

SCHEME & SYLLABUS

B. Sc. Forensic Science/Discipline Specific (3/4 years Honours and Honours with Research)

Four Year Under-Graduate (FYUG) Programme as per NEP
Choice Based Credit System Semester Scheme with Multiple Entry and Exit Options in the
Undergraduate and Post-graduate Degree Programmes

Programme Code: UG060
(Academic Session - 2026 onwards)



Department of Life Sciences
(UIS)
Sant Baba Bhag Singh University
2026

**Course Scheme for B. Sc. Forensic Science/Discipline Specific
(3/4 years Honours and Honours with Research)
Semester I**

I. Theory Subjects

S. No.	Course Category	Course Sub-Category	Course Code	Course Name	Contact Hours (L:T:P)	Credits (L:T:P)	Total Contact Hours	Total Credit
1	Major 1	DSC	BFS165	Basic Forensic Science	4:0:0	4:0:0	4	4
2	Major 2	DSC	BFS167	Crime and Society	4:0:0	4:0:0	4	4
3	Major 3	DSC	CHM161	Chemistry I: Fundamentals of Chemistry	4:0:0	4:0:0	4	4
	Minor 1		BOT169 CHM169 ZOO169	Archegoniate Pharmaceutical Chemistry Human Anatomy and Physiology	4:0:0	4:0:0	4	4
4	MDC-1	MDC-I	MDC074	Multidisciplinary Course-I Basics of Artificial Intelligence	3:0:0	3:0:0	3	3
5	AEC-1/ Jeevan Kaushal(Life Skills) - I	AEC/JK (LS) - I	AEC0010	Ability Enhancement Course-I Communication Skills in English-I	2:0:0	2:0:0	2	2
7	VAC-1	VAC-I	EVS100	Value Added Course-I Environment Education	4:0:0	4:0:0	4	4

II. Practical Subjects

1	Major 1	DSC	BFS169	Basic Forensic Science (Crime Scene) Lab	0:0:2	0:0:2	2	1
2	Major 2	DSC	BFS171	Crime and Society Lab	0:0:2	0:0:2	2	1
3	Major 3	DSC	CHM163	Chemistry I: Chemical Analysis - I Practical	0:0:2	0:0:2	2	1
Total							31	28

**Total Contact Hours: 31
Total Credit Hours: 28**

DSC: Discipline Specific Core Course
AEC-Ability Enhancement Compulsory Courses
MDC: Multidisciplinary/Interdisciplinary
VAC: Value added Course

Please Note: In Value-added courses student can opt for MOOC/SWAYAM Course of equivalent or more credits.

**Course Scheme for B. Sc. Forensic Science /Discipline Specific
(3/4 years Honours and Honours with Research)
Semester II**

I. Theory Subjects

S No.	Type of Course		Sub Code	Subject Name	Contact Hours (L:T:P)	Credits (L:T:P)	Total Contact Hours	Total Credit Hours
1	Major 4	DSC	BFS166	Forensic Dermatoglyphics	4:0:0	4:0:0	4	4
2	Major 5	DSC	BFS168	Criminalistics-I	4:0:0	4:0:0	4	4
3	Major 6	DSC	CHM162	Chemistry II: Inorganic &Physical Chemistry-I	4:0:0	4:0:0	4	4
4	Minor 2		BOT170 CHM170 ZOO170	Mycology and Phytopathology Inorganic Materials of Industrial Importance Insect, Vector and Diseases	4:0:0	4:0:0	4	4
5	MDC-2	MDC-2	MDC037	Multidisciplinary Course-I Nanoscience and Nanotechnology / others	3:0:0	3:0:0	3	3
6	AEC-2	AEC-II	AEC0011	Ability Enhancement Course- II Communication Skill in English-II	2:0:0	2:0:0	2	2
7	SEC-1	SEC-I	SEC016	Skill Enhancement Course-I Honey Processing, Packaging and Entrepreneurship	3:0:0	3:0:0	3	3
8	VAC-2/ Jeevan Kaushal (Life Skills)/Mulya Pravah - II	VAC-II	JKM001	Value added course-II Universal Human Values & Professional Ethics	2:0:0	2:0:0	2	2

II. Practical Subjects

1	Major (DS)	DSC	BFS170	Forensic Dermatoglyphics Lab	0:0:2	0:0:1	2	1
2	Major (DS)	DSC	BFS172	Criminalistics-I Lab	0:0:2	0:0:1	2	1
3	Major (DS)	DSC	CHM164	Chemistry II: Inorganic &Physical Chemistry-I	0:0:2	0:0:1	2	1
Total							32	29

Total Contact Hours: 32

Total Credit Hours: 29

DSC: Discipline Specific Core Course

AEC-Ability Enhancement Compulsory Courses

SEC: Skill Enhancement Course

MDC: Multidisciplinary/Interdisciplinary

VAC: Value added Course

VOC: *Vocational course/summer internship is mandatory for students who are willing to exit after 2nd sem

1.	VOC/Summer Internship	VOOC002 VOOC005	Landscaping and Nursery Management Vermitechnology	4:0:0	4:0:0	4	4
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SEMESTER-I

Semester	I
Course Code	BFS165
Course Title	BASIC FORENSIC SCIENCE
Type of course	Major (DSC)
L T P	4:0:0
Credits	4
Course prerequisite	10+2 or its equivalent in Science
Course Objective (CO)	The aim of this course is to 1.To emphasize the importance of scientific methods in crime detection. 2. To disseminate information on the advancements in the field of forensic science. 3. To highlight the importance of forensic science for perseverance of the society.
Course Outcomes (CO)	By the end of this course, students will be able to: CO1 The fundamental principles and functions of forensic science, its development and progress over the time CO2 The working of the forensic establishments in India and abroad. CO3 The role of police in the investigation CO4 The physical evidences & their methodology of collection & preservation CO5 Crime scene investigation and management

SYLLABUS

Unit I - History and Development of Forensic Science Functions of forensic science. Historical perspective of forensic science. Definitions and concepts in forensic science. Scope of forensic science. Need of forensic science. Basic principles of forensic science. Branches of forensic science.

Unit II - Organizational Set Up Hierarchical set up and the role and functions of Central Forensic Science Laboratories, State Forensic Science Laboratories, Government Examiners of Questioned Documents, Fingerprint Bureaus, National Crime Records Bureau, CID, CBI. Forensic science in international perspectives, including set up of INTERPOL and FBI.

Unit III - Police and Forensic science Police & Detective Training Schools, Bureau of Police Research & Development, Directorate of Forensic Science and Mobile Crime Laboratories. Police Academies. Police dogs. Services of crime laboratories. Basic services and optional services.

Physical Evidences: Definition, Types of Evidences, physical evidences and their importance in criminal investigation. Collection and preservation of physical evidences: Toxicological Evidences, Biological Evidences. Petroleum products, trace items, Entomological Evidences, Dental Evidences, bones, Fingerprint.

Unit IV - Crime Scene Investigation and Management Types and classification of Crime Scene, Crime Scene Management, Initial response, Securing the scene of crime, Various crime scene search methods, Various methods of preservation of crime scene: Photography, Sketching, Videography, Voice Recording, Notes taking. Collection methods and labelling, packing and forwarding of evidences, documentation and chain of custody, Role of First Responding Officer and Investigating officer. Duties of forensic scientists. Code of conduct for forensic scientists. Qualifications of forensic scientists. Report writing.

Text and Reference Books:

S. No.	Title	Author(s)	Publisher
1	Crime Scene Management- A Forensic Approach	Dr. M. S. Rao and Dr. B. P. Maithil	Delhi Selective and Scientific Books 2021
2	Forensic Science in Criminal Investigation & Trials	Sharma, B.R.	Universal Publishing Co., New Delhi, 2003

Course Code	BFS167
Course Title	CRIME AND SOCIETY
Type of course	Major (DSC)
L T P	4 0 0
Credits	4
Course prerequisite	10+2 or its equivalent in Science
Course Objective	The aim of this course is to enable the students to 1.To review the steps necessary for achieving highest excellence in forensic science. 2. To generate talented human resource, commensurating with latest requirements of forensic science. 3. To provide a platform for students and forensic scientists to exchange views, chalk out collaborative programs and work in a holistic manner for the advancement of forensic science.
Course Outcomes	By the end of this course, students will be able to To understand the crime characteristics, types and criminological perspective To learn the basics of criminology and criminal behavior To understand the concept of criminal behavior To understand causes, impact and consequences of crime in society To understand the relationship between crime and society, Sociology aspect and present scenario

SYLLABUS

Unit I: Introduction to Criminology and Crime: Definition and Concept of Crime, Meaning and characteristics of crime, Historical development of crime and criminology, Victimology and its significance, Criminological perspectives

Classification of Crime: Classification based on atrocity, seriousness, motive, statistical, situational and systematic aspects, White-collar crime, Professional crime, Organized crime, Hate crimes

Crime in Society: Causes of crime, Trends of crime in India, Crime rate and present scenario of crime in India, Sociological aspects of crime in society, Relationship between money and crime

Unit II: Criminal and Criminal Behaviour

Concept of Criminal: Definition of criminal, Classification of criminals, Criminal profiling

Criminal Behaviour: Concept of accused and criminal, Introduction to criminal behaviour, Deviant behaviour, Modus Operandi (MO), Investigative strategies

Theories of Criminal Behaviour: Historical development of criminal behaviour concepts, Identification of criminal intent, Classical and non-classical theories: Biological theories, Physiological theories, Psychogenic theories, Sociological theories

Unit III: Crime, Society and Criminal Justice System

Causes and Impact of Crime: Causes of crime, Impact and consequences of crime on society, Crime as a social problem, Relationship between crime and society

Social Change and Crime: Role of education in society, Social change and crime, Psychological disorders and criminality, Impact of modernization on criminal activities

Crime Detection and Prevention: Detection of crime, Prevention of crime, Different agencies involved in crime investigation: Police, Medico-legal experts, Judicial officers, Criminal Justice System

Unit IV: Media, Contemporary Crime Issues and Crime Control

Media and Crime: Role of media in society, Influence of social media on crime, Impact of television programs and movies on criminal behaviour, Media ethics and crime reporting

Contemporary Crime Issues: Emerging crime trends in India, Cybercrime and digital offences, Organized crime networks, Hate crimes and social conflicts

Crime Control and Social Responsibility: Community participation in crime prevention, Awareness and educational programs, Role of government and non-government organizations, Future challenges in crime control

Text and Reference Books

S. No.	Title	Author(s)	Publisher
1	Forensic Science: An Introduction to Scientific and Investigative Techniques	S.H. James and J.J. Nordby	CRC Press, Boca Raton (2005)
2	Practical Aspects of Interview and Interrogation	D.E. Zulawski and D.E. Wicklander	CRC Press, Boca Raton (2002).
3	Criminalistics	R. Saferstein	Prentice Hall, New Jersey (2004).

Course Code	CHM161
Course Title	CHEMISTRY I: FUNDAMENTALS OF CHEMISTRY
Type of course	Major (DSC)
L T P	4 0 0
Credits	4
Course prerequisite	10+2 or its equivalent in Science
Course Objective (CO)	The aim of the subject is to enhance the knowledge of students in Chemical bonding atomic / molecular structure, About basic concepts of inorganic chemistry.
Course Outcomes (CO)	By the end of the course, students will be able to CO1 acquire coherent knowledge of models of atomic structure in explaining various chemical phenomenon. CO2 Apply the Concept of periodicity trends in the atomic properties in predicting the chemical behaviour of atoms. CO3 Understand the basic concepts and phenomenon of organic chemistry CO4 Understand the basics of gaseous state. CO5 Derive mathematical expressions for different properties of gas and understand their physical significance.

SYLLABUS**UNIT I**

Introduction to Indian ancient chemistry and contribution of Indian chemists. Atomic Structure: Dual nature of electron, de Broglie hypothesis, Heisenberg uncertainty principle, Schrodinger wave equation, significance of Ψ and Ψ^2 , concept of atomic orbitals, shapes of s, p, d orbitals, Schrödinger equation for hydrogen atom. Radial and angular parts of the hydrogenic wavefunctions (atomic orbitals) and their variations for 1s, 2s, 2p, 3s, 3p and 3d orbitals (Only graphical representation). Radial and angular nodes and their significance. Radial distribution functions and the concept of the most probable distance with special reference to 1s and 2s atomic orbitals.

Significance of quantum numbers, Normalized and orthogonal wave functions. Contour boundary and probability diagrams. Orbital angular momentum and quantum numbers. Sign of wave functions. Radial and angular wave functions for hydrogen atom. Radial and angular distribution curves. Shapes of s, p, d and f orbitals, nodal planes. Discovery of spin, spin quantum number (s) and magnetic spin quantum number (ms). Rules for filling electrons in various orbitals, Electronic configurations of the atoms. Stability of half-filled and completely filled orbitals, concept of exchange energy. Energies of atomic orbitals, Anomalous electronic configurations. Pauli's Exclusion Principle, Hund's rule of maximum multiplicity, Aufbau's principle and its limitations, Variation of orbital energy with atomic number.

UNIT II

Periodicity of Elements: s, p, d, f block elements, the long form of periodic table. Detailed discussion of the following properties of the elements, with reference to s and p-block.

- Effective nuclear charge, shielding or screening effect, Slater rules, variation of effective nuclear charge in periodic table.
- Atomic radii (van der Waals)
- Ionic and crystal radii.
- Covalent radii (octahedral and tetrahedral)

(e) Ionization enthalpy, Successive ionization enthalpies and factors affecting ionization energy. Applications of ionization enthalpy.

(f) Electron gain enthalpy, trends of electron gain enthalpy.

(g) Electronegativity, Pauling's/ Mulliken's/ Allred Rachow's/ and Mulliken-Jaffé's electronegativity scales. Variation of electronegativity with bond order, partial charge, hybridization, group electronegativity. Sanderson's electron density ratio.

UNIT III

Basic Concepts in Organic Chemistry Electronic effects (inductive, resonance, hyperconjugation) and steric effects and their applications (acid/base property). Hydrogen bonding. Electrophiles and nucleophiles, nucleophilicity and basicity.. Energy considerations. Reactive intermediates: carbocations, carbanions, free radicals, carbenes, arynes, and nitrenes. Assigning formal charges in intermediates and other ionic species.

Classification and nomenclature of organic compounds, hybridization-types, shapes of organic molecules, influence of hybridization on bond properties. Nature of bonding in Organic molecules Types of chemical bonding, formation of covalent bond, notations used to represent electron movements and directions of reaction- curly arrows, formal charges. Types of bond breaking- homolytic and heterolytic.

Electronic displacement effects: Inductive effects, Electromeric effect, Resonance effect, Hyperconjugation and steric effects, explanation with examples.

Strength of organic acids and bases: Comparative study with emphasis on factors affecting pK values. Aromaticity: Benzenoids and Hückel's rule.

Types of Organic Reactions: Substitution, addition, elimination, rearrangement and pericyclic reactions, explanation with examples

Unit IV

Gaseous state: Gaseous State Elementary aspects of kinetic theory of gases, Ideal and real gases. Postulates and derivation of the kinetic gas equation, Boyle temperature (derivation not required), Molecular velocity, collision frequency, collision diameter, Collision cross section, collision number and mean free path and coefficient of viscosity, calculation of σ and η , variation of viscosity with temperature and pressure. Maxwell's Boltzmann distribution law of molecular velocities (Most probable, average and root mean square velocities). Relation between RMS, average and most probable velocity and average kinetic energies. (Mathematical derivation not required), law of equipartition of energy.

Behaviour of real gases: Deviation from ideal gas behaviour. Compressibility factor (Z) and its variation with pressure for different gases. Causes of deviation from ideal behaviour, vander Waals equation of state (no derivation) and application in explaining real gas behaviour. Critical phenomena - Andrews isotherms of CO₂, critical constants and their calculation from van der Waals equation, Continuity of states, Law of corresponding states. Numerical problems.

Text and Reference Books:

S. No	Name	Author(S)	Publisher
1	Concise Inorganic Chemistry	I.D. Lee	ELBS
2	Inorganic Chemistry	A.G. Sharpe	ELBS
3	Organic Chemistry	Morrison and Boyd	Prentice Hall

ARCHEGONIATE

Semester	I
Course Code	BOT169
Course Title	Archegoniate
Type of course	Theory
L T P	4:0:0
Credits	4:0:0
Course prerequisite	10+2 (Medical)
Course Objective	The aim of this course is to enable the students to 1. Acquaint about basic knowledge bryophytes, pteridophytes and gymnosperms 2. Acquaint about the fossil plants of archegoniate and its evolution, adaptation with the changing climate
Course Outcome	By the end of this course, students will be able to understand: 1. The evolution of fossil plants and its adaptation in land. 2. About the diversity, habitat and life cycle of bryophytes 3. About the diversity, habitat and life cycle of Pteridophytes 4. About the diversity, habitat and life cycle of Gymnosperm

UNIT I:**Introduction**

Unifying features of archegoniates; Transition to land habit; Alternation of generations.

Bryophytes

General characteristics; Adaptations to land habit; Classification; Range of thallus organization.

UNIT II**Type Studies-**

Bryophytes Classification (up to family), morphology, anatomy and reproduction of Riccia, Marchantia, Peltia, Porella, Anthoceros, Sphagnum and Funaria; Reproduction and evolutionary trends in Riccia, Marchantia, Anthoceros and Funaria (developmental stages not included). Ecological and economic importance of bryophytes with special reference to Sphagnum.

UNIT III:**Pteridophytes**

General characteristics; Classification; Early land plants (Cooksonia and Rhynia).

Type Studies- Pteridophytes

Classification (up to family), morphology, anatomy and reproduction of Psilotum, Selaginella, Equisetum and Pteris (Developmental details not to be included). Apogamy, and apospory, heterospory and seed habit, telome theory, stelar evolution; Ecological and economic importance.

UNIT IV:**Gymnosperms**

General characteristics, classification (up to family), morphology, anatomy and reproduction of Cycas, Pinus and Gnetum (Developmental details not to be included); Ecological and economic importance.

Text and Reference books:

S. No.	Name/Title	Author	Publisher
1	An introduction to Embryophyta: Vol. I. Bryophyta.	Parihar, N.S. (1991).	Central Book Depot. Allahabad.
2	Introduction to Bryophytes	Vanderpoorten, A. & Goffinet, B. (2009)	Cambridge University Press.
3	Biology.	Raven, P.H., Johnson, G.B., Losos, J.B., Singer, S.R. (2005)	Tata McGraw Hill, Delhi
4	Pteridophyta	Vashistha, P.C., Sinha, A.K., Kumar, A. (2010).	S. Chand. Delhi, India.
5	Gymnosperms	Bhatnagar, S.P. & Moitra, A. (1996)	New Age International (P) Ltd Publishers, New Delhi, India.

HUMAN ANATOMY AND PHYSIOLOGY

Semester	I
Course Code	ZOO169
Course Title	HUMAN ANATOMY AND PHYSIOLOGY
Type of course	Theory
L T P	4:0:0
Credits	4:0:0
Course prerequisite	10+2 or its equivalent in Science
Course Objective	The aim of this course is to enable the students 1.To understand the structure and function of human body systems and their interrelationships. 2. To explore the physiological processes that maintain homeostasis and health. 3. To apply anatomical and physiological knowledge through practical exercises and case studies.
Course Outcome	By the end of this course, students will be able to understand: 1.Describe the anatomical structures and physiological functions of major body systems. 2. Explain the physiological processes involved in maintaining homeostasis. 3. Identify and analyze common diseases and disorders related to specific body systems. 4. Demonstrate practical skills in observing and interpreting anatomical structures. 5. Apply knowledge of anatomy and physiology to real-life forensic cases.

SYLLABUS

UNIT I:

Introduction to Human Anatomy and Physiology: Overview of Human Anatomy and Physiology; Basic Terminology and Anatomical Positions; Overview of Body Systems; Levels of Organization: Cells, Tissues, Organs, and Systems; Homeostasis and Feedback Mechanisms

UNIT II:

Musculoskeletal System: Anatomy of Bones and Joints; Muscle Structure and Function; Types of Muscles and Their Functions; Mechanisms of Muscle Contraction; Common Musculoskeletal Disorders.

UNIT III:

Cardiovascular and Respiratory Systems: Anatomy of the Heart and Blood Vessels; Physiology of Blood Circulation; Anatomy of the Respiratory System; Mechanisms of Breathing and Gas Exchange; Cardiovascular and Respiratory Diseases.

Digestive and Nervous Systems: Anatomy of the Digestive Tract and Accessory Organs; Physiology of Digestion and Absorption; Anatomy of the Nervous System; Nervous System Functions and Reflexes; Common Digestive and Nervous Disorders.

UNIT IV:

Forensic Applications and Case Studies (6 Hours) Application of Anatomy and Physiology in Forensic Science; Identifying Trauma and Disease from a Forensic Perspective; Analyzing Forensic Case Studies: Anatomy and Physiology in Action; Techniques for Estimating Time of Death and Cause of Injury; Review of Landmark Forensic Cases and Their Anatomical Insights.

Text and Reference books:

S. No.	Name/Title	Author	Publisher
1	Anatomy and Physiology	Kelly A. Young and contributors	Kendall/Hunt Publishing
2	BRS Physiology	Linda S. Costanzo	LWW
3	Guyton and Hall textbook of Medical Physiology	John E. Hall PhD, Michael E. Hall	Elsevier

BASICS OF ARTIFICIAL INTELLIGENCE

Semester	I
Course Code	MDC074
Course Title	BASICS OF ARTIFICIAL INTELLIGENCE
Type of course	Theory
L T P	3:0:0
Credits	3:0:0
Course prerequisite	Basic Knowledge of Computer
Course Objective	The aim of this course is to enable the students The objective of the study is to provide basic knowledge representation, terminology and learning methods of Artificial Intelligence.
Course Outcome	By the end of this course, students will be able to understand: 1.Understand fundamentals and Structure of AI. 2. Understand basic terminology of AI. 3. Understand Mathematics in coordination with AI. 4. Understand AI values.

SYLLABUS**UNIT-1**

Introduction: Introduction-AI for everyone, what is AI, History of AI, what is Machine Learning, Difference between conventional programming and machine learning, how is Machine learning related to AI, what is data, Structured and Unstructured Data, Examples of unstructured data- text, images, Deep learning, Reinforcement learning, Machine Learning, Neural Networks.

UNIT-1

Applications and Methodologies: Present day AI and Applications, Key Fields of Application in A.I., Chatbots (Natural Language Processing, speech), Alexa, Siri and others. Computer vision, Weather Predictions, Price forecast for commodities, Self-driving cars, Characteristics and types of AI, Data driven, Autonomous systems, Recommender systems.

UNIT-1

Maths for Artificial Intelligence: Introduction to matrices, Introduction to set theory, Introduction to data table joins, Simple statistical concepts, Visual representation of data, bar graph, histogram, frequency bins, scatter plots, etc. With co-ordinates and graph's introduction to dimensionality of data, Simple linear equation, least square method of regression.

UNIT-1

A.I. Values: A.I. Issues, Concerns and Ethical Considerations, Issues and Concerns around A.I., A.I. and Ethical Concerns, A.I. and Bias, A.I.: Ethics, Bias, and Trust, Employment and A.I.

S. No.	Name/Title	Author	Publisher
1.	Artificial Intelligence Basics	Kevin Warwick	Routledge Publications
2.	Artificial Intelligence: The Basics	Russell A Stultz	BPB Publication

COMMUNICATION SKILLS IN ENGLISH-I

Course Code	AEC0010
Course Title	COMMUNICATION SKILLS IN ENGLISH-I
Type of course	Theory
L T P	2 0 0
Credits	2
Course prerequisite	+2 with any stream
Course Objective (CO)	The course will introduce learners to the role and importance of effective communication at work. It presents theories and principles of communication responsible for good interpersonal interaction. Students will be prepared to communicate effectively in a variety of contexts and different mediums. The Units are structured around the communication tasks of managers.

SYLLABUS**UNIT-I**

Basics of Communication Skills: Communication, Process of Communication, Types of Communication Verbal and Non-verbal communication, Channels of Communication- Upward, Downward, Horizontal, Barriers to Communication, Role of Communication in society.

UNIT-II

Listening Skills: Listening Process, Hearing and Listening, Types of Listening, Effective Listening, Barriers to Effective Listening, Note Taking.

Reading Skills: Purpose of reading, Process of reading, Reading skills Models and strategies, scanning, skimming, SQ3R, Approaches of Reading, Comprehension passages for practice.

UNIT III

Writing Skills: Purpose of writing, Effective writing, Types of writing, Business Correspondence, Precis writing, Memo writing, Minutes of meeting.

UNIT-IV

Speaking Skills: Speech Mechanism, Sounds System, Articulation, Vowels & Consonants, Skills for effective speaking, Role of audience, Feedback Skill, Oral Presentation.

Recommended Books:

Sr No	Author(s)	Title	Publisher
1.	Bhupender Kour	Effectual Communication Skills	S.K. Kataria and Sons
2.	R. Datta Roy and K.K. Dheer	Communications Skills	Vishal Publishing Company
3	The Essence of Effective Communication	Ludlow and Panton	Prentice Hall of India
4	Essentials of Business Communication	Pal and Korlahalli	S. Chand and Sons. New Delhi

ENVIRONMENTAL EDUCATION

Course Code	EVS100
Course Name	ENVIRONMENTAL EDUCATION
Course Category	Value Added Course (VAC)
Course Type	Lecture
Contact Hours (L:T:P)	4:0:0
Credits (L:T:P)	4:0:0
Course Objective (CO)	1. To sensitize the students about the scope and importance of environmental studies, different natural resources and their utilization as well as conservation methods 2. Awareness of the consequences of population explosion; diseases such as HIV/AIDS and various family welfare programs. 3. To inculcate the awareness and responsibility about environment and need of maintaining it with best possible knowledge. 4. Develop an attitude of concern for the environment.
Course Outcomes (CO)	1. Students will gain knowledge about the environment, ecosystem and effects of environmental pollution and remediation. 2. Students will be able to learn and understand the role of individual in conservation of environment. 3. Students will gain knowledge on environmental protection Acts and Rule, which will acquaint them with the legal aspects towards conservation of environment. 4. Students will understand the impact of human population, and study social issues related to environment.

SYLLABUS

UNIT-I

Introduction to Environment and Ecosystem: Definition and scope and importance of multidisciplinary nature of environment. Need for public awareness, Concept of Ecosystem, Structure, interrelationship, producers, Consumers and decomposers, ecological pyramids. Biodiversity, its importance and conservation: Introduction – Definition: genetic, species and ecosystem diversity. Biogeographical classification of India, Value of biodiversity: consumptive use, productive use, social, ethical aesthetic and option values. Biodiversity at global, national and local levels. India as a mega-diversity nation and Hot-spots of biodiversity, Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts. Endangered and endemic species of India. Conservation of Biodiversity.

UNIT-II

Environmental Pollution & Natural Resources: Definition, Causes, effects and control measures of air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, nuclear hazards. Solid waste Management: Causes, effects and control measure of urban and industrial wastes..Role of an individual in prevention of pollution. Pollution case studies. Disaster Management: Floods, earthquake, cyclone and landslides. **Natural Resources:** **Renewable and non-renewable resources:** Natural Resources and associated problems, use and over exploitation, case studies of forest resources and water resources.

UNIT-III

Social Issues and the Environment: From Unsustainable to Sustainable development, Urban problems related to energy, Water conservation, rain water harvesting, watershed management. Resettlement and rehabilitation of people; its problems and concerns. Case studies. Environmental ethics: Issues and possible solutions. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies. Wasteland reclamation. Consumerism and waste products. Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and control of pollution) Act. Wildlife Protection Act, Forest Conservation Act, Issues involved in enforcement of environmental legislation

UNIT-IV

Human Population and the Environment & Field Work: Population growth, variation among nations. Population explosion –Family Welfare Programme. Environment and human health, Human Rights, Value Education, HIV/AIDS. Women and child Welfare. Role of Information Technology in Environment and human health. Case studies

Visit to a local area to document environmental assets river/forest/grassland/hill/mountain; Visit to a local polluted site- Urban/Rural/Industrial/Agricultural; Study of common plants, insects, birds; Study of simple ecosystems-pond, river, hill slopes, etc.

Text and reference books:

S. No	Title	Author(S)	Publisher
1	A Textbook for Environmental Studies	Erach Bharucha	Universities Press, Hyderabad
2	Environmental Biology	Agarwal, K.C. 2001	Nidi Publ. Ltd. Bikaner.
3	Environmental Science	Miller T.G. Jr.	Wadsworth
4	A Text Book in Environmental Sciences	Subramanian, V.	Narosa Publishing House, New Delhi
5	Global Biodiversity Assessment	Heywood, V.H. & Waston, R.T.	Cambridge House, Delhi
6	Essentials of Environmental Studies	Joseph, K. & Nagendran, R	Pearson Education (Singapore) Pvt. Ltd., Delhi
7	Perspective in Environmental Studies	Kaushik, A. & Kaushik, C.P.	New Age International (P) Ltd, New Delhi
8	Environmental Studies from Crisis to Cure	Rajagopalan, R.	Oxford University Press, New Delhi
9	Comprehensive Environmental Studies	Sharma, J. P., Sharma. N.K. & Yadav, N.S.	Laxmi Publications, New Delhi
10	Ecology and Environment	. Sharma, P. D.	Rastogi Publications, Meerut

BASIC FORENSIC SCIENCE (CRIME SCENE) LAB

Course Code	BFS169
Course Title	BASIC FORENSIC SCIENCE (CRIME SCENE) LAB
Type of course	Major (Practical)
L T P	0 0 2
Credits	1
Course prerequisite	10+2 or its equivalent in Science
Course Objective	The aim of this course is to 1.To emphasize the importance of scientific methods in crime detection. 2. To disseminate information on the advancements in the field of forensic science. 3. To highlight the importance of forensic science for perseverance of the society.
Course outcome	By the end of the course, students will be able to: CO1 The fundamental principles and functions of forensic science, its development and progress over the time CO2 The working of the forensic establishments in India and abroad. CO3 The role of police in the investigation CO4 The physical evidences & their methodology of collection & preservation CO5 Crime scene investigation and management

LIST OF SUGGESTED LAB EXERCISES:

1. To differentiate between indoor and outdoor crime scenes.
2. To conduct a preliminary survey of crime scene and safety protocols.
3. To perform note making and sketching of indoor crime scene.
4. To perform note making and sketching of outdoor crime scene.
5. To perform crime scene photography of indoor crime scene.
6. To perform crime scene photography of outdoor crime scene.
7. To search the crime scene using various crime scene searching method.
8. To identify, collect, package, label and forwarding of evidences.
9. To conduct evidence documentation and chain of custody.
10. To examine the given crime scene and prepare a report.

Text and References Books:

S. No	Name	Author(S)	Publisher
1	Crime Scene Management- A Forensic Approach	Dr. M. S. Rao and Dr. B. P. Maithil	Delhi Selective and Scientific Books 2021
2	Forensic Science in Criminal Investigation & Trials	Sharma, B.R.	Universal Publishing Co., New Delhi, 2003

CRIME AND SOCIETY LAB

Semester	I
Course Code	BFS171
Course Title	CRIME AND SOCIETY LAB
Type of course	Practical
L T P	0 0 2
Credits	1
Course prerequisite	10+2 or its equivalent in Science
Course Objective	The aim of this course is to enable the students to 1.To review the steps necessary for achieving highest excellence in forensic science. 2. To generate talented human resource, commensurating with latest requirements of forensic science. 3. To provide a platform for students and forensic scientists to exchange views, chalk out collaborative programs and work in a holistic manner for the advancement of forensic science.
Course Outcomes (CO)	By the end of this course, students will be able to To understand the crime characteristics, types and criminological perspective To learn the basics of criminology and criminal behavior To understand the concept of criminal behavior To understand causes, impact and consequences of crime in society To understand the relationship between crime and society, Sociology aspect and present scenario

LIST OF SUGGESTED LAB EXERCISES:

1. Classification of crimes based on nature, motive, and severity.
2. Comparative case analysis: White-collar vs. Organized vs. Hate crime.
3. To extract and record Modus Operandi from crime reports for investigative use.
4. To build a basic offender profile from crime scene indicators.
5. To conduct a community survey on causes and social perception of crime.
6. Linking theories of criminal behavior - biological, psychogenic, and sociological theories to real cases.
7. Field visit to a police station, court, or correctional institution and report preparation.
8. To analyze victim impact statements or case studies; identify victim-offender relationship patterns.
9. To design a community crime-prevention program.
10. To analyse emerging crime trends and prepare a presentation seminar.

Text and Reference Books:

S. No.	Title	Author(s)	Publisher
1	Forensic Science: An Introduction to Scientific and Investigative Techniques	S.H. James and J.J. Nordby	CRC Press, Boca Raton (2005)
2	Practical Aspects of Interview and Interrogation	D.E. Zulawski and D.E. Wicklander	CRC Press, Boca Raton (2002).
3	Criminalistics	R. Saferstein	Prentice Hall, New Jersey (2004).

CHEMISTRY I: CHEMICAL ANALYSIS I (PRACTICAL)

Course Code	CHM163
Course Title	CHEMISTRY I: CHEMICAL ANALYSIS I (PRACTICAL)
Type of course	Major (Practical)
L T P	0:0:2
Credits	1
Course prerequisite	10+2 with chemistry as core subject
Course Objective	The aim of this course is to impart practical knowledge to the students about the separation of organic molecules and quantitative estimation of inorganic salt through titrimetric study.
Course outcome	By the end of the course, students will be able to: CO1 Weigh accurately compounds up to fourth decimal CO2 Know the importance of calibration of instruments, pipette, burette and volumetric flask CO3 Prepare standard/working solutions, standardization of solutions and determination of the respective analytes CO4 Handle proficiently byproducts and disposal of waste, Learn the importance of green methods over conventional methods. CO5 Enthuse students to conduct experiments by arousing the curiosity which would help them in learning basics and advanced concepts through simulation-based lab

LIST OF SUGGESTED LAB EXERCISES:**General Instruction in Chemistry Laboratory:**

- Green Principles to be adopted in the laboratories
- Specific arrangements to be made for disposal of chemicals and solutions after the experiments
- Calibration of instruments, glasswares etc to be performed in the beginning of the experiments
- Preparation of Standard solution along with calculations to be taught
- Handling and dilution of mineral acids to be emphasized
- Selection and usage of Indicators to be explained

TITRIMETRY

1. Determination of carbonate and hydroxide present in a mixture.
2. Determination of oxalic acid and sodium oxalate in a given mixture using standard $\text{KMnO}_4/\text{NaOH}$ solution
3. Standardization of potassium permanganate solution and determination of nitrite in a water sample
4. Determination of alkali content in antacids
5. Determination of chlorine in bleaching powder using iodometric method.
6. Determination of concentration of Potassium Permanganate solution using Ferrous Ammonium sulphate
7. Standardization of silver nitrate and determination of chloride in a water sample
8. Soil Analysis-Determination of pH of soil

Volumetric Analysis

Estimation of sodium carbonate and sodium hydrogen carbonate present in a mixture.

Estimation of oxalic acid by titrating it with KMnO_4 .

Estimation of water of crystallization in Mohr's salt by titrating with KMnO_4 .

Organic Chemistry

Detection of extra elements (N, S, Cl, Br, I) in organic compounds (containing upto two extra elements)

Separation of mixtures by Chromatography:

Measure the R_f value in each case (combination of two compounds to be given)

Identify and separate the components of a given mixture of two amino acids (glycine, aspartic acid, glutamic acid, tyrosine or any other amino acid) by paper chromatography

Identify and separate the sugars present in the given mixture by paper chromatography.

**Perform any four experiments from each section*

Text and References Books

S. No	Name	Author(S)	Publisher
1	Vogel's Qualitative Inorganic Analysis (7 th Edition).	G Svehla	Prentice Hall
2	Laboratory Manual in Organic Chemistry	R.K. Bansal,	Wiley Eastern
3	Advanced Experimental Chemistry. Vol. I	Physical, J.N. Gurtu and R. Kapoor	S. Chand & CO.

SEMESTER-II

FORENSIC DERMATOGLYPHICS

Semester	II
Course Code	BFS166
Course Title	Forensic Dermatoglyphics
Type of course	Theory
L T P	4 0 0
Credits	4
Course prerequisite	10+2 or its equivalent in science
Course Objective	The aim of this course is to enable the students to The aim of this course is to 1.To emphasize the importance of impression evidences. 2. To understand the advancements in fingerprint and impression analyses. 3. To understand the ability to collect, develop and preserve various types of fingerprint impressions.
Course Outcomes (CO)	By the end of this course, students will be able to CO1 Have familiarity with the field of forensic dermatoglyphics. CO2 Know the significance of forensic dermatoglyphics and impression evidences in investigation process CO3 Have through understanding of collection and preservation procedures of different impression evidences. CO4 Have understanding of advancements and latest technologies used in impression evidence analysis. CO5 Have understanding of class and individual characteristics of various impression evidences.

Unit I: Introduction to Forensic Dermatoglyphics and Fingerprint Development- Introduction to dermatoglyphics; history of dermatoglyphics; biological formation of ridges; formation of fingerprints; fundamental principles of fingerprinting; types of fingerprint patterns; fingerprint ridge characteristics; significance of poroscopy and edgeoscopy; composition of fingerprint residue.

Unit II : Collection, development and preservation of Fingerprints- Collection of fingerprints; classification and cataloguing of fingerprint records; types of impressions left on a surface; latent fingerprint detection by physical and chemical techniques; mechanism of detection of fingerprints by different developing reagents; application of light sources in fingerprint detection; preservation of developed fingerprints; digital imaging for fingerprint enhancement; fingerprinting the deceased; developing fingerprints on gloves; Unique Identification Authority of India (UIDAI).

Unit III: Impression Evidence : Types and Development - types of impression evidences (lip print, footprint, tyre marks, skid marks, drag marks, bite marks, ear prints, tool marks), classification, nature, location of occurrence, Methods of collection of various impressions; casting of impressions; electrostatic lifting of impressions; utilization of light sources for impression evidence visualization; generation of control standards for comparison; comparison of control and questioned impressions; proceedings to be followed at a crime scene for handling such impressions.

Unit IV: Advancements in Fingerprint and Impression Analysis - Automated Fingerprint Identification Technology (AFIT); biometric identification; micro X-ray fluorescence; color-changing films utilized in developing fingerprints; development of prints from metal objects; development of prints from washed surfaces; non-invasive techniques of fingerprint development, Utilization of forensic photography in impression analysis; image enhancement; various equipment involved in analysis; TraX Software; SUT-Lip-DB — database for lip prints.

Text and Reference Books:

S. No.	Title	Author(s)	Publisher
1	Biometrics & Fingerprint Analysis	S. Indira Sudha	Selective & Scientific Books
2	Forensic Science in Crime Investigation	B. S. Nabar	Asia Law House

CRIMINALISTICS-I

Semester	II
Course Code	BFS168
Course Title	CRIMINALISTICS-I
Type of course	Theory
L T P	4 0 0
Credits	4
Course prerequisite	10+2 or its equivalent in science
Course Objective (CO)	To give an exposure to the students about the basics of Forensic Science investigations. To familiarize the students about the different types of evidences involved in forensic investigations. .
Course Outcomes (CO)	Student will able to understand To understand the importance in forensic investigation in criminal cases. To evaluate different types of different evidences present at crime scene. To understand the importance of documentation of crime scene To determine types of adulterants in various types of evidences To examine of paint, glass and other materials.

SYLLABUS

Unit I: Crime Scene Investigation: Crime Scene Investigation: Concept and importance, Types of crime scenes, Understanding and purposes of crime scene examination, Duties of first responding officers, Protection and preservation of crime scenes, Documentation of crime scenes, Methods of searching for physical clue materials, Reconstruction of crime scenes, Physical evidence: Definition, classification, collection, packing, transportation, and chain of custody.

Unit II: Examination of Glass and Paint: Types of glass and their composition, Forensic examination of glass, Glass fracture analysis, Interpretation of glass evidence, Types of paints and their composition, Forensic examination of paints, Interpretation of paint evidence

Unit III: Building Materials Examination: Types of cement and their composition, Determination of adulterants in cement, Analysis of bitumen and road materials, Analysis of cement mortar, cement concrete, and stones, Forensic examination of electrical appliances and installations.

Unit IV: Miscellaneous Clue Materials: Examination of strings and ropes, Examination of fibers, threads, and fabrics, Examination of wires and cables, Examination of seals, Examination of counterfeit coins.

Text and Reference Books:

S. No.	Title	Author	Publisher
1	Integrative Criminology	Barak G. (1998)	Ashgate Pub Ltd.
2	Crime and Criminology,	Reid S.T. (12 th Edition) (2008),	Oxford University Press, USA.
3	Criminalistics,	Saferstein R. (1976),	Prentice Hall Inc. USA.

MYCOLOGY AND PHYTOPATHOLOGY

Semester	II
Course Code	BOT170
Course Title	Mycology and Phytopathology
Type of course	Theory
L T P	4:0:0
Credits	4:0:0
Course prerequisite	10+2 (Medical)
Course Objective	By the end of this course, students will be able to: 1. Know about the diversity of Fungi and its classification 2. Learn about the symptoms, diseases and plant fungi interactions
Course Outcome	By the end of this course, students will be able to understand: The diversity and life cycles of fungi The Mycorrhiza-Ectomycorrhiza, Endomycorrhiza and their significance The cultivation of mushroom The phytopathology and diseases in plants caused by fungus About the commercial and industrial application of fungi.

UNIT I:

Introduction to true fungi: General characteristics; Affinities with plants and animals; Thallus organization; Cell wall composition; Nutrition; Classification. Chytridiomycota and Zygomycota : Characteristic features; Ecology and significance; Thallus organisation; Reproduction; Life cycle with reference to *Synchytrium*, *Rhizopus* .

UNIT II:

Ascomycota : General characteristics (asexual and sexual fruiting bodies); Ecology; Life cycle, Heterokaryosis and parasexuality; Life cycle and classification with reference to *Saccharomyces*, *Aspergillus*, *Penicillium*, *Alternaria*, *Neurospora* and *Peziza*. Basidiomycota : General characteristics; Ecology; Life cycle and Classification with reference to black stem rust on wheat *Puccinia* (Physiological Specialization), loose and covered smut (symptoms only), *Agaricus*; Bioluminescence, Fairy Rings and Mushroom Cultivation.

UNIT III:

Allied Fungi : General characteristics; Status of Slime molds, Classification; Occurrence; Types of plasmodia; Types of fruiting bodies. Oomycota : General characteristics; Ecology; Life cycle and classification with reference to *Phytophthora*, *Albugo*. Symbiotic associations : Lichen – Occurrence; General characteristics; Growth forms and range of thallus organization; Nature of associations of algal and fungal partners; Reproduction; Mycorrhiza-Ectomycorrhiza, Endomycorrhiza and their significance.

UNIT IV:

Applied Mycology: Role of fungi in biotechnology; Application of fungi in food industry (Flavour & texture, Fermentation, Baking, Organic acids, Enzymes, Mycoproteins); Secondary metabolites (Pharmaceutical preparations); Agriculture (Biofertilizers); Mycotoxins; Biological control (Mycofungicides, Mycoherbicides, Mycoinsecticides, Myconematicides); Medical mycology.

Phytopathology: Terms and concepts; General symptoms; Geographical distribution of diseases; Etiology; Symptomology; Host-Pathogen relationships; Disease cycle and environmental relation; prevention and control of plant diseases, and role of quarantine. Bacterial diseases – Citrus canker and angular leaf spot of cotton. Viral diseases – Tobacco Mosaic viruses, vein clearing. Fungal diseases – Early blight of potato, Black stem rust of wheat, White rust of crucifers.

Text and Reference books:

S. No.	Name/Title	Author	Publisher
1	Introduction to Fungi, 3rd edition	Webster, J. and Weber, R. (2007).	Cambridge University Press, Cambridge.
2	Text book of Fungi and Their Allies	Sethi, I.K. and Walia, S.K. (2011).	Macmillan Publishers India Ltd.
3	Plant Pathology	Sharma, P.D. (2011).	Rastogi Publication, Meerut, India.
4	Plant Pathology, 4th edition,	Agrios, G.N. (1997)	Academic Press, U.K.
5	Introductory Mycology	Alexopoulos, C.J., Mims, C.W., Blackwell, M. (1996)	John Wiley & Sons (Asia) Singapore. 4th

			edition
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NANOSCIENCE AND NANOTECHNOLOGY

Course Code	MDC037
Course Title	NANOSCIENCE AND NANOTECHNOLOGY
Type of Course	Theory
L T P	3 0 0
Credits	3
Course pre-requisite	NA
Course Objectives	1.Understand the fundamental concepts, principles, and scope of Nanoscience and Nanotechnology. 2.Explain the unique physical, chemical, optical, electrical, and mechanical properties of nanomaterials. 3.Describe various methods for synthesis, fabrication, and characterization of nanomaterials and nanostructures. 4.Understand the applications of nanotechnology in electronics, medicine, energy, agriculture, and environmental science.

SYLLABUS

UNIT I

Basics of Nanotechnology: General Concepts in Nanotechnology, History of nanotechnology, Classification of different areas of nanotechnology, Top-down Approach, Bottom-up Approach, Interdisciplinary nature of nanotechnology, Definitions, Relationship and Differences among nanoscience, nanotechnology, Nano-Physics and Nano-Chemistry, Future perspectives of nanoscience and nanotechnology

UNIT II

Scientific Evolution: Atomic Structure and atomic size, Interconversion of units, Introduction to surface area to volume ratio and aspect ratio, Difference between surface area to volume ratio of bulk materials and nanomaterials, Influence of nano over micro/macro, Size effects and crystals, Surface effects on the properties, Carbon nanotubes and their applications
Types of Bonding: Molecular Interactions, van der Waals Interactions, Hydrogen bonding, Hydrophilic and Hydrophobic Effects, Stacking

UNIT III

Dimensional Growth Process: Introduction to dimensional growth process, Classification of nanomaterials into 0D, 1D, 2D and 3D, Relationship between dimension and shape of nanomaterials: Quantum dots, Quantum wires, Carbon nanotubes, Bucky balls, Fullerenes, Introduction to size effect on electronic and optical properties (Quantum confinement).

UNIT IV

Fundamentals of Nanoscale Self Assembly: Self-assembly process involved in important functional biomolecules such as: Nucleic acid (DNA and RNA), Proteins, Enzymes

Nanomaterials and Applications: Identify and differentiate between different types of nanomaterials and their properties, Application of Nanomaterial: Nanobiology, Nano-Pharmacy, Nanomedicine, Ferroelectric materials, Nanoclays, Coating, Molecular electronics and nanoelectronics, Metal oxides, Semiconductors, Composites, Biological applications, Environmental applications, Membrane based applications, Polymer based applications

Recommended Books:

Sr No	Author(s)	Title	Publisher
1.	Masaru Kuno	Introductory Nanoscience	Garland Science Publications
2.	Charles P. Poole Jr. & Frank J. Owens	Introduction to Nanotechnology	Wiley India
3	M. S. Ramachandra Rao & Shubra Singh	Nanoscience and Nanotechnology	Wiley India

Ability Enhancement Course-II

Course Code	AEC0011
Course Title	Communication Skills in English-II
Type of Course	Theory
L T P	2 0 0
Credits	2
Course pre-requisite	NA
Course Objectives	To enhance employability skills of the learners by enabling them to write an effective resume and face the interview with confidence.

SYLLABUS

UNIT I

PUBLIC SPEAKING: Introduction to Public Speaking, Business Conversation, Effective Public Speaking Art of Persuasion

UNIT II

INTERVIEW SKILLS: Types of Interviews, Styles of Interview, Facing Interviews-Fundamentals and Practice Session, Conducting Interviews- Fundamentals and Practice Session, Mock interview sessions

UNIT III

Writing Skills: Resume Writing, Covering Letters, Interview Follow Up Letters, Email, Fax, Assessment through employability score card

UNIT IV

ETIQUETTES: Business Etiquette, dressing up Sense, Exchanging Business card, Shaking hands, Dining etiquette

Recommended Books:

Sr No	Author(s)	Title	Publisher
1.	Jeremy Comfort	Speaking Effectively	CUP
2.	N.Krishnaswamy	Creative English for Communication	Macmillan
3	Raman Prakash	Business Communication	CUP
4	Anjanee Sethi & Bhavana Adhikari	Business Communication	Tata McGraw Hill

Skill Enhancement Course-I

Course Code	SEC016
Course Title	Honey Processing, Packaging and Entrepreneurship
Type of course	Theory
L T P	3 0 0
Credits	3
Course prerequisite	B.Sc. Non-Medical or B. Sc. Medical with Zoology as main subject
Course Objective	This course describes about economic importance of honey bees and honey production and entrepreneurship
Course Outcomes	The students will able to: 1. On successful completion of this course, students should acquire the detailed knowledge of: 2. Knowledge about honey bees and bee products 3. Processing of honey and generation of income

Syllabus

Unit-I

Bee Keeping: Present scenario and prospects for bee keeping, Requirements of Commercial Bee Keeping, Pit falls in Bee Keeping. Bee identification and Bee flora. Introduction to honey bee; Origin, systematic and distribution, Types of honey bees, Species of honey bees.

Unit II

Bee products: An introduction, honey, pollen, royal jelly, bees wax, propolis & venom, Significance of bee products. Value added honey products. Properties of honey products, Nutrients and composition of honey, Acid content and flavor effects. Types of value-added honey products

Unit III

Harvesting, Processing and Preservation of Honey

Methods of harvesting honey

Processing of honey

Preservation of honey

Unit IV

Costing, Pricing, Packaging & Marketing of Honey

Methodologies adopted for costing, pricing

Packaging, labeling and branding

Marketing Management

Text books and references

S. No	Title	Author(S)	Publisher
1	Complete Technology Book on Honey Processing and Formulations (Harvesting, Extraction, Adulteration, Chemistry, Crystallization, Fermentation, Dried Honey, Uses, Applications and Properties)	Himadri Panda	engineers India research institute
2	Honey: A Miraculous Product of Nature	Om Prakash Agrawal, Rajesh Kumar, Younis Ahmad Hajam	CRC (Taylor and Francis)

Universal Human Values & Professional Ethics

Course Code	JKM001
Course Title	Universal Human Values & Professional Ethics
Type of course	Theory
L T P	3 0 0
Credits	3
Course prerequisite	B.Sc. Non-Medical or B. Sc. Medical with Zoology as main subject
Course Objective	This course describes about economic importance of honey bees and honey production and entrepreneurship
Course Outcomes	The students will able to: 1. On successful completion of this course, students should acquire the detailed knowledge of: 2. Knowledge about honey bees and bee products 3. Processing of honey and generation of income

Syllabus

Unit-I

Bee Keeping : Present scenario and prospects for bee keeping, Requirements of Commercial Bee Keeping, Pit falls in Bee Keeping. Bee identification and Bee flora. Introduction to honey bee; Origin, systematic and distribution, Types of honey bees, Species of honey bees.

Unit II

Bee products: An introduction, honey, pollen, royal jelly, bees wax, propolis & venom, Significance of bee products. Value added honey products. Properties of honey products, Nutrients and composition of honey, Acid content and flavor effects. Types of value added honey products

Unit III

Harvesting, Processing and Preservation of Honey
Methods of harvesting honey
Processing of honey
Preservation of honey

Unit IV

Costing, Pricing, Packaging & Marketing of Honey
Methodologies adopted for costing, pricing
Packaging, labeling and branding
Marketing Management

Text books and references

S. No	Title	Author(S)	Publisher
1	Complete Technology Book on Honey Processing and Formulations (Harvesting, Extraction, Adulteration, Chemistry, Crystallization, Fermentation, Dried Honey, Uses, Applications and Properties)	Himadri Panda	engineers India research institute
2	Honey: A Miraculous Product of Nature	Om Prakash Agrawal, Rajesh Kumar, Younis Ahmad Hajam	CRC (Taylor and Francis)

Forensic Dermatoglyphics Lab

Semester	II
Course Code	BFS170
Course Title	Forensic Dermatoglyphics Lab
Type of course	Practical
L T P	0 0 2
Credits	1
Course prerequisite	10+2 or its equivalent in Science
Course Objective	The aim of this course is to enable the students to The aim of this course is to 1.To learn how to develop, lift, and preserve fingerprints using physical and chemical methods. 2. To train students in identifying and comparing impression evidence found at crime scenes. 3. To introduce students to modern tools and software used in dermatoglyphic and impression analysis.
Course Outcomes (CO)	By the end of this course, students will be able to 1. Students will be able to develop and lift latent fingerprints from different surfaces. 2. Students will be able to classify and compare fingerprint and impression evidence. 3. Students will be able to use casting, photography, and digital tools to document impression evidence.

1. Recording of ten-digit rolled and plain fingerprint slips.
2. To study and classify different fingerprint patterns.
3. To mark and count ridge characteristics on a given print.
4. To develop and lift latent fingerprints using physical methods.
5. To develop latent fingerprints using chemical methods.
6. To record and analyze a simulated bite mark impression using overlay/comparison method
7. To create and cast a simulated tool mark and compare against a suspect tool
8. To identify class characteristics and individual characteristics from sample footwear/footprint impression.
9. To identify, collect and classify lip prints.
10. To identify and classify miscellaneous impression evidences.

Text and Reference Books:

S. No.	Title	Author(s)	Publisher
1	Fingerprints and Other Ridge Skin Impressions	Christophe Champod, Chris Lennard, Pierre Margot, Milutin Stoilovic	CRC Press
2	Forensic Science in Crime Investigation	B. S. Nabar	Asia Law House
3	Footwear Impression Evidence: Detection, Recovery and Examination	William J. Bodziak	CRC Press

CRIMINALISTICS-I Lab

Semester	II
Course Code	BFS172
Course Title	CRIMINALISTICS-I Lab
Type of course	Practical
L T P	0 0 2
Credits	1
Course prerequisite	10+2 or its equivalent in science
Course Objective	To give an exposure to the students about the basics of Forensic Science investigations. To familiarize the students about the different types of evidences involved in forensic investigations. .
Course Outcomes (CO)	Student will able to understand To understand the importance in forensic investigation in criminal cases. To evaluate different types of different evidences present at crime scene. To understand the importance of documentation of crime scene To determine types of adulterants in various types of evidences To examine of paint, glass and other materials.

LIST OF EXPERIMENTS

1. Examination of a simulated crime scene and identification of physical evidence.
2. Preparation of rough and finished crime scene sketches using appropriate measurements and symbols.
3. Demonstration of crime scene protection and preservation techniques by first responding officers.
4. Collection, packaging, sealing, labeling, and transportation of physical evidence while maintaining the chain of custody.
5. Study and identification of different types of glass samples and their forensic significance.
6. Analysis and comparison of glass samples and examination of glass fracture patterns.
7. Study and comparison of paint samples using physical and microscopic characteristics.
8. Examination of paint flakes/chips for layer sequence analysis and source comparison.
9. Detection of adulterants in cement and examination of cement, mortar, concrete, stone, and bitumen samples.
10. Microscopic examination and comparison of miscellaneous clue materials such as fibers, threads, ropes, wires/cables, seals, and counterfeit coins.

Text and Reference Books:

S. No.	Title	Author(s)	Publisher
1	Integrative Criminology	Barak G. (1998)	Ashgate Pub Ltd.
2	Crime and Criminology,	Reid S.T. (12 th Edition) (2008),	Oxford University Press, USA.
3	Criminalistics,	Saferstein R. (1976),	Prentice Hall Inc. USA.