



Three- Year Undergraduate Programme

Bachelor of Science

Environmental Science

Faculty of Applied Sciences

Parul University

Vadodara, Gujarat, India

Faculty of Applied Sciences

Bachelor of Science in Environmental Science

1. Vision

The vision of an Environmental Science department typically revolves around understanding, preserving, and improving the health of the planet and its ecosystems and promoting sustainable development by conducting research and implementing practices that balance environmental, social, and economic needs.

2. Mission of the Department

M1	Working towards the preservation and protection of natural ecosystems, biodiversity, and endangered species.
M2	Promoting the sustainable use of natural resources such as water, soil, air, and energy to ensure their availability for future generations.
M3	Conducting scientific research to enhance our understanding of environmental processes, pollution sources, and the impacts of human activities on the environment.
M4	Organizing training programs for farmers, milk producers & unemployed youth.
M5	Studying climate change impacts, developing strategies to mitigate its effects, and promoting adaptation measures to cope with changing environmental conditions.

3. Program Educational Objectives

The statements below indicate the career and professional achievements that the B.Sc. Environmental Science curriculum enables graduates to attain:

PEO 1	Application of fundamental principles of environmental science to analyze and solve complex environmental issues. This includes demonstrating proficiency in research methodologies, data collection, and critical thinking skills to address real-world environmental challenges.
PEO 2	Implementation of sustainable practices in their professional careers. This involves understanding the ecological, social, and economic dimensions of sustainability and applying this knowledge to make informed decisions that minimize environmental impact while promoting long-term well-being.
PEO 3	Recognizing and addressing ethical considerations in environmental decision-making, maintaining integrity in research and reporting, and promoting responsible environmental stewardship.

PEO 4	Recognize the dynamic nature of environmental science and commit to continuous learning. This includes staying abreast of new developments, technologies, and research in the field, and actively seeking professional development opportunities to enhance their knowledge and skills throughout their careers.
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4. Program Learning Outcomes

Program Learning outcomes are statements conveying the intent of a program of study.

PLO 1	Knowledge	Utilize foundational scientific principles to address intricate challenges through diverse solutions.
PLO 2	Problem Analysis	Evaluate and interpret experimental results, drawing conclusions based on acquired data, while also identifying, formulating, and analyzing scientific problems to arrive at solutions using diverse scientific principles.
PLO 3	Designing Solutions	Develop solutions and execute experiments that showcase their comprehension of the methods and processes involved.
PLO 4	Modern tool usage	Create, select, and apply appropriate techniques, resources and IT tools in the analysis and synthesis of data within limitations.
PLO 5	Communication Development	Skilled at clear communication through both written and oral formats, capable of explaining complex concepts in understandable terms, learners will effectively engage with the scientific community and society on scientific matters.
PLO 6	Employability	Considering our learners' diverse career goals, including scientific, technical, and quantitative roles, the institution informs them about relevant job opportunities through the Placement cell, offering skill enhancement and value-added courses in addition to science subjects to give them a competitive advantage in the job market.
PLO 7	Ethics	Cultivate a sense of healthy competition among students while also nurturing a strong ethical foundation, including an appreciation for scientific principles and their impact on societal, economic, and environmental issues, understand and practice ethical values in both professional and personal spheres, contributing to a responsible society.
PLO 8	Environment and Sustainability	Understand the impact of scientific solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.
PLO 9	Soft-Skill Development	Develop soft skills like leadership, teamwork, and effective communication to excel in various roles and contribute to societal progress, enhancing academic, professional, and

		personal growth for self-improvement and collective advancement.
PLO 10	Science and Society	Apply logical thinking, knowledge, and skills in designing solutions for societal issues, including health, safety, and scientific responsibilities.
PLO 11	Life-long learning	Encouraging learners to seek knowledge for personal or professional growth includes promoting volunteering, self-motivation, societal values, and lifelong learning for enhanced competitiveness and employability amidst technological advancements.
PLO 12	Data Analysis and Interpretation	Analyzing and interpreting scientific data, drawing meaningful conclusions, and communicating results effectively.

5. Program Specific Learning Outcomes

PSO 1	Recent research trends	Demonstrate advanced skills in employing quantitative and qualitative research methods, data collection, analysis, and synthesis, with an emphasis on addressing real-world environmental challenges.
PSO 2	Evaluation and Analysis	Adopt collaborating with professionals from diverse fields to develop holistic and sustainable solutions.

6. Credit Framework

Semester wise Credit distribution of the programme	
Semester-1	22
Semester-2	22
Semester-3	22
Semester-4	22
Semester-5	22
Semester-6	22
Total Credits:	132

Category wise Credit distribution of the programme	
Category	Credit
Major Core	88
Minor Stream	0
Multidisciplinary	12
Ability Enhancement Course	10
Skill Enhancement Courses	10
Value added Courses	8
Summer Internship	4
Total Credits:	132

7. Program Curriculum

Semester 1						
Sr. No.	Subject Code	Subject Name	Credit	Lect	Lab	Tut

1	11011401DS01	Principles of Environment	4	4	-	-
2	11011401DS02	Environmental Chemistry	2	2	-	-
3	11011401DS03	Ecology: Theory & Practice	2	2	-	-
4	11011401DS04	Lab 1-Environmental Water Chemistry	2	-	4	-
5	11011401DS05	Lab 2-Ecological Analysis	2	-	4	-
6	11011401VA01	Climate Change & Sustainable Environment	2	2	-	-
7	11011401SE01	SEC-1 Water Budgeting & Auditing	2	2	-	-
8	00019301AE01/ 00019301AE02/ 00019301AE03	AEC-1 (MIL-1) Basic of English-1/ Basic of Hindi-1/ Basic of Gujarati-1	2	2	-	-
9	University Electives					
	05010101UE01	Office Automation	4	3	2	-
	09010101UE01	First aid and life support		3	2	-
	18010201UE01	Basic Photography		2	4	-
	03010901UE01	Introduction to MATLAB programming		3	2	-
Total			22	18	8	0
Semester 2						
Sr. No.	Subject Code	Subject Name	Credit	Lect	Lab	Tut
10	11011402DS06	Principles of Earth Science	4	4	0	-
11	11011402DS07	Environmental Biology	4	4	-	-
12	11011402DS08	Lab 1-Earth Science	2	-	4	-
13	11011402DS09	Lab 2- Environmental Biology	2	-	4	-
14	00019102SE01	SEC-2 (Mathematical Aptitude)	2	2	-	-
15	00019302VA01	VAC-2 (IPDC including history and culture of India and IKS-I)	2	2	-	-
16	03010602UE01/ 15010402UE01/ 19010002UE01/ 19010202UE01	Maintenance of Household Apparatus/ Human Psychology/ Digital Health/ Public Health Nutrition	4	4	-	-

17	00019302AE04/ 00019302AE05/ 00019302AE06	AEC-2 (MIL-2) Basic of English-2/Basic of Hindi- 2/Basic of Gujarati-2	2	2	-	-
Total			22	18	8	0
Semester 3						
Sr. No.	Subject Code	Subject Name	Credit	Lect	Lab	Tut
18	11011403DS01	Biodiversity & Conservation	4	4	-	-
19	11011403DS02	Environmental Resources & Management	4	4	-	-
20	11011403DS03	Lab 1-Biodiversity	2	-	4	-
21	11011403DS04	Lab 2-Environmental Resources	2	-	4	-
22	00019303AE01/ 00019303AE02/ 00019303AE03	AEC- III (MIL-3) Advanced English- I Basic German Basic French	2	2	-	-
23	00019303VA01	VAC-3 (IPDC including history and culture of India and IKS - 2)	2	2	-	-
24	03010503SE01	SEC-3 (AI/ Web Development and Design)	2	2	-	-
25	05010103UE01/ 06010103UE02/ 21010101UE02/ 16010103UE01	University Elective – 3 Artificial Intelligence Application in People Management/ Cyber Security, Tools, Techniques and Counter Measures/ Basics of Event Management/ Income Tax Return & E-Filing	4	4	-	-
Total			22	18	8	-
Semester 4						
Sr. No.	Subject Code	Subject Name	Credit	Lect	Lab	Tut
26	11011404DS01	Environmental Hazards & Disaster Management	4	4	-	-
27	11011404DS02	Environmental Pollution (Air, Water, Soil)	4	4	-	-
28	11011404DS03	Climate change & Mitigations	4	4	-	-
29	11011404DS04	Lab 1- Air, Water & Soil Analysis	2	-	4	-

30	11011404DS05	Lab 2- Climate Change	2	-	4	-
31	00019304AE01/ 00019304AE02/ 00019304AE03	AEC- IV (MIL-4) Advanced English- II Advanced German Advanced French	2	2	-	-
32	11011404SE01	SEC-4 (Cleaner Production Assessment)	2	2	-	-
33	19010204VA01	VAC-4 (Positive Mental Health/Physical Education/Yoga/NCC)	2	2	-	-
Total			22	18	8	-
Semester 5						
Sr. No.	Subject Code	Subject Name	Credit	Lect	Lab	Tut
34	11011405DS01	Solid Waste Management	4	4	-	-
35	11011405DS02	Environmental Microbiology	4	4	-	-
36	11011405DS03	Environmental Informatics	4	4	-	-
37	11011405DS04	Environmental Health and Safety	4	4	-	-
38	11011405DS05	Lab-I Solid waste management	2	-	4	-
39	11011405DS06	Lab-2 Environmental Microbiology	2	-	4	-
40	06010105SE01/ 06010105SE02	SEC-5 (Digital Literacy/Finance for Everyone)	2	2	-	-
Total			22	18	8	-
Semester 6						
Sr. No.	Subject Code	Subject Name	Credit	Lect	Lab	Tut
41	11011406DS01	Environmental Monitoring	3	3	-	-
42	11011406DS02	Environmental Economics	3	3	-	-
43	11011406DS03	Environmental Toxicology	3	3	-	-
44	11011406DS04	Sustainable Agriculture & Organic farming	3	3	-	-
45	11011406DS05	Lab-1 Environmental Monitoring	2	-	4	-
46	11011406DS06	Lab 2 Toxicological Analysis	2	-	4	-
47	00019306AE01	AEC-6 Professional ethics & communication	2	2	-	-

48	11011406IN01	Internship / Mini Project-1 (in Major Specific Course)	4	-	-	-
Total			22	14	8	-
Internship Guidelines: 30 days (120 Hrs.)						

ANNEXURE-III

Semester -1

a. Course Name: Principles of Environment

b. Course Code: 11011401DS01

c. Prerequisite: Should be familiar with basic of environmental science

d. Rationale: The course will provide a strong foundation on environmental science which will be useful for creating foundation on environmental science.

e. Course Learning Objective:

CLOBJ 1	Develop a comprehensive understanding of environmental science
CLOBJ 2	Apply the knowledge on simple environmental issue
CLOBJ 3	Learn the cause and effect for different environmental problems
CLOBJ 4	Understand the characteristics of environmental science
CLOBJ 5	Grasp the fundamentals of sampling and the environmental science

f. Course Learning Outcomes:

CLO 1	Understanding the basic concept of ecology and environment
CLO 2	Understand various components of the environment and interfaces
CLO 3	Study of the cause and effect of environmental pollution
CLO 4	Analyze environmental concerns of today
CLO 5	Conclude environmental movements & environmental conservation

g. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
4	-	-	4	20	20	-	60	-	100

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Unit 1: Introduction to Environment Global Climate System Concept and types of environment: Physical, Biological and Cultural - Environment as perceived by different sciences. Multidisciplinary nature of environmental studies Scope and importance; Concept of sustainability and sustainable development.	25%	15
2	Unit 2: Ecosystems: Ecosystem: Types, Structure and function. Energy flow in an ecosystem: food chains, food webs and ecological succession. Case studies of the following ecosystems: a) Forest ecosystem, b) Grassland ecosystem, c) Desert ecosystem, d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)	25%	15
3	Unit 3: Environmental Pollution: Pollution types, causes, effects and controls; Air, water, soil and noise pollution, Nuclear hazards and human health risks, Solid waste management, Control measures of urban and industrial waste Pollution case studies.	25%	15
4	Unit 4: Human Communities and the Environment: Need for public awareness. Institutions in Environment, People in Environment. Role of individual and public participation for environment protection. Environmental movements: Chipko, Silent valley, Bishnois of Rajasthan	25%	15
	Total	100%	60

i. Text Book and Reference Book:

1. Kaushik, A and Kaushik, C. (2004). Perspectives in Environmental Studies. New Age International (P) Limited, Publishers.
2. Bharucha, E. (2004). Textbook for Environmental Studies. University Grant Commission.
3. Saravanan, K. (2005). Principles of Environmental Science and Technology. New Age International (P) Limited, Publishers.
4. Singh, Y.K. (2006). Environmental Science. New Age International (P) Limited, Publishers.
5. Singh, J.S., Singh, S.P. and Gupta, S.R. (2014). Ecology, Environmental Science and Conservation. S. Chand Publishing, New Delhi.

a. **Course Name: Environmental Chemistry**

b. **Course Code: 11011401DS02**

c. **Prerequisite:** Should be Familiar with organic and inorganic chemistry

d. **Rationale:** The course will provide a base for acquiring knowledge to understand the physical, chemical and biological properties of air, water & soil.

e. **Course Learning Objective:**

CLOBJ 1	Develop a comprehensive understanding of environmental chemistry
CLOBJ 2	Apply the knowledge on simple environmental chemistry
CLOBJ 3	Learn the cause and effect for different environmental reactions
CLOBJ 4	Understand the characteristics of environmental cause and effect

f. **Course Learning Outcomes:**

CLO 1	Describe the concept of acid-base, neutralization, buffer and buffer capacity
CLO 2	Comprehensive understanding about the fundamental of thermodynamics, chemical equilibrium and chemical kinetics, chemistry of water, air and soil, and how human activities pose to alter the chemistry
CLO 3	Define the concept of atom, electronic configuration, periodic properties and bonding
CLO 4	Understanding atmospheric and climate change reaction chemistry

g. **Teaching & Examination Scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
2	-	-	2	20	20	-	60	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. **Course Content:**

Sr. No.	Content	Weightage	Teaching Hours
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1	Unit-1: Fundamentals of Environmental Chemistry: Solution concentration (Normality, Molarity, Molality, ppm, Equivalent weight etc.) Types of chemical reactions; acids, bases and salts, solubility products; solutes and solvents; Redox reactions, concepts of pH and EC. Chemical equilibrium, saturated and unsaturated hydrocarbons.	20%	7
2	Unit-2: Chemistry of Atmosphere: Acid rain, Global warming, Photochemical reactions involved in atmosphere. Ozone chemistry. Thermo chemical reactions in atmosphere, Pollutant dispersal; Plume behaviour, mixing heights, types of flow	20%	7
3	Unit-3: Chemistry of Water: Physical properties of water: Colour, Temperature, Taste and Odour, Turbidity, Conductivity, Hydrogen Ion Concentration (pH), Total Solids, Suspended and Dissolved Solids. Chemical properties of water: Acidity, Alkalinity, Hardness, Chlorides, Fluorides, Dissolved Oxygen, BOD, COD, Principal Involved, Methods of Estimation, Significance and Standards. Sedimentation, filtration, coagulation. Water Quality Criteria for Drinking Purpose. Indian Standard Specification for Drinking Water, WHO Guidelines, The safe drinking water act.	45%	10
4	Unit-4: Chemistry of soil: Physical Properties: Soil Textures, Structure of Soil, Soil Density, Porosity of Soil, Permeability of Soil, Soil Colors, Soil Temperature, Soil Air & Soil Water. Chemical Properties of Soils: Inorganic Matter of Soil, Organic Matter of Soil, Colloidal Properties of Soil, Acidic Soils and Basic Soils. Soil Erosion: Definition and Types of Erosion, causes Soil Erosion. Conservation of soil.	15%	6
	Total	100%	30

i. Text Book and Reference Book:

1. Connell, D.W. 2005. Basic Concepts of Environmental Chemistry (2nd edition). CRC Press
2. Girard, J. 2013. Principles of Environmental Chemistry (3rd edition). Jones & Bartlett.
3. Harnung, S.E. & Johnson, M.S. 2012. Chemistry and the Environment. Cambridge University Press.
4. The Nature and Properties of Soils by Nyle C., Brady Eurasia Publishing House Ltd. New, Delhi, 1988
5. Environmental Analysis by M.M. Saxena, Agro Botanical Publisher, Bikaner.

a. **Course Name: Ecology: Theory and Practice**

b. **Course Code: 11011401DS03**

c. **Prerequisite:** Should be familiar with basic of biology up to 12th science level

d. **Rationale:** Acquire basic knowledge on the environment and ecology, which is a strong foundation for various environmental problem-solving skills, supports innovation, and opens doors to diverse career opportunities.

e. **Course Learning Objective:**

CLOBJ 1	Gain familiarity with Ecology and various elements of Ecology.
CLOBJ 2	Solve issues related to Ecology and ecosystem.
CLOBJ 3	Acquire knowledge about the structure of the ecosystem.
CLOBJ 4	Understand the difference between various types of ecosystems.
CLOBJ 5	Demonstrate a clear understanding of the basic concepts, working principles and applications of ecology.

f. **Course Learning Outcomes:**

CLO 1	Ability to understand and appreciate the role of biodiversity in specific natural habitats and agroecosystems.
CLO 2	Understand the classification of ecosystems
CLO 3	Understanding the different divisions of ecology and their characteristics
CLO 4	Ability to understand the comprehensive structure and functions of the ecosystem.
CLO 5	Analyze the limitations/ stress on patterns of productivity, energy flow through natural food webs, and ecosystem dynamics.

g. **Teaching & Examination Scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	

2	-	-	2	20	20	-	60	-	100
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L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Unit 1: Divisions of Ecology: Levels of organization, approaches in studying Ecology. Ecosystems – Definitions. Classification of ecosystem – Terrestrial and Aquatic with their divisions. Structure of the ecosystem - Function of ecosystem - food chain – food web – bio-magnification. Ecological pyramids – Types. Biogeochemical cycles: Classification. Carbon and Phosphorus cycles – anthropogenic influences on these cycles. Energy flow in an ecosystem – productivity - trophic levels; Study of pond and crop land ecosystems; homeostasis and feedback mechanisms.	20%	7
2	Unit 2: Community Ecology: Definition, Characteristics of a Community – Species diversity, growth form and structure, dominance, relative abundance, trophic structure. Population Ecology: Definition, Characteristics of Population: Density – Natality – Mortality – Age distribution – Growth form-Population Equilibrium – Biotic potential – Carrying capacity – Dispersal – Dispersion – Population fluctuations – Population regulation.	20%	7
3	Unit 3: Ecological succession: Primary and Secondary succession – Natural and man-influenced succession, – Hydrarch and Xerarch - Climax vegetation and their theories; Ecotone and Edge effect; Ecological equivalents; Ecotypes and Ecophenes; Ecological indicators. Ecological Niche: Concept and Types of niches: Spatial, Trophic and Multidimensional – Niche parameters: Form, Position and Width – Niche Partitioning - Realized and Fundamental Niche. Biomes: Definition and concept. Classification of biomes.	45%	10
4	Unit 4: Biotic and Abiotic factors: Influence Temperature, Wind and Water, Edaphic, Topographic on flora and fauna. Concept of Limiting Factors: Liebig's Law of Minimum; Shelford's Law of Tolerance and the combined concept Evolution: Definition – Darwin's postulates - Natural selection – Types – Industrial Melanism - Pesticide resistance. Co-evolution; Mimicry – Batesian and Mullerian mimicry, warning colouration.	15%	6

	Total	100%	30
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i. Text Book and Reference Book:

1. Agarwal, K. C. (1999). Environmental Biology. Agro Botanica.
2. Chapman, J. L. and Reiss, M. J. (1995). Ecology – Principles and Applications. Cambridge University Press.
3. Dash, M. C. (2001). Fundamentals of Ecology. Tata McGrawHill Publishing Co.
- Kormondy, E. J. (1996). Concepts of Ecology. Prentice Hall of India.
4. Mamta Rawat, Sumit Dookia and Chandrakasan Sivaperuman. (2015). Aquatic Ecosystem: Biodiversity, Ecology and Conservation. Springer publication.
5. McCleery, Robert A., Moorman, Christopher, Peterson, M. Nils (Eds.). (2014).

a. **Course Name:** Lab 1-Environmental Water Chemistry

b. **Course Code:** 11011401DS04

c. **Prerequisite:** Should be familiar with the basics of handling and preparation of reagents.

d. **Rationale:** Acquire knowledge about different water quality parameters on theoretical knowledge by applying the concept to practical skills.

e. **Course Learning Objective:**

CLOBJ 1	Analyze water quality and aquatic systems in various categories.
CLOBJ 2	Analyze and understand various water parameters and their properties.
CLOBJ 3	Apply theoretical knowledge such as DO, BOD and COD etc. to real field.
CLOBJ 4	Identify and prepare different types of reagent and chemicals used in water quality analysis.

f. **Course Learning Outcomes:**

CLO 1	Acquire knowledge about different water quality parameters.
CLO 2	Acquire knowledge about properties of different types of wastewater.
CLO 3	Learning the methods of preparing the different types of solution and reagents.
CLO 4	Learning about titration methods and handling of different instruments.

g. **Teaching & Examination Scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
-	-	4	2	-	-	20	-	30	50

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination

h. **Course content**

Exp. No.	Name of the Experiment
1	Adjustment of pH, Preparation of Buffer solution, Turbidimetry
2	Preparation of Normal, Molar, Molal, ppm, percentage solutions.
3	Estimation of pH and Electrical Conductivity
4	Estimation of TDS and Turbidity
5	Estimation of acidity and alkalinity.
6	Redox titrations, Iodometric & Iodimetric titration

i. Text Book and Reference Book:

1. Vogel, A. I. (1996). Textbook of Quantitative Chemical Analysis ELBS 5th Edn.
2. Mann, F. G. (2009). Practical organic chemistry. Pearson Education India.
3. AI, V. (2005). Tatchell AR. Furnis BS. Hannaford AJ. Smith PWG. Vogel's Textbook of Practical Organic Chemistry Pearson.

a. **Course Name: Lab 2- Ecological Analysis**

b. **Course Code: 11011401DS05**

c. **Prerequisite:** Should be familiar with basic of ecological analysis.

d. **Rationale:** Acquire knowledge about different types of interaction between plants, animals and environment and their responses.

e. **Course Learning Objective:**

CLOBJ 1	Apply theoretical knowledge such as sampling and quantifying to real field.
CLOBJ 2	Field visit to nearby areas for studying and understanding the ecology and ecosystem
CLOBJ 3	Analyze ecology and various ecosystem and their properties.
CLOBJ 4	Acquiring knowledge on sampling techniques of phytoplankton and zooplankton.

f. **Course Learning Outcomes:**

CLO 1	Understanding theoretical approach on field.
CLO 2	Analyze and understand various ecological parameters and their properties.
CLO 3	Ability to understand ecological parameters and their properties.
CLO 4	Learning sample collection techniques of phytoplankton and zooplankton.

g. **Teaching & Examination Scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
-	-	4	2	-	-	20	-	30	50

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. **Course content**

Exp. No.	Name of the Experiment
1	Adjustment of pH, Preparation of Buffer solution, Turbidimetry
2	Preparation of Normal, Molar, Molal, ppm, percentage solutions.
3	Estimation of pH and Electrical Conductivity
4	Estimation of TDS and Turbidity
5	Estimation of acidity and alkalinity.
6	Redox titrations, Iodometric & Iodimetric titration

i. Text Book and Reference Book:

1. Michael, P. (1986). Ecological Methods for Field and Laboratory Investigations. Tata Mc Graw-Hill Publishing Co. Ltd.
2. Subrahmanyam, N. S. and Sambamurty, A. V. S. S. (2000). Ecology. Narosa Publishing House.
3. Trivedi, P. K. and Goel, P. K. (1984). Chemical and Biological Methods of Water Pollution Studies. Environmental Publications.
4. Rolan, R. G. (1973). Laboratory and Field Investigations in General Ecology. Macmillan Co.

a. **Course Name: Basic English-I**

b. **Course Code: 00019301AE01**

c. **Prerequisite:** Basic Knowledge of LSRW. To provide students with soft skills that complement their skills, making them more marketable when entering the workforce.

d. **Rationale:** Knowledge of LSRW is essential for students.

e. **Course Learning Objective:**

CLOBJ 1	Remember basic English language terms and concepts.
CLOBJ 2	Understand the main ideas and key details of simple English language materials.
CLOBJ 3	Apply grammar and vocabulary knowledge to construct simple sentences and paragraphs.
CLOBJ 4	Analyze the structure and organization of basic English texts.
CLOBJ 5	Evaluate the use of language in different contexts and for different purposes.
CLOBJ 6	Create original written and spoken English language content.

f. **Course Learning Outcomes:**

CLO 1	Define and recognize simple grammatical structures and rules in English sentences.
CLO 2	Understanding of basic English grammar concepts through application in context.
CLO 3	Apply listening skills to follow and respond appropriately to basic instructions and directions given in English.
CLO 4	Analyse language usage and areas for improvement in pronunciation, grammar, and vocabulary.
CLO 5	Evaluate new vocabulary and grammatical structures learned in class into their communication to demonstrate language fluency and creativity.
CLO 6	Develop the cultural relevance and appropriateness of language use in various contexts, demonstrating an understanding of cultural sensitivity and communication norms.

g. **Teaching & Examination Scheme**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
2	-	-	2	20	20	-	60	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; **MSE**- Mid-Semester Evaluation, **CE**- Continuous Evaluation, **ESE**- End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Listening Skills and Hearing: Listening Vs Hearing Types of listening, Traits of good listener, Barriers of listening	7%	2
2	Listening Practice: Listening Practice (Audio & Video)	10%	3
3	Presentation Skills: Defining the purpose of presentation Presentation strategies, How to make an effective presentation? Knowing /Analysing audience, Organizing content and preparing an outline Traits of a good speaker	3%	1
4	Activity: Crazy Scientist.	7%	2
5	Speaking Practice: Speaking practice (Elocution)	24%	7
6	Reading Skills: Define reading, Reading Strategies, Techniques of reading, Techniques to read faster	3%	1
7	Reading Practice: Reading Practice (Reading Comprehension)	13%	4
8	Writing Skills: Develop Writing Skills, 7cs of communication, Techniques of writing better, Identifying common errors in writing	10%	3
9	Paragraph Writing: Introduction of Paragraph Writing, Central components of paragraph development, Techniques for paragraph development	3%	1
10	Writing Practice: Note making, Picture Description, Dialogue Writing, Paragraph Writing Completion of story from given points	20%	6
	Total	100%	30

i. Text Book and Reference Book:

- 1) Understanding and Using English Grammar, By Betty Azar & Stacy Hagen | Pearson Education
- 2) Business Correspondence and Report Writing, By SHARMA, R. AND MOHAN, K.
- 3) Communication Skills, By Kumar S And Lata P | New Delhi Oxford University Press

- 4) Technical Communication : Principles And Practice, By Sangeetha Sharma, Meenakshi Raman | Oxford University Press
- 5) Practical English Usage, By MICHAEL SWAN
- 6) A Remedial English Grammar for Foreign Student, By F.T. WOOD
- 7) On Writing Well, By William Zinsser | Harper Paperbacks,2006 | 30th anniversary edition
- 8) Oxford Practice Grammar, By John Eastwood | Oxford University Press

- a. **Name: Basic Hindi-I**
- b. **Course Code: 00019301AE02**
- c. **Prerequisite:** Basic communication skills in Hindi
- d. **Rationale:** Basic comprehensive skills Hindi
- e. **Course Learning Objective:**

CLOBJ 1	Remember key terms related to the Hindi language, such as grammar rules, vocabulary, and sentence structure.
CLOBJ 2	Understand the main ideas and themes of Hindi literary works or cultural texts.
CLOBJ 3	Apply knowledge of Hindi vocabulary to communicate in everyday situations, such as greetings, shopping, and asking for directions.
CLOBJ 4	Analyse the structure and style of Hindi literature, including poetry, short stories, or essays.
CLOBJ 5	Evaluate the appropriateness of Hindi language translations or interpretations.
CLOBJ 6	Create original content in Hindi, such as stories, poems, or dialogues..

- f. **Course Learning Outcomes:**

CLO 1	Identify the sounds and symbols of the Hindi alphabet.
CLO 2	Understand simple spoken and written Hindi passages on familiar topics.
CLO 3	Apply their knowledge of Hindi in everyday situations, such as greetings, introductions, and basic conversations.
CLO 4	Analyse the structure and content of simple Hindi texts, such as stories, poems, or dialogues.
CLO 5	Create original content in Hindi, such as short stories, poems, or dialogues.
CLO 6	Evaluate the effectiveness of different language learning strategies for acquiring Hindi proficiency.

- g. **Teaching & Examination Scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
2	-	-	2	20	20	-	60	-	100

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Hindi Alphabets: Hindi Alphabets Relate with English Alphabets, vowel, consonant.	13%	4
2	Hindi Phonetics: Hindi Phonetics, Joint words kha, sva etc	13%	4
3	Word Formation: Two/three letter word formation	13%	4
4	Hindi Grammar: Noun, Pronoun, Verb, Adverb, Adjective.	34%	10
5	Hindi Vocabulary: Number from 1 to 50, Days of week, Colors	27%	8
	Total	100%	30

i. Reference Books:

1. Hindi for Beginners published by UpToSchoolWorksheets
2. Hindi Abhyaas Pustika by Seema Verma, Published by Trishala Learning System pvt.
3. NCERT Workbook of Hindi for Grade-2
4. Rachnatmak Vyakaran by Suresh Pant and Himani Joshi, Published by Pearson.
5. Matra Gyan, Published by Wonder House Books
6. Amoli Hindi Vyakaran by Dr. Nirmal Dalal

- a. **Course Name: Basic Gujarati-I**
- b. **Course Code: 00019301AE03**
- c. **Prerequisite:** Basic communication skills in Gujarati
- d. **Rationale:** Basic comprehensive skills in Gujarati.
- e. **Course Learning Objective:**

CLOBJ 1	Remember key terms related to the Gujarati language, such as grammar rules, vocabulary, and sentence structure.
CLOBJ 2	Understand the main ideas and themes of Gujarati literary works or cultural texts.
CLOBJ 3	Apply knowledge of Gujarati vocabulary to communicate in everyday situations, such as greetings, shopping, and asking for directions.
CLOBJ 4	Analyse the structure and style of Gujarati literature, including poetry, short stories, or essays.
CLOBJ 5	Evaluate the appropriateness of Gujarati language translations or interpretations.
CLOBJ 6	Create original content in Gujarati, such as stories, poems, or dialogues.

- f. **Course Learning Outcomes:**

CLO 1	Remember key terms related to the Gujarati language, such as grammar rules, vocabulary, and sentence structure.
CLO 2	Understand the main ideas and themes of Gujarati literary works or cultural texts.
CLO 3	Apply knowledge of Gujarati vocabulary to communicate in everyday situations, such as greetings, shopping, and asking for directions.
CLO 4	Analyse the structure and style of Gujarati literature, including poetry, short stories, or essays.
CLO 5	Evaluate the appropriateness of Gujarati language translations or interpretations.
CLO 6	Create original content in Gujarati, such as stories, poems, or dialogues.

- g. **Teaching & Examination Scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
2	-	-	2	20	20	-	60	-	100

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Gujarati Alphabets: Gujarati Alphabets relate with English Alphabets, vowel, consonant.	13%	4
2	Gujarati Phonetics: Gujarati Phonetics, Joint words kha, sva etc	13%	4
3	Word Formation: Two/three letter word formation	13%	4
4	Gujarati Grammar: Noun, Pronoun, Verb, Adverb, Adjective.	34%	10
5	Gujarati Vocabulary: Number from 1 to 50, Days of week, Colors	27%	8
	Total	100%	30

i. Reference Books:

1. All in One (English-Gujarati), Manoj Publications
2. Gujarati Barakhadi by Sonika Agrawal, Published by Notion Press
3. Varna Lekhan by Gujarati Books
4. My first Gujarati alphabets by Priyal J., Published by My first Picture Book Inc.

- a. **Course Name: Introduction to MATLAB Programming**
- b. **Course Code: 03010901UE01**
- c. **Prerequisite:** Fundamental Knowledge of Mathematics.
- d. **Rationale:** An Introduction to MATLAB Programming" course is essential because MATLAB is widely used in scientific and engineering fields for data analysis, simulations, and algorithm development. Its user-friendly interface and high-level language allow beginners to quickly grasp fundamental programming concepts and focus on problem-solving. The course equips learners with valuable skills for data visualization, numerical computing, and rapid prototyping, enhancing their capabilities and employability in diverse domains.
- e. **Course Learning Objective:**

CLOBJ 1	Remember foundational understanding of MATLAB syntax, data types, and basic programming concepts such as variables, arrays, and control structures.
CLOBJ 2	Explain the principles of problem-solving using MATLAB, including algorithm development, debugging techniques, and code documentation.
CLOBJ 3	Apply MATLAB programming skills to solve a variety of computational problems, including mathematical calculations, data analysis, and visualization tasks.
CLOBJ 4	Analyse and debug MATLAB code to identify errors, optimize performance, and improve code efficiency.
CLOBJ 5	Evaluate the effectiveness of different MATLAB programming techniques and strategies in solving specific types of problems, considering factors such as code readability, scalability, and computational efficiency.
CLOBJ 6	Develop their understanding of MATLAB programming concepts to design and implement their own algorithms and functions to solve complex problems.

- f. **Course Learning Outcomes:**

CLO 1	Memorize the MATLAB environment with confidence, effectively utilizing its features and tools for programming and data analysis.
CLO 2	Understand matrices and arrays, perform basic operations, and visualize data using 2D and 3D plots for effective data exploration and representation.
CLO 3	Compare programming concepts like control statements, loops, and logical operations to write structured MATLAB code for problem-solving.
CLO 4	Analyse & distinguish and use user-defined functions, promoting code reusability and modular design in MATLAB programs.

CLO 5	Evaluate Work with file input/output, enabling data exchange with external sources, and utilize the Symbolic Math Toolbox for performing symbolic computation.
CLO 6	Creative ability to independently solve problems using MATLAB.

g. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
3	-	2	4	20	20	20	60	30	150

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Getting Started with MATLAB: Introduction to MATLAB, history, features, and uses, MATLAB desktop, basic commands, variables, and data types, performing arithmetic operations and using functions.	13%	6
2	Working with Matrices and Arrays: Creating Matrices and Arrays, Array Operations and Indexing, Logical Operations and Relational Operators	18%	8
3	Data Visualization in MATLAB: Visualizing data using 2D plots and 3D Plot, Customizing Plots, Enhancing plots with titles, labels, and formatting.	18%	8
4	Programming with MATLAB: Conditional Statements (if-else), loops (for and while), Vectorization and Logical operation	18%	8
5	Writing Functions in MATLAB: User-defined Functions, Creating and using anonymous functions	15%	7
6	Working with Files and Symbolic Math: Reading from and writing to files, data	18%	8

	import/export, performing symbolic computations using Symbolic Math Toolbox		
	Total	100%	45

i. Text Book and Reference Book:

1. MATLAB: PROGRAMMING FOR ENGINEERS (TextBook), By Chapman, Stephen J ., | Thomson Asia Pvt Ltd ,
2. Mastering Matlab, A Comprehensive tutorial and reference, By Duane Hanselman and Bruce Littlefield,
3. Getting Started with MATLAB-7 (TextBook), By Rudra Pratap | OXFORD University Press

List of Practicals:

- 1) **Basic Arithmetic Operations:** Write a MATLAB script that takes two user-input numbers, performs basic arithmetic operations (addition, subtraction, multiplication, division), and displays the results.
- 2) **Matrix Manipulation:** Create a 3x3 matrix with random integers. Implement a function that takes this matrix as input and returns the sum, mean, and maximum value of its elements.
- 3) **Plotting Data and Interpretation:** Generate a set of x and y values using MATLAB. Plot the data as a line graph, add appropriate labels, and customize the plot appearance.
- 4) **Control Statements:** Write a MATLAB script that takes a user-input number and checks if it's positive, negative, or zero using if-else statements. Display the result accordingly.
- 5) **Fibonacci sequence and usages:** Create a MATLAB function that generates the first n elements of the Fibonacci sequence and returns them in an array
- 6) **File Input/Output and application:** Read data from a CSV file into MATLAB, perform some data manipulation (e.g., finding the average), and save the results in a new CSV file.
- 7) **Symbolic Math:** Use the Symbolic Math Toolbox to solve a simple algebraic equation and display the result in symbolic form.

- a. **Course Name: Office Automation**
- b. **Course Code: 05010101UE01**
- c. **Prerequisite:** Basic computer literacy.
- d. **Rationale:** The objective of this course is to familiarize students with concepts of fundamentals of Microsoft Office, Excel, PowerPoint and Outlook for working of computer and its application.
- e. **Course Learning Objective:**

CLOBJ 1	Remember understanding of what office automation entails, including the use of technology to streamline office tasks, improve efficiency, and enhance productivity.
CLOBJ 2	Understand the advantages of office automation, such as increased accuracy, reduced manual labor, faster processing times, and improved communication and collaboration.
CLOBJ 3	Apply the role of office automation tools and technologies in contemporary workplaces, including their impact on workflow optimization, remote work, and digital transformation.
CLOBJ 4	Organize office automation systems to integrate with various business processes, including document management, workflow automation, customer relationship management, and enterprise resource planning.
CLOBJ 5	Evaluate the challenges and considerations associated with implementing office automation solutions, such as cost, compatibility, data security, and employee training.
CLOBJ 6	Develop Strategies for Successful Implementation: Students will develop strategies for successful implementation of office automation initiatives, including assessing organizational needs, selecting appropriate technologies, managing change, and evaluating outcomes.

- f. **Course Learning Outcomes:**

CLO 1	Demonstrate understanding of the concept of office automation, including its components, functions, and applications in modern workplaces.
CLO 2	Understand the importance and benefits of office automation, recognizing its role in enhancing efficiency, productivity, and communication in organizations.
CLO 3	Analyse the challenges and considerations associated with office automation implementation, such as technological limitations, organizational culture, and security concerns.

CLO 4	Apply their knowledge of office automation to analyze and evaluate its integration with business processes, identifying opportunities for automation and efficiency improvements.
CLO 5	Evaluate the effectiveness of office automation solutions in addressing organizational needs and improving workflow processes, considering factors such as cost-effectiveness, user satisfaction, and return on investment.
CLO 6	Synthesize their understanding of office automation concepts to develop strategies for successful implementation, including assessing organizational needs, selecting appropriate technologies, and managing change.

g. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
3	-	2	4	20	20	20	60	30	150

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Introduction to Office Automation: Overview of Office Automation, Importance and Benefits of Office Automation, Role in Modern Work Environments, Integration with Business Processes, Challenges and Considerations.	8%	4
2	Introduction of Computer: Overview of Computer, Computer Input and Output devices, Operating System, hardware and Software Introduction to Ram ,Rom ,CPU and more devices.	8%	4
3	Microsoft Word: Introduction to MS Word, Getting Familiar with the Interface, Creating a New Document, Basic Text Formatting, Bold, Italic, Underline), Aligning Text (Left, Center, Right), Saving and Opening Documents, Navigate Through a Document, Insert hyperlinks, Search for text, Replace, Create bookmarks, Move to a specific location or object in a document, Apply document themes, Apply document style sets,	25%	11

	Insert headers and footers, Insert page numbers, Format page background elements, Create a numbered or bulleted list, Change bullet characters or number formats for a list level, Define a custom bullet character or number format.		
4	Microsoft Excel: Introduction to MS Excel Create a workbook, Search for data within a workbook, Change worksheet tab color, Rename a worksheet, Insert and delete columns or rows, Change workbook themes, Adjust row height and column width, Insert headers and footers, Hide or unhide worksheets, data validation, Duplicate Values, Apply styles to tables, Filter records, Sort data by multiple columns, Change sort order, Remove duplicate records, Perform calculations by using the SUM function, MIN and MAX functions, COUNT function, AVERAGE function, Create a new chart, Resize charts, Save a workbook as a template, Manage workbook versions, Protect a worksheet	25%	10
5	Microsoft PowerPoint: Create a Presentation, Insert and Format Slides, Modify Slides, Handouts, and Notes, Configure a Presentation for Print, Configure and Present a Slide Show, Insert and Format Text, Insert and Format Shapes and Text Boxes, Insert and Format Images, Order and Group Objects, Insert and Format Tables, Insert and Format Charts, Insert and Format SmartArt graphics, Apply Slide Transitions, Animate Slide Content. Set Timing for Transitions and Animations.	17%	8
6	Microsoft Outlook: Create messages, Create and send messages Configure message, Format messages, Format text Apply, themes and styles, Apply styles, Create hyperlinks, Insert images, Manage schedules, Insert memorized content, Insert signatures, Configure calendar settings ,Work with multiple calendars Share calendar information, Create appointments and events Create meetings Manage calendar items, Create tasks Manage tasks Create and manage notes, Create journal entries, Create and manage contacts Create and modify contact records Store contact records Share contact records and address books.	17%	8
	Total	100%	45

i. Text Book and Reference Book:

- Digital Logic and Computer Design (TextBook), By Morris Mano | PHI
- Introduction to Information Technology, By ITL Education Solution Limited | Pearson Education | 2012
- MS OFFICE 2007, By Vikas Gupta | Wiley
- Computer Fundamentals, By Anita Goel | Pearson Education | 2011
- Digital Fundamentals, By Thomas L Floyd | Pearson

List of Practicals:

- 1) Case study on salary calculation Calculate Allowance based on given Condition. 1. HRA is 10% on Basic Salary if Salary more than 20000. 2. DA is on 25% on Basic Salary. 3. Medical Allowance (MA) = Executives get MA Rs 1000, Officers get MA Rs 700 & Assistants get MA Rs 500 4. Calculate Gross Salary. Gross Salary = Total of Basic + HRA + DA + MA 5. Calculate Professional Tax Upto 5000 = 0, upto 1000 = 60, upto 15000 = 100 & over 15000 = 150 6. Calculate Annual Salary 7. Calculate Income Tax Upto
- 2) Formatting alignment and creating table 1. Type in the Title Microsoft Word Computer Training Manual 2. Text formatting: Times New Roman font, size 14, Bold and Blue. Paragraph formatting: Align Center. 3. Type in the first paragraph. Text formatting: Arial font, size 11. Paragraph formatting: Align Justify, First Line Indent at 0.5 Type the notes
- 3) Word art and clip art Prepare visiting card for caterer service in word 2007 Prepare interactive word document(apply all formatting style)
- 4) Macro creating macro
- 5) Invitation letter format The format of invitation is as shown below: Anand Institute of Information Science, Shri. Ramkrishna Seva Mandal Opp. Town Hall, Anand 388 001 Ph. No. (02696) 266062 To, The Director/Principal, The name of Institute The address of Institute.
- 6) Work sheet exercise 1. Insert a column Number of Teams between columns Year and Tickets sold with values Insert a row between row 3 and row 4 with values Delete column Revenue Rename the Sheet1 with name Format cells Delete Sheet3.6. Hide row 4. 7. Insert a sheet and rename it with name.
- 7) Table exercise Complete the following tasks:
 - a. Widen the first column to 15.
 - b. Add a row beneath the details on Southampton to show the average monthly rainfall.
 - c. Add a new column after the June rainfall statistics to show the total rainfall in each city over the period. d) The rainfall in Birmingham during March should be 58.
 - d. Insert a new row between the rows holding the London and Sheffield rainfall statistics. Enter the following details: Newcastle 65 63 57 50 39 21.
 - e. Copy the appropriate formula to obtain the total rainfall for Newcastle during the period.
- 8) Table column exercises. Change the column width of column B to 15. 2. Change column width of column D to G to 20. 3. Change column width of column A and B to 14 4. Calculate Total Sales for each item and store result in column D. Hint: Total sales=Quantity * Unit Price. 5. Calculate

Total Sales for all the items and store result in cell B6. 6. Copy Unit Price for **PC** in cell D7. Move **Total sales** from cell B6 to D8.

9) Insert remove columns of table Complete the following tasks:

- a. Add a Units Used column to show the number of units of electricity used by each customer (Hint: Subtract the Previous Reading from the Present Reading).
- b. The cost of one unit of electricity is Rs.0.08. Add a Unit Cost column to show the cost of one unit. (This column will contain 0.08 in all of the relevant cells).
- c. Add a Units Charge column to show the total cost of the units used by each customer. (Hint: Unit Cost * Units Used)
- d. There is a standing charge of Rs.13.60 on each customer's account. Add a column to display this Standing Charge. (This column will contain Rs.13.60 in all of the relevant cells).

10) Math functions: The functions and commands required to solve the following assignment are as follows: Enter data - labels and values

1. Editing cell contents
2. Saving a spreadsheet
3. Altering column widths
4. Using the SUM function
5. Adding a new row after the last row of data
6. Adding a new column after the last column of data
7. Copying a formula
8. Using the AVERAGE, MIN, MAX function
9. Inserting a new row between existing rows Inserting a new column between existing columns.

11) Table formatting using background color: Format the Student Grades so that your spreadsheet looks like the one below (you can use different colours, if you like).

12) Calculate total sale and commission based on given details in table

13) Filter data of excel sheet:

1. Count number of order in Boston.
2. Count number of Microwave order.
3. Count number of journeys with truck 3.
4. Count number of Peter White journeys.
5. How many times is no. of items less than 20.
6. Display sum of refrigerator items.
7. Display sum of washing machine items.
8. Display sum of items transported by truck 4.
9. Sum of items transported by trucks.
10. Number of microvawe orders in Boston .

11. Number of Peter White journeys with truck 1.
 12. Number of orders in Boston after 2/3/2013:
 13. Number of orders between 2/3/2013 and 2/6/2013:
 14. sum of microwaves transported to NY:
 15. sum of items transported to Pittsburgh by truck 1:
 16. sum of items ordered between 2/3/2013 and 2/6/2013:
 17. Sum of items transported to NY, Baltimore and Philadelphia.
- 14) Conditional formatting do conditional formatting on the excel sheet in given data.
 - 15) Sorting sort given data of excel sheet.
 - 16) Typing exercise aq1 qa sw2ws de3ed fr4rf gt5tg queen 11 queens 1 apple 11 apples 2 wishes 22 wishes 2 swims 22 swims eddies 33 eddies 3 deeds 33 deeds 4 roses 44 roses 4 fish 44 fish tugs 55 tugs 5 goats 55 goats.
 - 17) Water mark and header footer inserting and removing
 - 18) Power point presentation creating presentation.
 - 19) PPT add timing and sound effects.
 - 20) Access create data base, tables create database, tables.
 - 21) Access, relations between tables relations between tables.

- a. **Course Name: Basic Photography**
- b. **Course Code: 18010201UE01**
- c. **Prerequisite:** 1) Understanding of Basic Computer Skills 2) Media Literacy 3) Creative Vision 4) Passion to learn
- d. **Rationale:** Taking a basic photography course can be incredibly helpful for anyone looking to improve their photography skills. Not only will you learn about the technical aspects of photography, but you'll also gain a greater appreciation for the art form and discover your own unique style.
- e. **Course Learning Objective:**

CLOBJ 1	Remember different focal lengths and their aesthetic uses, enabling them to choose appropriate lenses based on specific photographic needs
CLOBJ 2	Understanding of digital camera mechanisms, including aperture, shutter speed, ISO, and their significance in photography.
CLOBJ 3	Implement knowledge and skills related to marketing and promoting their photography work, including strategies for selling, exhibiting, participating in competitions, and understanding current marketing trends in the photography industry.
CLOBJ 4	Analyse about metadata and its role in photography, particularly in manipulating technical information using RAW technology and software like Photoshop to enhance image quality.
CLOBJ 5	Access various techniques and methods to express their creative vision through photography, experimenting with different styles and approaches in the digital realm.
CLOBJ 6	Develop skills in composing visually appealing photographs by understanding the principles of composition and arranging visual elements within the frame effectively.

- f. **Course Learning Outcomes:**

CLO 1	Remember some component of photography and Improved technical skills: Basic photography classes will teach you the fundamentals of camera operation, exposure, and lighting.
CLO 2	Understand how to use your camera to its full potential and create images that are properly exposed and well-lit.
CLO 3	Apply the ability to use natural and artificial light effectively to enhance the visual impact of their photographs

CLO 4	Analyse By learning about composition, colour, and perspective, you'll be able to create images that are not only technically proficient but also visually compelling.
CLO 5	Assess proficiency in operating and adjusting camera settings to achieve proper exposure.
CLO 6	Create vision and explore different styles of photography.

g. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation		ESE			Total
				MSE	CE	P	Theory	P	
2	-	4	4	20	20	20	60	30	150

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Digital Camera Mechanism: A basic photography course will help you understand the features of a Digital Camera Mechanism, such as aperture, shutter speed, ISO, and how to use them effectively to create the kind of photos you want. Characteristic of Lens: Different focal lengths has different aesthetical use. According to need we'll choose our Lens. Aesthetic of Composition: In terms of Visual Experience composition is a very important element. It Is the arrangement of visual elements within the frame of the photograph.	34%	10
2	Experience the Metadata: Metadata is actually the technical information about the photograph, Using RAW technology we can manipulate the metadata through 'Photoshop'. Experiment on Expression: An Image is actually the expression of the photographer. How does he/she sees a particular thing or incident. In Digital	33%	10

	era we can do various experiment on our expression and enhance the expression. Business and Marketing for Photographers : This is the most crucial part of the field, through the curriculum we'll learn how to sell or exhibit our photograph, how to take part in various competition and learn about the present marketing strategy.		
3	Documentary Photography: Apart from the fiction, there is parallel world of documentary Photography. Great photographers like Kevin Carter, Danish Siddiqui has devoted there life in Documentary Photography and Photo Journalism. Students need to go out and Practically grab some images from daily livelihood of the society. Photographers Study : Students need to study great photographers and their work both from fiction and non- fiction genre	33%	10
	Total	100%	30

i. Text Book and Reference Book:

- Basic Photography, By Michael Langford | Focal Press
- Digital Photography complete course: Everything you need to know in 20 weeks, By Patel, N. | DK Publishers, USA, Pub. Year 2021
- Handbook of Photography, By James A. Folts & Ronaldo P. Lovel

List of experiments:

- 1) Landscape
- 2) A picture that reflects you
- 3) A photostory with 3 pictures and 5 pictures
- 4) Photos on a particular topic
- 5) Assignments for photography

- a. **Course Name: First Aid and Life Support**
- b. **Course Code: 09010101UE01**
- c. **Prerequisite:** Shall have the basic knowledge about anatomy and physiology of the human body.
- d. **Rationale:** Will gain the basic knowledge about first Aid and life sciences.
- e. **Course Learning Objective:**

CLOBJ 1	Remember the primary objectives of first aid, including preserving life, preventing worsening conditions, and promoting recovery.
CLOBJ 2	Explain the legal framework surrounding first aid, including Good Samaritan laws and the duty of care, and understand their responsibilities and limitations as first
CLOBJ 3	Apply skills in identifying and responding to emergencies, including performing a top-to-toe assessment, maintaining hygiene, and following an overview flow chart for providing appropriate first aid.
CLOBJ 4	Organize and manage injuries such as fractures, wounds, and bleeding, including understanding basic anatomy, recognizing different types of fractures, and applying appropriate
CLOBJ 5	Access knowledge of respiratory emergencies, including recognizing signs of difficulty breathing and performing CPR, as well as understanding the types of burns and providing appropriate care for burn injuries.
CLOBJ 6	Develop competence in lifesaving procedures such as CPR, managing head trauma and strokes, and providing first aid for gastrointestinal issues such as diarrhea, food poisoning, and diabetes.

- f. **Course Learning Outcomes:**

CLO 1	Identify and prioritize different types of injuries and illnesses.
CLO 2	Understand the importance of first aid in emergency situations
CLO 3	Demonstrate the ability to assess the scene of an emergency.
CLO 4	Analyse the importance of infection control in wound care
CLO 5	Evaluate signs and symptoms of shock and how to provide first aid for different types of burns and how to assess and provide first.
CLO 6	Develop CPR techniques for adults, children, and infants and use of automated external defibrillators (AEDs) and how to use them.

g. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
3	-	2	4	20	20	-	60	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Introduction to first aid Aims of first aid The first aider, First aid and the law, Indian good Samaritan protection guidelines, Duty of giving care, Consent of the person in need, Privacy, Negligence, Dealing with an emergency, Top-to-toe assessment, Hygiene and hand washing, First aid overview flow char	7%	4
2	Assessment of patients with fractures, wounds, and bleeding Brief Anatomy of the skeletal system Fractures (injuries to bones), Injuries and fractures to the head, neck and spine Injuries and fractures to the cheekbone, nose and lower jaw Fracture of the cheekbone or nose Fractures of the lower jaw Injuries to the shoulder, ribs or breastbone Injuries or fractures of the shoulder Injuries and fractures of the collarbone Rib injuries and fractures Fractures of the breastbone Injuries to the arm, elbow, wrist, hand or Injuries and fractures of the arm(upper arm, forearm, wrist) Injuries and fractures of hand or fingers Injuries to the pelvis, lower limbs, knee, ankle or feet Injuries and fractures of the pelvis Injuries and fractures of the leg (thigh or lower leg) or ankle	10%	6

	Fracture of the knee cap (patella) Injuries and fractures of foot or toes Dislocations (injuries to joints) Strains and sprains (injuries to ligaments, muscles and tendons)		
3	Respiratory emergencies Respiration The respiratory system No breathing or difficult breathing When to refer the casualty to a healthcare facility Drowning Remove the victim out of the water Strangulation and hanging Choking Swelling within the throat Suffocation by smoke or gases Asthma	10	6
4	Care of burns The skin Burn wounds First, second and third degree burns Type of burns by origin Danger of burn Dry burns and scalds (burns from flames, hot surfaces, steam, Care of minor burns (small first and second degree burns) Specific burn locations Electrical burns and electrocution by electricity or lightning Chemical burns Sunburns, snow/welders eyes, heat exhaustion and heat stroke Heat exhaustion Heatstroke Frostbites Prevention of burns Fever Hypothermia	8%	5
5	Lifesaving procedures in emergency & shock The heart and the blood circulation, Heart and blood circulation, Blood pressure, Pulse, The blood, Chest discomfort, Bleeding, First aid for bleeding (in general), Resuscitation (basic CPR), Resuscitation of a person who is not breathing or not breathing normally, Resuscitation of baby/child (less than one year old)	8%	5
6	Head trauma & stroke The nervous system, The central nervous system, The peripheral nervous system (PNS), Unconsciousness, Head injuries, Concussion, Cerebral compression, Skull fractures, Stroke, Fits – convulsions - seizures	10%	6
7	Gastrointestinal tract, diarrhea, food poisoning and diabetes Review of anatomy and physiology of gastrointestinal tract, Diarrhea, Prevent dehydration, Food poisoning, Diabetes, Type 1 diabetes, Type 2 diabetes, Gestational diabetes (diabetes during pregnancy), Diagnosis, Hyperglycaemia, Symptoms of hyperglycaemic coma or diabetic coma, Hypoglycaemia	10%	6
8	Senses, foreign bodies in eye, ear, nose or skin and swallowed foreign Objects Review of anatomy and physiology of the special senses,	10%	6

	Foreign body in the eye, Foreign body in the ear, Foreign body in the nose, Foreign body in the skin, Swallowed foreign objects		
9	Urinary system, reproductive system and emergency childbirth Review of anatomy and physiology of Urinary & Reproductive system, Male reproductive system, Female reproductive system, Pregnancy, Stages of labour and giving birth, Aftercare of the mother, Medical conditions and pregnancy, Diabetes, High blood pressure, Infections, Prevention of sexually transmitted diseases (STD), Sexually transmitted infections, Reducing the risk of STDS/STIS, Emergency childbirth	10%	6
10	Psychological first aid Definition of psychological first aid, Traumatic crisis, (psychological) shock phase, Reaction phase, Processing phase, Reorientation phase, Behave calmly, Listening to the affected person, Physical contact, Providing psychological first aid to all	7%	4
11	Specific emergency situations and disaster management Emergencies at school, Emergencies at work, Road and traffic accidents, Emergencies in rural area, Disasters and multiple casualty accidents Emergency triage	10%	6
	Total	100%	60

i. Text Book and Reference Book:

1. First aid handbook: Fast and effective emergency care (TextBook) By Dr. Pipa Keech | 3rd
2. Until Medical Help Arrives: First aid Book (TextBook) By Dr. H. V. Sardesai | 1 st Edition, Pub. Year 2022
3. First aid manual, (TextBook) By UK's Leading First aid providers | 11th edition:, Pub. Year 2021

- a) **Course Name: Climate change & Sustainable Environment**
- b) **Course Code: 11011401VA01**
- c) **Prerequisite:** Shall have the basic knowledge about environmental studies.
- d) **Rationale:** Will understand the basic interface between climate change and sustainability.
- e) **Course Learning Objective:**

CLOBJ 1	Remember to examine national and state policies related to climate change and sustainable development, as well as the roles of various stakeholders such as governments, NGOs, businesses, and communities in achieving SDGs.
CLOBJ 2	Understanding of the components and dynamics of the global climate system, including the atmosphere, hydrosphere, biosphere, and lithosphere, and how they interact to shape Earth's climate.
CLOBJ 3	Apply the Sustainable Development Goals (SDGs) outlined by the United Nations, understanding their significance in addressing climate change and promoting sustainable development worldwide.
CLOBJ 4	Analyse the causes and consequences of climate change, including global warming, ozone layer depletion, acid rain, and the greenhouse effect, through case studies of nuclear accidents, chemical disasters, and climatic episodes.
CLOBJ 5	Evaluate approaches to mitigating climate change, including energy conservation, the use of renewable energies (water, solar, wind, tidal, geothermal), water conservation techniques such as rainwater harvesting, and the importance of
CLOBJ 6	Develop the concept of sustainable human development, considering the intersection of environmental, social, and economic factors, and understanding how various religions, cultural practices, and ethical frameworks contribute to environmental conservation and sustainable development efforts.

f. Course Learning Outcomes:

CLO 1	Remember scientific principles behind climate change, including the greenhouse effect, and its implications for global ecosystems.
CLO 2	Explain the differences between government and governance and the various ideas and meanings attached to the goal of sustainable development.
CLO 3	Apply high-quality written and verbal communication skill.
CLO 4	Analyse policy-making processes in regard to sustainability issues.
CLO 5	Recommended the complexity and operations of governance systems and processes on international, national, and local levels.
CLO 6	Creative work effectively in a team and in tutorial or workshop situations.

g. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
2	-	-	2	20	20	-	60	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Introduction to Climate Change: Global Climate System Climate Change: Causes and Consequences: Global warming, ozone layer depletion, acid rain, and greenhouse effect case studies: nuclear accidents, chemical disasters, and climatic episodes	33%	10
2	Sustainable Development: Sustainable Development Goals: An overview Climate Change and Sustainable Development: National and State Policies Achieving Sustainable Development Goals: Role of Various Stakeholders Building Partnership for Climate Change and Sustainable Development	34%	10
3	Sustainable Approach to Climate Change: Energy Conservation: Use of Renewable energies: Water, Solar, Wind, Tidal, Geothermal Water conservation techniques: Rain Water Harvesting. Environmental Ethics & Public Awareness: Role of various religions and cultural practices in environmental conservation Sustainable Human Development.	33%	10
	Total	100%	30

i. Text Book and Reference Book:

1. Climate Change and Sustainable Development: Prospects for Developing Countries, By Anil Markandya, Kirsten Halsnæs
2. Climate Change and Sustainable Development Global Prospective, By R.K.Mishra, P.s.Janki Krishna & CH. Laskhmi Kuma
3. This Changes Everything: Capitalism vs The Climate, By Naomi Klein
4. The Uninhabitable Earth: Life After Warming (TextBook), By David Wallace-Wells

a. **Course Name: Water Budgeting & Auditing**

b. **Course Code: 11011401SE01**

c. **Prerequisite:** Should be familiar with basic knowledge of water resources, types of sources and use of water resources

d. **Rationale:** Acquire knowledge and basic understanding of environmental science and ecology is beneficial, as water budgeting and auditing often involve assessing the impact of human activities on natural ecosystems.

e. **Course Learning Objective:**

CLOBJ 1	Analyze and quantify water use in different sectors (agriculture, industry, municipal).
CLOBJ 2	Examine local, national, and international water laws and regulations.
CLOBJ 3	Explore the use of technology (sensors, remote sensing, GIS) and various software in water budgeting and auditing.
CLOBJ 4	Develop skills to conduct water audits in different settings.
CLOBJ 5	Demonstrate proficiency in collecting and analyzing relevant data for water budgeting.

f. **Course Learning Outcomes:**

CLO 1	Acquire knowledge about the water distribution in various sector
CLO 2	Understanding various laws and regulations related to water
CLO 3	Explore and understand the role of technology and best practices in water conservation.
CLO 4	Applying skills to conduct water audits
CLO 5	To imply the knowledge of data assessment of water budgeting

g. **Teaching & Examination Scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
2	-	-	2	20	20	-	60	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Unit 1: Water-General Introduction Structure of water molecule, Unique properties of water, Physical, Chemical and Biological Characteristics of Water, Properties of water, Water Quality, Physical Characteristics: Temperature, Color, Taste and Odor, Turbidity, Solids, Chemical Characteristic: pH, Electrical Conductivity, Salinity, Alkalinity, Hardness, Major ions in Water, Heavy Metals, Dissolved Oxygen, BOD, COD, Biological Characteristics: Microbial Contamination, Faecal Matter, Role and importance of water in life, Use of water, Scarcity of water, different issues related with water, Water Pollution	25%	7
2	Unit:2 Water Demand Water availability and demand, Factors affecting global water demand: Population, Agriculture and Industrial growth, Climate Change, consequences of unsustainable growth on water demand, Impacts of increased global demand, Water demand management: Integrated approach to water demand management, Water demand forecasting, Community Intervention Programme, concept of water quality, Agencies for setting Water Quality Standards: EPA, WHO, BIS, Factors affecting water quality: Natural factors and Anthropogenic activities, need for water quality management, Steps for Water Quality management.	25%	8
3	Unit 3: Water Conservation and Management Strategies Water management, Water conservation technologies: Water System Management, Water Loss Minimization, Metering of consumed water, Conservation rate structure, End use water conservation and efficiency analysis, Watershed management, Water harvesting, Rain Water Harvesting: Traditional Techniques for Rainwater Harvesting, Modern techniques for Rainwater Harvesting, Groundwater Recharging, Desalination, Water conservation practices, water conservation strategies,	25%	8

4	Unit 4: Water Balance Water Balance: Basic Concepts, Water Budget Equation, Global Water Balance, System Water Balance: Water Balance of a Lake, water balance for different zones, Ground Water Balance, Water Resources of India: types of water resources, Precipitation, Surface water resources, Mangroves, Manmade Reservoirs, Groundwater resources, importance of water resources, threats to water resources, Hydrological Cycle: Mechanism of Water Cycle, Water Budget: Water Budget of India	25%	7
	Total	100%	30

i. Text Book and Reference Book:

1. “Water Conservation, Management and Analysis”, By Madireddi V. SubbaRao, | Readworthy, New Delhi.
2. Fundamentals of Watershed Management Technology. By Singh, G.D. and T.C. Poonia | Yash Publishing House, Bikaner
3. ‘Water Supply & Sanitary Engineering’ By G.S Birdie | Dhanpat Rai Publishing Company

Semester -2

- a. **Course Name:** Principles of Earth Science
- b. **Course Code:** 11011402DS06
- c. **Prerequisite:** Should be familiar with basic of geology.
- d. **Rationale:** The course will provide strong foundation on Geology and Earth science which will be useful for creating foundation on environmental science.
- e. **Course Learning Objective:**

CLOBJ 1	Develop a comprehensive understanding of Earth sciences
CLOBJ 2	Apply the knowledge on geological phenomena issue
CLOBJ 3	Learn the cause and effect for different earth and soil formation process
CLOBJ 4	Understand the characteristics of geology and Earth sciences
CLOBJ 5	Grasp the fundamentals of sampling and the analysis of geological science
CLOBJ 6	Understanding extraterrestrial climate and factors affecting variations
CLOBJ 7	Understanding various major climatic change events on the Earth

- f. **Course Learning Outcomes:**

CLO 1	Study of soil formation and its types
CLO 2	Study of ground water and surface water
CLO 3	Understanding about extraterrestrial climate and factors affecting variations
CLO 4	Study of major climatic change events on the Earth surface
CLO 5	Understanding of geological times-scale and rock cycle
CLO 6	Understanding the effect of external factors on the distribution of minerals of the lithosphere
CLO 7	Study of hydrogeological cycle and drainage pattern of catchment

- g. **Teaching & Examination Scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
4	-	-	4	20	20	-	60	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Unit 1: Concepts of environmental system and geological time Linked environmental systems and their significance in the study of the environment. Feedback links among earth systems. Growth of the Antarctic Ice Sheet Time, space and earth processes. Relative and absolute geologic time scale. The rock cycle and types of rocks	25%	15
2	Unit 2: Lithosphere Materials of the lithosphere- their evolution and distribution. Effect of external forces on the lithosphere- effect of weather, wind and glacier Soil formation and processes involved, soil profile and types of soils.	25%	15
3	Unit 3: Hydrosphere Cycling of surface water among atmosphere, biosphere and hydrosphere Drainage basins and streams Development of drainage system and drainage patterns Groundwater sources, aquifers and its types.	25%	15
4	Unit 4: Indicators of environmental change Climate of Mars, Venus and Earth and causes of specific climatic conditions. Historical Climatic conditions on earth, Events causing climate change.	25%	15
	Total	100%	60

i. Text Book and Reference Book:

1. Valdiya K.S. (2003), Geology, Environment and Society, University press.
2. Basu S. K. (2003), Handbook of Oceanography, Global Vision Publishing House.
3. Lal. D. S. (2009), Physical Geography. Sharda pustak bhavan, Alhabad.
4. Savindra Singh.S. (2001), Physical Geography, Prayag Pustak Bhavan, Alhabad.
5. Keller, E. A. (1979). Environmental Geology, Charles E. MerrillPublishing Company.

a. Course Name: Environmental Biology

b. Course Code: 11011402DS07

c. Prerequisite: Should be familiar with basics of biology, both botany and zoology.

d. Rationale: Acquire knowledge and develop Skills for Gram Staining, MPN and naturally occurring biogeochemical cycles.

e. Course Learning Objective:

CLOBJ 1	Understand the characteristics of environmental microbiology.
CLOBJ 2	Develop a comprehensive understanding on the concept of environmental biotechnology.
CLOBJ 3	Learn about the plant microbe interaction with nutrient cycling.
CLOBJ 4	Apply the knowledge to classify physiology of plants and animals.

f. Course Learning Outcomes:

CLO 1	Understanding the basics of environmental microbiology..
CLO 2	Understanding about the concept and approaches related with environmental biotechnology.
CLO 3	Analyze the plant microbe interaction and nutrient cycling.
CLO 4	Classify physiology of plants and animals and their relation with environment.

g. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
4	-	-	4	20	20	-	60	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE-

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Unit-1: Introduction to Environmental Biology General characteristics of major plant groups and their properties with suitable examples - Algae, Fungi, Bryophytes, Pteridophytes, Gymnosperms and Angiosperms. General characteristics of major animal phylum and their characteristic features: General features and broad classification of: Porifera: Canal structure, Spicules, Cnidaria: Nematocyst, coral and coral reefs, Platyhelminthes, Nematodes, Mollusca, Annelida, Arthropoda and Echinodermata and Classes of Phylum Chordata	34%	20
2	Unit-2: Introduction to microbiology and Microbial interactions Major groups of microorganisms. Nutritional requirements of microorganisms- oxygen, carbon, Nitrogen, Hydrogen, sulfur, Phosphorous and Mineral requirements. Soil microorganisms. Factors affecting the growth and metabolic activities of soil microorganisms. Competition for survival in nature, positive and negative interaction of the microorganisms, plant- microbe interaction. Nutrient cycling: Nitrogen, sulfur, phosphorous, iron & other elements. Role of micro- organisms in biogeochemical cycling.	33%	20
3	Unit-3: Environmental Biotechnology Biotechnological Approaches to combat Environmental Issues, Genetically Modified Organisms, Potentials use of microorganisms in Environmental Management, Bioremediation, Phytoremediation and Biodegradation.	33%	20
	Total	100%	60

i. Text Book and Reference Book:

1. Eric Garnier, Marie-Laure Navas, Karl Grigulis (2015) Plant Functional Diversity: Organism traits, community structure, and ecosystem properties, OUP Oxford.
2. Agrawal and Parihar (2008), Industrial Microbiology Fundamental and Application. Agrobios. Jodhpur

3. Fulekar, M. H. (2010). Environmental biotechnology. CRC Press.
4. Environmental Biotechnology, Principles and Applications by Bruce E Rittman and Perry L McCarty, McGrawhill Higher education.

a. **Course Name: Lab 1- Earth Science**

b. **Course Code: 11011402DS08**

c. **Prerequisite:** Should be familiar with types of rocks & minerals

d. **Rationale:** Acquire knowledge about different Earth's inner and outer system.

e. **Course Learning Objective:**

CLOBJ 1	Identify different types of rocks and minerals of earth surface
CLOBJ 2	Apply theoretical knowledge to study ground water.

f. **Course Learning Outcomes:**

CLO 1	Acquiring knowledge about different rocks and minerals
CLO 2	Analysis of ground water and its quality.

g. **Teaching & Examination Scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
-	-	4	2	-	-	20	-	30	50

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. **Course Content:**

Exp. No.	Name of the Experiment
1	Identification of major rock types- Igneous, Sedimentary and metamorphic
2	Identification of minerals- hand specimens
3	Study of fossils and their ecological significance

Exp. No.	Name of the Experiment
4	Study of physical properties of minerals- Silicates
5	Study of important rock forming and economic minerals in hand specimen
6	Ground water testing and analysis

i. Text Book and Reference Book:

1. Lal. D. S. (2009), Physical Geography. Sharda pustak bhavan, Alhabad.
2. Savindra Singh.S. (2001), Physical Geography, Prayag Pustak Bhavan, Alhabad.
3. Keller, E. A. (1979). Environmental Geology, Charles E. MerrillPublishing Company.

a. **Course Name: Lab 2- Environmental Biology**

b. **Course Code: 11011402DS09**

c. **Prerequisite:** Should be familiar with the basic concept of environmental microbiology

d. **Rationale:** Develop skills for handling different Develop skills for gram staining, MPN and naturally occurring biogeocycles.

e. **Course Learning Objective:**

CLOBJ 1	Identify different parts and operating principle of various instruments.
CLOBJ 2	Apply theoretical knowledge to handle and analyze environmental samples
CLOBJ 3	Analyze and understand various techniques to isolate microbes from samples.

f. **Course Learning Outcomes:**

CLO 1	Understanding of various instruments, working principles, calibration etc.
CLO 2	Learning the sample collection and processing techniques.
CLO 3	Culture and cultivation of microorganism batch with different types of media.

g. **Teaching & Examination Scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
-	-	4	2	-	-	20	-	30	50

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. **Course Content:**

Exp. No.	Name of the Experiment
1	Demonstration of the presence of microorganisms in water and soil samples
2	Isolation of microorganisms: Streak plate technique
3	Gram staining
4	Enumeration of microorganisms: spread plate technique
5	Most probable number technique
6	Cultivation of microorganisms- Sloppy Agar method
7	Cultivation of microorganisms in different types of media

i. Text Book and Reference Book:

1. Agrawal and Parihar (2008), Industrial Microbiology Fundamental and Application. Agrobios. Jodhpur
2. Basic ecology E. Odum (1983) Sunders
3. Madigan M.T., Martinko J.M and Brock J. P(1997). Biology of micro-organisms.8th edition Prentice Hall International, Inc.

- a. **Course Name: Basic English-II**
- b. **Course Code: 00019302AE04**
- c. **Prerequisite:** Basic Knowledge of Communication
- d. **Rationale:** Knowledge of Communication is essential for students
- e. **Course Learning Objective:**

CLOBJ 1	Understand the definition of communication and recognize its significance in various contexts.
CLOBJ 2	Explain the process of communication and its components.
CLOBJ 3	Identify the levels and flow of communication within different organizational structures.
CLOBJ 4	Recognize common barriers to effective communication and develop strategies to overcome them.
CLOBJ 5	Define non-verbal communication and distinguish between its various forms, including kinesics, proxemics, paralinguistic, and chronemics.
CLOBJ6	Perform error analysis in written and spoken communication, focusing on tense usage, voice variations, and reported speech.

- f. **Course Learning Outcomes:**

CLO 1	Define communication and articulate its importance in various personal, professional, and societal contexts.
CLO 2	Understanding of the process of communication, including its different levels and the flow of information within different communication structures.
CLO 3	Solve barriers to effective communication and apply strategies to overcome these barriers in real-life scenarios.
CLO 4	Analyse error analysis in written and spoken communication, focusing on tense usage, voice variations, and reported speech to identify areas for improvement.
CLO 5	Evaluate own communication skills through activities such as reading comprehension, vocabulary building, idioms, phrases, synonyms, antonyms, theatrics (role-play), extempore speaking, application writing, and letter writing, focusing on elements, layouts, inquiries, complaints, and adjustments.
CLO6	Develop and apply effective communication skills, including non-verbal communication techniques such as kinesics, proxemics, paralinguistic, and chronemics, to convey messages accurately and appropriately in various situations.

- g. **Teaching & Examination Scheme:**

Teaching Scheme	Evaluation Scheme
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L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
2	-	-	2	20	20	-	60	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. Course Content:

Sr. No	Topic	Weightage	Teaching Hrs.
1	Definition of Communication & Importance of Communication, Definition and process of communication	7%	2
2	Levels of Communication, Flow of Communication	7%	2
3	Barriers to effective Communication, Features of effective Communication	7%	2
4	Define non-verbal communication, Kinesics	3%	1
5	Proxemics, Paralinguistic, Chronemics	3%	1
6	Error Analysis (Tenses, voices & reported speech)	7%	2
7	Reading Comprehension	3%	1
8	Vocabulary Building, Idioms, Phrases, Synonyms, Antonyms	7%	2
9	Theatrics (Role Play)	16%	5
10	Extempore	16%	5
11	Application writing	10%	3
12	Letter writing (Elements, Layouts, Inquiry, Complain, & Adjustment,)	14%	4
	Total	100%	30

i) Reference Books:

1. Sanjay Kumar, Pushp Lata, Communication Skills, Oxford University Press
2. Business Correspondence and Report Writing By SHARMA, R. AND MOHAN, K.
3. Practical English Usage By MICHAEL SWAN
4. A Remedial English Grammar for Foreign Student By F.T. WOOD

5. On Writing Well By William Zinsser | Harper Paperbacks,2006 | 30th anniversary edition
6. Oxford Practice Grammar, By John Eastwood | Oxford University Press
7. Technical Communication : Principles And Practice By Sangeetha Sharma, Meenakshi Raman | Oxford University Press Printed

- a. **Course Name: Basic Hindi-II**
- b. **Course Code: 00019302AE05**
- c. **Prerequisite:** Knowledge of Hindi-I
- d. **Rationale:** Basic comprehensive skills and Hindi-I
- e. **Course Learning Objective:**

CLOBJ 1	Remember key terms related to the Hindi language, such as grammar rules, vocabulary, and sentence structure.
CLOBJ 2	Understand the main ideas and themes of Hindi literary works or cultural texts.
CLOBJ 3	Apply knowledge of Hindi vocabulary to communicate in everyday situations, such as greetings, shopping, and asking for directions.
CLOBJ 4	Analyse the structure and style of Hindi literature, including poetry, short stories, or essays.
CLOBJ 5	Evaluate the appropriateness of Hindi language translations or interpretations.
CLOBJ 6	Create original content in Hindi, such as stories, poems, or dialogues.

- f. **Course Learning Outcomes:**

CLO 1	Identify the sounds and symbols of the Hindi alphabet.
CLO 2	Understand simple spoken and written Hindi passages on familiar topics.
CLO 3	Apply their knowledge of Hindi in everyday situations, such as greetings, introductions, and basic conversations.
CLO 4	Analyse the structure and content of simple Hindi texts, such as stories, poems, or dialogues.
CLO 5	Evaluate the effectiveness of different language learning strategies for acquiring Hindi proficiency
CLO 6	Create original content in Hindi, such as short stories, poems, or dialogues

- g. **Teaching & Examination Scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
2	-	-	2	20	20	-	60	-	100

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Advanced vocabulary: Number 51 onwards, Telling time, Greetings	13%	4
2	Listening skills: Short story, Short Conversation.	20%	6
3	(Speaking Skills): Self Introduction, Day to Day Conversation, Elocution	27%	8
4	Reading skills Reading Comprehension, Short Story, Newspaper.	20%	6
5	Writing skills: Self-Introduction, Short message	20%	6
	Total	100%	30

i. Reference Books:

1. Hindi for Beginners published By Up To School Worksheets
2. Hindi Abhyaas Pustika Published By Seema Verma | Trishala Learning System pvt.
3. NCERT Workbook of Hindi for Grade-2
4. Rachnatmak Vyakaran By Suresh Pant and Himani Joshi | Pearson.
5. Matra Gyan Wonder House Books
6. Amoli Hindi Vyakaran By Dr. Nirmal Dalal

- a. **Course Name:** Basic Gujarati-2
- b. **Course Code:** 00019302AE06
- c. **Prerequisite:** Knowledge of Gujarati-I
- d. **Rationale:** Basic comprehensive skills and Gujarati-I
- e. **Course Learning Objective:**

CLOBJ 1	Remember key terms related to the Gujarati language, such as grammar rules, vocabulary, and sentence structure.
CLOBJ 2	Understand the main ideas and themes of Gujarati literary works or cultural texts.
CLOBJ 3	Apply knowledge of Gujarati vocabulary to communicate in everyday situations, such as greetings, shopping, and asking for directions.
CLOBJ 4	Analyse the structure and style of Gujarati literature, including poetry, short stories, or essays.
CLOBJ 5	Evaluate the appropriateness of Gujarati language translations or interpretations.
CLOBJ 6	Create original content in Gujarati, such as stories, poems, or dialogues.

- f. **Course Learning Outcomes:**

CLO 1	Identify the sounds and symbols of the Gujarati alphabet.
CLO 2	Understand simple spoken and written Gujarati passages on familiar topics.
CLO 3	Apply their knowledge of Gujarati in everyday situations, such as greetings, introductions, and basic conversations.
CLO 4	Analyse the structure and content of simple Gujarati texts, such as stories, poems, or dialogues.
CLO 5	Evaluate the effectiveness of different language learning strategies for acquiring Gujarati proficiency.
CLO 6	Create original content in Gujarati, such as short stories, poems, or dialogues.

- g. **Teaching & Examination Scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
2	-	-	2	20	20	-	60	-	100

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Advanced vocabulary: Number 51 onwards, Telling time, Greetings	13%	4
2	Listening skills: Short story, Short Conversation.	20%	6
3	(Speaking Skills): Self-Introduction, Day to Day Conversation, Elocution	27%	8
4	Reading skills Reading Comprehension, Short Story, Newspaper.	20%	6
5	Writing skills: Self-introduction, Short message	20%	6
	Total	100%	30

i. Reference Books:

1. Technical Communication : Principles And Practice By Sangeetha Sharma, Meenakshi Raman | Oxford University Press
2. All in One (English-Gujarati) Manoj Publications
3. Gujarati Barakhadi by Sonika Agrawal Published by Notion Press
4. Varna Lekhan By Gujarati Books
5. My first Gujarati alphabets By Priyal J. | My first Picture Book Inc

- a. **Course Name: Mathematical Aptitude**
- b. **Course Code: 00019101SE01**
- c. **Prerequisite:** Basic numeracy skill
- d. **Rationale:** Mathematical aptitude refers to the ability to reason, think critically, and apply mathematical principles to solve problems and make sense of the world around us.
- e. **Course Learning Objective:**

CLOBJ 1	Understand and apply fundamental concepts of arithmetic, including numbers, highest common factor (HCF), lowest common multiple (LCM), square roots, and cube roots, to solve numerical problems efficiently and accurately.
CLOBJ 2	Develop proficiency in solving problems involving ratio and proportion, including applications in comparison, scaling, mixing, and distribution scenarios, to analyze and solve real-world quantitative problems effectively.
CLOBJ 3	Practice solving problems related to permutations and combinations, including applications in counting arrangements, selections, and probability calculations, to analyze and solve combinatorial problems across various domains.
CLOBJ 4	Analyze concepts of percentage, average, and partnership, including shortcut techniques for calculating averages and distributing profits or expenses among partners, to analyze financial data and make informed decisions.
CLOBJ 5	Evaluate proficiency in solving problems related to time, work, distance, boats, streams, mixtures, logarithms, progressions (arithmetic mean, geometric mean, harmonic mean), and series, to solve practical problems involving time management, resource allocation, and sequence analysis.
CLOBJ 6	Develop the ability to solve problems related to interest (simple interest and compound interest), depreciation rates, profit-loss calculations, discounts, equations (linear and quadratic), and probability, to analyze financial transactions, investment decisions, and risk assessment scenarios effectively

f. **Course Learning Outcomes:**

CLO 1	Remember and differentiate between numbers, including integers, fractions, decimals, and real numbers.
CLO 2	Understand & analyse data presented in various forms, including tables, charts, and graphs, to extract meaningful information related to percentages, averages, and proportions.
CLO 3	Apply knowledge of logarithms, exponential functions, and interest rates to solve problems related to financial calculations, including compound interest, depreciation, and annuity investments.

CLO 4	Analyse and interpret data sets, including grouped and ungrouped data, to calculate measures of central tendency (mean) and dispersion (standard deviation) and draw meaningful conclusions about data distributions.
CLO 5	Evaluate and critique data interpretation methods, including the accuracy and effectiveness of tabulation, bar graphs, pie charts, and line charts in conveying information and making comparisons.
CLO 6	Synthesize information from multiple sources to solve problems related to mensuration, including calculating areas, perimeters, volumes, and surface areas of geometric shapes and solids.

g. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
2	-	-	2	20	20		60		100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Numbers, HCF & LCM, Square Root & Cube Root, Ratio & Proportion, Permutations & Combinations, Percentage, Average-Shortcut averages, Partnership, Time -work & distance, Boats & streams, Mixtures, Logarithm	40	12
2	Progression (AM, GM, HM), Series, Interest (S.I. & C.I.) and depreciation rate, Profit-Loss & Discount, Equations (Linear & Quadratic), Probability	40	12
3	Mensuration I (Area & Perimeter), Mensuration II (Volume & Surface area), Grouped Data, Ungrouped Data (Mean and Standard Deviation) Data interpretation: (Tabulation, Bar Graph, Pie Chart, Line Chart).	20	6
	Total	100%	30

i. Reference Books:

1. Quantitative Aptitude for Competitive Examinations (TextBook) By D. Khattar | Person Indian Education Service
2. Verbal Reasoning and Non - Verbal Reasoning (TextBook) By B. S. Sijwali and Indu Sijwali | New Delhi: Arihant
3. Quantitative Aptitude for Competitive Examinations By R. S. Aggarwal | S. Chand Publishing,

- a. **Course Name:** IPDC including history and culture of India and IKS-I
- b. **Course Code:** 00019302VA01
- c. **Prerequisite:** IPDC aims to prepare students for the modern challenges they face in their daily lives. Promoting fortitude in the face of failures, Unity amongst family discord, Self-discipline amidst Distractions and many more priceless lessons.
- d. **Rationale:** IPDC aims to prepare students for the modern challenges they face in their daily lives. Promoting fortitude in the face of failures, Unity amongst family discord, Self-discipline amidst Distractions... and many more priceless lessons. The course focuses on morality and character development at the core of student growth, to enable students to become self-aware, sincere, and successful in their many roles - as an ambitious student, reliable employee, caring family member, and considerate citizen.
- e. **Course Learning Objective:**

CLOBJ 1	Remember key event, figures and date in history of India
CLOBJ 2	Understand diversity of Indian culture, including language, religions and customs.
CLOBJ 3	Apply principles of Indian philosophy to analyse complementary issues.
CLOBJ 4	Analyze influence of Indian philosophy on various aspects of life such as ethics, politics and art.
CLOBJ 5	Evaluate impact of globalization on Indian culture and philosophy.
CLOBJ 6	Create innovative solutions on cultural diversity based on principles of India

- f. **Course Learning Outcomes:**

CLO 1	Remember key events, figures and periods in history of India
CLO 2	Describe basic tenets and principles of prominent Indian philosophy schools
CLO 3	Apply concepts of Indian philosophy and culture to analyse contemporary issues and phenomenon
CLO 4	Compare and Contrast different philosophical schools within Indian traditions
CLO 5	Evaluate relevance of Indian knowledge system in modern world.
CLO 6	Develop strategy for integrating Indian knowledge system into contemporary educational framework.

- g. **Teaching & Examination Scheme:**

Teaching Scheme	Evaluation Scheme
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L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
2	-	-	2	20	20	-	60	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Introduction and Remaking Yourself: Restructuring Yourself: Students learn how self-improvement enables them to secure a bright future for themselves. They will learn 6 powerful thought-processes that can develop their intellectual, physical, emotional, and spiritual quotients	7	2
2	Remaking Yourself: Power of Habit: Students will undergo a study of how habits work, the habits of successful professionals, and the practical techniques that can be used to develop good habits in their life.	7	2
3	Learning from Legends: Tendulkar & Tata: Students will learn from the inspirational lives of India's two legends, Sachin Tendulkar and Ratan Tata. They will implement these lessons through relatable case studies.	7	2
4	From House to Home: Listening & Understanding: Active listening is an essential part of academic progress and communications. Students will learn to listen with their eyes, ears, mind, and heart	7	2
5	Facing Failures: Welcoming Challenges: This lecture enables students to revisit the way in which they approach challenges. Through the study of successful figures such as Disney, Lincoln and Bachchan, students will learn to face difficulties through a positive perspective.	7	2
6	Facing Failures: Significance of Failures: Failure is a student's daily source of fear, negativity, and depression. Students will be given the constructive skills to understand failure as formative learning experiences.	7	2
7	My India My Pride: Glorious Past - Part 1: India's ancient Rishis, scholars, and intellectuals have made tremendous contributions to the world, they developed	7	2

	an advanced, sophisticated culture and civilization which began thousands of years ago. Students will learn the importance of studying India's glorious past so that they could develop a strong passion and pride for our nation.		
8	My India My Pride: Glorious Past - Part 2: Our ancient concepts can be used to seek revolutionary ideas and to generate inspiration. Students will develop a deeper interest in India's Glorious Past – by appreciating the need to read about it, research it, write about it, and share it.	7	2
9	Learning from Legends: A.P.J. Abdul Kalam: Dr Kalam's inspirational life displayed legendary qualities which apply to students (1) Dare to Dream (2) Work Hard (3) Get Good Guidance (4) Humility (5) Use Your Talents for the Benefit of Others	7	2
10	Soft Skills Networking & Leadership: Students are taught the means of building a professional network and developing a leadership attitude.	7	2
11	Soft Skills Project Management: Students will learn the secrets of project management through the Akshardham case study. They will then practice these skills through an activity relevant to student life	6	2
12	Remaking Yourself: Handling Social Media: Students will learn how social media can become addictive and they will imbibe simple methods to take back control.	6	2
13	Facing Failures Power of Faith: Students will learn about the : power and necessity of faith in our daily lives.	6	2
14	From House to Home Bonding the Family: Students will understand the importance of strong family relationships. They will learn how to overcome the generation gap and connect with their family more.	6	2
15	Selfless Service Seva: Students will learn that performing seva is beneficial to one's health, wellbeing, and happiness. It also benefits and inspires others.	6	2
	Total	100%	30

i. Reference Books:

1. Integrated Personality Development Course (TextBook) - By Bochasawasi Akshar Purushottam Swaminarayan Sansth

- a. **Course Name: Public Health Nutrition**
- b. **Course Code: 19010202UE01**
- c. **Prerequisite:** Basic knowledge of Nutrition and Public Health
- d. **Rationale:** Public health nutrition is the field of study that is concerned with promotion. of good health through prevention of nutrition–related illnesses or deficiencies in the population, and the government policies and programmed that are aimed at solving these problems. This course aims to provide an overview of public health nutrition, nutritional problems of public health significance and programmed to tackle nutritional problems.
- e. **Course Learning Objective:**

CLOBJ 1	Remember major nutritional deficiency and their consequences in different populations
CLOBJ 2	Understand relationship between diet, lifestyle and risk of chronic diseases.
CLOBJ 3	Apply nutritional assessment methods to evaluate nutritional status of individuals and communities.
CLOBJ 4	Analyse effectiveness of public health and nutrition programs and policies.
CLOBJ 5	Evaluate outcomes of nutrition interventions on population health.
CLOBJ 6	Develop educational materials om nutrition for diverse populations.

f. **Course Learning Outcomes:**

CLO 1	Remember the global and national burden of nutritional deficiencies
CLO 2	Understand dietary habits and relate these to individual, social, cultural and economical factors
CLO 3	Apply public health nutrition problems in high-income and low-income countries respectively, and discuss long term and short-term countermeasures
CLO 4	Analyse role and impact of different policy documents, international agreements and regulations of importance for public health nutrition activities on a national and international level
CLO 5	Evaluate & compile scientific material in the field of public health nutrition
CLO 6	Apply nutritional health in daily life.

g. **Teaching & Examination Scheme:**

Teaching Scheme				Evaluation Scheme		
L	T	P	C	Internal Evaluation	ESE	

				MSE	CE	P	Theory	P	T o t a l
3	-	2	4	20	20	20	60	30	150

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Introduction to public health nutrition: History of the development of nutrition science Understanding the role of food and nutrients for health Nutrition Transition: Demographic, economic transition, poverty alleviation, food consumption patterns Determinants of nutritional status of individual & populations The need and adequacy of nutrients including the nutritional adequacy of various physiological groups according to the life cycle (from preconception to the elderly) Nutritional status assessment –MUAC, Weight for age, Height for age, Weight for height, BMI Definitions of various nutrition and health indicators	30	12
2	Major nutrition deficiencies as public health challenge Undernutrition: Global and Indian prevalence of undernutrition, risk factors consequences Major nutritional Problems – etiology, prevalence, clinical manifestations, preventive and therapeutic measures for: Macro and micro nutrient deficiencies. Other nutritional problems- etiology, prevalence, clinical manifestations, preventive and therapeutic measures for: lathyrism, dropsy, aflatoxicosis, alcoholism and fluorosis. Nutrition and Non-communicable diseases – Overweight, obesity and chronic degenerative diseases	30	12
3	National nutrition programmes and policies: Programmes and policies on nutrition and health (National and Global) 3.2. United Nations (UN) Decade of Action on Nutrition (2016 - 2025) 3.3. Overview of Sustainable Development Goals (SDGs) - keeping Nutrition at centre stage	10	5

4	Food and nutrition security: Factors affecting food security, indicators and systems (Global & national) 4.2. Identification and measurement of food insecurity (FIA, ISMAP) 4.3. Food production, access, distribution, availability, losses and consumption 4.4. Socio-cultural aspects of dietary patterns and their implications for nutrition and health	10	5
5	Approaches and Strategies for improving nutritional status and health: Programmatic approaches, their advantages and demerits, feasibility, and available resources Health-based interventions, food-based interventions including: Fortification and genetic improvement of foods, supplementary feeding, nutrition education for behaviour change. Case studies: Community-based preventive and management programmes; screening approaches, etc.	20	11
	Total	100%	45

i. Reference Books:

1. Sharda Gupta, Santosh Jain Passi, Rama Seth, Ranjana Mahna & Seema Puri Kumud Khanna, Nutrition and Dietetics, 2014 (TextBook).
2. Michael J. Gibney, Barrie M. Margetts, John M. Kearney, Lenore Arab, Public Health Nutrition, Wiley India Pvt. Ltd (TextBook)
3. Park Textbook of Preventive and Social Medicine, K Park, 21 st Edition, 2011, ISBN-14: 9788190128285, BANARSIDAS BHANOT PUBLISHERS (TextBook)

List of Practicals:

1. Public health nutrition
Nutritional status assessment –MUAC, Weight for age, Height for age, Weight for height, BMI
2. Nutrition deficiencies as public health challenge
 1. Global and Indian prevalence of undernutrition, risk factors consequences.
 2. Nutritional problems- etiology, prevalence, clinical manifestations, preventive and therapeutic measures for: lathyrism, dropsy, aflatoxicosis, alcoholism and fluorosis
 3. Nutrition and Non-communicable diseases – Overweight, obesity and chronic degenerative diseases
3. Nutrition programmes and policies
 1. Sustainable Development Goals (SDGs) - keeping Nutrition at centre stage
 2. Programmes and policies on nutrition and health
4. Food and nutrition security
 1. Visit to Public Health Lab, VMC.
5. Approaches and Strategies for improving nutritional status and health
 1. Health-based interventions, food-based interventions
 2. Case studies: Community-based preventive and management programmes; screening approaches

- a. **Course Name: Maintenance of Household Apparatus**
- b. **Course Code: 03010602UE01**
- c. **Prerequisite:** Knowledge of Physics and Mathematics up to 12th science level.
- d. **Rationale:** This course provides maintenance details of household appliances essential to prolong their lifespan, ensure their function efficiently, and prevent costly repairs or replacements
- e. **Course Learning Objective:**

CLOBJ 1	Remember common household apparatus and their functions.
CLOBJ 2	Explain Principles behind the operation of household apparatus
CLOBJ 3	Demonstrate proper maintenance techniques for different household apparatus.
CLOBJ 4	Evaluate performance of household apparatus to identify area for improvement.
CLOBJ 5	Assess effectiveness of maintenance procedures on the performance of household apparatus.
CLOBJ 6	Develop comprehensive maintenance plans for specific household apparatus.

- f. **Course Learning Outcomes:**

CLO 1	Remember concepts, perform calculations, and identify practical applications and assess electrical loads and power ratings of household appliances.
CLO 2	understanding of electrical circuits including the ability to apply concepts, perform calculations, and identify practical applications and assess electrical loads and power ratings of household appliances.
CLO 3	Apply multi-meter to measure various electrical quantities accurately, and apply measurement techniques to assess power consumption and energy efficiency of electrical appliances.
CLO 4	analyse a comprehensive understanding of earthing and grounding systems in residential buildings, recognizing the significance of grounding for electrical safety, and showcasing practical skills.
CLO 5	Interpret various electrical wiring systems employed in households, encompassing staircase and Godown wiring, and competence in hands-on wiring connections while prioritizing safety measures.
CLO 6	Create thorough knowledge and design for using household appliances

- g. **Teaching & Examination Scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
3	-	2	4	20	20	20	60	30	150

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Understanding Electrical Circuits Series and parallel circuits: concepts, calculations, and applications. Electrical loads and power ratings of household appliances. Safety considerations and working with electrical circuits and appliances.	18	8
2	Electrical Measurements: Measurement of voltage, current, and resistance using multimeters. Measurement of power consumption and energy efficiency of electrical appliances. Understanding power factor and its significance in household appliances. Comparison between AC and DC circuit. Understand the difference between various measuring instruments between AC and DC circuit.	18	8
3	Earthing and Grounding: Detailed study of earthing and grounding systems in residential buildings. Pipe earthing and plate earthing of the electrical system. Importance of grounding for electrical safety and protection of appliances. Practical demonstration and installation of earthing systems	18	8
4	Types of Wiring: Study of different types of electrical wiring systems used in households. Staircase wiring, Godown wiring. Wiring for lighting circuits, power outlets, and specialized appliances. Hands-on practice on wiring connections and safety measures.	13	6
5	Maintenance of Household Appliances: Understanding the common components of household appliances. Techniques for cleaning and maintaining refrigerators, ovens, microwaves, and dishwashers. Practice- preventive maintenance, regular cleaning, oiling, greasing of household gadgets like fans, coolers,	20	9

	water pump motors etc. Practice- Replacement of damaged switches, MCB, fan- capacitor, regulator, and lighting points i.e. holder, choke, starters, water coolers, and their pump & motor. Practice- Maintenance of electrical equipment's like- iron, toaster, induction-plate & cooker,ups ,gyser and inverter. Practice: Basic maintenance of AC. Practice: Basic maintenance of Refrigerator. Troubleshooting common problems in appliances and basic repairs. Concept of smart technology.		
6	Safety and Precautions: Fire safety and prevention measures for electrical appliances. Identifying potential electrical hazards and safety measures. Safe handling of electrical shocks and emergency response procedures	13	6
	Total	100%	45

i. Reference Books:

1. Electricity and Basic Electronics By Stephen R. Matt | Goodheart-Willcox Co Inc.,U.S | Revised edition, Pub. Year 1982
2. Home Maintenance For Dummies By J Carey | John Wiley & Sons Inc | 2nd, Pub. Year 2009
3. Electrical Wiring Residential (TextBook) By Ray C. Mullin and Phil Simmons | Delmar Cengage Learning | 17th edition, Pub. Year 2011

List of Practicals:

1. Introduction to various electrical symbols and various measuring instruments.
2. To learn how to measure voltage, current, and resistance using a multimeter and to understand their importance in electrical measurements.
3. To study and perform ohm's law, series and parallel circuit.
4. To investigate the electrical characteristics of household appliances and assess their power consumption using a millimeter.
5. To explore the internal components and workings of the fan by safely disassembling and reassembling.
6. To demonstrate and to understand the power consumption and comments on the various power.
7. To understand potential electrical fire hazards and learn to use fire extinguishers effectively.
8. To measure earth resistance with the help of an earth resistance meter.
9. To understand the importance of MCB, ELCB, and Fuse and explain all these with the help of electrical circuits.
10. To utilize a non-contact voltage tester to check the connectivity of the system
11. Demonstration and maintenance of any one of the iron, toaster, induction-plate & cooker, ups, gysers and inverter.
12. To study the various soldering techniques.

a. **Course Name: Human Psychology**

b. **Course Code: 15010402UE01**

c. **Prerequisite:** Shall have the basic knowledge of human biology and English language

d. **Rationale:** Students will have basic understanding of different concepts of Psychology and various mental processes.

e. **Course Learning Objective:**

CLOBJ 1	Remember principles of classical and operant conditioning.
CLOBJ 2	Understand basic structure and functions of nervous system
CLOBJ 3	Apply psychological research methods to design and conduct a simple experiment or study.
CLOBJ 4	Analyse factor that influence human behaviour such as genetics, environment and culture
CLOBJ 5	Evaluate effectiveness of different therapeutic approaches in treating psychological disorders
CLOBJ 6	Design research study to investigate a new hypothesis in field of psychology.

f. **Course Learning Outcomes:**

CLO 1	Remember concepts, perform calculations, and identify practical applications and assess electrical loads and power ratings of household appliances.
CLO 2	Understanding of electrical circuits including the ability to apply concepts, perform calculations, and identify practical applications and assess electrical loads and power ratings of household appliances.
CLO 3	Apply multi-meter to measure various electrical quantities accurately, and apply measurement techniques to assess power consumption and energy efficiency of electrical appliances.
CLO 4	Analyse a comprehensive understanding of earthing and grounding systems in residential buildings, recognizing the significance of grounding for electrical safety, and showcasing practical skills.
CLO 5	Interpret various electrical wiring systems employed in households, encompassing staircase and Godown wiring, and competence in hands-on wiring connections while prioritizing safety measures.
CLO 6	Create thorough knowledge and design for using household appliances

g. **Teaching & Examination Scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
4	-	-	4	20	20	-	60	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. Course Content

Sr. No.	Content	Weightage	Teaching Hours
1	Unit I Human Development: Meaning, Difference between Growth, Development, Maturation and Evolution Factors Influencing Development Overview of Developmental stages Prenatal stage Infancy Childhood Challenges of Adolescence Adulthood Old Age	17	10
2	Unit II Sensation, Attention & Perception: Sensation: Definition, types Attention: Definition, Types Perception: Figure-Ground perception, perceptual constancies: shape, size, brightness; Depth perception: monocular and binocular cues; illusions	17	10
3	Unit III Thinking: Nature and Processes Problem Solving Reasoning Decision Making Developing Creative Thinking Barriers to Creative Thinking Strategies for Creative Thinking	17	10
4	Unit IV Intelligence: Theories of Intelligence, Multiple Intelligence theory, Triarchic Theory of Intelligence, PASS Model of Intelligence, Individual Differences in Intelligence Emotional Intelligence.	17	10
5	Unit V Personality: Concept of Self and Personality Major Approaches of Personality Trait & Type Approaches Five-Factor Model Psychodynamic Approach Behavioural Approach Humanistic Approach Refrigerator. Troubleshooting common problems in appliances and basic repairs. Concept of smart technology.	16	10
6	Unit VI Sexuality and Gender: Physical and psychological side of psychology Gender theories Human sexual behavior Sexual dysfunction and problems	16	10

	Total	100%	60
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i. Reference Books:

1. Introduction to psychology By Baron R | McGraw Hill Publishing House, New Delhi
2. Psychology By Ciccarelli, S. K. & Meyer, G. E. (2008), | Pearson Education
3. Introduction to Psychology By Clifford.T Morgan | Tata Mcgraw Hill

- a. **Course Name: Digital Health**
- b. **Course Code: 19010002UE01**
- c. **Prerequisite:** Basic Knowledge of Healthcare Systems, Medical Science, Information Technology Literacy, Healthcare Terminology, Regulatory and Ethical Considerations.
- d. **Rationale:** Emergence of Digital Health Technologies, Data-Driven Decision Making, Interdisciplinary Nature & Improved Patient Outcomes.
- e. **Course Learning Objective:**

CLOBJ 1	Remember the Interdisciplinary Nature of Digital Health: Identify the diverse disciplines and stakeholders involved in digital health, including healthcare providers, technologists, policymakers, researchers, and patients.
CLOBJ 2	Understand the historical development and key milestones in the field of digital health, including the adoption of electronic health records (EHRs), emergence of telemedicine, and advancements in wearable technologies.
CLOBJ 3	Apply the functionalities and significance of health information technologies such as Electronic Health Records (EHRs), Health Information Exchange (HIE), and interoperability standards in facilitating data exchange and continuity of care.
CLOBJ 4	Analyse the capabilities and potential applications of wearable technologies and remote monitoring devices in healthcare, including monitoring vital signs, tracking physical activity, and managing chronic conditions.
CLOBJ 5	Evaluate the effectiveness, scalability, and regulatory considerations of telemedicine and health applications for chronic disease management and remote patient monitoring.
CLOBJ 6	Create awareness related to data privacy, patient consent, data security, and equity in access to digital health technologies, and their implications for research, development, and implementation.

- f. **Course Learning Outcomes:**

CLO 1	Remember the interdisciplinary nature of digital health, recognizing the contributions of various stakeholders and disciplines such as medicine, technology, policy, and entrepreneurship.
CLO 2	Understand functionalities and significance of health information technologies, including Electronic Health Records (EHRs), Health Information Exchange (HIE), and interoperability standards, in facilitating data exchange and healthcare delivery.
CLO 3	Apply knowledge of wearable technologies and remote monitoring devices to analyse their potential applications in healthcare, including disease management, preventive care, and patient engagement.

CLO 4	Analyse the impact of health analytics and big data in healthcare, including their role in improving clinical decision-making, population health management, and personalized medicine.
CLO 5	Evaluate the future trends and emerging technologies in digital health, including Internet of Things (IoT) applications, block chain in healthcare, and other transformative technologies, in terms of their potential impact, scalability, and ethical considerations..
CLO 6	Synthesize knowledge of artificial intelligence (AI) and machine learning applications in healthcare to propose innovative solutions for diagnostics, treatment optimization, and predictive analytics.

g. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
4	-	-	4	20	20	-	60	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Foundations of Digital Health Overview of Digital Health Evolution and milestones in Digital Health Interdisciplinary nature of Digital Health Key stakeholders and their roles Health Information Technologies: Electronic Health Records (EHR), Health Information Exchange (HIE), Standards, and Interoperability	25%	15
2	Patient-Centric Technologies Wearable Technologies and Remote Monitoring Telemedicine and telehealth Mobile Health (mHealth) Applications Chronic disease management using mobile technologies Regulatory considerations for mobile health apps	25%	15
3	Data Analytics and Artificial Intelligence in Healthcare Health Analytics and Big Data Role of data analytics in healthcare Big data applications in health Artificial Intelligence in Healthcare Machine learning applications in diagnostics and treatment	25%	15

4	Innovation, Ethics, and Future Trends Digital Health Start-ups and Innovations Case studies of successful digital health innovations Entrepreneurship in digital health Regulatory and Ethical Considerations Regulatory frameworks for digital health products Ethical considerations in digital health research and development Future Trends and Emerging Technologies Internet of Things (IoT) in healthcare Block chain applications in healthcare Emerging technologies shaping the future of digital health	25%	15
	Total	100%	60

i. Text Book and Reference Book:

1. Digital Health: A Framework for Healthcare Transformation"By Marion J. Ball, Patricia C. Dykes, and Kathryn H. Bowles | Springer
2. Introduction to Digital Health By Jörg F. Debatin, Nassir Navab, Christoph Seebauer | Springer
3. The Fourth Industrial Revolution By Klaus Schwab | Crown Business
4. Healthcare Information Technology Exam Guide for CompTIA Healthcare IT Technician and HIT Pro Certifications By Kathleen A. McCormick | McGraw-Hill Education
5. Digital Health: Scaling Healthcare to the World By Homero Rivas, Paul Cerrato, and John Mattison | CRC Press

Semester -3

- a. **Course Name: Biodiversity and Conservation**
- b. **Course Code: 11011403DS01**
- c. **Prerequisite:** Shall have basic knowledge of Biology and Biodiversity.
- d. **Rationale:** Acquire knowledge on different biodiversity conservation method along with its index.
- e. **Course Learning Objective:**

CLOBJ 1	Understand and Explain Biodiversity Concepts
CLOBJ 2	Analyze Threats to Biodiversity
CLOBJ 3	Evaluate Conservation Strategies
CLOBJ 4	Apply Principles of Conservation Biology

- f. **Course Learning Outcomes:**

CLO 1	define biodiversity and explain its importance in ecosystems, including the various levels of biodiversity (genetic, species, and ecosystem) and their contributions to ecosystem stability and resilience.
CLO 2	identify and analyze the major threats to biodiversity, including habitat loss, pollution, climate change, overexploitation, and invasive species, and assess their impacts on different levels of biodiversity.
CLO 3	evaluate various conservation strategies and practices, such as protected areas, restoration projects, and sustainable resource management, and assess their effectiveness in preserving biodiversity and promoting ecosystem health.
CLO 4	apply principles of conservation biology to design and implement conservation projects, including formulating objectives, selecting appropriate methods, and assessing outcomes to ensure the preservation of biodiversity.

- g. **Teaching & Examination Scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
4	-	-	4	20	20	-	60	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. Course Content:

Course Content		W-Weightage (%), T-Teaching Hours	
Sr. No.	Topics	W	T
1	Unit 1: Introduction to Biodiversity: Introduction- Definition, Ecosystem Diversity, Species Diversity, Genetic diversity: Structural and functional aspects. Bio-geographic classification of India. Importance of Biodiversity, Role of Biodiversity in ecological balance, Biodiversity Status, Significance of Biodiversity.	25%	15
2	Unit 2: Biodiversity Indices: Different types of biodiversity measurement indices viz. Shannon Wiener biodiversity index, Simpson Index, similarity index, evenness index, frequency, abundance, density, relative density. Functional Diversity Indices: Functional trait diversity, Functional dispersion indices, Functional richness indices. Landscape-Level Biodiversity Indices: Landscape diversity indices, Fragmentation indices, Connectivity indices.	25%	15
3	Unit 3: Loss of Biodiversity: Habitat loss and Destruction, Introduction of Exotic or Non-native Species, Human-generated pollution and contaminants, Population Growth, Over-exploitation, Global climate change, Species- Ecological theories, Anthropogenic disturbance, poaching of wildlife and man wildlife conflict, Factors for decline of biological diversity, Threatened and endangered animals of India.	25%	15
4	Unit 4: Conservation of Biodiversity: Basic concepts of conservation biology, history of conservation biology, the value of biodiversity and conservation, current practice in conservation, relevance of ecosystem diversity as well as services in conservation, <i>In situ</i> conservation; <i>Ex-situ</i> conservation, role of local communities and traditional knowledge in conservation; biodiversity hotspots; Conservation Practices in World and in India, Organizations involved in resource conservation IUCN, WWF, UNEP, UNESCO, Biodiversity International, IPGRI, FAO, BSI, ZSI. Phytogeography – Hotspots of India and world. General account on activities of DBT, BSI, NBPGR, ZSI, FSI, NBFGR and NBAGR NFPTCR, Sacred groves, Biodiversity register.	25%	15
	Total	100%	60

i. Text Book and Reference Book:

1. Chandel, K.P.S., Shukla, G. And Sharma, N. (1996). Biodiversity in Medicinal and Aromatic
2. Plants in India Conservation and Utilization, National Bureau of Plant Genetic Resources, New Delhi.
3. Zachos, Frank E.; Habel, Jan Christian (2011) Biodiversity Hotspots, Distribution and Protection of Conservation Priority Areas, Springer
4. Council of Scientific and Industrial Research (1986). The Useful Plants of India Publication and Information Directorate, CSIR, New Delhi.

- a. **Course Name: Environmental Resources & Management**
- b. **Course Code: 11011403DS02**
- c. **Prerequisite:** Shall have basic knowledge of the types, importance, and influencing factors of environmental resources and management strategies and policies.
- d. **Rationale:** Equip students with the knowledge and skills necessary to manage natural resources sustainably by understanding complex ecological and social interdependencies.
- e. **Course Learning Objective:**

CLOBJ 1	Understand the Principles of Environmental Resource Management
CLOBJ 2	Evaluate Environmental Impacts and Develop Management Strategies
CLOBJ 3	Analyze Policy and Legislation in Environmental Management
CLOBJ 4	Implement Resource Management Techniques
CLOBJ 5	Develop and Present Environmental Management Plans

- f. **Course Learning Outcomes:**

CLO 1	Explain the core principles and concepts of environmental resource management, including sustainable use, conservation strategies, and the balance between resource utilization and preservation.
CLO 2	Assess the environmental impacts of various resource extraction and usage activities and develop effective management strategies to mitigate these impacts and promote sustainability.
CLO 3	Analyze existing policies, regulations, and legislation related to environmental resource management and assess their effectiveness in addressing resource management challenges and promoting environmental sustainability.
CLO 4	Apply practical techniques for managing environmental resources, including monitoring and assessment methods, resource allocation, and conservation practices, to ensure the sustainable use of natural resources.
CLO 5	Create comprehensive environmental management plans for specific projects or regions, incorporating data analysis, stakeholder input, and best practices to achieve sustainable resource management goals and present these plans effectively to various audiences.

- g. **Teaching & Examination Scheme:**

Teaching Scheme	Evaluation Scheme
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L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
4	-	-	4	20	20	-	60	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. Course Content:

Course Content		W-Weightage (%), T-Teaching Hours		
Sr. No.	Topics	W	T	
1	Unit 1: Elements of Environmental Resources Introduction to Environmental Resources – Classification of natural resources, List of natural resources, Values of natural resources, Interrelationships, Demands on Natural Resources, Factors influencing resource availability, distribution and use, Threats to natural resource, Scope and Importance of Natural Resources, Need for public awareness.	20%	15	
2	Unit 2: Management of Environmental Resources Energy resources: Growing energy needs, Renewable vs. non-renewable, conservation and management, Innovations in energy technology, Case studies. Water resource: Hydrological cycle, integrated water resource management; rainwater harvesting; watershed management; conflicts over water, environmental issues of lakes, dams and reservoirs; river linking and its impacts. Soil Resources: Soil types and health; soil degradation, erosion, and desertification; integrated strategies for soil conservation and regeneration; recent changes in land use and land cover pattern, land use planning. Coastal and Marine Resources: Coastal resources; mangrove and salt marsh ecosystems; integrated coastal zone management (ICZM); Threats to marine ecosystem; marine resource management.	30%	15	
3	Unit 3: Conservation and Management Forest Conservation and Management: Classification and distribution of forests; forest degradation; deforestation and desertification and their impact on environment; afforestation; current strategies of conservation and management of forest resource; agro-forestry, social forestry. Timber extraction, Impacts on forest resources and communities. Wildlife Conservation and management: Wildlife- concept and values, strategies of wildlife conservation and management; protected area	30%	15	

	network, sanctuary, national park, biosphere reserve; Conservation Management Areas (CMAs); Wetland Conservation and Management: Wetlands- definition, functions, ecology and biodiversity; wetland loss and degradation; Ramsar sites; strategies for wetland conservation and management, Wetland Conservation status in worldwide and India.		
4	Unit 4: Management law and Policies Introduction to Legal System (Environmental law and Policy), Sustainable Development Goals, frameworks for sustainable management, International environmental agreements, Case studies (Chipko movement etc.), Wildlife Protection Act, 1972, National Forest Policy; Forest (conservation) Act, 1980, Forest Rights Act 2006, Biological Diversity Act 2002, National Green Tribunal, Stockholm Conference.	20%	15
	Total	100%	60

i. Text Book and Reference Book:

1. Coastal Ecology & Management, Mann, K.H. 2000. Ecology of Coastal Waters with Implications for Management (2nd Edition). Chap. 2-5, pp.18-78 & Chap. 16, pp.280-303.
2. Global Change and Natural Resource Management, Vitousek, P.M. 1994. Beyond global warming: Ecology and global change. Ecology 75, 1861-1876
3. Mitchell, Bruce. 2018. Resource and Environmental Management: Third Edition. Oxford University Press.
4. Singh, K. K. 2008. Natural Resources Conservation & Management. M D Publications Pvt. Ltd, 1-280.
5. Oliver, C. D., & Oliver, F. A. (2018). Global resources and the environment. Cambridge University Press.
6. Heywood, V.H. & Watson, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press.
7. Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB) Townsend C., Harper J, and Michael Begon. Essentials of Ecology, Blackwell Science.
8. Singh, J.S., Singh, S.P. and Gupta, S.R. 2006. Ecology, Environment and Resource Conservation, Anamaya Publishers, New Delhi.

- a. **Course Name:** Lab 1- Biodiversity Lab
- b. **Course Code:** 11011403DS03
- c. **Prerequisite:** Should be familiar with the basic concept of species diversity, ecosystems etc.
- d. **Rationale:** Students will develop skills in biodiversity assessment and conservation planning, through theoretical learning and practical experiences.
- e. **Course Learning Objective:**

CLOBJ 1	Identify a variety of species across different taxa, including plants, animals, and microorganisms, using appropriate taxonomic keys and field guides.
CLOBJ 2	Apply field sampling techniques for biodiversity assessment, including quadrat sampling, transect methods, and species counting, to gather data effectively in different ecosystems.
CLOBJ 3	Understanding of the importance of biodiversity conservation, exploring threats to biodiversity, conservation strategies, and the role of local communities and global initiatives in biodiversity conservation efforts.

f. **Course Learning Outcomes:**

CLO 1	Understand the Diversity of Life Forms
CLO 2	Analyze Ecological Relationships
CLO 3	Apply Conservation Techniques

g. **Teaching & Examination Scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
-	-	3	2	-	-	20	-	30	50

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. Course content:

Exp. No.	Name of the Experiment
1	Biodiversity index
2	Population density index
3	Animal community structure of selected Biomes and Habitats
4	Plants community structure of selected Biomes and Habitats
5	Species diversity
6	Determination of % frequency, density and abundance using quadrat method

i. Text Book and Reference Book:

- a. Gaston, K. J., & Spicer, J. I. (2004). Biodiversity: an introduction.
- b. Wheater, C. P., Bell, J. R., & Cook, P. A. (2020). Practical field ecology: a project guide. John Wiley & Sons.
- c. Van Dyke, F. (2008). Conservation biology: foundations, concepts, applications. Springer Science & Business Media.
- d. Molles, M. C., & Tibbets, T. (2002). Ecology: concepts and applications (pp. 186-254). New York: McGraw-Hill.

a. **Course Name: Lab 2- Environmental Resources**

b. **Course Code: 11011403DS04**

c. **Prerequisite:** Expected to have a solid understanding of environmental resources and environmental systems.

d. **Rationale:** Understanding and practical skills development related to the study and management of environmental resources and environmental systems.

e. **Course Learning Objective:**

CLOBJ 1	Understand the Types and Importance of Environmental Resources and explain their ecological and economic significance.
CLOBJ 2	Analyze the Impact of Human Activities such as deforestation, pollution, and resource extraction on the availability and sustainability of environmental resources.
CLOBJ 3	Assess different conservation methods and apply Conservation Strategies for Sustainable Resource Management

f. **Course Learning Outcomes:**

CLO 1	Understanding of various methods for assessing environmental resources, including soil, water, and biodiversity, through hands-on experiments and field studies.
CLO 2	Develop skills in using analytical instruments and techniques for measuring the quality and quantity of natural resources, such as water quality parameters, soil composition, and energy flow in ecosystems.
CLO 3	Evaluation of the sustainability of natural resource use and propose effective management strategies to mitigate environmental degradation, focusing on conservation and efficient utilization practices.

g. **Teaching & Examination Scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	

-	-	3	2	-	-	20	-	30	50
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L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination

h. Course content

Exp. No.	Name of the Experiment
1	Rainwater Harvesting and Water Shed Management.
2	Demonstration of Hydro Power Plant
3	Demonstration of Thermal Power Plant
4	Visit and demonstration to Mines and Minerals Depository.
5	Visit to Wildlife Sanctuary and Forest to explore the Natural Resources.
6	Demonstration of Solar, Wind, Geothermal Power Stations.

i. Text Book and Reference Book:

- a. Coastal Ecology & Management, Mann, K.H. 2000. Ecology of Coastal Waters with Implications for Management (2nd Edition). Chap. 2-5, pp.18-78 & Chap. 16, pp.280-303.
- b. Global Change and Natural Resource Management, Vitousek, P.M. 1994. Beyond global warming: Ecology and global change. Ecology 75, 1861-1876
- c. Mitchell, Bruce. 2018. Resource and Environmental Management: Third Edition. Oxford University Press.
- d. Singh, K. K. 2008. Natural Resources Conservation & Management. M D Publications Pvt. Ltd, 1-280.

- a. **Course Name:** IPDC Including History & Culture of India and IKS 2 (VAC 3)
- b. **Course Code:** 00019303VA01
- c. **Prerequisite:** IPDC Including History and Culture of India and IKS I
- d. **Rationale:** IPDC aims to prepare students for the modern challenges they face in their daily lives. Promoting fortitude in the face of failures, Unity amongst family discord, Self-discipline amidst Distractions... and many more priceless lessons. The course focuses on morality and character development at the core of student growth, to enable students to become self-aware, sincere, and successful in their many roles as an ambitious student, reliable employee, caring family member, and considerate citizen.
- e. **Course Learning Objective:**

Not received

- f. **Course Learning Outcomes:**

Not received

- g. **Teaching scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
2	-	-	2	-	100	-	-	-	100

- h. **Course Content**

Course Content		W-Weightage (%), T-Teaching Hours		
Sr. No.	Topics	W	T	
1	Remaking Yourself : Begin with the End in mind Students will learn to visualize their future goals and will structure their lives through smart goals to give themselves direction and ultimately take them to where they want to go.	6%	2	
2	Remaking Yourself: Being Addiction Free Students will explore the detrimental effects of addictions on one's health, personal life, and family life. They will learn how to take control of their life by becoming addiction free.	6%	2	
3	Selfless Service: Case Study: Disaster Relief Students will apply previous lessons of seva, to analyse the case study of the Bhuj earthquake relief work.	6%	2	
4	Soft Skills: Teamwork & Harmony Students will learn the six steps of teamwork and harmony that are	6%	2	

	essential for students' professional and daily life.		
5	My India My Pride: Present Scenario To implement the transformation of India from a developing country into a developed country it is necessary to have a value based citizen. Students will see how the transformation to a greater India relies on the vision and efforts of themselves as a youth.	6%	2
6	Learning from Legends: Leading Without Leading Students will explore a new approach to leadership, through humility.	7%	2
7	My India My Pride: An Ideal Citizen 1 Students will learn that to become value based citizens, they must first develop good values in their lives. They start by exploring the values of responsibility and integrity.	7%	2
8	My India My Pride: An Ideal Citizen 2 Students will learn that by developing the values of loyalty, sincerity, and punctuality; they become indispensable and can leave a strong impression. They will start developing these values by trying to keep perfection in every small task and by looking at the bigger picture.	7%	2
9	Facing Failures: Timeless Wisdom for Daily Life Students will learn the role wisdom plays in finding long term stability. They will use ancient wisdom to solve their modern day challenges.	7%	2
10	From House to Home: Forgive & Forget Students will understand the importance and benefits that forgiveness plays in their personal and professional life. They will learn to apply this knowledge in realistic situations.	7%	2
11	Remaking Yourself: Stress Management Students will learn to cope with current and future causes of stress.	7%	2
12	Remaking Yourself: Better Health Better Future A healthy body prevents disease and stress; increases positivity, productivity, and brainpower. Students will learn to maintain good health through regular exercise, healthy eating habits, and regular and sufficient sleep.	7%	2
13	Learning from Legends: Words of Wisdom A panel of learned and experienced mentors will personally answer practical questions that students face in their daily life.	7%	2
14	Soft Skills: Financial Planning	7%	2

	Students will develop a variety of practical financial skills that prepare them to become financially stable throughout their future careers.		
15	Remaking Yourself: Impact of Company and Life After IPDC Students will understand that the type of company that we keep, has a crucial role in determining who we are and who we will become. They will develop the ability to create a positive environment around them. This concluding lecture encourages students to keep practising these priceless lessons and prepares them for the next steps in their lives.	7%	2
	Total	100%	30

i. References books

Not received

- a. **Course Name: Advanced English (AEC 3)**
- b. **Course Code: 00019303AE01**
- c. **Prerequisite:** Basic Knowledge of Commercial Communication and provide students with soft skills that complement their hard skills, making them more marketable when entering the workforce. To inspire students to strive for a higher sense of character by learning from role models who have lived principled, disciplined, and value based lives.
- d. **Rationale:** Advanced Communication Skills of English Language.
- e. **Course Learning Objective:**
Not received
- f. **Course Learning Outcomes:**
Not received
- g. **Teaching scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
2	-	-	2	-	100	-	60	-	100

h. **Course Content**

Course Content		W-Weightage (%), T-Teaching Hours	
Sr. No.	Topics	W	T
1	ABCD	5%	2
2	Public Speaking Define Public Speaking Importance of Public speaking Types of Public speaking Techniques to master public speaking	10%	5
3	Activity Speaking World’s best public speakers (activity based)	5%	1
4	Debate Vs Group Discussion Define Debate vs GD Importance of debate Techniques to master debate	10%	5
5	Activity Debate Debate activity	10%	2
6	Vocabulary Building Advanced vocabulary building Homophones	10%	2

	Homonyms Analogies		
7	Reading Comprehension Reading Comprehension	10%	5
8	Grammar Error Analysis Para jumble sentence completion confusable sentences Incorrectly spelt words One word substitute Cloze Passages	10%	2
9	Report Writing Report Writing	10%	2
10	Memo Writing Memo Writing	10%	2
11	Narrative Story Writing Narrative Story Writing	5%	2
12	Activity Tourism Pitch Activity Tourism Pitch	5%	2
	Total	100%	30

i. Text Books:

1. Business Correspondence and Report Writing

By SHARMA, R. AND MOHAN, K.

2. Communication Skills

By Kumar S and Lata P | New Delhi Oxford University Press

3. Practical English Usage

By MICHAEL SWAN

4. A Remedial English Grammar for Foreign Student

By F.T. WOOD

5. On Writing Well

By William Zinsser | Harper Paperbacks, 2006 | 30th anniversary edition

6. Oxford Practice Grammar

By John Eastwood | Oxford University Press

7. Quantitative Aptitude for Competitive Examinations

By Dr. R.S. Aggarwal

- a. **Course Name: Artificial intelligence Application in People Management**
- b. **Course Code: 05010103UE01**
- c. **Prerequisite:** understanding AI applications in people management includes foundational knowledge in human resources management, familiarity with basic concepts of artificial intelligence, and an understanding of data analysis and interpretation
- d. **Rationale:** AI applications in people management is to optimize HR processes, enhance employee experiences and drive organizational effectiveness through automation, data-driven decision-making, and personalized interventions.
- e. **Course Learning Objective:**
Not received
- f. **Course Learning Outcomes:**
Not received
- g. **Teaching scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
4	-	-	4	20	20	-	60	-	100

h. **Course Content**

Course Content		W-Weightage (%), T-Teaching Hours	
Sr. No.	Topics	W	T
1	Introduction to AI in people management Overview of artificial intelligence and its applications in HR and people Management Historical perspective and current trends in AI adoption in HR ethical considerations and Challenges in AI-driven HR practices	16%	10
2	Recruitment and Talent Acquisition AI- powered talent sourcing and candidate screening Application tracking systems (ATS) and resume parsing using AI algorithms Bias mitigation and fairness in AI-driven recruitment process	20%	12
3	Employee engagement and Retention Ai applications for measuring and analyzing employee engagement and satisfaction Predictive analytics for identifying flight risks and retention strategies	20%	8

	Personalized career development and learning pathways using AI-driven recommendations		
4	Performance management AI based performance evaluation and feedback systems continuous performance monitoring and feedback loops Data-driven insights for goal setting and performance improvement	22%	10
5	Learning and Development Adaptive learning platforms and personalized training recommendations AI-driven content curation and course recommendations Gamification and micro learning applications in employee development	11%	12
6	Employee wellbeing and Workforce Analytics AI-enabled well-being assessments and interventions Predictive analytics for identifying burnout and mental health risks Workforce planning and optimization using predictive workforce analytics	11%	8
	Total	100%	60

i. Text Books

1. **AI for HR: A Book of ideas for HR Professionals** By By Nigel Guenole/Jonathan Ferrar/ and Sheri Feinzig
2. **Artificial Intelligence in Human Resources Management: Theory and Practice** By Raghvendra Kumar and Kamal Kant (Springer, 2020)

a. **Course Name: Retail Management**

b. **Course Code: 21010103UE02**

c. **Prerequisite:** The students should have the basic knowledge about the retail management.

d. **Rationale:** The course provides theoretical knowledge about the concept of management in retail sector.

e. **Course Learning Objective:**

Not received

f. **Course Learning Outcomes:**

Not received

g. **Teaching scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
4	-	-	4	20	20	-	60	-	100

h. **Course Content**

Course Content		W-Weightage (%), T-Teaching Hours	
Sr. No.	Topics	W	T
1	NATURE & FUNCTIONS OF MANAGEMENT IN RETAIL SECTOR Importance & Definition of Management, Management Functions in Retail, Role of an Retail Manager, Management Skills for Retail management	10%	6
2	DEVELOPMENT OF MANAGEMENT THOUGHT Early Classical Approaches, Neo Classical Approaches, Modern Approaches	8%	4
3	INTRODUCTION TO PLANNING & DECISION MAKING IN RETAIL SECTOR Nature & Importance of Planning, Types of Plans, Meaning of Decision, Types of Decisions, Steps in Rational Decision making	18%	10
4	CONCEPT OF ORGANISING IN RETAIL SECTOR Concept, nature, significance of organizing, Formal and informal organization, Organization chart of a 5 star hotel,	20%	12

	Types of organization, functional , Line and staff relationship, Delegation and Authority, Centralization and Decentralization, Recruitment – internal and external sources, Steps in the process of selection, recruitment Vs selection.		
5	DIRECTING & LEADING IN RETAIL SECTOR Meaning, nature, significance, characteristics of directing, chain of command, authority – responsibility accountability relationship, Elements of Direction – supervision, communication, training and development, leadership, motivation, Leadership – meaning, importance, theories and styles, Communication – meaning, significance, types, process and barriers to communication, Supervision – Meaning, nature and significance of supervision.	18%	10
6	MANAGERIAL CONTROL IN RETAIL SECTOR Meaning of Managerial Control, Steps in Control Process, Need for Control System, Benefits of Control, Control Techniques	18%	10
7	MANAGERIAL CONTROL IN RETAIL SECTOR Meaning of Managerial Control, Steps in Control Process, Need for Control System, Benefits of Control, Control Techniques	8%	8
	Total	100%	60

i. Text Books

1. Retail Management

By Michael Levy & Barton A Weitz, Tata McGraw Hill

2. Retailing Management

By Gibson C Vedamani | Jaico Publishing House, Mumbai

3. Retail Strategies- Understanding why we shop,

By Jim | Jaico Publishing House, Mumbai

4. Retail Management

By Dunne Lusch | South Western Cengage Learning

5. Store Management

By K.S. Menon | Macmillan India Ltd

a. **Course Name: Artificial Intelligence**

b. **Course Code:** 03010503SE01

c. **Prerequisite:** Data structure, Probability and Statistics, Linear Algebra, Mathematics

d. **Rationale:** This course provides a broad introduction to Artificial Intelligence. AI techniques for search and knowledge representation also apply knowledge of AI planning and machine learning techniques to real-world problems

e. **Course Learning Objective:**

Not received

f. **Course Learning Outcomes:**

Not received

g. **Teaching scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
2	-	-	2		40	-	60	-	100

h. **Course Content**

Course Content		W-Weightage (%), T-Teaching Hours		
Sr. No.	Topics	W	T	
1	UNIT-1 Introduction to AI and ML concepts Machine Learning algorithms- Supervised Linear Regression, Logistic Regression, Decision Trees, Random Forest, Support Vector Machines (SVM), Naive Bayes, k-Nearest Neighbors (k-NN) Unsupervised K-Means Clustering, Hierarchical Clustering, Density Based Clustering, Anomaly Detection Techniques, Reinforcement Learning	20%	7	
2	UNIT-2 Programming fundamentals in Python- Syntax, Variables and Data Types, Operators, Control Structures, Functions, Data Structures, Input and Output, Modules and Packages	20%	6	
3	UNIT-3 Data preprocessing and Data analysis Using Python Library (Pandas,	20%	7	

	Numpy). Data exploration and Visualization Using Python Library (Matplotlib, Seaborn)		
4	UNIT-4 Model Evaluation- Classification Metrics, Regression Metrics Model Selection- Train-Test Split, Cross-Validation Methods (K-Fold, Random Sampling, Leave-one out, Hold-Out) Ethical considerations in AI and ML	20%	5
5	UNIT-5 Training and evaluating models on real-world datasets (e.g., image classification, text analysis)	20%	5
	Total	100%	30

i. Text Books

1. Artificial Intelligence: A Modern Approach" Author: Stuart Russell and Peter Norvig |Publisher: Pearson (TextBook)
2. Python Machine Learning" Author: Sebastian Raschka and Vahid Mirjalili | Publisher: Packt
3. Machine Learning Yearning" Author: Andrew Ng | Publisher: Deeplearning.ai
4. Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow" Author: Aurélien Géron | Publisher: O'Reilly Media
5. Machine Learning: A Probabilistic Perspective" Author: Kevin P. Murphy | Publisher: The MIT Press

a. **Course Name: Income Tax Return & E-Filing**

b. **Course Code: 16010103UE01**

c. **Prerequisite:** Familiarity with taxation principles and legal frameworks.

d. **Rationale:** Financial Knowledge is essential for grasping the complexities of income tax.

e. **Course Learning Objective:**

Not received

f. **Course Learning Outcomes:**

Not received

g. **Teaching scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
4	-	-	4	20	20	-	60	-	100

h. **Course Content**

Course Content		W-Weightage (%), T-Teaching Hours	
Sr. No.	Topics	W	T
1	Unit 1 - Introduction to Direct TaxationBasic Concepts: Income, agricultural Income, casual income, assessment year, previous year, gross total income, total income, person. Basis of charge: Scope of total income, residence and tax liability, income which does not form part of total income	25%	15
2	Unit 2 - Heads of Income - 1Income from Salary Income from house property	25%	15
3	Unit 3 - Heads of Income - 2Profit and gains of business or profession, including provisions relating to specific business; Capital gains, Income from other sources, Computation of Tax Liability: Set-off and carry forward of losses; Deduction from gross total	25%	15
4	Unit 4 - Payment of TaxDue date of filing of income tax return. Instructions for filling out form ITR-1, ITR-2, ITR-3, ITR-4, ITR-4S, ITR-5, ITR-6. Introduction to Income Tax Portal; preparation of electronic return (practical workshops)	25%	15
	Total	100%	60

i. **Text Books**

1. **Direct Tax Laws & Practices** By Girish Ahuja & Ravi Gupta | Bharat Law House
2. **Direct Taxes - Laws and Practice** By Dr. Vinod Singhania | Taxmann
3. **Students Guide to Income Tax - Problems and Solutions** By V K Singhania | Taxmann; 2015 edition

- a. **Course Name:** Basic French-I
- b. **Course Code:** 00019303AE03
- c. **Prerequisite:** Knowledge of English Language
- d. **Rationale:** Basic Communication Skills of French Language.
- e. **Course Learning Objective:**
Not received
- f. **Course Learning Outcomes:**
Not received
- g. **Teaching scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
2	-	-	2		40	-	60	-	100

h. **Course Content**

Course Content		W-Weightage (%), T-Teaching Hours		
Sr. No.	Topics	W	T	
1	Grammar Alphabets Numbers Telling time Personal Pronouns Nouns (masculine & feminine nouns, singular and plural nouns) Verbe conjugaisons (être, avoir, s'appeler and "er ending") Adjective possessive (mon, ma, ton, ta, etc.)	33%	10	
2	Listening Skills Sounds French Songs Basic Vocabulary (months of the year, days of the week, family members' names, Countries and nationalities, colors, Professions)	17%	5	
3	Speaking Skills How to Introduce self? Greetings How to ask and tell time? How to talk about Family?	17%	5	
4	Reading Skills Samples of: Self-Introduction My family	33%	10	

	Total	100%	30
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i. Text Books

1. Saison 1 Didier

By Marie-Noelle Cocton | Didier

2. Enchanté 0

By Ms. Archana Khurana | Rachna Sagar

3. Larrouse Dictionnaire de Poche

4. Larousse French Grammar (Mini) by Paperback

5. Plaisir D'ecrire

By Viral Thakkar | Saraswati House Pvt. Ltd

- a. **Course Name:** Cyber Security, Tools, Techniques and Counter Measures
- b. **Course Code:** 06010103UE02
- c. **Prerequisite:** Knowledge of operating systems including Windows • Understanding of computer architecture and components • Awareness of common security threats and attack vectors • Understanding of cybersecurity laws and regulations
- d. **Rationale:** This course is aimed at providing a comprehensive overview of the different facets of Cyber Security. In addition, the course will detail into specifics of Cyber Security with Cyber Laws both in Global and Indian Legal environments.
- e. **Course Learning Objective:**
Not received
- f. **Course Learning Outcomes:**
Not received
- g. **Teaching scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
4	-	-	4	20	20	-	60	-	100

h. **Course Content**

Course Content		W-Weightage (%), T-Teaching Hours		
Sr. No.	Topics	W	T	
1	Introduction to Cyber security Concept of Internet, World wide web and Cyberspace Regulation of cyberspace, Concept of cyber security, Issues and challenges of cyber Security.Cyber terrorism, Cyber Defamation	15%	10	
2	Cyber crime Classification of cyber crimes, Common cyber crimes- cyber crime targeting computers and mobiles, cyber crime against women and children, financial frauds, social engineering attacks, malware and ransomware attacks, zero day and zero click attacks, Cybercriminals modus-operandi ,Reporting of cyber crimes, Remedial and mitigation measures	15%	12	
3	Cyber law Need for Cyber Law, Cyber Jurisprudence at International and Indian Level Legal perspective of cyber crime, IT Act 2000 and its amendments, Cyber crime and offenses, Laws regarding posting of inappropriate content, Relevant provisions	15%	13	

	of Payment Settlement Act,2007, Organizations dealing with Cyber crime and Cyber security in India, Case studies.		
4	Social Media Overview and Security Introduction to Social networks. Types of Social media platforms, Social media monitoring, Social media privacy, Challenges, opportunities and pitfalls in online social network, Security issues related to social media, Flagging and reporting of inappropriate content,, Best practices for the use of Social media, Case studies.	25%	15
	E - Commerce and Digital Payments, Digital Devices Security, Tools and Technologies for Cyber Security Definition of E- Commerce,, Elements of E-Commerce security, E-Commerce threats, E-Commerce security best practices, Introduction to digital payments, Components of digital payment and stakeholders, Digital payments related common frauds and preventive measures.Modes of digital payments- Banking Cards, Unified Payment Interface (UPI), e-Wallets, Unstructured Supplementary Service Data (USSD) Aadhar enabled payments,. RBI guidelines on digital payments and customer protection in unauthorized banking transactions. End Point device and Mobile phone security, Password policy, Data backup, Downloading and management of third party software, Device security policies, Significance and Management of Ant-virus, of Antivirus, Wi-Fi security, Configuration of basic security policy and permissions.	30	20
	Total	100%	60

i. Text Books

- 1. Information Security Principles and Practice**
By Deven Shah, | Wiley-India
- 2. Cryptography and Network Security (TextBook)**
- 3. By Atul Kahate, TMH**
- 4. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives**
- 5. By Nina Godboleand Sunit Belpure | Wiley**

a. **Course Name: Advanced English-I**

b. **Course Code: 00019303AE01**

c. **Prerequisite:** Basic Knowledge of Commercial Communication and provide students with soft skills that complement their hard skills, making them more marketable when entering the workforce. To inspire students to strive for a higher sense of character by learning from role models who have lived principled, disciplined, and value-based lives.

d. **Rationale:** Advanced Communication Skills of English Language

e. **Course Learning Objective:**

Not received

f. **Course Learning Outcomes:**

Not received

g. **Teaching scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
2	-	-	2	-	40	-	60	-	100

h. **Course Content**

Course Content		W-Weightage (%), T-Teaching Hours	
Sr. No.	Topics	W	T
1	abcd	5%	2
2	Public Speaking Define Public Speaking Importance of Public speaking Types of Public speaking Techniques to master public speaking	10%	5
3	Activity - Speaking World’s best public speakers (activity based)	5%	1
4	Debate Vs Group Discussion Define Debate vs GD Importance of debate Techniques to master debate	10%	5
5	Activity - Debate Debate activity	10%	2
6	Vocabulary Building Advanced vocabulary building Homophones	10%	2

	Homonyms Analogies		
7	Reading Comprehension Reading Comprehension	10%	5
8	Grammar - Error Analysis Para- jumble sentence completion confusable sentences Incorrectly spelt words One word substitute Cloze Passages	10%	2
29	Report Writing Report Writing	10%	2
10	Memo Writing Memo Writing	10%	2
11	Narrative Story Writing Narrative Story Writing	10%	2
12	Activity - Tourism Pitch Activity - Tourism Pitch	10%	2
	Total	100%	30

i. Text Books

1. Business Correspondence and Report Writing

By SHARMA, R. AND MOHAN, K.

2. Communication Skills

By Kumar S and Lata P | New Delhi Oxford University Press

3. Practical English Usage

By MICHAEL SWAN

4. A Remedial English Grammar for Foreign Student

By F.T. WOOD

5. On Writing Well

By William Zinsser | Harper Paperbacks, 2006 | 30th anniversary edition

6. Oxford Practice Grammar

By John Eastwood | Oxford University Press

7. Quantitative Aptitude for Competitive Examinations

By Dr. R.S. Aggarwal

a. **Course Name: Intellectual Property**

b. **Course Code: 17010103UE01**

c. **Prerequisite:** Students should have a basic understanding of creative and innovative processes, familiarity with different types of intellectual property (such as copyrights, trademarks, and patents), and awareness of the significance of IP rights in promoting innovation and protecting creators.

d. **Rationale:** Studying Intellectual Property (IP) is crucial for students as it helps them understand how IP rights incentivize creativity and innovation, equips them with knowledge to protect their own intellectual contributions, and fosters an appreciation for the legal and economic impacts of IP in various industries.

e. **Course Learning Objective:**

Not received

f. **Course Learning Outcomes:**

Not received

g. **Teaching scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
4	-	-	4	20	20	-	60	-	100

h. **Course Content**

Course Content		W-Weightage (%), T-Teaching Hours	
Sr. No.	Topics	W	T
1	PATENT Introduction to Intellectual Property Law (IPR) Meaning of patent Patentable inventions Procedure for obtaining patent Rights of patent holder Infringement and remedies of patent	25%	15
2	COPYRIGHT Introduction, meaning and characteristics of copyright Rights of copyright owner Infringement and remedies of copyright	25%	15
3	TRADEMARK Introduction and meaning of trademark Types of trademark Procedure for registering trademark	25%	15

	Infringement and remedies of trademark		
4	OTHER IPR Geographical Indications: Overview on Geographical Indication Act Designs: Overview on Design Act, 2000 Semiconductor Integrated Circuits Layout: Overview on Semiconductor Integrated Circuits Layout Design Act, 2000 Plant Varieties and Farmers' Rights: Overview on Protection of Plant Varieties and Farmers' Rights Act, 2001	25%	15
	Total	100%	60

i. Text Books

1. Law Relating to Intellectual Property Rights

By V K Ahuja | Lexis Nexis

2. Intellectual Property Rights

By P. Narayanan | , Eastern Law House Private Ltd, Pub. Year 2001

3. The Global Regime for the Enforcement of Intellectual Property Rights

By X. Seuba | Cambridge University Press, Pub. Year 2017

4. Globalizing Intellectual Property Rights

By D. Matthews | Routledge, Pub. Year 2003

a. **Course Name: Basic German-I**

b. **Course Code: 00019303AE02**

c. **Prerequisite:** Knowledge of English Language

d. **Rationale:** German is the second most commonly used scientific language. Germany is the third largest contributor to research and development and offers research fellowships to scientists from abroad. Developments in media, information and communication technology require multilingual communicators. A wide range of important websites are in German and worldwide, Germany is ranked number 5 in terms of annual publication of new books. Knowledge of German therefore offers you extended access to information. Learning German provides you with an insight into the way of life, and the hopes and dreams of people in German speaking countries, broadening your horizon.

e. **Course Learning Objective:**

Not received

f. **Course Learning Outcomes:**

Not received

g. **Teaching scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
2	-	-	2	-	40	-	60	-	100

h. **Course Content**

Course Content		W-Weightage (%), T-Teaching Hours		
Sr. No.	Topics	W	T	
1	Grammar Das Alphabets Die Zahlen (Numbers) Zeit (Telling time) Personal Pronomen (Akk., Nom., Dativ) Nomen (der, die, das, die) Verb Konjugation Satz Bildung Prepositionen	33%	10	
2	Listening Skills Aussprache (Pronunciation) Deutsche Lieder (German songs) Audio Übung (Numbers, Colors, Time, Months, Weeks)	17%	5	

3	Speaking Die Grüßen (Greetings) Vorstellen (Self-introduction) Meine Familie (My Family) Basic conversation skills (Buying – selling, time, leisure activities)	17%	5
4	Reading Stadt und Arbeit (city and jobs) Vorstellen und Familie (self-introduction and family)	33%	10
	Total	100%	30

i. Text Books

1. Netzwerk A1 Deutsch als Fremdsprache Kursbuch

By Stefanie Dengler, Paul Rusch | Klett- Langenscheidt

2. Studio D

By Hermann Funk| Cornelsen

3. The Everything Essential German Book

By Edward Swick | Adams Media

Semester -4

- a. **Course Name: Environmental Hazards & Disaster Management**
- b. **Course Code: 11011404DS01**
- c. **Prerequisite:** Students shall know about the natural and man-made disaster and management strategies and policies.
- d. **Rationale:** Knowledge about the hazard, disaster, impacts on ecosystems and human and risk management
- e. **Course Learning Objective:**

CLOBJ 1	Understand the Nature and Types of Environmental Hazards
CLOBJ 2	Analyze the Causes and Effects of Environmental Hazards
CLOBJ 3	Apply Risk Assessment and Mitigation Strategies
CLOBJ 4	Evaluate Legal and Institutional Frameworks
CLOBJ 5	Design Disaster Response and Recovery Plans

- f. **Course Learning Outcomes:**

CLO 1	understanding of the various types of environmental hazards, including natural (earthquakes, floods, hurricanes) and anthropogenic (industrial accidents, deforestation) disasters.
CLO 2	analyze the causes behind environmental hazards and disasters, and assess their short-term and long-term impacts on ecosystems, human health, and infrastructure.
CLO 3	apply tools and techniques for risk assessment, and develop disaster preparedness plans to mitigate the impacts of environmental hazards on communities.
CLO 4	evaluate national and international policies, legislation, and institutional frameworks governing disaster management and environmental hazard mitigation.
CLO 5	design effective disaster response strategies and recovery plans, ensuring sustainability and resilience in affected areas while addressing environmental and social factors.

- g. **Teaching & Examination Scheme:**

Teaching Scheme	Evaluation Scheme
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L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
4	-	-	4	20	20	-	60	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. Course Content:

Course Content		W-Weightage (%), T-Teaching Hours		
Sr. No.	Topics	W	T	
1	Unit 1: Introduction to Environmental Hazards Environmental Hazards, Disasters, risks, and vulnerabilities, Types of environmental hazards: natural and anthropogenic, reasons of vulnerability - rapid population growth, urban expansion, environmental pollution, epidemics, industrial accidents, inadequate government policies.	20%	15	
2	Unit 2: Natural Hazards Understanding disasters - geological disasters (earthquake, landslide, volcanoes, avalanche, tsunami) - hydro-meteorological disasters (cyclone, flood, drought) - biological disasters (epidemics, pandemics), sea level changes and its impact on coastal areas and coastal zone management, Causes, impacts, and mitigation strategies, Case studies.	30%	15	
3	Unit 3: Industrial and Technical Hazards Types and causes of industrial accident - physical, chemical, biological, electrical. Nature of accident - explosion, fire, oil spills, forest fires, toxic release & dispersion. Technical Hazards: Occupational health hazards - Their causes & prevention. Chemical, Biological, Radiological, and Nuclear (CBRN), Environmental impact of technical hazards, Case Studies.	20%	15	
4	Unit 4: Disaster Management Understanding of key concepts in Disasters Management: Disaster Management Cycle, Capacity Development, Mock Drill, Important Contacts for Disaster response, Yokohama Strategy for a Safer World (1999), Hyogo Framework for Action (HFA) (2005-2015), Sendai Framework for Action (2015-2030). Institutional Framework: Institutional arrangements for disaster management in India, Disaster Management Act, 2005, National Disaster Management Authority (NDMA), National Institute of Disaster Management (NIDM), National Disaster Response Force (NDRF), National Action Plan on Climate Change, Global Scenario - World's and India's Deadliest disaster.	30%	15	
	Total	100%	60	

i. Text Book and Reference Book:

1. Gupta A.K., Niar S.S and Chatterjee S. (2013) Disaster management and Risk Reduction, Role of Environmental Knowledge, Narosa Publishing House, Delhi.
2. Murthy D.B.N. (2012) Disaster Management, Deep and Deep Publication PVT. Ltd. New Delhi.
3. Edward A Keller and Robert H Blodgett. (2008). Natural hazards. Pearson Prentice Hall, 488p. 2. Donald Hyndman and David Hyndman. 2009. Natural hazards and disasters. Brooks/Cole. 555p.
4. Singh T. (2006). Disaster management Approaches and Strategies, Akansha Publishing House, New Delhi.
5. Sinha, D. K. (2006) Towards Basics of Natural Disaster Reduction, Research Book Centre, New Delhi.
6. Bankoff, G., Frerks, G. and Hilhorst, D. (2004). (eds.) Mapping Vulnerability: Disasters, Development, and People, Earthscan, London.
7. Smith, K. (2001). Environmental Health, Assessing Risk and Reduction Disaster, 3rd Edition, Routledge, London.
8. Sahni, P. and Malagola M. (2003). (Eds.). Disaster Risk Reduction in South Asia, Prentice-Hall of India, New Delhi.
9. Carter, N. W. (1992). Disaster Management: A Disaster Manager's Handbook, Asian Development Bank, Manila.
10. Sharma, V.K. (1995) (Ed.). Disaster Management, IIPA, New Delhi.

- a. **Course Name: Environmental Pollution (Air, Water, Soil)**
- b. **Course Code: 11011404DS02**
- c. **Prerequisite:** Familiar with essential knowledge and skills to address environmental pollution.
- d. **Rationale:** Develop critical thinking skills to analyze environmental problems, evaluate different perspectives.
- e. **Course Learning Objective:**

CLOBJ 1	Understand the key sources, types, and effects of air, water, and soil pollution on ecosystems and human health.
CLOBJ 2	Analyze the chemical and physical properties of common environmental pollutants and their behavior in air, water, and soil systems.
CLOBJ 3	Evaluate the effectiveness of various pollution control technologies and strategies for mitigating air, water, and soil contamination.
CLOBJ 4	Develop the ability to assess the environmental and health risks associated with exposure to pollutants using scientific and regulatory frameworks.
CLOBJ 5	Critically assess the role of legislation, policies, and international protocols in managing and controlling environmental pollution across different sectors.

f. **Course Learning Outcomes:**

CLO 1	Understand the sources, types, and effects of pollution on ecosystems and human health.
CLO 2	Analyze the chemical and physical properties of common environmental pollutants and their behavior in air, water, and soil systems.
CLO 3	Evaluate the effectiveness of various pollution control technologies and strategies for mitigating air, water, and soil contamination.
CLO 4	Develop the ability to assess the environmental and health risks associated with exposure to pollutants using scientific and regulatory frameworks.
CLO 5	Critically assess the role of legislation, policies, and international protocols in managing and controlling environmental pollution across different sectors.

g. **Teaching & Examination Scheme:**

Teaching Scheme	Evaluation Scheme
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L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
4	-	-	4	20	20	-	60	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. Course Content:

Course Content		W-Weightage (%), T-Teaching Hours		
Sr. No.	Topics	W	T	
1	Unit 1: Introduction Definition of environmental pollution, Interaction between Earth, Man and Environment, Environmental structure, and composition: Atmosphere, Hydrosphere, Lithosphere and Biosphere, Definition and scope of environmental pollution, Environmental Pollution: sources and types; General introduction of air, water and soil pollution, Sources and causes of pollution: natural and anthropogenic.	25%	15	
2	Unit 2: Air Pollution Definition and background of air pollution, Classification of air pollutants: criteria pollutants and non-criteria pollutants, Indoor and outdoor air pollutants, Natural and anthropogenic sources of air pollutants, Basic meteorology and transport of air pollution, Health and Environmental Effects of Air Pollution, Plume behavior under different atmospheric and meteorological conditions, Mechanisms of atmospheric dispersion, Air Quality Standards and Regulations, Noise pollution and its quality standards, Noise control methods.	25%	15	
3	Unit 3: Water Pollution Definition and background of water pollution, overview of major types of water pollutants, Sources (Point sources and non-point sources) and Types of Water Pollution, Physical, chemical, and biological pollutants, Emerging contaminants, Ecological impacts of water pollution, Human health impacts of water pollution, sustainability principles into water pollution management, case studies of water pollution incidents, National and international water quality standards, and guidelines.	25%	15	
4	Unit 4: Soil Pollution Definition of soil pollution, global perspectives on soil contamination issues, parameters for assessing soil quality, major types of soil pollutants; inorganic pollutants, organic pollutants and biological pollutants, sources of soil Pollution, emerging contaminants in the soil, impacts of soil pollution; Soil degradation, ecological impacts, Human health impacts, soil management practices and soil conservation strategies.	25%	15	

	Total	100%	60
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i. Text Book and Reference Book:

1. Environmental Science: A Global Concern by Cunningham, W. P., & Cunningham, M. A. (2023) (Provides a broad overview of environmental science principles)
2. Soil Pollution: Processes and Dynamics" by Ian Pepper, Colin A. Carter, and Dick van Bruggen
3. Introduction to Air Pollution Science: A Public Health Perspective 1st Edition (2011)
- Robert F. Phalen and Robert N. Phalen
4. Environmental Chemistry, New Age International (P) Ltd. Publishers, New Delhi (2000)- De, A.K
5. Environmental Pollution - Management and Control for sustainable Development – R.K. Khitoliya, S. Chand and company, New Delhi

- a. **Course Name: Climate Change and Mitigations**
- b. **Course Code: 11011403DS03**
- c. **Prerequisite:** Should have basic knowledge of changing climate
- d. **Rationale:** Understanding the impact of human activities on the environment and developing strategies to reduce greenhouse gas emissions, adapt to changing climate conditions, and foster sustainability for future generations.
- e. **Course Learning Objective:**

CLOBJ 1	Understand the Scientific Basis of Climate Change
CLOBJ 2	Evaluate the Impacts of Climate Change
CLOBJ 3	Examine International and National Climate Policies
CLOBJ 4	Develop Climate Mitigation Strategies
CLOBJ 5	Apply Climate Risk Management and Adaptation Techniques

- f. **Course Learning Outcomes:**

CLO 1	Analyze the fundamental scientific concepts of climate change, including the greenhouse effect, global warming, and the role of human activities in altering the Earth's climate system.
CLO 2	Assess the environmental, social, and economic impacts of climate change on ecosystems, biodiversity, human health, agriculture, and infrastructure at local, national, and global scales.
CLO 3	Investigate global climate governance frameworks such as the Paris Agreement, Kyoto Protocol, and national climate policies, including carbon pricing, emissions trading schemes, and regulatory measures.
CLO 4	Explore various strategies to mitigate climate change, such as renewable energy adoption, carbon sequestration, energy efficiency improvements, and sustainable land use practices.
CLO 5	Formulate effective adaptation and risk management plans to cope with the impacts of climate change, focusing on resilient infrastructure, disaster risk reduction, and sustainable resource management.

- g. **Teaching & Examination Scheme:**

Teaching Scheme	Evaluation Scheme
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L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
4	-	-	4	20	20	-	60	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. Course Content:

Course Content		W-Weightage (%), T-Teaching Hours	
Sr. No.	Topics	W	T
1	Unit 1: Introduction to Climate Change Overview of climate change: causes, impacts, and global trends, Historical perspectives on climate change, Climate models and predictions, Climate change and ecosystems, Koppen Climate classification.	25%	15
2	Unit 2: Greenhouse Gases and Their Effects Greenhouse gases: types, sources, and concentrations, Role of carbon dioxide, methane, nitrous oxide, and other greenhouse gases, Global warming potential and radiative forcing, Impacts of greenhouse gases on climate and ecosystems, Greenhouse gases policy issue.	25%	15
3	Unit 3: Mitigation Strategies Renewable energy sources: Use of alternative energy resources, Energy efficiency and conservation, Carbon capture and storage (CCS) technologies, Afforestation and reforestation initiatives, Sustainable agriculture and land use practices, Climate-friendly transportation solutions, Green Energy.	25%	15
4	Unit 4: Policy and Adaptation International climate agreements: Kyoto Protocol, Paris Agreement, etc., National and regional climate policies and initiatives, Climate adaptation strategies for communities and ecosystems, Role of businesses, governments, and individuals in climate action, Climate justice and equity considerations	25%	15
	Total	100%	60

i. Text Book and Reference Book:

1. Climate Change 2014: Synthesis Report" by the Intergovernmental Panel on Climate Change (IPCC) - Published in 2014.
2. "The Sixth Extinction: An Unnatural History" by Elizabeth Kolbert - Published in 2014.

3. "This Changes Everything: Capitalism vs. The Climate" by Naomi Klein - Published in 2014.
4. "Drawdown: The Most Comprehensive Plan Ever Proposed to Reverse Global Warming" by Paul Hawken - Published in 2017.
5. "The Uninhabitable Earth: Life After Warming" by David Wallace-Wells - Published in 2019.
6. "The Future We Choose: Surviving the Climate Crisis" by Christiana Figueres and Tom Rivett-Carnac - Published in 2020.
7. "Climate Change 2014: Synthesis Report" by the Intergovernmental Panel on Climate Change (IPCC) - Published in 2014.
8. "The Sixth Extinction: An Unnatural History" by Elizabeth Kolbert - Published in 2014.

- a. **Course Name: Cleaner Production and Assessment**
- b. **Course Code: 11011404SE01**
- c. **Prerequisite:** Knowledge of fundamentals of environment studies- Green Chemistry.
- d. **Rationale:** The aim of this course is to educate students about ‘Cleaner Production Techniques’ and its application leading to pollution minimization. Students will acquire knowledge about environmental, economic and technological aspects of Cleaner Production Methods.
- e. **Course Learning Objective:**
Not Received
- f. **Course Learning Outcomes:**
Not Received
- g. **Teaching & Examination Scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
2	-	-	4	20	20	-	60	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. **Course Content:**

Course Content		W-Weightage (%), T-Teaching Hours	
Sr. No.	Topics	W	T
1	Unit 1: Cleaner Production: Concept & Principles Introduction of Major Industrial Pollution Incidents: London Smog & Bhopal Gas Tragedy, Status of industrial development and Pollution problems. Introduction: Types of Pollution, Source of Pollution, Reactive “pollution control” & Proactive “pollution prevention” Inception of Cleaner Production Concept, Cleaner Production Definition: United Nations Environment Programme, Cleaner Production: Hierarchy	25%	7
2	Unit 2: Cleaner Production: Tools with Examples Cleaner Production Options or Measures could be grouped in three major categories: (a) Waste Reduction at Source: 1. Good Housekeeping 2. Process Change 3. Raw Material Change 4. Better Process Control 5. Equipment Modification 6. Technology Change (b) Waste utilization, Recycling & Reuse: Concept and application 1. Onsite 2. Off site (c) Product Modification, Life cycle analysis (LCA), Ecologically friendly	25%	8

	products: eco design.		
3	Unit 3: Cleaner Production Methodology Methodology of Cleaner Production: Six steps methodology for CP, The technical solutions to implement cleaner production, Designation of cleaner production team, Analyze process steps, generating cleaner production opportunities, selecting cleaner production solutions, Implementation, maintaining cleaner production Balance of material and energy, The barrier in the process of cleaner production.	25%	8
4	Unit 4: End of Pipe Treatment and Case Studies Introduction of EOP (End of Pipe) Treatment, Drawbacks of EOP (End of Pipe) Treatment, Benefits of Cleaner Production: Environment, Health & Safety, Cleaner Production – Indicators Case Studies: Ceramic, Glass, Textile, Dairy, Recycle Paper, Chemicals and Petrochemicals, Pharmaceuticals, Dyes and Dye Intermediates, Bentonite, Fish Processing etc.	25%	7
	Total	100%	30

i) Reference books

1. **Cleaner Production Worldwide**
United Nations Environment Programme, Industry and Environment, Paris, France,, Pub. Year 1993
2. **Cleaner Production: Training Resource Package**
UNEP IE, Paris, Pub. Year 1998
3. **“Clean Technology for manufacture of Specialty Chemicals”,**
Editor-W. Hoyle and M. Lancaster, Royal Society of Chemistry, U.K
4. **Engineers Guide to Cleaner Production Technologies**
By Paul M. Randall

- a. **Course Name:** Lab 1- Air, Water & Soil Analysis
- b. **Course Code:** 11011404DS08
- c. **Prerequisite:** Shall be familiar with concept of practical experience that complements practical knowledge.
- d. **Rationale:** Enhances understanding of the complexities of air, water soil pollution issues and prepares them for careers in environmental science.
- e. **Course Learning Objective:**

CLOBJ 1	Develop an understanding of the fundamental techniques used for analyzing air, water, and soil quality.
CLOBJ 2	Apply environmental regulations and standards in analyzing and assessing environmental pollutants.
CLOBJ 3	Assess and analyze pollution sources and environmental health risks through practical experiments.

- f. **Course Learning Outcomes:**

CLO 1	Students will be able to accurately measure physical, chemical, and biological parameters of air, water, and soil samples using standard analytical techniques.
CLO 2	Identify and apply national and international environmental standards (e.g., WHO, EPA) in air, water, and soil sample analysis.
CLO 3	Develop problem-solving skills by proposing methods to mitigate pollution based on their analytical results.

- g. **Teaching & Examination Scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
-	-	3	2	-	-	20	-	30	50

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination

h. Course content

Exp. No.	Name of the Experiment
1	Sampling techniques to collect air, water, and soil samples from various sources.
2	Determination of pH in water and soil samples.
3	Determination of Soil moisture in soil samples.
4	Determination of Chloride in water samples.
5	Determination of Carbonate, Bicarbonate, BOD and COD in water samples.
6	Determination of Electrical conductivity of Water samples.
7	Collection of particulate matter samples from ambient air.
8	Determination of Organic carbon and organic matter in soil samples.
9	Calibration techniques for air, water, and soil monitoring instruments to ensure accurate measurements

i. Text Book and Reference Book:

- a. Environmental Science: A Global Concern by Cunningham, W. P., & Cunningham, M. A. (2023) (Provides a broad overview of environmental science principles)
- b. Soil Pollution: Processes and Dynamics" by Ian Pepper, Colin A. Carter, and Dick van Bruggen
- c. Introduction to Air Pollution Science: A Public Health Perspective 1st Edition (2011) - Robert F. Phalen and Robert N. Phalen
- d. Environmental Chemistry, New Age International (P) Ltd. Publishers, New Delhi (2000)- De, A.K

- a. **Course Name:** Lab 2- Climate Change
- b. **Course Code:** 11011404ES09
- c. **Prerequisite:** Expected to have a basic understanding of climate change.
- d. **Rationale:** Understanding and practical skills for various aspect of climate change from data analysis to policy implications.
- e. **Course Learning Objective:**

CLOBJ 1	Understand the key atmospheric parameters related to climate change and how they can be measured.
CLOBJ 2	Apply Climate Modeling and Prediction Methods
CLOBJ 3	Evaluate the Impacts of Climate Change on Natural and Human Systems

- f. **Course Learning Outcomes:**

CLO 1	Demonstrate the ability to measure and analyze atmospheric data, such as temperature, humidity, and CO2 levels, using various instruments and techniques, and interpret the results to assess climate trends.
CLO 2	Develop skills in using climate models to simulate future climate scenarios, assessing the impacts of different variables on climate change and understanding the limitations of climate predictions.
CLO 3	Assess the ecological, economic, and social impacts of climate change on different sectors, such as agriculture, water resources, and public health, through case studies and experimental investigations.

- g. **Teaching & Examination Scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
-	-	3	2	-	-	20	-	30	50

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination

h. Course content:

Exp. No.	Name of the Experiment
1	Collection of climatic parameters from the external sources.
2	Hands-on experience with collecting climatic parameters and analysis (Temperature and precipitation).
3	Measurement of weather parameters: Temperature, Humidity, Wind speed and direction, Pressure, Radiation
4	Measurement and analysis of greenhouse gas emission.
5	Analyzing case study of climate change impacts.
6	Impact of green-house gases on climate using software technique

i. Text Book and Reference Book:

- a. Climate Change 2014: Synthesis Report" by the Intergovernmental Panel on Climate Change (IPCC) - Published in 2014.
- b. The Sixth Extinction: An Unnatural History" by Elizabeth Kolbert - Published in 2014.
- c. This Changes Everything: Capitalism vs. The Climate" by Naomi Klein - Published in 2014.
- d. Drawdown: The Most Comprehensive Plan Ever Proposed to Reverse Global Warming" by Paul Hawken - Published in 2017.

- a. **Course Name: Physical Education and Sports**
- b. **Course Code: 00019404VA02**
- c. **Prerequisite:** Basic understanding of physical fitness concepts and a willingness to actively participate in physical activities and team-based sports.
- d. **Rationale:** The objective of this course is promoting physical health, enhancing mental well-being, fostering social skills, and encouraging lifelong habits of fitness and teamwork, ultimately contributing to holistic personal development and community cohesion.
- e. **Course Learning Objective:**
Not Received
- f. **Course Learning Outcomes:**
Not Received
- g. **Teaching & Examination Scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
1	-	2	2	-	20	20	20	40	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. Course Content:

Course Content		W - Weightage (%) , T - Teaching hours	
Sr.	Topics	W	T
1	History and Basic Concept of Sports and Fitness: Concept of Sports and Fitness Aims and Objectives, Importance of Sports and Fitness Difference between Games and Sports History of Sports Ancient and Modern Olympics Asian Games and Common Wealth Games functioning	33	5
2	Concepts of Physical Fitness and Rules and Techniques of Games: Concepts of Physical Fitness Fitness Components Meaning and development of strength, speed and accuracy in different physical activities Sports Nutrition Importance of a Balanced Diet Rules and Techniques (games like Football, Athletics, Kho Kho, Kabaddi, Hockey etc.) Basic concepts and rules of different sports Fundamental Skills of Games and Sports	34	5

3	Trends in Sports and Fitness: Personality Development through Sports Team building through Group games General Sports Policies Role of Khel Mahakumbh in Gujarat to promote Sports Careers in Physical Education and Sports	33	5
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i) Reference books

1. **A Text book of Sports and Exercise Physiology**
By Dey, Swapan Kumar | Jaypee Brothers Medical publishers
2. **Competition Level Book of Sports and Games**
By Dr. A. Mahaboojan, and etal | Lakshya Publisher and Distributor
3. **Exercise, Physiology, Fitness and sports Nutrition**
By B. Srilakshmi, V. Suganthi and G. Kalaivani Ashok | New Age International Publisher
4. **Health and Physical Education**
By Puri & Chandra S S | Surjeet Publications
5. **Rules of Games and Sports, Updated Version 2024**
By Shrivastava, Singh and Kumar | KSK Publishers and Distributors, Delhi
6. **Sports Nutrition and Weight Management**
By Prof. V. Satyanarayana | Sports Publications, Delhi
7. **Swasthya Shiksha**
By Dixit, Suresh | Sports Publications, Delhi
8. **Principles and History of Physical Education**
By Kamlesh, M.L | New Delhi: Friends Publication

List of Practical

1.	Fundamental Skill Development Activities: Marking fields or courts on ground, Group Games or Relay Race, Outdoor Games, Fundamental Skill Development Activities: • Practicing general warm-up, stretching • Practicing cardio and respiratory fitness • Walking, Skipping and Running Participate and match practice in Game and Sports.
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- a. **Course Name: National Cadet Corps (NCC)**
- b. **Course Code: 00019404VA03**
- c. **Prerequisite:** Student who opt for this course should be physically fit and free from any major ailment
- d. **Rationale:** The objective of the NCC as a value-added course is to develop character, comradeship, secular outlook, discipline, leadership, and a spirit of adventure among youth.
- e. **Course Learning Objective:**
Not Received
- f. **Course Learning Outcomes:**
Not Received
- g. **Teaching & Examination Scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
1	-	2	2	-	20	20	20	40	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. Course Content:

Course Content		W - Weightage (%) , T - Teaching hours	
Sr.	Topics	W	T
1	Introduction to NCC: History and significance of NCC, Organizational structure and functioning	14	2
2	Leadership and Personality Development: Leadership qualities and styles, Communication skills, Team building and management	16	3
3	National Integration and Awareness : Importance of national integration, Cultural diversity and unity	14	2
4	Health and Hygiene: Basic health and hygiene practices, First aid and emergency response	14	2
5	Environmental Awareness: Conservation and sustainable practices, Role of NCC in environmental protection	14	2
6	Disaster Management: Types of disasters and their impact, Preparedness and response strategies	14	2
7	Social Service and Community Development: Role of NCC in community service, Planning and executing social service activities	14	2

i) Reference books

Reference Books	
1.	Cadet's Hand Book Common Subject, All Wings (in English) DGNCC, New Delhi

2.	Cadet's Hand Book Common Subject, All Wings (in Hindi) DGNCC, New Delhi)
3.	Cadet's Hand Book Specialized Subject, All Wings DGNCC, New Delhi

List of Practical

1.	Drill: Basic drill movements, Marching and parade techniques
2.	Physical Fitness: Physical training exercises, Endurance, strength building, and Yogasana
3.	Community Service Projects: Participation in local community service projects, Planning and execution of social activities

a. **Course Name: Foundations of Yoga**

b. **Course Code: 00019404VA01**

c. **Prerequisite:** An open mind, basic health, consistency, a quiet space, comfortable clothing, a yoga mat, proper guidance, and a willingness to connect with your body, breath, and mind.

d. **Rationale:** The foundation of yoga promotes physical flexibility, mental clarity, emotional resilience, and spiritual growth, fostering a holistic approach to well-being that enhances overall health and encourages a deeper connection between mind, body, and spirit.

e. **Course Learning Objective:**

Not Received

f. **Course Learning Outcomes:**

Not Received

g. **Teaching & Examination Scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
1	-	2	2	-	20	20	20	40	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. **Course Content:**

Course Content		W - Weightage (%) , T - Teaching hours	
Sr.	Topics	W	T
1	Introduction to Yoga: Definition and History of Yoga Different Paths of Yoga (Hatha, Raja, Karma, Bhakti, Jnana) Importance and relevance of Yoga in modern life	20	3
2	Philosophy of Yoga: The Eight Limbs of Yoga (Ashtanga Yoga) Basic concepts of Patanjali's Yoga Sutras Concept of Mind, Body, and Spirit connection	15	2
3	Basic Anatomy and Physiology for Yoga: Understanding the Musculoskeletal System Respiratory and Circulatory Systems in relation to Yoga Physiological and Anatomical Effects of Asanas on the Human Body	20	3
4	Introduction to Pranayama and Meditation: Basics of Pranayama (Breathing Techniques) Introduction to Meditation: Importance and Benefits Techniques for Developing Concentration and Mindfulness	20	3

5	Shat chakras:	5	1
6	Yoga and Health: Physical and Mental Health Benefits of Yoga Yoga for Stress Management Yoga and Lifestyle Diseases (e.g., Hypertension, Diabetes)	20	3

i) Reference books

1.	A Text book of Sports and Exercise Physiology By Dey, Swapan Kumar Jaypee Brothers Medical publishers
2.	Competition Level Book of Sports and Games By Dr. A. Mahaboojan, and etal Lakshya Publisher and Distributor
3.	Exercise, Physiology, Fitness and sports Nutrition By B. Srilakshmi, V. Suganthi and G. Kalaivani Ashok New Age International Publisher
4.	Health and Physical Education By Puri & Chandra S S Surjeet Publications
5.	Rules of Games and Sports, Updated Version 2024 By Shrivastava, Singh and Kumar KSK Publishers and Distributors, Delhi
6.	Sports Nutrition and Weight Management By Prof. V. Satyanarayana Sports Publications, Delhi
7.	Swasthya Shiksha By Dixit, Suresh Sports Publications, Delhi
8.	Principles and History of Physical Education By Kamlesh, M.L New Delhi: Friends Publication
9.	Light on Yoga (TextBook) By B.K.S. Iyengar
10.	The Yoga Sutras of Patanjali (TextBook) By Swami Satchidananda
11.	The Heart of Yoga (TextBook) By T.K.V. Desikachar
12.	Yoga Anatomy (TextBook) By Leslie Kaminoff and Amy Matthews

List of Practical

1.	Warm-up and Preparation: • Basic Warm-up Exercises • Joint Mobilization and Stretching
2.	Foundational Yoga Postures: • Standing Postures: Tadasana, Ardhakatchakrasana, Ardhashakrasana, Padahasthasana, Trikonasana and Vrikshasana step by step with Sthiti, main procedure, and vishrama. • Sitting Postures: Vajrasana, Suptavajrasana, Shashankasana, Ushtrasana, Marjarasana, Pashchimottanasana, Bhadrasana, Swasthikasana, Siddhasana, Padmasana, Gomukhasana and Ardhamatsyendrasana step by step with Sthiti, main procedure, and vishrama. • Supine Postures: Shavasana, Pavanamuktasana, Sarvangasana, Matsyasana, Halasana, Chakrasana and Setubandhasana step by step with Sthiti, main procedure and visrama • Prone Postures: Bhujangasana, Shalabhasana, Dhanurasana, and Makarasana step by step with Sthiti, main procedure and vishrama. • Introduction to Sun Salutations (Surya Namaskar)

3.	Pranayama Techniques: • Perform Kumbhakabhedas namely-Suryabhedana, Ujjayi, Sitkari, Sheetali, Bhastrika and Bhramari. • Perform Nadishuddhi Pranayama with inhalation-retention-exhalation in the ratio of 1:4:2 in a comfortable sitting posture.
4.	Shuddhikriya Techniques: • Perform Jalaneti, Kapalabhati and Trataka.
5.	Meditation and Relaxation Techniques: • Guided Meditation for Beginners • Techniques for Relaxation: Yoga Nidra • Mindfulness Meditation Practice • Breath Awareness Meditation
6.	Mudras and Bandhas:

a. Course Name: Basic French - II

b. Course Code: 00019304AE03

c. Prerequisite: Knowledge of MIL – 1 (French) or Basic French – I (00019303AE03)

d. Rationale: Basic Communication Skills of French Language

e. Course Learning Objective:

CLOBJ 1	Talk about future activities and plans.
CLOBJ 2	Ask and respond to questions in French.
CLOBJ 3	Describe feelings in French.
CLOBJ 4	Talk about likes and dislikes.

f. Course Learning Outcomes:

CLO 1	Learners will be able to recall specific information (e.g., dates, steps, or goals).
CLO 2	Learners will be able to apply knowledge by forming and answering questions in real-life scenarios.
CLO 3	Learners will apply vocabulary and sentence structures to describe their own or others' feelings in French.
CLO 4	Learners will apply vocabulary and sentence structures to share their own preferences effectively.

g. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				T	CE	P	Theory	P	
2	-	-	2	100	100	-	-	-	100

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination

h. Course Content:

Course Content				W - Weightage (%) , T - Teaching hours	
Sr.	Topics			W	T
1	Grammar: - Articles (definite, indefinite and partitive) - Prepositions (à, en, au, aux, à la, à l', chez, du, de la, des, d') - Les verbs (Present Tense) : ir, re, irregular verbs - La negation - Le futur Proche			33	10

	Poser et Répondez aux questions (Asking Questions) – Qui, Quand, Où, Pourquoi, Quel, Quelle, Quels, Quelles, Close-Ended questions		
2	Listening Skills: • Basic Vocabulary: • Class room objects • Study Subjects • Common nouns of places • Seasons	16	5
3	Speaking Skills Talking to a French Speaking Stranger Talking about hobbies Talking and writing about hobbies	18	5
4	Reading Skills and Writing Skills My family (Ma famille) Les dialogues (Talking to a classmate on the 1st day of school/college. / Talking to a friend about your family or vice versa. / Talking and writing about hobbies. / Talking to a French Speaking Stranger.) My hobbies (Mes loisirs) My Best friend (Mon meilleure ami)	33	10

i) Reference Books

1. Saison 1 Didier
2. Enchanté 0
3. Larrouse Dictionnaire de Poche
4. Larousse French Grammar (Mini) by Paperback
5. Plaisir D'ecrire by Viral Thakkar, Saraswati House Pvt. Ltd.

a. Course Name: Advanced English -II

b. Course Code: 00019304AE01

c. Prerequisite: Interpersonal skills along with aptitude skills

d. Rationale: The development of soft skills, professional etiquette, effective communication, reading comprehension, and assertiveness is essential for personal and professional growth, as these competencies foster successful interpersonal relationships, enhance workplace dynamics, and empower individuals to navigate complex environments with confidence and clarity.

e. Course Learning Objective:

CLOBJ 1	Identify and develop soft skills required for personal and professional growth.
CLOBJ 2	Develop professional etiquette & desired behaviour at the workplace
CLOBJ 3	Speak and participate effectively in oral organizational communication
CLOBJ 4	Improve comprehensive skills for reading
CLOBJ 5	Know how to be assertive in professional environment.

f. Course Learning Outcomes:

CLO 1	Recognise the soft skills and demonstrate to achieve professional growth.
CLO 2	Exemplify and analyze the professional etiquette and work place behaviour
CLO 3	Engage in discussions and presentations applying communication strategies.
CLO 4	Employ reading strategies to understand and evaluate the complex texts.
CLO 5	Practice assertiveness in various communication scenarios.

g. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				T	CE	P	Theory	P	
2	-	-	2	100	100	-	-	-	100

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination

h. Course Content:

Course Content		W - Weightage (%) , T - Teaching hours	
Sr.	Topics	W	T
1	Corporate Etiquettes 1. Tips and guide to develop personality and gain various etiquettes manners, case studies and activities. 2. Telephone etiquettes	3	1
2	Etiquette for foreign business trips	3	1
3	Etiquette for small talks	3	1
4	Respecting privacy Learning to say 'No'	3	1
5	Presentation Skills Introduction to Presentation Skills and Audience Analysis Planning and Structuring Your Presentation Visual Aids, Body Language, and Non-Verbal Communication Voice Control, Delivery, and Overcoming Nervousness Engaging Your Audience and Handling Questions	33	10
6	Email etiquettes & Writing	7	2
7	Article writing	7	2
8	Poster making	7	2
9	Advertisement designing	7	2
10	Convincing skills	7	2
11	Insane inventor	7	2
12	Picture perception	4	1
13	Book review	3	1
14	Movie review	3	1
15	Critical thinking	3	1

i) Reference books:

Reference Books	
1.	Business Correspondence and Report Writing SHARMA, R. AND MOHAN, K. By SHARMA, R. AND MOHAN, K.
2.	Communication Skills 2011 By Kumar S and Lata P Oxford University Press
3.	Practical English Usage By MICHAEL SWAN
4.	A Remedial English Grammar for Foreign Student By F.T. WOOD
5.	On Writing Well By William Zinsser Harper Paperbacks, 2006 30th anniversary edition
6.	Oxford Practice Grammar, By John Eastwood Oxford University Press

a. **Course Name:** Basic German-II

b. **Course Code:** 00019304AE02

c. **Prerequisite:** Basic German - I

d. **Rationale:** German is the second most used scientific language. Knowing the language of your German business partners improves your relations and therefore your chances for effective communication and success.

e. **Course Learning Objective:**

CLOBJ 1	Communicate, understand various City Places, Body Parts, Professions. Can also able to frame the Sentences with the help of Modal Verbs.
CLOBJ 2	Can communicate in German with Friends and in shopping mall and also able ask and guide Directions in German Language.
CLOBJ 3	Can read basic Passages in German
CLOBJ 4	Write basic topics in German

f. **Course Learning Outcomes:**

CLO 1	Recall German vocabulary related to city places, body parts, and professions.
CLO 2	Understand the context of conversations with friends in German
CLO 3	Communicate effectively in German in real-life situations such as shopping or asking for directions.
CLO 4	Analyze German sentence structures to understand the role of modal verbs and contextual clues in passages.

g. **Teaching & Examination Scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				T	CE	P	Theory	P	
2	-	-	2	100	100	-	-	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. **Course Content:**

Course Content		W - Weightage (%) , T - Teaching hours	
Sr.	Topics	W	T
1	Grammar and Vocabulary Körperteile (Body Parts) Beruf (Professions) Konjunktion (Conjunctions) Modal Verb Zeitformen (Tenses) Briefeschreiben (Letter writing)	33	10
2	Speaking skills Dialogue Sprechen (Suggested Situation) Richtungen (Asking Directions) Conversation between two People Conversation in shopping mall/Shop	20	6
3	Reading Skills Lebenslauf (Daily activities) Kurzgeschichten (Short stories)	20	6
4	Listening Skills Objekt (Objects) Audio Übung (audio exercises) Conversation identification	27	8

i) Reference books

Reference Books	
1.	Netzwerk A1 Deutsch als Fremdsprache Kursbuch By Stefanie Dengler, Paul Rusch Klett- Langenscheidt
2.	Studio D By Hermann Funk Cornelsen
3.	The Everything Essential German Book By Edward Swick Adams Media