Four-Year Undergraduate Programme

Bachelor of Science
Forensic Science (Hons.) Minor in Chemistry

Faculty of Applied Sciences
Parul University Vadodara, Gujarat, India

Faculty of Applied Sciences

Bachelor of Science (Hons) in Forensic Science

1. **Vision of the Department**

   Advancing forensic science through cutting-edge technologies and rigorous methodologies, our department envisions a future where justice is served with unwavering accuracy and integrity.

2. **Mission of the Department**

M1	To provide graduates with a comprehensive foundation of knowledge and hands-on skills in Forensic Science, harmonizing with the Institute's mission of training students in a blend of traditional subjects and emerging specializations for skill development through rigorous laboratory work.
M2	To contribute to the advancement of forensic knowledge through faculty-led research, in consonance with the Institute's mission of developing programs that focus on specialization and environmental protection.
M3	To cultivate a culture of integrity, ethics, and collaboration, aligning with the Institute's mission of fostering a holistic learning environment that prepares students for the challenges of the future and instills a sense of responsibility towards the environment. This, in turn, aims to shape the next generation of skilled and ethical forensic professionals.

3. **Program Educational Objectives**

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

PEO1	To develop technical skills such as critical investigation, communication, analysis, and computer proficiency, as well as human relations skills encompassing group dynamics, team building, organization, and delegation, enabling students to effectively apply acquired knowledge into action.
PEO 2	To instil critical analysis and communication skills in students, fostering their ability to articulate views both in writing and through oral presentations, aligning with the varied cognitive levels of Bloom's Taxonomy.
PEO 3	To create an environment conducive to cultivating a Research & Development attitude among students, facilitating their excellence in the domain of Research and Development

4. **Program Learning Outcomes**

PLO 1	**Knowledge**	Acquire comprehensive understanding of forensic science principles, practices, and techniques.
PLO 2	**Problem Analysis**	Demonstrate analytical skills in identifying and resolving complex forensic challenges.
PLO 3	**Designing Solutions**	Develop innovative approaches to forensic investigation and evidence analysis.
PLO 4	**Modern tool usage**	Utilize state-of-the-art forensic technologies and methodologies for effective crime scene investigation.
PLO 5	**Communication Development**	Enhance communication skills to convey forensic findings accurately and professionally.
PLO 6	**Employability**	Apply ethical principles in forensic practice, upholding integrity and professionalism.
PLO 7	**Environment and Sustainability**	Implement environmentally sustainable practices in forensic procedures and evidence management.

PLO 8	**Soft-Skill Development**	Cultivate teamwork, leadership, and interpersonal skills essential for collaborative forensic work.
PLO 9	**Science and Society**	Explore the intersection of forensic science with legal, social, and ethical issues in contemporary society.
PLO 10	**Life-long learning**	Commit to continuous professional development and staying updated with advancements in forensic science.
PLO 11	**Data Analysis and Interpretation**	Master techniques for analyzing and interpreting forensic data to support criminal investigations.

5. Program Specific Outcomes

PSO 1	Demonstrate proficiency in collecting, preserving, and analyzing forensic evidence using advanced scientific methods and technologies.
PSO 2	Apply critical thinking skills to evaluate and interpret forensic data, contributing to accurate and reliable conclusions in criminal investigations.
PSO 3	Ethical awareness and adherence to professional standards in conducting forensic investigations and presenting findings.

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
Semester-7	22
Semester-8	22
Total Credits:	**176**

Category wise Credit distribution of the programme	
Category	**Credit**
Major Core	88
Minor Stream	32
Multidisciplinary	12
Ability Enhancement Course	10
Skill Enhancement Courses	10
Value added Courses	08
Summer Internship	4
Research Project/Dissertation	12
Total Credits:	**176**

7. Program Curriculum

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

1	11010701DS01	Introduction to Forensic Science	2	2	0	0
2	11010701DS02	Computer Application and cyber crime	2	2	0	0
3	11010701DS03	Basics of Forensic Biological Science	2	2	0	0
4	11010701DS04	FS Lab-I	2	0	4	0
5	11010701SE01	Forensic psychology: witness investigation	2	2	0	0
6	11011401VA01	Climate change & sustainable environment	2	2	0	0
7	03010901UE01/ 0501001UE01/ 09010101UE01/ 18010201UE01	**University Elective – 1** Introduction to MATLAB Programming/ Office Automation / First Aid & Life Support/ Basic Photography	4	4	0	0
8	11010501CH01, 11010501CH02/ 11010401PH01, 11010401PH02/1 1011201LS01, 11011201LS02/ 15010401PG01/ 03010801IT01, 03010801IT02	**Minor Subject 1** Basics of Chemistry, Lab (Basics of chemistry) **/** Basic Physics, Lab 1 / Cell Biology, Lab - 1 (Cell Biology) / Psychology-I / Introduction to IT Fundamentals, LAB- IT Fundamentals	4	2	0	0
9	00019301AE01/ 00019301AE02/ 00019301AE03	**AEC-1 (MIL-1)** Basic of English-1/ Basic of Hindi-1/ Basic of Gujarati-1	2	2	0	0
Total			**22**	**18**	**4**	**0**
Semester 2						
Sr. No	**Subject Code**	**Subject Name**	**Credit**	**Lect**	**Lab**	**Tut**
10	11010702DS05	Basics of Forensic Physical Science	2	2	0	0
11	11010702DS06	Basics of Forensic Chemical Science	2	2	0	0
12	11010702DS07	FS Lab-I	2	0	4	0
13	11010702DS08	FS Lab-II	2	0	4	0
14	00019302AE04/ 00019302AE05/ 00019302AE06	**AEC-2 (MIL-2)** Basic of English-2/ Basic of Hindi-2/ Basic of Gujarati-2	4	4	0	0
15	11010701SE02	SEC-2 (Mathematical Aptitude/Statistical SoftwarePackage)	2	0	0	2
16	11011401VA02	VAC-2 (IPDC including history and culture of Indiaand IKS-I)	2	2	0	0
17	11010502CH01, 11010502CH02 / 11010402PH01, 11010402PH02 / 11011202LS01, 11011202LS02/ 15010402PG01/ 03010802IT01, 03010802IT02	**Minor Subject 2** Basics of organic chemistry, Lab (Basics of organic chemistry) / Theory of Semiconductor Devices, Lab-II(Physics) / Basics of Microbiology, Lab - 2 (Basics of Microbiology) / Psychology-II / Networking and Infrastructure, LAB- Networking and Infrastructure	4	4	0	0
18	03010602UE01/	**University Elective – 2**	4	3	2	0

	15010402UE01/ 19010002UE01/ 19010202UE01	Maintenance of Household Apparatus/ Human Psychology/ Digital Health/ Public Health Nutrition				
Total			**22**	**17**	**10**	**0**
Semester 3						
Sr. No	**Subject Code**	**Subject Name**	**Credit**	**Lect**	**Lab**	**Tut**
19	11010702DS09	Fingerprint and other impression evidence	3	3	0	0
20	11010702DS10	Crime Scene Management	3	3	0	0
21	11010702DS11	Multimedia Forensic	2	2	0	0
22	11010702DS12	Lab-I Multimedia Forensic	2	0	4	0
23	11010702DS13	Lab-II CSM & Fingerprint Science	2	0	4	0
24	00019303AE01 / 00019303AE02 / 00019303AE03	**MEL-1** Advanced English – I / Basic German -I / Basic French -I	2	2	2	0
25	11011401VA03	VAC-3 (IPDC including history and culture of Indiaand IKS - 2)	2	2	0	0
26	11010701SE03	SEC-3 AI/ Web Development and Designing / Professional ethics & communication - Part 1	2	0	2	0
27	06010103UE02 / 05010103UE01 / 21010101UE02/ 16010103UE01 / 17010103UE01	**(UniversityElective 3)** Cyber Security, Tools, Techniques and Counter Measures / Artificial Intelligence Application in People Management / Basics of Event Management / Income Tax Return & E-Filing / Intelectual Property	4	4	0	0
Total			**22**	**16**	**12**	**0**
Semester 4						
Sr. No	**Subject Code**	**Subject Name**	**Credit**	**Lect**	**Lab**	**Tut**
29	11010702DS14	Forensic Anthropology & Odontology	2	2	0	0
30	11010702DS15	Criminology, Criminal Law and Police Organization	3	3	0	0
31	11010702DS16	Questioned Document & Fraud Investigation	3	3	0	0
32	11010702DS17	Lab-I Forensic Anthropology & Odontology	2	0	4	0
33	11010702DS18	Lab-II Questioned Document & Fraud Investigation	2	0	4	0
34	11010504CH01 / 11010504CH02 / 03010804IT01 /03010804IT02 /11010404PH01 / 11010404PH02 / 11011204LS01 /11011204LS02 / 15010404PG01	Chemistry: Basics of inorganic chemistry & Lab Basics of inorganic chemistry / Information Technology: Fundamental of Operating Systems & LAB- Fundamental of Operating Systems / Physics: Electronics & Lab Electronics / Life Science: Fundamentals of Biomolecules & LAB - Fundamentals of Biomolecules / Psychology: Social Psychology	4	4	0	0
35	11010701SE04	SEC-5 Understanding drugs and addiction	2	2	0	0
36	00019304AE01 / 00019304AE02 /	MEL 2: Advanced English – II / Basic German- II /	2	2	2	0

	00019304AE03	Basic French - II				
37	19010204VA01 / 00019404VA01 / 00019404VA02 / 00019404VA03	VAC: Positive mental health / Physical Education: Yoga/NCC/Sports	2	0	2	0
Total			**22**	**16**	**12**	**0**
Semester 5						
Sr. No	**Subject Code**	**Subject Name**	**Credit**	**Lect**	**Lab**	**Tut**
37	11010702DS19	Forensic Toxicology and Pharmacology	3	3	0	0
38	11010702DS20	Forensic Serology	3	3	0	0
39	11010702DS21	Instrumentation in Forensic Science	2	2	0	0
40	11010702DS22	Lab-I Forensic Toxicology & IT	2	0	4	0
41	11010702DS23	Lab-II Forensic Serology & IT	2	0	4	0
42	06010105SE01 / 06010105SE02	SEC - Digital Literacy/Finance for everyone	2	2	0	0
43	11010505CH01 / 11010505CH02 / 03010805IT01 / 03010805IT02 / 11010405PH01 / 11010405PH02 / 11011205LS01 / 11011205LS02 /11010505PG01	**Minor sub-4** Chemistry: Basics of Physical chemistry & Lab (Basics of Physical chemistry) / Information Technology: Introduction to Cyber Security & LAB- Security and Cybersecurity / Physics: Mathematical Physics & Lab Mathematical Physics / Life Science: Information Pathway & LAB - Information Pathway / Psychology: Industrial Psychology	4	4	0	0
44	11010505CH03 / 11010505CH04 / 11010505CH03 / 11010505CH04 / 11010405PH03 / 11010405PH04 / 11011205LS03 / 11011205LS04 / 15010405PG02	**Minor sub-5:** Chemistry: Applied chemistry & Lab (Applied chemistry) / Information Technology: Cyber law & ethics & LAB- Cyber law & ethics / Physics: Solid State Physics & Lab Solid State Physics / Life Science: Molecular Techniques / LAB - Molecular Techniques / Psychology: Mental Health and Well-being	4	4	0	0
Total			**22**	**18**	**8**	**0**
Semester 6						
Sr. No	**Subject Code**	**Subject Name**	**Credit**	**Lect**	**Lab**	**Tut**
45	11010702DS24	Forensic Ballistics & Explosives	3	3	0	0
46	11010702DS25	Forensic Psychology	2	2	0	0
47	11010702DS26	Forensic Medicine & Entomology	2	2	0	0
48	11010702DS27	Digital & Cyber Forensic	2	2	0	0
49	11010702DS28	Lab- I Forensic Ballistics & Forensic Medicine	2	0	4	0
50	11010702DS29	Lab- II Digital & Cyber Forensic	1	0	2	0
51	00019306AE01	Professional ethics and communication	2	2	0	0
52	11010506CH01 / 03010806IT01 / 03010806IT02 /	Minor sub-6 Chemistry: Basics of Analytical chemistry / Information Technology: Fundamentals of	4	4	0	0

	11010406PH01 / 11010406PH02 / 11011206LS01 / 11011206LS02 / 15010406PG01	Web application & LAB-Fundamentals of Web application / Physics: Modern Physics & Lab Modern Physics / Life Science: Molecular Forensics & LAB - Molecular Forensics/ Psychology: Psychology of Personality				
53	11010706IN01	Internship/Mini Project	4	4	0	0
Total			**22**	**19**	**6**	**0**
Semester 7 (Hons.)						
Sr. No	**Subject Code**	**Subject Name**	**Credit**	**Lect**	**Lab**	**Tut**
54	11010702DS30	Advance in Forensic Biological Science	2	2	0	0
55	11010702DS31	Advance in Forensic Chemical Science	2	2	0	0
56	11010702DS32	Advances in Forensic Physical Science	2	2	0	0
57	11010702DS33	Lab-I Advances Forensic Biological Sciences	2	0	4	0
58	11010702DS34	Lab-II Advance in Forensic Chemical Science	2	0	4	0
59	11010702DS35	Lab-III Advance in Forensic Physical Science	2	0	4	0
60	11010507CH01 / 03010807IT01 / 03010807IT02 / 11010407PH01 / 11011207LS01 / 11011207LS02 / 15010407PG01	**Minor sub-7** Chemistry: Nanomaterial chemistry / Information Technology: Security monitoring & LAB-Security monitoring / Physics: Thermodynamics and Statistical Physics / Life Science: Analytical Tools & Techniques & LAB-Analytical Tools & Techniques / Psychology: Psychological Disorders	4	4	0	0
61	11010702IN01/ 11010702RP01	On Job Training (Hons.) / Research Project (Hons. With Research)	6	6	0	0
Total			**22**	**16**	**12**	**0**
Semester 8 (Hons.)						
Sr. No	**Subject Code**	**Subject Name**	**Credit**	**Lect**	**Lab**	**Tut**
62	11010702DS36	Advancement in Digital Computer Forensic	4	4	0	0
63	11010702DS37	Legal and Ethical Issues in Cyber security & DigitalForensics	2	2	0	0
64	11010702DS38	Advanced Data Carving Techniques	4	4	0	0
65	11010702DS39	Lab I Computer Forensic	2	0	4	0
66	11010508CH01 / 03010808IT01 / 03010808IT02 / 11010408PH01 / 11011208LS01 / 11011208LS02 / 15010408PG01	Minor sub-8 Chemistry - Advanced analytical techniques / Information Technology - Introduction of Dark web & block chain & LAB-Introduction of Dark web & block chain / Physics - Experimental Techniques / Life Science - Genetic Engineering & LAB - Genetic Engineering / Psychology - Guidance and Counselling	4	4	0	0
67	11010702IN01	On Job Training	6	6	0	0
Total			**22**	**20**	**4**	**0**

8. Detailed Syllabus

Semester 1

a. **Course Name:** Introduction to Forensic Science

b. **Course Code:** 11010701DS01

c. **Prerequisite:** Proficient in fundamental biology, chemistry, and physics. Understanding scientific principles and methods. Strong critical thinking and problem-solving skills.

d. **Rationale:** The "Introduction to Forensic Science" course in BSc Semester One provides a comprehensive foundation, covering historical, legal, and scientific aspects. Students study India's forensic science history, laboratory structure, and quality assurance. The curriculum also includes physical evidence handling, preservation, and bloodstain pattern analysis.

e. Course Learning Objective:

CLOBJ 1	Classify the basics of Forensic Science and its need and scope in recent days.
CLOBJ 2	Identify and explain the criminal behavior and its linkage to different crime scenes and its applicability
CLOBJ 3	Elucidate various principles of forensic science and its connection to differentcrime scenario
CLOBJ 4	Analyze various crime scenes and apply it into a case study
CLOBJ 5	Demonstrate a clear understanding of the basic concepts, working principlesand applications of Forensic Science.

f. Course Learning Outcomes:

CLO 1	Understand the basics of Forensic Science and its need and scope in recent days.
CLO 2	Identify and explain the criminal behaviour and its linkage to different crimescenes and its applicability
CLO 3	Elucidate various principles of forensic science and its connection to differentcrime scenario.
CLO 4	Acquire proficiency in crime scene investigation methods, including evidence collection, preservation, and documentation.
CLO 5	Explore the application of scientific methods in forensic analysis, focusing on DNA, toxicology, and trace evidence.

g. Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme					Total
Lect. Hrs./week	Tut Hrs.	Lab Hrs.	Credit	External		Internal			
				T	P	T	CE	P	
3	-	-	3	60	-	20	20	-	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**	**25%**	**12**

	Science, basic VS applied, scientific method (deductive & Inductive logic), scientific hypotheses, Law & legal systems (Patriarch, The sovereign, customary, a legal code, Individuals, contractual relationships), relevance of Forensic evidence in criminal trials, Forensic science (significance in Criminal investigation, branches), Definition of forensic science; scope and need of forensic science; Functions of Forensic Science; Evidence; classification of evidence: according to Indian Evidence Act, based on nature of evidence, class and individual evidence; Principles of forensic science; Frye Rule; Daubert Standards; Terminologies in forensic science: First responder, chain of custody, mahazaar; Code of conduct for forensic scientists; Qualifications of forensic scientists; Duties of forensic scientists; Data depiction; Report writing. Ethics in Forensic Science.		
2.	**Unit-2** Worldwide pioneers in FS in India Government Chemical Examiner Laboratory, Anthropometric Bureau, Fingerprint Bureau, Department Explosive, Government Examiner of Questioned Document, Shimla, Serologist to the Government of India, Footprint Section of Criminal Investigation Department, Note Forgery Section in Criminal Investigation Department, Ballistics Laboratory, Scientific Sections in the Criminal Investigation, Forensic Science Laboratory, Calcutta, Central Fingerprint Bureau, Central Detective Training School, Calcutta, Central Forensic Science Laboratory, Calcutta, Central Forensic Institute, Calcutta, CDTS Hyderabad and Calcutta, Central Forensic Laboratory, Hyderabad, Government Examiner of Questioned Document, Calcutta (Kolkata) and Hyderabad, Central & State Forensic Laboratory, Central Forensic Science Laboratory, Chandigarh, The Role of Central Advisory Committees, Central Forensic Science Laboratory (CBI), New Delhi, Forensic science Laboratories in other states, Regional Forensic Science Laboratories, Mobile Forensic Science Laboratories, Indian Academy of Forensic Science, Teaching of Forensic Science in the Universities, Creation of Forensic Science Division at BPR&D, Creation of Forensic Science Division at BPR&D, Recommendations of Scientific Advisory Committee to the Cabinet, A Mandate to CFSLS OF BPR&D, Establishment of DNA Typing Laboratory at CFSL Calcutta, First Independent Forensic Science Laboratory, National Cyber Forensic Science Laboratory, CYPAD (Cyber Prevention), I4C	**25%**	**11**
3.	**Unit-3** **Organizational set-up in FSL** FSLs, (CFSL, SFSL, RFSL, Mobile FSL, etc.), Divisions in FSL & their working (Training & development, evidence management, evidence control, documentation-method validation, reference materials, Quality Assurance- qualitycontrol, reference collection, proficiency test, instruments & equipment, Calibration- Instruments/equipment & Chemical analysis. Quality check & reports), Other Institutions (IITR, CDTS, CCMB, CDFD, NCRB, DRDO, BPRD, etc)	**25%**	**10**

	Law of Evidence: Evidence, Fact, Types, Testimonial and Real Evidence, Evidence in Enquiry and Trial, First Information Report, Interview and Interrogation of the Criminals, Witness, Types of Witnesses, Admissibility of the Evidence in the Court **Legal aspects of crime:** Crime – Introduction, Nature, causes and consequences of crime, Broad concepts of criminal Justice System, Procedures involved in the detection of crime, Filing of criminal charges, Indian police system – The police Act, Human rights and criminal justice system in India. Set up of INTERPOL, Duties of forensic scientist, code of conduct of forensic scientists. **Experts**: Experts as per IEA, Experts (GOVT. & Private) in court & their functions, Central & state govt. expert & medicolegal expert, Central & state institutions in FS.		
4.	**UNIT 4** Role of Forensic Evidence in the Legal System Physical Evidence - definition, types, significance, collection, preservation, packing and forwarding of different evidence to the forensic laboratory. Bloodstain Pattern Analysis - terminology, Blood physics, Spatter patterns, Motion and directionality, point of origin and point of convergence, preservation of blood evidence, procedures and precautions Presentation of Expert Evidence, Evidence in The Court of Law, Report writing & Evidence presentation, Components of reports and report format (according to ISO/IEC17025:2005). Tools and Techniques in Forensic Science Branches of forensic science. Forensic science in international perspectives, including set up of INTERPOL and FBI. Duties of forensic scientists. Code of conduct for forensic scientists. Qualifications of forensic scientists. Data depiction. Report writing Criminal Justice System: Introduction to Criminal Justice System; Different agencies involved in crime detection: Police, Medico-legal expert, Judicial officers. Introduction to IPC (Indian Penal Code) and Cr.P.C – sections 291, 292 and 293.Indian Evidence Act – Introduction and Sections 32, 45, 46, 47, 57, 58, 60, 73, 135, 136, 137, 159. Court Testimony- admissibility of expert testimony, Court Procedure: Examination in chief, Cross Examination and Reexamination; Ethics in Forensic Science. International Justice System – an overview	**25%**	**12**
TOTAL		**100%**	**45 Hrs**

I. Text Book and Reference Book:

1. "Forensic Science: An Introduction to Scientific and Investigative Techniques" Author: Stuart H. James, Jon J. Nordby, and Suzanne Bell Publisher: CRC Press Present Edition: 3rd Edition
2. "Forensic Science: From the Crime Scene to the Crime Lab" Author: Richard Saferstein, Present Edition: 4th Edition
3. "Introduction to Forensic Sciences" Author: William G. Eckert Publisher: CRC Press Present Edition: 2nd Edition
4. "Forensic Science: The Basics" Author: Jay A. Siegel Publisher: CRC Press Present Edition: 3rd Edition
5. "Crime Scene Processing and Laboratory Workbook" Author: Michael J. Maloney

Publisher: CRC Press Present Edition: 1st Edition
6. "Handbook of Forensic Science" Editor: Jim Fraser Publisher: Routledge Present Edition: 2nd Edition
7. "Forensic Science in India: A Vision for the Twenty-First Century" Author: Anil Aggrawal Publisher: CRC Press Present Edition: 1st Edition
8. "Forensic Science: A Multidisciplinary Approach"

Semester 1

a. Course Name: Computer Application and cyber crime
b. Course Code: 11010701DS02
c. Prerequisite: Proficient in computer usage with Windows, Linux. Understanding

computer hardware components like motherboard, processor. Familiarity with command-line and graphical user interface systems. Understanding computer boot process and file systems.

d. Rationale: The "Introduction to Cyber Forensics" course provides a comprehensive understanding of computer hardware, networking, and cybercrime investigation skills. Students learn about digital evidence handling, ethical considerations, and cyber forensic techniques. Practical application includes using Windows, Linux, and forensic tools like FTK and Encase. Legal and privacy aspects are integrated for a holistic understanding.

e. Course Learning Objective:

CLOBJ 1	Gain proficiency in using computer applications for diverse tasks, rangingfrom document creation to data analysis.
CLOBJ 2	Understand the nature of cybercrime and develop skills to identify, prevent,and respond to digital threats.
CLOBJ 3	Explore the legal and ethical implications of cyber activities, emphasizing the importance of responsible digital citizenship.
CLOBJ 4	Acquire hands-on experience in cybersecurity practices, including networksecurity, encryption, and malware detection.
CLOBJ 5	Develop competence in digital forensics, enabling the investigation andanalysis of electronic evidence related to cybercrime.

F. Course Learning Outcomes:

CLO 1	Understand the basic components of computers like Motherboard, Processor,Memory, Storage Devices and Networking components.
CLO 2	Classify Cybercrime and various Internal and External cyber-attacks like ATMand Banking Frauds, Phishing, Data Privacy issues, Packet sniffing, Spoofing etc.
CLO 3	Solve problems related to cybercrime and digital evidences.
CLO 4	Practice effective methods like handling electronic media, collection, ofdifferent types of digital evidences.
CLO 5	Examine various techniques used during handling in cyber related evidenceand methods of investigation and examination.

G. Teaching & Examination Scheme:

Teaching Scheme				**Examination Scheme**					**Total**
Lect. Hrs./week	**Tut Hrs.**	**Lab Hrs.**	**Credit**	**External**		**Internal**			
				T	**P**	**T**	**CE**	**P**	
2	-	-	2	60	-	-	20	20	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 Fundamentals and Concepts**	**33%**	**11**

	Introduction to Computer Hardware - Various Components of a Computer, Motherboard, Processor, Memory, Storage, Introduction to File Systems and types of File System. Operating System: Types of operating systems • Function of OS • Building OS • CLI vs. GUI operating systems • Computer boot process • OS file systems management Software • Software and types of software • System software • Application software • Freeware and shareware • Open-source software • BIOS and Accessing • Program and services Networking: How computers communicate • IP address (Static vs. DHCP) • TCP/IP • Gateway • Subnet mask • Computer MAC address • OSI layer • OSI vs. TCP/IP Protocols and Ports • Types of Network Devices (Hub, Switch, Modem, Router, Access point) • How internet works		
2	**UNIT 2 Cybercrime and digital Evidence** Cyber Crime- Different categories of cybercrime (hacking, identity theft, phishing, malware, etc.), Overview of cybercriminal motivations and tactics, Internal and External Attacks, Crimes related to social media, ATM and Banking Frauds. Data Privacy issues, Packet sniffing,Spoofing, Web security. Understanding ethical considerations in computer applications and cybercrime. Introduction to cyber forensics, definition, types of cybercrimes, handling of electronic media, collection, searching and storage of electronic data, Sources of Information, Accessing Information On-line, Data Analysis,Reporting Tools. First responder – Role and toolkit.Procedure for search and seizure of digital evidences. Search and Seizure of Volatile and Non-volatile Digital Evidence. Imaging and Hashing Digital Evidence. Analysing and Recovery of Deleted, Hidden and Altered files.	**33%**	**9**
3	**UNIT 3 Computer Forensic Investigations** Seizure of suspected computer. Preparation required priorto seizure. Collection and seizure of magnetic data, Treatment of exhibits, Extraction of information, Restoration of deleted files –familiarization of software, Encase, Cyber check suites, Encryption and decryption methods. Protocol to be taken at the scene. Extraction of information from the hard disk. Treatment of exhibits. Creating bitstream of the original media. Collection and seizure of magnetic media. Legal and privacy issues. Examining forensically sterile media. Restoration of deleted files. Password cracking and E-mail tracking. Encryption and decryption methods. Tracking users. Extraction Tools (Autopsy, Encase, Cellebrite UFED etc.)	**34%**	**10**
TOTAL		**100%**	**30 Hrs**

I. Text Book and Reference Book:

1. R.K. Tiwari, P.K. Sastry and K.V. Ravikumar, Computer Crimes and Computer Forensics, Select Publishers, New Delhi (2003).

2. C.B. Leshin, Internet Investigations in Criminal Justice, Prentice Hall, New Jersey (1997).
3. R. Saferstein, Criminalistics, 8th Edition, Prentice Hall, New Jersey (2004).
4. Casey, Digital Evidence and Computer Crime, Academic Press, London (2000).

h. **Course Name:** Basics of Forensic Biological Science

i. **Course Code:** 11010701DS03

j. **Prerequisite:** Foundational knowledge in biology and genetics, along with an understanding of forensic principles, is essential for grasping the intricacies of forensic biological science.

k. **Rationale:** Forensic biological science relies on a deep understanding of biological processes to analyze biological evidence, aiding in criminal investigations by identifying individuals and providing crucial insights into crime scenes.

l. Course Learning Objective:

CLOBJ 1	Develop proficiency in DNA analysis techniques for forensic identification and profiling.
CLOBJ 2	Understand the principles and methodologies of serology and bloodstain pattern analysis in forensic investigations.
CLOBJ 3	Gain practical skills in the examination and interpretation of biological evidence, such as hair, fibers, and bodily fluids.
CLOBJ 4	Apply knowledge of forensic botany and entomology to aid in crime scene reconstruction and timeline determination.
CLOBJ 5	Explore the ethical considerations and legal implications surrounding the use of biological evidence in forensic science.

m. Course Learning Outcomes:

CLO 1	Mastery in performing DNA analysis, leading to accurate identification and profiling of individuals involved in criminal cases.
CLO 2	Competence in conducting serological examinations and bloodstain pattern analysis, contributing to the reconstruction of crime scenes.
CLO 3	Ability to examine and interpret biological evidence effectively, providing valuable insights into criminal investigations.
CLO 4	Proficiency in utilizing forensic botany and entomology to establish timelines and environmental contexts in forensic scenarios.
CLO 5	Understanding of ethical standards and legal frameworks governing the use of biological evidence in forensic science, promoting integrity and accountability in practice.

G. Teaching & Examination Scheme:

Teaching Scheme				**Examination Scheme**					**Total**
Lect. Hrs./week	**Tut Hrs.**	**Lab Hrs.**	**Credit**	**External**		**Internal**			
				T	**P**	**T**	**CE**	**P**	
2	-	-	2	60	-	20	20	-	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 Cell Biology, Definition of a cell, Cell theory and historical developments, Types of cells: prokaryotic and eukaryotic, Cell Structure and Function, Prokaryotic cell structure and components, Eukaryotic cell structure and components, Cell organelles and their functions, Cell membrane and transport mechanisms, Cell Division and Reproduction, The cell cycle and its phases, Mitosis: stages and significance, Meiosis: stages and significance. Study of Biomolecules: protein, lipids, carbohydrates, amino acids. Cell reproduction and genetic variation: DNA Structure and Replication, Introduction to DNA and its significance, DNA structure: nucleotides, base pairing, and double helix, DNA replication process and enzymes involved, DNA repair mechanisms, Gene Expression and Regulation, Transcription and translation processes, RNA types: mRNA, tRNA, rRNA, and non-coding RNA, Gene regulation: transcription factors and epigenetics, post-translational modifications	**33%**	**9**
2.	**UNIT 2** Taxonomy, Animal and Plant Morphology, and Human Physiology Introduction to Taxonomy Definition and importance of taxonomy, History and development of taxonomy, Taxonomic hierarchy and classification systems, Principles of taxonomy and nomenclature, Animal and Plant Morphology, Animal tissues and organ systems, Plant tissues and organ systems, Morphological adaptations in animals and plants, Comparative anatomy and homology Human Physiology: Introduction to human physiology Cardiovascular system: heart, blood vessels, and circulation, Respiratory system: lungs, gas exchange, and breathing, Digestive system: organs and processes of digestion, Nervous system: neurons, brain, and sensory functions, Homeostasis and Regulation, Endocrine system: hormones and their functions, Immune system: innate and adaptive immunity Integration and Coordination Musculoskeletal system: muscles, bones, and movement, Reproductive system: male and female reproductive organs, Developmental biology: embryonic development and growth, Aging and senescence: physiological changes and implications.	**17%**	**5**
3.	UNIT 3 forensic botany, entomology, wild life forensics & microbial forensics. General plant classification schemes. Sub specialization of forensic botany- plant morphology, plant anatomy, plant systematic, palynology, plant ecology, limnology, Plant architecture- roots, stems, flowers, leaves. Practical plant classification schemes: - vegetables and herbs, fruits bearing trees and plants, landscaping plants: trees, shrubs and vines, grasses, plant cell structure and functions. Basic plant tissues Various types of woods, timbers, seeds and leaves and their forensic importance. Identification and matching of various types of wood, timber varieties, seeds and leaves. Types of fibers – forensic aspects of fiber examinationfluorescent, optical properties, refractive index, birefringence, dye analysis etc. Identification and comparison of man–made and natural fibres. Various types	**30%**	**10**

	of Planktons and diatoms and their forensic importance Diatoms types morphology, methods of isolation from different tissue. Study and identification of pollen grains, Identification of starch grains, powder and stains of spices etc. Paper and Paper Pulp identification, Microscopical examination of pulp material. Introduction to Wildlife Forensics, Importance and scope of wildlife forensics, Role of forensic techniques in wildlife crime investigations, Wildlife conservation and the need for effective forensic tools, Protected and Endangered Species, Identification of protected and endangered species, Study of their habitats, behavior, and conservation status, Wildlife Acts and relevant legislation for species protection, Forensic Techniques in Wildlife Crime Investigation, Collection and preservation of wildlife evidence, Forensic analysis of animal remains, including bones, feathers, and skins, DNA profiling for species identification and population genetics, Wildlife Crime and Legal Framework, Types of wildlife crimes: poaching, trafficking, habitat destruction, Overview of relevant wildlife and environmental acts, Prosecution of wildlife offenders and expert testimony in court		
4.	**Unit-4** Biological Evidence Collection, Preservation & Analysis, Introduction to Forensic Biology, Definition and scope of forensic biology, Role of biological evidence in criminal investigations, Legal aspects and forensic protocols, Biological Evidence Collection, Crime scene investigation procedures, Techniques for identifying and collecting biological evidence, Chain of custody and evidence documentation, Biological Evidence Preservation, Importance of proper evidence handling and preservation, Packaging and storage methods for different types of biological evidence, Preservation techniques to prevent degradation and contamination, Biological Evidence Analysis, Microscopic examination of biological evidence	**20%**	**6**
TOTAL		**100%**	**30 Hrs**

I. Text Book and Reference Book:

1. "Wildlife Forensics: Methods and Applications" by Jane E. Huffman and John R. Wallace
2. "Forensic Biology: Identification and DNA Analysis of Biological Evidence" by Richard Li
3. "Forensic Botany: A Practical Guide" by David W. Hall and Jason H. Byrd
4. "Introduction to Wildlife Conservation in Farming" by John D. Holland and Peter H. L. Groenewegen "Forensic Entomology: The Utility of Arthropods in Legal Investigations" by Jason H. Byrd and James L. Castner
5. "Forensic Ecology Handbook: From Crime Scene to Court" by Julie Roberts and Nicholas V. Passmore "Wildlife Forensic Investigation: Principles and Practice" by John E. Cooper, Margaret E. Cooper, and Ruth M. Morgan
6. "Plant Systematics: A Phylogenetic Approach" by Walter S. Judd, Christopher S. Campbell, Elizabeth A. Kellogg, Peter F. Stevens, and Michael J. Donoghue
7. "Introduction to Plant Systematics" by Gurcharan Singh
8. "Forensic Botany: Principles and Applications to Criminal Casework" by Heather Mil

Semester 1

a. **Course Name:** FS Biology Lab-I

b. **Course Code:** 11010701DS04

c. **Prerequisite:** Proficiency in basic laboratory techniques and a foundational understanding of biology are necessary for engaging in practical applications within forensic biological science labs.

d. **Rationale:** Forensic biological science laboratory activities provide hands-on experience crucial for applying theoretical knowledge in analyzing biological evidence, preparing students for real-world forensic investigations and ensuring competency in evidence processing and analysis.

e. Course Learning Objective:

CLOBJ 1	Acquire practical skills in biological evidence analysis.
CLOBJ 2	Understand DNA extraction, serological analysis, and bloodstain pattern interpretation.
CLOBJ 3	Gain proficiency in forensic botany and entomology for timeline establishment.
CLOBJ 4	Learn standard operating procedures and safety protocols in forensic biological science labs.
CLOBJ 5	Develop critical thinking abilities for evaluating and interpreting biological evidence findings.

f. Course Learning Outcomes:

CLO 1	Proficiency in collecting, preserving, and analyzing biological evidence.
CLO 2	Competence in DNA extraction and serological analysis for forensic identification.
CLO 3	Capability to interpret bloodstain patterns for accurate crime scene reconstruction.
CLO 4	Ability to apply advanced techniques in forensic botany and entomology.
CLO 5	Understanding of ethical considerations in forensic biological science, ensuring integrity in practice.

g. Teaching & Examination Scheme:

Teaching Scheme				**Examination Scheme**					**Total**
Lect. Hrs./week	**Tut Hrs.**	**Lab Hrs.**	**Credit**	**External**		**Internal**			
				T	**P**	**T**	**CE**	**P**	
-	-	4	2	-	30		10	10	50

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

h. Course Content:

Sr.	**List of Practical**
1	To perform the collection, preservation and packaging of various biological evidences.

2	To study the morphological features of pollen grains, diatoms, hair and fibres.
3	To perform the species-based identification of hair sample.
4	To perform simple, negative and grams staining for microbiological evidences.
5	To study the plant morphology.
6	Detection of biomolecules using preliminary test.
7	Colorimetric analysis of biological samples.

i. Text Book and Reference Book:

1. "Forensic Science: From the Crime Scene to the Crime Lab" Author: Richard Saferstein, Edition: 4th Edition
2. "Introduction to Plant Physiology" Author: William G. Hopkins and Norman P. A. Hüner Publisher: Wiley Edition: 4th Edition

Semester 1

A. Course Name: Forensic Psychology: Witness Investigation

B. Course Code: 11010701SE01

C. **Prerequisite:** Foundational Knowledge: General Psychology: Understanding of basic psychological theories and principles. Knowledge of major schools of thought in psychology (e.g., behaviorism, cognitive psychology, psychodynamic theories).

D. **Rationale:** The course then proceeds to examine the complexities of eyewitness memory and testimony, scrutinizing factors influencing accuracy and the potential pitfalls of identification procedures.

E. Course Learning Objective:

CLOBJ 1	Understand the principles and theories underlying forensic psychology.
CLOBJ 2	Analyze the application of psychological principles in legal contexts.
CLOBJ 3	Evaluate the role of psychology in criminal behavior and the justice system.
CLOBJ 4	Apply psychological assessment techniques to forensic settings.
CLOBJ 5	Examine ethical dilemmas and professional responsibilities in forensic psychology practice.

F. Course Learning Outcomes:

CLO 1	Articulate major theories and concepts in forensic psychology.
CLO 2	Demonstrate the ability to apply psychological principles to analyze criminal behavior.
CLO 3	Psychological assessments and interpret findings within a forensic context.
CLO 4	Demonstrate ethical decision-making skills in forensic practice.
CLO 5	Communicate forensic psychological concepts effectively through written and oral presentations.

G. Teaching & Examination Scheme:

Teaching Scheme				**Examination Scheme**					**Total**
Lect. Hrs./week	**Tut Hrs.**	**Lab Hrs.**	**Credit**	**External**		**Internal**			
				T	**P**	**T**	**CE**	**P**	
2	-	-	2	60	-	20	20	-	100

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

J. Course Content:

Sr. No	**Content**	**Weightage**	**Teaching Hours**
1.	**Unit-1** Introduction to Forensic Psychology: Introduction to Forensic Psychology, Definition and scope of forensic psychology, Historical overview, Ethical considerations in forensic psychology, Role of psychologists as expert witnesses.	**30%**	**8**
2.	**Unit-2** Eyewitness Memory and Testimony Eyewitness Memory and Testimony, Memory processes and their limitations, Factors affecting eyewitness accuracy, Eyewitness identification procedures	**40%**	**11**
3.	**Unit-3** Interviewing Witnesses and Victims:	**30%**	**11**

	Cognitive interview techniques, Legal and ethical issues in witness interviews, Interrogation techniques and false confessions.		
TOTAL		**100%**	**30 Hrs**

K. Text Book and Reference Book:

1. Leo, Richard A. and Steven A. Drizin. The Three Errors: Pathways to False Confession and Wrongful Conviction, in Police
2. Interrogations and False Confessions: Current Research, Practice and Policy Recommendations (G. Daniel Lassiter & Christian A.
3. Meissner eds., 2010).
4. Meissner, Christian A. et al. Interview and interrogation methods and their effects on true and false confessions. Campbell Systematic Reviews (2012:2013),
5. Blau, T. H. (I998). The Psychologist as Expert Witness, (Second Edition), New York: John Wiley & Sons, Inc.
6. Hess, A.K,, Weiner, I.B. (I999). The Handbook of Forensic Psychology. New York: John Wiley & Sons, Inc.
7. Smith, S.R., Meyer, R.G. Law, Behavior, and Mental Health Policy and Practice. (1987) New York: New York University Press.
8. Rogers, R. (1997). Clinical Assessment of Malingering and Deception (Second Edition) Edited by Richard Rogers. New York: The

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.

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	**3%**	**1**

	presentation? Knowing /Analysing audience, Organizing content and preparing an outline Traits of a good speaker		
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 Hrs**

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

Semester 1

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:** **T**wo/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 Hrs**

Reference Books:

1. Hindi for Beginners published by Up to School Worksheets
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

Semester 1

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:** **T**wo/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 Hrs**

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.

Semester 1

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.

E. **Course Learning Objective:**

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

F. **Course Learning Outcomes:**

CLO 1	Memorize the MATLAB environment with confidence, effectively utilizing its features and tools for programming and data analysis.
CLO 2	Understand matrices and arrays, perform basic operations, and visualize data using 2D and 3D plots for effective data exploration and representation.
CLO 3	Compare programming concepts like control statements, loops, and logical operations to write structured MATLAB code for problem-solving.
CLO 4	Analyse & distinguish and use user-defined functions, promoting code reusability and modular design in MATLAB programs.
CLO 5	Evaluate Work with file input/output, enabling data exchange with external sources, and utilize the Symbolic Math Toolbox for performing symbolic computation.
CLO 6	Creative ability to independently solve problems using MATLAB.

G. **Teaching & Examination Scheme:**

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

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

H. **Course Content:**

Sr. No.	**Content**	**Weightage**	**Teaching Hours**
1	**Getting Started with MATLAB:** Introduction to MATLAB, history, features, and uses, MATLAB desktop, basic commands,	**10%**	**10**

	variables, and data types, performing arithmetic operations and using functions.		
2	**Working with Matrices and Arrays:** Creating Matrices and Arrays, Array Operations and Indexing, Logical Operations and Relational Operators	**18%**	**10**
3	**Data Visualization in MATLAB:** Visualizing data using 2D plots and 3D Plot, Customizing Plots, Enhancing plots with titles, labels, and formatting.	**18%**	**10**
4	**Programming with MATLAB:** Conditional Statements (if-else), loops (for and while), Vectorization and Logical operation	**18%**	**10**
5	**Working with Files and Symbolic Math:** Reading from and writing to files, data import/export, performing symbolic computations using Symbolic Math Toolbox	**18%**	**10**
6	**Reading Skills:** Define reading, Reading Strategies, Techniques of reading, Techniques to read faster	**18%**	**10**
TOTAL		**100%**	**100%**

I. List of Practicals:

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

J. 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 Littletied,
3. Getting Started with MATLAB-7 (TextBook), By Rudra Pratap | OXFORD University Press

Semester 1

A. **Course Name:** Office Automation
B. **Course Code:** 0501001UE01
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 Outcomes:**

CLOBJ 1	Memorize the MATLAB environment with confidence, effectively utilizing its features and tools for programming and data analysis.
CLOBJ 2	Understand matrices and arrays, perform basic operations, and visualize data using 2D and 3D plots for effective data exploration and representation.
CLOBJ 3	Compare programming concepts like control statements, loops, and logical operations to write structured MATLAB code for problem-solving.
CLOBJ 4	Analyse & distinguish and use user-defined functions, promoting code reusability and modular design in MATLAB programs.
CLOBJ 5	Evaluate Work with file input/output, enabling data exchange with external sources, and utilize the Symbolic Math Toolbox for performing symbolic computation.
CLOBJ 6	Creative ability to independently solve problems using MATLAB.

F. Course Learning Outcomes:

CLO 1	Demonstrate understanding of the concept of office automation, including its components, functions, and applications in modern workplaces.
CLO 2	Understand the importance and benefits of office automation, recognizing its role in enhancing efficiency, productivity, and communication in organizations.
CLO 3	Analyse the challenges and considerations associated with office automation implementation, such as technological limitations, organizational culture, and security concerns.
CLO 4	Apply their knowledge of office automation to analyze and evaluate its integration with business processes, identifying opportunities for automation and efficiency improvements.
CLO 5	Evaluate the effectiveness of office automation solutions in addressing organizational needs and improving workflow processes, considering factors such as cost-effectiveness, user satisfaction, and return on investment.
CLO 6	Synthesize their understanding of office automation concepts to develop strategies for successful implementation, including assessing organizational needs, selecting appropriate technologies, and managing change.

G. Teaching & Examination Scheme:

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

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

H. Course Content:

Sr. No.	**Content**	**Weightage**	**Teaching Hours**
1	**Introduction to Office Automation:** Overview of Office Automation, Importance and Benefits of Office Automation, Role in Modern Work Environments, Integration with Business Processes, Challenges and Considerations.	**8%**	**4**

2	**Introduction of Computer:** Overview of Computer, Computer Input and Output devices, Operating System, hardware and Software Introduction to Ram ,Rom ,CPU and more devices.	**8%**	**4**
3	**Microsoft Word:** Introduction to MS Word, Getting Familiar with the Interface, Creating a New Document, Basic Text Formatting, Bold, Italic, Underline), Aligning Text (Left, Center, Right),Saving and Opening Documents,Navigate Through a Document, Insert hyperlinks, Search for text, Replace, Create bookmarks, Move to a specific location or object in a document, Apply document themes, Apply document style sets, 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 Hrs**

I. List of Practical's

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 Instituute The address of Institute.
6) Work sheet exercise 1. Insert a column Number of Teams between columns Year and Tickets sold with values Insert a row between row 3 and row 4 with values Delete column Revenue Rename the Sheet1 with name Format cells Delete Sheet3.6. Hide row 4. 7. Insert a sheet and rename it with name.
7) Table exercise Complete the following tasks:
   a) Widen the first column to 15.
   b) Add a row beneath the details on Southampton to show the average monthly rainfall.
   c) Add a new column after the June rainfall statistics to show the total rainfall in each city over the period. d) The rainfall in Birmingham during March should be 58.
   d) Insert a new row between the rows holding the London and Sheffield rainfall statistics. Enter the following details:Newcastle 65 63 57 50 39 21.
   e) Copy the appropriate formula to obtain the total rainfall for Newcastle during the period.
8) Table column exercises. Change the column width of column B to 15. 2. Change column width of column D to G to 20. 3.Change column width of column A and B to 14 4. Calculate Total Sales for each item and store result in column D. Hint: Total sales=Quantity * Unit Price. 5. Calculate Total Sales for all the items and store result in cell B6. 6. Copy Unit Price for **PC in cell D7. Move Total sales from cell B6 to D8.**
9) Insert remove columns of table Complete the following tasks:
   a) Add a Units Used column to show the number of units of electricity used by each customer (Hint: Subtract the Previous Reading from the Present Reading).
   b) The cost of one unit of electricity is Rs.0.08. Add a Unit Cost column to show the cost of one unit. (This column will contain 0.08 in all of the relevant cells).
   c) Add a Units Charge column to show the total cost of the units used by each customer. (Hint: Unit Cost * Units Used)
   d) There is a standing charge of Rs.13.60 on each customer's account. Add a column to display this Standing Charge. (This column will contain Rs.13.60 in all of the relevant cells).
10) Math functions: The functions and commands required to solve the following assignment are as follows: Enter data - labels and values
    1. Editing cell contents
    2. Saving a spreadsheet
    3. Altering column widths
    4. Using the SUM function
    5. Adding a new row after the last row of data
    6. Adding a new column after the last column of data
    7. Copying a formula
    8. Using the AVERAGE, MIN, MAX function
    9. Inserting a new row between existing rows Inserting a new column between existing columns.
11) Table formatting using background color: Format the Student Grades so that your spreadsheet looks like the one below (you can use different colours, if you like).
12) Calculate total sale and commission based on given details in table
13) Filter data of excel sheet:
    1. Count number of order in Boston.
    2. Count number of Microwave order.
    3. Count number of journeys with truck 3.
    4. Count number of Peter White journeys.
    5. How many times is no. of items less than 20.

6. Display sum of refrigerator items.
7. Display sum of washing machine items.
8. Display sum of items transported by truck 4.
9. Sum of items transported by trucks.
10. Number of microvawe orders in Boston .
11. Number of Peter White journeys with truck 1.
12. Number of orders in Boston after 2/3/2013:
13. Number of orders between 2/3/2013 and 2/6/2013:
14. sum of microwaves transported to NY:
15. sum of items transported to Pittsburgh by truck 1:
16. sum of items ordered between 2/3/2013 and 2/6/2013:
17. Sum of items transported to NY, Baltimore and Philadelphia.

14) Conditional formatting do conditional formatting on the excel sheet in given data.
15) Sorting sort given data of excel sheet.
16) Typing exercise aq1 qa sw2ws de3ed fr4rf gt5tg queen 11 queens 1 apple 11 apples 2 wishes 22 wishes 2 swims 22 swims eddies 33 eddies 3 deeds 33 deeds 4 roses 44 roses 4 fish 44 fish tugs 55 tugs 5 goats 55 goats.
17) Water mark and header footer inserting and removing
18) Power point presentation creating presentation.
19) PPT add timing and sound effects.
20) Access create data base, tables create database, tables.
21) Access, relations between tables relations between tables.

J. 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

Semester 1

A. Course Name: Basic Photography

B. Course Code: 18010201UE01

C. **Prerequisite:** 1) Understanding of Basic Computer Skills 2) Media Literacy 3) Creative Vision 4) Passion to learn

D. **Rationale:** Taking a basic photography course can be incredibly helpful for anyone looking to improve their photography skills. Not only will you learn about the technical aspects of photography, but you'll also gain a greater appreciation for the art form and discover your own unique style.

E. Course Learning Objective:

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

F. Course Learning Outcomes:

CLO 1	Remember some component of photography and Improved technical skills: Basic photography classes will teach you the fundamentals of camera operation, exposure, and lighting.
CLO 2	Understand how to use your camera to its full potential and create images that are properly exposed and well-lit.
CLO 3	Apply the ability to use natural and artificial light effectively to enhance the visual impact of their photographs
CLO 4	Analyse By learning about composition, colour, and perspective, you'll be able to create images that are not only technically proficient but also visually compelling.
CLO 5	Assess proficiency in operating and adjusting camera settings to achieve proper exposure.
CLO 6	Create vision and explore different styles of photography.

G. Teaching & Examination Scheme:

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

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

H. Course Content:

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

I. List of experiments

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

J. 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

Semester 1

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	-	0	4	20	20	-	60	-	100

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

H. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	**Introduction to first aid** Aims of first aid The first aider First aid and the law Indian good Samaritan protection guidelines Duty of giving care Consent of the person in need Privacy Negligence Dealing with an emergency Top-to-toe assessment Hygiene and hand washing First aid overview flow char	**7%**	**4**
2	**Assessment of patients with fractures, wounds, and bleeding** Brief Anatomy of the skeletal system Fractures (injuries to bones) Injuries and fractures to the head,neck and spine Injuries and fractures to the cheekbone, nose and lower jaw Fracture of the cheekbone or nose Fractures of the lower jaw Injuries to the shoulder, ribs or breastbone Injuries or fractures of the shoulder Injuries and fractures of the collarbone Rib injuries and fractures Fractures of the breastbone Injuries to the arm, elbow, wrist, hand or Injuries and fractures of the arm(upper arm, forearm, wrist) Injuries and fractures of hand or fingers Injuries to the pelvis, lower limbs, knee, ankle or feet Injuries and fractures of the pelvis Injuries and fractures of the leg (thigh or lower leg) or ankle 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)	**10%**	**6**
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	**8%**	**5**

	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		
5	**Lifesaving procedures in emergency & shock** The heart and the blood circulation, Heart and blood circulation, Blood pressure, Pulse, The blood, Chest discomfort, Bleeding, First aid for bleeding (in general), Resuscitation (basic CPR), Resuscitation of a person who is not breathing or not breathing normally, Resuscitation of baby/child (less than one year old)	**8%**	**5**
6	**Head trauma & stroke** The nervous system, The central nervous system, The peripheral nervous system (PNS), Unconsciousness, Head injuries, Concussion, Cerebral compression, Skull fractures, Stroke, Fits – convulsions - seizures	**10%**	**6**
7	**Gastrointestinal tract, diarrhea, food poisoning and diabetes** Review of anatomy and physiology of gastrointestinal tract, Diarrhea, Prevent dehydration, Food poisoning, Diabetes, Type 1 diabetes, Type 2 diabetes, Gestational diabetes (diabetes during pregnancy), Diagnosis, Hyperglycaemia, Symptoms of hyperglycaemic coma or diabetic coma, Hypoglycaemia	**10%**	**6**
8	**Senses, foreign bodies in eye, ear, nose or skin and swallowed foreign Objects** Review of anatomy and physiology of the special senses, 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 giving birth, Aftercare of the mother, Medical conditions and pregnancy, Diabetes, High blood pressure, Infections, Prevention of sexually transmitte diseases (STD), Sexually transmitted infections, Reducing the risk of STDS/STIS, Emergency childbirth	**10%**	**6**
10	**Psychological first aid**Definition of psychological first aid, Traumatic crisis, (psychological) shock phase, Reaction phase, Processing phase, Reorientation phase, Behave calmly, Listening to the affected person, Physical contact, Providing psychological first aid to all	**7%**	**4**
11	**Specific emergency situations and disaster management** Emergencies at school, Emergencies at work, Road and traffic accidents, Emergencies in rural area, Disasters and multiple casualty accidents Emergency triage	**10%**	**6**
	Total	**100%**	**60**

I. Text Book and Reference Book:

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

Semester 1

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:**

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

Semester 2

A. **Course Name:** Basics of Forensic Physical Science
B. **Course Code:** 11010702DS05
C. **Prerequisite:** Fundamental understanding of general chemistry, physics, and biology. Knowledge of laboratory techniques including sample preparation, microscopic examination, and instrumental analysis. Familiarity with basic forensic principles and investigative procedures.
D. **Rationale:** Essential for understanding scientific principles and methodologies applied in the analysis of physical evidence encountered in forensic investigations. Provides comprehensive knowledge and practical skills in the examination and analysis of various types of physical evidence.
E. Course Learning Objective:

CLOBJ 1	Able to demonstrate proficiency in various techniques used to collect physical evidence at crime scenes, including but not limited to fingerprinting, DNA sampling, trace evidence collection, and tool mark analysis.
CLOBJ 2	Learning about spectroscopy, chromatography, microscopy, and other analytical techniques commonly employed in forensic laboratories.
CLOBJ 3	Understanding the significance of different types of evidence, recognizing patterns, and drawing conclusions based on scientific data.
CLOBJ 4	To develop an awareness of the legal and ethical considerations that govern the collection, analysis, and interpretation of physical evidence in forensic investigations.
CLOBJ 5	Understanding chain of custody procedures, the admissibility of evidence in court, and the ethical responsibilities of forensic scientists.

F. Course Learning Outcomes:

CLO 1	Identification and classification of different types of physical evidence encountered in forensic investigations.
CLO 2	Proficiency in sample preparation techniques for various types of physical evidence.
CLO 3	Application of physical and instrumental methods for the analysis of physical evidence.
CLO 4	Interpretation of analytical results and drawing conclusions regarding forensic significance.
CLO 5	Understanding of soil mechanics, structure, and composition for forensic soil analysis.

G. Teaching & Examination Scheme:

Teaching Scheme				**Examination Scheme**					**Total**
Lect. Hrs./week	**Tut Hrs.**	**Lab Hrs.**	**Credit**	**External**		**Internal**			
				T	**P**	**T**	**CE**	**P**	
2	-	-	2	60	-	20	20	-	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** Soil: Types of soil, sample preparation, removal of contaminants, colour, molecular particle size distribution, turbidity test, pH measurements, microscopic examination, Physical examinations of soil evidence, Soil mechanics, Structure & Composition, Baking, Compaction and Agro-soil additives, Instrumental analysis of soil, Interpretation of soil evidence, Standard Operating Procedures for examination, Discussion on important case studies of soil evidence Forensic Engineering Examination and analysis of the construction materials, Sampling, collection & preservation of the materials with relevant information required for the investigation, determination of adulterants by physical, chemical and instrumental methods, investigation and observation of collapsed structures & causes of failure, crash investigations.	**25%**	**8**
2.	**UNIT 2** Paint: Types of paint and their composition, Difference between dye and pigment, chemical and instrumental analysis of paint pigments, forensic significance. Fibre: Classification and properties of textile, paper and fibres, Physical and Instrumental analysis of fibres evidence and dyes, Examination of damage to textiles, yarn, weaving & fabrics, Collection of fibre evidence, Interpretation of fibre evidence, Discussion on important case studies of fibre evidence Glass: Types, composition, chemical and physical properties of glass, types of glass fractures, examination and elemental analysis of evidence. Forensic examination of glass fractures, Physical and Microscopic examination of glass evidence, Standard Operating Procedures for examination, Discussion on important case studies of glass evidence	**26%**	**6**
3.	**UNIT 3** Tool Marks: Tool marks- Types, Class and Individual Characteristics, Comparisons, Impression Marks, Compression Marks, Striated Marks, Combination of Impression and Striated Marks, Repetitive Marks, Materials for making Test Tool Marks, Methods of preparation of Test Tool Marks, Comparison of test and evidence tool marks, Rubber Stamp Impressions, Metallic Seal Impressions, Embossed Impressions and Indentation marks, Mechanical Impressions. Restoration of erased/obliterated marks: Restoration of erased numbers, methods of marking-cast, punch and engraved, methods used for removal of serial numbers, theory behind number restoration, restoration of marks on cast iron, Aluminum, brass, wood, leather etc., chemical methods of restoration (etching), reagents used for various metals, electrolytic methods of restoration reagents used, ultrasonic cavitation for restoration, magnetic particle method for restoration, other methods of restoration, laser etched serial numbers and bar codes and their restoration, recording of restored marks.	**24%**	**10**
4.	**UNIT 4** Tyre and Track Impressions Tyre Impressions: Introduction, Types, Construction, and Nomenclature of tread and Information obtained from sidewall,	**25%**	**6**

	Noise Treatment significance, Importance of tread wear indicators and retread tires. Tire Track Evidence: Introduction, Types of Evidences, Recovery of Tire Evidences, Casting of tire impressions, the examination process including identification and comparison, Skid Marks		
TOTAL		**100%**	**30 Hrs**

I. Text Book and Reference Book:

1. "Forensic Science: An Introduction to Scientific and Investigative Techniques" by Stuart H. James, Jon J. Nordby, and Suzanne Bell
2. "Criminalistics: An Introduction to Forensic Science" by Richard Saferstein
3. "Introduction to Forensic Science and Criminalistics" by Robert E. Gaensslen, Howard Harris, and Henry Lee
4. "Forensic Science: Fundamentals and Investigations" by Anthony J. Bertino and Patricia Nolan Bertino
5. "Crime Scene to Court: The Essentials of Forensic Science" by Peter White
6. "Forensic Science: From the Crime Scene to the Crime Lab" by Richard Saferstein
7. "Forensic Science: The Basics" by Jay Siegel and Kathy Markovitz
8. "Forensic Science: An Introduction" by Richard A. Stripp
9. "Forensic Science: An Introduction to Scientific and Investigative Techniques" by Stuart H. James, Jon J. Nordby, and Suzanne Bell

Semester 2

A. **Course Name:** Basics of Forensic Chemical Science
B. **Course Code:** 11010702DS06
C. **Prerequisite:** Basic understanding of chemistry principles, including periodic trends, bonding, electronic transitions, polarity, pH, buffer solutions, and the mole concept. Familiarity with qualitative and quantitative chemical analysis techniques. Knowledge of common chemical substances and their properties. Understanding of basic forensic science principles and methodologies.
D. **Rationale:** Forensic Chemical Sciences play a crucial role in modern forensic investigations by providing scientific evidence related to various types of crimes, accidents, and disputes. Understanding the fundamental concepts of chemistry and their application in forensic analysis is essential for forensic chemists to accurately identify, analyze, and interpret evidence obtained from crime scenes.
E. **Course Learning Objective:**

CLOBJ 1	Demonstrate a comprehensive understanding of the fundamental principles and techniques utilized in forensic chemical analysis, including spectroscopic methods, chromatography, and microscopy.
CLOBJ 2	Apply theoretical knowledge to practical scenarios by effectively collecting, preserving, and analysing forensic evidence using appropriate chemical and instrumental methods.
CLOBJ 3	Critically evaluate forensic chemical data and interpret results accurately to draw scientifically sound conclusions regarding the presence, identity, and significance of chemical evidence in criminal investigations.
CLOBJ 4	Communicate forensic findings effectively, both orally and in writing, to diverse audiences, including forensic professionals, law enforcement personnel, legal practitioners, and laypersons, while adhering to ethical standards and legal requirements.
CLOBJ 5	Understanding chain of custody procedures, the admissibility of evidence in court, and the ethical responsibilities of forensic scientists.

F. **Course Learning Outcomes:**

CLO 1	Gain a thorough understanding of fundamental chemistry principles, including periodic trends, bonding, hybridization, electronic transitions, polarity, pH, buffer solutions, and the mole concept.
CLO 2	Learn qualitative and quantitative analysis techniques commonly used in forensic chemistry, enabling them to identify and analyse chemical evidence accurately. They will be familiar with instrumental methods for analysing chemical substances, including chromatography, spectroscopy, and mass spectrometry.
CLO 3	Acquire knowledge of the distillation and fractionation processes of petroleum products and their commercial uses. They will develop skills in the analysis of petroleum

G. **Teaching & Examination Scheme:**

Teaching Scheme				**Examination Scheme**					**Total**
Lect. Hrs./week	**Tut Hrs.**	**Lab Hrs.**	**Credit**	**External**		**Internal**			
				T	**P**	**T**	**CE**	**P**	
2	-	-	2	60	-	20	20	-	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 Forensic Chemistry Basics concepts of Chemistry: Periodic trends, bonding & hybridization, electronic transitions, polarity, pH, Buffer, solutions, basics of Mole Concept, Types of cases/exhibits received for analysis, Overview of forensic chemical analysis, Qualitative and Quantitative Analysis, Bribe Trap Cases: Examination of Chemicals (Phenolphthalein) used in Bribe trap cases. Petroleum and Petroleum Products Distillation and fractionation of petroleum products Commercial uses of different petroleum fractions. Analysis of petroleum products	**33%**	**8**
2.	**UNIT 2** Fire and Arson Introduction to Fires, Types of Fires, and Causes of fire, Patterns of fire, Thermodynamics of fire, Accelerants and incendiary devices, Forensic Analysis of Fire Debris by Instrumental methods, Introduction, Forensic Analysis, and adulteration in petroleum products as per BIS Specifications. Explosives Introduction, classification and chemistry of explosives, Various types of IEDs and their reconstruction, Accidental Explosions, Mechanism of explosion and their effects, Post blast residue analysis (organic and inorganic) by chemical and instrumental techniques and interpretation of results, Explosives Act and Explosive Substance Act.	**34%**	**13**
3.	**UNIT 3** Forensic Analysis of Food & Beverages Introduction to Alcoholic and non-alcoholic beverages, Analysis of alcoholic beverages, country made liquor, illicit liquor and medicinal preparations containing alcohol as constituents, Analysis of non-alcoholic beverages like tea, coffee. Adulterated Food Analysis: Common adulterants in food, Analysis of samples taken under Food Adulteration Act, and case studies.	**33%**	**9**
TOTAL		**100%**	**30 Hrs**

I. Text Book and Reference Book:

1. Maudham Bassett etal; Voget's Textbook of Quantitative Chemical Analysis, 6th Ed. Longman Essex
2. I. I. Finar: Organic Chemistry vol. II Pearson Education (Singapore)
3. R. T. Morrison, Rn.N Boyd; Organic Chemistry, 6th Ed. Prentice Hall, New Delhi
4. Brean S. Furniss Etal; A.I.Vogel Textbook Of Practicals: Oraganic Chemistry, Addison Wesley Longman, Edinburg
5. A. Burger; Medicinal Chemistry, Vol. Ii, Wiley Interscience, Ny
6. D A Skoog, D.M. West, F.J. Holler; Analytical Chemistry – An Introduction, 7th Ed. Saunders College Pub, Philadelphia, USA
7. Boudreau JE, Etal; Arson & Arson Investigation, Survey & Assessment National Insti-tutes Of Law Enforcement, U.S. Deptt Of Justice, U.S. Govt Printing Press
8. Dettean J D; Kirk's Fire Investigation, 5th Ed. Prentice Hall, Eaglewood Cliffs, N. J.
9. Yinon Jitrin; Modern Methods & Application In Analysis Of Explosives, John Wiley & Sons, England

Semester 2

A. **Course Name:** Basics of Forensic Physical Science (LAB-1)

B. **Course Code:** 11010702DS07

C. **Prerequisite:** Basic understanding of chemistry, including concepts of elements, compounds, and chemical reactions. Familiarity with laboratory safety protocols and procedures.

D. **Rationale:** Forensic physical sciences play a crucial role in the investigation and analysis of physical evidence found at crime scenes. Understanding the properties and characteristics of materials such as soil, fibers, glass, and paint can aid in identifying and linking evidence to suspects or crime scenes.

E. **Course Learning Objective:**

CLOBJ 1	Able to demonstrate proficiency in various techniques used to collect physical evidence at crime scenes, including but not limited to fingerprinting, DNA sampling, trace evidence collection, and tool mark analysis.
CLOBJ 2	Learning about spectroscopy, chromatography, microscopy, and other analytical techniques commonly employed in forensic laboratories.
CLOBJ 3	Understanding the significance of different types of evidence, recognizing patterns, and drawing conclusions based on scientific data.
CLOBJ 4	To develop an awareness of the legal and ethical considerations that govern the collection, analysis, and interpretation of physical evidence in forensic investigations.
CLOBJ 5	Understanding chain of custody procedures, the admissibility of evidence in court, and the ethical responsibilities of forensic scientists.

F. **Course Learning Outcomes:**

CLO 1	Identification and classification of different types of physical evidence encountered in forensic investigations.
CLO 2	Proficiency in sample preparation techniques for various types of physical evidence.
CLO 3	Application of physical and instrumental methods for the analysis of physical evidence.
CLO 4	Interpretation of analytical results and drawing conclusions regarding forensic significance.
CLO 5	Understanding of soil mechanics, structure, and composition for forensic soil analysis.

G. **Teaching & Examination Scheme:**

Teaching Scheme				**Examination Scheme**					**Total**
Lect. Hrs./week	**Tut Hrs.**	**Lab Hrs.**	**Credit**	**External**		**Internal**			
				T	**P**	**T**	**CE**	**P**	
-	-	4	2	-	30	-	-	20	50

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

H. **Course Content:**

Exp. No.	**Name of the Experiment**
1	Density gradient technique for soil analysis.
2	Study microscopic examination of different plant and animal fiber.
3	Study chemical properties and burn test for fiber.
4	Study of glass fractures and physical matching of broken glass.
5	Examination of physical properties of glass, soil, fiber and paint evidences.

I. **Text Book and Reference Book:**

1. "Forensic Science: An Introduction to Scientific and Investigative Techniques" by Stuart H. James, Jon J. Nordby, and Suzanne Bell
2. "Criminalistics: An Introduction to Forensic Science" by Richard Saferstein

3. "Introduction to Forensic Science and Criminalistics" by Robert E. Gaensslen, Howard Harris, and Henry Lee
4. "Forensic Science: Fundamentals and Investigations" by Anthony J. Bertino and Patricia Nolan Bertino
5. "Crime Scene to Court: The Essentials of Forensic Science" by Peter White
6. "Forensic Science: From the Crime Scene to the Crime Lab" by Richard Saferstein
7. "Forensic Science: The Basics" by Jay Siegel and Kathy Markovitz
8. "Forensic Science: An Introduction" by Richard A. Stripp
9. "Forensic Science: An Introduction to Scientific and Investigative Techniques" by Stuart H. James, Jon J. Nordby, and Suzanne Bell

Semester 2

A. **Course Name:** Basics of Forensic Chemical Science (LAB-2)

B. **Course Code:** 11010702DS08

C. **Prerequisite:** Basic knowledge of chemistry principles and laboratory techniques. Understanding of forensic science concepts, including evidence collection and analysis.

D. **Rationale:** Forensic chemical sciences play a crucial role in the investigation and analysis of various types of evidence encountered in forensic investigations. By understanding the chemical composition of substances such as fuels, accelerants, and other materials commonly encountered in forensic casework, forensic chemists can provide valuable insights into criminal activities, accidents, and other incidents.

E. **Course Learning Objective:**

CLOBJ 1	Able to demonstrate proficiency in various techniques used to collect physical evidence at crime scenes, including but not limited to fingerprinting, DNA sampling, trace evidence collection, and tool mark analysis.
CLOBJ 2	Learning about spectroscopy, chromatography, microscopy, and other analytical techniques commonly employed in forensic laboratories.
CLOBJ 3	Understanding the significance of different types of evidence, recognizing patterns, and drawing conclusions based on scientific data.
CLOBJ 4	To develop an awareness of the legal and ethical considerations that govern the collection, analysis, and interpretation of chemical evidence in forensic investigations.
CLOBJ 5	Understanding chain of custody procedures, the admissibility of evidence in court, and the ethical responsibilities of forensic scientists.

F. **Course Learning Outcomes:**

CLO 1	Understand the principles and techniques involved in the analysis of gasoline, diesel, and kerosene, including methods for identification and quantification of components.
CLO 2	Develop the skills necessary to prepare comprehensive case reports on incidents involving arson, incorporating evidence analysis, interpretation, and conclusions.
CLO 3	Gain proficiency in the analysis of phenolphthalein in bribery cases, including sample preparation, chemical testing, and interpretation of results.
CLO 4	Acquire knowledge and practical experience in conducting chemical analysis of food samples, including methods for detecting contaminants, additives, and adulterants.
CLO 5	Learn qualitative analysis techniques for post-blast residue using chemical tests and chromatography methods, with an emphasis on identifying explosive residues and interpreting results accurately.

G. **Teaching & Examination Scheme:**

Teaching Scheme				**Examination Scheme**					**Total**
Lect. Hrs./week	**Tut Hrs.**	**Lab Hrs.**	**Credit**	**External**		**Internal**			
				T	**P**	**T**	**CE**	**P**	
-	-	4	2	-	30	-	-	20	50

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

H. **Course Content:**

Exp. No.	**Name of the Experiment**
1	To carry out analysis of gasoline.
2	To carry out analysis of diesel.
3	To carry out analysis of kerosene.

Exp. No.	Name of the Experiment
4	To prepare a case report on a case involving arson.
5	Analysis of phenolphthalein in bribe cases.
6	Analysis of food samples by chemical methods.
7	Qualitative analysis of Post blast residue by chemical test and Chromatography methods.

I. Text Book and Reference Book:

1. Maudham Bassett etal; Voget's Textbook of Quantitative Chemical Analysis, 6th Ed. Longman Essex
2. I. I. Finar: Organic Chemistry vol. II Pearson Education (Singapore)
3. R. T. Morrison, Rn.N Boyd; Organic Chemistry, 6th Ed. Prentice Hall, New Delhi
4. Brean S. Furniss Etal; A.I.Vogel Textbook Of Practicals: Oraganic Chemistry, Addison Wesley Longman, Edinburg
5. A. Burger; Medicinal Chemistry, Vol. Ii, Wiley Interscience, Ny
6. D A Skoog, D.M. West, F.J. Holler; Analytical Chemistry – An Introduction, 7th Ed. Saunders College Pub, Philadelphia, USA
7. Boudreau JE, Etal; Arson & Arson Investigation, Survey & Assessment National Insti-tutes Of Law Enforcement, U.S. Deptt Of Justice, U.S. Govt Printing Press
8. Dettean J D; Kirk's Fire Investigation, 5th Ed. Prentice Hall, Eaglewood Cliffs, N. J.
9. Yinon Jitrin; Modern Methods & Application In Analysis Of Explosives, John Wiley & Sons, England

Semester 2

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**	**-**	**100**	**-**	**-**	**-**	**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 Hrs**

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

Semester 2

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 tine, 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 Hrs**

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

Semester 2

A. Course Name: Basic Gujarati-2

B. Course Code: 00019302AE06

C. **Prerequisite:** Knowledge of Gujarati-I

D. **Rationale:** Basic comprehensive skills and Gujarati-I

E. Course Learning Objective:

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

F. Course Learning Outcomes:

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

G. Teaching & Examination Scheme:

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

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

H. Course Content:

Sr. No.	**Content**	**Weightage**	**Teaching Hours**
1	**Advanced vocabulary:** Number 51 onwards, Telling tine, 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 Hrs**

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

Semester 2

A. **Course Name:** Mathematical Aptitude
B. **Course Code:** 00019101SE01
C. **Prerequisite:** Basic numeracy skill
D. **Rationale:** Mathematical aptitude refers to the ability to reason, think critically, and apply mathematical principles to solve problems and make sense of the world around us.
E. **Course Learning Objective:**

CLOBJ 1	Understand and apply fundamental concepts of arithmetic, including numbers, highest common factor (HCF), lowest common multiple (LCM), square roots, and cube roots, to solve numerical problems efficiently and accurately.
CLOBJ 2	Develop proficiency in solving problems involving ratio and proportion, including applications in comparison, scaling, mixing, and distribution scenarios, to analyze and solve real-world quantitative problems effectively.
CLOBJ 3	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 & analyse data presented in various forms, including tables, charts, and graphs, to extract meaningful information related to percentages, averages, and proportions.
CLO 3	Apply knowledge of logarithms, exponential functions, and interest rates to solve problems related to financial calculations, including compound interest, depreciation, and annuity investments.
CLO 4	Analyse and interpret data sets, including grouped and ungrouped data, to calculate measures of central tendency (mean) and dispersion (standard deviation) and draw meaningful conclusions about data distributions.
CLO 5	Evaluate and critique data interpretation methods, including the accuracy and effectiveness of tabulation, bar graphs, pie charts, and line charts in conveying information and making comparisons.
CLO 6	Synthesize information from multiple sources to solve problems related to mensuration, including calculating areas, perimeters, volumes, and surface areas of geometric shapes and solids.

G. Teaching & Examination Scheme:

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

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

H. Course Content:

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

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.

Semester 2

A. **Course Name:** IPDC including history and culture of India and IKS-I

B. **Course Code:** 00019302VA01

C. **Prerequisite:** 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.

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.

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, Lincoln and Bachchan, students will learn to face difficulties through a positive perspective.	7	2
6	Facing Failures: Significance of Failures: Failure is a student's daily source of fear, negativity, and depression. Students will be given the constructive skills to understand failure as formative learning experiences.	7	2
7	My India My Pride: Glorious Past - Part 1: India's ancient Rishis, scholars, and intellectuals have made tremendous contributions to the world, they developed 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 Hrs**

I. Reference Books:

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

Semester 2

A. **Course Name:** Public Health Nutrition

B. **Course Code:** 19010202UE01

C. **Prerequisite:** Basic knowledge of Nutrition and Public Health

D. **Rationale:** Public health nutrition is the field of study that is concerned with promotion. of good health through prevention of nutrition–related illnesses or deficiencies in the population, and the government policies and programmed that are aimed at solving these problems.

E. **Course Learning Objective:**

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

F. **Course Learning Outcomes:**

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

G. Teaching & Examination Scheme:

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

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

H. Course Content:

Sr. No.	**Content**	**Weightage**	**Teaching Hours**
1	**Introduction to 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	30	**12**

	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		
2	**Major nutrition deficiencies as public health challenge Undernutrition:** Global and Indian prevalence of undernutrition, risk factors consequences Major nutritional Problems – etiology, prevalence, clinical manifestations, preventive and therapeutic measures for: Macro and micro nutrient deficiencies. Other nutritional problems- etiology, prevalence, clinical manifestations, preventive and therapeutic measures for: lathyrism, dropsy, aflatoxicosis, alcoholism and fluorosis. Nutrition and Non-communicable diseases – Overweight, obesity and chronic degenerative diseases	30	**12**
3	**National nutrition programmes and policies:** Programmes and policies on nutrition and health (National and Global) 3.2. United Nations (UN) Decade of Action on Nutrition (2016 - 2025) 3.3. Overview of Sustainable Development Goals (SDGs) - keeping Nutrition at centre stage	10	5
4	**Food and nutrition security:** Factors affecting food security, indicators and systems (Global & national) 4.2. Identification and measurement of food insecurity (FIA, ISMAP) 4.3. Food production, access, distribution, availability, losses and consumption 4.4. Socio-cultural aspects of dietary patterns and their implications for nutrition and health	10	5
5	**Approaches and Strategies for improving nutritional status and health:** Programmatic approaches, their advantages and demerits, feasibility, and available resources Health-based interventions, food-based interventions including: Fortification and genetic improvement of foods, supplementary feeding, nutrition education for behaviour change. Case studies: Community-based preventive and management programmes; screening approaches, etc.	7	2
TOTAL		**100%**	**36 Hrs**

I. PRACTICAL

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

J. 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)

Semester 2

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**		**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	**Understanding Electrical Circuits Series and parallel circuits**: concepts, calculations, and applications. Electrical loads and	18	**8**

	power ratings of household appliances. Safety considerations and working with electrical circuits and appliances.		
2	**Electrical Measurements:** Measurement of voltage, current, and resistance using multimeters. Measurement of power consumption and energy efficiency of electrical appliances. Understanding power factor and its significance in household appliances. Comparison between AC and DC circuit. Understand the difference between various measuring instruments between AC and DC circuit.	18	8
3	**Earthing and Grounding:** Detailed study of earthing and grounding systems in residential buildings. Pipe earthing and plate earthing of the electrical system. Importance of grounding for electrical safety and protection of appliances. Practical demonstration and installation of earthing systems	18	8
4	**Types of Wiring:** Study of different types of electrical wiring systems used in households. Staircase wiring, Godown wiring. Wiring for lighting circuits, power outlets, and specialized appliances. Hands-on practice on wiring connections and safety measures.	13	6
5	**Maintenance of Household Appliances:** Understanding the common components of household appliances. Techniques for cleaning and maintaining refrigerators, ovens, microwaves, and dishwashers. Practice- preventive maintenance, regular cleaning, oiling, greasing of household gadgets like fans, coolers, 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 Hrs**

I. PRACTICAL

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.

J. 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

Semester 2

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	17	**10**

	Developmental stages Prenatal stage Infancy Childhood Challenges of Adolescence Adulthood Old Age		
2	**Unit II Sensation, Attention & Perception:** Sensation: Definition, types Attention: Definition, Types Perception: Figure-Ground perception, perceptual constancies: shape, size, brightness; Depth perception: monocular and binocular cues; illusions	17	10
3	**Unit III Thinking:** Nature and Processes Problem Solving Reasoning Decision Making Developing Creative Thinking Barriers to Creative Thinking Strategies for Creative Thinking	17	10
4	**Unit IV Intelligence:** Theories of Intelligence, Multiple Intelligence theory, Triarchic Theory of Intelligence, PASS Model of Intelligence, Individual Differences in Intelligence Emotional Intelligence.	17	10
5	**Unit V Personality:** Concept of Self and Personality Major Approaches of Personality Trait & Type Approaches Five-Factor Model Psychodynamic Approach Behavioural Approach Humanistic Approach Refrigerator. Troubleshooting common problems in appliances and basic repairs. Concept of smart technology.	16	10
6	**Unit VI Sexuality and Gender:** Physical and psychological side of psychology Gender theories Human sexual behavior Sexual dysfunction and problems	16	10
TOTAL		**100%**	**60 Hrs**

I. 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

Semester 2

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 awarness related to data privacy, patient consent, data security, and equity in access to digital health technologies, and their implications for research, development, and implementation.

F. Course Learning Outcomes:

CLO 1	Remember the interdisciplinary nature of digital health, recognizing the contributions of various stakeholders and disciplines such as medicine, technology, policy, and entrepreneurship.
CLO 2	Understand functionalities and significance of health information technologies, including Electronic Health Records (EHRs), Health Information Exchange (HIE), and interoperability standards, in facilitating data exchange and healthcare delivery.
CLO 3	Apply knowledge of wearable technologies and remote monitoring devices to analyse their potential applications in healthcare, including disease management, preventive care, and patient engagement.
CLO 4	Analyse the impact of health analytics and big data in healthcare, including their role in improving clinical decision-making, population health management, and personalized medicine.
CLO 5	Evaluate the future trends and emerging technologies in digital health, including Internet of Things (IoT) applications, block chain in healthcare, and other transformative technologies, in terms of their potential impact, scalability, and ethical considerations..
CLO 6	Synthesize knowledge of artificial intelligence (AI) and machine learning applications in healthcare to propose innovative solutions for diagnostics, treatment optimization, and predictive analytics.

G. Teaching & Examination Scheme:

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

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

H. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	**Foundations of Digital Health** Overview of Digital Health Evolution and milestones in Digital Health Interdisciplinary nature of Digital Health Key stakeholders and their roles Health Information Technologies: Electronic Health Records (EHR), Health Information Exchange (HIE), Standards, and Interoperability	25%	**15**
2	Patient-Centric Technologies Wearable Technologies and Remote Monitoring Telemedicine and telehealth Mobile Health (mHealth) Applications Chronic disease management using mobile technologies Regulatory considerations for mobile health apps	25%	**15**
3	Data Analytics and Artificial Intelligence in Healthcare Health Analytics and Big Data Role of data analytics in healthcare Big data applications in health Artificial Intelligence in Healthcare Machine learning applications in diagnostics and treatment	**25%**	**15**
4	Innovation, Ethics, and Future Trends Digital Health Start-ups and Innovations Case studies of successful digital health innovations Entrepreneurship in digital health Regulatory and Ethical Considerations Regulatory frameworks for digital health products Ethical considerations in digital health research and development Future Trends and Emerging Technologies Internet of Things (IoT) in healthcare Block chain applications in healthcare Emerging technologies shaping the future of digital health	**25%**	**15**
TOTAL		**100%**	**60 Hrs.**

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

G. Course Name: Fingerprint and Other Impression Evidence

H. Course Code: 11010703DS01

I. Prerequisite: Basic understanding of crime scene investigation techniques.

J. Rationale: To equip students with knowledge of fingerprint and impression evidence collection and analysis.

K. Course Learning Objective:

CLOBJ 1	Understand fingerprint patterns and ridge characteristics.
CLOBJ 2	Learn methods of latent print development.
CLOBJ 3	Study various types of impression evidence.
CLOBJ 4	Explore fingerprint databases and their role in investigations.
CLOBJ 5	Analyze the limitations of fingerprint evidence in court.

L. Course Learning Outcomes:

CLO 1	Identify and classify fingerprint patterns.
CLO 2	Perform techniques for developing latent prints.
CLO 3	Collect and preserve impression evidence at a crime scene.
CLO 4	Utilize databases for fingerprint comparison.
CLO 5	Present fingerprint analysis in a forensic report.

H. Teaching & Examination Scheme:

Teaching Scheme				**Examination Scheme**					**Total**
Lect. Hrs./week	**Tut Hrs.**	**Lab Hrs.**	**Credit**	**External**		**Internal**			
				T	**P**	**T**	**CE**	**P**	
3	-	-	3	60	-	20	20	-	100

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

L. Course Content:

Sr. No	**Content**	**Weightage**	**Teaching Hours**
1.	**Module I: Introduction to Fingerprint science** History and Development of fingerprints; Importance, nature and location, Biological Development of fingerprints, Biological significance of skin pattern, Ridge Formation, Composition of Sweat, Fingerprint patterns, Pattern Areas, General and Individual characteristics of fingerprints.	**20**	**8**
2.	**Module II: Classification of fingerprints** Classification of Fingerprints for Comparison purposes: Pattern area, Core, Delta, Type Lines, Poroscopy, Edgeoscopy, ridge characteristics, Fingerprint Pattern Types: Essentials And its types of Loop, Arch, whorl, Composites, accidental patters etc, Classification of Fingerprints Henry system of classification, 20Establishment and Function of fingerprint Bureau.	**20**	**10**
3.	**Module III: Recording and Examination of fingerprints** Ridge counting and tracing. Method for making an inked specimen of Fingerprint. Taking fingerprints from living and dead person - Post-mortem Fingerprinting (Fresh corpus, Rigor mortis, mutilated, decomposed, drowned, Burned). Comparison Protocols: Class And individual characteristics (Galton's details),	**30**	**15**

	different ridge characteristics. Automated Fingerprint Identification.		
4.	**Module IV: Fingerprint evidence in a court** Latent fingerprint and Chance Fingerprints in criminal investigation, various methods of development of fingerprints: physical (Black and grey, Fluorescent and magnetic powder method) and chemical methods, fuming methods, laser Method, lifting of latent fingerprints, Development of latent fingerprints from latex materials. Photography of fingerprints. Fingerprint as forensic Evidence, presentation of fingerprint Evidence and testimony in court; Recent Advancements in Fingerprint Development Techniques: New developed methods, use of nanoparticles for the development of latent fingerprints, Modification of SPR method.	**20**	**6**
5.	**Module V: Other Impressions** Importance of footprints. Casting of footprints, Electrostatic lifting of latent footprints. Palm Prints. Lip prints – Nature, location, collection and examination of lip prints. Ear prints and their Significance. Palm prints and their historical importance.	**10**	**6**
	TOTAL	**100**	**45**

M. Text Book and Reference Book:

1. "Forensic Science: An Introduction to Scientific and Investigative Techniques" by Stuart H. James, Jon J. Nordby, and Suzanne Bell
2. "Criminalistics: An Introduction to Forensic Science" by Richard Saferstein
3. "Introduction to Forensic Science and Criminalistics" by Robert E. Gaensslen, Howard Harris, and Henry Lee
4. "Forensic Science: Fundamentals and Investigations" by Anthony J. Bertino and Patricia Nolan Bertino
5. "Crime Scene to Court: The Essentials of Forensic Science" by Peter White
6. "Forensic Science: From the Crime Scene to the Crime Lab" by Richard Saferstein
7. "Forensic Science: The Basics" by Jay Siegel and Kathy Markovitz
8. "Forensic Science: An Introduction" by Richard A. Stripp
9. "Forensic Science: An Introduction to Scientific and Investigative Techniques" by Stuart H. James, Jon J. Nordby, and Suzanne Bell

Semester 3

A. **Course Name:** Crime Scene Management
B. **Course Code:** 11010703DS02
C. **Prerequisite**: Familiarity with forensic science fundamentals and crime scene protocols.
D. **Rationale**: To provide a comprehensive understanding of managing crime scenes from arrival to documentation and evidence collection.
E. **Course Learning Objective:**

CLOBJ 1	Understand the importance of crime scene preservation.
CLOBJ 2	Learn effective strategies for crime scene documentation.
CLOBJ 3	Study proper techniques for evidence collection.
CLOBJ 4	Examine roles of forensic specialists in crime scene management.
CLOBJ 5	Learn legal and ethical considerations in crime scene handling.

F. Course Learning Outcomes:

CLO 1	Preserve and secure crime scenes.
CLO 2	Accurately document a crime scene through sketches and notes.
CLO 3	Collect, package, and preserve evidence for analysis.
CLO 4	Coordinate with various forensic experts.
CLO 5	Ensure the integrity of the evidence chain for court presentation.

G. Teaching & Examination Scheme:

Teaching Scheme				**Examination Scheme**					**Total**
Lect. Hrs./week	**Tut Hrs.**	**Lab Hrs.**	**Credit**	**External**		**Internal**			
				T	**P**	**T**	**CE**	**P**	
3	-	-	3	60	-	20	20	-	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**: **Crime scene Investigation:** Scene of crime: Types, protection of scene of crime, searching, preservation (recording) of scene of crime- sketching, photography, videography and notetaking.	**20**	**10**
2.	**Unit 2: Physical evidence:** Meaning, Types, search methods, collection and preservation, Forwarding. Chain of custody. Collection, preservation, packing and forwarding of blood, semen and other biological stains, firearm exhibits, documents, fingerprint, viscera, hair & fibre, glass, soil and dust, petroleum products, drugs and poisons, etc. duties of various experts, chain of custody.	**20**	**15**
3.	**Unit 3: Crime scene reconstruction:** Steps involved (Recognition of evidence, Documentation of evidence, Collection of evidence, Evaluation of evidence, Hypothesis, Testing, Reconstruction), various crime scenes and scenarios (like Hit and Run, Accidents, Hanging, Shooting, Burglary, etc.). Digital Aids in Reconstruction (3-D Photography/Videography, Computer aided Reconstruction),	**30**	**10**
4.	**Unit 4: Forensic Photography:**	**30**	**10**

	Basic principles of Photography, Techniques of black & white and color photography, cameras, lenses, shutters, depth of field, film; exposing, development and printing techniques; Different kinds of developers and fixers; UV, IR, fluorescence illumination guided photography; Modern development in photography-digital photography, working and basic principles of digital photography; Surveillance photography. Videography and Crime Scene & laboratory photography.		
	TOTAL	**100**	**45**

I. Text Book and Reference Book:

1. "Forensic Science: An Introduction to Scientific and Investigative Techniques" by Stuart H. James, Jon J. Nordby, and Suzanne Bell
2. "Criminalistics: An Introduction to Forensic Science" by Richard Saferstein
3. "Introduction to Forensic Science and Criminalistics" by Robert E. Gaensslen, Howard Harris, and Henry Lee
4. "Forensic Science: Fundamentals and Investigations" by Anthony J. Bertino and Patricia Nolan Bertino
5. "Crime Scene to Court: The Essentials of Forensic Science" by Peter White
6. "Forensic Science: From the Crime Scene to the Crime Lab" by Richard Saferstein
7. "Forensic Science: The Basics" by Jay Siegel and Kathy Markovitz
8. "Forensic Science: An Introduction" by Richard A. Stripp
9. "Forensic Science: An Introduction to Scientific and Investigative Techniques" by Stuart H. James, Jon J. Nordby, and Suzanne Bell

Semester 3

A. **Course Name:** Multimedia Forensic
B. **Course Code:** 11010703DS03
C. **Prerequisite**: Knowledge of digital technology and basic forensic principles.
D. **Rationale**: To analyze digital media evidence, such as images, videos, and audio, used in forensic investigations.
E. **Course Learning Objective:**

CLOBJ 1	Understand the role of digital evidence in investigations.
CLOBJ 2	Study methods for analyzing multimedia content.
CLOBJ 3	Learn techniques for authenticating digital media.
CLOBJ 4	Explore legal frameworks governing multimedia evidence.
CLOBJ 5	Investigate ethical considerations in digital evidence analysis.

J. Course Learning Outcomes:

CLO 1	Analyze digital images, videos, and audio for forensic purposes.
CLO 2	Authenticate multimedia content in investigations.
CLO 3	Preserve the integrity of digital evidence.
CLO 4	Interpret multimedia evidence in a legal context.
CLO 5	Present findings of multimedia analysis in forensic reports.

K. Teaching & Examination Scheme:

Teaching Scheme				**Examination Scheme**					**Total**
Lect. Hrs./week	**Tut Hrs.**	**Lab Hrs.**	**Credit**	**External**		**Internal**			
				T	**P**	**T**	**CE**	**P**	
2	-	-	2	60	-	20	20	-	100

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

L. Course Content:

Sr. No	**Content**	**Weightage**	**Teaching Hours**
1.	**Unit 1: Introduction to Multimedia Forensics:** Definition of multimedia and its components (images, audio, video), Importance of multimedia in digital communication and entertainment, Basics of forensic science and its applications in multimedia Understanding multimedia data and its types & file formats (JPEG, MP3, MP4, etc.), Overview of digital imaging, audio, and video forensics, Techniques for analyzing digital images, audio, and video.	**30**	**10**
2.	**Unit 2: CCTV Data Retrieval and Analysis** Introduction to Closed-Circuit Television (CCTV) systems and their components, Types of CCTV cameras (analog, IP cameras, etc.), Role of CCTV in surveillance and security: Applications of CCTV in public safety, traffic monitoring, and commercial security Understanding CCTV data storage formats and systems, Techniques for retrieving CCTV data from various storage media (hard drives, DVRs, etc.), Analysis of CCTV footage for identifying relevant events or incidents, Interpretation of timestamps, metadata, and other contextual information in CCTV footage, Retrieving and analyzing CCTV data using forensic tools	**20**	**10**

	and software, Case studies illustrating the importance of effective CCTV data retrieval and analysis in forensic investigations		
3.	**Unit 3: Digital Media Analysis** **Digital Image Forensics:** Basics of digital imaging**,** Introduction to image manipulation techniques**,** Techniques for detecting image forgeries and alterations, understanding image properties (resolution, color depth, etc.), Techniques for image enhancement and restoration, Image comparison and matching, Methods for comparing images and identifying similarities/differences, Applications of image matching in forensic investigations **Audio and Video Forensics:** Fundamentals of audio and video signals**,** Techniques for analyzing audio and video recordings**,** Detection of tampering and authenticity verification in audio and video files, **Fundamentals of audio analysis:** Methods for identifying speakers and verifying audio recordings, Analysis of voice patterns and characteristics, **Fundamentals of Video analysis:** Techniques for video stabilization, deinterlacing, and noise reduction, Tools and software for video analysis and enhancement, Case studies illustrating the importance of digital media analysis	**30**	**10**
4.	**Unit 4: Multimedia Authentication and Security** Definition and importance of multimedia authentication in forensic investigations, Role of authentication techniques in verifying the integrity and authenticity of digital media, Digital watermarking techniques for multimedia authentication, Basics of digital watermarking: Understanding the concept of embedding information into digital media, Techniques for embedding watermarks in images, audio, and video files, Applications of digital watermarking in multimedia authentication and copyright protection, Introduction to cryptographic methods for securing multimedia data, Understanding steganography and steganalysis techniques	**20**	**5**
	TOTAL	**100**	**30**

M. Text Book and Reference Book:

1. "Forensic Science: An Introduction to Scientific and Investigative Techniques" by Stuart H. James, Jon J. Nordby, and Suzanne Bell
2. "Criminalistics: An Introduction to Forensic Science" by Richard Saferstein
3. "Introduction to Forensic Science and Criminalistics" by Robert E. Gaensslen, Howard Harris, and Henry Lee
4. "Forensic Science: Fundamentals and Investigations" by Anthony J. Bertino and Patricia Nolan Bertino
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6. "Forensic Science: From the Crime Scene to the Crime Lab" by Richard Saferstein
7. "Forensic Science: The Basics" by Jay Siegel and Kathy Markovitz
8. "Forensic Science: An Introduction" by Richard A. Stripp
9. "Forensic Science: An Introduction to Scientific and Investigative Techniques" by Stuart H. James, Jon J. Nordby, and Suzanne Bell

Semester 3

A. **Course Name:** Lab-I Multimedia Forensic
B. **Course Code:** 11010703DS04
C. **Prerequisite**: Understanding of digital forensics and multimedia formats.
D. **Rationale**: To provide hands-on experience in processing and analyzing multimedia evidence.
E. **Course Learning Objective:**

CLOBJ 1	Learn practical tools for multimedia analysis.
CLOBJ 2	Perform forensic analysis on images and videos.
CLOBJ 3	Understand methods of recovering data from multimedia files.
CLOBJ 4	Practice multimedia content authentication.
CLOBJ 5	Document findings in multimedia forensic reports.

F. Course Learning Outcomes:

CLO 1	Apply forensic tools to analyze multimedia evidence.
CLO 2	Recover and process data from images and videos.
CLO 3	Authenticate multimedia content for forensic purposes.
CLO 4	Prepare reports on multimedia forensic findings.
CLO 5	Present multimedia evidence effectively in mock trials.

G. Teaching & Examination Scheme:

Teaching Scheme				**Examination Scheme**					**Total**
Lect. Hrs./week	**Tut Hrs.**	**Lab Hrs.**	**Credit**	**External**		**Internal**			
				T	**P**	**T**	**CE**	**P**	
2	-	4	2	-	30		10	10	50

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

H. Course Content:

Sr.	**List of Practical**
1	Image Metadata Analysis : To extract and analyze metadata from digital images to gather information such as date, time, and camera settings.
2	Audio File Authentication : To verify the authenticity of an audio file by analyzing its format, metadata, and potential signs of tampering.
3	Video Analysis: To analyze video footage for evidence of editing, tampering, or anomalies that may indicate falsification.
4	File Hashing for Integrity Verification : To compute and compare hash values of multimedia files to check for any modifications or corruption.
5	Steganography Detection in Images : To uncover hidden information within digital images by using steganalysis techniques to detect steganographic content.
6	Digital Watermarking Detection: To detect and analyze digital watermarks embedded in multimedia files to establish ownership and track distribution.
7	Image Metadata Analysis : To extract and analyze metadata from digital images to gather information such as date, time, and camera settings.

I. Text Book and Reference Book:

9. "Forensic Science: An Introduction to Scientific and Investigative Techniques" Author: Stuart H. James, Jon J. Nordby, and Suzanne Bell Publisher: CRC Press Present Edition: 3rd Edition
10. "Forensic Science: An Introduction to Scientific and Investigative Techniques" by Stuart H. James, Jon J. Nordby, and Suzanne Bell
11. "Criminalistics: An Introduction to Forensic Science" by Richard Saferstein

12. "Introduction to Forensic Science and Criminalistics" by Robert E. Gaensslen, Howard Harris, and Henry Lee
13. "Forensic Science: Fundamentals and Investigations" by Anthony J. Bertino and Patricia Nolan Bertino
14. "Crime Scene to Court: The Essentials of Forensic Science" by Peter White
15. "Forensic Science: From the Crime Scene to the Crime Lab" by Richard Saferstein
16. "Forensic Science: The Basics" by Jay Siegel and Kathy Markovitz
17. "Forensic Science: An Introduction" by Richard A. Stripp
18. "Forensic Science: An Introduction to Scientific and Investigative Techniques" by Stuart H. James, Jon J. Nordby, and Suzanne Bell

Semester 3

A. **Course Name:** Lab-II CSM & Fingerprint Science
B. **Course Code:** 11010703DS05
C. **Prerequisite:** Basic knowledge of crime scene investigation and forensic principles is required to effectively manage crime scenes and analyze fingerprint evidence.
D. **Rationale:** This lab combines practical training in crime scene management and fingerprint science, emphasizing the importance of meticulous evidence collection and analysis in forensic investigations.
E. **Course Learning Objective:**

CLOBJ 1	Learn practical techniques for fingerprint development.
CLOBJ 2	Perform crime scene documentation and evidence collection.
CLOBJ 3	Analyze fingerprints using lab tools.
CLOBJ 4	Practice proper handling of fingerprint evidence for court.
CLOBJ 5	Develop skills in organizing and managing crime scenes.

F. **Course Learning Outcomes:**

CLO 1	Develop and analyze latent fingerprints.
CLO 2	Document crime scenes through sketching and photography.
CLO 3	Collect and preserve fingerprint evidence.
CLO 4	Maintain chain of custody for crime scene evidence.
CLO 5	Demonstrate proper crime scene management techniques.

G. **Teaching & Examination Scheme:**

Teaching Scheme				**Examination Scheme**					**Total**
Lect. Hrs./week	**Tut Hrs.**	**Lab Hrs.**	**Credit**	**External**		**Internal**			
				T	**P**	**T**	**CE**	**P**	
2	-	4	2	-	30		10	10	50

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

H. **Course Content:**

Sr.	**List of Practical**
1	To record plain and rolled fingerprints.
2	To carry out ten-digit classification of fingerprints.
3	To identify different fingerprint patterns.
4	To identify core and delta.
5	To carry out ridge tracing and ridge counting.
6	To investigate physical methods of fingerprint detection.
7	To investigate chemical methods of fingerprint detection.
8	To use different light sources for enhancing developed fingerprints.
9	To prepare a cast of footprints.
10	To carry out photography of indoor and outdoor crime scenes.
11	Crime scene photographic processing and development in different light sources and using different filters.
12	To carry out digital photography of various forensic evidences.
13	Mock crime scene investigation and writing a report on evaluation of crime scene.
14	Interpretation of crime scene notes, photos, sketches and reconstruction of crime scene.
15	Microscopy of various physical evidences.
16	Expert testimony in a mock court case scenario.
17	To record plain and rolled fingerprints.

I. Text Book and Reference Book:

1. "Forensic Science: An Introduction to Scientific and Investigative Techniques" Author: Stuart H. James, Jon J. Nordby, and Suzanne Bell Publisher: CRC Press Present Edition: 3rd Edition
2. "Forensic Science: An Introduction to Scientific and Investigative Techniques" by Stuart H. James, Jon J. Nordby, and Suzanne Bell
3. "Criminalistics: An Introduction to Forensic Science" by Richard Saferstein
4. "Introduction to Forensic Science and Criminalistics" by Robert E. Gaensslen, Howard Harris, and Henry Lee
5. "Forensic Science: Fundamentals and Investigations" by Anthony J. Bertino and Patricia Nolan Bertino
6. "Crime Scene to Court: The Essentials of Forensic Science" by Peter White
7. "Forensic Science: From the Crime Scene to the Crime Lab" by Richard Saferstein
8. "Forensic Science: The Basics" by Jay Siegel and Kathy Markovitz
9. "Forensic Science: An Introduction" by Richard A. Stripp
10. "Forensic Science: An Introduction to Scientific and Investigative Techniques" by Stuart H. James, Jon J. Nordby, and Suzanne Bell

Semester 3

A. **Course Name:** Advanced English – 1 (AEC-3)
B. **Course Code:** 00019303AE01
C. **Prerequisite:** Basic Knowledge of Commercial Communication and provide students with soft skills that complement their hard skills, making them more marketable when entering the workforce. To inspire students to strive for a higher sense of character by learning from role models who have lived principled, disciplined, and value-based lives.
D. **Rationale:** Advanced Communication Skills of English Language.

E. Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme					Total
Lect. Hrs./week	Tut Hrs.	Lab Hrs.	Credit	External		Internal			
				T	P	T	CE	P	
2	-	-	2	50	50	-	-	-	100

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

J. Course Content:

Sr. No	Content	Weightage	Teaching Hours
1.	**ABCD**	5	2
2.	**Public Speaking** Define Public Speaking Importance of Public speaking Types of Public speaking Techniques to master public speaking	10	5
3.	**Activity – Speaking** World's best public speakers (activity based)	5	1
4.	**Debate Vs Group Discussion** Define Debate vs GD Importance of debate Techniques to master debate	10	5
5	**Activity – Debate** Debate activity	10	2
6	**Vocabulary Building** Advanced vocabulary building Homophones 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
9	**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	5	2
	TOTAL	100	30

K. Text Book 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

Semester 3

A. **Course Name:** Advanced English – 1 (AEC-3)
B. **Course Code:** 00019303AE01
C. **Prerequisite:** Basic Communication Skills of French Language.
D. **Rationale:** Advanced Communication Skills of French Language.
E. **Teaching & Examination Scheme:**

Teaching Scheme				**Examination Scheme**					**Total**
Lect. Hrs./week	**Tut Hrs.**	**Lab Hrs.**	**Credit**	**External**		**Internal**			
				T	**P**	**T**	**CE**	**P**	
2	**-**	**-**	**2**	**50**	**50**	**-**	**-**	**-**	**100**

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

L. **Course Content:**

Sr. No	**Content**	**Weightage**	**Teaching Hours**
1.	Grammar Alphabets Numbers Telling time Personal Pronouns Nouns (masculine & feminine nouns, singular and plural nouns) Verbe conjugations (être, avoir, s'appeler and "er ending") Adjective possessive (mon, ma, ton, ta, etc.)	**33**	**10**
2.	Listening Skills Sounds French Songs Basic Vocabulary (months of the year, days of the week, family members' names, Countries and nationalities, colors, Professions)	**17**	**5**
3.	Speaking Skills How to Introduce self? Greetings How to ask and tell time? How to talk about Family?	**17**	**5**
4.	Reading Skills Samples of: Self-Introduction My family	**33**	**10**
	TOTAL	**100**	**30**

M. **Text Book and Reference Book:**

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

Semester 3

A. **Course Name:** IPDC including History and Culture of India and IKS-II
B. **Course Code:** 00019303VA01
C. **Prerequisite:** IPDC Including History and Culture of India and IKS-II
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.
E. **Teaching & Examination Scheme:**

Teaching Scheme				**Examination Scheme**					**Total**
Lect. Hrs./week	**Tut Hrs.**	**Lab Hrs.**	**Credit**	**External**		**Internal**			
				T	**P**	**T**	**CE**	**P**	
2	-	-	-	2	40	40	-	60	100

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

F. **Course Content:**

Sr. No	**Content**	**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**Students will learn that to become value-based citizens, they must first develop good values in their lives. They start by exploring the values of responsibility and integrity.	**7%**	**2**
8	**My India My Pride: An Ideal Citizen – 2**Students will learn that by developing the values of loyalty, sincerity, and punctuality; they become indispensable and can leave a strong impression. They will start developing these values by trying to keep perfection in every small task and by looking at the bigger picture.	**7%**	**2**
9	**Facing Failures: Timeless Wisdom for Daily Life** Students will learn the role wisdom plays in finding long-term stability. They will use ancient wisdom to solve their modern-day challenges.	**7%**	**2**
10	**From House to Home: Forgive & Forget** Students will understand the importance and benefits that forgiveness plays in	**7%**	**2**

	their personal and professional life. They will learn to apply this knowledge in realistic situations.		
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** Students will develop a variety of practical financial skills that prepare them to become financially stable throughout their future careers.	**7%**	**2**
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 practicing these priceless lessons and prepares them for the next steps in their lives.	**7%**	**2**
	TOTAL	**100**	**30**

Semester 3

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. **Teaching & Examination Scheme:**

Teaching Scheme				**Examination Scheme**					**Total**
Lect. Hrs./week	**Tut Hrs.**	**Lab Hrs.**	**Credit**	**External**		**Internal**			
				T	**P**	**T**	**CE**	**P**	
2	-	-	-	2	40	40	-	60	100

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

A. **Course Content:**

Sr. No	**Content**	**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, Reinforcement Learning	20%	7
2	UNIT-2 Programming fundamentals in Python- Syntax, Variables and Data Types, Operators, Control Structures, Functions, Data Structures, Input and Output, Modules and Packages	20%	6
3	UNIT-3 Data preprocessing and Data analysis Using Python Library (Pandas, 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**

B. **Text Book 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.

Semester 4

A. **Course Name:** Criminology, Criminal Law and Police Organization
B. **Course Code:** 11010704DS02
C. **Prerequisite:** Familiarity with basic concepts in law and social sciences.
D. **Rationale:** To provide a comprehensive understanding of crime theories, legal frameworks, and the structure of police organizations.
E. **Course Learning Objective:**

CLOBJ 1	Study theories of crime causation and criminal behavior.
CLOBJ 2	Learn the structure and function of criminal law in society.
CLOBJ 3	Understand the organization and operation of police agencies.
CLOBJ 4	Examine the legal procedures in the investigation and prosecution of crimes.
CLOBJ 5	Explore the interaction between criminology, law, and policing.

N. Course Learning Outcomes:

CLO 1	Apply criminological theories to explain criminal behavior.
CLO 2	Interpret key principles of criminal law.
CLO 3	Understand the structure and role of police organizations.
CLO 4	Analyze legal procedures in criminal investigations.
CLO 5	Assess the relationship between law enforcement and crime prevention.

O. Teaching & Examination Scheme:

Teaching Scheme				**Examination Scheme**					**Total**
Lect. Hrs./week	**Tut Hrs.**	**Lab Hrs.**	**Credit**	**External**		**Internal**			
				T	**P**	**T**	**CE**	**P**	
3	-	-	3	60	-	20	20	-	100

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

P. Course Content:

Sr. No	**Content**	**Weightage**	**Teaching Hours**
1.	**Unit I: Principles of Criminology** Criminology, Crime - definitions; historical perspectives, nature, origin and scope Criminology, Schools of Criminology: Pre-classical – Demonology; Classical theories – Ideas of Bentham and Beccaria; Neo classical theories – Golly Garaud and Rossi; Positivist / Positive School Morphological theories – Cesare Lombroso, Enrico Ferri, Rafael Garafalo; Biological theories – Family-Genetics, Chromosomes and Genes, Study of twins and family trees-Kallikas, Jukes; Anthropological theories – Kretschmer, Hooton, Sheldon; Sociological Theories- Chicago School of Crime – Social Disorganization, Anomie theory – Emile Durkhiem, Robert K Merton, Differential Association Theory – EH Sutherland, Rational Choice Theory – Cornis & Clarke ,Routine Activity Theory – Cohen & Felson, Left Radical View – Richard Quinney, Erickson (with focus on critical analysis of each theory)	**30**	**15**
2.	**Unit II: Crime** Deviant behaviour. Hate crimes, organized crimes and public disorder, domestic violence and workplace violence, White collar	**20**	**5**

	crimes, Victimology, Juvenile delinquency with reference to Juvenile Justice Act, Crime prevention.		
3.	**Unit III: Elements of Criminal Law** Elements of Criminal liability – Actus Reus Non Facit Reum Nisi Mens Sit Rea; Principles of group liability, Offences against person (IPC) Homicidal and Suicidal death, Kidnapping Abduction, Rape; Offence against property (theft, robbery, dacoity and cheating), General Exception: Right to Private Defence Against Person, Right to Private Defence Against Property, Insanity, and Intoxication; Criminal Investigation and Prosecution: FIR, Investigation, Arrest and Charge Sheet Custody, Remand and Bail, Summon, Warrant, Search Warrant, Cognizable, Non-cognizable, Bailable, Non-Bailable offences. Criminal Trial: Right to Accused, Trial, right against self-incrimination, Rights of Victims (Plea Bargaining and Victim Participation), Free Legal Aid (with reference to Indian Constitution) Evidence law: Relevancy and admissibility of facts, Relevancy of confessions and dying declarations, Appreciating expert evidence in court Burden of proof (IEA)	**30**	**10**
4.	**Unit IV: Organization and Structure of Police** Role of Police in Independent India, Constitutional provisions regarding police in India, Types of Police Organization - State Police, Central Police, Civil Police, Armed and other branches, District Police, Police Station, Crime record statistics; Hierarchy of Police in India; Executive powers and duties of police officers in the investigation of crime: Procedure in investigation, Investigation of crimes and relations with Courts/Magistrate: Hierarchy Indian Judicial system, Role of Courts.	**30**	**10**
	TOTAL	**100**	**45**

Q. Text Book and Reference Book:

19. Akers, Ronald. L and Sellers. Christine S, 2004 Criminological Theories
20. Introduction, Evaluation and application, Roxbury Pub. Com.
21. Williams Katherine S, 2001, Text Book of Criminology, Universal Law Publishing Co. Pvt. Ltd.
22. Siegal Larry, J. 2000, Criminology, Wadsworth Thromson Learning.
23. Reid, Sue Titus, 2006, Crime and Criminology, Mc Graw Hill.
24. Ahuja Ram, 2000, Criminology, Rawat Publications.
25. Paranjape N.V., 2009, Criminology and Penology, Central Law Publications.
26. Basu Duraga Das, 2005, Introduction to Constitution of India. 19th Edu., Wadhwa and Company Law Publishers.
27. Ratan Lal and Dhirajlal, 2002, Indian Penal Code, Wadhwa and Company Pub.
28. Kelkar RV 2001, Criminal Procedure, 4th Edition, Eastern Book Company.
29. Kathuria, R.P, 2007, Law of Crimes and Criminology, Vinod Publishing House, Delhi.
30. Ratanlal and Dhiorajlal, 2004, The code of Criminal Procedure, Wadhwa and Company Publications

Semester 4

A. **Course Name:** Forensic Anthropology & Odontology
B. **Course Code:** 11010704DS01
C. **Prerequisite:** Basic understanding of human anatomy and forensic science principles.
D. **Rationale:** To introduce students to the methods used in identifying human remains and forensic dental evidence.
E. **Course Learning Objective:**

CLOBJ 1	Understand the role of anthropology and odontology in forensic investigations.
CLOBJ 2	Study human skeletal anatomy for identification purposes.
CLOBJ 3	Learn dental analysis techniques for age and identity estimation.
CLOBJ 4	Explore methods for identifying trauma in skeletal remains.
CLOBJ 5	Examine case studies involving forensic anthropology and odontology.

R. Course Learning Outcomes:

CLO 1	Identify human skeletal and dental remains.
CLO 2	Analyze skeletal features for age, sex, and ancestry estimation.
CLO 3	Use dental records for identification purposes.
CLO 4	Interpret trauma evidence from skeletal remains.
CLO 5	Apply forensic anthropology and odontology knowledge in case investigations.

S. Teaching & Examination Scheme:

Teaching Scheme				**Examination Scheme**					**Total**
Lect. Hrs./week	**Tut Hrs.**	**Lab Hrs.**	**Credit**	**External**		**Internal**			
				T	**P**	**T**	**CE**	**P**	
2	-	-	2	60	-	20	20	-	100

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

T. Course Content:

Sr. No	**Content**	**Weightage**	**Teaching Hours**
1.	**Unit 1: Medical jurisprudence and death:** Medical jurisprudence: Introduction, identification of mutilated bodies, fragmentary remains and bones. Medico legal aspects of death- Death from asphyxia- (Hanging, strangulation, throttling, suffocation and drowning) Death from starvation, cold, heat, electricity etc. Infanticide.	34%	10
2.	**Unit 2**: **Autopsy, Injuries and sexual offences** Medico-legal aspects of death. Causes of death. Determination of time since death. Introduction and Investigation of sexual offences. Virginity, pregnancy, delivery, Abortion, Impotence and Sterility. Injuries. Types and classification of injuries. Medico legal aspects of wounds: -medical and legal definition of wounds, types of mechanical and regional injuries, aging of wounds, difference between suicidal, homicidal and accidental wounds.	33%	10
3.	**Unit 3**: **Forensic Odontology:** Scope and role of forensic odontology in mass disaster, Types of teeth and their comparative anatomy. Bite marks. Forensic significance of bite marks. Collection, preservation and	33%	10

	photography of bite marks evidence. Legal aspects of bite marks. Estimation of age from teeth.		

U. Text Book and Reference Book:

1. Smyth, The Cause of Death, Van Nostrand and Company, New York (1982).
2. Bernstein, Forensic odontology in, Introduction to Forensic Sciences, 2nd Ed., W.G.
3. Eckert (Ed.), CRC Press, Boca Raton (1997).
4. Dix, Handbook for Death Scene Investigations, CRC Press, Boca Raton (1999).
5. H.B. Baldwin and C.P. May in, Encyclopedia in Forensic Science, Volume 1, J.A. Siegel, P.J. Saukko and G.C. Knupfer (Eds.), Academic Press, London (2000).
6. V.J. Geberth, Practical Homicide Investigation, CRC Press, Boca Raton (2006).
7. T. Bevel and R.M. Gardner, Bloodstain Pattern Analysis, 3rd Edition, CRC Press, Boca Raton (2008).
8. W.J. Tilstone, M.L. Hastrup and C. Hald, Fisher's, Techniques of Crime Scene Investigation, CRC Press, Boca Raton (2013).
9. Apurba Nandi, Principals of forensic medicine, including toxicology, NCBA.
10. Parikh's tectbook of medical jurisprudence, forensic medicine and toxicology, CBS, 7th ED. BV Subrahmanyam (2016).

Semester 4

A. **Course Name:** Questioned Document & Fraud Investigation
B. Course Code: 11010704DS03
C. **Prerequisite:** Basic knowledge of forensic investigation and document analysis.
D. **Rationale:** To train students in identifying and investigating questioned documents and fraudulent activities.
E. Course Learning Objective:

CLOBJ 1	Understand the principles of document examination.
CLOBJ 2	Learn techniques for detecting forgeries and alterations in documents.
CLOBJ 3	Study methods for investigating financial fraud and forgery.
CLOBJ 4	Explore the role of handwriting analysis in questioned document cases.
CLOBJ 5	Examine case studies on document fraud investigations.

V. Course Learning Outcomes:

CLO 1	Analyze questioned documents for signs of forgery.
CLO 2	Detect alterations, erasures, and tampering in documents.
CLO 3	Investigate cases involving financial fraud and forgery.
CLO 4	Conduct handwriting analysis in forensic contexts.
CLO 5	Present findings in a forensic report on questioned document analysis.

W. Teaching & Examination Scheme:

Teaching Scheme				**Examination Scheme**					**Total**
Lect. Hrs./week	**Tut Hrs.**	**Lab Hrs.**	**Credit**	**External**		**Internal**			
				T	**P**	**T**	**CE**	**P**	
3	-	-	3	60	-	20	20	-	100

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

X. Course Content:

Sr. No	**Content**	**Weightage**	**Teaching Hours**
1.	**Unit 1**: **Document and examination methods** Questioned Documents nature, scope and definition. Types of documents: standard admitted/specimen writing. Preliminary examination of documents. Comparison of Documents. Basic tools needed for forensic documents' examination, Determining the age and relative age of documents. Collection, handling, preservation and forwarding of documents seized from scene of crime.	**30**	**15**
2.	**Unit 2: Handwriting Identification** Basics of handwriting identification, Comparison of handwriting, development of individuality. Natural variations and fundamental divergences in handwritings. Class and individual characteristics. Merits and demerits of exemplar and non-exemplar samples during comparison of handwriting. Standards for comparison of handwriting. Distinguished writing and anonymous letter: identification of writer, examination of signature.	**30**	**5**
3.	**Unit 3: Foraged Documents** Forgeries Alterations in documents, including erasures, additions, over-writings and obliterations. Indented and Secret writings. Charred documents & their decipherment. Examination of counterfeit Indian passports, visas, currency notes, coins and stamp. Sequence Of Stroke Analysis	**20**	**10**

4.	**Unit-4** Forensic Accounting – Introduction Principles of accounting – Basic concepts of forensic accounting, Understanding Frauds – Fraud examination methodology – Introduction to Financial Statements, Financial Statement Frauds, Frauds in Financial Institutions, Introduction to and prevalence of fraud.	**20**	**10**
	TOTAL	**100**	**45**

Y. Text Book and Reference Book:

1. Forensic Accounting and Fraud Examination by Mary-Jo Kranacher, Richard Riley, Joseph T. Wells
2. Fraud Auditing and Forensic Accounting by Tommie W. Singleton, Aaron J. Singleton
3. Financial Investigation and Forensic Accounting, Third Edition, George A. Manning, Ph.D, CFE, EA
4. A Guide to Forensic Accounting Investigation by Steven L. Skalak, Thomas W. Golden, Mona M. Clayton

Semester 4

A. **Course Name:** Lab-I Forensic Anthropology & Odontology
B. Course Code: 11010704DS04
C. Prerequisite: Basic knowledge of human anatomy and skeletal structure.
D. **Rationale:** To provide practical experience in forensic anthropology and odontology, focusing on identification techniques.

E. Course Learning Objective:

CLOBJ 1	Perform skeletal analysis for human identification.
CLOBJ 2	Practice age estimation techniques from bones and teeth.
CLOBJ 3	Study trauma in skeletal remains.
CLOBJ 4	Analyze dental evidence for identity confirmation.
CLOBJ 5	Document findings in forensic anthropology and odontology cases.

F. Course Learning Outcomes:

CLO 1	Perform hands-on skeletal and dental identification.
CLO 2	Estimate age, sex, and ancestry from remains.
CLO 3	Analyze trauma on skeletal remains for forensic purposes.
CLO 4	Apply dental records in human identification cases.
CLO 5	Prepare comprehensive reports based on forensic analysis.

G. Teaching & Examination Scheme:

Teaching Scheme				**Examination Scheme**					**Total**
Lect. Hrs./week	**Tut Hrs.**	**Lab Hrs.**	**Credit**	**External**		**Internal**			
				T	**P**	**T**	**CE**	**P**	
2	-	4	2	-	30		10	10	50

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

H. Course Content:

Sr.	**List of Practical**
1	To identify the types of injuries.
2	To study the teeth from different age group.
3	To examine the bitemarks and their collection.
4	To determine of age and sex from skull.
5	To determine sex from pelvis.
6	To study identification and description of bones and their measurements.
7	To investigate the differences between animal and human bones.
8	To perform Somatometry measurements on living subjects.
9	To estimate stature from long bone length.

Text Book and Reference Book:

1. Forensic Accounting and Fraud Examination by Mary-Jo Kranacher, Richard Riley, Joseph T. Wells
2. Fraud Auditing and Forensic Accounting by Tommie W. Singleton, Aaron J. Singleton
3. Financial Investigation and Forensic Accounting, Third Edition, George A. Manning, Ph.D, CFE, EA
4. A Guide to Forensic Accounting Investigation by Steven L. Skalak, Thomas W. Golden, Mona M. Clayton

Semester 4

A. **Course Name:** Lab-II Questioned Document & Fraud Investigation
B. **Course Code:** 11010704DS05
C. **Prerequisite:** Basic knowledge of questioned documents and document fraud investigation techniques.
D. **Rationale:** To provide practical experience in examining questioned documents and investigating fraudulent activities.
E. **Course Learning Objective:**

CLOBJ 1	Examine handwriting samples for forensic analysis.
CLOBJ 2	Analyze documents for signs of forgery or alterations.
CLOBJ 3	Apply forensic techniques to detect counterfeit or fraudulent documents.
CLOBJ 4	Investigate financial fraud involving documents.
CLOBJ 5	Prepare forensic reports on questioned document cases.

F. **Course Learning Outcomes:**

CLO 1	Perform forensic analysis of handwriting and signatures.
CLO 2	Detect forgeries and alterations in documents.
CLO 3	Investigate fraudulent documents using forensic tools.
CLO 4	Present findings from financial fraud investigations.
CLO 5	Create forensic reports on questioned documents and fraud cases.

G. **Teaching & Examination Scheme:**

Teaching Scheme				**Examination Scheme**					**Total**
Lect. Hrs./week	**Tut Hrs.**	**Lab Hrs.**	**Credit**	**External**		**Internal**			
				T	**P**	**T**	**CE**	**P**	
2	-	4	2	-	30		10	10	50

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

H. **Course Content:**

Sr.	**List of Practical**
1	Identification of Handwriting-general characteristics, natural variations, fundamental divergences and individual characteristics.
2	To detect Simulated and traced forgeries.
3	To study the handwriting of person suffering from illness and handwriting written on usual surface.
4	Examination of additions, alterations, and obliterations in the documents.
5	Examination of mechanical and chemical use of erasers on the documents.
6	Examination of indented handwriting.
7	Examination of writing inks by TLC/ Paper chromatography.
8	Examination of sequence of intersecting strokes.
9	Examination of disguised writings.
10	Examination of counterfeit currency by using microscopy and UV light.
11	To examine the security features of passports.

I. **Text Book and Reference Book:**

1. Forensic Accounting and Fraud Examination by Mary-Jo Kranacher, Richard Riley, Joseph T. Wells
2. Fraud Auditing and Forensic Accounting by Tommie W. Singleton, Aaron J. Singleton
3. Financial Investigation and Forensic Accounting, Third Edition, George A. Manning, Ph.D, CFE, EA
4. A Guide to Forensic Accounting Investigation by Steven L. Skalak, Thomas W. Golden, Mona M. Clayton

Semester 4

A. **Course Name:** Basics of Inorganic Chemistry
B. Course Code: 11010504CH01
C. **Prerequisite:** Understanding of wave mechanics, including matter waves, Schrodinger's wave equation, and quantum numbers, alongside knowledge of molecular orbital theory and acid-base concepts.
D. **Rationale:** Mastery of these concepts enables the comprehension of fundamental principles governing quantum behavior, molecular structure, and chemical reactivity, facilitating the analysis and prediction of molecular properties and reactions.

E. Course Learning Objective:

CLOBJ 1	Understand the fundamental principles of inorganic chemistry, including atomic structure and periodic properties.
CLOBJ 2	Identify and describe the properties and uses of common inorganic compounds.
CLOBJ 3	Explore chemical bonding and its role in the formation of inorganic molecules.
CLOBJ 4	Develop knowledge about acids, bases, and salts and their applications.
CLOBJ 5	Gain basic laboratory skills for handling and analyzing inorganic substances.

J. Course Learning Outcomes:

CLO 1	Explain the periodic trends and their impact on chemical behavior.
CLO 2	Classify and describe the characteristics of inorganic compounds.
CLO 3	Illustrate the types of chemical bonding in inorganic molecules.
CLO 4	Apply the concepts of acids, bases, and salts in practical scenarios.
CLO 5	Perform simple experiments to analyze and interpret the properties of inorganic substances.

K. Teaching & Examination Scheme:

Teaching Scheme				**Examination Scheme**					**Total**
Lect. Hrs./week	**Tut Hrs.**	**Lab Hrs.**	**Credit**	**External**		**Internal**			
				T	**P**	**T**	**CE**	**P**	
2	-	-	2	60	0	20	20	0	100

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

L. Course Content:

Sr. No	**Content**	**Weightage**	**Teaching Hours**
1.	**Unit-1** Wave mechanics:introduction, matter waves, the wave nature of the electron, wave equation, De-Broglie equation and uncertainty principle, fundamental postulates of wave mechanics, introduction of Schrodinger's wave equation and quantum numbers, numerical based on De-Broglie equation and uncertainty principle.	**33**	**10**
2.	**Unit-2** M. O. Theory:Formation of bonding and anti-bonding molecules orbitals, bond order, order of energy for molecular orbitals, Molecular orbital diagram of homo nuclear diatomic molecules, Molecular orbital diagram of ions such as H2, H2+, He2, He2+ and C2 ,N2 ,O2 ,F2.	**33**	**10**
3.	**Unit-3** Acids and Bases:Arrhenius concept, Lowry-Bronsted Acid-Base concept, solvent system concept, Lux-flood concept, Lewis Acid-Base concept, classification of Lewis Acids and	**34**	**10**

	Bases, Pearson's Soft and Hard Acid-Base principle (HSAB), application of HSAB principle, Levelling effect.		
	TOTAL	**100**	**30**

M. Text Book and Reference Book:

1. Advanced Inorganic Chemistry By Satya Prakash, G. D. Tuli, S. K. Basu & R D Madan, | S Chand & Co Ltd | Volume-II
2. Concise Inorganic Chemistry by By J. D. Lee
3. Principles of Inorganic Chemistry By B. R. Puri, L. R. Sharma ; K. C. Kalia | S Chand and Company

Semester 4

N. Course Name: Lab-Basics of Inorganic Chemistry

O. Course Code: 11010504CH02

P. Prerequisite: Basic understanding of analytical chemistry, laboratory skills, chemical safety, and knowledge of chemical reactions.

Q. **Rationale:** Selective quantitative analysis of a diverse inorganic mixture is essential for various applications, requiring careful

R. consideration of methods and safety measures.

S. Course Learning Objective:

CLOBJ 1	Familiarize with basic laboratory safety rules and practices in inorganic chemistry.
CLOBJ 2	Learn techniques for preparing and handling inorganic compounds.
CLOBJ 3	Understand methods of qualitative and quantitative analysis of inorganic substances.
CLOBJ 4	Develop skills in performing experiments to study the properties of inorganic compounds.
CLOBJ 5	Enhance accuracy in recording and interpreting experimental observations.

T. Course Learning Outcomes:

CLO 1	Demonstrate adherence to safety protocols in the inorganic chemistry lab.
CLO 2	Prepare and handle inorganic compounds using proper techniques.
CLO 3	Conduct qualitative and quantitative analyses of inorganic substances.
CLO 4	Analyze and interpret experimental data related to inorganic compounds.
CLO 5	Maintain accurate laboratory records and report findings effectively.

U. Teaching & Examination Scheme:

Teaching Scheme				**Examination Scheme**					**Total**
Lect. Hrs./week	**Tut Hrs.**	**Lab Hrs.**	**Credit**	**External**		**Internal**			
				T	**P**	**T**	**CE**	**P**	
-	-	4	2	-	30		10	10	50

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

V. Course Content:

Sr.	**List of Practical**
1	Inorganic qualitative Analysis: $CuCO_3$
2	Inorganic qualitative Analysis: KI
3	Inorganic qualitative Analysis: $SrSO_4$
4	Inorganic qualitative Analysis: $CdCl_2$
5	Inorganic qualitative Analysis: $CoSO_4$
6	Inorganic qualitative Analysis: $FeSO_4$
7	Inorganic qualitative Analysis: $K_2Cr_2O_7$
8	Inorganic qualitative Analysis: K_2CrO_4
9	Inorganic qualitative Analysis: $BaCl_2$
10	Inorganic qualitative Analysis: $AlPO_4$
11	Inorganic qualitative Analysis: $MgCl_2$
12	Inorganic qualitative Analysis: NH_4SO_4
13	Inorganic qualitative Analysis: $NiCO_3$
14	Inorganic qualitative Analysis: $ZnSO_4$
15	Inorganic qualitative Analysis: $MnCl_2$

W. Text Book and Reference Book:

5. Forensic Accounting and Fraud Examination by Mary-Jo Kranacher, Richard Riley, Joseph T. Wells
6. Fraud Auditing and Forensic Accounting by Tommie W. Singleton, Aaron J. Singleton

7. Financial Investigation and Forensic Accounting, Third Edition, George A. Manning, Ph.D, CFE, EA
8. A Guide to Forensic Accounting Investigation by Steven L. Skalak, Thomas W. Golden, Mona M. Clayton

Semester 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 Objective:

CLOBJ 1	Understand the role and objectives of NCC in nation-building.
CLOBJ 2	Develop discipline, leadership, and teamwork skills through NCC training.
CLOBJ 3	Learn basic military drills, physical fitness routines, and survival skills.
CLOBJ 4	Participate in community service and develop a sense of social responsibility.
CLOBJ 5	Cultivate patriotism and awareness of national security issues.
CLOBJ 6	Gain awareness of national defense, security, and disaster management strategies.

F. 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 6	Actively participate in community service initiatives, demonstrating social responsibility, empathy, and a commitment to societal well-being.

G. Teaching & Examination Scheme:

Teaching Scheme				**Examination Scheme**					**Total**
Lect. Hrs./week	**Tut Hrs.**	**Lab Hrs.**	**Credit**	**External**		**Internal**			
				T	**P**	**T**	**CE**	**P**	
1	-	2	2	20	40	-	20	20	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 NCC:History and significance of NCC, Organizational structure and functioning	**14%**	**2**
2.	**Unit 2**: Leadership and Personality Development:Leadership qualities and styles, Communication skills, Team building and managemen	**16%**	**3**
3.	**Unit 3:** National Integration and Awareness :Importance of national integration, Cultural diversity and unity	**14%**	**2**
4.	**Unit 4:** Health and Hygiene:Basic health and hygiene practices, First aid and emergency response	**14%**	**2**
	Unit 5:	**14%**	**2**

	Environmental Awareness: Conservation and sustainable practices, Role of NCC in environmental protection		
	Unit 6: Disaster Management:Types of disasters and their impact, Preparedness and response strategies	**14%**	**2**
	Unit 7: Social Service and Community Development:Role of NCC in community service, Planning and executing social service activities	**14%**	**2**
TOTAL		**100%**	**15 Hrs**

I. 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

Semester 4

A. Course Name: Foundations of Yoga
B. Course Code: 00019404VA01
C. Prerequisite: An open mind, basic health, consistency, a quiet space, comfortable clothing, a yoga mat, proper guidance, and a willingness to connect with your body, breath, and mind.
D. Rationale: The foundation of yoga promotes physical flexibility, mental clarity, emotional resilience, and spiritual growth, fostering a holistic approach to well-being that enhances overall health and encourages a deeper connection between mind, body, and spirit.
E. Course Learning Objective:

CLOBJ 1	Understand the origins, history, and philosophy of yoga.
CLOBJ 2	Learn basic yoga postures (asanas) and breathing techniques (pranayama).
CLOBJ 3	Explore the role of yoga in enhancing physical and mental health.
CLOBJ 4	Develop mindfulness and relaxation through meditation practices.

F. 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.

G. Teaching & Examination Scheme:

Teaching Scheme				**Examination Scheme**					**Total**
Lect. Hrs./week	**Tut Hrs.**	**Lab Hrs.**	**Credit**	**External**		**Internal**			
				T	**P**	**T**	**CE**	**P**	
1	-	2	2	20	40	-	20	20	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 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.	**Unit 2**: Philosophy of Yoga: The Eight Limbs of Yoga (Ashtanga Yoga) Basic concepts of Patanjali's Yoga Sutras Concept of Mind, Body, and Spirit connection	**15%**	**2**
3.	**Unit 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.	**Unit 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.	**Unit 5:** Shat chakras:	**5%**	**1**

6.	**Unit 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 Hrs**

I. 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. Iyengar
10. The Yoga Sutras of Patanjali (TextBook) By Swami Satchidananda
11. The Heart of Yoga (TextBook) By T.K.V. Desikachar
12. Yoga Anatomy (TextBook) By Leslie Kaminoff and Amy Matthews

Semester 4

A. Course Name: Physical Education and Sports
B. Course Code: 00019404VA02
C. Prerequisite: Basic understanding of physical fitness concepts and a willingness to actively participate in physical activities and team-based sports.
D. Rationale: The objective of this course is promoting physical health, enhancing mental well-being, fostering social skills, and encouraging lifelong habits of fitness and teamwork, ultimately contributing to holistic personal development and community cohesion.
E. Course Learning Objective:

CLOBJ 1	Understand the principles and benefits of physical education and sports.
CLOBJ 2	Learn basic techniques and rules of various sports and physical activities.
CLOBJ 3	Develop fitness through structured exercise programs and sports participation.
CLOBJ 4	Explore the role of physical education in promoting mental health and well-being.
CLOBJ 5	Cultivate teamwork, discipline, and leadership through sports and group activities.
CLOBJ 6	Gain knowledge about nutrition and its impact on athletic performance.
CLOBJ 7	Learn injury prevention and first aid techniques related to physical activities.

F. 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 6	Behaviour and technical competencies.
CLO 7	Acquire information of sports initiatives of the Government.

G. Teaching & Examination Scheme:

Teaching Scheme				**Examination Scheme**					**Total**
Lect. Hrs./week	**Tut Hrs.**	**Lab Hrs.**	**Credit**	**External**		**Internal**			
				T	**P**	**T**	**CE**	**P**	
2	-	3	-	-	40	-	-	60	-

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**: History and Basic Concept of Sports and Fitness: Concept of Sports and Fitness Aims and Objectives,Importance of Sports and Fitness Difference between Games and Sports History of Sports Ancient and Modern Olympics Asian Games and Common Wealth Games functioning	**33%**	**5**
2.	**Unit 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	**34%**	**5**

	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		
3.	**Unit 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 Hrs**

List of Practical:

1. Fundamental Skill Development Activities: Marking fields or courts on ground, Group Games or Relay Race, Outdoor Games,
   Fundamental Skill Development Activities:
   • Practicing general warm-up, stretching
   • Practicing cardio and respiratory fitness
   • Walking, Skipping and Running
   Participate and match practice in Game and Sports.

I. 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

Semester 4

J. Course Name: BCA
K. Course Code:
L. Prerequisite: 00019303AE03 - Basic French-I
M. Rationale: Basic Communication Skills of French Language.
N. Course Learning Objective:

CLOBJ 1	Develop Foundational Vocabulary and Grammar
CLOBJ 2	Enhance Listening Comprehension Skills
CLOBJ 3	Improve Speaking Skills
CLOBJ 4	Build Reading Skills
CLOBJ 5	Strengthen Writing Skills

O. 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.

P. Teaching & Examination Scheme:

Teaching Scheme				Examination Scheme					Total
Lect. Hrs./week	Tut Hrs.	Lab Hrs.	Credit	External		Internal			
				T	P	T	CE	P	
2	-	-	2	100	-	-	100	-	100

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

Q. Course Content:

Sr. No	Content	Weightage	Teaching Hours
1.	**Unit 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	**25%**	**5**
2.	**Unit 2**: **Listening Skills** Class room objects Study Subjects Common nouns of places Seasons	**25%**	**15**
3.	**Unit 3: Speaking Skills** Talking to a French Speaking Stranger Talking about hobbies Talking and writing about hobbies	**25%**	**12**
4.	**Unit 4:** 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)	**25%**	**13**
TOTAL		**100%**	**45 Hrs**

R. Text Book and Reference Book:

- Saison 1 Didier
- By Marie-Noelle Cocton | Didier
- Enchanté 0

- By Ms. Archana Khurana | Rachna Sagar
- Larrouse Dictionnaire de Poche
- Larousse French Grammar (Mini) by Paperback
- Larousse French Grammar (Mini)
- Paperback
- Plaisir D'ecrire by
- By Viral Thakkar | Saraswati House Pvt. Ltd.

Semester 4

A. Course Name: BCA
B. Course Code: 00019303AE01
C. Prerequisite: : 00019303AE01 - Advanced English-I
D. Rationale: Advanced Communication Skills of English Language
E. Course Learning Objective:

CLOBJ 1	Develop Foundational Vocabulary and Grammar
CLOBJ 2	Enhance Listening Comprehension Skills
CLOBJ 3	Improve Speaking Skills
CLOBJ 4	Build Reading Comprehension Skills
CLOBJ 5	Strengthen Writing Skills

S. 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.

T. Teaching & Examination Scheme:

Teaching Scheme				**Examination Scheme**					**Total**
Lect. Hrs./week	**Tut Hrs.**	**Lab Hrs.**	**Credit**	**External**		**Internal**			
				T	**P**	**T**	**CE**	**P**	
2	-	-	2	100	-	-	100	-	100

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

U. Course Content:

Sr. No	**Content**	**Weightage**	**Teaching Hours**
1.	**Unit 1**: Corporate Etiquettes 1. Tips and guide to develop personality and gain various etiquettes manners, case studiesand activities. 2. Telephone etiquettes	**3**	**1**
2.	**Unit 2**: Etiquette for foreign business trips	**3**	**1**
3.	**Unit 3:** Etiquette for small talks	**3**	**1**
4.	**Unit 4:** **Respecting privacy Learning to say 'No'**	**3**	**1**
5.	**Presentation Skills** Introduction to Presentation Skills and Audience Analysis Planning and Structuring Your Presentation Visual Aids, Body Language, and Non-Verbal Communication Voice Control, Delivery, and Overcoming Nervousness Engaging Your Audience and Handling Questions	**33**	**10**
6.	Email etiquettes & Writing	7	2
7.	Article writing	7	2
8.	Poster making	7	2
9.	Advertisement designing	7	2
10	Convincing skills	7	2

11.	Insane inventor	7	2
12	Picture perception	4	1
13	Book review	3	1
14	Movie review	3	1
15.	Critical thinking	3	1
TOTAL		**100%**	**45 Hrs**

V. 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 A Remedial English Grammar for Foreign Student By F.T. WOOD
4. On Writing Well By William Zinsser | Harper Paperbacks,2006 | 30th anniversary edition
5. Oxford Practice Grammar, By John Eastwood | Oxford University Press

Semester 4

A. **Course Name**: BCA
B. Course Code: 00019303AE02
C. Prerequisite: German is the second most commonly used scientific language.
D. Rationale: 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 Objective:

CLOBJ 1	Acquire fundamental speaking, listening, reading, and writing skills in German to engage in simple daily conversations and exchange basic information.
CLOBJ 2	Learn essential grammatical structures, such as sentence formation, verb conjugations, nouns, articles, pronouns, and basic tenses (present tense).
CLOBJ 3	Build a foundational vocabulary related to common topics like greetings, introductions, family, numbers, days of the week, shopping, and directions.
CLOBJ 4	Gain an introductory understanding of German-speaking countries, their traditions, culture, and societal norms to communicate effectively in culturally appropriate ways.
CLOBJ 5	Develop accurate pronunciation skills and the ability to comprehend simple spoken German through listening exercises.

W. Course Learning Outcomes:

CLO 1	Communicate, understand various City Places, Body Parts, Professions. Can also able to frame the Sentences with the help model words.
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 topic in German
CLO 5	Can read basic Passages in German

X. Teaching & Examination Scheme:

Teaching Scheme				**Examination Scheme**					**Total**
Lect. Hrs./week	**Tut Hrs.**	**Lab Hrs.**	**Credit**	**External**		**Internal**			
				T	**P**	**T**	**CE**	**P**	
2	-	-	2	100	100	-	-	-	100

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

Y. Course Content:

Sr. No	**Content**	**Weightage**	**Teaching Hours**
1.	**Unit 1**: **Grammar and Vocabulary** Körperteile (Body Parts) Beruf (Professions) Konjunktion (Conjunctions) Modal Verb Zeitformen (Tenses) Briefeschreiben (Letter writing)	**33%**	**10**
2.	**Unit 2**: **Speaking skills** Dialogue Sprechen (Suggested Situation) Richtungen (Asking Directions) Conversation between two People Conversation in shopping mall/Shop	**20%**	**6**

3.	**Unit 3: Reading Skills** Lebenslauf (Daily activities) Kurzgeschichten (Short stories)	**20%**	**6**
4.	**Unit 4: Listening Skills** Objekt (Objects) Audio Übung (audio exercises) Conversation identification	**27%**	**8**
TOTAL		**100%**	**45 Hrs**

Z. 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