ANNAMACHARYA UNIVERSITY

(Estd A.P. Private Universities (Establishment and Regulation) Act, 2016)
RAJAMPET-516126, Annamayya District, A.P, INDIA

COURSE STRUCTURE AND SYLLABI of B.Sc. in Forensic Science

For the students admitted to

B.Sc. Regular three- year Undergraduate Degree Programme from the Academic Year 2026-27

ANNAMACHARYA UNIVERSITY

(ESTD UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

RAJAMPET, Annamayya District, AP – 516126, INDIA

B.Sc. in Forensic Science

B.Sc. – I Year I Semester

Sl. No.	Category	Course Code	Course Title	Hours per Week			Credits
				L	T	P	C
1	PC	26BFSC11T	Fundamentals of Forensic Science	3	0	0	3
2	PC	26BFSC12T	Introduction to Criminology and Criminal Profiling	3	0	0	3
3	BS	26BCHE11T	Fundamentals of Inorganic and Physical Chemistry	3	0	0	3
4	HSM	26BENG11T	Communicative English	3	0	0	3
5	HSM	26BENG12T	Human Values	3	0	0	3
6	PC	26BFSC11L	Fundamentals of Forensic Science Lab	0	0	2	1
7	PC	26BFSC12L	Introduction to Criminology and Criminal Profiling Lab	0	0	2	1
8	BS	26BCHE11L	Fundamentals of Inorganic and Physical Chemistry Lab	0	0	2	1
9	HSM	26BENG11L	Communicative English Lab	0	0	2	1
Total				**15**	**0**	8	19

Category	Credits
Professional Core Courses	08
Basic Science Courses	04
Humanities & Social Sciences and Management Courses	07
Total Credits	**19**

B.Sc.– I Year II Semester

Sl. No.	Category	Course Code	Course Title	Hours per Week			Credits
				L	T	P	C
1	PC	26BFSC21T	Crime Scene Management	3	0	0	3
2	PC	26BFSC22T	Criminal and Evidence Law	3	0	0	3
3	PC	26BFSC23T	Forensic Physics	3	0	0	3
4	BS	26BCHE21T	Fundamentals of Organic and General Chemistry	3	0	0	3
5	BS	26BCHE22T	Environmental Studies	3	0	0	3
6	PC	26BFSC21L	Crime Scene Management Lab	0	0	2	1
7	PC	26BFSC23L	Forensic Physics Lab	0	0	2	1
8	BS	26BCHE21L	Fundamentals of Organic and General Chemistry Lab	0	0	2	1
9	SEC	26BCOM21S	Computer Fundamentals Lab	1	0	2	2
10	SEC	26BBBA26S	Self-Awareness & Personality Development	0	0	2	1
Total				16	0	10	**21**

Category	Credits
Professional Core Courses	11
Basic Science Courses	07
Skill Enhancement Courses	03
Total Credits	**21**

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RAJAMPET, Annamayya District, AP – 516126, INDIA

Title of the Course: Fundamentals of Forensic Science
Category: PC
Course Code: 26BFSC11T
Branch: Forensic Science
Year I Year
Semester: I Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:

This course aims to provide comprehensive knowledge of the history, principles, and functional aspects of forensic science, develop understanding of forensic institutions and investigative agencies, and build analytical skills required to interpret forensic practices and their role in crime investigation and national security.

Course Outcomes:

On successful completion of the course, a student will be able to:

1. recall the development, scope, and branches of forensic science.
2. interpret principles and ethical practices in forensic evidence analysis and reporting.
3. explain organizational structures and functions of forensic laboratories globally and in India.
4. analyze the roles of agencies involved in crime detection and forensic support.
5. evaluate the functions of national agencies involved in criminal and security investigations.

Unit 1 History of Forensic Science 10

History of Development of Forensic Science Globally. Historical aspects of forensic science in India. Functions of forensic science. Definitions and concepts in forensic sciences. Need of forensic science. Scope of forensic science. Branches of forensic science (definition and functions). Various contemporary disciplines of forensic science.

Unit 2 Concepts in Forensic Science 9

Basic principles of forensic science. Roles and responsibilities of forensic scientist. Code of conduct for forensic scientists. Ethics in forensic science. Qualifications of forensic scientists. Tools and Techniques used in forensic science for analysis of evidence. Chain of custody. Data depiction. Report writing.

Unit 3 Functional Aspects of Forensic Science 9

Forensic science in international perspectives: set up of INTERPOL, and FBI. Organizational setup of Forensic Science Laboratories in India. Hierarchical setup of Central Forensic Science Laboratories, State Forensic Science Laboratories, Directorate of Forensic Science Services.

Unit 4 Agencies Involved in Crime Detection 9

Organizational structure of Government Examiners of Questioned Documents, Fingerprint Bureaus, National Crime Records Bureau, Bureau of Police Research & Development, CCTNS.

Unit 5 Agencies Involved in the Investigation 8

Academic institutions involved; Police and Detective Training Schools, NIA, R&AW, and CBI.

Prescribed Textbook:

1. B. R. Sharma. Forensic Science in Criminal Investigation and Trials. 6st Ed., Universal Law Publishing Co., New Delhi, 2011.

Reference Books:

1. Max M. Houck and Jay A. Siegel Fundamentals *of Forensic Science*. 1st Ed., Academic Press, 2006.
2. Richard Saferstein. Criminalistics: An Introduction to Forensic Science (8th ed.). Prentice Hall, New Jersey, 2004.
3. Theju Kumar. Introduction to Criminology and Forensic Science. Current Publications, Agra, 2024.
4. B.B. Nanda and R.K. Tiwari, Forensic Science in India: A Vision for the Twenty First Century, Select Publishers, New Delhi, 2001.
5. V. Veeraraghavan. Handbook of Forensic Science. S&S Books, New Delhi, 2004.

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RAJAMPET, Annamayya District, AP – 516126, INDIA

Title of the Course: Introduction to Criminology and Criminal Profiling
Category: PC
Course Code: 26BFSC12T
Branch: Forensic Science
Year I Year
Semester: I Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:
This course aims to provide comprehensive understanding of criminological theories, causes and types of crimes, structure of the criminal justice system, and crime prevention and rehabilitation measures, enabling students to analyze criminal behaviour and evaluate criminal justice practices in contemporary society.

Course Outcomes:
On successful completion of the course, students will be able to:
1. Explain foundations and theoretical perspectives of criminology.
2. Analyze causes and patterns of criminal behavior.
3. Identify different types of crimes and their societal impact.
4. Describe the structure and functioning of the criminal justice system in India.
5. Evaluate crime prevention and rehabilitation strategies within legal and human rights frameworks.

Unit 1 **Foundations of Criminology** 9

Introduction to Crime: Essentials of Crime (Actus Reus and Mens Rea); Criminology: Definition, Aim, and Scope; Schools of Criminology: Pre-classical, Classical, Neo-classical, Positivist, Feminist Criminology; Criminology and Other Social Sciences, Criminological Theories: Historical and Contemporary Perspectives

Unit 2 Crime and Criminal Behavior 11

Causation of Crime: Psychological, Sociological, and Biological Theories; Psychological Disorders and Criminality; Types of Criminals: Adult Offenders, Juveniles, Recidivists, Violent Offenders, Occupational Offenders;
Criminal Profiling: History of Profiling, Components of Criminal Profiling, Behavioral Evidence Analysis, Crime scene investigation, Victim profiling, Geographical Profiling, Psychological Autopsy, Criminal motivation, Sexual Offences, Criminal behavior on the Internet, Case studies.

Unit 3 Types of Crimes 9

Crimes Against Property and Person: Hate Crimes, Transnational Crimes, Organized Crime; Traditional and Modern Crimes: White Collar Crimes, Economic Crime, Political Crimes, Cyber-crime; Terrorism and Insurgency; Media, Technology, and Crime; Social Change and Crime

Unit 4 **Criminal Justice System** 9

Structure of the Criminal Justice System in India: Coordination Among Components; Juvenile Delinquency; Roles of Legislature, Law Enforcement, Prosecution, Judicial, Investigation of Crimes: Complaint, F.I.R., Arrest, Search, Seizure, Police Custody, Judicial Remand, and Bail; Types of Evidence: Admissibility of Confession, Dying Declaration

Unit 5 Crime Prevention and Rehabilitation 9

Crime Prevention Strategies: Situational Crime Prevention, Policing Styles, Community Policing; Correctional Measures and Rehabilitation of Offenders; Human Rights and the Criminal Justice System in India.

Prescribed Textbooks:

1. Frank E. Hagan. Introduction to Criminology: Theories, Methods, and Criminal Behavior. 6th Ed., Sage Publications, 2007
2. B. R. Sharma. Forensic Science in Criminal Investigation and Trials. Universal Law Publishing Co., New Delhi, 2011

Reference Books:

1. Richard Saferstein. Criminalistics: An Introduction to Forensic Science (8th ed.). Prentice Hall, New Jersey, 2004.
2. Marilyn D. McShane and Frank P. Williams III. Introduction to Criminology: Theories, Methods, and Criminal Behavior. Pearson Education, 2017.
3. Prof. N.V. Paranjape. Criminology & Penology (Including Victimology). 2026 Edition, Central Law publications, 2026.
4. Brent E Turvey. Criminal Profiling. 4th Ed., Academic Pree, 2011.

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RAJAMPET, Annamayya District, AP – 516126, INDIA

Title of the Course: Fundamentals of Inorganic and Physical Chemistry
Category: BS
Course Code: 26BCHE11T
Branch: Forensic Science
Year: I Year
Semester: I Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:

This course aims to provide fundamental understanding of periodic properties of elements, chemistry of p, d, and f block elements, and principles governing solutions and acid–base behavior, enabling students to analyze chemical trends and apply physicochemical concepts in chemical systems.

Course Outcomes: At the end of the course, students will be able to:

1: Understand the Periodic Table and Periodic Trends
2: Explore the Chemistry of p-block Elements
3: Analyze the Properties of d and f-block Elements
4: Examine the Properties of Solutions and Ionic Equilibria
5: Understand Acids, Bases, and Buffer Solutions

Unit 1 Periodic table 10

Classification of elements into s, p, d, f blocks. Periodicity - periodic law and arrangement of elements in the periodic table, group number, horizontal, vertical, and diagonal relationships in the periodic table. Trend in atomic radii, ionization potential, electron affinity; electronegativity, metallic nature, oxidation states and variable valency.

Unit 2 Chemistry of p-block elements 8

Preparations, structures, classification and uses of of Diborane, Borazine, Silicones, Phosphonitrilic halides, Oxides and Oxoacids of Sulphur, Pseudo halogens, Interhalogen compounds, Xenon Fluorides and Oxyfluorides.

Unit 3 Chemistry of d and f-block elements 8

Characteristics of d and f-block elements with special reference to electronic configuration, variable valence, magnetic properties, catalytic properties and ability to form complexes. Stability of various. Oxidation states. Lanthanide contraction, consequences of lanthanide contraction, actinide contraction, comparison of lanthanides and actinides.

Unit 4 Solutions 9

Types of solutions, Concentration and its measurements, Ionic equilibrium Ionic product, common ion effect, solubility and solubility product. Ideal and non-ideal solutions, Raoult's law. Dilute solutions Colligative properties- RLVP, Osmotic pressure, Elevation in boiling point and depression in freezing point. Abnormal colligative properties. Van't Hoff factor.

Unit 5 Acids and Bases 9

Theories of acids and bases: Arrhenius theory, Bronsted-Lowry theory, Lewis theory, classification-protic and aprotic solvents, Types of indicators, Buffer solutions, Types of chemical reactions. Definition of p^H, p^{OH}, p^{ka} and p^{kb}, Types of salts, Salts hydrolysis.

Prescribed Textbooks:

1. B. R. Puri, L. R. Sharma & M.S. Pathania. Principles of Physical Chemistry. Vishal Publishing Co., 50th Ed., 2025.
2. B. R. Puri, L. R. Sharma & K.C. Kalia. Principles of inorganic Chemistry, Vishal Publishing Co., 35th Ed., 2026.

Reference Books:

1. Sharma, Y.R., and Rama Rao, Unified Chemistry. Kalyani Publishers, New Delhi, 2022
2. Agarwal,O.P. Unified Chemistry. Pragati Prakashan, Meerut,2010
3. Samuel Glasstone. *Textbook of Physical Chemistry*. Macmillan & Co. Ltd., London, 1962.
4. Bahl, B. S., G. D. Tuli and Arun Bahl. *Essentials of Physical Chemistry*. 28th ed., S. Chand Publishing, 2022. ISBN 978935501060
5. Sharma, Y.R., And Rama K. Rao. Kalyani's Unified Chemistry B.Sc.-1, 1st Semester. Kalyani Publishers New Delhi,2017. ISBN 9789327257366.
6. Sharma, Y.R., and Rama K. Rao, Unified Chemistry. Kalyani Publishers, New Delhi, 2017. B.Sc.- B1,2ND Semester. Kalyani Publishers New Delhi, 2022.
6. Sharma, Y.R., and Rama K. Rao, Kalyani's Unified Chemistry B.Sc. Part-II, 3rd Semester. Kalyani Publishers, New Delhi ,2022.
7. Lee, J.D. Concise Inorganic Chemistry. 5th ed., Wiley India Pvt.Ltd., 2008.
8. Madan, R. D.G.D. Tuli, and S. K. Malik. Selected Topics Inorganic Chemistry. S. Chand Publishing, 2016.

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RAJAMPET, Annamayya District, AP – 516126, INDIA

Title of the Course: Communicative English
Category: HSM
Course Code: 26BENG11T
Branch: Forensic Science
Year: I Year
Semester: I Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives: The primary goal of the Communicative English course is to develop students' listening, reading, speaking, and writing skills, enhancing their comprehension, oral presentation, and reporting abilities. It focuses on improving grammatical structures and vocabulary, equipping students with the proficiency needed for effective communication and preparing them to meet industry standards.

Course Outcomes:
At the end of the course, the student will be able to

1. understand the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English
2. analyze literary forms, journalistic articles and scientific readings for comprehension and retention
3. demonstrate effective writing and speaking skills
4. apply grammatical knowledge in speech and writing and formulate sentences with accuracy
5. produce coherent and unified paragraphs with adequate support and detail

Unit 1 HUMAN VALUES: The Gift of the Magi (Short Story) 10

Listening: Identifying the topic, the context and specific pieces of information by listening to short audio texts and answering a series of questions.
Speaking: Asking and answering general questions on familiar topics such as home, family, work, studies and interests; introducing oneself and others.
Reading: Skimming to get the main idea of a text; scanning to look for specific pieces of information.
Writing: Mechanics of Writing-Capitalization, Spellings, Punctuation-Parts of Sentences.
Grammar: Parts of Speech, Basic Sentence Structures-forming questions
Vocabulary: Synonyms, Antonyms, Affixes (Prefixes/Suffixes), Root words.

Unit 2 NATURE: The Brook by Alfred Tennyson (Poem) 8

Listening: Answering a series of questions about main ideas and supporting ideas after listening to audio texts.
Speaking: Discussion in pairs/small groups on specific topics followed by short structure talks.
Reading: Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.
Writing: Structure of a paragraph - Paragraph writing (specific topics)
Grammar: Cohesive devices - linkers, use of articles and zero article; prepositions.
Vocabulary: Homonyms, Homophones, Homographs.

Unit 3 BIOGRAPHY: Elon Musk 8

Listening: Listening for global comprehension and summarizing what is listened to.
Speaking: Discussing specific topics in pairs or small groups on what is discussed
Reading: Reading a text in detail by making basic inferences -recognizing and interpreting specific context clues; strategies to use text clues for comprehension.
Writing: Summarizing, Note-making, paraphrasing

Grammar: Verbs - tenses; subject-verb agreement; Compound words, Collocations
Vocabulary: Compound words, Collocations

Unit 4 INSPIRATION: The Toys of Peace by Saki 10

Listening: Making predictions while listening to conversations/ transactional dialogues without video; listening with video.
Speaking: Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions.
Reading: Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicate processes or display complicated data.
Writing: Letter Writing: Official Letters, Resumes
Grammar: Reporting verbs, Direct & Indirect speech, Active & Passive Voice
Vocabulary: Words often confused, Jargons

Unit 5 MOTIVATION: The Power of Intrapersonal Communication (An Essay) 9

Listening: Identifying key terms, understanding concepts and answering a series of relevant questions that test comprehension.
Speaking: Formal oral presentations on topics from academic contexts
Reading: Reading comprehension.
Writing: Writing structured essays on specific topics.
Grammar: Editing short texts –identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement)
Vocabulary: Technical Jargons

Prescribed Textbook:

1. *Pathfinder: Communicative English for Undergraduate Students.* 1st Ed., Orient Black Swan, 2023.

Reference Books:

1. Dubey, Sham Ji & Co. *English for Engineers.* Vikas Publishers, 2020
2. Bailey, Stephen. *Academic writing: A Handbook for International Students*. Routledge, 2014.
3. Murphy, Raymond. *English Grammar in Use.* 4th Ed., Cambridge University Press, 2019.
4. Lewis, Norman. *Word Power Made Easy- The Complete Handbook for Building Superior Vocabulary.* Anchor, 2014.

Web Resources:
GRAMMAR:

1. www.bbc.co.uk/learningenglish
2. https://dictionary.cambridge.org/grammar/british-grammar/
3. www.eslpod.com/index.html
4. https://www.learngrammar.net/
5. https://english4today.com/english-grammar-online-with-quizzes/
6. https://www.talkenglish.com/grammar/grammar.aspx

VOCABULARY

1. https://www.youtube.com/c/DailyVideoVocabulary/videos

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RAJAMPET, Annamayya District, AP – 516126, INDIA

Title of the Course: Human Values
Category: HSM
Course Code: 26BENG12T
Branch: Forensic Science
Year I Year
Semester: I Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives: The course aims to help students recognize the vital interplay between values and skills, promoting sustained happiness and prosperity. It seeks to foster a holistic perspective on life and profession, encouraging value-based living through a clear understanding of human reality and existence. Additionally, the course emphasizes the ethical implications of such an understanding, fostering trustful behaviour, fulfillinghuman interactions, and a harmonious relationship with nature.

Course Outcomes:
At the end of the course, the student will be able to
1. comprehend the terms like Natural Acceptance, Happiness and Prosperity
2. analyze one's self, and one's surroundings (family, society, nature)
3. apply human values in enriching human relationships and human society.
4. analyze the need for universal human values and harmonious existence.
5. evaluate themselves as socially and ecologically responsible engineers.

Unit 1 Introduction to Value Education 10

Lecture1: Right Understanding, Relationship and Physical Facility (Holistic Development and the Role of Education)
Lecture2: Understanding Value Education
Tutorial 1: Practice Session1: Sharing about oneself
Lecture 3: Self-Exploration as the Process for Value Education
Lecture4: Continuous Happiness and Prosperity – The Basic Human Aspirations
Tutorial 2: Practice Session2: Exploring Human Consciousness
Lecture 5: Happiness and Prosperity – Current Scenario
Lecture 6: Method to Fulfill the Basic Human Aspirations
Tutorial 3: Practice Session3: Exploring Natural Acceptance

Unit 2 Harmony in the Human Being 8

Lecture 7: Understanding Human being as the co-existence of the self and the body.
Lecture 8: Distinguishing between the needs of the self and the body
Tutorial 4: Practice Session4: Exploring the difference of needs of self and body.
Lecture 9: The body as an instrument of the self
Lecture 10: Understanding harmony in the self
Tutorial 5: Practice Session5: Exploring sources of imagination in the self
Lecture 11: Harmony of the self with the body
Lecture 12: Programme to ensure self-regulation and health
Tutorial 6: Practice Session 6: Exploring harmony of self with the body

Unit 3 Harmony in the Family and Society 8

Lecture 13: Harmony in the Family – the Basic Unit of Human Interaction
Lecture 14: 'Trust' – the Foundational Value in Relationship
Tutorial 7: Practice Session7: Exploring the Feeling of Trust
Lecture 15: 'Respect' – as the Right Evaluation
Tutorial 8: Practice Session 8: Exploring the Feeling of Respect
Lecture 16: Other Feelings, Justice in Human-to-Human Relationship
Lecture 17: Understanding Harmony in the Society
Lecture 18: Vision for the Universal Human Order
Tutorial 9: Practice Session9: Exploring systems to fulfil human goal

Unit 4 Harmony in the Nature/Existence 10

Lecture 19: Understanding Harmony in the Nature
Lecture 20: Interconnectedness, Self-Regulation and Mutual Fulfilment among the Four Orders of Nature
Tutorial 10: Practice Session 10: Exploring the Four Orders of Nature
Lecture 21: Realizing Existence as Co-existence at All Levels
Lecture 22: The Holistic Perception of Harmony in Existence
Tutorial 11: Practice Session11: Exploring Co-existence in Existence

Unit 5 Implications of the Holistic Understanding – a Look at Professional Ethics 10

Lecture 23: Natural Acceptance of Human Values
Lecture 24: Definitiveness of (Ethical) Human Conduct
Tutorial 12: Practice Session 12: Exploring Ethical Human Conduct
Lecture 25: A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order
Lecture 26: Competence in Professional Ethics
Tutorial 13: Practice Session13: Exploring Humanistic Models in Education
Lecture 27: Holistic Technologies, Production Systems and Management
Models-Typical Case Studies
Lecture 28: Strategies for Transition towards Value-based Life and Profession
Tutorial 14: Practice Session14: Exploring Steps of Transition towards Universal Human Order

Practice Sessions for UNIT I – Introduction to Value Education
PS1 Sharing about Oneself
PS2 Exploring Human Consciousness
PS3 Exploring Natural Acceptance
Practice Sessions for UNIT II – Harmony in the Human Being
PS4 Exploring the Difference of Needs of Self and Body
PS5 Exploring Sources of Imagination in the Self
PS6 Exploring Harmony of Self with the Body
Practice Sessions for UNIT III – Harmony in the Family and Society
PS7 Exploring the Feeling of Trust
PS8 Exploring the Feeling of Respect
PS9 Exploring Systems to fulfil Human Goal
Practice Sessions for UNIT IV – Harmony in the Nature (Existence)
PS10 Exploring the Four Orders of Nature
PS11 Exploring Co-existence in Existence
Practice Sessions for UNIT V – Implications of the Holistic Understanding – a Look at Professional Ethics
PS12 Exploring Ethical Human Conduct
PS13 Exploring Humanistic Models in Education
PS14 Exploring Steps of Transition towards Universal Human Order

Prescribed Textbooks:

1. R R Gaur, R Asthana, G P Bagaria. *A Foundation Course in Human Values and Professional Ethics.* 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1.

Reference Books:

1. A. Nagaraj. *Jeevan Vidya: Ek Parichaya.* Jeevan Vidya Prakashan, Amarkantak, 1999.
2. A.N. Tripathi. Human Values. New Age Intl. Publishers, New Delhi, 2004.
3. The Story of Stuff (Book).
4. Mohandas Karamchand Gandhi. The Story of My Experiments with Truth
5. E.F Schumacher . Small is Beautiful
6. The Teacher's Manual-R R Gaur, R Astana, G P Bagaria. Teacher's Manual for A Foundation Course in Human Values and Professional Ethics. 2nd Revised Edition, Excel Books, New Delhi ,2019.

Web Resources:

1. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%201Introduction%20to%20Value%20Education.pdf
2. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%202-Harmony%20in%20the%20Human%20Being.pdf
3. https://fdp-si.aicte-india.org/UHV%201%20Teaching%20Material/D3S2%20Respect%20July%2023.pdf
4. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%205-Harmony%20in%20the%20Nature%20and%20Existence.pdf
5. https://fdp-si.aicte-india.org/UHV%20II%20Teaching%20Material/UHV%20II%20Lecture%202325%20Ethics%20v1.pdf
6. https://www.studocu.com/in/document/kiet-group-of-institutions/universal-humanvalues/chapter-5-holistic-understanding-of-harmony-on-professional-ethics/62490385https://onlinecourses.swayam2.ac.in/aic22_ge23/preview
7. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%203-Harmony%20in%20the%20Family.pdf

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RAJAMPET, Annamayya District, AP – 516126, INDIA

Title of the Course: Fundamentals of Forensic Science Lab
Category: PC
Course Code: 26BFSC11L
Branch: Forensic Science
Year I Year
Semester: I Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	2	1

Course Objectives:
This course aims to develop understanding of crime cases from a forensic science perspective, build skills in preparing crime case reports, examine coordination mechanisms among forensic and police research institutions, and analyse professional conduct standards applicable to forensic scientists for effective criminal investigation support.

Course Outcomes:
1. Analyse crime cases using forensic science principles.
2. Prepare structured reports on crime investigations.
3. Evaluate research practices and professional ethics in forensic science.

1. **Practice Components (Any 10 components can be performed)**
2. To study the history of crime cases from a forensic science perspective. (Case Study)
3. To analyse crime cases using forensic science principles through real or hypothetical scenarios. (Case Study)
4. To examine burglary or theft cases and identify the role of physical evidence like fingerprints and tool marks. (Case Study)
5. To write structured reports on different types of crime cases. (Report Writing)
6. To prepare detailed forensic reports based on simulated or real case studies. (Report Writing)
7. To demonstrate and document the chain of custody process for evidence in a mock crime case. (Report Writing / Case Documentation)
8. To prepare laboratory analysis reports for different types of forensic evidence (fingerprints, documents, biological samples). (Report Writing)
9. To prepare a comprehensive case file including evidence description, analysis, and conclusion. (Report Writing)
10. To examine ethical issues in forensic science through case studies and discussions. (Ethical Analysis)
11. To compare the code of conduct prescribed by different establishments for forensic scientists. (Ethical Analysis)
12. Pioneers of forensic science with their contributions.
13. Identification, location and preservation of physical evidences robbery & dacoity, suicide, murder, sexual assault.

References

1. B. R. Sharma. *Forensic Science in Criminal Investigation and Trials*. Universal Law Publishing Co., New Delhi, 2011.
2. M. S. Dahiya. *Crime Scene Management (A Scientific Approach)*. CRC Press, Boca Raton, 2013.
3. Stuart H. James and Jon J. Nordby. *Forensic Science: An Introduction to Scientific and Investigative Techniques* (2nd ed.). CRC Press, Boca Raton, 2005.
4. Richard Saferstein. *Criminalistics: An Introduction to Forensic Science* (8th ed.). Prentice Hall, New Jersey, 2004.

5. V. Veeraraghavan. *Handbook of Forensic Science*. S&S Books, New Delhi, 2004.
6. Jay A. Siegel. *Encyclopedia of Forensic Science*. Academic Press, San Diego, 2000.

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Title of the Course: Introduction to Criminology and Criminal Profiling Lab
Category: PC
Course Code: 26BFSC12L
Branch: Forensic Science
Year I Year
Semester: I Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	2	1

Course Objectives:

This course aims to study crime cases where criminal profiling aided investigations, analyze the relationship between socio-economic changes and crime rates, examine modernization measures in police stations and their implementation, and develop skills to prepare reports on interrogation facilities with suggestions for improvement.

Course Outcomes:

1. analyse crime trends and profiling applications.
2. evaluate modernization and policing practices.
3. recommend improvements in interrogation and investigation systems.

Practice Components**(Any 10 components can be performed)**

1. To review crime cases where criminal profiling assisted the police in apprehending the accused. (Case Study)
2. To evaluate how rising standards of living affect the crime rate. (Case Study / Socio-economic Analysis)
3. To review the recommendations on the modernization of police stations and evaluate how far these have been carried out in different police stations. (Institutional Study)
4. To prepare a report on interrogation cells and suggest improvements. (Report Writing)
5. To analyse crime trends using statistical data and relate them to criminological theories. (Case Study / Data Analysis)
6. To analyse criminal behaviour using psychological, sociological, and biological theories. (Case Study)
7. To perform criminal profiling based on behavioural evidence from simulated crime scenarios. (Case Study / Profiling)
8. To analyse cybercrime cases and study criminal behaviour on the internet. (Case Study)
9. To write structured reports on crime cases incorporating criminological theories and profiling techniques. (Report Writing)
10. To prepare a detailed criminal profiling report based on a given case scenario. (Report Writing)
11. To document investigation procedures (FIR, arrest, search, seizure) and prepare a case report. (Report Writing)
12. To examine the structure and functioning of the criminal justice system in India through institutional study. (Institutional Study)
13. To analyse crime prevention strategies and rehabilitation measures through case studies and prepare suggestions. (Case Study / Policy Analysis)
14. Analysis of news items of criminology importance from the daily newspapers.
15. Collection of crime news clippings.
16. Pioneers of classical and positive criminology with their contributions.

17. Classification / types of cyber crimes.
18. Crime statistics analysis – crime against person and property.
19. Study of Graphical Representation of Crime Statistics.
20. Kim's Game: Observation, Retention, Memory and Interpretation.

References:

1. Formatted References (same format as your example):
2. P. O'Connor. Criminology: Theory, Research, and Policy. Pearson Education, London, 2010.
3. Hans J. Eysenck and Michael W. Eysenck. Criminal Behavior: A Psychological Approach. Psychology Press, London, 2004.
4. Marilyn D. McShane and Frank P. Williams III. Introduction to Criminology: Theories, Methods, and Criminal Behavior. Pearson Education, Boston, 2012.
5. Thomas H. Barlow. Crime and Justice: An Introduction. Wadsworth Publishing, Belmont, 1993.
6. S. K. Roberts and P. D. H. Hughes. The Criminal Justice System. Pearson Education, New Delhi, 2015.

ANNAMACHARYA UNIVERSITY

(ESTD UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)
(UNIVERSITY LISTED IN UGC AS PER THE SECTION 2(f) OF THE UGC ACT, 1956)
RAJAMPET, Annamayya District, AP – 516126, INDIA

Title of the Course:	Fundamentals of Inorganic and Physical Chemistry Lab
Category:	BS
Course Code:	26BCHE11L
Branch:	Forensic Science
Year:	I Year
Semester:	I Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	2	1

Course Objectives:

This course aims to develop practical skills in qualitative analysis of inorganic salts to identify common anions and cations, and to train students in quantitative volumetric analysis techniques for determining concentrations of acids and bases through standard titration methods, ensuring accuracy and laboratory competence.

Course Outcomes: At the end of the course ,students will be able to

1. Perform systematic qualitative analysis to identify basic radicals (anions) and acdic radicals (cations) present in given inorganic salts.
2. Apply conductometric titration techniques to accurately deterimine the concentration of unknown acid and base solutions.
3. Prepare standard solutions and perform standardization techniques using primary standards in volumetric analysis.

Practical Work:

Qualitative Inorganic Salt Analysis: Systematic qualitative analysis of a given simple salt containing one anion (Carbonate , Sulphate, Chloride, Bromide, Acetate , Nitrate, Borate, Phosphate) and one cation (Lead, Copper, Iron ,Aluminium , Zinc, Manganese, Nickel, Calcium, Strontium, Barium, Potassium, Ammonium)

1. Systematic qualitative analysis of a given inorganic simple salt -I
2. Systematic qualitative analysis of a given inorganic simple salt -II
3. Systematic qualitative analysis of a given inorganic simple salt -III
4. Systematic qualitative analysis of a given inorganic simple salt -IV
5. Systematic qualitative analysis of a given inorganic simple salt -V

Quantitative Volumetric Analysis:

6. Estimation of ferrous iron by Dichrometry.
7. Estimation of oxalic acid ($H_2C_2O_4$) solution by permanganometry.
8. Determination of concentration of a given unknown HCl solution using standard NaOH.
9. Determination of concentration of a given unknown CH_3COOH solution using std. NaOH solution by conductometry.
10. Determination of concentration of a given unknown NH_4OH solution using standard HCl solution by conductometry.

Prescribed Laboratory Manuals:

1. Agarwal O.P. Advanced Practical *Chemistry*. S. Chand Publishing, New Delhi 2017.
2. Vogel, Arthur I. Vogel's Qualitative Inorganic Analysis. 7th ed., Pearson Education, 2012.

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(UNIVERSITY LISTED IN UGC AS PER THE SECTION 2(f) OF THE UGC ACT, 1956)

RAJAMPET, Annamayya District, AP – 516126, INDIA

Title of the Course: Communicative English Lab
Category: HSM
Course Code: 26BENG11L
Branches: Forensic Science
Year: I Year
Semester: I Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	2	1

Course Objectives:

The main objective of Communicative English Laboratory course is to provide students with a range of self-instructional and learner-friendly methods for enhancing their language skills. This course is designed to train students in fundamental communication abilities and prepare them effectively for job interviews.

Course Outcomes:

At the end of the course, the student will be able to

1. relate and differentiate the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension
2. develop effective communication skills through various verbal and non-verbal language learning practices
3. demonstrate professional skills by actively participating role-plays and descriptions
4. build an effective resonate and equip themselves with essential employability skills for professional success
5. enhance public speaking skills and deliver oral presentations with clarity and confidence

List of Topics

1. Phonetics: Vowels & Consonants
2. Just A Minute (JAM)
3. Role Play / Situational Dialogues
4. Oral Presentation/ Poster Presentation
5. Information Transfer
6. Describing people/objects/situations
7. Group Discussions
8. Email Writing
9. Resume Writing
10. Interview Skills

Suggested Software:

1. Walden Infotech
2. Sky Pronunciation Suite
3. Clarity Pronunciation Power – Part I
4. Learning to Speak English - 4 CDs
5. Loose Your Accent in 28 days, CD Rom, Judy Ravin

References:

1. Meenakshi Raman, Sangeeta-Sharma. *Technical Communication*. Oxford Press.2018.
2. Grant Taylor. *English Conversation Practice.* Tata McGraw-Hill Education India, 2016
3. Hewing's, Martin. *Cambridge Academic English* (B2). CUP, 2012.
4. T. Balasubramanyam. *A Textbook of English Phonetics for Indian Students.* 3rd Ed., Trinity Press.

Web Resources:

Spoken English:

1. www.esl-lab.com
2. www.englishmedialab.com
3. www.englishinteractive.net
4. https://www.britishcouncil.in/english/online
5. http://www.letstalkpodcast.com/
6. https://www.youtube.com/c/mmmEnglish_Emma/featured
7. https://www.youtube.com/c/ArnelsEverydayEnglish/featured
8. https://www.youtube.com/c/engvidAdam/featured
9. https://www.youtube.com/c/EnglishClass101/featured
10. https://www.youtube.com/c/SpeakEnglishWithTiffani/playlists
11. https://www.youtube.com/channel/UCV1h_cBE0Drdx19qkTM0WNw

Voice & Accent:

1. https://www.youtube.com/user/letstalkaccent/videos
2. https://www.youtube.com/c/EngLanguageClub/featured
3. https://www.youtube.com/channel/UC_OskgZBoS4dAnVUgJVexc
4. https://www.youtube.com/channel/UCNfm92h83W2i2ijc5Xwp_IA

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(ESTD UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)
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RAJAMPET, Annamayya District, AP – 516126, INDIA

Title of the Course: Crime Scene Management
Category: PC
Course Code: 26BFSC21T
Branch: Forensic Science
Year I Year
Semester: II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:

1. To understand the techniques behind the management of different crime scenes, including photography.
2. To evaluate the importance of evidence and its correct collection, handling, and preservation techniques.
3. To develop proficiency in the analysis and reconstruction of crime scenes and the presentation of evidence in court.

Course Outcomes:

On successful completion of this course, students will be able to:

1. Apply skills in investigation, documentation, and reconstruction for crime scenes and makelogical deductions.
2. Develop proficiency in crime scene photography.
3. Process the standards for handling different types of evidence.
4. Understand various tools and techniques for the analysis of different types of crime scene evidence.
5. Maintain the chain of custody for physical evidence and present findings effectively in a court of law.

Unit 1: Introduction to Crime Scene Management 10

Introduction to the crime scene; Types of crime scenes; Evaluation and processing of crime scenes; Securing the scene of the crime; Documenting the crime scene: Note making, sketching; Searching techniques of crime scene; Reconstruction of the scene of crime; Report writing of crime scene visits; Role of the first arriving officer and investigating officer at the crime scene; Manpower and logistics management of crime scene; Case studies.

Unit 2: Crime Scene Photography 9

Types of crime scene photography; Cameras: SLR & DSLR, lenses, filters, films; Exposing, development, and printing; Different kinds of developers and fixers; Specialized photography: UV, IR, X-Ray; Photography using scientific equipment; Videography of crime scene

Unit 3 Introduction to Physical Evidence 10

Introduction to physical evidence; Types of physical evidence; Classification and role of physical evidence in criminal investigations & trials; Processing of physical evidence: Discovering, recognizing, and examinationof physical evidence; Collection, safety measures for evidence collection; Preservation, packaging, sealing, labeling, and forwarding of physical evidence; Maintaining the chain of custody; Probative value of physical evidence

Unit 4 Tools and Techniques for Crime Scene Investigation 9

Tools: Basic kits, Investigator's kit, Tools used in the mobile laboratory; Techniques: Detective dyes, Speed detection devices, 3-D scanning technique, Neutron radiography, Tele forensic technology for crime scene investigation; Technology innovation in crime scene management; National and international scenario of crime scene management

Unit 5 Crime Scene to the Court 9

Overview of the legal system; Role of forensic experts in court; Presentation of physical evidence in court; Preparation of expert witness testimony; Cross-examination techniques; Legal and ethical responsibilities of forensic experts; Case studies on court presentations; Interaction with legal professionals and mock trials

Prescribed Textbooks:

1. Barry A. J. Fisher and David R. Fisher Techniques of Crime Scene Investigation. 7th Ed., (Forensic and Police Science Series) . Crc press .2003.
2. William J. Tilstone, Michael L. Hastrup and Cheryl Hald. *Fisher's Techniques of Crime Scene Investigation*. CRC Press, Boca Raton, 2013.

Reference Books:

1. Richard Saferstein. *Criminalistics: An Introduction to Forensic Science*. Pearson Education, New Delhi, 2011.
2. Stuart H. James and Jon J. Nordby. *Forensic Science: An Introduction to Scientific and Investigative Techniques*. CRC Press, Boca Raton, 2013.
3. Jay A. Siegel, Pekka J. Saukko and Geoffrey C. Knupfer. *Encyclopedia of Forensic Science*. Academic Press, San Diego, 2000.
4. B. R. Sharma. *Forensic Science in Criminal Investigation and Trials*. LexisNexis, Gurgaon, 2022.
5. K. S. Narayan Reddy. *Practical Crime Scene Processing and Investigation*. Jaypee Brothers Medical Publishers, New Delhi, 2017.
6. T. J. Fish. *Crime Scene Investigation*. Elsevier, Amsterdam, 2014.

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(ESTD UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

RAJAMPET, Annamayya District, AP – 516126, INDIA

Title of the Course: Criminal and Evidence Law
Category: PC
Course Code: 26BFSC22T
Branch: Forensic Science
Year I Year
Semester: II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:

1. Understand Key Legal Frameworks
2. Foundational understanding of criminal law, including key legal terminology, court structures, and procedures under the IPC, CrPC, and IEA.
3. Explore Law Enforcement Structures: Learn about national and international police organizations, their functions, and their role in criminal justice.
4. Analyze Special Laws: Examine laws related to narcotics, explosives, environmental protection, and other socio-economic issues and their relevance to forensic science.

Course Outcomes: On successful completion of the course, a student will be able to

1. Apply Legal Knowledge: Demonstrate understanding of criminal law, legal procedures, and evidence rules in forensic contexts.
2. Understand Police and Legal Institutions: Describe the structure and functions of police organizations and their impact on criminal investigations.
3. Interpret Special Laws: Analyze and apply various laws related to drugs, explosives, environmental protection, and socio-economic issues.
4. Engage with Forensic Evidence: Utilize knowledge of the IPC, CrPC, and IEA to handle forensic evidence and expert witness procedures.
5. Navigate Legal Frameworks: Show proficiency in navigating the legal system and understanding the implications of different legal statutes for forensic science.

Unit 1 : Law Fundamentals 10

Definition of Law, Court, and Judge; Basic Terminology in Law; Introduction to Criminal Procedure Code (CrPC); FIR and Differences between Civil and Criminal Justice; Object of Punishment and Types of Punishment; Classification of Cases: Civil, Criminal; Essential Elements of Criminal Law; Constitution and Hierarchy of Criminal Courts; Cognizable and Non-Cognizable Offences; Bailable and Non-Bailable Offences; Sentences by Chief Judicial Magistrate

Unit 2 : Section related to Forensic Science 10

Constructors, Constructor Overloading, Destructors, Function Overloading, Operator Overloading: Plus, Minus, Unary, Inheritance: Base Class Access Control, Types of Inheritance, Reasons for the usage of Inheritance, Polymorphism: Virtual Functions, Pure Virtual Functions, Abstract Classes, Generic Programming with Templates: Function Templates, Class Templates.

Algorithms: Performance Analysis, Space Complexity, Time Complexity: Bubble Sort, Selection Sort.

Unit 3 : Police Science 9

Definition and Scope of Police Science; Central Government Police Organizations: BPR&D, CBI, IB, RAW, NCRB, NICFS, NPA, UT Police Force; International Police Organization: INTERPOL; State Police Organization: Structure and Functions at State, Range, and District Levels

Unit 4 : Acts Relating to Socio-Economic and Environmental Crimes 10

Narcotic Drugs and Psychotropic Substances Act; Essential Commodity Act; Drugs and Cosmetics Act; Explosive Substances Act; Arms Act; Dowry Prohibition Act; Prevention of Food Adulteration Act; Prevention of Corruption Act; Wildlife Protection Act; Information Technology (IT) Act; Environment Protection Act; Untouchability Offences Act

Unit 5 : Merging Special Laws Relevant to Forensics 9

Integration of Special Laws into Forensic Practices; Comparative Analysis of Indian and International Laws; Case Studies involving Multiple Legal Frameworks; Practical Implications of Legal Mergers in Forensic Investigations; Current Trends and Updates in Forensic Law.

Prescribed Textbooks:

1. M. Monir. *Law of Evidence* (6th ed.). Universal Law Publishing Co. Pvt. Ltd., New Delhi, 2002.
2. M.P. Tandon . Bharatiya Nyaya Sanhita. 13th Edition Allahabad Law Agency, Faridabad. 2023

Reference Books:

1. D. A. Bronstein. *Law for the Expert Witness*. CRC Press, Boca Raton, 1999.
2. Vepa P. Sarathi. *Law of Evidence* (6th ed.). Eastern Book Company, Lucknow, 2006.
3. R. C. Nigam. *Law of Crimes in India, Volume I*. Asia Publishing House, New Delhi, 1965.

Title of the Course: Forensic Physics
Category: PC
Course Code: 26BFSC23T
Branch: Forensic Science
Year: I Year
Semester: II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:

1. To understand the properties of the evidence like glass, paint, soil, fiber, tools, etc.
2. To evaluate classifications of physical evidence and their compositions.
3. To analyze the importance of physical evidence with the help of case studies.

Course Outcomes: On successful completion of the course, a student will be able to:

1. Remember the methods for examination and analysis of glass evidence.
2. Understand the composition of the paint and its forensic examination.
3. Understand soil as a geo-marker evidence along with forensic analysis of fibers.
4. Understand properties and analysis of Tool and Tyre Mark and Restoration of erased marks
5. Analyze different types of impression marks such as earprints, lip prints, bite marks, footprints, and shoeprints.

Unit 1 **Glass** **10**

Introduction to glass, Types of glass and their compositions, Collection, packaging and Preservation, Forensic examination of glass, fractures under different conditions, determination of the direction of impact: fractures, hackle marks, backward fragmentation, Physical measurements of glass, color and fluorescence, physical matching, density comparison, refractive index, elemental analysis, Case Studies.

Unit 2 **Paints** **10**

Introduction, Composition, and types of paint, Forensic Examination of Paints and Coatings: Collection and Preservation of paint samples, macroscopic and microscopic techniques for the characterization of Paint Fragments, Physical, Chemical & Instrumental analysis of paint, Case Studies.

Unit 3 Soil and Fibre **9**

Soil: Soil and its composition, Classification of soil, Collection, packaging and Preservation of soil as a evidence, analysis of soil samples: Physical, chemical and instrumental, Soil as a geomarker, Case Studies.

Fibre evidence: Introduction and classification of fibres, collection of fibre evidence, Identification and comparison of fibres, Cloth evidence – importance, collection, analysis of adhering material, Matching of pieces.

Unit 4 Tool and Tyre Mark, and Restoration of erased marks **10**

Tool Marks: Introduction to tool marks, Types of tool marks, Class characteristics and individual characteristics of tool marks, Collection and Preservation of tool marks, Forensic examination of tool marks, Case Studies.

Tyre marks: Introduction to tyre impressions, Collection and Preservation of the tyre impression evidence, Forensic Significance of skid marks, Forensic Examination for identification and comparison, Case Studies.

Erased marks: Principle of restoration of erased marks, Techniques involved for alteration and obliterations of individual markings, Restoration of erased and obliterated marks on various surfaces, Photography and Forensic assessment of methods for restoration of obliterated marks, case studies.

Unit 5 Impression Marks **9**

Lip print: Introduction to Cheiloscopy and history of lip prints, Classification of lip prints, Collection, Development, Identification and Comparison of lip prints.

Bite marks: Objectives and forensic importance of bite-mark examination, morphology and types of bite marks, Evidence collection from victims and suspects, Photography and collections of bite marks, Case Studies.

Ear Prints: Introduction to the history of ear prints, Morphology of the ear, Procedure of taking standards from the suspects, Identification and comparison of ear prints.

Case Studies.

Prescribed Textbooks:

1. **Richard Saferstein.** *Criminalistics: An Introduction to Forensic Science* (8th ed.). Prentice Hall New Jersey, 2004.
2. B.R Sharma, Forensic Science in Criminal Investigation and Trials, Lexis Nexis (2017).

Reference Books:

Jasleen Kaur, Meenal Dhal, Renu Tyagi and Anup Kumar Kapoor. Handbook of forensic science. Selective & Scientific Books. 2024.

2. B Caddy, Forensic Examination of glass and paint, CRC Press (2001).

3. J.A Siegel, Encyclopedia of Forensic Sciences, Academic Press (2000).

4. J. Robertson, Forensic Examination of Fibers, CRC Press (2020).

Title of the Course: Fundamentals of Organic and General Chemistry
Category: BS
Course Code: 26BCHE21T
Branch: Forensic Science
Year: I Year
Semester: II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:

This course aims to develop understanding of structural theory in organic chemistry, analyze the physical and chemical properties of hydrocarbons, explain addition reactions of alkenes and alkynes, and build foundational knowledge of chemical bonding and stereochemical configurations along with their practical applications.

Course Outcomes:

At the end of the course, the student will be able to

1. Understand Structural Theory in Organic Chemistry
2. Analyze physical and chemical properties of alkanes.
3. Describe electrophilic and nucleophilic addition reactions of alkenes and alkynes.
4. Understand Chemical Bonding Concepts
5. Understand D, L, R, S, and E, Z configurations and their applications

Unit 1 Structural theory in Organic Chemistry 10

Types of bond fission and organic reagents (Electrophilic, Nucleophilic, and free radical reagents). Reaction intermediates – Carbocations, carbanions & free radicals. Bond polarization: Factors influencing the polarization of covalent bonds, inductive effect - Application of inductive effect
(a) Basicity of amines (b) Acidity of carboxylic acids. Resonance or Mesomeric effect, application to (a) acidity of phenol, and (b) acidity of carboxylic acids. Hyper conjugation and its application to stability of carbonium ions, Free radicals.

Unit 2 Saturated Hydrocarbons (Alkanes and Cycloalkanes) 8

General methods of preparation of alkanes- Wurtz and Wurtz Fittig reaction, Corey House synthesis, physical and chemical properties of alkanes, Conformational analysis of alkanes (Conformations, relative stability and energy diagrams of Ethane, Propane and butane). General molecular formula of cycloalkanes and relative stability, Baeyer strain theory, Cyclohexane conformations with energy diagram, Conformations of monosubstituted cyclohexane.

Unit 3 Unsaturated Hydrocarbons (Alkenes and Alkynes) 8

General methods of preparation, physical and chemical properties, Saytzeff and Hofmann eliminations (with mechanism), Electrophilic Additions, (H2, HX) mechanism (Markovnikov/ Anti Markovnikov addition) with suitable examples- addition of X2, HX, hydroxylation, Diels Alder reaction, 1,2- and1,4-addition reactions in conjugated

dienes. Reactions of alkynes; acidity, electrophilic and nucleophilic additions, hydration to form carbonyl compounds, Alkylation of terminal alkynes.

Unit 4 Chemical bonding 9

Types of bonds ionic and covalent bonds, Fajan's rule, factors affecting Fajans rule, Chemical Bonding Valence bond theory, hybridization, Molecular orbital theory -LCAO method, construction of M.O. diagrams for homo-nuclear and hetero-nuclear diatomic molecules. Pearson's concept, HSAB principle & its importance, bonding in Hard-Hard and Soft-Soft combinations.

Unit 5 Stereochemistry of carbon compounds 9

Molecular representations- Wedge, Fischer, Newman and Saw-Horse formulae. Optical isomerism: Optical activity, plane polarised light, optical rotation and specific rotation. Chiral molecules- definition and criteria (Symmetry elements)- Definition of enantiomers and diastereomers – Explanation of optical isomerism with example- Glyceraldehyde, D, L, R, S and E, Z- configuration with examples. Definition of Racemic mixture.

Prescribed Textbooks:

1. Arun Bahl and B.S. Bahl. A Textbook of Organic Chemistry, S. Chand, 23rd Ed., 2025.
2. S.C. Agarwal and co-authors, Unified Chemistry. Shiva Lal Agarwala & Co.

Reference Books:

1. Agarwal, O. P. *Unified Chemistry*. Pragati Prakashan, Meerut, 2010.
2. Kapoor , K. L. *A Textbook of Physical Chemistry*. Macmillan India Ltd., New Delhi, 2000
3. Samuel Glasstone. *Textbook of Physical Chemistry*. Macmillan & Co. Ltd., London, 1962.
4. Kapoor, , K. L. *A Textbook of Physical Chemistry: States of Matter and Ionic Equilibrium. 5th ed., McGraw Hill Education (India),2019. ISBN 9789339204235.*
5. Kapoor, , K. L. *A Textbook of Physical Chemistry: Thermodynamics and Chemical Equilibrium. 6th ed., McGraw Hill Education (India),2019. ISBN 9789353165239.*
6. Sharma, Y.R. Kalyani's Unified Chemistry B.SC.-1,2nd Semester. Kalyani Publishers, New Delhi, 2017 ISBN 9789327259902.
7. Sharma, Y.R. A Textbook of Complete Organic Chemistry. Kalyani Publishers, New Delhi ,2014. ISBN 9789327241372.

Web Links:

1. https://unacademy.com/content/jee/study-material/chemistry/alkane?utm
2. https://www.khanacademy.org/science/chemistry/chemical-bonds?utm
3. https://egonw.github.io/cdkbook/stereo.html?utm

Title of the Course:	Environmental Studies
Category:	BS
Course Code:	26BCHE22T
Branch:	Forensic Science
Year:	I Year
Semester:	II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives: This course aims to raise awareness among students about the environment and the critical need to protect natural resources. It emphasizes the significance of ecosystems and biodiversity, while sensitizing students to the pollution challenges caused by everyday human activities. Additionally, the course equipsstudents with the skills to identify and address social issues related to the environment.

Course Outcomes: At the end of the course, the student will be able to

1. explain how natural resources should be utilized with a focus on sustainability.
2. describe the need to protect ecosystems and biodiversity for future generations.
3. comprehend major pollution problems related to ecosystems.
4. apply quantitative reasoning skills in the proper utilization of goods and services.
5. analyze the interconnectedness of human dependence on Earth's ecosystems.

Unit 1 Multidisciplinary Nature of Environmental Studies 10

Definition, Scope and Importance – Need for Public Awareness. Natural resources: Renewable and non-renewable resources – Forest resources: Uses, deforestation– Water resources: Uses, floods, drought – Mineral resources: Uses, environmental effects of extracting mineral resources – Food resources: Impacts of overgrazing, problems with traditional agriculture, effects of modern agriculture – Land Resources: Land degradation, soil erosion Energy resources: Renewable and non-renewable energy resources.

Unit 2 Ecosystems, Biodiversity and its Conservation 10

Ecosystems: Producers, consumers and decomposers – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem: Forest ecosystem, lake ecosystem.

Biodiversity and Its Conservation: Definition – Value of biodiversity. Hot-spots of biodiversity – Threats to biodiversity – Conservation of biodiversity.

Unit 3 Environmental Pollution 8

Definition, Causes, effects and control measures of: Air Pollution, Water pollution, Soil pollution, Marinepollution, Noise pollution, Thermal pollution, nuclear hazards. Solid waste management: Causes, effects and controlmeasures of urban and industrial wastes. e-waste: sources and health hazards. Need for e-waste management – recycling.

Unit 4 Social Issues and the Environment 9

Rain water harvesting, Environmental ethics: Issues and possible solutions – global warming, acid rain, ozone layer depletion – Environment Protection Act – Air (Prevention and Control of Pollution) Act – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act.

Unit 5 Human Population and the Environment **8**

Population explosion – Family Welfare Programmes – Environment and human health – Value Education–HIV/AIDS – Role of information Technology in Environment and human health, Field work – Visit to a local area to document environmental assets

Prescribed Textbooks:

1. Kaushik, Anubha, and C.P. Kaushik. *Perspectives in Environmental Studies*. 6th Ed., New Age International Publishers, 2018.

Reference Books:

1. Chawla, Shashi . A Textbook of Environmental studies. McGraw Hill Education, 2017.
2. Joseph, Benny. *Environmental Studies*. 3rd Ed., McGraw Hill Education, 2017.
3. Dhinakaran, A., and B. Sankaran. *A Textbook of Environmental Studies*. Himalaya Publishing House, 2017.
4. Basu, Mahua, and S. Xavier. *Fundamentals of Environmental Studies*. Cambridge University Press, 2017.
5. Bharucha, Erach. *Textbook of Environmental Studies for Undergraduate Courses*. University Press, 2013.
6. Tiwari, Vijay Kumar. *A Textbook of Environmental Studies*. Himalaya Publishing House, 2017.

Title of the Course:	Crime Scene Management Lab
Category:	PC
Course Code:	26BFSC21L
Branch:	Forensic Science
Year	I Year
Semester:	II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	2	1

Course Objectives:

This course aims to develop practical skills. crime scene evaluation and reconstruction, establish proper procedures for evidence handling and documentation, and train students in preparation and presentation of expert testimony while understanding legal procedures through mock trial participation.

Course Outcomes:

1. Evaluate crime scenes and evidence systematically.
2. Reconstruct indoor and outdoor crime scenes.
3. Demonstrate expert evidence in legal proceedings.

Practice Components: (Any 10 components can be performed)

1. To prepare a detailed report on the evaluation of a simulated crime scene. *(Crime Scene Evaluation / Report Writing)*
2. To establish and document the chain of custody along with systematic note-taking at a crime scene. *(Chain of Custody / Documentation)*
3. To reconstruct an indoor crime scene using physical evidence and scene interpretation techniques. *(Crime Scene Reconstruction)*
4. To reconstruct an outdoor crime scene considering environmental and situational factors. *(Crime Scene Reconstruction)*
5. To demonstrate the collection, packaging, and preservation of different types of evidence (biological, physical, trace). *(Evidence Handling)*
6. To prepare and present expert witness testimony based on analysed crime scene evidence. *(Expert Testimony)*
7. To participate in a mock trial to understand legal procedures related to crime scene investigation and evidence presentation. *(Mock Trial / Legal Process)*
8. To perform systematic crime scene search methods (spiral, grid, strip, zone) in a simulated environment. *(Crime Scene Search Techniques)*
9. To document a crime scene using photography, sketching, and videography methods. *(Crime Scene Documentation)*
10. To identify, collect, and preserve biological evidence such as blood, hair, and fibres from a mock crime scene. *(Evidence Analysis)*
11. To analyse bloodstain patterns and interpret the events at a crime scene. *(Forensic Analysis / Reconstruction)*
12. To prepare a comprehensive case file including scene report, evidence log, and reconstruction findings. *(Report Writing / Case Documentation)*

Reference Books:

1. M. S. Dahiya. *Crime Scene Management (A Scientific Approach)*. Shanti Prakashan, New Delhi, 2009.
2. Richard Saferstein. *Criminalistics: An Introduction to Forensic Science*. Pearson Education, New Delhi, 2011.
3. William J. Tilstone, Michael L. Hastrup and Cheryl Hald. *Fisher's Techniques of Crime Scene Investigation*. CRC Press, Boca Raton, 2013.
4. Stuart H. James and Jon J. Nordby. *Forensic Science: An Introduction to Scientific and Investigative Techniques*. CRC Press, Boca Raton, 2013.
5. Jay A. Siegel, Pekka J. Saukko and Geoffrey C. Knupfer. *Encyclopedia of Forensic Science*. Academic Press, San Diego, 2000.
6. B. R. Sharma. *Forensic Science in Criminal Investigation and Trials*. LexisNexis, Gurgaon, 2022.
7. K. S. Narayan Reddy. *Practical Crime Scene Processing and Investigation*. Jaypee Brothers Medical Publishers, New Delhi, 2017.
8. T. J. Fish. *Crime Scene Investigation*. Elsevier, Amsterdam, 2014.

Title of the Course:	Forensic Physics Lab
Category:	PC
Course Code:	26BFSC23L
Branch:	Forensic Science
Year:	I Year
Semester:	II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	2	1

Course Objectives: This course provides fundamental knowledge and practical skills for examining and analyzing physical evidence in forensic investigations. It covers techniques such as density gradient analysis, refractive index determination, physical matching, tool mark analysis, and tensile strength testing. It also develops skills in identifying, casting, and comparing impression evidence like footprints, tire marks, bite marks, ear prints, and lip prints.

Course Outcomes:

1. Explain the principles of density gradient analysis, refractive index, and tensile strength in forensic examination.
2. Perform experimental techniques for the determination of refractive index, density gradient analysis, and tensile strength of materials.
3. Analyze and compare physical evidence such as glass fragments, soil samples, tool marks, and broken pieces for forensic identification.
4. Demonstrate techniques for casting and identifying impression evidence including footprints, tire marks, and bite impressions.
5. Evaluate and interpret different types of impression evidence such as ear prints and lip prints for forensic comparison and reporting.

Practical Components:

1. Density gradient analysis of soil and glass samples.
2. Determination of refractive index of glass and liquid.
3. Physical matching of broken/ cut or intact pieces of different evidence.
4. Determination of tensile strength of rope/dupatta.
5. To identify and compare tool marks.
6. Casting of Sunken Foot Impressions
7. Casting of Surface Foot Impressions
8. Casting of tire impressions
9. Casting of bite impressions
10. Identification and comparison of ear prints and lip prints

Reference Books:

1. S.H. James and J.J. Nordby, Forensic Science: An Introduction to Scientific and Investigative Techniques, 2nd Edition, CRC Press, Boca Raton (2005).
2. R. Saferstein, Criminalistics, 8th Edition, Prentice Hall, New Jersey (2004).
3. B Caddy, Forensic Examination of glass and paint, CRC Press (2001).
4. B.R Sharma, Forensic Science in Criminal Investigation and Trials, Lexis Nexis (2017).
5. J.A Siegel, Encyclopedia of Forensic Sciences, Academic Press (2000).
6. J. Robertson, Forensic Examination of Fibers, CRC Press (2020).

Title Of the Course: Fundamentals Of Organic and General Chemistry Lab
Category: PC
Course Code: 26BCHE21L
Branches: Forensic Science
Year: I Year
Semester: II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	4	2

Course Objectives:
This course aims to develop practical skills in qualitative analysis of mixed inorganic salts containing multiple anions and cations and to provide experimental understanding of reactions and tests used to distinguish alkanes and alkenes through combustion, unsaturation, and oxidation reactions.

Course Outcomes: At the end of the course, students will be able to

1. apply systematic qualitative analysis techniques to identify anions and cations of different groups present ina given inorganic salt mixture.
2. apply systematic qualitative analysis techniques to identify and distinguish different organic functional groups.
3. conduct standard organic tests to distinguish between saturated and unsaturated hydrocarbons.

Practical Work

Qualitative Inorganic salt Analysis: Systematic qualitative analysis. mixture salt containing two anions and two cations (from different groups) selected from the following:
Anions: Carbonate, Sulphate, Chloride , Bromide, Acetate, Nitrate, Borate, Phosphate
Cations: Lead , Copper, Iron , Aluminium, Zinc, Nickel, Manganese, Calcium, Strontium, Barium, Potassium, Ammonium

1. Systematic qualitative analysis of a given inorganic salt mixture -I
2. Systematic qualitative analysis of a given inorganic salt mixture -II
3. Systematic qualitative analysis of a given inorganic salt mixture -III
4. Systematic qualitative analysis of a given inorganic salt mixture -IV
5. Systematic qualitative analysis of a given inorganic salt mixture -V
6. Organic Hydrocarbon Test

a. Combustion test to distinguish saturated alkanes from unsaturated alkenes based on flame characteristics.
b. Bromine water test for unsaturation in alknes via decolorization.
c. Baeyer's test (acidified $KMnO_4$) for alknes through oxidation and color change.
d. Comparative oxidation of alkanes and alkenes using hot $KMnO_4$ or chromic acid.

Systematic Identification of Organic Functional groups:

1. Systematic identification of organic functional group--carbohydrates, Aldehydes, ketones.

2. Systematic identification of organic functional group – phenol, carboxylic acids.
3. Systematic identification of organic functional group – Alcohols.
4. Systematic identification of organic functional group – amines.

Reference Books:

1. Agarwal. O. P. Advanced Practical *Chemistry*. S. Chand Publishing , New Delhi , 2017.
2. Vogel, Arthur I. Vogel's Qualitative Inorganic Analysis. 7th ed., Pearson Education, 2012.
3. Raj, Gurdeep. Advanced Practical Organic Chemistry. 5th ed., Goel Publishing House , 2019.
4. Furniss, B. S., et AI. Vogel's Textbook of Practical Organic Chemistry Including Qualitative Organic Analysis. 5th ed., Pearson Education ,1989.
5. K. L. Kapoor. *A Textbook of Physical Chemistry*. Macmillan India Ltd., New Delhi, 2000.
6. Samuel Glasstone. *Textbook of Physical Chemistry*. Macmillan & Co. Ltd., London, 1962.

Web Links:

1. https://unacademy.com/content/jee/study-material/chemistry/alkane?utm
2. https://www.khanacademy.org/science/chemistry/chemical-bonds?utm
3. https://egonw.github.io/cdkbook/stereo.html?utm

Title Of the Course: Computer Fundamentals Lab

Category: SEC
Course Code: 26BCOM21S
Branches: Forensic Science
Year : I Year
Semester: II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
1	0	2	2

Course Objectives:
This course covers the fundamentals of computers, including their characteristics, generations, classifications, and input/output devices. It introduces memory types, storage devices, and the basic concepts of hardware and software. The syllabus also focuses on practical skills in MS Word for document creation and formatting, PowerPoint for designing presentations, and MS Excel for data handling, functions, and charts, helping students build essential computing skills.

Course Outcomes: At the end of the course, the student will be able to

1. To understand the fundamental concepts of computers, including their characteristics,
2. classifications generations, and input/output devices
3. To develop skills in creating, editing, and formatting documents using MS Word.
4. To learn how to design and deliver effective presentations using PowerPoint
5. To build proficiency in using MS Excel for data management, functions, and chart creation.

Unit 1: 5
Number Systems: Binary, Decimal, Octal, Hexadecimal; conversations between number systems.
Introduction: Define Computer, Characteristics of computers, Applications of Computers, and Generations of computers, Block Diagram, Classification of Computers, Input and Output Devices, Types of Monitors, Types of Printers.

Unit 2: 5
Introduction: Types of Memories, Cache Memory, Magnetic Tapes, Optical Drives, USB Flash Drives, Mass Storage Devices, Software, Hardware, Classification of Software.
Networking Fundamentals: Definition, Basics Elements of a Communication Process, types of networks (LAN, WAN, MAN).

Unit 3: 5
Introduction: Features of MS-Word, Parts of MS-Word, File Menu, editing a document, Highlighting Text with Colors, applying Text Effects, Inserting WordArt, Formating a document, Table menu, Headers and Footers, Mail Merge.

Unit 4: 5

Introduction: Features of Power Point, File Menu, creating a Presentation Using a Template, Inserting and Deleting Slides in a Presentation, Design menu, Slide Transitions, Animations, Slide Show.

Unit 5: 5

Introduction: Features of MS-Excel, File menu, Inserting rows and columns, Deleting rows and columns, Types of Cell referencing, Types of Functions, Statistical Functions, Match Functions , Date and Time Functions, Types of Charts.

List of Experiments:

Note: Any 10 Experiments to be performed

1. Draw and identity parts of the block diagram of a computer
2. Identify and classify different types of memory (primary, secondary, cache).
3. Using Word, write a letter to your higher official seeking 10-days leave.
4. Create a Table of forensic laboratory equipment and perform table operations in MS-Word
5. Prepare a Resume for a Forensic Science student using MS-Word
6. Create a Mail Merge.
7. Create a presentation on ''Cyber Forensics and Digital Investigation '' using Power Point.
8. Using a spreadsheet, prepare your class Time Table
9. Calculate Gross Salary and Net Salary of forensic laboratory employees using MS- Excel formulas.
10. Using a spreadsheet calculate the student Result.
11. Prepare attendance sheets for forensic laboratory employees using MS-Excel
12. Using a Spread sheet calculate the current bill.

Prescribed Textbook:

1. Reema Thareja. Fundamentals of Computers, Oxford University Press , 2nd Edition.

Reference Books:

1. I Randy Norde. Microsoft Office 365 In Practice, McGraw Hill Education.
2. V. Rajaraman. Fundamentals of Computers, PHI Learning

Title of the Course:	Self-Awareness & Personality Development
Category:	SEC
Course Code:	26BBBA26S
Branch:	Forensic Science
Year	I Year
Semester:	II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	2	1

Course Objectives: To equip students with essential life and professional skills such as goal setting, time management, stress and emotional control, effective communication, memory enhancement, critical thinking, debating, and social etiquette, enabling them to perform confidently in academic, personal, and workplace environments.

Course Outcomes: At the end of the course, the student will be able to

1. Set personal and professional goals effectively.
2. Manage time and stress in academic and professional contexts.
3. Communicate ideas confidently through speech and interaction.
4. Demonstrate interpersonal and professional etiquette skills.
5. Develop memory and critical thinking abilities

Activity Areas:

1. **Goal Setting**

- Vision Board Creation: Students create a digital or physical vision board using images, quotes, and words representing their career aspirations and life goals. They explain their board to peers, linking visuals with future plans.
- Elevator Pitch for Goals: Students prepare and deliver a 1-minute elevator pitch about their primary career goal as if they were pitching to an employer or mentor. This builds clarity and confidence.

2. **Time Management**

- Eisenhower Matrix Game: Students are given a list of 10–12 mixed tasks (e.g., "exam tomorrow," "watch Netflix," "friend's call," "assignment due"). They must place them into the 4 quadrants: Urgent–Important, Not Urgent–Important, Urgent–Not Important, Not Urgent–Not Important

3. **Stress & Emotional Management**

- Role Play-Emotional Situations: Divide students into small groups. Give scenarios like "Exam results are delayed," "Conflict with a friend," or "Job interview stress." Each group enacts how stress shows up and healthy ways to manage it.

4. **Elocution**

- Impromptu Speech: Students can pick a topic of their own (e.g., Social Issues, Current Affairs & Contemporary Topics, Technology, Business & Economy) and speak for 5-10 minutes.

5. **Role Play**

- Situational Role Play: Students will be divided into pairs or groups of three. Each group will be given a real-life situation related to business or everyday interactions (e.g., job interview, customer complaint, workplace conflict).

They will act out the scenario through role play, demonstrating communication, problem-solving, and interpersonal skills in a practical manner.

6. **Memory Development**

- Story-Linking Method (Associative Memory): Students are given a random list of 15–20 unrelated words (e.g., pen, moon, ladder, elephant…). They must create a short story connecting all words in order. They narrate the story to recall the full list.

7. **Debate**

- Balloon Debate: Each student takes on the role of a famous personality/professional (e.g., teacher, doctor, entrepreneur, cricketer). They debate why they should be "saved" if only one can remain in a metaphorical "hot-air balloon" that is losing height

8**. Etiquettes & Manners**

- Etiquette Showcase: Each student selects one etiquette or manner (e.g., dining etiquette, workplace etiquette, communication manners, digital etiquette) and delivers a short speech or presentation explaining its importance, correct practice, and relevance in daily or professional life.

Prescribed Textbook:

1. Personality Development and Soft Skills. Barun K. Mitra, Oxford University Press, 3rd Edition, 2023

Reference Books:

1. The EQ Edge: Emotional Intelligence and Your Success. Steven J. Stein & Howard E. Book, Jossey-Bass/Wiley, 2020.
2. Raymond V. Lesikar, Marie E. Flatley, Kathryn Rentz & Paula Lentz – Basic Business Communication Skills for Empowering the Internet Generation, Tata McGraw Hill, 2009 (11th Edition)
3. Soft Skills : Know Yourself and know the World.K. Alex , S Chand Publishing ,2012

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