Karmaveer Bhaurao Patil University, Satara

Syllabus for

B. Sc. III Forensic Science

Under

Faculty of Science and Technology

(As per NEP 2020)

With effect from Academic Year 2026-2027

Syllabus for Bachelor of Science (B. Sc.) Part – III Forensic Science

PREAMBLE:

This syllabus is prepared for third-year undergraduate students to encourage them to study Forensic Science and gain both academic insight and practical exposure relevant to the field. In alignment with UGC norms and the evolving demands of the criminal justice and scientific communities, the content of the syllabus has been carefully structured. The depth of the syllabi corresponds with that of other leading institutions while remaining flexible enough to accommodate the learning curve of undergraduate students. The units are clearly defined, each with a specific scope and prescribed number of lectures. Relevant references are provided to guide further reading and research.

GENERAL OBJECTIVES OF THE COURSE:

1.To introduce forensic science with a detailed study of its applications, enhancing students' interdisciplinary approach with analytical rigor.
2.To understand the fundamentals, principles, methodologies, and recent advancements in the field of forensic science.
3.To create a skilled and competent workforce capable of contributing to the criminal justice system and scientific investigations.
4.To develop a scientific attitude that encourages open-mindedness, objectivity, and critical thinking among students.
5. To foster practical skills through laboratory experiments, forensic case studies, and evidence analysis, enabling students to collect, examine, and interpret scientific data effectively.

PROGRAMME OUTCOMES

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

1.Able to apply theoretical and practical knowledge of forensic science in domains such as forensic biology, forensic chemistry, Cyber & digital forensics, questioned document examination, toxicology and criminalistics.
2.Able to communicate scientific observations, analyses, and conclusions effectively, both orally and in writing, to diverse audiences including legal and scientific communities.
3.Able to perform multiple roles within the forensic domain, including crime scene investigation, laboratory analysis, law enforcement collaboration, and academic research.
4.Graduates will have core proficiency in the principles and techniques of forensic science, ensuring practical readiness for real-world challenges in the justice system.
5.Prepared to pursue advanced studies or specialized training in forensic disciplines or allied fields such as criminology, law, biotechnology, or cyber forensics.
6.Able to design, conduct, and interpret forensic experiments and research projects, ensuring scientific rigor and legal admissibility of findings.
7.Skilled in the application of scientific instruments and technologies commonly used in forensic investigations and laboratory settings.

1. Capable of critically evaluating evidence and maintaining the chain of custody, upholding ethical standards and legal requirements.
2. Able to undertake internships, field training, and research projects to gain real-world experience and professional competence in forensic settings.
3. Aware of their role as responsible citizens in promoting justice and environmental sustainability, adhering to legal, ethical, and societal standards.

1. **TITLE:** Forensic Science
2. **YEAR OF IMPLEMENTATION:** 2026-2027
3. **DURATION:** 01 year
4. **PATTERN:** Semester examination
5. **MEDIUM OF INSTRUCTION:** English
6. **FACULTY ELIGIBILITY:** As per the rules and regulations of the UGC and Government of Maharashtra.
7. **STRUCTURE OF COURSE:** As per NEP-2020 (2.0)

Sem (Level)	**Courses**			**OE**	**VSC/ SEC**	**AEC/ VEC/ IKS**	**OJT/ FP/ CEP/ CC/ RP**	**Total Credits**	**Degree/ Cum. Cr. MEME**
	Course I	**Course II**	**Course III**						
	Major Mandatory	**Major Elective**	**--**						
Sem V (5.5)	Major IX (2) Major X (2) Major XI (2) Major P V (2)	Major XII (Elect.) (2) Major P VI (Elect.) (2)	-	-	VSC III (2) (P) Major specific)	AEC III (2) (English)	OJT (4) CEP (2)	22	UG Degree : 132
Sem VI (5.5)	Major XIII (2) Major XIV (2) Major XV (2) Major P VII (2)	Major XVI (Elect.) (2) Major P VIII (Elect.) (2)	-	-	VSC IV (2) (P) Major specific) SEC III (2) (P)	AEC III (2) (English)	FP (2) CC (2)	22	
Credits	16	08	-	-	06	04	10	44	
Total	**48**	**24**	**12**	**08**	**14**	**16**	**10**	**132**	Exit Option

8. COURSE TITLE

1) Fifth Semester

Semester V				
Sr. No.	**Components**	**Course Code**	**Course**	**Credits**
1	DSC I	BFST 351	Applied Forensic Science I	02
2	DSC II	BFST 352	Applied Digital and Cyber Forensic I	02
3	DSC III	BFST 353	Applied Forensic Chemistry I and Forensic Physics I	02
4	DSE I	BFST 354	Applied Forensic Biology I and Applied Forensic Psychology I	02
	DSE II	BFST 355	Criminology I	
5	DSCP I	BFSP 356	Practical Course-I	02
6	DSCP II	BFSP 357	Practical Course-II	02
7	VSC	BFSPVSC III	Forensic Serology	02
8	AEC	BFSTAEC III	English For Communication	02
9	OJT	BFSPOJT I	On Job Training	04
10	CEP	BFSPCEP I	Community Engagement Programme	02
			Total	**22**

2) Sixth Semester

Semester VI				
Sr. No.	Components	Course Code	Course	Credits
1	DSC I	BFST 361	Applied Forensic Science II	02
2	DSC II	BFST 362	Applied Digital and Cyber Forensic II	02
3	DSC III	BFST 363	Applied Forensic Chemistry II and Forensic Physics II	02
4	DSE I	BFST 364	Applied Forensic Biology II and Applied Forensic Psychology II	02
	DSE II	BFST 365	Criminology II	
5	DSCP I	BFSP 366	Practical Course-I	02
6	DSCP II	BFSP 367	Practical Course-II	02
7	VSC	BFSPVSC IV	Forensic Tool Marks and Impression Evidence I	02
8	SEC	BFSPSEC III	Forensic Anthropology	02

9	AEC	BFSTAEC IV	English For Communication P-IV	02
10	FP	BFSPFP I	Field Project	02
11	CC	BFSTCC I	Co-curricular Course in Forensic Science (**Script Writing)**	02
			Total	22
EXIT OPTION: Award of UG Degree in Major with 132 credits OR Continue with Major & Minor.				

Abbreviations: DSC: Discipline Specific Course; DSE: Discipline Specific Elective; CCE: Continuous Comprehensive Examination; AEC: Ability Enhancement Course; VSC: Vocational Skill Course; SEC: Skill Enhancement Course; OJT: On Job Training; FP: Field Project; CEP: Community Engagement Program; CC: Co-curricular Course; T: Theory; P: Practical

9. EVALUATION STRUCTURE:

Semester V (5.5)

Vertical	**Course Category**	**Course Code**	**Internal Evaluation**			**ESE**	**Total Marks**	**Credits**
			CCE-I	**CCE-II**	**CCE-III**			
DSC	T	BFST 351	10	10	10	30	50	02
	T	BFST 352	10	10	10	30	50	02
	T	BFST 353	10	10	10	30	50	02
	P	BFSP 356	20			30	50	02
DSE (1 Theory Papers Out of 2)	T	BFST 354	10	10	10	30	50	02
	T	BFST 355	10	10	10	30	50	02
	P	BFSP 357	20			30	50	02
AEC	T	AEC III	10	10	10	30	50	02
VSC	P	BFSPVSC III	20			30	50	02
CEP	P	BFSPCEP I	20			30	50	02
OJT	P	BFSPOJT I	50			50	100	04
Total							**550**	**22**

Semester VI

Vertical	**Course Category**	**Course Code**	**Internal Evaluation**			**ESE**	**Total Marks**	**Credits**
			CCE-I	**CCE-II**	**CCE-III**			
DSC	T	BFST 361	10	10	10	30	50	02
	T	BFST 362	10	10	10	30	50	02
	T	BFST 363	10	10	10	30	50	02
	P	BFSP 366	20			30	50	02
DSE (1 Theory	T	BFST 364	10	10	10	30	50	02
	T	BFST 365	10	10	10	30	50	02

Papers Out of 2)	P	BFSP 367	20			30	50	02
AEC	T	AEC IV	10	10	10	30	50	02
VSC	P	BFSPVSC IV	20			30	50	02
SEC	P	BFSPSEC III	20			30	50	02
CC	T	BFSPCC I	10	10	10	30	50	02
FP	P	BFSPFP I	20			30	50	02
Total							**550**	**22**

Abbreviations: DSC: Discipline Specific Course; DSE: Discipline Specific Elective; CCE: Continuous Comprehensive Examination; AEC: Ability Enhancement Course; VSC: Vocational Skill Course; SEC: Skill Enhancement Course; OJT: On Job Training; FP: Field Project; CEP: Community Engagement Program; CC: Cocurricular Course; T: Theory; P: Practical

10. OTHER FEATURES:

A) LIBRARY:

Reference books, Textbooks, journals, and Periodicals are available in Institute and Departmental Library. (Separate reference lists are attached along with the respective course syllabus)

B) EQUIPMENT:

a. Computer, Interactive Panel, visualizer, smart board
b. Laboratory Equipment:

1. Microscope with a digital camera
2. Hot Air Oven
3. Digital weighing balance
4. Incubator
5. pH meter
6. Refrigerator
7. Microtome
8. Autoclave

	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 Chemistry	
	Programme: B.Sc. III	**Semester** – V
	Type: DSC I	**Marks:** 50
	Credits: 2	**From:** A. Y. 2026-27
	Name of the Course: Applied Forensic Science I **(BFST 351)**	

Course Objectives: Students should be able to…

1) learn the fundamentals of forensic document examination, handwriting identification, and signature analysis.
2) study the scientific methods used for the examination of questioned and forged documents.
3) understand the principals involved in the examination of anonymous letters and determination.
4) examine the concepts, scope, and medico-legal importance of forensic medicine.

Course Outcomes: Students will be able to…

1) understand the characteristics of handwriting, signatures, and questioned documents for forensic examination.
2) examine forged documents, alterations, erasures, obliterations, and secret writings using scientific techniques.
3) analyse anonymous letters and determine the relative age of documents, writings, and signatures.
4) learn post-mortem changes, modes of death, and various forms of asphyxial deaths in medico-legal investigations.

Module	Title and Contents	Hrs
Module -1:	**Basics of document, Handwriting and Signature Examination** **1.1** Basics of document **1.2** Essentials to produce document **1.3** Types of documents **1.4** Scope of forensic document examination **1.5** Document expert **1.6** Basis of forensic examination – examination of writing surface and material **1.7** Security documents, printed, typewritten and photocopied documents **1.8** Handwriting/signature examination – principles of handwriting identification, general and individual characteristics of handwriting, rare/occasional and accidental features in handwriting, effect of posture, emotion, illness, age and drugs/alcohol on handwriting, procurement of handwriting standards – specimens and contemporaneous writings, process of comparison of like with like, best standards for comparison with disputed documents. **1.9** Detection and examination of forgery in documents – detection and decipherment of various alterations, obliterations, additions, overwriting, mechanical and chemical erasures, charred document, torn document and secret writings, types of forgery, inherent signs of forgery. Detection and decipherment of mechanical impressions –	08

	rubber stamp impressions, seal impressions, embossed impressions, indentations. Case studies.	

Module-2:	**Examination of anonymous letters and Determination of Forged documents** **2.1** Examination of anonymous letters – Identification of writer of the letter, features indicating religion, region, sex and educational background of the writer, importance of preserving envelope containing anonymous letters, types of anonymous letters and various methods used for their communication, case studies. **2.2** Determination of forged documents **2.3** Determination of relative age of writing and signatures **2.4** Determination of relative age by examination of signatures/rubber stamp impression in chronological order **2.5** Determination of relative age of document by: Examination of writing paper and ink, Examination of sequence of intersecting strokes, Addition of text with ink or type script & Anachronistic features and their importance **2.6** Case studies	07
Module -3:	**Forensic medicine** **3.1** Introduction and scope of forensic medicine **3.2** Historical perspectives of forensic medicine: Global and Indian scenario **3.3** Legal aspects in view of forensic medicine: Inquest, Exhumation, dying declaration, Dying deposition, medical certificates, medical report & Post mortem reports **3.4** Personal Identification **3.5** Death Definition and types, Modes of death, Stages of death – somatic death and molecular death and Signs of death **3.6** Changes after death: Early changes: Algor mortis, Rigor mortis, Cadaveric spasm, Heat stiffening, Cold stiffening, Changes in blood, Chemical changes in cerebrospinal fluid, Changes in vitreous humour, Postmortem lividity & Fluidity of blood. Late changes: Putrefaction – external and internal changes, Adipocere, Mummification & Destruction of body and tissues by maggots and other insects. **3.7** Medicolegal aspects of death **3.8** Violent asphyxia deaths: Hanging, Strangulation, Throttling, Suffocation & Drowning.	08
Module -4:	**Autopsy, Injuries, Infanticide, and Forensic Psychiatry** **4.1** Medical autopsy: Introduction and objectives, rules for medico-legal autopsy, external and internal examination of body, examination of clothing and weapons, collection of postmortems samples, autopsy report. **4.2** Injury: Introduction and classification of injury, medico-legal aspects of injuries, mechanical injuries – abrasions, bruises, lacerations, incised wounds, stab wounds, defence wound and self-inflicted wounds, regional injuries – head injury, injuries to brain, abdomen and other body parts, accident injuries – vehicular injuries, railway injuries and aircraft injuries, injury due to fall. **4.3** Thermal injuries: Burn and scalds, lightning, electricity and explosions. **4.4** Infanticide: Introduction, definition and types. **4.5** Forensic psychiatry: Introduction and medicolegal aspects	07

Reference Books:

1) Biswas, Gautam. *Review of Forensic Medicine and Toxicology*. 5th ed. New Delhi: Jaypee Brothers Medical Publishers, 2023.

2) Osborn, Albert S. *Questioned Documents*. 2nd ed. New Delhi: Universal Law Publishing Co., 1998.

3) Harrison, Wilson R. *Suspect Documents: Their Scientific Examination*. New Delhi: Universal Law Publishing Co, 2001.

4) Kelly, Jan Seaman, and Brian S. Lindblom. *Scientific Examination of Questioned Documents*. Boca Raton: CRC Press, 2006.

5) Brunelle, Richard L., and Robert W. Reed. *Forensic Examination of Ink and Paper*. Springfield, IL: Charles C Thomas, 1984.

6) Reddy, K. S. Narayan, and O. P. Murty. *The Essentials of Forensic Medicine and Toxicology*. 35th ed. New Delhi: Jaypee Brothers Medical Publishers, 2023.

7) Parikh, C. K. *Parikh's Textbook of Medical Jurisprudence, Forensic Medicine and Toxicology*. New Delhi: CBS Publishers, 2021.

Evaluation Pattern: 60:40

Total Marks: 50

Continuous Comprehensive Evaluation: (20Marks)

- Internal Work CCE-I Home Assignment (10 Marks)
- Internal Work CCE-II Short and long answer question test/seminar/open book test/ quiz/ case study/ book review/ field work/ industry visit
- Internal Work CCE-III Compulsory MCQ test (Each question for 1marks) (10 Marks)

Note: - (Internal Evaluation best of the two CCE marks will be considered)

End Semester Evaluation (30 Marks)

- Question 1 – Solve the following questions (Five questions of 2 marks)
- Question 2 – Attempt any two questions (Three questions of 10 marks)
- Question 3 – Attempt any four questions (Six questions of 5 marks)

Note: - Conversion of 50 marks of ESE evaluation to 30 marks.

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Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Chemistry

Programme: B. Sc. III	**Semester** – V
Type : DSC II	**Marks:** 50
Credits : 2	**From:** A. Y. 2026-27

Name of the Course: Applied Digital and Cyber Forensic I **(BFST 352)**

Course Objectives: Students should be able to…

1) learn the principles of speaker identification and forensic audio analysis.
2) study the applications of forensic linguistics in criminal investigations.
3) understand methods used in speech signal analysis.
4) learn techniques of forensic audio authentication.

Course Outcomes: Students will be able to…

1) analyze speech samples using forensic audio examination techniques.
2) examine linguistic features for speaker characterization.
3) interpret instrumental results obtained from speech analysis.
4) analyze forensic audio recordings for authenticity and evidential value.

Module	Title and Contents	Hrs
Module -1:	**Speaker Identification and Audio Authentication** **1.1** Introduction to speaker identification. **1.2** Application of speaker identification in various types of crime. **1.3** Audio tape authentication and examination. **1.4** Physics of sound: • Waves and sound • Analysis and synthesis of complex waves **1.5** Human and non-human utterances. **1.6** Anatomy of vocal tract, vocal formants. **1.7** Analysis of vocal sound, frequencies and overtones. **1.8** Electronics of audio recording, transmission, and playback devices. **1.9** Noise and distortion, voice storage and preservation.	08

Module -2:	**Linguistics and Forensic Linguistics** **2.1** Phonetics, phonology, morphology, and word formation processes as individual linguistic abilities. **2.2** Syntax, semantics, stylistics, and pragmatics. **2.3** Script, orthography, and graphology; difference between language and speech. **2.4** Psycholinguistics, neurolinguistics, and sociolinguistics. **2.5** Scientific approaches; reliability and admissibility of evidence in the court. **2.6** Linguistic profile, language register, and idiolects for speaker characterization. **2.7** Discourse analysis: connivance, acceptance, listening feedback, and rejection in the context of mens rea **2.8** Narrative, dialectology, and linguistic variety as a geographical marker. **2.9** Application of linguistic analysis in forensic contexts and speaker profiling.	07
Module -3:	**Instrumental and Analytical Approaches in Speaker Identification** **3.1** Instrumental analysis of speech sample. **3.2** Interpretation of result. **3.3** Statistical interpretation of probability scale. **3.4** Objective and subjective methods in speaker identification. **3.5** Discriminating tests – closed test and open test. **3.6** Likelihood ratio calculation. **3.7** Concept of test and error in speaker identification. **3.8** Source-filter theory. **3.9** Case studies.	08
Module -4:	**Advanced Speaker Identification and Forensic Evidence Handling** **4.1** Automatic speaker identification and verification systems based on fuzzy logic, neural networks, MPCC, etc. **4.2** Voice biometrics. **4.3** VoIP and other modes of speech communication and their forensic analysis **4.4** Forensic analysis options and types of evidence **4.5** The rules of evidence and volatile evidence **4.6** General procedure for evidence handling **4.7** Collection and archiving of forensic audio evidence **4.8** Methods of collection and handling of artifacts **4.9** Collection steps and controlling contamination.	07

Reference Books:

1)Rose, Phil. *Forensic Speaker Identification*. London: Taylor & Francis, 2002.

2)Hollien, Harry. *Forensic Voice Identification*. San Diego: Academic Press, 2002.

3)Coulthard, Malcolm, and Alison Johnson. *An Introduction to Forensic Linguistics*. London: Routledge, 2010.

4)Nolan, Francis. *Speaker Recognition and Forensic Phonetics*. Cambridge: Cambridge University Press, 2003.

5)French, Peter, and Philip Harrison. *Forensic Speaker Recognition*. London: Routledge, 2007.

Evaluation Pattern: 60:40	
Total Marks: 50	
Continuous Comprehensive Evaluation: (20Marks) • Internal Work CCE-I Home Assignment (10 Marks) • Internal Work CCE-II Short and long answer question test/seminar/open book test/ quiz/ case study/ book review/ field work/ industry visit • Internal Work CCE-III Compulsory MCQ test (Each question for 1marks) (10 Marks) Note: - (Internal Evaluation best of the two CCE marks will be considered)	**End Semester Evaluation (30 Marks)** • Question 1 – Solve the following questions (Five questions of 2 marks) • Question 2 – Attempt any two questions (Three questions of 10 marks) • Question 3 – Attempt any four questions (Six questions of 5 marks) Note: - Conversion of 50 marks of ESE evaluation to 30 marks.

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	Board of Studies in Chemistry	
	Programme: B. Sc. III	**Semester** - V
	Type : DSC III	**Marks:** 50
	Credits : 2	**From:** A. Y. 2026-27
	Name of the Course: Applied Forensic Chemistry I and Forensic Physics I **(BFST 353)**	

Course Objectives: Students should be able to…

1) learn the principles of forensic chemistry and alcohol analysis.
2) study the identification and analysis of adulterants and toxic substances.
3) understand the fundamentals of forensic toxicology.
4) learn the concepts of internal and external ballistics.

Course Outcomes: Students will be able to…

1) analyze alcoholic beverages and alcohol-related evidence.
2) examine food, drug, and chemical adulteration using forensic methods.
3) analyze toxic substances and their forensic significance.
4) examine factors affecting firearm performance and ballistics.

Module	Title and Contents	Hrs
Module -1:	**Forensic Chemistry and Alcohol Analysis** **1.1** Introduction to forensic chemistry **1.2** Types of forensic chemistry evidence **1.3** Examination in trap cases **1.4** Study of analysis of beverages: Introduction **1.5** Definition of alcohol and illicit liquor **1.6** Alcoholic and non-alcoholic beverages and their composition **1.7** Proof spirit, absorption, detoxification, and excretion of alcohol **1.8** Problems in alcohol cases and difficulties in diagnosis **1.9** Alcohol and prohibition, consequences of drunken driving, analytical techniques in the analysis of alcohol and other articles; case study.	08

Module -2:	**Food and Drug Adulteration, Toxicology** **2.1** Definition, nature, and current scenario of food and drug adulteration **2.2** Types of adulteration **2.3** Food adulteration and food safety: Milk and milk product adulteration, edible oil, and fat adulteration, sweetening agent adulteration, food grains and product adulteration **2.4** Drug adulteration: Adulterants used in drug addiction, types of drug adulteration, detection of drug adulteration **2.5** Cement adulteration: Types of cement, sampling, analysis of cement and building materials (silicon dioxide and other metal oxides, sulphide-sulphur, loss on ignition, insoluble residue) **Basics of Toxicology** **2.6** Introduction to toxicology **2.7** Branches of toxicology **2.8** Nature, needs, and scope of forensic toxicology **2.9** Concept of forensic toxicology: Important definitions, classification of poisons (based on state, mode of action, chemical nature); symptoms of poisons on the human body; antidotes (mechanical/physical antidote, physiological/pharmacological antidote, chemical antidote, chelating agent, universal and specific antidotes).	07
Module -3:	**Internal Ballistics** **3.1** Definition of internal ballistics **3.2** Ignition of propellants **3.3** Shape and size of propellants, manner of burning **3.4** Various factors affecting internal ballistics: lock time, ignition time, barrel time, erosion, corrosion, and gas cutting **3.5** Muzzle velocity: barrel length and velocity **3.6** Effect of quantity of gunpowder on velocity **3.7** Effect of bullet weight on velocity **3.8** Twist versus muzzle velocity **3.9** Strength of barrel and other parts: recoil, jump, and vibration.	07

Module -4:	**External Ballistics** **4.1** Introduction to external ballistics **4.2** General considerations in external ballistics **4.3** Parabolic trajectory of a bullet **4.4** Vacuum trajectory and calculation of remaining velocity **4.5** Air resistance and its effect on bullet trajectory **4.6** Bullet drop and wind deflection **4.7** Gyroscopic drift and its impact on bullet flight **4.8** Twist versus stability in bullet flight **4.9** Canting, shooting up/down, velocity of falling shot and falling bullet, escape velocity, maximum horizontal and vertical range of shot pellets, ricochet.	08

Reference Books:

1) Dixit, P. C. *Textbook of Forensic Medicine and Toxicology*. New Delhi: Peepee Publishers, 2019.

2) Reddy, K. S. Narayan. *The Essentials of Forensic Medicine and Toxicology*. New Delhi: Jaypee, 2023.

3) Hofmann, F. G. *A Handbook on Drug and Alcohol Abuse*. New York: Oxford University Press, 1983.

4) Saferstein, Richard. *Criminalistics: An Introduction to Forensic Science*. Boston: Pearson, 2024.

5) Heard, Brian J. *Handbook of Firearms and Ballistics*. Chichester: Wiley, 2015.

Evaluation Pattern: 60:40

Total Marks: 50

Continuous Comprehensive Evaluation: (20Marks)	**End Semester Evaluation (30 Marks)**
• Internal Work CCE-I Home Assignment (10 Marks) • Internal Work CCE-II Short and long answer question test/seminar/open book test/ quiz/ case study/ book review/ field work/ industry visit • Internal Work CCE-III Compulsory MCQ test (Each question for 1marks) (10 Marks) Note: - (Internal Evaluation best of the two CCE marks will be considered)	• Question 1 – Solve the following questions (Five questions of 2 marks) • Question 2 – Attempt any two questions (Three questions of 10 marks) • Question 3 – Attempt any four questions (Six questions of 5 marks) Note: - Conversion of 50 marks of ESE evaluation to 30 marks.

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	Yashavantrao Chavan Institute of Science, Satara	
	Board of Studies in Chemistry	
	Programme: B.Sc. III	**Semester** – V
	Type: DSE I	**Marks:** 50
	Credits: 2	**From:** A. Y. 2026-27
	Name of the Course: Applied Forensic Biology I and Applied Forensic Psychology I **(BFST 354)**	

Course Objectives: Students should be able to…

1) learn the principles of forensic serology and forensic microbiology.
2) study the applications of wildlife forensics and forensic botany.
3) understand theories of personality and psychological assessment.
4) study counselling psychology and therapeutic approaches.

Course Outcomes: Students will be able to…

1) analyze biological evidence using forensic serological methods.
2) examine microbial and botanical evidence of forensic significance
3) analyze wildlife evidence for species identification.
4) examine personality theories and psychological assessments.

Module	Title and Contents	Hrs
Module -1:	**Forensic Serology, Microbiology, and Bioterrorism** **1.1** Determination of human and animal origins from bones, hairs, nails, skin, body t issue, fluids/stains (blood, menstrual blood, semen, saliva, sweat, pus, vomit) through immune diffusion and immune-electrophoresis. **1.2** Sero genetic markers: Blood groups – biochemistry and genetics of ABO, Rh, and Mn systems **1.3** Identification of stains and other body fluids/stains through biochemical and serological techniques **1.4** Development of forensic microbiology **1.5** Types and identification of microbial organisms and fungi of forensic significance **1.6** Techniques in forensic microbiology **1.7** Understanding bioterrorism: Types of biological agents – Category A, B, and C **1.8** Planning and response to bioterrorism – preparedness, bio-surveillance, biodefence **1.9** Epidemiology of bioterrorism and pollen grain analysis	08

Module -2:	**Wildlife Forensics and Forensic Botany** **2.1** Introduction and importance of wildlife **2.2** Protected and endangered species of animals and plants **2.3** Types of wildlife investigations and the application of forensic science to wildlife cases. **2.4** Identification of wildlife materials by conventional and modern methods **2.5** Identification of pug marks of various animals and census of wildlife population **2.6** Genetic methodologies in wildlife investigation **2.7** Birds' flight, means of locomotion, strikes and collisions; quarantine issues and crime scenes **2.8** Confiscated bird goods, anthropological artefacts, applications of forensic ornithology; feather structure and topography **2.9** Dendrochronology: types of wood, identification of wood, study of tree rings and dating; plants of forensic significance.	07
Module -3:	**Psychology of Personality** **3.1** Personality: Concept and nature **3.2** Basic issues related to the study of personality **3.3** Eastern and Western perspectives on personality **3.4** Trait and type approaches: Allport, Cattell, Eysenck **3.5** Big Five Model of personality **3.6** Psychodynamic and psychosocial approaches: Freud and Erikson **3.7** Behaviouristic approaches: Skinner **3.8** Social learning approaches: Bandura and Mischel **3.9** Humanistic and phenomenological approaches: Rogers and Kelly.	07
Module -4:	**Counselling Psychology** **4.1** Counselling: Historical perspective **4.2** Educational, developmental, and preventive models; ethical issues in counselling **4.3** The counsellor and the counselee: Expectations and goals **4.4** Characteristics of the counselee and the counsellor; roles and functions of counsellors **4.5** Counselling approaches: Psychoanalytic, person-centred, existential, and cognitive behavioural approaches **4.6** Counselling process: External conditions and preparation **4.7** Structuring the counselling relationship; counselling interview and degrees of lead by the counsellor **4.8** Nonverbal behaviours in counselling **4.9** Areas of counselling: Educational, career, marital, gerontological, stress management, and counselling for terminal disease patients (cancer and HIV/AIDS).	08

Reference Books:

1) Butler, John M. *Fundamentals of Forensic DNA Typing*. London: Academic Press, 2010.
2) Linacre, Adrian. *Forensic Science in Wildlife Investigations*. Boca Raton: CRC Press, 2009.
3) Feist, Jess, and Gregory Feist. *Theories of Personality*. New York: McGraw-Hill, 2009.
4) Li, Richard. *Forensic Biology*. Boca Raton: CRC Press, 2015.
5) Cloninger, Susan C. *Theories of Personality*. Boston: Pearson, 2012.

Evaluation Pattern: 60:40

Total Marks: 50

Continuous Comprehensive Evaluation: (20Marks)

- Internal Work CCE-I Home Assignment (10 Marks)
- Internal Work CCE-II Short and long answer question test/seminar/open book test/ quiz/ case study/ book review/ field work/ industry visit
- Internal Work CCE-III Compulsory MCQ test (Each question for 1marks) (10 Marks)

Note: - (Internal Evaluation best of the two CCE marks will be considered)

End Semester Evaluation (30 Marks)

- Question 1 – Solve the following questions (Five questions of 2 marks)
- Question 2 – Attempt any two questions (Three questions of 10 marks)
- Question 3 – Attempt any four questions (Six questions of 5 marks)

Note: - Conversion of 50 marks of ESE evaluation to 30 marks.

	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 Chemistry	
	Programme: B. Sc. III	**Semester** - V
	Type : DSE II	**Marks:** 50
	Credits : 2	**From:** A. Y. 2026-27
	Name of the Course: Criminology I **(BFST 355)**	

Course Objectives: Students should be able to…

1) learn the concepts, nature, and scope of criminology.
2) study the relationship between crime, criminals, and society.
3) understand various theories of crime causation.
4) study juvenile delinquency and victimology.

Course Outcomes: Students will be able to…

1) analyze the concepts and significance of criminology.
2) examine various types of crimes and criminal behavior.
3) analyze sociological, psychological, and biological theories of crime.
4) evaluate factors contributing to juvenile delinquency.

Module	Title and Contents	Hrs
Module -1:	**Introduction to Criminology** **1.1** Definition, Nature and Scope of Criminology **1.2** Historical Development and Schools of Criminology **1.3** Relationship of Criminology with Sociology, Psychology, Law and Forensic Science **1.4** Importance and Functions of Criminology in Criminal Justice System	07
Module -2:	**Crime and Criminal** **2.1** Definition, Elements and Classification of Crime **2.2** Types of Crime: Violent, Property, Cyber and White Collar Crime **2.3** Causes of Crime: Social, Economic, Psychological and Biological Factors **2.4** Concept, Classification and Characteristics of Criminals	08
Module -3:	**Theories of Crime Causation** **3.1** Sociological Theories of Crime **3.2** Psychological and Biological Theories of Crime **3.3** Differential Association, Strain and Social Disorganization Theories **3.4** Modern Approaches and Multiple Causation Theory	07
Module -4:	**Juvenile Delinquency and Victimology** **4.1** Meaning, Nature and Causes of Juvenile Delinquency **4.2** Prevention and Control of Juvenile Delinquency **4.3** Juvenile Justice System in India **4.4** Concept, Types and Rights of Victims under Victimology	08

Reference Books:

1) Vold, George B., Thomas Bernard, and Jeffrey Snipes. *Theoretical Criminology*. New York: Oxford University Press, 2018.
2) Siegel, Larry J. *Criminology*. Boston: Cengage Learning, 2023.
3) Sutherland, Edwin H. *Principles of Criminology*. Philadelphia: Lippincott, 2019.
4) Bartol, Curt R., and Anne M. Bartol. *Criminal Behavior*. Boston: Pearson, 2021.
5) Sharma, Rajendra Kumar. *Criminology and Penology*. New Delhi: Atlantic Publishers, 2020.

Evaluation Pattern: 60:40

Total Marks: 50

Continuous Comprehensive Evaluation: (20Marks)

- Internal Work CCE-I Home Assignment (10 Marks)
- Internal Work CCE-II Short and long answer question test/seminar/open book test/ quiz/ case study/ book review/ field work/ industry visit
- Internal Work CCE-III Compulsory MCQ test (Each question for 1marks) (10 Marks)

Note: - (Internal Evaluation best of the two CCE marks will be considered)

End Semester Evaluation (30 Marks)

- Question 1 – Solve the following questions (Five questions of 2 marks)
- Question 2 – Attempt any two questions (Three questions of 10 marks)
- Question 3 – Attempt any four questions (Six questions of 5 marks)

Note: - Conversion of 50 marks of ESE evaluation to 30 marks.

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Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Chemistry

Programme: B. Sc. III	**Semester:** V
Type: DSCP I	**Marks: 50**
Credits: 2	**From: A.Y 2026-27**

Name of the Course: Practical Course-I based on BFST 351 and BFST 352 **(BFSP 356)**

Course Objectives: Students should be able to…

1) learn practical techniques of forensic document examination.
2) study methods for detection of forged and altered documents.
3) understand forensic audio analysis procedures.
4) examine instrumental methods used in speech analysis.

Course Outcomes: Students will be able to…

1) examine questioned documents using scientific methods.
2) analyse handwriting and signature characteristics.
3) perform forensic audio and speech analysis.
4) understand security features of documents.

No. of Practical's	List of Practicals	Hrs
1)	To identify different types of documents.	60
2)	To conduct the preliminary examination of different types of documents.	
3)	To study the detection and decipherment of secret document.	
4)	To study the detection and decipherment of charred document.	
5)	To study the different types of document forgery.	
6)	To study the different types of handwriting/signature forgery.	
7)	To study the stamp impression.	
8)	To perform the TLC of different ink samples.	
9)	To represent speech signal in the form of waveform and to resample the same.	
10)	To convert analog speech signal into digital one.	
11)	To segregate voice sample of a particular subject.	
12)	To form clue words of given speech sample of a subject.	
13)	To describe speech sample in terms of IPA.	
14)	To perform auditory analysis on a given set of speakers.	
15)	To study formant frequency in a given sound spectrograph.	

Reference Books: -

1) Hilton, Ordway. *Scientific Examination of Questioned Documents*. New York: Elsevier Science Publishing, 1982.
2) Ellen, David. *The Scientific Examination of Documents: Methods and Techniques*. 3rd ed. Boca Raton, FL: CRC Press, 2006.
3) Osborn, Albert S. *Questioned Documents*. 2nd ed. Albany, NY: Boyd Printing Company, 1929.
4) Harrison, Wilson R. *Suspect Documents: Their Scientific Examination*. Chicago: Nelson-Hall, 1981.
5) Hollien, Harry. *Forensic Voice Identification*. San Diego: Academic Press, 2002.
6) Rose, Phil. *Forensic Speaker Identification*. London: Taylor & Francis, 2002.
7) Coulthard, Malcolm, and Alison Johnson. *An Introduction to Forensic Linguistics: Language in Evidence*. London: Routledge, 2010.

Evaluation Pattern: 60:40

Total Marks: 50

Internal Practical Examination: (20 Marks)	**End Semester Practical Examination:(30 Marks)**
• Journal (05 M) • Viva (05 M) • Day to Day Performance (10 M)	• Practical Examination (30 M)

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Programme: B. Sc. III	**Semester:** V
Type: DSEP II	**Marks: 50**
Credits: 2	**From: A.Y 2026-27**

Name of the Course: Practical Course-II based on BFST 353 and BFST 354
(BFSP357)

Course Objectives: Students should be able to…

1) learn practical aspects of forensic chemistry and ballistics.
2) study analytical methods for poison detection.
3) understand firearm examination procedures.
4) examine biological evidence examination techniques.

Course Outcomes: Students should be able to…

1) learn firearm and ballistic evidence.
2) examine poisons and adulterants using laboratory methods.
3) perform biological evidence examinations.
4) analyse crime-related case studies.

No. of Practical's	List of Practicals	Hrs
1)	To study the working mechanism of firearm(s).	60
2)	To study Documentation, Collection, of fired evidences.	
3)	To study Class characteristics of firearm	
4)	Examination of Entrance Versus Exit wounds.	
5)	To detect plant poisons. (Any 2)	
6)	To identify metallic poisons. (Any 2)	
7)	To identify ethyl alcohol. (Any 2)	
8)	Detection of adulteration (Any 2)	
9)	To perform electrophoresis for separation of various polymorphic enzymes.	
10)	Examination of Barr bodies from blood sample and determination of human hair.	
11)	Presumptive tests for Blood: a. Phenolphthalein Assay. b. Benzidine.	
12)	Personality assessment using any projective test	
13)	To write an individual case study report.	
14)	To measure five factors of personality.	
15)	To measure academic stress scale.	

Reference Books: -

1) Heard, Brian J. *Handbook of Firearms and Ballistics: Examining and Interpreting Forensic Evidence*. 3rd ed. Chichester: Wiley-Blackwell, 2016.
2) Jauhari, R. K. *Firearms in Criminal Investigation and Trials*. New Delhi: Universal Law Publishing, 2004.
3) James, Stuart H., and Jon J. Nordby. *Forensic Science: An Introduction to Scientific and Investigative Techniques*. 5th ed. Boca Raton: CRC Press, 2019.
4) Butler, John M. *Fundamentals of Forensic DNA Typing*. London: Academic Press, 2010.
5) Li, Richard. *Forensic Biology*. Boca Raton: CRC Press, 2015.
6) Siegel, Larry J. *Criminology*. 14th ed. Boston: Cengage Learning, 2023.
7) Bartol, Curt R., and Anne M. Bartol. *Criminal Behavior: A Psychological Approach*. 12th ed. Boston: Pearson, 2021.

Evaluation Pattern: 60:40

Total Marks: 50

Internal Practical Examination: (20 Marks)	**End Semester Practical Examination: (30 Marks)**
• Journal (05 M) • Viva (05 M) • Day to Day Performance (10 M)	• Practical Examination (30 M)

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Programme: B. Sc. III	**Semester:** V
Type: DSEP II	**Marks: 50**
Credits: 2	**From: A.Y 2026-27**

Name of the Course: Practical VI based on BFST 353 and BFST 355 **(BFSP357)**

Course Objectives: Students should be able to…

1) learn practical aspects of forensic chemistry.
2) study analytical methods for poison detection.
3) understand firearm examination procedures.
4) evaluate biological evidence examination techniques.

Course Outcomes: Students should be able to…

1) understand firearm and ballistic evidence.
2) examine poisons and adulterants using laboratory methods.
3) perform biological evidence examinations.
4) analyse crime-related case studies.

No. of Practical's	List of Practicals	Hrs
1)	To study the working mechanism of firearm(s).	60
2)	To study Documentation, Collection, of fired evidences.	
3)	To study Class characteristics of firearm	
4)	Examination of Entrance Versus Exit wounds.	
5)	To detect plant poisons. (Any 2)	
6)	To identify metallic poisons. (Any 2)	
7)	To identify ethyl alcohol. (Any 2)	
8)	Detection of adulteration (Any 2)	
9)	Study of different schools of criminology through case analysis.	
10)	Preparation of a chart on the historical development of criminology.	
11)	Classification of crimes based on IPC and modern crime categories.	
12)	Case study analysis of violent and property crimes.	
13)	Study of white-collar crime through newspaper or media reports.	
14)	Comparative study of cybercrime cases in India.	
15)	Preparation of criminal profiling based on hypothetical cases.	

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Reference Books: -

1) Heard, Brian J. *Handbook of Firearms and Ballistics: Examining and Interpreting Forensic Evidence*. 3rd ed. Chichester: Wiley-Blackwell, 2016.
2) Jauhari, R. K. *Firearms in Criminal Investigation and Trials*. New Delhi: Universal Law Publishing, 2004.
3) James, Stuart H., and Jon J. Nordby. *Forensic Science: An Introduction to Scientific and Investigative Techniques*. 5th ed. Boca Raton: CRC Press, 2019.
4) Butler, John M. *Fundamentals of Forensic DNA Typing*. London: Academic Press, 2010.
5) Li, Richard. *Forensic Biology*. Boca Raton: CRC Press, 2015.
6) Siegel, Larry J. *Criminology*. 14th ed. Boston: Cengage Learning, 2023.
7) Bartol, Curt R., and Anne M. Bartol. *Criminal Behavior: A Psychological Approach*. 12th ed. Boston: Pearson, 2021.

Evaluation Pattern: 60:40

Total Marks: 50

Internal Practical Examination: (20Marks)	**End Semester Practical Examination: (30Marks)**
• Journal (05 M) • Viva (05 M) • Day to Day Performance (10 M)	• Practical Examination (30 M)

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Programme: B. Sc. III	**Semester:** V
Type: BFSPVSC III	**Marks: 50**
Credits: 2	**From: A.Y 2026-27**

Name of the Course: Forensic Serology **(BFSPVSC III)**

Course Objectives: Students should be able to…

1) learn the principles of forensic serology.
2) study methods for identification of biological fluids.
3) understand antigen-antibody reactions in forensic science.
4) learn evidence collection and preservation procedures.

Course Outcomes: Students will be able to…

5) analyse blood, semen, saliva, urine, and other biological fluids.
6) examine serological evidence using presumptive and confirmatory tests.
7) differentiate human and animal blood samples.
8) apply immunological techniques in forensic investigations.

No. of Practical's	Practicals on Forensic Serology	Hrs
1)	To perform a presumptive test for the presence of blood using colorimetric techniques.	60
2)	To confirm the presence of human blood using crystal tests.	
3)	To detect latent bloodstains using chemiluminescent reagents like luminol or Bluestar.	
4)	To detect acid phosphatase enzyme indicative of seminal fluid.	
5)	To identify spermatozoa microscopically for forensic semen analysis.	
6)	To detect salivary amylase as an indicator of the presence of saliva.	
7)	To determine ABO blood groups from dried bloodstains using agglutination.	
8)	To assess secretor status by detecting antigens in saliva.	
9)	To identify urine stains through chemical tests for urobilinogen.	
10)	To test and identify vomitus and bile in suspected stains.	
11)	To practice collection, labelling, and preservation techniques for serological evidence.	
12)	To extract and process blood samples from fabric and absorbent surfaces.	
13)	To distinguish human blood from animal blood using the precipitin test.	
14)	Differentiate menstrual blood from peripheral blood using enzymatic & microscopic analysis.	
15)	To study cross-reactivity in antigen-antibody reactions and interpret test reliability.	

Reference Books: -

1. Saferstein, Richard. *Forensic Science: From the Crime Scene to the Crime Lab*. 5th ed. New York: Pearson, 2023.
2. Butler, John M. *Fundamentals of Forensic DNA Typing*. London: Academic Press, 2010.
3. Li, Richard. *Forensic Biology*. Boca Raton: CRC Press, 2015.
4. Houck, Max M., and Jay A. Siegel. *Fundamentals of Forensic Science*. 4th ed. London: Academic Press, 2023.
5. James, Stuart H., and Jon J. Nordby. *Forensic Science: An Introduction to Scientific and Investigative Techniques*. 5th ed. Boca Raton: CRC Press, 2019.
6. Gaensslen, R. E. *Sourcebook in Forensic Serology, Immunology and Biochemistry*. Washington, DC: U.S.
7. Department of Justice, 1983.
8. Lee, Henry C., Timothy Palmbach, and Marilyn T. Miller. *Henry Lee's Crime Scene Handbook*. Burlington, MA: Elsevier Academic Press, 2014.

Evaluation Pattern: 60:40

Total Marks: 50

Internal Practical Examination: (20 Marks)	**End Semester Practical Examination: (30 Marks)**
• Journal (05 M) • Viva (05 M) • Day to Day Performance (10 M)	• Practical Examination (30 M)

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Programme: B.Sc. III	**Programme:** V
Type: OJT	**Marks:** 100
Credits: 4	**From:** A. Y. 2026-27

Name of the Course and Code: On Job Training **(BFSP OJT-I)**

Course Objectives: Students should be able to…

1. provide students with practical exposure to real workplace environments through On Job Training (OJT).
2. develop professional skills, work ethics, and industry-oriented competencies required for employability.
3. enable students to apply theoretical knowledge gained during the academic program to real-world situations.
4. enhance communication, teamwork, problem-solving, and decision-making abilities in professional settings.

Course Outcomes: Students will be able to…

1. demonstrate practical knowledge and skills relevant to their field of study in a workplace environment.
2. apply theoretical concepts to solve real-life problems encountered during training or internship.
3. exhibit professional behaviour, ethical practices, and effective communication in organizational settings.
4. work effectively as an individual and as a member of a team to accomplish assigned tasks.

On Job Training (OJT)

OJT will provide the opportunities for internship with local/regional industries, business organization, health and allied areas, local government, etc. so that students may actively engaged with the employability opportunities. Students will undergo 4 credit work-based learning/OJT/internship.

Practical Evaluation Pattern: 60:40

Total Marks: 100

Internal Examination: (40 Marks)	**External Examination (60 Marks)**
• Attendance/Daily Logbook = 20 Marks • Supervisor Evaluation from Industry: 20 Marks	• Report = 20 Marks • Presentation (PPT) = 20 Marks • Viva = 20 Marks

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	Yashavantrao Chavan Institute of Science, Satara
	Board of Studies in Chemistry
	Programme: B.Sc. III — **Semester –** V
	Type: CEP — **Marks:** 50
	Credits: 2 — **From:** A. Y. 2026-27
	Name of the Course and Code: Community Engagement Programme **(BFSP CEP-I)**

Course Objectives: Students should be able to…

1. promote a respect for rural culture, lifestyle, and wisdom among students.
2. learn about the present status of agricultural and development initiatives.
3. identify and address the root causes of distress and poverty among vulnerable households.
4. improve learning outcomes by applying classroom knowledge to real-world situations

Course Outcomes: Students will be able to…

1. gain an understanding of rural life, Indian culture, and social realities.
2. develop empathy and bonds of mutuality with the local community.
3. appreciate the significant contributions of local communities to Indian society and economy.

Community Engagement Programme (CEP)

The Community Engagement Programme (CEP) is an integral part of the undergraduate curriculum under NEP 2020. It aims to connect students with society by involving them in activities that promote civic responsibility, scientific temper, and sustainable development. This program encourages experiential learning by exposing students to community challenges and enabling them to contribute positively using their academic knowledge and innovative ideas.

Practical Evaluation Pattern: 60:40

Total Marks: 50

Internal Examination: (20 Marks)	**External Examination: (30 Marks)**
• Report = 10 Marks • Day To Day Performance =10 Marks	• Presentation = 20 Marks • Viva = 10 Marks

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	Yashavantrao Chavan Institute of Science, Satara	
	Board of Studies in Chemistry	
	Programme: B. Sc. III	**Semester** – VI
	Type : DSC I	**Marks:** 50
	Credits : 2	**From:** A. Y. 2026-27
	Name of the Course: Applied Forensic Science II **(BFST 361)**	

Course Objectives: Students should be able to…

1) learn the history, development, and principles of fingerprint science.
2) study the classification systems and identification methods used in fingerprint examination.
3) understand techniques for collection, preservation, and development of fingerprints.
4) study the principles and applications of bloodstain pattern analysis.

Course Outcomes: Students will be able to…

1) analyze fingerprint patterns and ridge characteristics for personal identification.
2) examine various methods for collection, development, and comparison of fingerprints.
3) analyze bloodstain patterns for reconstruction of crime scene events.
4) examine the point of convergence, point of origin, and impact patterns in bloodstain evidence.

Module	Title and Contents	Hrs
Module -1:	**Fundamentals of Fingerprint Examination** **1.1** History and development of fingerprint in India and abroad **1.2** Morphology and anatomy of dermal skin **1.3** Embryology of fingerprint – morphology of volar pad and configurational areas, development of volar pad, formation of friction ridges. **1.4** Sweat glands – eccrine, sebaceous and apocrine. **1.5** Definition of fingerprint. **1.6** Theory and principles of fingerprint. **1.7** Forensic significance of fingerprint. Case studies **1.8** Taking and collection of fingerprints: Types of fingerprints – rolled, plain, chance, latent, patent and plastic. **1.9** Collection of latent, patent and plastic fingerprint: methods, procedure, precautions, limitations, preservation and lifting of fingerprint; Taking of fingerprint – Taking fingerprints of living person: purpose, requirements, procedures, precautions, limitation and collection;	08

Module -2:	**Classification, Development and Comparison of Fingerprints** **2.1** Basic classification of fingerprint – arch, loop, whorl and composite **2.2** Rules for placing core and delta, counting and tracing of ridges, ridge density **2.3** Classification and identification of fingerprint – different systems of classifications (Ivon, Vucetich, Purkinje, Francis Galton, Henry 10-digit, Henry FBI extension and Battley single digit classification) and their modification till date and their utilities **2.4** Development of fingerprint – conventional methods: black powder, magnetic powder and fluorescent powder; chemical methods: silver nitrate, ninhydrin and its analogues, physical developer etc.; fuming methods: iodine fuming, cyanoacrylate fuming, soot method, hydrogen fluoride fuming and metal deposition method **2.5** Comparison of fingerprint – class and individual characteristics (minutiae). **2.6** Fundamentals of comparison – print to print, trace to record, trace to print, trace to trace, documentation of fingerprint, AFIS (Automated Fingerprint Identification System).	07
Module -3:	**Bloodstain Pattern Analysis (BPA)** **3.1** Historical perspective of bloodstain evidence **3.2** Introduction, terminologies and classification **3.3** Biological and physical properties of human blood **3.4** Droplet dynamics in flight and on impact **3.5** Droplet directionality from bloodstain patterns **3.6** Determination of point of convergence and point of origin **3.7** Impact spatter and mechanisms; concept of preponderant stain size; spatter associated with a projection mechanism **3.8** Altered bloodstain patterns; formation of spatter and spatter associated with a secondary mechanism **3.9** Documentation and evaluation of bloodstain evidence **3.10** Importance and legal aspects of BPA **3.11** Manual and computer-assisted reconstruction of BPA; dealing with risk of bloodborne pathogens.	08
Module -4:	**Emerging Forensic Disciplines – Introduction, Scope and Importance** **4.1** Forensic Engineering **4.2** Forensic Radiology **4.3** Forensic Accounting **4.4** Forensic Nursing **4.5** Forensic Nanotechnology	07

	4.6 Forensic Archaeology **4.7** Forensic Arts **4.8** Computational Forensics **4.9** Nuclear Forensics **4.10** Forensic Journalism **4.11** Environmental Forensics **4.12** Forensic Pharmacology **4.13** Forensic Biotechnology **4.14** Introduction, scope and importance of each emerging forensic discipline.	

Reference Books:

1) Lee, Henry C., and R. E. Gaensslen. *Advances in Fingerprint Technology*. 3rd ed. Boca Raton: CRC Press, 2012.

2) Cowger, James P. *Friction Ridge Skin Comparison and Identification of Fingerprints*. Boca Raton: CRC Press, 1993.

3) Henry, Edward R. *Classification and Uses of Finger Prints*. London: Routledge, 1900.

4) Komarinski, Peter. *Automated Fingerprint Identification Systems (AFIS)*. Burlington: Elsevier, 2005.

5) Bevel, Tom, and Ross Gardner. *Bloodstain Pattern Analysis*. 4th ed. Boca Raton: CRC Press, 2021.

6) James, Stuart H., and William G. Eckert. *Interpretation of Bloodstain Evidence at Crime Scenes*. Boca Raton: CRC Press, 1998.

Evaluation Pattern: 60:40

Total Marks: 50

Continuous Comprehensive Evaluation: (20Marks)	**End Semester Evaluation (30 Marks)**
• Internal Work CCE-I Home Assignment (10 Marks) • Internal Work CCE-II Short and long answer question test/seminar/open book test/ quiz/ case study/ book review/ field work/ industry visit • Internal Work CCE-III Compulsory MCQ test (Each question for 1marks) (10 Marks) Note: - (Internal Evaluation best of the two CCE marks will be considered)	• Question 1 – Solve the following questions (Five questions of 2 marks) • Question 2 – Attempt any two questions (Three questions of 10 marks) • Question 3 – Attempt any four questions (Six questions of 5 marks) Note: - Conversion of 50 marks of ESE evaluation to 30 marks.

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Programme: B. Sc. III	**Semester** – VI
Type : DSC II	**Marks:** 50
Credits : 2	**From:** A. Y. 2026-27

Name of the Course: Applied Digital and Cyber Forensic II **(BFST 362)**

Course Objectives: Students should be able to…

1) learn the concepts and methods of data recovery in digital forensics.
2) study the role of backup systems and recovery solutions.
3) understand procedures for collection and preservation of digital evidence.
4) learn techniques used in duplication and authentication of digital evidence.

Course Outcomes: Students will be able to…

1) analyze data recovery procedures used in digital forensic investigations.
2) examine methods for collection and preservation of digital evidence.
3) analyze digital artifacts and hidden data in electronic devices.
4) apply forensic procedures for duplication and authentication of digital evidence.

Module	Title and Contents	Hrs
Module -1:	**Data Recovery** **1.1** Data Recovery Defined **1.2** Data Backup and Recovery **1.3** The Role of Backup in Data Recovery **1.4** The Data-Recovery Solution **1.5** Hiding and Recovering Hidden Data	08
Module -2:	**Collection of Digital Evidence** **2.1** Collection of Digital Evidence **2.2** Collection Options **2.3** Obstacles **2.4** Types of Evidence **2.5** The Rules of Evidence **2.6** Volatile Evidence **2.7** General Procedure for Collection and Archiving **2.8** Methods of Collection **2.9** Artifacts.	07

Module -3:	**Duplication and Preservation of Digital Evidence** **3.1** Instrumental analysis of speech sample. **3.2** Interpretation of result. **3.3** Statistical interpretation of probability scale. **3.4** Objective and subjective methods in speaker identification. **3.5** Discriminating tests – closed test and open test. **3.6** Likelihood ratio calculation. **3.7** Concept of test and error in speaker identification. **3.8** Source-filter theory. **3.9** Case studies.	08
Module -4:	**Digital Evidence Handling** **4.1** Why Collect Evidence **4.2** Collection Options **4.3** Types of Evidence **4.4** The Rules of Evidence **4.5** Volatile Evidence **4.6** General Procedure **4.7** Collection and Archiving **4.8** Methods of Collection **4.9** Artifacts **4.10** Collection Steps **4.11** Controlling Contamination.	07

Reference Books:

1. Vacca, John R. *Computer Forensics: Computer Crime Scene Investigation*. 2nd ed. Hingham: Charles River Media, 2005.
2. Nelson, Bill, Amelia Phillips, and Christopher Steuart. *Guide to Computer Forensics and Investigations*. Boston: Cengage Learning, 2018.
3. Casey, Eoghan. *Digital Evidence and Computer Crime*. 3rd ed. Burlington: Academic Press, 2011.
4. Sammons, John. *The Basics of Digital Forensics*. Amsterdam: Elsevier, 2015.
5. Carrier, Brian. *File System Forensic Analysis*. Boston: Addison-Wesley, 2005.

Evaluation Pattern: 60:40

Total Marks: 50

Continuous Comprehensive Evaluation: (20Marks)	**End Semester Evaluation (30 Marks)**
• Internal Work CCE-I Home Assignment (10 Marks) • Internal Work CCE-II Short and long answer question test/seminar/open book test/ quiz/ case study/ book review/ field work/ industry visit (10 Marks) •Internal Work CCE-III Compulsory MCQ test (Each question for 1marks) (10 Marks) Note: - (Internal Evaluation best of the two CCE marks will be considered)	• Question 1 – Solve the following questions (Five questions of 2 marks) • Question 2 – Attempt any two questions (Three questions of 10 marks) • Question 3 – Attempt any four questions (Six questions of 5 marks) Note: - Conversion of 50 marks of ESE evaluation to 30 marks.

	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 Chemistry
Programme: B. Sc. III	**Semester** – VI
Type: DSC III	**Marks:** 50
Credits: 2	**From:** A. Y. 2026-27
Name of the Course: Applied Forensic Chemistry II and Forensic Physics II **(BFST 363)**	

Course Objectives: Students should be able to…

1) learn the classification and forensic significance of narcotic drugs and psychotropic substances.
2) study laws and regulations related to forensic chemistry and toxic substances.
3) understand the principles of wound ballistics.
4) learn methods used in the investigation of vehicular and rail accidents.

Course Outcomes: Students will be able to…

1) analyze narcotic drugs and psychotropic substances using forensic techniques.
2) examine provisions of NDPS Act, Poisons Act, and other relevant legislations.
3) analyze wound characteristics associated with firearm injuries.
4) examine vehicular and rail accident evidence for forensic reconstruction.

Module	Title and Contents	Hrs
Module -1:	**Narcotic Drugs and Psychotropic Substances** **1.1** Definition of Narcotic Drugs and Psychotropic Substances **1.2** Broad Classification – Stimulants, Depressants, and Hallucinogens **1.3** Natural, Synthetic, and Semi-Synthetic Narcotics; Designer Drugs **1.4** General Characteristics and Common Examples of Each Classification **1.5** Drug Dependence and Drug Abuse – Important Definitions (Drug, Medicine, Poison, Drug Addiction, Drug Dependence, Drug Habituation, Drug Tolerance, Lethal Dose, etc.) **1.6** Drug Addiction – Causes of Drug Addiction **1.7** Characteristics of a Drug Addict and Withdrawal Symptoms **1.8** Relation Between Drug Addiction and Crime – Indian Scenario **1.9** Analysis of Narcotic Drugs **1.10** Narcotic Drugs & Psychotropic Substances Act, 1985 – Definition, Licit Opium Cultivation **1.11** Minimum and Commercial Quantity in Narcotic Drugs, Offences and Penalties.	08

Module -2:	**Law and Regulations Related to Forensic Chemistry** **2.1** The Poisons Act, 1919 and Section 284 of IPC, 1860 – Negligent Conduct with Respect to Poisonous Substance **2.2** Explosives Act, 1984 – Definition, Powers of Central Government and Licensing Authority, Offences and Penalties **2.3** Section 286 of IPC, 1860 – Negligent Conduct with Respect to Explosive Substance **Explosive Substance** **2.4** Explosive Substances Act, 1908 – Definition, Offences and Penalties **2.5** Prevention of Food Adulteration Act, 1954 – Definition, Powers of Food Inspector, Offences and Penalties **2.6** Drugs and Cosmetics Act, 1945 – Definition of Adulterated, Misbranded, Spurious Drugs and Cosmetics; Offences and Penalties.	07
Module -3:	**Wound Ballistics** **3.1** Introduction **3.2** Stopping Power of Bullet **3.3** Injuries and the Quantity of Energy of Projectiles **3.4** Shock Wave and Cavitation Effect **3.5** Wounding Mechanism **3.6** Elements of Wound Ballistics **3.7** Nature of Target **3.8** Velocity of Projectile **3.9** Constructional Features of Projectile **3.10** Entrance Wound and Exit Wound	07
Module -4:	**Investigation of Vehicular and Rail Accidents** **4.1** Introduction **4.2** Sources of Information **4.3** Eye Witnesses **4.4** Tire and Other Marks **4.5** Pedestrian Impacts and Vehicle Speed **4.6** Vehicle Condition **4.7** Vehicle Speed and Damage **4.8** Curved Scuffmarks **4.9** Time and Distance, Reaction Time **4.10** Photography and Plans **4.11** Rail Accidents – Investigation of Rail Crash: Criminal and Safety Investigation.	08

Reference Books:

1. Hofmann, F. G. *A Handbook on Drug and Alcohol Abuse*. New York: Oxford University Press, 1983.
2. Reddy, K. S. Narayan. *The Essentials of Forensic Medicine and Toxicology*. New Delhi: Jaypee, 2023.
3. Parikh, C. K. *Textbook of Medical Jurisprudence, Forensic Medicine and Toxicology*. New Delhi: CBS Publishers, 2021.
4. Heard, Brian J. *Handbook of Firearms and Ballistics*. Chichester: Wiley-Blackwell, 2016.
5. Saferstein, Richard. *Criminalistics: An Introduction to Forensic Science*. Boston: Pearson, 2024.
6. Sharma, B. R. *Forensic Science in Criminal Investigation and Trials*. New Delhi: Universal Law Publishing, 2019.

Evaluation Pattern: 60:40

Total Marks: 50

Continuous Comprehensive Evaluation: (20Marks)	**End Semester Evaluation (30 Marks)**
• Internal Work CCE-I Home Assignment (10 Marks) • Internal Work CCE-II Short and long answer question test/seminar/open book test/ quiz/ case study/ book review/ field work/ industry visit (10 Marks) •Internal Work CCE-III Compulsory MCQ test (Each question for 1marks) (10 Marks) Note: - (Internal Evaluation best of the two CCE marks will be considered)	• Question 1 – Solve the following questions (Five questions of 2 marks) • Question 2 – Attempt any two questions (Three questions of 10 marks) • Question 3 – Attempt any four questions (Six questions of 5 marks) Note: - Conversion of 50 marks of ESE evaluation to 30 marks.

	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 Chemistry
Programme: B. Sc. III	**Semester** – VI
Type: DSE I	**Marks:** 50
Credits: 2	**From:** A. Y. 2026-27
Name of the Course: Applied Forensic Biology II and Applied Forensic Psychology II **(BFST 364)**	

Course Objectives: Students should be able to…

1) learn the principles and applications of DNA profiling in forensic investigations.
2) study forensic entomology and its role in estimation of postmortem interval.
3) understand the concepts of forensic anthropology and forensic odontology.
4) study personality psychology and criminal profiling techniques.

Course Outcomes: Students will be able to…

1) analyse DNA profiling techniques and their forensic applications.
2) examine entomological evidence for estimation of time since death.
3) learn skeletal and dental evidence for human identification.
4) personality characteristics using psychological approaches.

Module	Title and Contents	Hrs
Module -1:	**Forensic DNA Profiling and Forensic Entomology** **1.1** History of DNA fingerprinting **1.2** Human genetics – Heredity, Alleles, Mutations & Population Genetics **1.3** Molecular Biology of DNA **1.4** Forensic application of recombinant DNA technology / Forensic Biotechnology **1.5** Human Genome Project **1.6** Variations, Polymorphism in DNA System – DNA markers: RELP, RAPD, VNTRs, SNP **1.7** Autosomal – STR, Y-STR, Mitochondrial DNA **1.8** Forensic significance of DNA profiling – Application in disputed paternity cases, child swapping **FORENSIC ENTOMOLOGY** **1.9** Introduction and History **1.10** Identification of insects **1.11** Training required **1.12** Determination of time elapsed since death **1.13** Dipterans larval development **1.14** Successional colonization of body **1.15** Determination of displacement and disturbance of the body, presence and position of wounds, drugs consumption ante mortem, challenges in entomology, collection of entomological evidence.	08

Module -2:	**Forensic Anthropology and Forensic Odontology** **2.1** Introduction and History of Anthropology **2.2** Physical Anthropology and Human Variability **2.3** Understanding Archaeology and Osteology **2.4** Scene Processing **2.5** Examining Remains – Human or Animal / Old or New **2.6** Issues Involved in Development of Biological Profile **2.7** Issues in Identification **2.8** Age Estimation in Childhood and Adulthood **2.9** Sexual Dimorphism **2.10** Population Ancestry **2.11** Stature Estimation **2.12** Individualization and Identification **2.13** Evidence for Cause and Manner of Death from Bones **2.14** Documentation and Expert Witness Testimony **2.15** Portrait Parle **2.16** Bertillon System **2.17** Facial Reconstruction **2.18** Superimposition Techniques **2.19** Reconstruction Based on Craniometrical and Somatoscopic Methods **2.20** Importance of Tissue Depth to Reconstruct Various Facial Features **2.21** Introduction and History of Odontology; Forensic Significance of Bite Marks	07
Module -3:	**Psychology of Personality** **3.1** Criminal Psychological Profiling – Nature, Definition **3.2** Psychological Tests Used in Criminal Psychological Profiling **3.3** Psychological Autopsy **3.4** Forensic Hypnosis **3.5** Narco Analysis **3.6** Polygraph **3.7** Brain Fingerprinting **3.8** Layered Voice Analysis **3.9** Stalking – The Psychology of Violence	07
Module -4:	**Correctional Psychology** **4.1** Definition, Scope, Nature and Need of Correctional Psychology **4.2** Remand Homes and Correctional Homes – Indian Scenario **4.3** Identification of Correctional Needs and Risk Assessment **4.4** Diagnosis of Mental Disorders in Correctional Setting **4.5** Treatment of Mental Disorders in Correctional Setting	08

Reference Books:

1. Butler, John M. *Fundamentals of Forensic DNA Typing*. London: Academic Press, 2010.
2. Lee, Henry C., and Richard Li. *Forensic Biology*. Boca Raton: CRC Press, 2015.
3. Byrd, Jason H., and James L. Castner. *Forensic Entomology: The Utility of Arthropods in Legal Investigations*. Boca Raton: CRC Press, 2010.
4. White, Tim D., Michael T. Black, and Pieter A. Folkens. *Human Osteology*. Burlington: Academic Press, 2012.
5. Feist, Jess, and Gregory Feist. *Theories of Personality*. New York: McGraw-Hill, 2009.
6. Bartol, Curt R., and Anne M. Bartol. *Introduction to Forensic Psychology*. Thousand Oaks: Sage Publications,
7. 2021.

Evaluation Pattern: 60:40	
Total Marks: 50	
Continuous Comprehensive Evaluation: (20Marks) • Internal Work CCE-I Home Assignment (10 Marks) • Internal Work CCE-II Short and long answer question test/seminar/open book test/ quiz/ case study/ book review/ field work/ industry visit (10 Marks) •Internal Work CCE-III Compulsory MCQ test (Each question for 1marks) Note: - (10 Marks) (Internal Evaluation best of the two CCE marks will be considered)	**End Semester Evaluation (30 Marks)** • Question 1 – Solve the following questions (Five questions of 2 marks) • Question 2 – Attempt any two questions (Three questions of 10 marks) • Question 3 – Attempt any four questions (Six questions of 5 marks) Note: - Conversion of 50 marks of ESE evaluation to 30 marks.

	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 Chemistry	
	Programme: B. Sc. III	**Semester** - VI
	Type: DSE II	**Marks:** 50
	Credits: 2	**From:** A. Y. 2026-27
	Name of the Course: Criminology II **(BFST 365)**	

Course Objectives: Students should be able to…

1. learn the principles and functioning of the criminal justice system.
2. study correctional administration and various correctional institutions.
3. understand penology and different methods of punishment and rehabilitation.
4. study the role of police, courts, prisons, and correctional services in crime prevention.

Course Outcomes: Students will be able to…

1. analyse the structure and functions of the criminal justice system.
2. examine the role of police, courts, prisons, and correctional institutions in crime control.
3. learn various theories and practices of punishment, rehabilitation, and correction.
4. evaluate correctional programs and their effectiveness in offender reform.

Module	Title and Contents	Hrs
Module -1:	**Penology and Correctional Administration** **1.1** Meaning, Nature and Scope of Penology **1.2.** Theories and Types of Punishment **1.3.** Prison System, Probation, Parole and Open Prison **1.4.** Rehabilitation and Correctional Administration in India	07
Module -2:	**Police Administration and Investigation** **2.1.** Organization and Functions of Police System in India **2.2.** Role of Police in Crime Prevention and Investigation **2.3.** FIR, Arrest, Search and Seizure Procedures **2.4.** Community Policing and Modern Investigation Techniques	08
Module -3:	**White Collar and Cyber Crime** **3.1.** Meaning, Nature and Characteristics of White-Collar Crime **3.2.** Corporate, Financial and Organized Crimes **3.3.** Cyber Crimes: Hacking, Identity Theft, Cyber Stalking and Online Fraud **3.4.** Prevention, Investigation and Legal Provisions related to Cyber Crime	07

Module -4:	**Contemporary Issues in Criminology** **4.1.** Organized Crime and Terrorism **4.2.** Drug Abuse, Drug Trafficking and Human Trafficking **4.3.** Gender-based Crimes and Domestic Violence **4.4.** Emerging Trends and Challenges in Criminology	08

Reference Books:

1) Sutherland, Edwin H., Donald R. Cressey, and David F. Luckenbill. *Principles of Criminology*. New York: Rowman & Littlefield, 2019.

2) Siegel, Larry J. *Criminology*. 14th ed. Boston: Cengage Learning, 2023.

3) Vold, George B., Thomas J. Bernard, and Jeffrey B. Snipes. *Theoretical Criminology*. 8th ed. New York: Oxford University Press, 2018.

4) Bartol, Curt R., and Anne M. Bartol. *Criminal Behavior: A Psychological Approach*. 12th ed. Boston: Pearson, 2021.

5) Reid, Sue Titus. *Crime and Criminology*. 15th ed. New York: Oxford University Press, 2020.

6) Sharma, Rajendra Kumar. *Criminology and Penology*. New Delhi: Atlantic Publishers, 2020.

7) Paranjape, N. V. *Criminology and Penology with Victimology*. Allahabad: Central Law Publications, 2021.

Evaluation Pattern: 60:40

Total Marks: 50

Continuous Comprehensive Evaluation: (20Marks)	**End Semester Evaluation (30 Marks)**
• Internal Work CCE-I Home Assignment (10 Marks) • Internal Work CCE-II Short and long answer question test/seminar/open book test/ quiz/ case study/ book review/ field work/ industry visit (10 Marks) •Internal Work CCE-III Compulsory MCQ test (Each question for 1marks) (10 Marks) Note: - (Internal Evaluation best of the two CCE marks will be considered)	• Question 1 – Solve the following questions (Five questions of 2 marks) • Question 2 – Attempt any two questions (Three questions of 10 marks) • Question 3 – Attempt any four questions (Six questions of 5 marks) Note: - Conversion of 50 marks of ESE evaluation to 30 marks.

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 Chemistry

Programme: B.Sc. III	**Semester** - VI
Type: DSCP I	**Marks:** 50 /50
Credits: 2	**From:** A. Y. 2026-27

Name of the Course: Practical Course I based on BFST 361 and 362 **(BFSP 366)**

Course Objectives: Students should be able to…

1) learn practical techniques of fingerprint examination and development.
2) study bloodstain pattern documentation and analysis.
3) understand digital evidence acquisition and preservation procedures.
4) analyse practical approaches to data recovery and evidence duplication.

Course Outcomes: Students will be able to…

1) examine fingerprint evidence using various development techniques.
2) evaluate bloodstain patterns for crime scene reconstruction.
3) perform digital evidence acquisition and preservation procedures.
4) analyse recovered digital data using forensic tools.

No. of Practicals	List of Practicals	Hrs
1)	Taking of plain and rolled fingerprint.	60
2)	Identification of patterns of fingerprint.	
3)	To study the characteristics of fingerprint.	
4)	To determine the ridge, count of fingerprint.	
5)	Ridge tracing of fingerprint.	
6)	To calculate the ridge density of fingerprint.	
7)	Development of fingerprint on various surfaces by powder method.	
8)	Development of fingerprint on various surfaces by chemical method.	
9)	Solid state drive recovery.	
10)	Logical Recovery of disabled hard drives	
11)	P-List and G-List recovery	
12)	Linux Data Recovery	
13)	Vista and Recovery of Shadow Copies	
14)	To create Disk image by using Prodiscover	
15)	To create Disk image by using FTK	

Reference Books:

1) Lee, Henry C. *Advances in Fingerprint Technology*. Boca Raton: CRC Press, 2012.
2) Bevel, Tom. *Bloodstain Pattern Analysis*. Boca Raton: CRC Press, 2021.
3) Casey, Eoghan. *Digital Evidence and Computer Crime*. Burlington: Academic Press, 2011.
4) Carrier, Brian. *File System Forensic Analysis*. Boston: Addison-Wesley, 2005.
5) Sammons, John. *The Basics of Digital Forensics*. Amsterdam: Elsevier, 2015.
6) Nelson, Bill. *Guide to Computer Forensics and Investigations*. Boston: Cengage Learning, 2018.

Evaluation Pattern: 60:40	
Total Marks: 50	
Internal Practical Examination: (20 Marks) • Journal (05 M) • Viva (05 M) • Day to Day Performance (10 M)	**End Semester Practical Examination: (30 Marks)** • Practical Examination: (30 Marks)

Karmaveer Bhaurao Patil University, Satara
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Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Chemistry

Programme: B. Sc. III	**Semester** – VI
Type : DSEP II	**Marks:** 50
Credits : 2	**From:** A. Y. 2026-27

Name of the Course: Practical VIII based on BFST 363 and BFST 364 **(BFSP 367)**

Course Objectives: Students should be able to…

1) develop practical skills for analyzing physical and chemical forensic evidence.
2) understand ballistic injuries, accident reconstruction, and physical evidence interpretation.
3) perform chemical identification, extraction, and separation techniques for drugs, poisons, and explosives.
4) enhance observation and analytical abilities for examining firearm wounds, vehicle damage, skid marks, and toxic substances.

Course Outcomes: Students will be able to…

1) analyze narcotic drugs and poisons using laboratory methods.
2) examine ballistic and firearm-related evidence.
3) perform DNA and biological evidence examinations.
4) analyze anthropological and entomological evidence.

No. of Practicals	List of Practicals	Hrs
1)	Identification of firearm injury.	60
2)	Peripheral vision measurement.	
3)	To study the characteristics of Contact wounds.	
4)	Analysis of accident scene photography.	
5)	Quantitative or qualitative study of drug opiates. (2 no's).	
6)	Chemical analysis of explosive materials. (Gun powder)- Colour test, microscopic examination. (2 nos).	
7)	Extraction methods of drugs, Poisons. (2 nos.)	
8)	Colour Tests for identification of poisons, drugs. (2 nos.)	
9)	To determine the age from Dentition.	
10)	To determine the sex from skull.	
11)	To determine sex from pelvis.	
12)	To investigate the differences between animal and human bones.	
13)	To measure the patient gradient of a subject.	
14)	To measure the lifestyle scale of a subject.	
15)	Standard progressive matrices by Raven. / Koh's Block test/Alexander Pass Along test.	

Reference Books:

1) Butler, John M. *Fundamentals of Forensic DNA Typing*. London: Academic Press, 2010.
2) Byrd, Jason H. *Forensic Entomology*. Boca Raton: CRC Press, 2010.
3) White, Tim D. *Human Osteology*. Burlington: Academic Press, 2012.
4) Heard, Brian J. *Handbook of Firearms and Ballistics*. Chichester: Wiley-Blackwell, 2016.
5) Bartol, Curt R. *Introduction to Forensic Psychology*. Thousand Oaks: Sage Publications, 2021.
6) Saferstein, Richard. *Criminalistics: An Introduction to Forensic Science*. Boston: Pearson, 2024.

Evaluation Pattern: 60:40	
Total Marks: 50	
Internal Practical Examination: (20 Marks) • Journal (05 M) • Viva (05 M) • Day to Day Performance (10 M)	**End Semester Practical Examination: (30 Marks)** • Practical Examination: (30 Marks)

Karmaveer Bhaurao Patil University, Satara
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Programme: B. Sc. III	**Semester** – VI
Type: DSEP II	**Marks:** 50
Credits: 2	**From:** A. Y. 2026-27

Name of the Course: Practical VIII based on BFST 363 and BFST 365 **(BFSP 367)**

Course Objectives: Students should be able to…

1) develop practical skills for analysing physical and chemical forensic evidence.
2) understand ballistic injuries, accident reconstruction, and physical evidence interpretation.
3) perform chemical identification, extraction, and separation techniques for drugs, poisons, and explosives.
4) enhance observation and analytical abilities for examining firearm wounds, vehicle damage, skid marks, and toxic substances.

Course Outcomes: Students will be able to…

1) learn narcotic drugs and poisons using laboratory methods.
2) examine ballistic and firearm-related evidence.
3) perform DNA and biological evidence examinations.
4) analyse anthropological and entomological evidence.

No. of Practicals	Practicals based on Theory Paper BFST 363 and 365	Hrs
1)	Identification of firearm injury.	60
2)	Peripheral vision measurement.	
3)	To study the characteristics of Contact wounds.	
4)	Analysis of accident scene photography.	
5)	Quantitative or qualitative study of drug opiates. (2 no's).	
6)	Chemical analysis of explosive materials. (Gun powder)- Colour test, microscopic examination. (2 nos).	
7)	Extraction methods of drugs, Poisons. (2 nos.)	
8)	Colour Tests for identification of poisons, drugs. (2 nos.)	
9)	Study of prison administration and correctional institutions.	
10)	Preparation of a report on theories of punishment. \	
11)	Comparative study of probation, parole and open prison systems.	
12)	Visit report of police station / correctional institution / court.	
13)	Demonstration and documentation of FIR registration procedure.	
14)	Mock exercise on crime scene investigation and evidence recording.	
15)	Preparation of case report on police investigation methods.	

Reference Books:

1) Butler, John M. *Fundamentals of Forensic DNA Typing*. London: Academic Press, 2010.
2) Byrd, Jason H. *Forensic Entomology*. Boca Raton: CRC Press, 2010.
3) White, Tim D. *Human Osteology*. Burlington: Academic Press, 2012.
4) Heard, Brian J. *Handbook of Firearms and Ballistics*. Chichester: Wiley-Blackwell, 2016.
5) Bartol, Curt R. *Introduction to Forensic Psychology*. Thousand Oaks: Sage Publications, 2021.
6) Saferstein, Richard. *Criminalistics: An Introduction to Forensic Science*. Boston: Pearson, 2024.

Evaluation Pattern: 60:40	
Total Marks: 50	
Internal Practical Examination: (20 Marks) • Journal (05 M) • Viva (05 M) • Day to Day Performance (10 M)	**End Semester Practical Examination: (30 Marks)** • Practical Examination: (30 Marks)

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Board of Studies in Chemistry

Programme: B. Sc. III	**Semester** - VI
Type: VSC Practical	**Marks:** 50
Credits: 2	**From:** A. Y. 2026-27

Name of the Course: Forensic Tool Marks and Impression Evidence I
(BFSPVSC IV)

Course Objectives: Students should be able to…

1. understand the principles and significance of tool marks and impression evidence in forensic investigations.
2. study the classification and characteristics of various tool marks and impression evidence.
3. understand methods for collection, preservation, and examination of tool mark evidence.
4. learn techniques used for comparison and identification of tool marks and impressions.

Course Outcomes: Students will be able to…

1. evaluate different types of tool marks and impression evidence encountered at crime scenes.
2. examine tool mark characteristics for identification and comparison purposes.
3. apply scientific methods for collection, preservation, and documentation of impression evidence.
4. analyse footprints, tire marks, bite marks, and other impression evidence using forensic techniques.

No. of Practicals	List of Practicals	Hrs
1)	To collect and preserve toolmarks made on different surfaces.	60
2)	To compare toolmark patterns using a forensic comparison microscope.	
3)	To create a reference toolmark database for forensic comparison.	
4)	To lift latent footwear impressions using electrostatic techniques.	
5)	To cast footwear impressions from soft surfaces using plaster or dental stone.	
6)	To identify class and individual characteristics of footwear impressions.	
7)	To detect and lift latent tire impressions for forensic examination.	
8)	To photograph and document bite marks accurately for forensic comparison.	
9)	To prepare and analyse bite mark overlays for individualization.	
10)	To reconstruct and match broken objects through fracture pattern analysis.	
11)	To process a simulated burglary scene for toolmark and impression evidence.	
12)	To compare toolmarks made by similar instruments like screwdrivers and chisels.	
13)	To restore obliterated serial numbers from metal surfaces using chemical etching.	
14)	To capture and examine 3D impression evidence using scanning technology.	
15)	To analyse gait, stride, and shoe size from footprint evidence.	

Reference Books:

1. Bodziak, William J. *Footwear Impression Evidence: Detection, Recovery and Examination*. 3rd ed. Boca Raton: CRC Press, 2017.
2. Cassidy, Michael J. *Footwear Identification*. London: The Forensic Science Society, 1980.
3. Saferstein, Richard. *Criminalistics: An Introduction to Forensic Science*. 13th ed. Boston: Pearson, 2024.
4. Houck, Max M., and Jay A. Siegel. *Fundamentals of Forensic Science*. 4th ed. London: Academic Press, 2023.
5. James, Stuart H., and Jon J. Nordby. *Forensic Science: An Introduction to Scientific and Investigative Techniques*.
6. 5th ed. Boca Raton: CRC Press, 2019.
7. Fisher, Barry A. J. *Techniques of Crime Scene Investigation*. 9th ed. Boca Raton: CRC Press, 2022.
8. Nickell, Joe, and John F. Fischer. *Crime Science: Methods of Forensic Detection*. Lexington: University Press of Kentucky, 1999.

Evaluation Pattern: 60:40

Total Marks: 50

Internal Practical Examination: (20 Marks)	**End Semester Practical Examination: (30 Marks)**
• Journal (05 M) • Viva (05 M) • Day to Day Performance (10 M)	• Practical Examination: (30 Marks)

	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 Chemistry
Programme: B. Sc. III	**Semester:** VI
Type: BFSPSEC III	**Marks: 50**
Credits: 2	**From: A.Y 2026-27**
Name of the Course: Forensic Anthropology **(BFSPSEC III)**	

Course Objectives: Students should be able to…

1) learn the fundamental principles and scope of forensic anthropology in criminal investigations.
2) study human skeletal anatomy and its significance in forensic identification.
3) understand methods used for estimation of age, sex, ancestry, and stature from skeletal remains.
4) learn techniques used in the recovery, examination, and documentation of human remains.

Course Outcomes: Students will be able to…

1) evaluate human skeletal remains for forensic identification purposes.
2) examine skeletal characteristics for estimation of age, sex, ancestry, and stature.
3) apply anthropological techniques for recovery and documentation of skeletal evidence.
4) analyse skeletal trauma and pathological changes in forensic case investigations.

No. of Practicals	List of Practicals	Hrs
1)	To differentiate between human and non-human bones based on anatomical features.	**60**
2)	To estimate age-at-death using the fusion status of long bones.	
3)	To determine sex from pelvic and cranial morphological traits.	
4)	To estimate stature using measurements of long bones.	
5)	To analyze cranial traits for the estimation of ancestry.	
6)	To estimate age using dental eruption and wear patterns.	
7)	To determine age based on the degree of cranial suture closure.	
8)	To perform skull-photo superimposition for individual identification.	
9)	To reconstruct facial features from a skull using forensic techniques.	
10)	To identify and classify skeletal trauma as antemortem, perimortem, or postmortem.	
11)	To examine and interpret thermally altered human bones.	
12)	To use skeletal pathologies and anomalies for personal identification.	
13)	To estimate the postmortem interval (PMI) from skeletal changes.	
14)	To apply 3D scanning for digital documentation and analysis of bones.	
15)	To assess environmental weathering and surface modifications of bones.	

Reference Books: -

1. Byers, Steven N. *Introduction to Forensic Anthropology*. 5th ed. New York: Routledge, 2017.
2. White, Tim D., Michael T. Black, and Pieter A. Folkens. *Human Osteology*. 3rd ed. Burlington: Academic Press, 2012.
3. Bass, William M. *Human Osteology: A Laboratory and Field Manual*. 5th ed. Columbia: Missouri Archaeological Society, 2005.
4. Blau, Soren, and Douglas H. Ubelaker, eds. *Handbook of Forensic Anthropology and Archaeology*. 2nd ed. New York: Routledge, 2016.
5. Christensen, Angi M., Nicholas V. Passalacqua, and Eric J. Bartelink. *Forensic Anthropology: Current Methods and Practice*. San Diego: Academic Press, 2014.
6. Burns, Karen R. *Forensic Anthropology Training Manual*. 3rd ed. New York: Routledge, 2019.
7. Dirkmaat, Dennis C., ed. *A Companion to Forensic Anthropology*. Chichester: Wiley-Blackwell, 2012.

Evaluation Pattern: 60:40	
Total Marks: 50	
Internal Practical Examination: (20 Marks) • Journal (05 M) • Viva (05 M) • Day to Day Performance (10 M)	**End Semester Practical Examination: (30 Marks)** • Practical Examination: (30 Marks)

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 Chemistry

Programme: B.Sc. III	**Semester –** VI
Type: Field Project	**Marks:** 100
Credits: 2	**From:** A. Y. 2026-27

Name of the Course : Field Project **(BFSP FP-I)**

Course Objectives: Students should be able to…

1. apply theoretical knowledge and technical skills to investigate real-world problems through field-based or project-oriented activities.
2. develop research aptitude, critical thinking, observation, data collection, analysis, and interpretation skills using scientific methods.
3. promote experiential, interdisciplinary, and community-oriented learning by engaging students in industry, environmental, or societal projects.
4. enhance students' problem-solving, teamwork, project management, and professional communication skills through collaborative project work.

Course Outcomes: Students will be able to…

1. apply theoretical concepts & practical skills to design & execute a field-based or project-oriented study.
2. collect, analyse, and present data using appropriate research methodologies and analytical tools.
3. demonstrate effective teamwork, project planning, and communication skills while working on interdisciplinary or community/industry-based projects.
4. prepare comprehensive project reports and deliver professional presentations based on project findings and recommendations.

Field Project (FP)

1. Objective of Field Project

The field project is designed to:

1. apply theoretical knowledge to real-world situations
2. develop research, observation, and analytical skills
3. encourage interdisciplinary and experiential learning
4. enhance problem-solving and communication skills

2. Nature of Project

Students can choose:

1. Field-based study (survey, industry visit, environmental study)
2. Experimental/project-based work
3. Industry-oriented or community-based project
4. Interdisciplinary project (e.g., animation + AI, science + media)

Practical Evaluation Pattern: 60:40

Total Marks: 50

Internal Examination: (20 Marks)	**External Examination: (30 Marks)**
• Log Book = 10 Marks • Day To Day Performance =10 Marks	• Presentation = 20 Marks • Report = 10 Marks

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Board of Studies in Chemistry

Programme: B. Sc. III	**Semester** – VI
Type: Co-curricular Course	**Marks:** 50
Credits: 2	**From:** A. Y. 2026-27

Name of the Course: Co-curricular Course in Forensic Science **(Script Writing) (BFSTCC I)**

Course Objectives: Students should be able to…

1. understand the fundamentals, importance and process of script writing.
2. explore various forms and styles of script writing used in different media platforms.
3. develop knowledge about different scripts, their structure and characteristics.
4. identify and differentiate various types of scripts and writing formats

Course Outcomes: Students will be able to…

1. analysis and compare script writing techniques used in different media.
2. demonstrate creative and professional script writing skills.
3. prepare and present original scripts for various communication media.
4. differentiate and identify different types of scripts based on their format and application

Module	Title and Contents	Hrs
Module -1:	**Fundamentals of Script Writing** **1.1** Introduction to Script Writing – Definition, concept, objectives, importance and scope of script writing. **1.2** Types of Script Writing – Narrative, screenplay, documentary, radio, television, educational and forensic scripts **1.3** Language Skills – Grammar, vocabulary, sentence construction, clarity, coherence, punctuation, paragraph development, dialogue writing and storytelling techniques. **1.4** Elements of Script Writing – Theme, plot, storyline, character, setting, conflict, climax, dialogue, narration, scene description and visual storytelling. **1.5** Script Structure and Formatting – Three-act structure, scene headings, action lines, transitions, screenplay formatting, script editing and proofreading. **1.6** Script Development Process – Concept generation, research, synopsis, treatment, first draft, revision and final script preparation.	08
Module -2:	**Script Writing for Different Media** **2.1** Introduction to Media Script Writing – Characteristics of scripts for print, audio and visual media. **2.2** Documentary Script Writing – Research methods, factual narration, interview planning, sequencing and documentary production. **2.3** Film Script Writing – Storyboarding, screenplay development, scene construction, dialogue writing, character arc and continuity. **2.4** Radio Script Writing – Script format, narration, sound effects, music cues. **2.5** Digital Media Script Writing – Scripts for YouTube, podcasts, social media content, short films and web seri	07

Module -3:	**Crime Scene Script Writing and Documentation** **3.1** Introduction to Crime Scene Documentation – Importance, objectives and legal significance. **3.2** Types of Crime Scenes – Indoor, outdoor, primary, secondary, organized, disorganized and reconstructed crime scenes. **3.3** Crime Scene Observation Skills – Recording observations, note-taking, evidence documentation and scene description. **3.4** Script Writing for Crime Scene Reconstruction – Sequence of events, witness statements, evidence integration and chronological narration. **3.5** Script Preparation for Different Cases – Homicide, suicide, accidental death, suspicious death, fire incidents and property offences. **3.6** Ethical and Legal Considerations – Objectivity, confidentiality, accuracy and admissibility of documented information.	07
Module -4:	**Script Analysis and Forensic Examination of Indian Scripts** **4.1** Introduction to Script Analysis – Definition, objectives, principles and forensic significance. **4.2** Evolution of Indian Writing Systems – Historical development and classification of Indian scripts. **4.3** Devanagari Script – Origin, structure, writing characteristics and identification features. **4.4** Urdu Script – Historical background, writing style and distinguishing characteristics. **4.5** Bengali Script – Structure, writing pattern and identification features. **4.6** Gujarati Script – Evolution, structural characteristics and forensic importance.	08

Reference Books:

1. Anderson, Linda. 2005. *Creative Writing: A Workbook with Readings*. London: Routledge.
2. Bell, Julia, and Paul Magrs. 2001. *The Creative Writing Coursebook*. London: Macmillan.
3. Blake, Carole. 1999. *From Pitch to Publication*. Basingstoke: Macmillan.
4. Brande, Dorothea. 1981. *Becoming a Writer*. Los Angeles: Jeremy P. Tarcher.
5. Burroway, Janet. 2010. *Imaginative Writing: The Elements of Craft*. 3rd ed. Basingstoke: Palgrave Macmillan.
6. Dawson, Paul. 2005. *Creative Writing and the New Humanities*. London: Routledge

Evaluation Pattern: 60:40

Total Marks: 50

Continuous Comprehensive Evaluation: (20Marks)	**End Semester Evaluation (30 Marks)**
• Internal Work CCE-I Home Assignment (10 Marks) • Internal Work CCE-II Short and long answer question test/seminar/open book test/ quiz/ case study/ book review/ field work/ industry visit (10 Marks) •Internal Work CCE-III Compulsory MCQ test (Each question for 1marks) (10 Marks) Note: - (Internal Evaluation best of the two CCE marks will be considered)	• Question 1 – Solve the following questions (Five questions of 2 marks) • Question 2 – Attempt any two questions (Three questions of 10 marks) • Question 3 – Attempt any four questions (Six questions of 5 marks) Note: - Conversion of 50 marks of ESE evaluation to 30 marks.