Karmaveer Bhaurao Patil University, Satara

Syllabus for
B. Sc. II Forensic Science

Under
Faculty of Science and Technology

(As per NEP 2020)

With effect from Academic Year 2025-2026

Syllabus for B. Sc. II Forensic Science

PREAMBLE

This updated syllabus is prepared for second year undergraduate students. At this level, to develop their interest towards Forensic Science as basic science and also to prepare them for the academic and industrial exposure simultaneously. Introduction of scientific techniques with the regular exercises will help to enhance rational thinking of the students towards Forensic Science. The interdisciplinary approach with vigor and depth is compatible to the syllabi of other universities, at the same time is not rigid for the students at second year of their graduation. The units in the syllabus are well defined with scope and the number of lectures. The references are mentioned with relevance.

GENERAL OBJECTIVES OF THE COURSE

1. To develop the content of the syllabus according to the UGC norms
2. To inculcate fundamental principles of forensic sciences in students.
3. To establish the link between theory and laboratory practice by conducting laboratory experiments which help students to improve the, understanding of the concepts.
4. To enhance student's sense of enthusiasm for Forensic Science and to involve them in an intellectually stimulating experience of learning in a supportive environment.

PROGRAMME OUTCOMES

After completing the B.Sc. II program, graduates will:

1. Possess a strong foundation of knowledge in their chosen field of study.
2. Develop a scientific mindset, becoming open-minded, critical, and curious, which will support their entry into research and innovation.
3. Be skilled in practical work, experiments, and the use of laboratory materials.
4. Be eligible to pursue higher studies in their field, both in India and abroad.
5. Qualify to appear for examinations for jobs in government organizations.
6. Meet the minimum eligibility requirements for various science-related job opportunities.
7. Be prepared to establish their own entrepreneurial ventures.
8. Enhance critical thinking, develop a scientific attitude, solve problems, improve practical skills, boost communication abilities, and strengthen social interactions

PROGRAMME SPECIFIC OUTCOMES

After completing the B.Sc. II (Forensic Science) program, students will:

1. Recall fundamental concepts, terminology, and principles of forensic science, including crime scene investigation, forensic biology, toxicology, and criminal law.
2. Explain the interdisciplinary nature of forensic science and describe how biological, chemical, and physical sciences are applied to legal investigations.
3. Demonstrate the ability to apply forensic techniques (e.g., fingerprinting, DNA analysis, ballistics) to simulated crime scenes and laboratory settings.
4. Analyze physical and biological evidence using scientific methods and identify patterns that aid in criminal investigations.
5. Critically evaluate forensic reports, lab results, and expert testimony, ensuring adherence to scientific and legal standards.
6. Design and execute independent forensic investigations, including report writing, interpretation of results, and presentation of evidence in a legal context.
7. Describe the ethical, legal, and professional responsibilities of forensic scientists, including the chain of custody and admissibility of evidence.
8. Assess the reliability and limitations of forensic evidence in real-life case studies, considering human error, contamination, and bias.

1. TITLE: Forensic Science

2. YEAR OF IMPLEMENTATION: 2025-2026

3. DURATION: 01 year

4. PATTERN: Semester examination

5. MEDIUM OF INSTRUCTION: English

6. ELIGIBILITY OF THE STUDENT: As per guidelines obtained from university by following rules and regarding reservations by Govt. of Maharashtra

7. ELIGIBILITY OF THE CORE FACULTY: As per the rules and regulations of the University Grants Commission (UGC) and the Government of Maharashtra

8. STRUCTURE OF COURSE: As per NEP- 2020 (2.0)

Level	Sem	Subject -1				Subject-2		Subject-3		VSEC		AEC, VEC, IKS			OE	Total
		DSC		DSE						VSC	SEC	AEC	VEC	IKS		
		T	P	T	P	T	P	T	P							
5.0	III	4	2	-	-	4	2	-	-	2	2	2	-	2	2	22
	IV	4	2	-	-	4	2	-	-	2	2	2	2	-	2	22

[OE- Open Elective, VSC- Vocational Skill Course, SEC- Skill Enhancement Course, AEC- Ability Enhancement course, VEC- Value Education Course, IKS- Indian Knowledge System]

9. COURSE TITLE:

B.Sc. II Semester III

Course	Course Code	Course Title
Major Paper I	BFST 231	Advanced Forensic Sciences I
Major Paper II	BFST 232	Advanced Computer and Digital Forensics I
Major Practical I	BFSP 233	Practical Course I based on BFST 231 & BFST 232
Minor Paper I	BFST 234	Advanced Forensic Chemistry I and Forensic Physics I
Minor Paper II	BFST 235	Advanced Forensic Biology I and Forensic Psychology I
Minor Practical I	BFSP 236	Practical Course II based on BFST 234 & BFST 235
OE III	BFSTOE- III	Data Science studies
VSC I	BFSPVSC-I	Essential components in cyber security
SEC I	BFSPSEC-I	Handwriting identification and recognition
IKS II	BFSTIKS II	History and Development of Forensic Science in India
AEC I	BFSTAEC-I	English for communication

B.Sc. II Semester IV

Course	Course Code	Course Title
Major Paper I	BFST 241	Advanced Forensic Sciences II
Major Paper II	BFST 242	Advanced Computer and Digital Forensics II
Major Practical I	BFSP 243	Practical Course I based on BFST 241 & BFST 242
Minor paper I	BFSP 244	Advanced Forensic Chemistry II and Forensic Physics II
Minor Paper II	BFST 245	Advanced Forensic Biology II and Forensic Psychology II
Minor Practical I	BFSP 246	Practical Course II based on BFST 244 & BFST 245
OE IV	BFSTOE- IV	Human Psychology
VSC II	BFSPVSC-II	Cyber security threat landscape
SEC II	BFSPSEC-II	Forensic Photography
VEC II	BFSPVEC- II	Environmental Studies
AEC II	BFSTAEC-II	English for communication

10.EVALUATION STRUCTURE: SEMESTER III

Course	Course Category	Course Code	Internal Evaluation			ESE	Total Marks	Credits
			CCE-I	CCE-II	CCE-III			
Major	T	BFST 231	10	10	10	30	50	02
	T	BFST 232	10	10	10	30	50	02
	P	BFSP 233	20			30	50	02
Minor	T	BFST 234	10	30	10	30	50	02
	T	BFST 235	10	10	10	30	50	02
	P	BFSP 236	20			30	50	02
OE	P	BFSTOE III (For IDS Courses)	20			30	50	02
OE	P	BFSTOE III (For Humanities)	20			30	50	02
VSC	P	BFSPVSC I	20			30	50	02
SEC	P	BFSPSEC I	20			30	50	02
AEC I	T	BFSTAEC I	10	10	10	30	50	02
IKS II	T	BFSTIKS II	10	10	10	30	50	02
Total							**550**	**22**

SEMESTER IV

Course	Course Category	Course Code	Internal Evaluation			ESE	Total Marks	Credits
			CCE-I	CCE-II	CCE-III			
Major	T	BFST 241	10	10	10	30	50	02
	T	BFST 242	10	10	10	30	50	02
	P	BFSP 243	20			30	50	02
Minor	T	BFST 244	10	30	10	30	50	02
	T	BFST 245	10	10	10	30	50	02
	P	BFSP 246	20			30	50	02
OE	P	BFSTOE IV (For IDS Courses)	20			30	50	02
OE	P	BFSTOE IV (For Humanities)	20			30	50	02
VSC	P	BFSPVSC II	20			30	50	02
SEC	P	BFSPSEC II	20			30	50	02
AEC I	T	BFSTAEC II	10	10	10	30	50	02
IKS II	T	BFSTVEC II	10	10	10	30	50	02
Total							**550**	**22**

*Note: - Best two scores of CCE will be considered out of three.

SEMESTER III

Karmaveer Bhaurao Patil University, Satara
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Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Biotechnology

Programme: B.Sc. II	**Semester**- III
Type: Major I	**Marks:**50
Credits: 2	**From:** A.Y.2025-26
Name of the Course: Advanced Forensic Sciences I **(BFST-231)**	

Course Objectives: Students should be able to…

1) explain the aims, principles, and structure of the criminal justice system in India.
2) apply crime scene protocols and evidence handling techniques in simulated crime scenarios.
3) differentiate between various types of crimes including violent, property, white-collar, and cybercrimes.
4) construct detailed crime scene documentation including notes, sketches, photographs, and reports.

Course Outcomes: The students will be able to...

1) understand and explain the structure and functioning of the criminal justice system in India.
2) apply standard procedures for managing a crime scene, including evidence handling and documentation.
3) analyze different crime typologies and juvenile delinquency through established criminological theories.
4) create comprehensive crime scene documentation including sketches, photographs, and structured reports for legal presentation.

Module	Course I: Advanced Forensic Science I	Hrs
Module-1:	**Basics of Criminology** 1.1 Definition of Criminology 1.2 Aim and Scope of Criminology 1.3 Theories of Criminal Behavior – Classical School 1.4 Theories of Criminal Behavior – Positivist School 1.5 Theories of Criminal Behavior – Italian School 1.6 Theories of Criminal Behavior – Chicago School 1.7 Definition of Criminal Justice System 1.8 Objectives and Goals of Criminal Justice System 1.9 Principles of Criminal Justice 1.10 Criminal Justice System in India – Major Components and Steps 1.11 Juvenile Delinquency – Causes, Theories, Juvenile Justice System, Prevention and Intervention Strategies	7
Module-2:	**Crime Scene Management** 2.1 Definition of Crime Scene Management 2.2 Significance of Crime Scene Management 2.3 Roles and Responsibilities of First Responders 2.4 Establishing and Maintaining the Perimeter of a Crime Scene 2.5 Controlling Access and Managing Personnel at the Crime Scene 2.6 Crime Scene Protocols – Step-by-Step Procedures from Arrival to Release of the Scene 2.7 Documentation and Reporting – Importance, Procedures, and Record Maintenance	7

Module-3:	**Crime Scene Investigation** 3.1 Overview of Crime Scene Investigation Principles 3.2 Types of Crime Scenes – Indoor, Outdoor, Vehicle, etc. 3.3 Types of Evidence – Physical, Biological, Digital, etc. 3.4 Initial Walkthrough and Scene Survey 3.5 Search Patterns and Methods – Grid, Spiral, Strip/Line, Quadrant/Zone 3.6 Prioritization of Evidence Collection 3.7 Techniques for Collecting and Preserving Different Types of Evidence 3.8 Crime Scene Reconstruction and Role of Forensic Science	8
Module-4:	**Crime Scene Documentation** 4.1 Importance and Purpose of Crime Scene Documentation 4.2 Types of Documentation – Written Notes, Sketches, Photographs, Videography 4.3 Writing Detailed and Accurate Crime Scene Notes – Observations, Actions, and Evidence 4.4 Principles and Techniques of Crime Scene Photography – Overviews, Close-ups, Scales, Markers, Lighting 4.5 Crime Scene Sketching and Mapping – Rough and Final Sketches, Measuring and Mapping 4.6 Structuring a Comprehensive Crime Scene Report – Legal Requirements and Considerations 4.7 Courtroom Presentation – Presenting Documentation, Expert Testimony, and Handling 4.8 Cross-Examination.	8

Reference Books: -

1. James, Stuart H., and Jon J. Nordby. *Forensic Science: An Introduction to Scientific and Investigative Techniques*. Boca Raton, FL: CRC Press, 2003.
2. Saferstein, Richard. *Criminalistics: An Introduction to Forensic Science*. Upper Saddle River, NJ: Prentice Hall, 1995.
3. Nanda, B. B., and R. K. Tiwari. *Forensic Science in India: A Vision for the Twenty First Century*. New Delhi: Select Publisher, 2001.
4. Fisher, Barry A. J. *Techniques of Crime Scene Investigation*. 7th ed. Boca Raton, FL: CRC Press, 2003.
5. Sharma, B. R. *Forensic Science in Criminal Investigation and Trials*. New Delhi: Universal Law Publishing, 2003.
6. Maguire, Mike, Rod Morgan, and Robert Reiner, eds. *The Oxford Handbook of Criminology*. 2nd ed. New York: Oxford University Press, 2002.

Evaluation Pattern: 60: 40

Total Marks:50

Continuous Comprehensive Evaluation (20 Marks):	**End Semester Examination:**
• CCE-I: Compulsory home assignment (10 Marks) • CCE-II: Short & long answer question Test/seminar/open book test/ quiz/case study/book review/field work/industrial visit (10 Marks each) • CCE-III: Compulsory MCQ test (Each question for 1Mark) 10 Marks Note: -Best two scores of CCE will be considered out of three.	• Question-1: Solve the following questions (five questions of 2 marks) 10M • Question-2: Attempt any two questions (three questions of 10 marks) 20 M • Question-3: Attempt any four questions (six questions of 5 marks) 20 M Note: Conversion of 50 marks of ESE to 30 marks

	Karmaveer Bhaurao Patil University, Satara (A State Public University Est. u/s3(6) of MPUA 2016) **Faculty of Science and Technology**
	Yashavantrao Chavan Institute of Science, Satara
	Board of Studies in Biotechnology
Programme: B.Sc. II	**Semester**- III
Type: Major II	**Marks:**50
Credits: 2	**From:** A.Y.2025-26
Name of the Course: -Advanced Computer and Digital Forensics I **(BFST232)**	

Course Objectives: Students should be able to…

1) understand the steps and processes involved in cyber forensic investigations, including identification, acquisition, authentication, and presentation of digital evidence.
2) apply appropriate network and cyber security measures to identify and prevent threats such as dos attacks, phishing, malware, and data breaches.
3) analyze mobile phone crimes and digital evidence by evaluating SMS tampering, handset theft, and mobile application vulnerabilities.
4) design secure systems using cryptographic techniques, encryption methods, and secure coding practices to enhance application and wireless security.

Course Outcomes: The students will be able to...

1) understand and explain key concepts in cyber and network forensics.
2) apply cyber forensic and network security tools and techniques to investigate incidents.
3) analyze real-world scenarios of cyber incidents and mobile phone investigations.
4) evaluate the Effectiveness of Security Measures and Forensic Processes in Cyber Crime Investigations

Module	**Course I: Advanced Computer I and Digital Forensics I**	**Hrs.**
Module-1:	**Introduction to Cyber Forensic** 1.1 Introduction to Cyber Forensic 1.2 Cyber Forensic Steps – Identification, Seizure, Acquisition, Authentication, Presentation, Preservation 1.3 Role of Computer Forensic Expert 1.4 Cyber Forensic Investigation Process 1.5 Goals of Forensic Investigation 1.6 Justification to Investigate – Internet Misuse, Email Misuse, Information Theft, Security Violations, Intellectual Property Infractions, Electronic Tampering 1.7 Auditing vs. Cyber Forensic Investigation – Impact and Differences	7
Module-2:	**Fundamentals of Network Security** 2.1 Definition and Objectives of Network Security 2.2 Network Threats – DoS, DDoS, Phishing, Malware 2.3 Network Security Vulnerabilities 2.4 CIA Triad – Confidentiality, Integrity, Availability 2.5 Network Security Models 2.6 Network Security Controls – Firewalls, IDS/IPS, ACLs 2.7 Network Security Concepts and Threat Response	7

Module-3:	**Basics of Mobile Phone Investigation** 3.1 Introduction to Mobile Crime Investigation 3.2 Role of Agencies in Crime Scene Management – Police, FSL, Medico-Legal Experts, Judicial Officers 3.3 Duties of First Responders at Mobile Crime Scenes 3.4 Technology Management in Crime Scene 3.5 Logistic and Manpower Management 3.6 Golden Rules for Ideal Crime Scene Management 3.7 Investigating Mobile Handset Theft, SMS and MMS Related Crimes 3.8 Case Studies on Flash SMS, SMS Tampering, Spoofing, and Postdated SMS	8
Module-4:	**Basics Of Cyber Security** 4.1 Introduction to Cryptography 4.2 Types of Cryptography and Cryptographic Algorithms 4.3 Applications of Cryptography 4.4 Encryption – Definition and Types 4.5 Applications of Encryption 4.6 Wireless Security – Threats, Standards (WPA/WPA2), Wireless Intrusion Detection Systems (WIDS) 4.7 Application Security – Web and Mobile Security, Secure Coding Practices	8

Reference Books: -

1. Daniel, Larry. *Digital Forensics for Legal Professionals*. 2nd ed. Boca Raton, FL: CRC Press, 2009.
2. Stephenson, Peter. *Investigating Computer-Related Crime*. 2nd ed. Boca Raton, FL: CRC Press, 2007.
3. Mandia, Kevin, Chris Prosise, and Matt Pepe. *Incident Response and Computer Forensics*. 2nd ed. New York: McGraw-Hill, 2003.
4. Casey, Eoghan. *Mobile Forensic Investigations: A Guide to Evidence Collection and Presentation*. Burlington, MA: Academic Press, 2011.
5. Nelson, Bill, Amelia Phillips, Christopher Steuart, and Frank Enfinger. *Guide to Computer Forensics and Investigations*. 6th ed. Boston, MA: Cengage Learning, 2019.
6. EC-Council. *Computer Forensics: Investigating Network Intrusions and Cyber Crime*. Boston, MA: Cengage Learning, 2010.
7. Carrier, Brian. *File System Forensic Analysis*. Boston, MA: Addison-Wesley Professional, 2005.

Evaluation Pattern: 60: 40

Total Marks: 50

Continuous Comprehensive Evaluation (20 Marks):	**End Semester Examination:**
• CCE-I: Compulsory home assignment (10 Marks) • CCE-II: Short & long answer question Test/seminar/open book test/ quiz/case study/book review/field work/industrial visit (10 Marks each) • CCE-III: Compulsory MCQ test (Each question for 1Mark) 10 Marks Note: -Best two scores of CCE will be considered out	• Question-1: Solve the following questions (five questions of 2 marks) 10M • Question-2: Attempt any two questions (three questions of 10 marks) 20 M • Question-3: Attempt any four questions (six questions of 5 marks) 20 M Note: Conversion of 50 marks of ESE to 30 • marks

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Board of Studies in Biotechnology

Programme: B.Sc. II	**Semester**- III
Type: Major Practical I	**Marks:**50
Credits: 2	**From:** A.Y.2025-26

Name of the Course: Practical Course I based on BFST 231 & BFST 232 (**BFSP 233)**

Course Objectives: Students should be able to…

1) apply forensic investigation techniques to crime scene.
2) analyze and interpret forensic evidence and psychological aspects of criminal behavior.
3) evaluate digital evidence and its relevance in forensic investigations.
4) synthesize Forensic Findings and Develop Security Solutions.

Course Outcomes: The students will be able to...

1) demonstrate proficiency in crime scene investigation techniques.
2) analyze and interpret forensic evidence in the context of criminal behavior.
3) evaluate the security implications of digital data and forensic tools.
4) synthesize and Present Forensic Findings in a Legal and Investigative Context.

Practical No.	Lists of Practical's (Conduct any 15 practicals)	Hrs
1)	To perform Note taking, photography and videography of crime scene	4
2)	To prepare a crime scene sketch by using various methods	4
3)	Searching evidence on crime scene using different methods	4
4)	Collection, packaging and forwarding of different types of evidences.	4
5)	To prepare report on crime scene investigation.	4
6)	To investigate the indoor crime scene.	4
7)	To investigate the outdoor crime scene.	4
8)	Understand the principles behind blood spatter patterns on the crime scene and the interpretations.	4
9)	To study basic commands of LINUX	4
10)	To Study Tools in LINUX	4
11)	Recent accessed file analysis (Recent files view)	4
12)	Network History (Wi-Fi history view)	4
13)	Disk imaging and analysis (FTK imager)	4
14)	Reviewing windows software uninstall history (Uninstall viewer)	4
15)	Extracting SMS messages (ADB) analysis of files with SQLite viewer	4
16)	Extracting contacts (ADB) analysis of files with SQLite viewer	4

Reference Books: -

1. Siegel, Larry J., and John L. Worrall. *Essentials of Criminal Justice*. 10th ed. Boston, MA: Cengage Learning, 2019.
2. O'Hara, Charles E., and Gregory L. O'Hara. *Fundamentals of Criminal Investigation*. 7th ed. Springfield, IL: Charles C Thomas Publisher, Ltd., 2013.
3. Gardner, Ross M., and Donna Krouskup. *Practical Crime Scene Processing and Investigation*. 2nd ed. Boca Raton, FL: CRC Press, 2018.
4. Reiber, Lee. *Mobile Forensic Investigations: A Guide to Evidence Collection, Analysis, and Presentation*. 2nd ed. Hoboken, NJ: Wiley, 2019.
5. Tamma, Rohi, Oleg Skulkin, Heather Mahalik, and Satish Bommisetty. *Practical Mobile Forensics: Forensically Investigate and Analyze iOS, Android, and Windows 10 Devices*. 4th ed. Birmingham, UK: Packt Publishing, 2020.
6. Casey, Eoghan, ed. *Handbook of Digital Forensics and Investigation*. 1st ed. Amsterdam: Elsevier Academic Press, 2010.

Evaluation Pattern: 60: 40

TotalMarks:50

Continuous Comprehensive Evaluation (20 marks) • Journal:10Marks • Students Performance & attendance: 10 Marks	**End Semester Evaluation: (30 Marks)** • Question 1 • Question 2

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	Board of Studies in Biotechnology
Programme: B.Sc. II	**Semester**- III
Type: Minor I	**Marks:**50
Credits: 2	**From:** A.Y.2025-26
	Name of the Course: Advanced Forensic Chemistry I and Forensic Physics I **(BFST234)**

Course Objectives: Students should be able to…

1) understand the processes involved in the distillation and fractionation of petroleum, and the commercial applications various petroleum fractions.
2) apply forensic techniques to analyze traces of petroleum products (e.g., petrol, diesel, ATF, kerosene) in forensic exhibits, and compare their characteristics.
3) analyze the chemistry of fire and explosives, including conditions for fire, collection and preservation of arson evidence, and post-blast residue analysis.
4) evaluate the physical properties and forensic significance of trace materials such as glass and paint, and examine tool marks for investigative purposes.

Course Outcomes: The students will be able to...

1) explain the methods of petroleum distillation and fractionation, and identify the commercial uses of different petroleum fractions.
2) demonstrate proficiency in analyzing forensic exhibits for traces of petroleum products, and compare the properties of petrol, diesel, ATF, and kerosene.
3) assess arson and explosive scenes by understanding fire chemistry, collecting and preserving relevant evidence and analyzing post-blast residues.
4) interpret the physical properties of materials (e.g., density, refractive index), and examine tool marks to aid in forensic investigations.

Module	**Course II: Basics of Forensic Chemistry I and Forensic Physics I**	**Hrs.**
Module-1:	**Petroleum Products** 1.1 Distillation and Fractionation of Petroleum 1.2 Commercial Uses of Different Petroleum Fractions 1.3 Forensic Analysis of Petroleum Products – Traces of Petrol, Diesel, ATF, and Kerosene; Comparison and Case Study	7
Module-2:	**Cases Involving Arson and Explosive** 2.1 Chemistry and Conditions of Fire 2.2 Collection and Preservation of Arson Evidence; Analysis of Fire Debris and Ignitable Liquid Residue 2.3 Scientific Investigation and Evaluation of Clue Materials; Information from Smoke Staining 2.4 Classification of Explosives and Blasting Agents 2.5 Bomb Scene Management and Explosion Process 2.6 Synthesis and Characteristics of TNT, PETN, RDX; Post-Blast Residue Collection and Analysis.	7

Module-3:	**Forensic Trace Analysis** 3.1 Physical Properties of Materials – Temperature, Weight, Mass, Density, Refractive Index and Their Forensic Importance 3.2 Forensic Analysis of Glass – Composition, Classification, Fractures, Density and Refractive Index Comparison, Collection and Preservation of Glass Evidence 3.3 Forensic Analysis of Paint – Composition, Classification, Pigment Volume Concentration, Microscopic Examination, Analytical Tools for Comparison, Significance of Paint Evidence 3.4 Collection, Preservation, and Forensic Examination of Paint	9
Module-4:	**Tools and Tool Marks** 4.1 Common Hand Tools – Levers (Screwdrivers, Crowbars, Pry Bars, Nail Pullers, Pinch Bars, Moulding Bar, Wrecking Bar) 4.2 Hand Saws – Rip Saw, Cross Cutting Saw, Bow Saw, Teeth Saw, Compass Saw, Dip Cut, Coping Saw, Wallboard Saw, Hacksaw, Chisel Teeth Saw 4.3 Striking Tools – Hammers, Hatchets, Axes 4.4 Grasping and Cutting Tools – Wrenches, Vise Grips, Pliers, Metal Snips, Wire Cutters, Bolt and Cable Cutters 4.5 Crimping Tools, Knives, Scissors and Shears, Chisels and Punches, Drill Bits 4.6 Tool Marks – Types (Impression/Compression Marks, Dent Marks, Saw Marks, Drill 4.7 Marks and Holes, Punctures, Blade Cut Marks, Scratch and Scour Marks); Collection and Documentation of Tool Marks.	7

Reference Books: -

1. DeHaan, John D. *Kirk's Fire Investigation*. 3rd ed. Upper Saddle River, NJ: Prentice Hall, 1991.
2. Moenssens, Andre A., James E. Starrs, Carol E. Henderson, and Fred E. Inbau. *Scientific Evidence in Civil and Criminal Cases*. 4th ed. New York: Foundation Press, 1995.
3. Saferstein, Richard. *Criminalistics: An Introduction to Forensic Science*. 8th ed. Upper Saddle River, NJ: Prentice Hall, 2004.
4. Ballou, Sue, Max M. Houck, Jay A. Siegel, Catherine A. Crouse, John J. Lentini, and Skip Palenik. "Criminalistics: The Bedrock of Forensic Science." In *Forensic Science: Current Issues, Future Directions*, edited by Douglas H. Ubelaker, 29–101. Chichester, UK: Wiley-Blackwell, 2013.
5. Ubelaker, Douglas H., ed. *Forensic Science: Current Issues, Future Directions*. Chichester, UK: Wiley-Blackwell, 2013.
6. Chatwal, G. R., and Sham K. Anand. *Instrumental Methods of Chemical Analysis*. 5th ed. Mumbai: Himalaya Publishing House, 2011.

Evaluation Pattern: 60: 40

Total Marks:50

Continuous Comprehensive Evaluation (20Marks):	**End Semester Examination (30Marks):**
CCE-I: Compulsory home assignment (10 Marks) CCE-II: Short & long answer question Test/seminar/open book test/ quiz/case study/book review/field work/industrial visit (10 Marks each) CCE-III: Compulsory MCQ test (Each question for 1Mark) 10 Marks Note:-Best two scores of CCE will be considered out of three.	Question-1: Solve the following questions (five questions of 2 marks) 10 M Question-2: Attempt any two questions (three questions of 10marks) 20 M Question-3: Attempt any four questions (six questions of 5 marks) 20 M Note: Conversion of 50 marks of ESE to 30 Marks

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	Yashavantrao Chavan Institute of Science, Satara	
	Board of Studies in Biotechnology	
	Programme: B.Sc. II	**Semester**- III
	Type: Minor II	**Marks:**50
	Credits: 2	**From:** A.Y.2025-26
	Name of the Course: Advanced Forensic Biology I and Forensic Psychology I **(BFST 235)**	

Course Objectives: Students should be able to…

1) define key concepts related to cell division and chromosome structure.
2) explain biochemical techniques and their forensic applications.
3) apply psychological theories to assess criminal behaviour in legal contexts.
4) critique ethical standards and assess psychological assessment tools in forensic psychology.

Course Outcomes: The students will be able to...

1) remember and describe key genetic concepts, including the cell cycle, chromatin modifications, and DNA polymorphisms relevant to forensic biology.
2) demonstrate proficiency in executing DNA extraction techniques and interpret the outcomes for forensic evidence analysis.
3) critically assess the role of forensic psychology in legal settings, including the application of intelligence, achievement, and personality tests for assessments.
4) differentiate between various types of aggression and violence, and formulate strategies for the assessment and management within forensic casework.

Module	**Course II: Advanced Forensic Biology I and Forensic Psychology I**	**Hrs**
Module-1:	**Advanced Genetics and Methods of DNA extraction** 1.1 Cell Division – Cell Cycle, Mitosis and Meiosis 1.2 Chromosomes – Structural and Definitive Properties, Nomenclature and Types 1.3 Packaging of Hereditary Material – Concept of Euchromatin and Heterochromatin, Chromatin Modification 1.4 Human Genome – Genes and Related Sequences, Non-Coding Sequences (Interspersed and Tandem Repeats), Human DNA Polymorphism 1.5 Enzymatic DNA Extraction – Phenol-Chloroform Method, Cell Lysis 1.6 Silica-Column Based Method – Cell Lysis, Protein Digestion, DNA Adsorption onto Silica, Washing, Elution of DNA 1.7 Magnetic Bead-Based DNA Extraction Method 1.8 Differential DNA Extraction Method	7

Module-2:	**Metabolism and Bioinstrumentation and Biochemical techniques** 2.1 Tricarboxylic Acid (TCA) Cycle – Introduction, Pathway, Function 2.2 Electron Transport Chain – Introduction, Pathway, Function 2.3 Glycolysis / EMP Pathway – Introduction, Pathway, Function 2.4 Electrophoresis – Basic Principle and Types (Moving Boundary, Zonal, Paper, Gel) 2.5 Gel Electrophoresis – Agarose Gel, PAGE, SDS-PAGE, Pulse Field Gel Electrophoresis 2.6 Centrifugation – Principle, Types and Applications 2.7 Ultra-Centrifuge – Differential and Density Gradient Centrifugation 2.8 Care and Maintenance of Centrifuge	8
Module-3:	**The Content of Forensic Psychology, Aggression and Violence** 3.1 History and Definition of Forensic Psychology 3.2 Importance and Ethical Standards in Forensic Psychology 3.3 Services Provided by Forensic Psychologists 3.4 Psychological Tests Used in Forensic Assessment – Intelligence Tests, Achievement Tests, Personality Tests 3.5 Aggression – Definition, Nature, and Types (Instrumental vs. Hostile, Proactive vs. Reactive, Spontaneous vs. Competitive, Positive vs. Negative, Thoughtful vs. Thoughtless, Childhood vs. Adolescent Onset) 3.6 Violence – Definition and Nature (Self-directed, Interpersonal, Family and Community Interpersonal, Collective) 3.7 Types of Violence – Physical, Sexual, Emotional, Psychological, Spiritual, and Cultural	8
Module-4:	**Perspective of Criminal Behaviour and Legal Proceedings, Application of Forensic Psychology in Civil and Criminal Legal Proceedings-** 4.1 Psychobiological Approaches to Criminal Behavior 4.2 Psychological Approaches – Emotional Deprivation, Psychological Motives of Crime, Frustration, Attitudes, Peer Influence 4.3 Psychological Disorders – Psychosis and Neurosis 4.4 Social Perspectives – Differential Association Theory, Labelling Theory, Critical Theory, Control Theory 4.5 Civil Proceedings – Domestic Law and Rights of Adults 4.6 Domestic Issues in Childhood and Adolescence 4.7 Assessment of Childhood and Adolescent Behavior 4.8 Assessment of Civil Competency 4.9 Personal Injury Evaluation 4.10 Evaluation of Trauma Caused by Sexual Harassment or Rape	7

Reference Books: -

1. Butler, John M. *Advanced Topics in Forensic DNA Typing: Methodology*. San Diego, CA: Academic Press, 2011.
2. Bartol, Curt R., and Anne M. Bartol. *Introduction to Forensic Psychology: Research and Application*. 6th ed. Thousand Oaks, CA: SAGE Publications, 2021.
3. Li, Richard. *Forensic Biology*. 2nd ed. Boca Raton, FL: CRC Press, 2015.
4. Brown, Jennifer M., and Miranda A. H. Horvath, eds. *The Cambridge Handbook of Forensic Psychology*. 2nd ed. Cambridge: Cambridge University Press, 2021.
5. American Psychological Association. *APA Handbook of Forensic Psychology*. Washington, DC: American Psychological Association, 2015.

Evaluation Pattern: 60 : 40

Total Marks:50

Continuous Comprehensive Evaluation (20Marks):

- CCE-I : Compulsory home assignment (10 Marks)
- CCE-II : Short & long answer question (Test/seminar/open book test/ quiz/case study/book review/field work/industrial visit (10 Marks each)
- CCE-III : Compulsory MCQ test (Each question for 1Mark) 10 Marks

Note:-Best two scores of CCE will be considered out of three.

End Semester Examination (30Marks):

- Question-1: Solve the following questions (five questions of 2 marks) 10 M
- Question-2: Attempt any two questions (three questions of 10marks) 20 M
- Question-3: Attempt any four questions (six questions of 5 marks) 20 M

Note: Conversion of 50 marks of ESE to 30 marks

Karmaveer Bhaurao Patil University, Satara
(A State Public University Est. u/s3(6) of MPUA 2016)
Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Biotechnology

Programme: B.Sc. II	**Semester**- III
Type: Minor Practical I	**Marks:**50
Credits: 2	**From:** A.Y.2025-26

Name of the Course: Practical Course II based on BFST 234 & BFST 235 **(BFSP 236)**

Course Objectives: Students should be able to…

1) apply analytical techniques to examine petroleum products, arson accelerants, explosives, and trace evidence such as glass and paint.
2) demonstrate proficiency in molecular biology techniques, including DNA extraction, electrophoresis, and chromatography, for forensic analysis.
3) analyze psychological assessment tools and interpret their relevance in forensic contexts.
4) evaluate forensic evidence to construct comprehensive case reports pertaining to arson, explosives, and psychological assessments.

Course Outcomes: The students will be able to...

1) perform qualitative and quantitative analyses of petroleum products and explosive substances using techniques like thin-layer chromatography (TLC) and gas chromatography (GC).
2) isolate and quantify DNA from biological samples utilizing methods such as phenol-chloroform extraction and gel electrophoresis.
3) administer and interpret psychological assessments, including Raven's Progressive Matrices and Bell's Adjustment Inventory, within forensic case studies.
4) compile detailed forensic reports that integrate chemical, biological, and psychological evidence to support investigative conclusions.

Practical No.	Lists of Practical's (Conduct any 15 practicals)	Hrs
1.	To carry out analysis of gasoline, diesel, kerosene oil	4
2.	To analyze arson accelerators. (no.2)	4
3.	To prepare a case report on a case involving arson.	4
4.	To carry out analysis of explosive substances. (no.2)	4
5.	Comparison and physical matching of glass fragments.	4
6.	Study of glass fractures due to impacts / heat.	4
7.	Study the refractive index of glass samples and to find out the density of a given sample.	4
8.	Microscopic examination of paint sample.	4
9.	To study the centrifugation of milk. 2.. 3. 4.. 5.. 6.. 7. 8. 9. 10.	4
10.	To demonstrate the gel electrophoresis models.	4
11.	To Study the Isolation of chromosomal DNA.	4
12.	Study of DNA Extraction and Quantification.	4
13.	Locus of Control.	4
14.	Social Adjustment Inventory- R. C. Deva.	4
15.	Life satisfaction scale- Q.G. Alam, Ramji Shrivastava.	4

16.	Koh's block design test.	4

Reference Books: -

1. Bell, Suzanne. *Forensic Chemistry*. 3rd ed. Boca Raton, FL: CRC Press, 2019.
2. Bell, Suzanne, ed. *Forensic Chemistry Handbook*. Hoboken, NJ: Wiley, 2012.
3. Jenkins, Amanda L. *Basic Principles of Forensic Chemistry*. Totowa, NJ: Humana Press, 2008.
4. Li, Richard. *Forensic Biology*. 2nd ed. Boca Raton, FL: CRC Press, 2015.
5. Puri, Avinash Chand, and Tanya Chauhan, eds. *Fundamentals of Forensic Biology*. Singapore: Springer, 2024.
6. Kebbell, Mark R., and Graham M. Davies. *Practical Psychology for Forensic Investigations and Prosecutions*. Chichester, UK: Wiley, 2006.

Evaluation Pattern: 60: 40

Total Marks:50

Continuous Comprehensive Evaluation (20 marks)	**End Semester Evaluation: (30 Marks)**
• Journal:10Marks • Students Performance & attendance: 10 Marks	• Question 1 • Question 2

Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Interdisciplinary Studies

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Interdisciplinary Studies

Programme: B.Sc. II	**Semester:** III
Type: OE	**Marks:** 50
Credits: 2	**From:** A. Y. 2025-26

Name of the Course: BxPOE: Data Science Studies

Course Objectives: Students Should be able to:

1. understand the Fundamental concepts of Data Science including data collection, pre-processing, exploration, and visualization.
2. develop basic Python Programming Skills.
3. develop an understanding of statistical, computational techniques used for data analysis.
4. learn the data analysis life cycle, identify sources of data, and apply appropriate data collection methods for decision-making.

Course Outcomes: Student will be able to:

1. perform Data Analysis and understanding of data science concepts, tools and workflows for data analysis.
2. perform data cleaning, transformation and exploratory data analysis using suitable programming tools
3. implement Data Visualization Using Python.
4. interpret and communicate analytical findings effectively through visualizations and reports for decision-making

Practical No.	Lists of Practical's (Conduct any 15 practicals)	Hrs.
1)	Data Collection using Google Form, Interview questionnaires survey and Online Website.	(60)
2)	Installation of Python Programming in Windows and Linux Operating System.	
3)	Implementation of basic operation in Python.	
4)	Importing CSV file Using Pandas Library in Python.	
5)	Implement Data Cleaning Operation in Python.	
6)	Implement the Descriptive Statistics Operations like Mean, Median and Mode on Dataset.	
7)	To find Variance, S.D., Range functions on data set.	
8)	To find the Quartiles, Skewness and kurtosis on data set.	
9)	Import Matplotlib Library for Data Visualization.	
10)	Implement the Bar chart and Pie chart on Dataset.	
11)	Implement the Line chart and Histogram on Dataset.	
12)	Performing case study on Sales dataset.	
13)	Performing case study on agriculture dataset.	
14)	Performing case study on medical/hospital dataset.	
15)	Performing case study on manufacturing dataset.	
16)	Performing case study on food industry dataset.	

17)	Performing case study on finance dataset.	
18)	Performing case study on fraud detection dataset	
19)	Performing case study on education dataset.	
20)	Performing case study on biological dataset.	

Reference Books:

1. Mittal Gautam, Data Science Simplified: A Hands-on Guide for Beginners, Notion Press, 2021
2. 2.Raghunathan, Foundations of Data Science, CRC Press,2020
3. Patil Prashant, Big Data Analytics: A Comprehensive Guide, McGraw-Hill Education, 2019
4. 4. Ian H. Witten, Frank, Eibe, Data Mining: Practical Machine Learning Tools and Techniques, Morgan Kaufmann,2016
5. Haider, Murtaza. Getting Started with Data Science: Making Sense of Data with Analytics. Upper Saddle River: IBM Press, 2015.
6. Maheshwari, Anil. Data Analytics Made Accessible. North Charleston: CreateSpace Independent Publishing Platform, 2014.
7. McKinney, Wes. Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython. Sebastopol: O'Reilly Media, 2017.

Evaluation Pattern: 60:40	
Total Marks: 50	
Journal, Students' Performance Viva, Project (20 Marks): • Journa1: 10 Marks • Students' Performance: 05 Marks • Viva: 05 Marks	**Practical Exam Paper (30 Marks):** • Section I: Attempt questions • (Two questions of 15 Marks each)

Karmaveer Bhaurao Patil University, Satara
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Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Biotechnology

Programme: B.Sc. II	**Semester**- III
Type: Vocational Skill Course (VSC)	**Marks:**50
Credits: 2	**From:** A.Y.2025-26

Name of the Course: Essential components in cyber security **(BFSPVSC1)**

Course Objectives: Students should be able to…

1) introduce students to various cybersecurity tools.
2) enable students to analyze and assess system security configurations.
3) provide knowledge and practical skills for implementing secure and effective authentication mechanisms.
4) equip students with the ability to design and formulate comprehensive cybersecurity policies for organizational security.

Course Outcomes: The students will be able to...

1) apply Cyber security Tools and Techniques.
2) analyze and Evaluate Security Configurations.
3) implement Secure Authentication Methods.
4) create Comprehensive Cybersecurity Policies.

Practical No.	Lists of Practical's (Conduct any 15 practicals)	Hrs
1	Setting privacy settings on social media platforms.	4
2	Dos and Don'ts for posting content on social media platforms.	4
3	Prepare password policy for computer and mobile devices.	4
4	List out security controls for computers and implement technical security controls in the personal computer	4
5	To prepare a case report on a case involving arson.	4
6	List out security controls for mobile phones and implement technical security controls in the personal mobile phone.	4
7	Log into computer system as an administrator and check the security policies in the system.	4
8	To Platforms for reporting cyber-crimes	4
9	Checklist for reporting cyber-crimes online	4
10	Wi-Fi security management in computer and mobile.	4
11	Setting, configuring and managing three password policy in the computer (BIOS, Administrator and Standard User).	4
12	Setting and configuring two factor authentication in the Mobile phone.	4
13	Security patch management and updates in Computer and Mobiles.	4
14	Managing Application permissions in Mobile phones.	4

15	Installation and configuration of computer Anti-virus.	4
16	Installation and configuration of Computer Host Firewall.	4

Reference Books: -

1. "Privacy Risks and Social Media." *IEEE Digital Privacy*. Accessed May 7, 2025.
2. "On Privacy and Security in Social Media: A Comprehensive Study." *ScienceDirect*. Accessed May 7, 2025.
3. "Cybersecurity Practices for Social Media Users." *International Journal of Research and Development*. Accessed May 7, 2025.
4. "The Complete Guide to Social Media Privacy: Protecting Your Digital Life in 2025." *My Privacy Blog*. Last modified February 8, 2025.
5. Nissenbaum, Helen. *Privacy in Context: Technology, Policy, and the Integrity of Social Life*. Stanford, CA: Stanford University Press, 2010.
6. Solove, Daniel J. *Understanding Privacy*. Cambridge, MA: Harvard University Press, 2008.
7. Solove, Daniel J. *Nothing to Hide: The False Trade-off between Privacy and Security*. New Haven, CT: Yale University Press, 2011.

Evaluation Pattern: 60: 40

Total Marks:50

Continuous Comprehensive Evaluation (20 marks)	**End Semester Evaluation: (30 Marks)**
• Journal:10Marks • Students Performance & attendance: 10 Marks	• Question 1 • Question 2

	Karmaveer Bhaurao Patil University, Satara (A State Public University Est. u/s3(6) of MPUA 2016) **Faculty of Science and Technology**
	Yashavantrao Chavan Institute of Science, Satara
	Board of Studies in Chemistry
	Programme: B.Sc. II — **Semester**- III
	Type: Skill Enhancement Course (SEC) — **Marks:**50
	Credits: 2 — **From:** A.Y.2025-26
	Name of the Course: Handwriting Identification and Recognition **(BFSPSEC I)**

Course Objectives: Students should be able to…

1) help students understand and analyze different handwriting features.
2) teach students how to identify forged and changed documents.
3) train students in using forensic methods for handwriting examination.
4) guide students in writing clear and detailed forensic reports.

Course Outcomes: The students will be able to...

1) analyze handwriting characteristics.
2) evaluate forged and altered documents.
3) apply forensic techniques to handwriting analysis.
4) create Detailed Forensic Reports.

Practical No.	Lists of Practical's (Conduct any 15 practicals)	Hrs
1	To perform examination of handwriting with the given samples	4
2	To perform examination of handwriting on various surfaces.	4
3	To examine handwriting influenced by age.	4
4	To examine handwriting samples of a twin.	4
5	To examine forged signatures.	4
6	To examine simulated handwriting.	4
7	To examine the handwriting numerals.	4
8	To perform analysis of handwriting strokes documents	4
9	To examine disguise in handwriting.	4
10	To perform analysis of currency and other security documents.	4
11	Identification of General Characteristics of Handwriting	4
12	Study of Natural variations in Handwriting	4
13	Examination of forged documents.	4
14	Examination of alteration, erasures, overwriting, additions and obliteration.	4
15	Decipherment of secret writings using VSC.	4

Reference Books: -

1. Directorate of Forensic Science Services. *DFSS Manual*. New Delhi: Ministry of Home Affairs, Government of India. Accessed May 7, 2025.
2. Evans, E. Hywel. *Forensic Analysis: Pre-Laboratory Exercises and Laboratory Student Manual*. Cambridge: Royal Society of Chemistry, 2001.
3. James, Stuart H., and Jon J. Nordby. *Forensic Science: An Introduction to Scientific and Investigative Techniques*. 4th ed. Boca Raton, FL: CRC Press, 2014.
4. Saferstein, Richard. *Criminalistics: An Introduction to Forensic Science*. 11th ed. Upper Saddle River, NJ: Pearson Education, 2014.
5. Nanda, B. B., and R. K. Tiwari. *Forensic Science in India: A Vision for the Twenty-First Century*. New Delhi: Select Publishers, 2001.
6. Fisher, Barry A. J. *Techniques of Crime Scene Investigation*. 7th ed. Boca Raton, FL: CRC Press, 2003.

Evaluation Pattern: 60: 40	
Total Marks:50	
Continuous Comprehensive Evaluation (20 marks) • Journal:10Marks • Students Performance & attendance: 10 Marks	**End Semester Evaluation: (30 Marks)** • Question 1 • Question 2

	Karmaveer Bhaurao Patil University, Satara (A State Public University Est. u/s3(6) of MPUA 2016) **Faculty of Science and Technology**
	Yashavantrao Chavan Institute of Science, Satara
	Board of Studies in Biotechnology
Programme: B.Sc. II	**Semester-** III
Type: Indian Knowledge System Knowledge **(IKS)**	**Marks:**50
Credits: 2	**From:** A.Y.2025-26
Name of the Course: History and Development of Forensic Science in India **(BFSTIKS II)**	

Course Objectives: Students should be able to…

1) To understand the historical roots of forensic practices in India from ancient to modern times.
2) To explore traditional Indian systems of crime detection, evidence handling, and justice delivery.
3) To examine the evolution of modern forensic science institutions in India.
4) To analyse the integration of Indian Knowledge Systems with contemporary forensic methods.

Course Outcomes: The students will be able to...

1) explain the concepts of ecology, ecosystems, biodiversity, and natural resources.
2) assess different forms of environmental pollution and evaluate their impact using forensic principles.
3) apply environmental forensic techniques for investigation of contamination, wildlife crimes, and environmental offences.
4) interpret environmental laws, policies, and ethical practices relevant to forensic science.
5) conduct basic environmental sampling, documentation, and report writing for environmental forensic investigations.

Module	Title and Content	Hrs.
Module:1	**Module:1 Ancient Indian Crime Investigation and Forensic Practices** 1.1 Concept of crime and criminal investigation in ancient India 1.2 Identification and interrogation of suspects 1.3 Detection of deception and suspicious behaviour 1.4 Ancient concepts related to physical evidence 1.5 Evidence preservation and presentation in ancient legal systems 1.6 Concept of crime scene investigation: historical perspective 1.7 Ancient methods of identifying: • Theft • Murder • Poisoning • Arson • Forgery and fraud 1.8 Comparison between ancient investigative methods and modern forensic investigation	08
Module:2	**Module:2 Forensic Science in the British Era: A Historical Journey of Crime Detection in India** 2.1 The Dawn of Scientific Policing Introduction: The for Change 2.2 The Pioneers of Indian Forensic Science • Development of fingerprint classification: Sir William Herschel, Edward Henry System. • Fingerprint Identification • Handwriting and Document Analysis • The Rise of Forensic Photography 2.3 Early Ballistics and Handwriting Analysis 2.4 Medical Jurisprudence: The Postmortem and Toxicology 2.5 Crime Scene Recognition in the Colonial Era	07

	• Evidence Collection • Evidence Packaging • Evidence Preservation • Evidence Analysis 2.6 Crime Management	
Module:3	**Module:3 Branches of Forensic Science** 3.1 Forensic Photography 3.2 Forensic Odontology 3.3 Forensic Anthropology 3.4 Facial Reconstruction 3.5 Wildlife Forensic 3.6 Forensic Accounting 3.7 Forensic Medicine 3.8 Forensic Engineering 3.9 Forensic Autopsy	07
Module:4	**Module:4 Tools and Technique** 4.1 Introduction to Forensic Tools and Analytical Techniques 4.2 Laboratory safety and Good Laboratory Practices 4.3 Accuracy, precision, sensitivity and specificity of Evidence 4.4 Errors in Forensic Analysis 4.5 Microscopy and Optical Techniques 4.6 Molecular and Advanced Forensic Techniques 4.7 Modern Tools and Techniques in Crime Investigation	08

Reference Books: -

1) Aitken, Colin G. G., and Franco Taroni. 2004. *Statistics and the Evaluation of Evidence for Forensic Scientists*. 2nd ed. Chichester: John Wiley & Sons.
2) Charaka. 2017. *Charaka Samhita*. Translated by P. V. Sharma. Varanasi: Chaukhambha Orientalia.
3) Directorate of Forensic Science Services (DFSS). 2023. *Quality Manual for Forensic Science Laboratories*. New Delhi: Ministry of Home Affairs, Government of India.
4) Henry, Edward Richard. 1900. *Classification and Uses of Finger Prints*. London: George Routledge & Sons.
5) Houck, Max M., and Jay A. Siegel, eds. 2015. *Fundamentals of Forensic Science*. 3rd ed. Amsterdam: Academic Press.
6) James, Stuart H., and Jon J. Nordby. 2009. *Forensic Science: An Introduction to Scientific and Investigative Techniques*. 3rd ed. Boca Raton, FL: CRC Press.

Evaluation Pattern: 60: 40

Total Marks:50

Continuous Comprehensive Evaluation (20 Marks):	**End Semester Examination (30Marks):**
• CCE-I: Compulsory home assignment (10 Marks) • CCE-II: Short & long answer question Test/seminar/open book test/ quiz/case study/book review/field work/industrial visit (10 Marks each) • CCE-III: Compulsory MCQ test (Each question for 1Mark) 10 Marks Note: -Best two scores of CCE will be considered out of three	• Question-1: Solve the following questions (five questions of 2 marks) 10 M • Question-2: Attempt any two questions (three questions of 10marks) 20 M • Question-3: Attempt any four questions (six questions of 5 marks) 20 M Note: Conversion of 50 marks of ESE to 30 marks

Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Humanities

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in English

Programme: B.Sc.-II	**Semester** - III
Type: AEC	**Marks:** 50
Credits: 02	**From:** A. Y. 2024-25

Name of the Course: English for Communication P-I

Course Objectives: Students will be able to…

1. understand basics of communication
2. study the non-verbal communication
3. learn the reading strategies for fast reading
4. know the comprehension skills

Course Outcomes:

At the end of the course, Students will be able to…

1. apply techniques to improve communication.
2. use the reading strategies for fast reading.
3. identify the note making and note taking skills
4. enhance the comprehension skills.

Module	Title and Contents	Hrs.
Module - I	**Introduction to Communication Skills** 1.1 Definition 1.2 Process of communication 1.3 Elements 1.4 Types of communication 1.5 Barriers of communication 1.6 Good communication gateways: 7c's of communication	07
Module - II	**Non-verbal communication** 2.1 Overview of non -verbal communication 2.2 Facial expressions and gestures 2.3 Eye contact 2.4 Body language 2.5 Voice and paralinguistic cues 2.6 Non -verbal communication in context	07
Module - III	**Reading Skills** 3.1 Definition 3.2 Scheming and scanning techniques, 3.3 Effective strategies for reading 3.4 Reading material: 3.4.1 Tree by Kalpana Chitnis 3.4.2 Facebook is making us miserable by Daniel Gulati	08
Module - IV	**Comprehension Skills** 4.1 Definition 4.2 Types 4.3 Strategies	08

	4.4 Summarizing 4.5 Paragraphs for Comprehension	

REFERENCE BOOKS:

1. Aggarwal Shalini, *Essential Communication Skills,* Ane Books Pvt. Ltd. New Delhi, first edition 2009
2. Dutt P. Kiramani, Rajeevan Geetha, *Basic Communication Skills*, Cambridge University Press India Pvt. Ltd. New Delhi, 2007 First, reprint 2010
3. Kumar Sanjay, Pushp Lata, *Communication Skills*, Oxford University Press, New Delhi, 2018 First Edition
4. Inthira S.R. and Saraswath V. *Enrich Your English*, OUP, New Delhi 1997.
5. Lester Mark,Tata MC Grew, *Handbook of English Grammar and Usage*, Hill Publishing Company: New Delhi ,2018
6. Pearson, *Business English, Language, Literature and Creativity*, Orient Blackswan, 2013.
7. Thomson and Marlinet, *A Practical English Grammar*, OUP, New Delhi 1960
8. Turton, N.D. and Heaton J.B., *Longman Dictionary of Common Errors,* Longman, 1998.
9. Wood John East, Oxford Practice Grammar. O.U.P-1999- Second Edition

Evaluation Pattern:

Total Marks: 30 / 20

1. **Examination Pattern: 30:20**
   (30 Weightage for End Semester Examination & 20 Weightage for Internal Continuous Evaluation)
2. **Nature of Question Paper:**

End Semester Examination Question Paper Pattern for 30 Marks

Instruction: 1) All Questions are compulsory.
2) All Questions carry equal marks.
3) Figures to the right indicate full marks.

Day and Date: Total Marks: 30
Time:

==========

Q.1. a) Multiple choice-type questions
(Based on all units) 5 marks
b) Objective question Answer in one word/phrase/sentence
(Based on all units) 5 marks
Q.2. a) Broad Question based on Unit I 5 marks
b) Broad Question based on Unit II 5 marks
Q.3. Short notes (2 out of 3) - 10 marks
(Based on all units)

3. ICE (Internal Continuous Evaluation)

ICE for 20 Marks

SEMESTER IV

Karmaveer Bhaurao Patil University, Satara
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Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Biotechnology

Programme: B.Sc. II	**Semester**- IV
Type: Major I	**Marks:**50
Credits: 2	**From:** A.Y.2025-26

Name of the Course: Advanced Forensic Science II **(BFST 241)**

Course Objectives: Students should be able to…

1) application of evidence collection and preservation techniques
2) analysis and comparison of impression and trace evidence
3) evaluation of bloodstain patterns for crime scene interpretation
4) construction and Presentation of Crime Scene Reconstructions

Course Outcomes: The students will be able to...

1) demonstrate correct procedures for collecting and preserving various types of forensic evidence.
2) analyze and interpret impression evidence to establish investigative leads.
3) evaluate bloodstain patterns to reconstruct the sequence of events at a crime scene.
4) create comprehensive crime scene reconstruction reports supported by scientific evidence.

Module	Course I: Advanced Forensic Science II	Hrs
Module-1:	**Physical Evidences – I** 1.1 Soil evidence – importance, location, collection and comparison of soil samples. 1.2 Cloth evidence- importance, collection, analysis of adhering material. Matching of pieces. 1.3 Fiber evidence- artificial and man-made fiber. Collection of fiber evidence. Identification and comparison of fiber 1.4 Forensic Gemology	7
Module-2:	**Impression evidences – I** 2.1 Lip print analysis (Development, collection, packaging, preservation, analysis) 2.2 Gait pattern analysis (Development, collection, packaging, preservation, analysis) 2.3 Ear print (Development, collection, packaging, preservation, analysis) Palm print (Development, collection, packaging, preservation, analysis)	7
Module-3:	**Impression evidences – II** 3.1 Tire marks (Development, collection, packaging, preservation, analysis) 3.2 Skid mark analysis Fingerprint (Development, collection, packaging, preservation, analysis) 3.3 Footprints and Shoe prints (Development, collection, packaging, preservation, analysis)	8

Module-4:	**Bloodstain Pattern and Crime Scene Reconstruction** 4.1 Bloodstain Pattern: Historical perspective, Physical and biological properties of human blood. 4.2 Types of Documentation – Written Notes, Sketches, Photographs, Videography Classification: Spatter and non-spatter, droplet directionality and angle of impact, determination of point of convergence and point of origin, altered bloodstain patterns. 4.3 Crime Scene reconstruction (CSR): nature and importance of CSR, basic principles and stages. Role of protocol in reconstruction. 4.4 Reconstruction of motor accident, firing, post blast cases, fire. Collection of data (videography photography, measurements, analysis of data) Writing of CSR reports, courtroom testimony.	8

Reference Books: -

1. James, Stuart H., and Jon J. Nordby. *Forensic Science: An Introduction to Scientific and Investigative Techniques*. Boca Raton, FL: CRC Press, 2003.
2. Saferstein, Richard. *Criminalistics: An Introduction to Forensic Science*. Upper Saddle River, NJ: Prentice Hall, 1995.
3. Nanda, B. B., and R. K. Tiwari. *Forensic Science in India: A Vision for the Twenty-First Century*. New Delhi: Select Publishers, 2001.
4. Fisher, Barry A. J. *Techniques of Crime Scene Investigation*. 7th ed. Boca Raton, FL: CRC Press, 2003.
5. Sharma, B. R. *Forensic Science in Criminal Investigation and Trials*. New Delhi: Universal Law Publishing, 2003.
6. Maguire, Mike, Rod Morgan, and Robert Reiner, eds. *The Oxford Handbook of Criminology*. 2nd ed. New York: Oxford University Press, 2002.

Evaluation Pattern: 60: 40

Total Marks:50

Continuous Comprehensive Evaluation (20Marks)	**End Semester Examination (30Marks):**
• CCE-I: Compulsory home assignment (10 Marks) • CCE-II: Short & long answer question Test/seminar/open book test/ quiz/case study/book review/field work/industrial visit (10 Marks each) • CCE-III: Compulsory MCQ test (Each question for 1Mark) 10 Marks Note: -Best two scores of CCE will be considered out of three.	• Question-1: Solve the following questions (five questions of 2 marks) 10 M • Question-2: Attempt any two questions (three questions of 10marks) 20 M • Question-3: Attempt any four questions (six questions of 5 marks) 20 M Note: Conversion of 50 marks of ESE to 30 marks

Karmaveer Bhaurao Patil University, Satara
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Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Biotechnology

Programme: B.Sc. II	**Semester-** IV
Type: Major II	**Marks:**50
Credits: 2	**From:** A.Y.2025-26

Name of the Course: Advanced Computer and Digital Forensics II **(BFST 242)**

Course Objectives: Students should be able to…

1) understand the fundamentals of computer networks, mobile technologies, and digital investigation tools.
2) apply appropriate procedures for the seizure, preservation, and analysis of mobile and digital evidence.
3) analyze and evaluate the effectiveness of various cyber forensic tools for incident response and investigation.
4) create legally sound documentation such as seizure memos and charge sheets, and effectively present digital evidence in court.

Course Outcomes: The students will be able to...

1) demonstrate understanding of computer networks, client-server models, and network devices used in cyber investigations.
2) apply correct procedures for mobile device seizure, investigation, and evidence preservation.
3) evaluate and select appropriate cyber forensic tools for effective digital evidence analysis.
4) prepare legal documents and present digital evidence in compliance with IT Act and judicial procedures.

Module	Course I: Computer and Digital Forensics II	Hrs
Module-1:	**Computer Networks** 1.1 Computer Networks, Topologies, 1.2 Network Devices, 1.3 Network Commands. 1.4 Client Server architecture, 1.5 Network technologies, Network Topologies, Network Devices, Network Commands.	7
Module-2:	**Mobile Crime Investigations** 2.1 Seizure notes for Mobile Handset, care taken for while confiscating Mobile Handset. 2.2 Toolkit for Investigation of mobile Handset, Software Required for, Investigation Mobile Number Portability 2.3 Mobile Number Tracing, Tracing Stolen/Lost Handset.	7
Module-3:	**Cyber Forensic Tools and Utilities** 3.1 Introduction, examining a Breadth of Products Cyber Forensic 3.2 Tools Good, Better, best: What's the Right Incident Response, Tool 3.3 Tool Review Forensic Toolkit, Encase, Mobil edit, F-RAT, FTK, Cyber check suites, etc. Specifications for Forensic tool Tested.	8
Module-4:	**Panch nama and FIR** 4.1 Registration of FIR (ITAA 2008) 4.2 Pancha Nama (Seizure Memo), Seizure Proceedings, Legal Procedure after seizure of evidence. Expert Opinion from Forensic Examiner, Gathering information from ISP/MSP/other service Providers 4.3 Analyzing and handling external data. Guideline to Prepare Chargesheet, Guideline for IO on what to include in Charge sheet, Tips to preserve seized digital media, Deposition of Evidence in court.	8

Reference Books: -

1) Mandia, Kevin, Chris Prosise, and Matt Pepe. *Incident Response and Computer Forensics*. 2nd ed. New York: McGraw-Hill, 2003.
2) Marshall, Angus M. *Digital Forensics: Digital Evidence in Criminal Investigation*. Chichester, UK: Wiley, 2008.
3) Menendez, Albert J. *Cyber Forensics: A Field Manual for Collecting, Examining, and Preserving Evidence of Computer Crimes*. Boca Raton, FL: Auerbach Publications, 2010.
4) Saferstein, Richard. *Forensic Science: From the Crime Scene to the Crime Lab*. 3rd ed. Upper Saddle River, NJ: Pearson, 2015.
5) Casey, Eoghan. *Digital Evidence and Computer Crime: Forensic Science, Computers, and the Internet*. 3rd ed. Burlington, MA: Academic Press, 2011.
6) Carrier, Brian. *File System Forensic Analysis*. Boston, MA: Addison-Wesley Professional, 2005.
7) Nelson, Bill, Amelia Phillips, Christopher Steuart, and Frank Enfinger. *Guide to Computer Forensics and Investigations*. 6th ed. Boston, MA: Cengage Learning, 2019.

Evaluation Pattern: 60: 40

Total Marks:50

Continuous Comprehensive Evaluation (20 Marks):	**End Semester Examination (30Marks):**
• CCE-I: Compulsory home assignment (10 Marks) • CCE-II: Short & long answer question Test/seminar/open book test/ quiz/case study/book review/field work/industrial visit (10 Marks each) • CCE-III: Compulsory MCQ test (Each question for 1Mark) 10 Marks Note: -Best two scores of CCE will be considered out	• Question-1: Solve the following questions (five questions of 2 marks) 10 M • Question-2: Attempt any two questions (three questions of 10marks) 20 M • Question-3: Attempt any four questions (six questions of 5 marks) 20 M Note: Conversion of 50 marks of ESE to 30 marks

Karmaveer Bhaurao Patil University, Satara
(A State Public University Est. u/s3(6) of MPUA 2016)
Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Biotechnology

Programme: B.Sc. II	**Semester**- IV
Type: Major Practical I	**Marks:**50
Credits: 2	**From:** A.Y.2025-26

Name of the Course: Practical Course I based on BFST 241 & BFST 242 **(BFSP 243)**

Course Objectives: Students should be able to…

1) apply forensic laboratory techniques to examine and compare trace evidence, including fibers, soil, bloodstains, lip prints, gait patterns, and footwear impressions.
2) demonstrate the use of microscopic, physical, and chemical methods for the examination and interpretation of forensic evidence.
3) perform digital forensic acquisition, preservation, and analysis using forensic tools such as Wireshark, FTK Imager, Volatility, Browser Auto-fill Viewer, Jump Lists View, Chrome Cookies View, and App Compact Cache Parser.
4) evaluate physical and digital forensic evidence to support forensic interpretation, documentation, and case investigation.

Course Outcomes: The students will be able to...

1) apply forensic laboratory techniques to examine and compare trace evidence, including fibers, soil, bloodstains, lip prints, gait patterns, and footwear impressions.
2) analyse physical evidence using microscopic, chemical, and impression analysis methods to determine its forensic significance.
3) perform digital forensic acquisition and analysis using forensic software tools to recover, preserve, and interpret digital evidence.
4) evaluate physical and digital forensic findings to prepare comprehensive forensic reports and support criminal investigations.

Practical No.	Lists of Practical's (Conduct any 15 practicals)	Hrs
1.	Examination fiber by using a microscope.	4
2.	To compare soil samples by density gradient method.	4
3.	To analyze the lip print.	4
4.	To study gait pattern analysis.	4
5.	To analyze the bloodstain pattern.	4
6.	Microscopic Examination of Soil.	4
7.	To perform cast and analyze footwear impression.	4
8.	Differentiate soil samples based on their chemical composition.	4
9.	To analyze network traffic using Wireshark to identify network Protocols.	4
10.	To analyze volatile memory using Volatility to extract evidence from a Running system.	4
11.	To demonstrate the use of FTK Imager to create forensic images of Storage devices	4
12.	Disk imaging and analysis (FTK imager)	4
13.	Extracting browser auto-fill data (Browser Auto-fill Viewer) Analysis of auto-fill data from web browsers	4

14.	Investigating application usage (App Compact Cache Parser) Recently run application analysis	4
15.	Analyzing Windows Jump list (Jump Lists View) View and analyze recent user activity	4
16.	Browser cookie analysis (Chrome Cookies View)	4

Reference Books: -

1. James, Stuart H., and Jon J. Nordby. *Forensic Science: An Introduction to Scientific and Investigative Techniques*. Boca Raton, FL: CRC Press, 2003.
2. Saferstein, Richard. *Criminalistics: An Introduction to Forensic Science*. Englewood Cliffs, NJ: Prentice Hall, 1995.
3. Nanda, B. B., and R. K. Tiwari. *Forensic Science in India: A Vision for the Twenty-First Century*. New Delhi: Select Publishers, 2001.
4. Reiber, Lee. *Mobile Forensic Investigations: A Guide to Evidence Collection, Analysis, and Presentation*. 2nd ed. Hoboken, NJ: Wiley, 2019.
5. Tamma, Rohit, Oleg Skulkin, Heather Mahalik, and Satish Bommisetty. *Practical Mobile Forensics: Forensically Investigate and Analyze iOS, Android, and Windows 10 Devices*. 4th ed. Birmingham, UK: Packt Publishing, 2020.
6. Casey, Eoghan, ed. *Handbook of Digital Forensics and Investigation*. Amsterdam: Academic Press, 2010.

Evaluation Pattern: 60: 40

TotalMarks:50

Continuous Comprehensive Evaluation (20 marks)	**End Semester Evaluation: (30 Marks)**
• Journal:10Marks • Students Performance & attendance: 10 Marks	• Question 1 • Question 2

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Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Biotechnology

Programme: B.Sc. II	**Semester**- IV
Type: Minor I	**Marks:**50
Credits: 2	**From:** A.Y.2025-26

Name of the Course: Advanced Forensic Chemistry II and Forensic Physics II
(BFST 244)

Course Objectives: Students should be able to…

1) understand the principles and applications of spectroscopy and polymer chemistry.
2) analyze the toxicological effects and forensic significance of various chemical substances, including heavy metals and pesticides.
3) apply the concepts of diffraction and polarization to interpret wave phenomena in forensic contexts.
4) evaluate the resolving power of optical instruments and the interaction of radiation with matter, relating these to forensic investigations.

Course Outcomes: The students will be able to...

1) explain the fundamentals of electromagnetic radiation and polymerization processes, and demonstrate their relevance in forensic science.
2) identify and assess the toxicological impact of environmental chemicals and pesticides, employing appropriate extraction and detection methods.
3) illustrate the principles of diffraction and polarization, and differentiate between various types of wave interactions.
4) assess the resolving capabilities of optical instruments and interpret the effects of radiation-matter interactions in forensic analyses.

Module	Course II: Advanced Forensic Chemistry II and Forensic Physics II	Hrs
Module-1:	**Spectroscopy and Polymers** 1.1 Introduction electromagnetic radiations, full range, absorbance, transmittance. 1.2 Beer- Lambert's laws, - Applications, U.V. Visible IR-molecular spectroscopy, electronics, vibrational, rotational spectra, Principle, diagram, working and construction, applications. 1.3 Introduction-General idea of structures, types, tactility, polymerization processes with examples, radical and ionic mechanism of polymerization, characteristic properties of polymers, Structure, preparation and applications of Polyethylene (types and Ziegler-Natta process), Teflon, PVC, Polystyrene.	7
Module-2:	**Chemical Toxicology** 2.1 Toxic chemicals in the environment – physical and chemical properties of lead, mercury, arsenic, cadmium and chlorine 2.2 bromine – Metallic and non- metallic toxic chemicals and its toxic effect– Extraction and detection methods. 2.3 Forensic significance. 2.4 Introduction of pesticides, classification of pesticides, properties, and its biochemical effects – Extraction and detection methods of pesticides, forensic significance.	7

Module-3:	**Diffraction and polymerization** 3.1 Introduction, Huygens- Fresnel's theory, Fresnel's assumptions, Distinction between interference and diffraction, Fresnel offer types of diffraction Diffraction due to single edge, Diffraction due to a narrow slit. 3.2 Introduction, Types of Polarization, Production of Plane polarized light, Polarizer and Analyzer, Malus law, Anisotropic crystal: Calcite crystal, Nicol prism, Production and detection of linearly, elliptically and circularly polarized light	9
Module-4:	**Resolving Power, Newtons law of motion and Interaction of Radiation with Matter** 4.1 Raleigh's criterion, resolving power of optical instruments, Criterion for resolution according to Lord Rayleigh's, resolving power of telescope, resolving power of a prism, Resolving power of a plane transmission grating. 4.2 Interaction of radiation with matter: Reflection, Absorption, Transmission, Fluorescence, and Phosphorescence. 4.3 Newton's all law, its forensic application; Elasticity, elastic properties of matter, elastic constants and their interrelation	7

Reference Books: -

1. Bell, Suzanne. *Forensic Chemistry*. 3rd ed. Boca Raton, FL: CRC Press, 2019.
2. Li, Richard. *Forensic Biology*. 2nd ed. Boca Raton, FL: CRC Press, 2015.
3. Saferstein, Richard. *Criminalistics: An Introduction to Forensic Science*. 8th ed. Upper Saddle River, NJ: Prentice Hall, 2004.
4. Kebbell, Mark R., and Graham M. Davies. *Practical Psychology for Forensic Investigations and Prosecutions*. Chichester, UK: Wiley, 2006.
5. Puri, Avinash Chand, and Tanya Chauhan, eds. *Fundamentals of Forensic Biology*. Singapore: Springer, 2024.
6. Butler, John M. *Forensic DNA Typing: Biology, Technology, and Genetics of STR Markers*. 2nd ed. Burlington, MA: Elsevier Academic Press, 2005.
7. Houck, Max M., and Jay A. Siegel. *Fundamentals of Forensic Science*. 4th ed. London: Academic Press, 2023.
8. James, Stuart H., and Jon J. Nordby. *Forensic Science: An Introduction to Scientific and Investigative Techniques*. 5th ed. Boca Raton, FL: CRC Press, 2019.

Evaluation Pattern: 60: 40

Total Marks:50

Continuous Comprehensive Evaluation (20 Marks):	**End Semester Examination (30Marks):**
• CCE-I: Compulsory home assignment (10 Marks) • CCE-II: Short & long answer question Test/seminar/open book test/ quiz/case study/book review/field work/industrial visit (10 Marks each) • CCE-III: Compulsory MCQ test (Each question for 1Mark) 10 Marks Note: -Best two scores of CCE will be considered out	• Question-1: Solve the following questions (five questions of 2 marks) 10 M • Question-2: Attempt any two questions (three questions of 10marks) 20 M • Question-3: Attempt any four questions (six questions of 5 marks) 20 M • Note: Conversion of 50 marks of ESE to 30 marks

Karmaveer Bhaurao Patil University, Satara
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Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Biotechnology

Programme: B.Sc. II	**Semester-** IV
Type: Minor II	**Marks:**50
Credits: 2	**From:** A.Y.2025-26

Name of the Course: Advanced Forensic Biology II and Forensic Psychology II **(BFST 245)**

Course Objectives: Students should be able to…

1) understand the principles of enzymology, protein purification, and metabolism, including enzyme classification, mechanisms, and purification techniques.
2) analyze various biological fluids and tissues to identify and interpret forensic evidence.
3) apply knowledge of human skeletal structure and blotting techniques in forensic investigations.
4) evaluate the role of social psychology, cognition, and personality disorders in criminal behaviour and legal contexts.

Course Outcomes: The students will be able to...

1) explain enzyme kinetics and purification methods, and demonstrate their applications in metabolic processes.
2) identify and analyze biological samples such as saliva, semen, and blood for forensic purposes.
3) illustrate the human skeletal system and utilize blotting techniques (southern, northern, western) in forensic analyses.
4) assess the impact of social cognition and personality disorders on criminal behaviour, and propose strategies for addressing prejudice and discrimination within the legal system.

Module	Course II: Advanced Forensic Biology II and Forensic Psychology II	Hrs
Module-1:	**Enzymology, Protein purification and Metabolism** 1.1 Enzymes: Introduction, IUB classification, active site, energy of activation, transition state hypothesis, lock and key hypothesis, induced fit hypothesis. Allosteric enzymes, enzyme inhibition (reversible and irreversible, MM equation. Protein Extraction and Purification: Methods of cell disruption (blenders, grinding with abrasives, presses, enzymatic method, sonication). 1.2 Prejudice and Discrimination: The Origins of Prejudice – Direct Intergroup Conflict, Social Categorization, The Role of Social Learning, Cognitive Sources of Prejudice. Techniques to Change Prejudices- Breaking Cycle of Prejudice, Direct Intergroup Contact, Re-categorization.	7
Module-2:	**Human Skeleton and Locomotion, Blotting techniques** 2.1 Human Skeleton –Axial Skeleton, Appendicular Skeleton Locomotion- Types of joints. 2.2 Southern Blotting (Principle, Procedure and Application), Northern Blotting (Principle, Procedure and Application), Western Blotting (Principle, Procedure and Application) Quantitative Method PCR (Polymerase Chain Reaction)	7

Module-3:	**Social Psychology and Social Cognition** 3.1 Social Cognition, Attitude - Meaning and Nature of Attitudes Explicit Attitudes, Implicit Attitudes. Attitude Formation – Based on Classical Conditioning, Instrumental Conditioning and Observational Learning. Persuasion- The Cognition Process- Systematic processing, Central route, Heuristic processing, peripheral route, Elaboration-Likelihood Model, Heuristic Systematic Model. 3.2 Prejudice and Discrimination: The Origins of Prejudice – Direct Intergroup Conflict, Social Categorization, The Role of Social Learning, Cognitive Sources of Prejudice. Techniques to Change Prejudices- Breaking Cycle of Prejudice, Direct Intergroup Contact, Re-categorization.	9
Module-4:	**Applying Social Psychology in The Interpersonal Aspects of Legal System and Behavioral** **Abnormalities and Personality Disorders in Crime** 4.1 Memory and Eyewitness, Social Influence and Legal System- Police Interrogations, Lineups and Effect of Media Coverage on Perception of Defendants. Social Cognition and Legal System: Eyewitness Testimony, Errors Problems in Eyewitness Testimony, Solutions for Increasing Eyewitness Accuracy. The Influence of Prejudice and Stereotypes on the Legal System 4.2Behavioral abnormalities – Harassment and types of harassment, Bullying and types of bullying, Stalking and types of stalking. Defining and Diagnosing Personality 4.3Disorders. Odd-Eccentric Personality Disorders. Dramatic- Emotional Personality Disorders. Anxious-Fearful Personality Disorders.	7

Reference Books: -

1. Price, Nicholas C. *Fundamentals of Enzymology: The Cell and Molecular Biology of Catalytic Proteins*. 3rd ed. Oxford: Oxford University Press, 1999.
2. Frayn, Keith N., and Rhys D. Evans. *Human Metabolism: A Regulatory Perspective*. 4th ed. Hoboken, NJ: Wiley-Blackwell, 2019.
3. Scopes, Robert K. *Protein Purification: Principles and Practice*. 3rd ed. New York: Springer, 1994.
4. Watson, Fiona, and C. Simon Herrington. *Blotting Techniques: Methodology and Applications*. Chichester, UK: Wiley, 2002.
5. Eysenck, H. J. *Crime and Personality*. 3rd ed. London: Routledge, 1997.
6. Stangor, Charles. *Principles of Social Psychology*. Minneapolis, MN: University of Minnesota Libraries Publishing, 2014.

Evaluation Pattern: 60: 40

Total Marks:50

Continuous Comprehensive Evaluation (20 Marks):	**End Semester Examination (30Marks):**
• CCE-I: Compulsory home assignment (10 Marks) • CCE-II: Short & long answer question Test/seminar/open book test/ quiz/case study/book review/field work/industrial visit (10 Marks each) • CCE-III: Compulsory MCQ test (Each question for 1Mark) 10 Marks Note: -Best two scores of CCE will be considered out	• Question-1: Solve the following questions (five questions of 2 marks) 10 M • Question-2: Attempt any two questions (three questions of 10marks) 20 M • Question-3: Attempt any four questions (six questions of 5 marks) 20 M • Note: Conversion of 50 marks of ESE to 30 marks

Karmaveer Bhaurao Patil University, Satara
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Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Biotechnology

Programme: B.Sc. II	**Semester**- IV
Type: Minor Practical I	**Marks:**50
Credits: 2	**From:** A.Y.2025-26

Name of the Course: Practical Course II based on BFST 244 & BFST 245
(BFSP 246)

Course Objectives: Students should be able to…

1) apply laboratory techniques to extract and analyze DNA and proteins.
2) analyze biological samples using various forensic methods.
3) assess psychological traits and behaviours through standardized tests.
4) evaluate forensic evidence using advanced analytical techniques.

Course Outcomes: The students will be able to...

1) apply Forensic Techniques to Analyze Physical Evidence
2) analyze Biological and Pattern Evidence for Investigative Insights
3) apply Digital Forensic Tools to Acquire and Analyze Evidence
4) analyze Network and System Artifacts to Identify Security Incidents.

Practical No.	Lists of Practical's (Conduct any 15 practicals)	Hrs
1.	Preliminary and confirmatory test for detection of pesticides (2) i] Organophosphate ii] Organochlorine	4
2.	To detect the metal & Nonmetal poison by Preliminary test (2) i] zinc (Zn) ii] Lead (Pb) iii] Mercury (Hg) iv] Chlorine (Cl) v] Iodine(I)	4
3.	To detect the metal poison by chemical method (2) i] zinc (Zn) ii] Lead (Pb) iii] Mercury (Hg) iv] Chlorine (Cl) V] Iodine	4
4.	Introduction UV-visible spectrophotometer	4
5.	To determine the Resolving power of plane diffraction grating.	4
6.	To determine the specific rotation of sugar solution (Polarimeter)	4
7.	To determine the refractive index of material of prism using Spectrometer	4
8.	To determine the radius of capillary using Travelling microscope.	4
9.	Detection of Amylase activity- a) Starch-Iodine Assay.	4
10.	Microscopic Comparison of Hair- i] Human Hair ii] Animal Hair.	4
11.	Presumptive test for Blood a] Phenolphthalein Assay b] Benzidine c] Leucomalachite Green d] Luminol test	4
12.	Confirmatory Tests for Blood –Crystallization Assays. To perform electrophoresis for separation of various polymorphic enzymes.	4
13.	Emotional Maturity Scale. Dr. Yashvir Singh and Dr. Manesh Bhargav.	4
14.	Achievement motivation- Deo Mohan	4
15.	Level of Aspiration – Dr. Chandra BhalDwivedi.	4
16.	Aggression test – C.G. Pati	4

Reference Books: -

1. Dwivedi, A. K., and Archana Tripathi. *Forensic Serology and Blood Examination*. New Delhi: Selective & Scientific Books, 2012.
2. Li, Richard. *Forensic Biology*. Boca Raton, FL: CRC Press, 2008.
3. Pandey, Bhawana, and M. H. Fulekar. *Bioinstrumentation*. New Delhi: PHI Learning Pvt. Ltd., 2019.
4. McClintock, J. Thomas. *Forensic DNA Analysis: A Laboratory Manual*. Boca Raton, FL: CRC Press, 2008.
5. Nelson, David L., and Michael M. Cox. *Lehninger Principles of Biochemistry*. 8th ed. New York: W. H. Freeman and Company, 2021.
6. Evans, E. Hywel. *Forensic Analysis: Pre-Laboratory Exercises and Laboratory Student Manual*. Cambridge: Royal Society of Chemistry, 2001.
7. Baron, Robert A., Nyla R. Branscombe, Donn Byrne, and Gopa Bhardwaj. *Social Psychology*. 12th ed. Boston, MA: Pearson, 2010.
8. Merton, Robert K. *Social Theory and Social Structure*. Enlarged ed. New York: Free Press, 1996.

Evaluation Pattern: 60: 40

TotalMarks:50

Continuous Comprehensive Evaluation (20 marks)	**End Semester Evaluation: (30 Marks)**
• Journal:10Marks • Students Performance & attendance: 10 Marks	• Question 1 • Question 2

Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in interdisciplinary studies

Programme: B.Sc. II	**Semester** – IV
Type: Open Elective Course	**Marks:** 50
Credits: 2	**From:** A. Y. 2025-26
Name of the Course: Human Psychology	

Course Objectives: Students should be able to…

1. gain hands-on experience in administering, scoring, and interpreting a variety of psychological tests.
2. understand the theoretical foundations and purposes of different psychological assessments (e.g., intelligence, personality, aptitude, motivation, attitudes, and emotions).
3. develop practical skills in observing, recording, and analysing human behaviour.
4. apply ethical principles and maintain confidentiality while conducting psychological assessments.

Course Outcomes: Students will be able to…

1. administer, score, and interpret various psychological tests accurately.
2. demonstrate understanding of the theoretical basis and purpose of different psychological assessments.
3. analyse and evaluate human behaviour using practical test data.
4. apply ethical standards and maintain confidentiality in psychological testing.

Practical No.	Lists of Practical's (Conduct any 15 practicals)	Hrs.
1)	To assess self-concept of the subject.	60
2)	To assess the stress level of an individual	
3)	To assess the aggression of the subject	
4)	To assess the Emotional Intelligence of the subject	
5)	To assess the Adjustment level of subject	
6)	To assess the Achievement Motivation of the subject.	
7)	To assess the depression level of subject.	
8)	To asses anxiety of the subject.	
9)	To assess the Study Habits of the subject	
10)	To assess Intelligence of an individual.	
11)	To assess the Social adjustment level of subject.	
12)	To assess the Life satisfaction of the subject	
13)	To asses Self-confidence of the subject	
14)	To assess Academic stress of the students	
15)	Field Visit	
16)	Field Visit	
17)	Survey Report	

Reference books:

1. Verma, S. & Gupta, A. (2010). *Handbook of Psychological Assessment in India*. Delhi: National Psychological Corporation.
2. Rao, S.N. (2011). *Manual of Psychological Testing in Indian Context*. Mumbai: Himalaya Publishing House.
3. Chadha, N.K. (2009). *Applied Psychometry*. SAGE Publications India.
4. Aiken, Lewis R. *Psychological Testing and Assessment*. 12th ed. Boston: Pearson, 2009.
5. Anastasi, Anne, and Susana Urbina. *Psychological Testing*. 7th ed. Upper Saddle River, NJ: Prentice Hall, 1997.
6. Bartol, Curt R., and Anne M. Bartol. *Introduction to Forensic Psychology: Research and Application*. 6th ed. Thousand Oaks, CA: SAGE Publications, 2021.

Evaluation Pattern: 60:40	
Total Marks: 50	
Continuous Comprehensive Evaluation (20marks): Journal/Viva: 10 Marks Students Performance: 10 Marks	**Theory Exam Paper (30 Marks):** 3 questions (for each question 10 Marks)

Karmaveer Bhaurao Patil University, Satara
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Faculty of Science and Technology

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Board of Studies in Biotechnology

Programme: B.Sc. II	**Semester**- IV
Type: Vocational Skill Course	**Marks:**50
Credits: 2	**From:** A.Y.2025-26

Name of the Course: Cyber Security Threat Landscape **(BFSPVSC II)**

Course Objectives: Students should be able to…

1) apply Cybersecurity Tools and Techniques
2) analyze and Evaluate Security Configurations
3) implement Secure Authentication Methods
4) create Comprehensive Cybersecurity Policies

Course Outcomes: The students will be able to...

1) demonstrate Cybersecurity Tools and Techniques.
2) analyze and evaluate Security Configurations
3) evaluate Secure Authentication Methods
4) synthesize and Present Comprehensive Cybersecurity Policies

Practical No.	Lists of Practical's (Conduct any 15 practicals)	Hrs
1	Setting privacy settings on social media platforms.	4
2	Do's and Don'ts for posting content on social media platforms.	4
3	Registering complaints on a social media platform.	4
4	Prepare password policy for computer and mobile devices.	4
5	List out security controls for computers and implement technical security controls in the personal computer.	4
6	List out security controls for mobile phones and implement technical security controls in the personal mobile phone.	4
7	Log into computer system as an administrator and check the security policies in the system.	4
8	Platforms for reporting cyber-crimes	4
9	Checklist for reporting cyber-crimes online.	4
10	Wi-Fi security management in computer and mobile.	4
11	Setting, configuring and managing three password policy in the computer (BIOS, Administrator and Standard User).	4
12	Setting and configuring two factor authentication in the Mobile phone.	4
13	Security patch management and updates in Computer and Mobiles.	4
14	Managing Application permissions in Mobile phones.	4
15	Installation and configuration of computer Anti-virus.	4
16	Installation and configuration of Computer Host Firewall.	4

Reference Books: -

1. Herath, Thilini B. G., Prashant Khanna, and Monjur Ahmed. “Cybersecurity Practices for Social Media Users: A Systematic Literature Review.” *Journal of Cybersecurity and Privacy* 2, no. 1 (2022).
2. Kumaraguru, Ponnurangam. “Privacy and Security in Online Social Media.” *National Programme on Technology Enhanced Learning (NPTEL)*. Accessed May 7, 2025.
3. Garg, Rashi. “Privacy and Security in Online Social Media.” *GeeksforGeeks*. Last modified May 7, 2025.
4. “Privacy Risks and Social Media.” *IEEE Digital Privacy*. Accessed May 7, 2025.
5. “On Privacy and Security in Social Media: A Comprehensive Study.” *ScienceDirect*. Accessed May 7, 2025.
6. “Cybersecurity Practices for Social Media Users.” *International Journal of Research and Development*. Accessed May 7, 2025.

Evaluation Pattern: 60: 40	
Total Marks:50	
Continuous Comprehensive Evaluation (20 marks) • Journal:10Marks • Students Performance & attendance: 10 Marks	**End Semester Evaluation: (30 Marks)** • Question 1 • Question 2

Karmaveer Bhaurao Patil University, Satara
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Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Chemistry

Programme: B.Sc. II	**Semester**- IV
Type: Skill Enhancement Course	**Marks:**50
Credits: 2	**From:** A.Y.2025-26

Name of the Course: Forensic Photography **(BFSPSEC II)**

Course Objectives: Students should be able to…

1) capture Photographs under Different Lighting Conditions
2) perform photograph Crime Scenes Using Different Angles and Perspectives
3) perform photograph Fingerprint Evidence Using Proper Lighting Techniques
4) study the Synthesis of Findings for Legal Documentation

Course Outcomes: The students will be able to...

1) evaluation of Photographs under Different Lighting.
2) identification of Photograph Crime Scenes Using Different Angles and Perspectives.
3) analysis of Photograph Evidence.
4) analyze legal Documentation and handling.

Practical No.	Lists of Practical's (Conduct any 15 practicals)	Hrs.
1)	To study different types of cameras.	2
2)	To study different types of lenses.	2
3)	To study parts of DSLR camera.	2
4)	To study working of DSLR camera.	2
5)	To study exposure settings of DSLR camera.	2
6)	To study photo- micrography.	2
7)	To study UV photography.	2
8)	To study IR photography.	2
9)	To study photogrammetry.	2
10)	To perform overall crime scene photography.	2
11)	To perform mid-range crime scene photography.	2
12)	To perform close-up/evidential crime scene photography.	2
13)	To perform fingerprint, questioned document and blood spatter photography.	2
14)	To perform explosion, hanging scene and accident photography.	2
15)	To perform scene videography of crime scene.	2

Reference Books: -

1. Jackson, A. R. W., and Julie M. Jackson. *Forensic Science*. 3rd ed. Harlow, UK: Pearson Education Limited, 2011.
2. Fisher, Barry A. J. *Techniques of Crime Scene Investigation*. 9th ed. Boca Raton, FL: CRC Press, 2022.
3. Nordby, Jon J., and David L. Hall. *Forensic Science: An Introduction to Scientific and Investigative Techniques*. 3rd ed. Boca Raton, FL: CRC Press, 2009.
4. Bevel, Tom, and Ross M. Gardner. *Bloodstain Pattern Analysis with an Introduction to*

Crime Scene Reconstruction. 3rd ed. Boca Raton, FL: CRC Press, 2009.

5. Gardner, Ross M., and Tom Bevel. *Practical Crime Scene Processing and Investigation*. 3rd ed. Boca Raton, FL: CRC Press, 2019.
6. James, Stuart H., and Jon J. Nordby. *Forensic Science: An Introduction to Scientific and Investigative Techniques*. 5th ed. Boca Raton, FL: CRC Press, 2019.
7. Saferstein, Richard. *Criminalistics: An Introduction to Forensic Science*. 12th ed. Hoboken, NJ: Pearson, 2020.
8. Houck, Max M., and Jay A. Siegel. *Fundamentals of Forensic Science*. 4th ed. London: Academic Press, 2023.

Evaluation Pattern: 60: 40	
Total Marks:50	
Continuous Comprehensive Evaluation (20 marks) • Journal:10Marks • Students Performance & attendance: 10 Marks	**End Semester Evaluation: (30 Marks)** • Question 1 • Question 2

Karmaveer Bhaurao Patil University, Satara
(A State Public University Est. u/s3(6) of MPUA 2016)
Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Biotechnology

Programme: B.Sc. II	**Semester-** IV
Type: Value Education Course **(VEC)**	**Marks:**50
Credits: 2	**From:** A.Y.2025-26

Name of the Course: Environmental Studies **(BFSTVEC II)**

Course Objectives: Students should be able to…

1) develop an understanding of the fundamental principles of environmental science and ecosystem functioning.
2) explain the relationship between environmental pollution and forensic investigations.
3) understand the role of environmental forensics in investigating pollution, environmental crimes, and ecological damage.
4) apply scientific methods for environmental evidence collection, preservation, and analysis.
5) recognize environmental legislation and ethical responsibilities related to forensic investigations.
6) promote sustainable environmental management through scientific and forensic approaches.

Course Outcomes: The students will be able to...

1) explain the concepts of ecology, ecosystems, biodiversity, and natural resources.
2) assess different forms of environmental pollution and evaluate their impact using forensic principles.
3) apply environmental forensic techniques for investigation of contamination, wildlife crimes, and environmental offences.
4) interpret environmental laws, policies, and ethical practices relevant to forensic science.
5) conduct basic environmental sampling, documentation, and report writing for environmental forensic investigations.

Module	Title and Content	Hrs.
Module:1	**Module:1 Fundamentals of Environmental Science and Ecosystems** 1.1 Introduction to Environmental Science: Scope, importance, and interdisciplinary nature. 1.2 Components of the Environment: Atmosphere, Hydrosphere, Lithosphere, and Biosphere. 1.3 Structure and Function of Ecosystems. 1.4 Food Chain, Food Web, and Ecological Pyramids. 1.5 Biogeochemical Cycles (Carbon, Nitrogen, and Water). 1.6 Biodiversity: Levels, Values, Threats, and Conservation. 1.7 Natural Resources: Renewable and Non-renewable Resources	07
Module:2	**Module:2 Environmental Pollution and Environmental Health** 2.1 Environmental Pollution: Air, Water, Soil, Noise, Thermal, and Radioactive Pollution. 2.2 Sources, Effects, and Control Measures. 2.3 Environmental Toxicology**.** 2.4 Bioaccumulation and Biomagnification 2.5 Climate Change, Global Warming, Greenhouse Effect, and Ozone Layer Depletion 2.6 Solid Waste, Hazardous Waste, and Biomedical Waste Management Environmental Health and Risk Assessment	07

Module:3	**Module:3 Environmental Forensic Science** 3.1 Introduction to Environmental Forensics 3.2 Scope and Applications in Criminal Investigation 3.3 Environmental Crimes and Pollution Investigation 3.4 Environmental Evidence: Soil, Water, Air, Sediment, Vegetation, and Biological Samples 3.5 Environmental Sampling Techniques 3.6 Preservation of Environmental Evidence and Chain of Custody 3.7 Analytical Techniques in Environmental Forensics 3.8 Wildlife Forensics and Environmental DNA (eDNA): Basic Concepts	08
Module:4	**Module:4 Environmental Laws, Ethics, and Sustainable Development** 4.1Environmental Legislation in India • Environment (Protection) Act, 1986 • Water (Prevention and Control of Pollution) Act, 1974 • Air (Prevention and Control of Pollution) Act, 1981 • Wildlife (Protection) Act, 1972 • Biological Diversity Act, 2002 4.2 National Green Tribunal (NGT) 4.3 Central and State Pollution Control Boards (CPCB and SPCBs) 4.4 Environmental Impact Assessment (EIA) 4.5 Sustainable Development Goals (SDGs) 4.6 Environmental Ethics 4.7 Emerging Trends in Environmental Forensics	08

Reference Books: -

1) Agarwal, K. C. *Environmental Biology*. 13th ed. New Delhi: Nidhi Publishers, 2017.
2) Cunningham, William P., and Mary Ann Cunningham. *Environmental Science: A Global Concern*. 16th ed. New York: McGraw-Hill Education, 2021.
3) Manahan, Stanley E. *Environmental Chemistry*. 10th ed. Boca Raton, FL: CRC Press, 2017.
4) Miller, G. Tyler, and Scott E. Spoolman. *Living in the Environment*. 20th ed. Boston, MA: Cengage Learning, 2021.
5) Odum, Eugene P., and Gary W. Barrett. *Fundamentals of Ecology*. 5th ed. Belmont, CA: Brooks/Cole, 2005.
6) Saferstein, Richard. *Criminalistics: An Introduction to Forensic Science*. 13th ed. New York: Pearson, 2023.
7) Shukla, S. K., and T. R. Shukla. *Environmental Studies*. New Delhi: CBS Publishers & Distributors, 2019.

Evaluation Pattern: 60: 40

Total Marks:50

Continuous Comprehensive Evaluation (20 Marks): • CCE-I: Compulsory home assignment (10 Marks) • CCE-II: Short & long answer question Test/seminar/open book test/ quiz/case study/book review/field work/industrial visit (10 Marks each) • CCE-III: Compulsory MCQ test (Each question for 1Mark) 10 Marks Note: -Best two scores of CCE will be considered out	**End Semester Examination (30Marks):** • Question-1: Solve the following questions (five questions of 2 marks) 10 M • Question-2: Attempt any two questions (three questions of 10marks) 20 M • Question-3: Attempt any four questions (six questions of 5 marks) 20 M • Note: Conversion of 50 marks of ESE to 30 marks

Karmaveer Bhaurao Patil University, Satara

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Faculty of Humanities

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in English

Programme: B.Sc.-II	**Semester** - IV
Type: AEC	**Marks:** 50
Credits: 02	**From:** A. Y. 2024-25

Name of the Course: English for Communication P-II

Course Objectives: Students will be able to…

1. learn the language skills
2. understand expansion of an idea
3. learn the note making and note taking skills
4. study the various methods of professional communication

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

1. identify the language skills.
2. expand an idea.
3. use the various methods for effective professional communication
4. escribe the global influences of IKS.

Module	Title and Contents	Hrs.
Module - I	**Language Skills** 1.1 Word building 1.2 Grammar 1.3 Language and style	07
Module - II	**Expansion of an Idea** .2 Definition, .3 Sentence building .4 Paragraph writing .5 Expansion of an idea	07
Module - III	**Professional Communication** 3.1 Definition 3.2 Professional communication 3.3 Report writing 3.4 Letter writing	08
Module - IV	**Conversation Skills** 4.1 Art of conversation 4.2 Manners and Etiquettes 4.3 Telephonic communication 4.4 Professional conversation	08

REFERENCE BOOKS:

1. Sanjay Kumar and Pushp Latha. *Communication Skills* New Delhi: OUP, 2012.
2. Farhathullah, T.M. *English for Business Communication*, Bangalore: Prism Publishers, 2009
3. Bikram K Das *Functional Grammar and Spoken and Written Communication in English.* Kolkata: Orient Blackswan, 2011.

4. Kiranmai Dutt, P et al. *A Course in Communication Skills.* New Delhi: CUP India, 2011.
5. Krishnaswamy, N. *Modern English – A Book of Grammar, Vocabulary and Usage* New Delhi: Macmillan India Pvt. Ltd, 2000.

Evaluation Pattern:

Total Marks: 30 / 20

1. **Examination Pattern: 30:20**
   (30 Weightage for End Semester Examination & 20 Weightage for Internal Continuous Evaluation)
2. **Nature of Question Paper:**

End Semester Examination Question Paper Pattern for 30 Marks

Instruction: 1) All Questions are compulsory.
2) All Questions carry equal marks.
3) Figures to the right indicate full marks.

Day and Date: Total Marks: 30
Time:

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Q.1. a) Multiple choice-type questions (Based on all units)	5 marks
b) Objective question Answer in one word/phrase/sentence (Based on all units)	5 marks
Q.2. a) Broad Question based on Unit I	5 marks
b) Broad Question based on Unit II	5 marks
Q.3. Short notes (2 out of 3) - (Based on all units)	10 marks

3. ICE (Internal Continuous Evaluation)

ICE for 20 Marks