



Three-Year Undergraduate Program

Bachelor of Science

B.Sc. Geology

Faculty of Applied Sciences

Parul University

Vadodara, Gujarat, India

Faculty of Applied Sciences

Bachelor of Geology

1. Vision of the Department

The Geology Department envisions a future where it stands as a beacon of excellence in geoscience education and research. Committed to fostering a dynamic learning environment, we aspire to be a catalyst for knowledge dissemination and community engagement. Our vision encompasses the development of a robust geoscience network that extends beyond academia, involving faculty, students, alumni, and the wider public.

2. Mission of the Department

M1	The Geology Department is dedicated to delivering top-notch education in geological principles, fieldwork, and lab techniques, fostering students' career readiness in academia, industry, and government.
M2	The department is committed to advancing the frontiers of geological via research, impactful studies, scientific journal contributions, and participating in interdisciplinary projects for Earth processes understanding.
M3	The Geology Department aims to instill in its students a deep sense of stewardship for the planet. Through research and outreach programs, the department seeks to address environmental challenges, promote sustainability, and contribute to the conservation of natural resources.
M4	The department is dedicated to fostering connections with local and global communities. Through outreach programs, workshops, and collaborations with other institutions.
M5	The mission includes preparing students for successful professional careers by offering opportunities for internships, field experiences, and networking with industry professionals. The Geology Department is committed to producing graduates who are not only academically proficient but also well-equipped with practical skills and a deep sense of ethical responsibility in the field of geology.

3. Program Educational Objectives

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

PEO 1	Apply geological principles and methodologies to analyze and interpret various Earth processes and phenomena.
PEO 2	Demonstrate proficiency in fieldwork techniques, including geological mapping, data collection, and interpretation.
PEO 3	Engage in critical thinking and problem-solving to address challenges in the exploration, exploitation, and management of Earth's resources.
PEO 4	Communicate effectively, both orally and in writing, scientific findings and interpretations to diverse audiences, utilizing appropriate geological terminology and techniques.

4. Programme 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 the geotechnical and remote sensing technologies, reflecting the industry's emphasis on data-driven decision-making and sustainable resource management.
PSO 2	Evaluation and Analysis	Proficiency in evaluation and analysis, emphasizing the ability to critically assess geological data, employ advanced analytical techniques.

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	11011101DS01	Earth System Science	4	4	-	-
2	11011101DS02	Geomorphology	2	2	-	-
3	11011101DS03	Mineralogy & Crystallography	2	2	-	-
4	11011101DS04	Lab 1 Mineralogy & Crystallography	2	-	4	-
5	11011101DS05	Lab 2 Geomorphology	2	-	4	-
6	11011401VA01	VAC-1 Climate Change & Sustainable Environment	2	2	-	-
7	11011401SE01	SEC -1 Water Budgeting & Auditing	2	2	-	-
8	00019301AE01/0 0019301AE02/00 019301AE03	AEC-1 (MIL-1) Basic English-1/Basic Hindi-1/Basic Gujarati-1	2	2	-	-
9	03010901UE01 / 05010101UE01 / 09010101UE01 / 18010201UE01	University Elective – 1 Introduction to MATLAB Programming/ Office Automation / First Aid & Life Support/ Basic Photography	4	4	-	-
Total			22	18	8	-
Semester 2						
Sr. No.	Subject Code	Subject Name	Credit	Lect	Lab	Tut
10	11011102DS06	Igneous petrology	4	4	-	-
11	11011102DS07	Sedimentary Petrology	4	4	-	-

12	11011102DS08	Lab 1 Igneous petrology	2	-	4	-
13	11011102DS09	Lab 2 Sedimentary Petrology	2	-	4	-
14	00019302VA01	VAC-2 (IPDC including history and culture of India and IKS-I)	2	2	-	-
15	00019102SE01	SEC-2 (Mathematical Aptitude)	2	2	-	-
16	19010002UE01 / 03010602UE01 / 15010402UE01 / 19010202UE01	University Elective-II Digital Health / Maintenance of household apparatus / Human Psychology / Public Health Nutrition	4	4	-	-
17	00019302AE04/0 0019302AE05/00 019302AE06	AEC-2 (MIL-2) Basic English-2/Basic Hindi-2/Basic Gujarati-2	2	2	-	-
Total			22	18	8	-
Semester 3						
Sr. No.	Subject Code	Subject Name	Credit	Lect	Lab	Tut
18	11011103DS01	Structural Geology	4	4	-	-
19	11011103DS02	Metamorphic Petrology	4	4	-	-
20	11011103DS03	Lab1 Structural Geology	2	-	4	-
21	11011103DS04	Lab 2 Metamorphic Petrology	2	-	4	-
22	03010503SE01	SEC-3 (Artificial Intelligence - AI)	2	2	-	-
23	00019303VA01	VAC-3 (IPDC including history and culture of India and IKS-II)	2	2	-	-

24	00019303AE01 / 00019303AE02 / 00019303AE03	AEC-3 (MIL-1) Advanced English – I / Basic German - I / Basic French - I	2	2	-	-
25	05010103UE01 / 06010103UE02 / 21010103UE02 / 16010103UE01 / 17010103UE01	University Electives -3 Artificial Intelligence Application in People Management / Cyber Security, Tools, Techniques and Counter Measures / Retail Management/ Income Tax Return & E-Filing / Intellectual Property	4	4	-	-
Total			22	18	8	-
Semester 4						
Sr. No.	Subject Code	Subject Name	Credit	Lect	Lab	Tut
26	11011104DS01	Paleontology	4	4	-	-
27	11011104DS02	Economic Geology	4	4	-	-
28	11011104DS03	Stratigraphy & Indian Geology	4	4	-	-
29	11011104DS04	Lab-1 Economic Geology	2	-	4	-
30	11011104DS05	Lab-2 Paleontology	2	-	4	-
31	19010204VA01 /00019404VA01/ 00019404VA02 / 00019404VA03	VAC-4 (Positive Mental Health/Physical Education (Yoga / Sports /NCC)	2	2 / 1 /1 /1	2 / 2 /2	-
32	11011404SE01	SEC-4 (Cleaner Production Assessment)	2	2	-	-
33	00019304AE01 / 00019304AE02 / 00019304AE03	AEC – 4 (MIL-2) Advanced English – II / Advanced German – II / Advanced French – II	2	2	-	-

Total			22	17/18	10	-
Semester 5						
Sr. No.	Subject Code	Subject Name	Credit	Lect	Lab	Tut
34	11011105DS01	Mineral Economics	4	4	-	-
35	11011105DS02	Hydrogeology	4	4	-	-
36	11011105DS03	Marine Geology	4	4	-	-
37	11011105DS04	Field Geology	4	4	-	-
38	11011105DS05	Environmental Geology & Natural hazards	2	2	-	-
39	11011105DS06	Lab-1 Hydrogeology	2	-	4	-
40	06010105SE01 / 06010105SE02	SEC-5 (Digital Literacy/Finance for Everyone)	2	2	-	-
Total			22	20	4	-
Semester 6						
Sr. No.	Subject Code	Subject Name	Credit	Lect	Lab	Tut
41	11011106DS01	Fundamentals of Geophysics	4	4	-	-
42	11011106DS02	Engineering Geology	4	4	-	-
43	11011106DS03	Tectonics Crustal Evolution	3	3	-	-
44	11011106DS4	Oceanography & Climatology	3	3	-	-
45	11011106DS5	Lab 1 Geophysics	2	-	4	-
46	00019306AE01	AEC-5 Professional Ethics and Communication	2	2	-	-

47	11011106IN01	Internship/Mini Project-1 (in Major Specific Course)	4	-	8	-
Total			22	16	12	-

Internship Guidelines: 30 days (120 Hrs.)

ANNEXURE-III

Semester 1

(1)

a. Course Name: Earth System Science

b. Course Code: 11011101DS01

c. Prerequisite: Fundamental knowledge of Physics and Chemistry (10+2)

d. Rationale: Acquire knowledge about the Earth and Solar system

e. Course Learning Objective:

CLOBJ 1	Define the Earth as a complex, interconnected system comprising geosphere, atmosphere, hydrosphere, biosphere, and anthroposphere.
CLOBJ 2	Differentiate between climate and weather and understand the factors influencing both.
CLOBJ 3	Explore the cycling of essential elements (carbon, nitrogen, water, etc.) within the Earth system.
CLOBJ 4	Investigate the structure and function of ecosystems and their role within the Earth system.
CLOBJ 5	Identify and assess natural hazards (earthquakes, hurricanes, floods) and their potential impacts on human societies.

f. Course Learning Outcomes:

CLO 1	Exploring the interactions among the geosphere, atmosphere, hydrosphere, biosphere, and anthroposphere interact to form the Earth system.
CLO 2	Analyze and predict climate patterns based on an understanding of atmospheric circulation, climate zones, and ocean currents.
CLO 3	Examining the major biogeochemical cycles and scrutinizing human influences on these cycles is an essential skill for students.
CLO 4	Assessing ecosystem health, identifying key species, and evaluating human impacts on biodiversity is a crucial skill for students to develop.
CLO 5	Evaluating the risks linked to natural hazards and suggesting strategies for mitigating and adapting to disasters are key competencies that scholar will acquire.

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: Earth as a planet, Understanding of dynamic planet 'Earth', Introduction to various branches of Earth Science General characteristics and origin of the Universe, Solar System and its planets, Meteorites and Asteroids.	25%	15
2	Unit 2: Earth in the solar system - origin, size, shape, mass, density, rotational and revolution parameters and its age Internal structure of the earth, Formation of core, mantle, crust, hydrosphere, atmosphere & biosphere.	25%	15
3	Unit 3: Plate Tectonics, Concept of plate tectonics, sea-floor spreading and continental drift, Geodynamic elements of earth-Mid Oceanic Ridges, trenches, transform faults and island arcs, Earthquake, Volcanoes, Origin of oceans, continents, mountains and rift valleys.	25%	15
4	Unit 4: Concepts of eustasy, Wave erosion and beach processes, Atmospheric circulation, Weather & climatic changes, Earth's heat budget.	25%	15
Total		100	60

i. Textbook and Reference Book:

1. Duff, P. M. D., & Duff, D. (Eds.). (1993). Holmes' principles of physical geology. Taylor & Francis.
2. Emiliani, C. (1992). Planet earth: cosmology, geology, and the evolution of life and environment. Cambridge University Press.
3. Gross, M. G. (1977). Oceanography: A view of the earth.
4. K.C. Condie. Plate Tectonics & Crustal Evolution, Fourth edition. Butterworth-Heinemann Publications
5. G.B. Mahapatra. Textbook of physical Geology. CBS Publishers & Distributors Pvt. Ltd.

(2)

a. Course Name: Geomorphology

b. Course Code: 11011101DS02

c. Prerequisite: Basic knowledge of Earth materials and Processes

d. Rationale: Acquire knowledge about different landforms and Evolution of topography

e. Course Learning Objective:

CLOBJ 1	Understand fundamental geomorphic processes and their role in shaping the Earth's surface.
CLOBJ 2	Explore how tectonic forces and climatic conditions influence the development of landforms.
CLOBJ 3	Investigate the impact of glaciation on landscapes and the unique features associated with periglacial environments.
CLOBJ 4	Analyze the formation and evolution of landforms in coastal and aeolian environments.
CLOBJ 5	Evaluate the ways in which human activities influence geomorphic processes and landform development.

f. Course Learning Outcomes:

CLO 1	Identify various landforms, describing their characteristics and formation.
CLO 2	Understand how tectonic forces and climatic conditions contribute to the development of specific landforms.
CLO 3	Understand the impact of glaciation on landscapes and identify features associated with periglacial environments.
CLO 4	Analyze the formation and evolution of coastal and aeolian landforms, considering the dynamic interactions involved.
CLO 5	Assess and articulate how human activities influence geomorphic processes and landform development.

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: Fundamental concepts of geomorphology, Exogenic and Endogenic processes, Weathering, Mass-wasting and its geomorphic significance.	25%	7
2	Unit 2: Types of mass-wasting, Earthflow, Mudflows, Debris avalanches, Erosional and Depositional features: Fluvial, Glacial, Aeolian and Coastal.	25%	8
3	Unit 3: Large-Scale Tectonic and Structural Landforms, Tectonic Geomorphology and Geological Structures, Continental drift theory, Wilson cycle	25%	7
4	Unit 4: Drainage basin morphology, Karst topography, Quaternary Climate Changes and Ice Ages	25%	8
Total		100	30

i. Textbook and Reference Book:

1. Thornbury, W. D. (1954). Principles of Geomorphology. John Wiley & Sons.
2. Bloom, A. L., & Blair, R. W. (1985). Geomorphology: A Systematic Analysis of Late Cenozoic Landforms. Prentice-Hall.
3. Huggett, R. J. (2011). Fundamentals of Geomorphology. Routledge.
4. Christopherson, R. W., & Birkeland, P. W. (2012). Geosystems: An Introduction to Physical Geography. Pearson.

5. Process Geomorphology by D.F. Ritter, R.C. Kochel and J.R. Miller
6. Tectonic Geomorphology by Douglas W. Burbank and Robert S. Anderson
7. Terrain Analysis by D.S. Way

(3)

a. Course Name: Mineralogy and Crystallography

b. Course Code: 11011101DS03

c. Prerequisite: Basic Knowledge of Physics and Chemistry (10+2)

d. Rationale: Acquire knowledge about the Physical, Chemical and Optical properties of Minerals along with general concepts of Crystallography

e. Course Learning Objective:

CLOBJ 1	Provide an overview of mineralogy, including the study of minerals, their classification, and their significance in geology.
CLOBJ 2	Introduce the fundamental principles of crystallography, including crystal systems, symmetry, and crystallographic axes.
CLOBJ 3	Develop skills in mineral identification based on physical and optical properties, such as color, hardness, cleavage, and refractive index.
CLOBJ 4	Explore the principles of optical mineralogy, including the use of polarized light microscopy for mineral identification.
CLOBJ 5	Classify minerals based on their chemical composition, crystal structure, and geological occurrence.

f. Course Learning Outcomes:

CLO 1	Define and classify minerals.
CLO 2	Demonstrate an understanding of crystallography principles, including crystal systems, symmetry, and crystallographic axes.
CLO 3	Identify minerals based on physical and optical properties, using key diagnostic features.
CLO 4	Identify optical properties of mineral using polarized light microscopy.
CLO 5	Classify minerals chemical composition, crystal structure, and geological occurrence.

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: Introduction to mineralogy, Classification of minerals, Introduction to processes of mineral formation, Physical properties of mineral, Rock-forming minerals (Silicates, Oxides, Carbonates, Sulphides), Gem and Gemstone.	25%	7
2	Unit 2: Properties of elements, Solid solution, Exsolution, Pauling's Rules, Goldschmidt's Rules, Silicate structures, Polymorphism, Pseudomorphism.	25%	8
3	Unit 3: Petrological microscope, Nature of Light, Reflection, Refraction, Double refraction, Total internal reflection and critical angle, Nicol's prism, Birefringence, Refractive index, Uniaxial and biaxial minerals, Uniaxial and biaxial interference figures, Determination of optic sign, Determination of interference colours, Optical properties of silicate group of minerals.	25%	7
4	Unit 4: Crystallization, Unit Cell, Lattice, Point groups and space groups, Bravais lattices, Crystal growth and morphology (faces, edge, solid angle), Symmetry elements, Weiss & Miller system of notation, Description of normal classes of Isometric, Tetragonal, Hexagonal, Trigonal,	25%	8

	Orthorhombic, Monoclinic and Triclinic systems, Introduction to 32 classes of symmetry.		
Total		100	30

i. Textbook and Reference Book:

1. Klein C. and Hurlbut (1993), Manual of Mineralogy (after James D. Dana), XXI, 700 p. Wiley.
2. Andrew Putnis (1992), Introduction to Mineral Sciences, Cambridge University Press.
3. William D. Nesse (2008), Introduction to Mineralogy, Oxford University Press
4. Deer, W. A., Howie, R. A., & Zussman, J. (2013). An introduction to the rock-forming minerals. Mineralogical Society of Great Britain and Ireland

(4)

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	Analyse 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.
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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

(5)

a. **Course 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. Textbook and 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

(6)

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. Textbook and 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.

(7)

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.
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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
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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 import/export, performing symbolic computations using Symbolic Math Toolbox	18%	8
	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 Practical's:

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.

(8)

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,	8%	4

	Integration with Business Processes, Challenges and Considerations.		
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, 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.	25%	11
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:

1. Digital Logic and Computer Design (TextBook), By Morris Mano | PHI
2. Introduction to Information Technology, By ITL Education Solution Limited | Pearson Education | 2012
3. MS OFFICE 2007, By Vikas Gupta | Wiley
4. Computer Fundamentals, By Anita Goel | Pearson Education | 2011
5. 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 microwave 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.

(9)

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	34%	10

	important element. It Is the arrangement of visual elements within the frame of the photograph.		
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 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.	33%	10
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

List of Experiments:

1. Landscape
2. A picture that reflects you
3. A photo story with 3 pictures and 5 pictures
4. Photos on a particular topic
5. Assignments for photography

i. Text Book and Reference Book:

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

(10)

a. **Course Name:** First Aid and Life Support

b. **Course Code:** 09010101UE01

c. **Prerequisite:** Shall have the basic knowledge about anatomy and physiology of 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	
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	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	7%	4

	Negligence Dealing with an emergency Top-to-toe assessment Hygiene and hand washing First aid overview flow char		
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	10%	6

	Injuries and fractures of the pelvis Injuries and fractures of the leg (thigh or lower leg) or ankle 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 Asthm	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	8%	5

	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)		
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, Foreign body in the eye, Foreign body in the ear, Foreign body in the nose, Foreign body in the skin, Swallowed foreign objects	10%	6
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	10%	6

	giving birth, Aftercare of the mother, Medical conditions and pregnancy, Diabetes, High blood pressure, Infections, Prevention of sexually transmittable diseases (STD), Sexually transmitted infections, Reducing the risk of STDS/STIS, Emergency childbirth		
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 | 1st Edition, Pub. Year 2022
3. First aid manual, (TextBook) By UK's Leading First aid providers | 11th edition, Pub. Year 2021

(11)

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 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

(12)

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:	25%	8

	EPA, WHO, BIS, Factors affecting water quality: Natural factors and Anthropogenic activities, need for water quality management, Steps for Water Quality management.		
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

(1)

a) Course Name: Igneous Petrology

b) Course Code: 11011102DS06

c) Prerequisite: A strong understanding of igneous rock classification and the ability to identify various rock-forming minerals are crucial prerequisites for delving into Igneous petrology.

d) Rationale: Igneous petrology is essential for comprehending the Earth's geological history, as igneous rocks constitute a significant portion of the planet's crust.

e) Course Learning Objective:

CLOBJ 1	Mineral composition, texture, and origin, demonstrating a comprehensive understanding of the various rock types.
CLOBJ 2	The origin and evolution of magmas, exploring the factors influencing magma composition, temperature, and viscosity.
CLOBJ 3	Through hands-on experiences, develop skills in field identification of igneous rocks and in the preparation and analysis of thin sections using petrographic microscopy.
CLOBJ 4	The fundamental principles of igneous geochemistry, understanding the distribution of elements in igneous rocks.
CLOBJ 5	They will analyze the role of igneous activity in plate tectonics, recognizing the features of different types of Igneous rock.

f. Course Learning Outcomes:

CLO 1	Identifying and describing a range of igneous rocks based on their mineralogy and texture
CLO 2	Applying petrographic techniques to interpret mineral assemblages, textures, and structures in igneous rocks
CLO 3	Involving understanding the spatial distribution of different igneous rock types and interpreting the geological history of an area.
CLO 4	Analyzing geochemical data, depositional environment, and the origin and evolution of igneous rocks
CLO 5	Integrating igneous processes with broader Earth processes, the course encompasses plate tectonics, volcanic activity, and crustal evolution to provide a comprehensive understanding

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: Sites of Magma Generation, Types of mantle melting, Partial Melting, Types of Magma, Physical Properties of the Magma, Extrusive and intrusive forms of igneous bodies.	25%	15
2	Unit 2: Cooling/Crystallization of Magmas, Formation of glass and crystal, Bowen's reaction series, Textures, Structures of Igneous Rocks, Microstructures of Igneous rocks	25%	15
3	Unit 3: Magmatic differentiation, Contamination, Mixing of magmas, Magmas and Tectonic Environments Classification of Igneous rocks	25%	15
4	Unit 4: Gibb's Phase Rule, One component system, Two component system, Three component system, Role of Volatiles on Phase Equilibria. Petrology and petrogenesis of granites and basalts, Common igneous rocks.	25%	15
Total		100	60

i. Textbook and Reference Book:

1. Winter, J. D. (2010). "Principles of Igneous and Metamorphic Petrology." Prentice Hall.

2. Best, M. G., & Christiansen, E. H. (2001). "Igneous Petrology." Jones & Bartlett Learning.
3. Philpotts, A. R., & Ague, J. J. (2009). "Principles of Igneous and Metamorphic Petrology." Cambridge University Press.
4. Blatt, H., Tracy, R. J., & Owens, B. E. (2006). "Petrology: Igneous, Sedimentary, and Metamorphic." W. H. Freeman.
5. Middlemost, E. A. K. (1989). "Magmas and Magmatic Rocks: An Introduction to Igneous Petrology." Prentice Hall.

(2)

a. Course Name: Sedimentary Petrology

b. Course Code: 11011102DS07

c. Prerequisite: The study of sedimentary petrology typically requires a foundational geology knowledge, including mineralogy, stratigraphy, and understanding geological processes, is a prerequisite for sedimentary petrology proficiency.

d. Rationale: Sedimentary petrology is crucial for deciphering Earth's history, reconstructing past environments, interpreting sedimentary basins, and assessing natural resource potential,

e. Course Learning Objective:

CLOBJ 1	Provide an overview of the classification, origin, and distribution of sedimentary rocks.
CLOBJ 2	Examine sedimentary structures and textures and interpret their significance in understanding depositional environments.
CLOBJ 3	Explore the diagenetic processes and lithification mechanisms that transform sediments into sedimentary rocks.
CLOBJ 4	Learn to conduct facies analysis to interpret ancient depositional environments based on sedimentary rock characteristics.
CLOBJ 5	Understand the principles of sequence stratigraphy and its application in interpreting the stratigraphic record.

f. Course Learning Outcomes:

CLO 1	Understanding the processes involved in sedimentary rock formation, such as weathering, transportation, and deposition, is a focus for students
CLO 2	Proficient in identifying and interpreting sedimentary structures and textures, students can correlate them with specific depositional environments.
CLO 3	Exploring the diagenetic processes and lithification mechanisms that transform sediments into sedimentary rocks is an essential learning objective for students.
CLO 4	Conducting facies analysis to interpret ancient depositional environments, students will rely on sedimentary rock characteristics as a key source of information.

CLO 5	Utilizing sequence stratigraphy principles, scholars will interpret the stratigraphic record as a crucial aspect of their learning journey.
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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 Sedimentology, Outline of sedimentation process: Definition of sediment; origin of sediments: mechanical and chemical sediments; source rock or provenance.	25%	15
2	Unit 2: Sedimentary textures Grain size: concept and size scale, particle size distribution, particle shape and fabric	25%	15
3	Unit 3: Basic hydraulics and Sedimentary structures, Fluid flow: Types of fluids, Laminar and turbulent flow, subcritical, critical and supercritical flows; concept of mean flow velocity, unit discharge and bed shear stress; flow profile and flow separation; particle entrainment, transport and deposition, Mass flow: types, mechanisms and controlling factors, process-product relationship, Penecontemporaneous deformation: mechanisms and controlling factors, Sedimentary structure: Primary and penecontemporaneous	25%	15

	structures, Bedform stability diagram, Paleocurrent analysis: Data acquisition, methodology, different palaeocurrent patterns		
4	Unit 4: Diagenesis: Concepts of diagenesis, Stages of diagenesis: diagenetic changes in sand and carbonate deposits, lithification	25%	15
Total		100	60

i. Textbook and Reference Book:

1. Boggs, S., Jr. (2009). "Principles of Sedimentology and Stratigraphy." Pearson Education.
2. Blatt, H., Middleton, G., & Murray, R. (1980). "Origin of Sedimentary Rocks." Prentice-Hall.
3. Nichols, G. (2009). "Sedimentology and Stratigraphy." Wiley-Blackwell.
4. Prothero, D. R., & Schwab, F. (2004). "Sedimentary Geology: An Introduction to Sedimentary Rocks and Stratigraphy." W. H. Freeman.
5. Allen, P. A., & Allen, J. R. (2013). "Field Description of Sedimentary Rocks." Wiley-Blackwell.

(3)

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					
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. Textbook and 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

(4)

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. Textbook and 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

(5)

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
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. Textbook and 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

(6)

a. **Course Name: Mathematical Aptitude**

b. **Course Code: 00019102SE01**

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	Practise 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	analyse concepts of percentage, average, and partnership, including shortcut techniques for calculating averages and distributing profits or expenses among partners, to analyse 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 & analyses 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. Textbook and 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,

(7)

a. Course Name: IPDC including History and Culture of India and IKS-I

b. Course Code: 00019302VA01

c. Prerequisite:

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	analyse influence of Indian philosophy 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	Evalute 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					
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,	7	2

	Lincoln and Bachchan, students will learn to face difficulties through a positive perspective.		
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 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.	7	2
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. Textbook and Reference Books:

1. Integrated Personality Development Course (TextBook) - By Bocharanwasi Akshar
Purushottam Swaminarayan Sanstha

(8)

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 programmes 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 programmes 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 on 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		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 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	30	12

	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		
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

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

i. Textbook and 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)

(9)

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	18	8

	electrical system. Importance of grounding for electrical safety and protection of appliances. Practical demonstration and installation of earthing systems		
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, 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.	20	9
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

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, gyser and inverter.
12. To study the various soldering techniques.

i. Textbook and 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

(10)

- 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:	17	10

	Nature and Processes Problem Solving Reasoning Decision Making Developing Creative Thinking Barriers to Creative Thinking Strategies for Creative Thinking		
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

i. Textbook and Reference Books:

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

(11)

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.
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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	25%	15

	(EHR), Health Information Exchange (HIE), Standards, and Interoperability		
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

(1)

a. **Course Name: Structural Geology**

b. **Course Code: 11011103DS01**

c. **Prerequisite:** A strong foundation in physics, mathematics and chemistry, coupled with a comprehensive understanding of rock types, geological processes, and basic fieldwork skills.

d. **Rationale:** Provide an understanding of Earth's deformation processes, help analyse geological structures, and interpret tectonic events crucial for resource exploration, hazard assessment, and geological mapping.

e. **Course Learning Objective:**

CLOBJ 1	Understand the fundamental concepts (deformation mechanisms, stress fields, and structural analysis) in structural geology.
CLOBJ 2	Apply structural principles to interpret geological data.
CLOBJ 3	Analyze structural features and their implications
CLOBJ 4	Communicate their understanding of structural geology.
CLOBJ 5	Gain practical experience in structural geology.

f. **Course Learning Outcomes:**

CLO 1	Define key terms and understand deformation mechanisms.
CLO 2	Interpret geological maps and cross-sections.
CLO 3	Analyze structural features and their implications.
CLO 4	Communicate effectively through reports, presentations, and sketches.
CLO 5	Demonstrate proficiency in field mapping and data analysis.

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
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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	<u>Unit 1: Fundamentals of Structural Geology:</u> Importance of Structural Geology. Definitions and brief descriptions: primary, penecontemporaneous, secondary structures. Linear and planar structures and their applications. Lineation and Foliation. Application of primary structures in structural geology. Unconformity: definition, process, and types. Concepts of projection techniques.	25%	15
2	<u>Unit 2: Stress, Strain, Rheology and Brittle deformations:</u> Concept of Stress and Strain, 2-D stress and strain analysis; Strain ellipses of different types and their geological significance; Mohr diagrams and their use; concept of stress-strain compatibility. Rheology: Factors controlling deformation behavior of rocks. Brittle and ductile deformation. Brittle deformation structures and mechanisms: Joint sets and joint systems. three types of fracture. Failure and fracture criteria, Tensile, Mohr-Coulomb envelope, von Mises envelope, Griffith's model. Faults: translational and rotational faults, slip and separation; nomenclature of faults based on geometrical relation of faults to affected strata, slip and separation. Effects of faults on outcrop of strata. Horst and graben, autochthon, allochthon, nappe, window and klippe. Anderson's classification of faults.	25%	15
3	<u>Unit 3: Ductile deformations:</u> Concept of Fold and its geometry and classifications based on various parameters. Fleuty's classification of folds, Ramsay's classification of folds (1967). Outcrops patterns of folded rock	25%	15

	units on horizontal and sloping surfaces. Relation between major folds and minor folds and their relations. Folding Mechanism: buckling, bending, flexural slip and flow folding. Fault-related folding. Superposed Deformation: Basic concepts of superposed deformation for passive shear folds and buckle folds and its applications.		
4	<u>Unit 4: Applications of Structural Geology:</u> Shear zone Basic concepts, shear zone rocks; subsidiary fault and fracture geometries, shear sense indicators. Strain model of shear zone. Fold and thrust belt: Brief descriptions of thrust system, thrust sheet, forelimb and backlimb. Emergent thrusts, blind thrusts, window and klippe, geometry of thrusts, flats and ramps, cutoff. Definition of fold-thrust belts, detachment fault or décollement, imbricate structure or imbricate fan, duplex structure, forethrust and backthrust. Basic ideas on tectonic setting of fold-thrust belts.	25%	15
	Total	100%	60

i. Text Book and Reference Book:

1. Billings, M. P., 1946. Structural geology. Prentice-Hall Inc.
2. Davis, GH. and Reynolds, S.J., 1996. Structural Geology of rocks and regions, John Wiley. and Sons.
3. Ghosh, S.K., 1993. Structural Geology: Fundamentals, and modern developments, Pergamon Press.
4. Leyson, P:R. and Lisle, R.J., 1996. Stereographic projection techniques in structural geology, Cambridge University Press.
5. Passhier, C. and Trouw, RAJ, 2005. Microtectonics. Springer, Berlin.
6. Pollard, D.D. and Fletcher, R.C., 2005. Fundamentals of structural geology, Cambridge University Press.
7. Ramsay, J.G and Huber, M.I., 1983. Techniques of Modern Structural Geology: Vol.I & 11. Academic Press
8. Ramsay, J. G, 1967. Folding and Fracturing of Rocks, McGraw-Hill Book Company, New York .

9. Rowland, S.M., Duebendorfer, E. and Schiefelbein, I.M., 2007. Structural analysis and synthesis: a laboratory course in structural geology, Blackwell Pub.
10. Suppe, J., The Principles of Structural Geology, Prentice-Hall, Inc., New Jersey, 1985.
11. Twiss, R.J. and Moores, E.M., 2007. Structural Geology. Freeman.
12. Van der Pluijm, B.A. and Marshak, S., 2004. Earth structure: an introduction to structural geology and tectonics, W.W. Norton & Company Ltd.

(2)

a. **Course Name: Metamorphic Petrology**

b. **Course Code: 11011103DS02**

c. **Prerequisite:** Basics of Mineralogy, Chemistry and Physics

d. **Rationale:** Acquire knowledge about metamorphic and metasomatism processes occurring deep into the Earth.

e. **Course Learning Objective:**

CLOBJ 1	Understand metamorphic processes and rock formation.
CLOBJ 2	Analyze metamorphic rocks for mineral composition, texture, and grade.
CLOBJ 3	Apply principles to understand geological history and ore deposits.
CLOBJ 4	Communicate understanding through written reports and presentations.
CLOBJ 5	Gain practical experience in identifying rocks and analyzing mineralogy and texture.

f. **Course Learning Outcomes:**

CLO 1	Define key terms, describe types of metamorphism, and understand grade-mineral relationships.
CLO 2	Identify metamorphic minerals, analyze texture and fabric, and determine metamorphic grade.
CLO 3	Relate rocks to tectonic setting, assess ore potential, and evaluate impact on rock properties.
CLO 4	Write clear reports, give effective presentations, and create informative sketches.
CLO 5	Demonstrate proficiency in using laboratory equipment, analyze thin sections, and apply principles to interpret field observations.

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: Definition of Metamorphism, Factors governing Metamorphism, Types of Metamorphism, Limits of Metamorphism, Diagenesis process, Common metamorphic minerals, Types of Protolith.	25%	15
2	Unit 2: Process of deformation, Foliated and Non-foliated rocks, Process of Recrystallization and Recovery, Texture of Contact, High strain, Regional orogenic metamorphic texture, Replacement textures and reaction rim.	25%	15
3	Unit 3: Metamorphic facies, Structures of metamorphic rocks, Progressive and Retrogressive metamorphism, Metamorphism igneous rocks, World famous examples of metamorphism.	25%	15
4	Unit 4: Metamorphism of pelitic rocks, Metasomatism, Migmatites, ACF, AKF, AFM Diagrams, Metamorphism at plate tectonic boundary.	25%	15
	Total	100%	60

i) Text Book and Reference Book:

1. Principles of Igneous and Metamorphic Petrology by John D. Winter.
2. Principles of Igneous and Metamorphic Petrology by Anthony R. Philpotts and Jay J. Ague.
3. Igneous and Metamorphic Petrology by Myron G. Best.
4. An Introduction to Metamorphic Petrology by Bruce Yardly and Clare Warren.
5. Metamorphic Petrology: Concepts and Methods by Ram S. Sharma.
6. Petrogenesis of Metamorphic Rocks by Kurt Bucher and Rodney Grapes.
7. Microtectonic by Cess W. Passchier and Rudolph A. J. Trouw.
8. Petrology: Principles and Practice by Gautam Sen.

9. Essentials of Igneous and Metamorphic petrology by B. Ronald Frost and Carol D. Frost.

(3)

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 Outcomes:**

CLO 1	Understand AI Fundamentals
CLO 2	Analyze HR Processes
CLO 3	Apply AI Tools and Techniques
CLO 4	Evaluate AI Solutions
CLO 5	Address Ethical and Legal Issues
CLO 6	Develop Strategic Insights
CLO 7	Implement AI Projects

f. **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

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

g. **Course Content**

Sr. No.	Content	Weightage	Teaching Hours
1	Introduction to AI in people management Overview of artificial intelligence and its applications in HR and	16%	10

	people Management Historical perspective and current trends in AI adoption in HR ethical considerations and Challenges in AI-driven HR practices		
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 Personalized career development and learning pathways using AI-driven recommendations	20%	8
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
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h. Textbooks and Reference Book

- 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)

(4)

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 Outcomes:**

CLO 1	Explain the role and importance of security architecture in safeguarding computer systems and networks.
CLO 2	Analyze the impact of cyber laws on cybersecurity practices and policies
CLO 3	Evaluate the effectiveness of cybersecurity measures in mitigating cyber threats.
CLO 4	Develop a comprehensive risk management plan for an organization's cybersecurity program.
CLO 5	Apply cryptographic algorithms and authentication mechanisms to protect sensitive information

f. **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**

Sr. No.	Topics	Weightage	Teaching Hours
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	Cybercrime Classification of cybercrimes, Common cybercrimes- cybercrime targeting computers and mobiles, cybercrime against women and children, financial frauds, social engineering attacks, malware and ransomware attacks, zero day and zero click attacks, Cybercriminals modus-operandi, Reporting of cybercrimes, 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, Cybercrime and offenses, Laws regarding posting of inappropriate content, Relevant provisions of Payment Settlement Act,2007, Organizations dealing with Cyber crime and Cyber security in India, Case studies.	15%	13
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
5	E - C o m m e r c e and Digital Payments, Digital Devices S e c u r i t y, 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
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i. Textbook and Reference Book

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

(5)

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 Outcomes:**

CLO 1	Understand & describe the functions of Retail management.
CLO 2	Describe the managerial functions in Retail.
CLO 3	Elaborate the importance of motivation & incentivization
CLO 4	Understand & apply the Management Theories and their relation with Retail management

f. **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

g. **Course Content**

Sr. No.	Topics	Weightage	Teaching Hours
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, 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.	20%	12
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

(6)

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 Outcomes:**

CLO 1	Define key terms related to income tax and understand their significance.
CLO 2	Identify different heads of income and their implications for tax calculations.
CLO 3	Calculate tax liabilities by applying relevant provisions and deductions.
CLO 4	Utilize the Income Tax Portal for tax-related activities and prepare electronic returns effectively.

f. **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**

Sr. No.	Topics	Weightage	Teaching Hours
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. Textbook and Reference 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

(7)

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 Outcomes:**

CLO 1	Identify the different forms of intellectual property and describe the importance of protection of IP.
CLO 2	List out the criteria/essential requirements of IP protection, duration, rights conferred and remedies provided.
CLO 3	Demonstrate a solid understanding of the key concepts, principles, and categories of intellectual property rights, as well as the legal frameworks that govern them
CLO 4	Demonstrate ethical awareness and professional responsibility in dealing with intellectual property issues, recognizing the balance between promoting innovation and creativity while respecting the rights of creators, innovators, and the public interest
CLO 5	Evaluate as against other the international legal framework related to IP protection and articulate the problem areas for the deficiency.

f. **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

f) **Course Content**

Sr. No.	Topics	Weightage	Teaching Hours
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 Infringement and remedies of trademark	25%	15
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. Textbook and Reference Book

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

(8)

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 Outcomes:**

CLO 1	Gain foundational knowledge of AI and ML, applicable to various fields.
CLO 2	Develop practical programming and data analysis skills.
CLO 3	Enhance critical thinking and problem-solving abilities.
CLO 4	Understand the potential and limitations of AI and ML technologies.
CLO 5	Prepare for a future where AI and ML are increasingly integrated across disciplines

f. **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**

Sr. No.	Topics	Weightage	Teaching Hours
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,	20%	7

	Reinforcement Learning		
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, Numpy). Data exploration and Visualization Using Python Library (Matplotlib, Seaborn)	20%	7
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. Textbook and Reference Book

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

(9)

- 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 Outcomes:

CLO 1	To provide students with a holistic value-based education that will enable them to be successful in their academic, professional, and social lives.
CLO 2	To give the students the tools to develop effective habits, promote personal growth, and improve their well-being, stability, and productivity.
CLO 3	To allow students to establish a stronger connection with their family through critical thinking and development of qualities such as unity, forgiveness, empathy, and effective communication.
CLO 4	To provide students with soft skills that complement their hard skills, making them more marketable when entering the workforce.
CLO 5	To enhance awareness of India's glory and global values, and to create considerate citizens who strive for the betterment of their family, college, workforce, and nation.
CLO 6	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.

f) Teaching scheme:

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

g) Course Content

Sr. No.	Topics	Weightage	Teaching Hours
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 essential for students' professional and daily life.	6%	2
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	7%	2

	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.		
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

(10)

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 Outcomes:**

CLO 1	Develop advanced communication skills.
CLO 2	Become more proficient in formal writing
CLO 3	Apply interpersonal communication skills to be more productive at the workplace.
CLO 4	Identify, set and achieve the goals with the help of public speaking.
CLO 5	Use wide range of vocabulary to communicate effectively.

f) **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**

Sr. No.	Topics	Weightage	Teaching Hours
1	1abcd	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 Homonyms Analogies	10%	2
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. Textbook and Reference Book

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

(11)

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 Outcomes:**

CLO 1	Understand the basic German grammar
CLO 2	Understand the basic communication in German, can greet someone in German
CLO 3	Can tell and understand the date & time in German
CLO 4	Can introduce oneself and third person also frame basic sentences in German language

f. **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**

Sr. No.	Topics	Weightage	Teaching Hours
1	Grammar Das Alphabets Die Zahlen (Numbers)	33%	10

	Zeit (Telling time) Personal Pronomen (Akk., Nom., Dativ) Nomen (der, die, das, die) Verb Konjugation Satz Bildung Prepositionen		
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. Textbook and Reference Book

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

(12)

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 Outcomes:**

CLO 1	Introduce self in French.
CLO 2	Greet someone in French.
CLO 3	Tell time in French.
CLO 4	Talk about family (their professions, nationalities, age etc.)

f. **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**

Sr. No.	Topics	Weightage	Teaching Hours
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	17%	5

	Basic Vocabulary (months of the year, days of the week, family members' names, Countries and nationalities, colors, Professions)		
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

i. Textbook and Reference Book

1. Saison 1 Didier By Marie-Noelle Cocton | Didier
2. Enchanté 0 By Ms. Archana Khurana | Rachna Sagar
3. Larousse Dictionnaire de Poche Larousse French Grammar (Mini) by Paperback
Plaisir D'ecrire By Viral Thakkar | Saraswati House Pvt. Ltd

SEMESTER 4

(1)

a. **Course Name:** Paleontology

b. **Course Code:** 11011104DS01

c. **Prerequisite:** Should have basic knowledge of geology and biology

d. **Rationale:** Acquire a comprehensive foundation in paleontological principles, including the identification and interpretation of fossils, evolutionary processes and their applications in various scientific disciplines.

e. **Course Learning Objective:**

CLOBJ 1	Understand the principles of paleontology and the fossil record.
CLOBJ 2	Able to interpret fossil evidence to reconstruct past environments and ecosystems.
CLOBJ 3	Develop practical skills in fossil identification, collection, and preparation.
CLOBJ 4	Able to evaluate paleontological data and information to make informed conclusions.
CLOBJ 5	Understand the ethical implications of paleontological research, including the preservation of fossil sites and the cultural significance of fossils.

f. **Course Learning Outcomes:**

CLO 1	Able to identify different types of fossils and their geological context.
CLO 2	Able to reconstruct past environments and ecosystems based on fossil evidence.
CLO 3	Able to collect, prepare, and analyze fossils.
CLO 4	Able to evaluate the reliability of paleontological data and information.
CLO 5	Able to identify and address potential ethical issues related to paleontological research.

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: Paleontology: definition, subdivisions and scope; Fossils: definition, characters, kinds; Fossilization: Fossilization processes and modes of preservation; Fossil record and mode of evolution: Nature and importance of fossil record, Incompleteness of fossils record, Microevolution, Macroevolution; Fossil diversity; Geological Time Scale with emphasis on major biotic-episodes; Taxonomy and Species concept	25%	15
2	Unit 2: Invertebrates Paleontology: Elementary knowledge about the chief characteristics of the Invertebrate phyla; A detailed study of the morphology and geological distribution of the following classes/orders – Brachiopoda, Trilobita, & Graptoloidea; Functional adaptation in Trilobites and Ammonoids; Ichnology: Classification of tracefossils and uses of ichnology	25%	15
3	Unit 3: Vertebrate Paleontology: Origin of vertebrates and major steps in vertebrate evolution, Origin, diversity and extinction of dinosaurs, Evolution of horse and intercontinental migrations, Human evolution and intercontinental migrations; Paleobotany: Origin and evolution of plants, Preservation, Gondwana Flora, Determining Paleoclimate from Fossil Plants	25%	15
4	Unit 4: Micropaleontology: Brief introduction of all microfossil groups; A detailed study of the morphology and geological distribution of the following microfossil groups: Foraminifera, Conodonts, & Palynomorphs; Collection and preparation techniques of microfossils; Application of fossils in Stratigraphy: Biozones, Index fossils, Correlation;	25%	15

	Implication of microfossils in Mineral Exploration and environmental studies		
	Total	100%	60

i. Text Book and Reference Book:

1. Raup, D. M., Stanley, S. M., Freeman, W. H. (1971). Principles of Paleontology
2. Clarkson, E. N. K. (2012). Invertebrate Paleontology and Evolution. Blackwell Publishing
3. Benton, M. (2009). Vertebrate Paleontology. John Wiley & Sons
4. Armstrong, H. A., & Brasier, M.D. (2005). Microfossils. Blackwell Publishing
5. Haq, B.U., & Boersma, A. (1998). Introduction to Marine Micropaleontology. Elsevier
6. Briggs, D.E.G., & Crowther, P.R. (2003). Palaeobiology II. Blackwell Publishing
7. Benton, M., & Harper, D.A.T. (2009). Introduction to Paleobiology and the Fossil Record. Wiley- Blackwell
8. Taylor, T.N., Taylor E.L., & Krings, M. (2009). Paleobotany: The Biology and Evolution of Fossil Plants. Elsevier

(2)

a. **Course Name: Economic Geology**

b. **Course Code: 11011104DS02**

c. **Prerequisite:** A fundamental understanding of solid foundation in geology, including knowledge of mineralogy, petrology, and structural geology, coupled with an understanding of economic principles

d. **Rationale:** Economic geology lies in its fundamental role in identifying, assessing, and exploiting Earth's natural resources, such as minerals, metals, and fossil fuels, to meet the demands of society and drive economic development

e. **Course Learning Objective:**

CLOBJ 1	Understand economic geology principles.
CLOBJ 2	Apply geological concepts to evaluate mineral deposits.
CLOBJ 3	Develop practical skills in mineral exploration.
CLOBJ 4	Critically evaluate geological data for decision-making.
CLOBJ 5	Understand ethical implications of mineral resource development.

f. **Course Learning Outcomes:**

CLO 1	Explain mineral deposits, economic factors, and exploration techniques.	
CLO 2	Interpret geological data and assess economic viability	
CLO 3	Conduct field mapping, data analysis, and report preparation	
CLO 4	Evaluate data reliability, risks, and sustainable management strategies.	
CLO 5	Understand ethical principles, conflicts, and responsible practices.	

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	<u>Unit 1:</u> Definition of ore; Materials of mineral deposits-ore mineral and gangue, grade, and tenor; Classification of ore deposits; Resources and reserves- Economic and Academic definitions; Concordant and discordant ore bodies.	25%	15
2	<u>Unit 2:</u> Endogenous processes: Magmatic concentration, skarns, greisens, and hydrothermal deposits, Exogenous processes: weathering products and residual deposits, oxidation and supergene enrichment, placer deposits,	25%	15
3	<u>Unit 3:</u> Ore grade and Reserve, assessment of grade, reserve estimation; Distribution and Occurrences of Metallic and Non-metallic ore deposits; Metallogenic provinces, and epochs.	25%	15
4	<u>Unit 4:</u> Study of important industrial minerals with reference to the industries - cement, glass and ceramics, refractory, fertilizer and building stones. Distribution of coal and petroleum in India.	25%	15
	Total	100%	60

i. Text Book and Reference Book:

1. Prasad U. Economic geology. CBS Publishers and Distributors, 2003
2. Gokhale K.V.G.K. and Rao T.C. Ore Deposits of India. East West Press Pvt. Ltd, 1983.
3. Jense M.L. and Bateman A.M. Economic Mineral Deposits. John Wiley and Sons. 1981.
4. Krishnaswamy S. India's Minerals Resources. Oxford and IBH Publ, 1979
5. Mookherjee, A. Ore genesis – A holistic approach, Allied Publisher, New Delhi, 1999
6. Evans, A.M. Introduction to Mineral Exploration, Blackwell Science, Oxford, 1995
7. Evans, A.M., Ore Geology and Industrial Minerals – An Introduction, Oxford Blackwell Scientific Publ., London, 1993.
8. Robb, L. Introduction to Ore-forming processes. Blackwell Publ., Oxford, 2005

(3)

- a. **Course Name: Stratigraphy and Indian Geology**
- b. **Course Code: 11011104DS03**
- c. **Prerequisite:** Basics of igneous, metamorphic and sedimentary petrology
- d. **Rationale:** Acquire knowledge about Indian geology
- e. **Course Learning Objective:**

CLOBJ 1	Understand the Principles of Stratigraphy
CLOBJ 2	Analyze and Interpret Geological Time Scales
CLOBJ 3	Examine the Geological Evolution of India
CLOBJ 4	Identify and Classify Indian Stratigraphic Units
CLOBJ 5	Apply Stratigraphic Methods to Field Studies and Research

f. Course Learning Outcomes:

CLO 1	Explain and apply fundamental stratigraphic principles to interpret geological sequences.
CLO 2	Construct and interpret geological time scales using radiometric dating and biostratigraphy.
CLO 3	Describe the major geological formations and tectonic events shaping the Indian subcontinent.
CLO 4	Identify and classify key stratigraphic units in India and interpret their depositional environments.
CLO 5	Use field techniques to collect and analyze stratigraphic data and conduct research projects.

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	<u>Unit 1:</u> International Stratigraphic Code and development of a standardised stratigraphic nomenclature. Concepts of Stratotypes, Global Stratotype Section and Point (GSSP). Principles of stratigraphy and correlation, Facies Concept in Stratigraphy, Walther's Law Principles of Stratigraphy, Fundamentals of litho-, bio- and chrono-stratigraphy, Seismic stratigraphy, and Sequence stratigraphy. Recent advances in refinement of Geological Time Scale.	25%	15
2	<u>Unit 2:</u> Physiographic and tectonic subdivisions of India. Introduction to Indian Shield, Introduction to Archean and Proterozoic Basins of India. Precambrian and its subdivisions. Tectonostratigraphic framework of Dharwar craton, an overview of Bastar, Singhbhum, Bundelkhand and Aravalli cratons, Eastern Ghat mobile belt, Central Indian Tectonic Zone; Proterozoic sedimentary basins of India: Vindhyan, Cuddapah, Chhattisgarh; Precambrian biota and its stratigraphic significance.	25%	15
3	<u>Unit 3:</u> Stratigraphic framework of Marine Palaeozoic rocks of Himalaya with special reference to Kashmir, Spiti, Kumaon and their correlatives in Salt Range and peninsular India; Gondwana Supergroup of rocks, its fauna and flora, depositional history, economic importance and climate. Mesozoic stratigraphy of Spiti, Kachchh, and Cauvery basin. Cenozoic stratigraphy of India: Kachchh basin, Siwalik successions, Assam, Andaman and Arakan basins	25%	15
4	<u>Unit 4:</u> Cenozoic formations in western, eastern, southern and Himalayan regions. Deccan Traps, Rajmahal Traps.	25%	15
	Total	100%	60

i. Text Book and Reference Book:

1. Krishnan, M. S. (1982) Geology of India and Burma, CBS Publishers, Delhi
2. Doyle, P. & Bennett, M. R. (1996) Unlocking the Stratigraphic Record. John Wiley
3. Ramakrishnan, M. & Vaidyanadhan, R. (2008) Geology of India Volumes 1 & 2, Geological society of India, Bangalore.
4. Valdiya, K. S. (2010) The making of India, Macmillan India Pvt. Ltd.

(4)

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 Outcomes:

CLO 1	Demonstrate the ability to work effectively in teams with mutual respect, fostering camaraderie and teamwork
CLO 2	Exhibit self-discipline and adhere to established rules and regulations in various activities, promoting an organized and disciplined approach.
CLO 3	Develop leadership qualities, including decision-making, problem-solving, and the ability to inspire and motivate others.
CLO 4	Understand and respect diverse cultures and religions, promoting unity, harmony, and a secular outlook in all interactions.
CLO 5	Engage in activities that enhance physical fitness, environmental awareness, and resilience, fostering a spirit of adventure and sustainable living.
CLO 5	Actively participate in community service initiatives, demonstrating social responsibility, empathy, and a commitment to societal well-being.

f. 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

SEE - Semester End Examination, CIA - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)

g. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
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
	Total	100%	15

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

h. Text Book and Reference Book:

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

(5)

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 Outcomes:**

CLO 1	Learning of New Skills in Games and Sports.
CLO 2	Develop healthy life style practices.
CLO 3	Acquire Knowledge of well- being and physical fitness.
CLO 4	Maintain physical fitness through sports.
CLO 5	Improve skills of critical thinking, creative-thinking, problem-solving, team-work leadership, cooperative
CLO 5	Behaviour and technical competencies.
CLO 6	Acquire information of sports initiatives of the Government.

f. **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

SEE - Semester End Examination, CIA - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)

g. **Course Content:**

Sr. No.	Content	Weightage	Teaching Hours
1	History and Basic Concept of Sports and Fitness: Concept of Sports and Fitness Aims and Objectives,Importance of Sports and Fitness	33	5

	Difference between Games and Sports History of Sports Ancient and Modern Olympics Asian Games and Common Wealth Gamesfunctioning		
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
	Total	100%	15

List of Practical

- 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

h. Text Book and Reference Book:

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 AgeInternational 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.

(6)

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 Outcomes:**

CLO 1	To introduce students to the basic principles and philosophy of yoga
CLO 2	To provide an understanding of the physical and mental benefits of yoga
CLO 3	To teach foundational yoga postures, breathing techniques, and meditation practices.
CLO 4	To cultivate a personal yoga practice that promotes well-being and stress management

f. **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

SEE - Semester End Examination, CIA - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)

g. **Course Content:**

Sr. No.	Content	Weightage	Teaching Hours
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:	15%	2

	The Eight Limbs of Yoga (Ashtanga Yoga) Basic concepts of Patanjali's Yoga Sutras Concept of Mind, Body, and Spirit connection		
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
	Total	100%	15

List of Practical

1. Warm-up and Preparation:
 - Basic Warm-up Exercises
 - Joint Mobilization and Stretching
2. Foundational Yoga Postures:
 - Standing Postures: Tadasana, Ardhakatichakrasana, 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:

h. Text Book and Reference Book:

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 AgeInternational 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. Iyeng.
- 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

(7)

a. Course Name: Advanced English-II

b. Course Code: 00019304AE01

c. Prerequisite: 00019303AE01 - Advanced English-I

d. Rationale: Advanced Communication Skills of English Language.

e. Course Learning Outcomes:

CLO 1	Develop advanced communication skills.
CLO 2	Become more proficient in formal writing.
CLO 3	Apply interpersonal communication skills to be more productive at the workplace.
CLO 4	Identify, set and achieve the goals with the help of public speaking
CLO 5..	Use wide range of vocabulary to communicate effectively

f. 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

SEE - Semester End Examination, CIA - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)

g. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
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	33	10

	Visual Aids, Body Language, and Non-Verbal Communication Voice Control, Delivery, and Overcoming Nervousness Engaging Your Audience and Handling Questions		
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
	Total	100%	30

h. Text Book and Reference Book:

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

(8)

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

b. **Course Code: 00019304AE02**

c. **Prerequisite:** 00019303AE02 - Basic German-I

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. Germany awards a generous number of scholarships and other support to study in Germany. Working holiday visas are available for young people from a range country, and special visas are offered to skilled workers and professionals. There are agreements for student exchange between Germany and many countries of the world. Knowing the language of your German business partners improves your relations and therefore your chances for effective communication and success.

e. **Course Learning Outcomes:**

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

f. **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

SEE - Semester End Examination, CIA - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)

g. **Course Content:**

Sr. No.	Content	Weightage	Teaching Hours
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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
	Total	100%	30

h. Text Book and Reference Book:

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.

(9)

a. Course Name: Basic French-II

b. Course Code: 00019304AE03

c. Prerequisite: 00019303AE03 - Basic French-I

d. Rationale: Basic Communication Skills of French Language

e. Course Learning Outcomes:

CLO 1	Recognize and use essential vocabulary and basic grammatical structures in French.
CLO 2	Talk about future activities and plans.
CLO 3	Ask and respond to questions in French.
CLO 4	Describe feelings in French.
CLO 5	Talk about likes and dislikes.
CLO 6	Engage in simple conversations in French on familiar topics

f. 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

SEE - Semester End Examination, CIA - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)

g. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Grammar Articles (definite, indefinite and partitive)\ repositions (à, en, au, aux, à la, à l', chez, du, de la, des, d') Les verbs (Present Tense) : ir, re, irregular verbs Le futur Proche Poser et Répondez aux questions (Asking Questions) – Qui, Quand, Où, Pourquoi, Quel, Quelle, Quels, Quelles	33	10
2	Listening Skills	17	5

	Class room objects Study Subjects Common nouns of places Seasons		
3	Speaking Skills Talking to a French Speaking Stranger Talking about hobbies Talking and writing about hobbies	17	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
	Total	100%	30

h. Text Book and Reference Book:

1. Saison 1 Didier By Marie-Noelle Cocton | Didier.
2. Enchanté 0 By Ms. Archana Khurana | Rachna Sagar
3. Larousse Dictionnaire de Poche
4. Larousse French Grammar (Mini) by Paperback
5. Larousse French Grammar (Mini) Paperback
6. Plaisir D'ecire by By Viral Thakkar | Saraswati House Pvt. Ltd

ANNEXURE-IV

Semester-I

(1)

a. Course Name: Lab 1 Mineralogy & Crystallography

b. Course Code: 11011101DS04

c. Prerequisite: Basic knowledge of Physics and Chemistry (10+2)

d. Rationale: Acquire knowledge about Crystal faces, Crystal system, Physical, Chemical and Optical properties of Minerals

e. Course Learning Objective:

CLOBJ 1	Develop the ability to identify minerals based on their physical and optical properties.
CLOBJ 2	Gain a comprehensive understanding of crystal lattice structures, crystal symmetry, unit cells.
CLOBJ 3	Polarized light microscopy to study the optical properties of minerals in thin sections.
CLOBJ 4	Explore the geological processes involved in the formation of minerals, including igneous, sedimentary, and metamorphic processes.

f. Course Learning Outcomes:

CLO 1	Understanding the Physical properties and classification of minerals, Process of their formation and mode of occurrence.
CLO 2	Studying the properties of elements, geochemical processes and silicate structures with respect to minerals.
CLO 3	Recognizing the optical properties of mineral using thin sections under the petrological microscope
CLO 4	Understanding the formation process of crystals, symmetry elements and axial characters of six systems.

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. Name of the Experiment

Exp. No.	Name of the Experiment
2	Study of physical properties of ore forming minerals in hand specimens.
3	Determination of specific gravity of given mineral by Walker-Steel Yard.
4	Study of optical properties of rock forming minerals in thin sections.
5	Study of Axial characters and forms of crystals belongs to Cubic, Tetragonal and Hexagonal system
6	Study of Axial characters and forms of crystals belongs to the Orthorhombic, Monoclinic and Triclinic system.

i. Textbook and Reference Book:

1. Winter, J. D. (2010). Principles of Igneous and Metamorphic Petrology. Prentice Hall.
2. Philpotts, A. R., & Ague, J. J. (2009). Principles of Igneous Petrology. Cambridge University Press.
3. Best, M. G. (2002). Igneous and Metamorphic Petrology. Wiley-Blackwell.
4. Tilling, R. I., & Heliker, C. C. (Eds.). (2013). Igneous petrology and volcanology: Selected papers of Frank W. Clarke. Geological Society of America.
5. Kerr, P. F. Optical Mineralogy. McGraw-Hill
6. An Introduction to Mineralogy for Geologists by Phillips and Phillips.
7. Mineralogy, Dexter Perkins, Pearson Publication.

(2)

a. Course Name: Lab 2 Geomorphology

b. Course Code: 11011101DS05

c. Prerequisite: Should be familiar with Earth surface Processes

d. Rationale: Acquire the knowledge of types of landforms and study of different topographical features

e. Course Learning Objective:

CLOBJ 1	Develop the ability to recognize, describe, and classify various landforms, understanding the processes and factors that shape the Earth's surface.
CLOBJ 2	Explore the fundamental geomorphic processes, including weathering, erosion, deposition, and tectonic activities.
CLOBJ 3	Spatial analysis and mapping techniques to represent and analyze the distribution of landforms.
CLOBJ 4	Learn quantitative methods to analyze geomorphic data, such as topography, sediment transport, and river morphology.

f. Course Learning Outcomes:

CLO 1	Understanding of the Exogenic and Endogenic processes, Weathering and Mass wasting.
CLO 2	Recognizing the types of mass wasting and erosion and depositional features: fluvial, glacial, aeolian, and coastal.
CLO 3	Comprehending the large-scale tectonic and structural landforms, tectonic geomorphology, continental drift and wilson cycle
CLO 4	Acquainted with Drainage basin morphology, Karst topography, Quaternary Climate Changes and Ice Ages

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. Name of the Experiment

Exp. No.	Name of the Experiment
1	Reading topographic maps
2	Concept of scale Preparation of a topographic profile
3	Preparation of longitudinal profile of a river; Calculating Stream length gradient index, Morphometry of a drainage basin, Calculating different morphometric parameters
4	Preparation of geomorphic map

i. Textbook and Reference Book:

1. Thornbury, W. D. (1954). Principles of Geomorphology. John Wiley & Sons.
2. Bloom, A. L., & Blair, R. W. (1985). Geomorphology: A Systematic Analysis of Late Cenozoic Landforms. Prentice-Hall.
3. Huggett, R. J. (2011). Fundamentals of Geomorphology. Routledge.
4. Mapping geomorphological environments by K. Pavlopoulos, N. Evelpidou and A. Vassilopoulos
5. Guide to field geology by S.M. Mathur

Semester -II

(1)

a) **Course Name:** Lab 1 Igneous petrology

b) **Course Code:** 11011102DS08

c) **Prerequisite:** The hands-on study of Igneous Petrology typically requires a foundational understanding of mineralogy and petrography.

d) **Rationale:** Igneous petrology is essential for elucidating the origins, compositions, and processes of igneous rocks, providing insights into Earth's mantle dynamics, crustal evolution, and natural hazard assessment.

e) **Course Learning Objective:**

CLOBJ 1	This includes the identification of minerals, textures, and structures, contributing to a detailed understanding of igneous rocks.
CLOBJ 2	The lab sessions aim to reinforce students' knowledge of igneous rock classification and enhance their ability to identify these rocks in the field.
CLOBJ 3	This could involve understanding the distribution of major and trace elements in igneous rocks.
CLOBJ 4	Develop skills in using instruments such as microscopes and sample preparation tools while adhering to best practices for laboratory safety.

f. **Course Learning Outcomes:**

CLO 1	Independently identify and classify a variety of igneous rocks using hand specimens and thin sections.
CLO 2	Identifying and interpreting mineral assemblages, textures, and structures in igneous rocks, contributing to a detailed petrological analysis.
CLO 3	Understanding elemental compositions, recognizing patterns, and drawing conclusions about the origin and evolution of igneous magmas.
CLO 4	Demonstrating on laboratory practices, competence in sample preparation, instrument usage, and safety protocols.

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. Name of the Experiment

Exp. No.	Name of the Experiment
1	Megascopic Study of Ultramafic Igneous Rocks.
2	Megascopic Study of Mafic Igneous Rocks.
3	Megascopic Study of Acidic Igneous Rocks.
4	Microscopic Study of Ultramafic Igneous Rocks.
5	Microscopic Study of Mafic Igneous Rocks.
6	Microscopic Study of Acidic Igneous Rocks.
7	Tectonic Discrimination Plots

i. Textbook and Reference Book:

1. Winter, J. D. (2010). "Principles of Igneous and Metamorphic Petrology." Prentice Hall.
2. Best, M. G., & Christiansen, E. H. (2001). "Igneous Petrology." Jones & Bartlett Learning.
3. Philpotts, A. R., & Ague, J. J. (2009). "Principles of Igneous and Metamorphic Petrology." Cambridge University Press.
4. Blatt, H., Tracy, R. J., & Owens, B. E. (2006). "Petrology: Igneous, Sedimentary, and Metamorphic." W. H. Freeman.
5. Middlemost, E. A. K. (1989). "Magmas and Magmatic Rocks: An Introduction to Igneous Petrology." Prentice Hall.

(2)

a. Course Name: Lab 2 Sedimentary Petrology

b. Course Code: 11011102DS09

c. Prerequisite: The Sedimentary Petrology lab typically requires a foundational understanding of basic geological principles, including knowledge of sedimentary rocks, minerals, and depositional environments..

d. Rationale: The Sedimentary Petrology lab is essential for bridging theoretical knowledge with practical skills, providing students with hands-on experience in the analysis of sedimentary rocks and structures.

e. Course Learning Objective:

CLOBJ 1	Aims to develop students' proficiency in identifying and classifying various sedimentary rocks. Through hands-on experience with rock specimens.
CLOBJ 2	This includes the interpretation of sedimentary structures, such as bedding, cross-bedding, and ripple marks, as well as the analysis of grain size, sorting, and other textural characteristics in sedimentary rocks.
CLOBJ 3	This includes the identification of mineral components, diagenetic alterations, and the interpretation of sedimentary textures.
CLOBJ 4	Interpret depositional environments based on sedimentary rock features.

f. Course Learning Outcomes:

CLO 1	Ability to apply theoretical knowledge to practical scenarios, showcasing their competence in the identification and classification of a variety of sedimentary rocks.
CLO 2	Ability to recognize and analyze features such as bedding structures, cross-bedding, and grain size variations.
CLO 3	Demonstrating the ability to identify minerals, textures, and diagenetic features under a microscope.
CLO 4	Recognizing of key sedimentary indicators and the integration of sedimentological data to infer the environmental conditions under which the rocks were formed.

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. List of experiments

Exp. No.	Name of the Experiment
1	Hand specimen analysis of Carbonate sedimentary rocks
2	Hand specimen analysis of Arenaceous sedimentary rocks
3	Hand specimen analysis of Argillaceous sedimentary rocks
4	Study of Sedimentary Structures.
5	Microscopic analysis of Carbonate sedimentary rocks
6	Microscopic analysis of Arenaceous sedimentary rocks
7	Microscopic analysis of Argillaceous sedimentary rocks
8	Study of Paleocurrent analysis, litholog preparation and fence diagram.

i. Textbook and Reference Book:

1. Boggs, S., Jr. (2009). "Principles of Sedimentology and Stratigraphy." Pearson Education.
2. Blatt, H., Middleton, G., & Murray, R. (1980). "Origin of Sedimentary Rocks." Prentice-Hall.
3. Nichols, G. (2009). "Sedimentology and Stratigraphy." Wiley-Blackwell.
4. Prothero, D. R., & Schwab, F. (2004). "Sedimentary Geology: An Introduction to Sedimentary Rocks and Stratigraphy." W. H. Freeman.
5. Allen, P. A., & Allen, J. R. (2013). "Field Description of Sedimentary Rocks." Wiley-Blackwell.

SEMESTER 3

(1)

a. **Course Name:** Lab 1 Structural Geology

b. **Course Code:** 11011103DS03

c. **Prerequisite:** Understanding fundamental structural geological concepts such as rock types, minerals, and basic geological processes.

d. **Rationale:** Offer a comprehensive and hands-on learning experience, aligning with the broader educational goals of fostering critical thinking, practical skills, and an understanding of Earth's geological processes.

e. **Course Learning Objective:**

CLOBJ 1	Develop Fundamental Understanding of Structural Geology Concepts
CLOBJ 2	Acquire Proficiency in Field Mapping Techniques
CLOBJ 3	Enhance Analytical Skills for Structural Interpretation
CLOBJ 4	Develop Problem-Solving Abilities in Structural Geology
CLOBJ 5	Foster Effective Communication and Teamwork Skills

f. **Course Learning Outcomes:**

CLO 1	Analyze the relationship between deformation structures and tectonic forces.
CLO 2	Collect and record relevant geological data, including rock types, structures, and stratigraphic relationships.
CLO 3	Analyze structural features using stereographic projections and other geological analysis tools.
CLO 4	Use structural data to assess the potential for mineral resources
CLO 5	Work collaboratively with peers to complete field mapping projects and analyze structural data.

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. List of experiments

Exp. No.	Name of the Experiment
1	Representation of planes and lines in stereographic and equal area projection diagrams.
2	Concepts of topography and elevation contour maps.
3	Analysis of folds and faults
4	Interpretation of geological maps.
5	Map sections and structural problems.
6	Petrofabric analysis.

i. Textbook and Reference Book:

1. Structural Geology: Fundamentals and Modern Developments" by S.K. Ghosh
2. An Introduction to Geological Structures and Maps by George M. Bennison.
3. Earth Structure: An Introduction to Structural Geology and Tectonics by Ben A. van der Pluijm and Stephen Marshak
4. Atlas of Structural Geology by Soumyajit Mukherjee
5. Map Interpretation for Structural Geologists by Narayan Bose and Soumyajit Mukherjee
6. Tectonics by Eldridge M. Moores and Robert J. Twiss

(2)

a. **Course Name:** Lab 2 Metamorphic Petrology

b. **Course Code:** 11011103DS04

c. **Prerequisite:** Should be familiar with Earth surface Processes

d. **Rationale:** Acquire the knowledge of types of landforms and study of different topographical features

e. **Course Learning Objective:**

CLOBJ 1	Develop Practical Skills and Knowledge
CLOBJ 2	Apply Geological Concepts
CLOBJ 3	Develop Laboratory Skills
CLOBJ 4	Enhance Critical Thinking and Problem-Solving

f. **Course Learning Outcomes:**

CLO 1	Identify and classify metamorphic rocks based on their mineralogical composition, texture, and foliation.
CLO 2	Able to interpret metamorphic rock assemblages to reconstruct the geological history of a region.
CLO 3	Identify common metamorphic minerals and their optical properties.
CLO 4	Able to evaluate different hypotheses about the formation and evolution of metamorphic rocks.

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. **List of experiments**

Exp. No.	Name of the Experiment
1	Megascopic study of foliated metamorphic rocks in hand specimen.
2	Megascopic study of Non-foliated metamorphic rocks in hand specimen.
3	Microscopic study of foliated metamorphic rocks in hand specimen.
4	Megascopic study of Non-foliated metamorphic rocks in hand specimen.
5	AKF, ACF and AFM projections.

i. Textbook and Reference Book:

1. Principles of Igneous and Metamorphic Petrology by John D. Winter.
2. Principles of Igneous and Metamorphic Petrology by Anthony R. Philpotts and Jay J. Ague.
3. Igneous and Metamorphic Petrology by Myron G. Best.
4. Microtectonic by Cess W. Passchier and Rudolph A. J. Trouw.
5. Principles of Metamorphic petrology by R.H. Vernon and G. L. Clarke.
6. The field description of Metamorphic Rocks by Dougal Jerram and Mark Caddick.

SEMESTER 4

(1)

- a. **Course Name:** Lab 1 Economic Geology
- b. **Course Code:** 11011104DS04
- c. **Prerequisite:** To understand about geological materials and the processes that form mineral deposits, which are essential for conducting lab exercises effectively
- d. **Rationale:** Provides a hands-on experience to apply theoretical knowledge, develop essential skills, and foster critical thinking, preparing them for careers in mineral exploration, resource assessment, and mining industry practices.
- e. **Course Learning Objective:**

CLOBJ 1	Identifying and analyzing various economic minerals using standard laboratory techniques.
CLOBJ 2	Understanding of the different types of ore deposits and their formation processes.
CLOBJ 3	Exploring and evaluating mineral resources, including techniques like sampling, assaying, and data analysis.
CLOBJ 4	Explore the practical applications of economic geology in industries such as mining, metallurgy, and environmental management.

i. Course Learning Outcomes:

CLO 1	Identify common economic minerals based on their physical and chemical properties.
CLO 2	Classify ore deposits according to their genetic types and characteristics.
CLO 3	Evaluate mineral resources using appropriate sampling and analytical methods.
CLO 4	Apply economic geology principles to real-world mining and exploration scenarios.

j. 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

k. List of experiments

Exp. No.	Name of the Experiment
1	Study of ore and economic minerals in hand specimen.
2	Study of industrial minerals and fossil fuels.
3	Study of microscopic properties of ore forming minerals.
4	Preparation of maps showing distribution of important metallic ore deposits.
5	Preparation of maps for distribution of important non-metallic deposits.
6	Preparation of maps for important coal and oil fields of India.

i. Textbook and Reference Book:

1. Prasad U. Economic geology. CBS Publishers and Distributors, 2003.
2. Gokhale K.V.G.K. and Rao T.C. Ore Deposits of India. East West Press Pvt. Ltd, 1983.
3. Jense M.L. and Bateman A.M. Economic Mineral Deposits. John Wiley and Sons. 1981.
4. Mookherjee, A. Ore genesis – A holistic approach, Allied Publisher, New Delhi, 1999
5. Evans, A.M. Introduction to Mineral Exploration, Blackwell Science, Oxford, 1995
6. Evans, A.M., Ore Geology and Industrial Minerals – An Introduction, Oxford Blackwell Scientific Publ., London, 1993.
7. Robb, L. Introduction to Ore-forming processes. Blackwell Publ., Oxford, 2005

(2)

a. **Course Name:** Lab 2 Paleontology

b. **Course Code:** 11011104DS05

c. **Prerequisite:** Should be familiar with basic knowledge of geology and biology.

d. **Rationale:** Acquire the knowledge of various types of fossil groups, identify and differentiate between different types of fossil groups.

e. **Course Learning Objective:**

CLOBJ 1	Identify and classify various fossil organisms using standard taxonomic keys and techniques.
CLOBJ 2	Gain hands-on experience with common paleontological techniques, such as fossil preparation, casting, and sectioning.
CLOBJ 3	Explore the principles of paleoenvironmental reconstruction and analyze the role of fossils in understanding ancient ecosystems.
CLOBJ 4	Investigate evolutionary patterns and processes through the study of fossil records

f. **Course Learning Outcomes:**

CLO 1	Identify common fossil organisms from different geological periods and taxonomic groups.
CLO 2	Prepare and preserve fossils using appropriate techniques.
CLO 3	Reconstruct paleoenvironments and ecosystems based on fossil evidence.
CLO 4	Analyze evolutionary trends and patterns in the fossil record.

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. List of experiments

Exp. No.	Name of the Experiment
1	Study of fossils showing various modes of preservation
2	Study of diagnostic morphological characters, systematic position, stratigraphic position and age of various macro-/micro - invertebrate and plant fossils
3	Study of diagnostic morphological characters, systematic position, stratigraphic position of different types of ichnofossils
4	Biostratigraphic correlation

i. Textbook and Reference Book:

1. Raup, D. M., Stanley, S. M., Freeman, W. H. (1971). Principles of Paleontology
2. Clarkson, E. N. K. (2012). Invertebrate Paleontology and Evolution. Blackwell Publishing
3. Armstrong, H. A., & Brasier, M.D. (2005). Microfossils. Blackwell Publishing
4. Haq, B.U., & Boersma, A. (1998). Introduction to Marine Micropaleontology. Elsevier
5. Benton, M., & Harper, D.A.T. (2009). Introduction to Paleobiology and the Fossil Record. Wiley- Blackwell
6. Taylor, T.N., Taylor E.L., & Krings, M. (2009). Paleobotany: The Biology and Evolution of Fossil Plants. Elsevier