-REQUISITE	Nil
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Course Outcomes

CO#	CO Description	BTL	PO Mapping
CO1	Apply the knowledge of fluid properties and the laws of fluid statics to estimate the total pressure, Centre of pressure and forces on submerged and floating bodies	3	PO1, PO2
CO2	Analyse the flow through pipes	4	PO1, PO2
CO3	Analyse the flow through open channel	4	PO1, PO2
CO4	Analyse the performance of hydraulic turbines and pumps	4	PO1, PO2
CO5	Analyse the flow through pipes and open channel by conducting experiment in laboratory	4	PO1, PO2

Syllabus

Module 1	Fluid Properties: Definition of fluid, properties of fluids - density, specific weight, specific gravity, viscosity, classification of fluids, surface tension, capillarity, vapor pressure. Fluid Statics: Introduction, pressure, Pascal law, hydrostatic law, measurement of pressure, simple and differential manometers; total pressure and centre of pressure on vertical, horizontal, inclined, and curved surfaces. Buoyancy: Buoyancy, centre of buoyancy, meta-centre, meta-centric height, forces on submerged bodies, stability of submerged and floating bodies. Fluid kinematics: Introduction, types of fluid flow, discharge, continuity equation, potential function and stream function.
Module 2	Fluid dynamics: Introduction, Euler's equation of motion, Bernoulli's equation and applications. Flow through pipes: Introduction, major and minor energy losses, friction coefficient in laminar and turbulent flow, Hagen-Poiseuille law, Hydraulic gradient and total energy line, pipes in series and parallel, power transmission through pipes, Water hammer. Boundary layer theory: Introduction, laminar and turbulent boundary layers, boundary layer thickness, displacement thickness, momentum thickness, energy thickness, boundary layer separation.
Module 3	Open channel hydraulics: Steady and Unsteady Flows, Uniform and Nonuniform flows, Laminar and Turbulent Flows, Subcritical, Supercritical, and Critical Flows; Chezy's Equation, Manning Equation in Uniform Flow, Most Efficient Hydraulic Section for rectangular and trapezoidal channel, Specific Energy and Specific Force for Rectangular and Non-rectangular Channel; Critical Flow; Hydraulic Jump: Ratio of Sequent Depths, Length of Jump, Jump types, Energy loss. Gradually Varied Flow, Governing Equation for gradually varied flow, Classification of Water-Surface Profiles. Dimensional analysis: Buckingham Pi Theorem method for dimensional analysis, Prototype, Model similitude, Model laws based on Reynolds and Froude number law.

Module 4	Impact of Jets: Introduction to impulse-momentum equation and its applications, force exerted by jet on fixed target, moving target, and series of curved vanes. Turbines: Introduction, types and classification Pelton wheel, Francis turbine, Kaplan turbine-theory, work done and efficiency. Centrifugal and Reciprocating Pumps: Definition of pump, classification, description and general principle of working; priming, work done and efficiency of pump, specific speed, cavitation, slip, multi-stage pumps.
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Reference Books:

Sl No	Title	Author(s)	Publisher	Year
1	Fluid Mechanics and Hydraulic Machines	R. K. Bansal	Laxmi Publication	2019
2	Fluid Mechanics and Hydraulic Machines	D. S. Kumar	Narosa Publishing House Private Limited	2012
3	Fluid Mechanics	S. K. Som and G. Biswas	McGraw Hill publications	2017
4	Fluid Mechanics	Yunus A. Cengel	McGraw Hill publications	2010
5	Fluid Mechanics & Hydraulics	Modi & Seth	Standard Book House, New Delhi.	2019

Global Certifications:

Mapped Global Certifications:

Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
1	Ansys Associate Certification in Basics of Fluid Dynamics	Ansys	Y	Online	Ansys	https://certifications.ansys.com/courses/basics-of-fluid-dynamics-associate-certification/

Tools used in Practical / Skill:

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
1	NA (For practical, instruments/machines available in the laboratory will be used)	NA	NA

Evaluation Components:

Evaluation	Component	Weightage	Total
In-Sem Formative	Active Learning	08	22
	Home Assignments	07	
	Practical Continuous Evaluation	07	
In-Sem Summative	In-Sem 1	15	38
	In-Sem 2	15	

	Practical In-Sem	08	
End-Sem	End-Sem Exam (Paper Based)	24	40
Summative	Lab End-Sem Exam	16	

PROBLEM SOLVING & REASONING SKILLS-1 (PSRS-1)

COURSE CODE	22UC3108	MODE	R	LTPS	0-0-0-4	PRE-REQUISITE	NONE
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Course Outcomes

CO#	CO Description	BTL	PO Mapping
CO1	Apply the concepts of Linear Equations, concepts of Ratios, Averages, Partnership, Percentages and Interest to solve the problems related to Ages, Ratio & Proportion, Variation & Partnership, Percentages, Profit, Loss & Discounts, Simple & Compound Interest, Averages & Allegations or Mixtures.	3	1,5
CO2	Apply the concepts of Co-primes, Divisibility rules, LCM & HCF concepts to solve problems in Numbers, Apply the concepts of Algebra to solve the problems based on Sets, Relations, Functions and Graphs, Surds & Indices, Logarithms, Quadratic Equations, Inequalities & Progressions.	3	1,5
CO3	Apply Venn diagrams and other applicable diagrams to solve questions in Syllogism, Logical Venn Diagrams, Cubes & Dice. Understand the principles used in forming Number & letter series, Number, letter & word Analogy, Odd man out, Coding & Decoding.	3	1,5
CO4	Understand the underlying assumptions in the arguments presented in the topics: Statements & conclusions, statements & Arguments (Critical Reasoning), statements & Assumptions, logical connectives, Binary logic.	2	1,5

Syllabus

Module 1	Simple Equations, Problem on Ages, Ratio & Proportion, Variation & Partnership, Percentages, Profit, Loss & Discounts, Simple & Compound Interest, Averages & Allegations or Mixtures.
Module 2	Numbers, Divisibility, Decimal Fractions, LCM & HCF, Simplification, Sequence, Series & Progressions, Linear Algebra, Quadratic Equations & Inequalities, Theory of Equations. Sets, Relations, Functions and Graphs, Surds & Indices, Logarithms

Module 3	Syllogism, Number & letter series, Number, letter & word Analogy, Odd man out, coding & decoding, Cubes & Dice, Logical Venn Diagrams, Ranking, Logical choice, Analytical reasoning
Module 4	Statements & conclusions, statements & Arguments (Critical Reasoning), statements & Assumptions, logical connectives, Binary logic, Statement - Courses of Action, Inferred meaning, Logical order

Reference Books:

Sl No	Title	Author(s)	Publisher	Year
1	Quantitative Aptitude	R S Aggarwal	S Chand	
2	A Modern Approach to Verbal Reasoning	R S Aggarwal	S Chand	

Global Certifications:

Mapped Global Certifications:

Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
1	NA	NA	NA	NA	NA	NA

Tools used in Practical / Skill:

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
1	NA	NA	NA

Evaluation Components:

Evaluation	Component	Weightage	Total
In-Sem Formative	ALM	10	20
	SKILLING CONTINUOUS EVALUATION	10	
In-Sem Summative	SKILL IN SEM	20	40
	SEM IN 1	10	
	SEM IN 2	10	
End-Sem Summative	SKILL SEM END EXAM	24	40
	END SEM EXAM (ONLINE MCQ)	16	

PROBLEM SOLVING & REASONING SKILLS-2 (PSRS-2)

COURSE CODE	22UC3209	MODE	R	LTPS	0-0-0-4	PRE-REQUISITE	PSRS-1
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Course Outcomes

CO#	CO Description	BTL	PO Mapping
CO1	Apply the concepts of Unitary method in solving problems in Time & Work, Chain Rule, Pipes & Cisterns. Apply the concept of Average speed and Relative speed to solve the problems related to Time, Speed & Distance, Trains, Boats & Streams, Races & games. Apply the concept of counting principles to solve the problems related to Permutations & Combinations and Probability.	3	1,5
CO2	Apply the concepts of Perimeter, Area, Surface Area & Volume to solve the problems in 2D & 3D Geometry. Apply the concepts of Trigonometry to solve problems related to Heights & Distances. Apply the concepts of Lines, Angles, Triangles, Quadrilaterals & Polygons to solve the problems related to Geometry, Analyzing the data given in the Table, Bar Graph, Pie Chart and Line Graph to solve the problems in Data Interpretation. Data Sufficiency, Statistics, Crypt arithmetic.	3	1,5
CO3	Apply the fundamental relationships and principles in solving questions in Blood Relations, Directions, Clocks, Calendars, Alphabet Test, Number, ranking & Time sequence test, Seating Arrangements, Mathematical Operations, Data Sufficiency, Nonverbal - series, analogy, classification.	3	1,5
CO4	Apply the conditions mentioned in the question statement to solve questions in Input & Output, Assertion and Reason, dot situation. embedded figures, figure matrix, mirror and water images, paper cutting, paper folding pattern completion, rule detection, flowcharts, Puzzles, Sudoku puzzles	3	1,5

Syllabus

Module 1	Time & Work, Chain Rule, Pipes & Cisterns, Time, Speed & Distance, Problems on Trains, Boats & Streams, Races & games, Permutations & Combinations, Combinatorics, Probability
Module 2	Areas & Perimeters, Mensuration, Trigonometry, Heights & Distances, Geometry, Coordinate Geometry, Data Interpretation, Data Sufficiency, Statistics, Simplification, Crypt arithmetic, Spatial Ability

Module 3	Blood Relations, Directions, clocks, calendars, Alphabet Test, Number, ranking & Time sequence test, Seating Arrangements, Mathematical Operations, Data Sufficiency, Nonverbal - series, analogy, classification, Team Formations, Rule detection
Module 4	Input & Output, Assertion and reason , dot situation, embedded figures, figure matrix, mirror and water images, paper cutting, paper folding pattern completion, rule detection, flowcharts, Logical Puzzles, Sudoku, Playing cards puzzles, Attention to details, Grouping of images, Shape construction, Game based puzzles (Gamification)

Reference Books:

Sl No	Title	Author(s)	Publisher	Year
1	Quantitative Aptitude	R S Aggarwal	S Chand	
2	A Modern Approach to Verbal Reasoning	R S Aggarwal	S Chand	

Global Certifications:

Mapped Global Certifications:						
Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
1	NA	NA	NA	NA	NA	NA

Tools used in Practical / Skill:

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
1	NA		

Evaluation Components:

Evaluation	Component	Weightage	Total
In-Sem Formative	ALM	10	20
	SKILLING CONTINUOUS EVALUATION	10	
In-Sem Summative	SKILL IN SEM	20	40
	SEM IN 1	10	
	SEM IN 2	10	
End-Sem Summative	SKILL SEM END EXAM	24	40
	END SEM EXAM (ONLINE MCQ)	16	

Indian knowledge System with Vedic Mathematics (INKSVM)

COURSE CODE	23UC0017	MODE	OFFLINE	LTPS	0-0-0-2	PRE-REQUISITE	NIL
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Course Outcomes

CO#	CO Description	BTL	PO/PSO Mapping
CO1	List all the 16 sutras in Vedic Mathematics, Using Vedic mathematics sutras to perform basic arithmetic operations and solve system of linear equations	2	PO1
CO2	Develop reasoning ,problem solving skills and critical thinking skills by using Shakuntala Devi Puzzles.	3	PO2

Syllabus

Module 1	the basics of 16 vedic sutras along with sub sutras and gain a knowledge about the indian knowledge system and the contribution of indian mathematicians to world,the usual multiplication by EkadhikenPurvena, to perform basic arithmetic operations(addition , division, subtraction, multiplication) of large numbers and able to solve system of linear equations of by Vedic methods Nikhilam NavatacharamamDasatah, Antyayoradaskaepi methods.
Module 2	Perform the reasoning and aptitude topic problems along with Shakuntala Devi Puzzles.

Reference Books:

Sl No	Title	Author(s)	Publisher	Year
1	A Modern Introduction to Ancient Indian Mathematics	S. K. Kapoor	LOTUS PRESS EDITION	
2	Vedic Mathematics Made Easy	DHAWAL BHATIYA	Jaico Publishing, New Delhi	
3	GENERAL APTITUDE AND REASONING	R S AGRWAL	SChand Publications	
4	Vedic Mathematics - Modern Research Methods	TIWARI P.	Cumpus Books International	

Mapped Global Certifications:

Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
1	Mathematics in India - From Vedic Period to Modern Time	NPTEL	Y	ONLINE	SWAYAM PORTAL	https://nptel.ac.in/courses/111101080
2	Reasoning = Computation	NPTEL	Y	ONLINE	SWAYAM PORTAL	https://www.youtube.com/watch?v=aDPu39j-mBY

Tools used in Practical / Skill:

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
	NA		

Evaluation Components:

Evaluation	Component	Weightage	Total
In-Sem Formative	CONTINUOUS EVALUATION	30	40
	ALM	10	
In-Sem Summative	LAB IN SEM-1	20	20
End-Sem Summative	QUESTION AND ANSWERS	40	40

GENDER AND SOCIAL EQUALITY (GSE)

COURSE CODE	22UC0011	MODE	OFFLINE	LTPS	2-0-0-0	PRE-REQUISITE	
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Course Outcomes

CO#	CO Description	BTL	PO Mapping
CO1	Students will have developed a better understanding of important issues related to gender in contemporary India	2	PO2
CO2	Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through group discussions.	3	PO4
CO3	Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.	4	PO6
CO4	Students will acquire insight into the gendered division of labour and its relation to politics and economics.	4	PO10

Syllabus

Module 1	UNDERSTANDING GENDER: Socialization: Making Women, Making Men, Preparing for Womanhood, Growing up Male, First lessons in Caste, Different Masculinities. GENDER AND BIOLOGY: Missing Women: Sex Selection and Its Consequences, Declining Sex Ratio. Demographic Consequences. Gender Spectrum: Beyond the Binary Two or Many? Struggles with Discrimination.
Module 2	GENDER AND LABOUR: Housework: The Invisible Labor, Women's work: Its politics and Economics, Fact and Fiction. Unrecognized and Unaccounted work. Additional Reading: Wages and Conditions of Work.
Module 3	ISSUES OF VIOLENCE: Sexual Harassment: Say No! Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment, Domestic Violence: Speaking Out, Is Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives. Additional Reading: New Forums for Justice. Thinking about Sexual Violence.
Module 4	GENDER: CO - EXISTENCE : Just Relationships: Being Together as Equals Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers.

Reference Books:

Sl No	Title	Author(s)	Publisher	Year
1	A World of Equals: A Textbook on Gender	<i>Edited by: Susie Tharu; A. Suneetha; Uma Maheswari Bhrugubanda</i>	Orient BlackSwan	
2	Seeing Like A Feminist	Menon Nivedita, Nivedita Menon	Penguin Zubaan	

3	Gender Sensitization: Issues and Challenges	Dr Raj Pal Singh, Dr Anupama Sihag	Raj Publications	
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Global Certifications:

Mapped Global Certifications:						
Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
1	Global Gender Policy Certificate	The George Washington University				https://elliott.gwu.edu/global-gender-policy

Tools used in Practical / Skill:

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
1	NA		

Evaluation Components:

Evaluation	Component	Weightage	Total
In-Sem Formative	ALM	10	20
	HOME ASSIGNMENTS	10	
In-Sem Summative	IN SEM-1	20	40
	IN SEM-2	20	
End-Sem Summative	END SEMESTER	40	40

INDIAN CONSTITUTION (IC)

COURSE CODE	22UC0008	MODE	R	LTPS	2-0-0-0	PRE-REQUISITE	Nil
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Course Outcomes

CO#	CO Description	BTL	PO Mapping
CO1	To acquire knowledge of the historical developments that culminated in the drafting of the Indian Constitution	2	PO6
CO2	To understand the basic features of the Indian Constitution	2	PO6
CO3	To understand the structure of the Federal Government as defined by the Indian Constitution	2	PO6
CO4	To understand the Indian Judicial System and Election System of India.	2	PO6

Syllabus

Module 1	Making of the Constitution: A brief analysis of National Movement, Constitutional Development with reference to Government of India Act 1909, 1919, 1935 and Indian Independence Act 1947
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Module 2	The Constituent Assembly of India. Basic features of the Indian Constitution and the Preamble, Fundamental Rights, Directive Principles of State Policy Fundamental Duties Government of the Union:
Module 3	The Union Executive – the President and the Vice-President – The Council of Ministers and the Prime Minister – Powers and functions The Union legislature – The Parliament – The Lok Sabha and the Rajya Sabha, Composition, powers and functions – the role of the Speaker. Government of the State: The Governor – the Council of Ministers and the Chief Minister Powers and Functions, The State Legislature – composition, powers and functions
Module 4	The Indian Judicial System: the Supreme Court and the High Court's – composition, Jurisdiction and functions. judicial review, Judicial activism, Independence of Judiciary In India. Election Commission: Role and Functioning, Chief Election Commissioner and Election Commissioners

Reference Books:

Sl No	Title	Author(s)	Publisher	Year
1	Indian Polity	Laxmikanth	McGraw Hill Edge	7th Edition
2	Indian Administration	Subhash Kashyap	NATIONAL BOOKS TRUST	2017
3	Constitution of India	Shukla V.N.	Eastern Book Company	2019
4	The Indian Constitution:	Granville Austin	Oxford	1999
5	Indian Constitutional Law'	M.P. Jain	Lexi Nexis	2018

Global Certifications:

Mapped Global Certifications:

Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
1	NA					

Tools used in Practical / Skill:

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
1	NA		

Evaluation Components:

Evaluation	Component	Weightage	Total
In-Sem Formative	ALM	10	20
	Home Assignment	10	
In-Sem Summative	Sem-in 1 (Online MCQ)	20	40
	Sem-in 2 (Online MCQ)	20	
End-Sem Summative	End Sem Exam (Online MCQ)	40	40

ECOLOGY & ENVIRONMENT (EE)

COURSE CODE	22UC0009	MODE	General	LTPS	2-0-0-0	PRE-REQUISITE	NIL
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Course Outcomes

CO#	CO Description	BTL	PO Mapping
CO1	Define to articulate basic understanding of the importance of Environmental education and conservation of natural resources. conservation of natural resources and Energy resources.	2	PO 7
CO2	Understand concepts of ecosystems and learn methods for conservation of habitats and biodiversity.	2	PO 7
CO3	Identify critically about individual roles in prevention of pollution. An Environmental Studies will be enabled to do independent research on human interactions with the environment.	2	PO 7
CO4	Recognize the knowledge on environmental legislation, disaster management and EIA process.	2	PO 6

Syllabus

Module 1	The Multidisciplinary nature of Environmental Studies: Introduction to Environment: Definition – scope – importance –Multidisciplinary nature of Environmental Studies, Need for public awareness. Institutions and people in Environment. Natural Resources: Renewable and Non-Renewable Resources: Forest resources: Uses –Deforestation–causes, effects and impacts, Afforestation Programmes-Socio-forestry, Agro-forestry, Vanasamrakshana programmes, Mining its impact on environment: mining, dams and their effects on forests and tribal people. . Water resources: Distribution of surface and ground water, Aquifers, – floods – drought – conflicts over water, dams - benefits and problems, Water conservation – rainwater harvesting – watershed management, Cloud seeding Mineral resources: Use – exploitation – environmental effects –. Food resources: Changes in agricultural methodologies, comparison between old and new methods of farming, Green Revolution, Environmental Impact Assessment of conversion of agricultural lands– effects of modern agriculture, Drip Irrigation – fertilizer-pesticide problems, Eutrophication, Vermicompost – waterlogging, Blue baby syndrome – Energy resources: Growing energy needs – renewable and non-renewable energy sources – Solar, wind, geothermal, tidal, bio energies . Land resources: Land as a resource – land degradation-. Soil erosion: Importance of soil, Types of soil erosion, Causes and effects of soil erosion. How to control soil erosion. Role of an individual in conservation of natural resources
Module 2	Ecosystems: Concept of an ecosystem: Structure and function of an ecosystem -Producers – consumers – decomposers with examples, Energy flow in the ecosystem – Ecological succession– Food chains – food webs and ecological pyramids. Types of ecosystems. characteristic features, structure and function of the following ecosystem a Forest ecosystem b. Grassland ecosystem c. Desert ecosystem e. Aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries). Biodiversity and its Conservation: Introduction – Introduction — Definition: genetic, species and ecosystem diversity. • Biogeographical

	classification of India • Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values Biodiversity at global, National, and local levels • India as a mega-diversity nation • Hotspots of biodiversity. • Threats to biodiversity: habitat loss, poaching of wildlife, man- wildlife conflicts. • Endangered and endemic species of India • Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.
Module 3	Environmental Pollution: Definition •Causes, effects and control measures of - a. Air pollution b. Water pollution c. Soil pollution d. Marine pollution. e. Noise pollution f. Thermal pollution g. Nuclear hazards • Solid waste Management Causes, effects and control measures of urban and industrial wastes. • Role of an individual in prevention of pollution. Pollution case studies. • Disaster management floods, earthquake, cyclone and landslides. Social Issues and the Environment • From Unsustainable to Sustainable development • Urban problems related to energy • Water conservation. rainwater harvesting, watershed management Resettlement and rehabilitation of people its problems and concerns. Case studies.
Module 4	Environmental ethics issues and possible solutions. Climate change. global warm acid rain, ozone layer depletion. nuclear accidents and holocaust. Case studies. Wasteland reclamation. •Environmental Protection Act, Air (Prevention and Control of Pollution) Act Water (Prevention and control of Pollution) Act • Wildlife Protection Act • Forest Conservation Act • Issues involved in enforcement of environmental legislation. • Public awareness. : Human Population and the Environment • Population growth, • Population explosion Family Welfare Programme. • Environment and human health. • Human Rights. Value Education. • HIV /AIDS. • Case Studies.

Reference Books:

Sl No	Title	Author(s)	Publisher	Year
1	Textbook of Environmental Studies	Erach Bharucha	Universities Press (India) Pvt Ltd	2010
2	Environmental Studies	Benny Joseph	Tata McGraw Hill	2009
3	Textbook of Environmental Studies	Deeksha Deve and S.S. Kateswa	Cengage learning India pvt ltd	2009
4	Environmental Studies	Anubha Kaushik, C.P. Kaushik	New Age International	2007

Global Certifications:

Mapped Global Certifications:

Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
1	NA	NA	NA	NA	NA	NA

Tools used in Practical / Skill:

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
1	NA	NA	NA

Evaluation Components:

Evaluation	Component	Weightage	Total
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In-Sem Formative	Active Learning	10	25
	Home Assignment & Textbook	10	
	Attendance	5	
In-Sem Summative	In-Sem 1	17.5	35
	In-Sem 2	17.5	
End-Sem Summative	End-Sem Exam (Paper Based)	40	40

ESSENCE OF INDIAN KNOWLEDGE TRADITION (EIKC)

COURSE CODE	23UC0019	MODE	R	LTPS	2-0-0-0	PRE-REQUISITE	NIL
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Course Outcomes

CO#	CO Description	BTL	PO Mapping
CO1	To understand the concepts of Indian traditional knowledge	2	PO1
CO2	To develop the outstanding knowledge on Indian administration	2	PO1
CO3	To understand the importance of traditional culture and knowledge	2	PO1
CO4	To know the impact of western culture on Indian society	2	PO1

Syllabus

Module 1	Indian Knowledge System – An Introduction Number System and Units of Measurements Mathematics, Astronomy Concept of Culture- Culture and Civilization- General Characteristics of Indian culture Importance of Culture-Unity in Diversity
Module 2	Evolution of Indian Administration Arthashastra and Kautilya Sapthanga theory Traditions and Culture through the Ages
Module 3	Fundamental Unity of Harappa and Vedic Culture Jainism and Buddhism Mauryan Period Gupta Period-Pallavas and Cholas, Vijayanagar Period-Art Architecture and Literature
Module 4	Rise of the West and its impact on India- Social and Religious reformers in the 18th and 19th centuries- Press and growth of modern Indian literature- Rise of Indian Cinema-Indian Independence

Reference Books:

Sl No	Title	Author(s)	Publisher	Year
1	Indian heritage, culture, Art and Culture	Madhukumar Bhagat	GKP Publishers	2019
2	Traditional Knowledge System in India,	Amit Jha,	Springer	2009.

Global Certifications:

Mapped Global Certifications:						
Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
1		SWAYAM	Y		NPTEL	https://onlinecourses.swayam2.ac.in/imb23_mg53/preview

Tools used in Practical / Skill:

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
1	NA		

Evaluation Components:

Evaluation	Component	Weightage	Total
In-Sem Formative	ALM	10	20
	HA	10	
In-Sem Summative	TEST 1-MCQ	20	40
	TEST 2-MCQ	20	
End-Sem Summative	END SEM-MCQ	40	40

Indian knowledge System with Vedic Mathematics (INKSVM)

COURSE CODE	23UC0017	MODE	OFFLINE	LTPS	0-0-0-2	PRE-REQUISITE	NIL
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Course Outcomes

CO#	CO Description	BTL	PO/PSO Mapping
CO1	List all the 16 sutras in Vedic Mathematics, Using Vedic mathematics sutras to perform basic arithmetic operations and solve system of linear equations	2	PO1
CO2	Develop reasoning ,problem solving skills and critical thinking skills by using Shakuntala Devi Puzzles.	3	PO2

Syllabus

Module 1	the basics of 16 vedic sutras along with sub sutras and gain a knowledge about the indian knowledge system and the contribution of indian mathematicians to world, the usual multiplication by Ekadhikena Purvena, to perform basic arithmetic operations (addition, division, subtraction, multiplication) of large numbers and able to solve system of linear equations of by Vedic methods Nikhilam Navatasharamam Dasatah, Antyayoradaskaapi methods.
Module 2	Perform the reasoning and aptitude topic problems along with Shakuntala Devi Puzzles.

Reference Books:

Sl No	Title	Author(s)	Publisher	Year
1	A Modern Introduction to Ancient Indian Mathematics	S. K. Kapoor	LOTUS PRESS EDITION	
2	Vedic Mathematics Made Easy	DHAWAL BHATIYA	Jaico Publishing, New Delhi	
3	GENERAL APTITUDE AND REASONING	R S AGRWAL	SChand Publications	
4	Vedic Mathematics - Modern Research Methods	TIWARI P.	Campus Books International	

Mapped Global Certifications:

Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
1	Mathematics in India - From Vedic Period to Modern Time	NPTEL	Y	ONLINE	SWAYAM PORTAL	https://nptel.ac.in/courses/111101080
2	Reasoning = Computation	NPTEL	Y	ONLINE	SWAYAM PORTAL	https://www.youtube.com/watch?v=aDPu39j-mBY

Tools used in Practical / Skill:

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
	NA		

Evaluation Components:

Evaluation	Component	Weightage	Total
In-Sem Formative	CONTINUOUS EVALUATION	30	40
	ALM	10	
In-Sem Summative	LAB IN SEM-1	20	20
End-Sem Summative	QUESTION AND ANSWERS	40	40

GENDER AND SOCIAL EQUALITY (GSE)

COURSE CODE	22UC0011	MODE	OFFLINE	LTPS	2-0-0-0	PRE-REQUISITE	
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Course Outcomes

CO#	CO Description	BTL	PO Mapping
CO1	Students will have developed a better understanding of important issues related to gender in contemporary India	2	PO2
CO2	Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through group discussions.	3	PO4
CO3	Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.	4	PO6
CO4	Students will acquire insight into the gendered division of labour and its relation to politics and economics.	4	PO10

Syllabus

Module 1	UNDERSTANDING GENDER: Socialization: Making Women, Making Men, Preparing for Womanhood, Growing up Male, First lessons in Caste, Different Masculinities. GENDER AND BIOLOGY: Missing Women: Sex Selection and Its Consequences, Declining Sex Ratio. Demographic Consequences. Gender Spectrum: Beyond the Binary Two or Many? Struggles with Discrimination.
Module 2	GENDER AND LABOUR: Housework: The Invisible Labor, Women's work: Its politics and Economics, Fact and Fiction. Unrecognized and Unaccounted work. Additional Reading: Wages and Conditions of Work.
Module 3	ISSUES OF VIOLENCE: Sexual Harassment: Say No! Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment, Domestic Violence: Speaking Out, Is Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives. Additional Reading: New Forums for Justice. Thinking about Sexual Violence.
Module 4	GENDER: CO - EXISTENCE : Just Relationships: Being Together as Equals Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers.

Reference Books:

Sl No	Title	Author(s)	Publisher	Year
1	A World of Equals: A Textbook on Gender	<i>Edited by: Susie Tharu; A. Suneetha; Uma Maheswari Bhrugubanda</i>	Orient BlackSwan	
2	Seeing Like A Feminist	Menon Nivedita, Nivedita Menon	Penguin Zubaan	

3	Gender Sensitization: Issues and Challenges	Dr Raj Pal Singh, Dr Anupama Sihag	Raj Publications	
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Global Certifications:

Mapped Global Certifications:						
Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
1	Global Gender Policy Certificate	The George Washington University				https://elliott.gwu.edu/global-gender-policy

Tools used in Practical / Skill:

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
1	NA		

Evaluation Components:

Evaluation	Component	Weightage	Total
In-Sem Formative	ALM	10	20
	HOME ASSIGNMENTS	10	
In-Sem Summative	IN SEM-1	20	40
	IN SEM-2	20	
End-Sem Summative	END SEMESTER	40	40

INDIAN CONSTITUTION (IC)

COURSE CODE	22UC0008	MODE	R	LTPS	2-0-0-0	PRE-REQUISITE	Nil
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Course Outcomes

CO#	CO Description	BTL	PO Mapping
CO1	To acquire knowledge of the historical developments that culminated in the drafting of the Indian Constitution	2	PO6
CO2	To understand the basic features of the Indian Constitution	2	PO6
CO3	To understand the structure of the Federal Government as defined by the Indian Constitution	2	PO6
CO4	To understand the Indian Judicial System and Election System of India.	2	PO6

Syllabus

Module 1	Making of the Constitution: A brief analysis of National Movement, Constitutional Development with reference to Government of India Act 1909, 1919, 1935 and Indian Independence Act 1947
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Module 2	The Constituent Assembly of India. Basic features of the Indian Constitution and the Preamble, Fundamental Rights, Directive Principles of State Policy Fundamental Duties Government of the Union:
Module 3	The Union Executive – the President and the Vice-President – The Council of Ministers and the Prime Minister – Powers and functions The Union legislature – The Parliament – The Lok Sabha and the Rajya Sabha, Composition, powers and functions – the role of the Speaker. Government of the State: The Governor – the Council of Ministers and the Chief Minister Powers and Functions, The State Legislature – composition, powers and functions
Module 4	The Indian Judicial System: the Supreme Court and the High Court's – composition, Jurisdiction and functions. judicial review, Judicial activism, Independence of Judiciary In India. Election Commission: Role and Functioning, Chief Election Commissioner and Election Commissioners

Reference Books:

Sl No	Title	Author(s)	Publisher	Year
1	Indian Polity	Laxmikanth	McGraw Hill Edge	7th Edition
2	Indian Administration	Subhash Kashyap	NATIONAL BOOKS TRUST	2017
3	Constitution of India	Shukla V.N.	Eastern Book Company	2019
4	The Indian Constitution:	Granville Austin	Oxford	1999
5	Indian Constitutional Law'	M.P. Jain	Lexi Nexis	2018

Global Certifications:

Mapped Global Certifications:

Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
1	NA					

Tools used in Practical / Skill:

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
1	NA		

Evaluation Components:

Evaluation	Component	Weightage	Total
In-Sem Formative	ALM	10	20
	Home Assignment	10	
In-Sem Summative	Sem-in 1 (Online MCQ)	20	40
	Sem-in 2 (Online MCQ)	20	
End-Sem Summative	End Sem Exam (Online MCQ)	40	40

ECOLOGY & ENVIRONMENT (EE)

COURSE CODE	22UC0009	MODE	General	LTPS	2-0-0-0	PRE-REQUISITE	NIL
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Course Outcomes

CO#	CO Description	BTL	PO Mapping
CO1	Define to articulate basic understanding of the importance of Environmental education and conservation of natural resources. conservation of natural resources and Energy resources.	2	PO 7
CO2	Understand concepts of ecosystems and learn methods for conservation of habitats and biodiversity.	2	PO 7
CO3	Identify critically about individual roles in prevention of pollution. An Environmental Studies will be enabled to do independent research on human interactions with the environment.	2	PO 7
CO4	Recognize the knowledge on environmental legislation, disaster management and EIA process.	2	PO 6

Syllabus

Module 1	The Multidisciplinary nature of Environmental Studies: Introduction to Environment: Definition – scope – importance –Multidisciplinary nature of Environmental Studies, Need for public awareness. Institutions and people in Environment. Natural Resources: Renewable and Non-Renewable Resources: Forest resources: Uses –Deforestation–causes, effects and impacts, Afforestation Programmes-Socio-forestry, Agro-forestry, Vanasamrakshana programmes, Mining its impact on environment: mining, dams and their effects on forests and tribal people. . Water resources: Distribution of surface and ground water, Aquifers, – floods – drought – conflicts over water, dams - benefits and problems, Water conservation – rainwater harvesting – watershed management, Cloud seeding Mineral resources: Use – exploitation – environmental effects –. Food resources: Changes in agricultural methodologies, comparison between old and new methods of farming, Green Revolution, Environmental Impact Assessment of conversion of agricultural lands– effects of modern agriculture, Drip Irrigation – fertilizer-pesticide problems, Eutrophication, Vermicompost – waterlogging, Blue baby syndrome – Energy resources: Growing energy needs – renewable and non-renewable energy sources – Solar, wind, geothermal, tidal, bio energies . Land resources: Land as a resource – land degradation-. Soil erosion: Importance of soil, Types of soil erosion, Causes and effects of soil erosion. How to control soil erosion. Role of an individual in conservation of natural resources
Module 2	Ecosystems: Concept of an ecosystem: Structure and function of an ecosystem -Producers – consumers – decomposers with examples, Energy flow in the ecosystem – Ecological succession– Food chains – food webs and ecological pyramids. Types of ecosystems. characteristic features, structure and function of the following ecosystem a Forest ecosystem b. Grassland ecosystem c. Desert ecosystem e. Aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries). Biodiversity and its Conservation: Introduction – Introduction — Definition: genetic, species and ecosystem diversity. • Biogeographical

	classification of India • Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values Biodiversity at global, National, and local levels • India as a mega-diversity nation • Hotspots of biodiversity. • Threats to biodiversity: habitat loss, poaching of wildlife, man- wildlife conflicts. • Endangered and endemic species of India • Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.
Module 3	Environmental Pollution: Definition • Causes, effects and control measures of - a. Air pollution b. Water pollution c. Soil pollution d. Marine pollution. e. Noise pollution f. Thermal pollution g. Nuclear hazards • Solid waste Management Causes, effects and control measures of urban and industrial wastes. • Role of an individual in prevention of pollution. Pollution case studies. • Disaster management floods, earthquake, cyclone and landslides. Social Issues and the Environment • From Unsustainable to Sustainable development • Urban problems related to energy • Water conservation. rainwater harvesting, watershed management Resettlement and rehabilitation of people its problems and concerns. Case studies.
Module 4	Environmental ethics issues and possible solutions. Climate change. global warm acid rain, ozone layer depletion. nuclear accidents and holocaust. Case studies. Wasteland reclamation. • Environmental Protection Act, Air (Prevention and Control of Pollution) Act Water (Prevention and control of Pollution) Act • Wildlife Protection Act • Forest Conservation Act • Issues involved in enforcement of environmental legislation. • Public awareness. : Human Population and the Environment • Population growth, • Population explosion Family Welfare Programme. • Environment and human health. • Human Rights. Value Education. • HIV /AIDS. • Case Studies.

Reference Books:

Sl No	Title	Author(s)	Publisher	Year
1	Textbook of Environmental Studies	Erach Bharucha	Universities Press (India) Pvt Ltd	2010
2	Environmental Studies	Benny Joseph	Tata McGraw Hill	2009
3	Textbook of Environmental Studies	Deeksha Deve and S.S. Kateswa	Cengage learning India pvt ltd	2009
4	Environmental Studies	Anubha Kaushik, C.P. Kaushik	New Age International	2007

Global Certifications:

Mapped Global Certifications:

Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
1	NA	NA	NA	NA	NA	NA

Tools used in Practical / Skill:

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
1	NA	NA	NA

Evaluation Components:

Evaluation	Component	Weightage	Total
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In-Sem Formative	Active Learning	10	25
	Home Assignment & Textbook	10	
	Attendance	5	
In-Sem Summative	In-Sem 1	17.5	35
	In-Sem 2	17.5	
End-Sem Summative	End-Sem Exam (Paper Based)	40	40

ESSENCE OF INDIAN KNOWLEDGE TRADITION (EIKC)

COURSE CODE	23UC0019	MODE	R	LTPS	2-0-0-0	PRE-REQUISITE	NIL
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Course Outcomes

CO#	CO Description	BTL	PO Mapping
CO1	To understand the concepts of Indian traditional knowledge	2	PO1
CO2	To develop the outstanding knowledge on Indian administration	2	PO1
CO3	To understand the importance of traditional culture and knowledge	2	PO1
CO4	To know the impact of western culture on Indian society	2	PO1

Syllabus

Module 1	Indian Knowledge System – An Introduction Number System and Units of Measurements Mathematics, Astronomy Concept of Culture- Culture and Civilization- General Characteristics of Indian culture Importance of Culture-Unity in Diversity
Module 2	Evolution of Indian Administration Arthashastra and Kautilya Sapthanga theory Traditions and Culture through the Ages
Module 3	Fundamental Unity of Harappa and Vedic Culture Jainism and Buddhism Mauryan Period Gupta Period-Pallavas and Cholas, Vijayanagar Period-Art Architecture and Literature
Module 4	Rise of the West and its impact on India- Social and Religious reformers in the 18th and 19th centuries- Press and growth of modern Indian literature- Rise of Indian Cinema-Indian Independence

Reference Books:

Sl No	Title	Author(s)	Publisher	Year
1	Indian heritage, culture, Art and Culture	Madhukumar Bhagat	GKP Publishers	2019
2	Traditional Knowledge System in India,	Amit Jha,	Springer	2009.

Global Certifications:

Mapped Global Certifications:						
Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
1		SWAYAM	Y		NPTEL	https://onlinecourses.swayam2.ac.in/imb23_mg53/preview

Tools used in Practical / Skill:

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
1	NA		

Evaluation Components:

Evaluation	Component	Weightage	Total
In-Sem Formative	ALM	10	20
	HA	10	
In-Sem Summative	TEST 1-MCQ	20	40
	TEST 2-MCQ	20	
End-Sem Summative	END SEM-MCQ	40	40

SOLID AND HAZARDOUS WASTE MANAGEMENT (SHWM)

COURSE CODE	23CE40A3	MODE	Regular	LTPS	3-0-0-0	PRE-REQUISITE	NIL
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Course Outcomes

CO#	CO Description	BTL	PO/PSO Mapping
CO1	Understand the importance types, sources and disposal methods of Solid waste.	2	PO1, PO7, PSO2
CO2	Summarize the importance of conversion and recycling of waste	2	PO1, PO7, PSO2
CO3	Associate about types, Sources of Hazardous waste	2	PO1, PO7, PSO2
CO4	Discuss the disposal and treatment methods of Hazardous waste	2	PO1, PO7, PSO2

Syllabus

Module 1	Solid wastes: Sources, Types, reasons for increase in generation, composition and properties of solid waste , Collection and on-site handling , Separation and processing. Solid waste disposal methods, Land filling,
Module 2	Methods of land filling, Design of Landfills, gas production, Leachate and its control. Conversion and recovery :Incineration, Pyrolysis, Composting methods, merits and demerits, Energy recovery, Biomethanation, use of refuse derived fuels (RDF).
Module 3	Hazardous Waste: Definition, Sources, Classification, Hazardous wastes rules, and Nuclear waste, Biomedical wastes, Chemical wastes,
Module 4	Conversion and recovery : Disposal methods, Waste minimization. Treatment methods, Physico-chemical processes, Biological methods, Stabilization and Solidification, Thermal methods, Disposal methods Land disposal. Remedial technologies.

Reference Books:

Sl No	Title	Author(s)	Publisher	Year
1	Solid waste Engineering	P.Aarne Vesilind, William Worrell and Debra Reinhart	Cengage Learning India Private Limited, New Delhi	2004
2	Solid and hazardous waste management	M.N.Rao and Razia Sultana	BS Publications, Hyderabad	2000
3	MoEF (2000)	Municipal Waste Management and Handling Rules	Govt. of India	2000
4	CPCB (2001)	Criteria for Hazardous waste Landfill	Govt. of India	2001
5	Solid waste management and Engineered Landfills	Venkatappa Rao. G and Sasidhar. R.S.	Sai Master Geoenvironmental Services Pvt.Ltd, Hyderabad	2009

Global Certifications:

Mapped Global Certifications:						
Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
1	Ansys Associate Certification in Landfill design	Ansys	Y	Online	Ansys	https://certifications.ansys.com/courses/basics-of-fluid-dynamics-associate-certification/

Tools used in Practical / Skill:

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
1	NO Practical	-----	----

Evaluation Components:

Evaluation	Component	Weightage	Total
In-Sem Formative	ALMs	10	20
	Home Assignment and Book. (Min. 4 Assignments etc.)	10	
In-Sem Summative	In-Sem Exam-I	20	40
	In-Sem Exam-II	20	
End-Sem Summative	End Semester Exam	40	40

ENVIRONMENTAL POLLUTION CONTROL METHODS(EPCM)

COURSE CODE	23CE40A2	MODE	Regular	LTPS	3-0-0-0	PRE-REQUISITE	NIL
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Course Outcomes

CO#	CO Description	BTL	PO/PSO Mapping
CO1	Understand the causes, effects and control methods of air pollution	2	PO1, PO7, PSO2
CO2	Discuss the sources and effects of water pollution and control methods.	2	PO1, PO7, PSO2
CO3	Understand the sources, effects and treatment method of waste water and Noise pollution	2	PO1, PO7, PSO2
CO4	Applying the design criteria to construction of landfills	2	PO1, PO7, PSO2

Syllabus

Module 1	Air pollution: Sources, Types, and effects and Fate of air pollutants. Meteorological factors and their impacts on pollutants dispersal. Sampling and measurement of air pollutants. Air quality standards. Air pollution control methods for particulates and gaseous pollutants. Emission Control equipments for particulate and gaseous matter.
Module 2	Water pollution: Sources, Types and Effects of Water pollutants. Measurement of pollution loads: DO, BOD, COD, TOC - Water quality and Effluent discharge standards.
Module 3	Role of Microorganisms in wastewater treatment. Bacterial population dynamics- growth kinetics. Pretreatment, primary treatment, secondary and tertiary treatment of wastewater. Low cost treatment unit processes. Human acoustics, Sound and its general features- Noise and its measurement - Noise pollution hazards -Control methods.
Module 4	Solid waste: Sources and types of Solid wastes – Disposal methods: Land filling - Composting - Incineration – Pyrolysis. Reclamation of polluted and degraded soil by Bioremediation- Phyto-remediation.

Reference Books:

Sl No	Title	Author(s)	Publisher	Year
1	Environmental Pollution Control Engineering	C.S.Rao	New Age International (P)Limited Publishers, New Delhi.	2016
2	Environmental Engineering	Howard S. Peavy, Donald R. Rowe and George Tchobanoglous	BS Publications, Hyderabad	2021
3	Sewage Disposal And Air pollution Engineering	S.K. Garg	Mc Graw-Hill International Editions, NewYork.	2020
4	Waste water Engineering	M.N Rao and A.K Dutta	Oxford & IBH Publishing Co.Ltd	2001
5	Air Pollution	M.N Rao and H.V.N Rao	Sai Master Geoenvironmental Services Pvt.Ltd, Hyderabad	2009

Global Certifications:

Mapped Global Certifications:

Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
1	Ansys Associate Certification in Landfill design	Ansys	Y	Online	Ansys	https://certifications.ansys.com/courses/basics-of-fluid-dynamics-associate-certification/

Tools used in Practical / Skill:

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
1	NO Practical	-----	----

Evaluation Components:

Evaluation	Component	Weightage	Total
In-Sem Formative	ALMs	10	20
	Home Assignment and Book. (Min. 4 Assignments etc.)	10	
In-Sem Summative	In-Sem Exam-I	20	40
	In-Sem Exam-II	20	
End-Sem Summative	End Semester Exam	40	40

SOLID AND HAZARDOUS WASTE MANAGEMENT (SHWM)

COURSE CODE	23CE40A3	MODE	Regular	LTPS	3-0-0-0	PRE-REQUISITE	NIL
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Course Outcomes

CO#	CO Description	BTL	PO/PSO Mapping
CO1	Understand the importance types, sources and disposal methods of Solid waste.	2	PO1, PO7, PSO2
CO2	Summarize the importance of conversion and recycling of waste	2	PO1, PO7, PSO2
CO3	Associate about types, Sources of Hazardous waste	2	PO1, PO7, PSO2
CO4	Discuss the disposal and treatment methods of Hazardous waste	2	PO1, PO7, PSO2

Syllabus

Module 1	Solid wastes: Sources, Types, reasons for increase in generation, composition and properties of solid waste , Collection and on-site handling , Separation and processing. Solid waste disposal methods, Land filling,
Module 2	Methods of land filling, Design of Landfills, gas production, Leachate and its control. Conversion and recovery :Incineration, Pyrolysis, Composting methods, merits and demerits, Energy recovery, Biomethanation, use of refuse derived fuels (RDF).
Module 3	Hazardous Waste: Definition, Sources, Classification, Hazardous wastes rules, and Nuclear waste, Biomedical wastes, Chemical wastes,
Module 4	Conversion and recovery : Disposal methods, Waste minimization. Treatment methods, Physico-chemical processes, Biological methods, Stabilization and Solidification, Thermal methods, Disposal methods Land disposal. Remedial technologies.

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1	Solid waste Engineering	P.Aarne Vesilind, William Worrell and Debra Reinhart	Cengage Learning India Private Limited, New Delhi	2004
2	Solid and hazardous waste management	M.N.Rao and Razia Sultana	BS Publications, Hyderabad	2000
3	MoEF (2000)	Municipal Waste Management and Handling Rules	Govt. of India	2000
4	CPCB (2001)	Criteria for Hazardous waste Landfill	Govt. of India	2001
5	Solid waste management and Engineered Landfills	Venkatappa Rao. G and Sasidhar. R.S.	Sai Master Geoenvironmental Services Pvt.Ltd, Hyderabad	2009

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Tools used in Practical / Skill:

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
1	NO Practical	-----	----

Evaluation Components:

Evaluation	Component	Weightage	Total
In-Sem Formative	ALMs	10	20
	Home Assignment and Book. (Min. 4 Assignments etc.)	10	
In-Sem Summative	In-Sem Exam-I	20	40
	In-Sem Exam-II	20	
End-Sem Summative	End Semester Exam	40	40

ENVIRONMENTAL POLLUTION CONTROL METHODS(EPCM)

COURSE CODE	23CE40A2	MODE	Regular	LTPS	3-0-0-0	PRE-REQUISITE	NIL
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Course Outcomes

CO#	CO Description	BTL	PO/PSO Mapping
CO1	Understand the causes, effects and control methods of air pollution	2	PO1, PO7, PSO2
CO2	Discuss the sources and effects of water pollution and control methods.	2	PO1, PO7, PSO2
CO3	Understand the sources, effects and treatment method of waste water and Noise pollution	2	PO1, PO7, PSO2
CO4	Applying the design criteria to construction of landfills	2	PO1, PO7, PSO2

Syllabus

Module 1	Air pollution: Sources, Types, and effects and Fate of air pollutants. Meteorological factors and their impacts on pollutants dispersal. Sampling and measurement of air pollutants. Air quality standards. Air pollution control methods for particulates and gaseous pollutants. Emission Control equipments for particulate and gaseous matter.
Module 2	Water pollution: Sources, Types and Effects of Water pollutants. Measurement of pollution loads: DO, BOD, COD, TOC - Water quality and Effluent discharge standards.
Module 3	Role of Microorganisms in wastewater treatment. Bacterial population dynamics- growth kinetics. Pretreatment, primary treatment, secondary and tertiary treatment of wastewater. Low cost treatment unit processes. Human acoustics, Sound and its general features- Noise and its measurement - Noise pollution hazards -Control methods.
Module 4	Solid waste: Sources and types of Solid wastes – Disposal methods: Land filling - Composting - Incineration – Pyrolysis. Reclamation of polluted and degraded soil by Bioremediation- Phyto-remediation.

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2	Environmental Engineering	Howard S. Peavy, Donald R. Rowe and George Tchobanoglous	BS Publications, Hyderabad	2021
3	Sewage Disposal And Air pollution Engineering	S.K. Garg	Mc Graw-Hill International Editions, NewYork.	2020
4	Waste water Engineering	M.N Rao and A.K Dutta	Oxford & IBH Publishing Co.Ltd	2001
5	Air Pollution	M.N Rao and H.V.N Rao	Sai Master Geoenvironmental Services Pvt.Ltd, Hyderabad	2009

Global Certifications:

Mapped Global Certifications:

Sl No	Title	Certification Provider	Proctored (Y/N)	Format of the Exam	Exam Provider	URL of the Certification
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Tools used in Practical / Skill:

Sl No	Tool Name	Parent Industry	Open Source/ Commercial
1	NO Practical	-----	----

Evaluation Components:

Evaluation	Component	Weightage	Total
In-Sem Formative	ALMs	10	20
	Home Assignment and Book. (Min. 4 Assignments etc.)	10	
In-Sem Summative	In-Sem Exam-I	20	40
	In-Sem Exam-II	20	
End-Sem Summative	End Semester Exam	40	40

