

**Rayat Shikshan Sanstha's
Yashwantrao Chavan Institute of Science (Autonomous) Satara.**

Undergraduate Programme

B.Sc. in Forensic Science

Syllabi of the course

Choice Based Credit System Syllabus

(To be implemented from academic year 2021-22)

Department of Forensic Science

Preamble:

This syllabus is framed to give sound knowledge within the understanding of Forensic Science to undergraduate students in the first year of three years of B.Sc. degree course.

The goal of the syllabus is to make the study of Forensic Science popular, interesting and encouraging to the students for higher studies including research.

The new syllabus is based on a basic and applied approach with vigor and depth. At the same time precaution is taken to make the syllabus

comparable to the syllabus of other universities and the need of advancement in crime detection techniques and research.

The syllabus is prepared after discussion at length with a number of faculty members of the subject and experts from academics and research fields.

The units of the syllabus are well defined, taking in to consideration the level and capacity of students.

Program Objectives of the Course:

- 1] To make the students knowledgeable with respect to the subject and its practical applicability.
- 2] To promote understanding of basic and advanced concepts in Forensic Science.
- 3] To expose the students to various emerging areas of Forensic science.
- 4] To prepare students for further studies, helping in their bright career in the subject.
- 5] To expose the students to different processes used in industries and in the research field.
- 6] To develop their ability to apply the knowledge of Forensic Science in day to day life.
- 7] To prepare the students to accept the challenges in all sciences.
- 8] To develop skills required in various industries, research labs and in the field of human & society health.

Program Specific Outcomes:

After successful completion of B.Sc. Forensic Science Course student will be able to:

Understand the basics of Forensic Science.

- * Learn, design and perform experiments in the labs to demonstrate the concepts, principles and theories learned in the classrooms.
- * Develop the ability to apply the knowledge acquired in the classroom and laboratories to specific problems in Crime Investigation, Analysis of Exhibits.
- * Identify their area of interest in academic, research and development.
- * Perform job in various fields' like Forensic Science Laboratory, Law Enforcement Agencies, Private Detective Agencies, Cyber Investigation Department, Education, Banking, Business and public service, etc. entrepreneur with precision, analytical mind, innovative thinking, clarity of thought, expression, and systematic approach.

*** General objectives of the programme**

- i] To nurture academicians with focus and commitment to their subject
- ii] To shape good and informed citizens from the students entering into programme
- iii] To create an skilled workforce to match the requirements of the society
- iv] To impart knowledge of science is the basic objective of this programme
- v] To develop scientific attitude is them ajoro
- vi] Objectives as to make the students open minded, critical and curious
- vii] To develop skill in practical work, experiment and the laboratory materials and equipments along with collection and interpretation of scientific data to contribute to science.

Programme outcomes

- i] The student will graduate with proficiency in the subject of their choice
 - ii] The student will be eligible to continue higher studies in their subject
 - iii] The student will be eligible to pursue higher studies abroad.
 - iv] The student will be eligible to appear for examinations for jobs in government organization
- The student will be eligible to apply for jobs with minimum requirement of B.Sc. programme

B. Sc. Part-I

1. **Title:** Forensic Science

2. **Year of Implementation:-** This syllabus will be implemented from 2021 onward.

3. **Duration:** The course shall be a fulltime.

4. **Pattern:** Semester examination.

5. **Medium of Instruction:** English

6. **Structure of Course:**

B.Sc.-I Semester-I

Paper Code	Title of the Paper	Period/ Week	Examination Marks			
			Mid Test	Online test	Theory	Total
BFST-101	Basics of Forensic Science I	3	05	05	30	40
BFST-102	Criminal Law I	3	05	05	30	40
BFST-103	Basics of Forensic Chemistry I	3	05	05	30	40
BFST-104	Basics of Forensic Physics I	3	05	05	30	40
BFST-105	Basics of Forensic Biology I	3	05	05	30	40
BFST-106	Basics of Forensic Psychology I	3	05	05	30	40
BFST-107	Basics of Computer & Digital Forensic I	3	05	05	30	40
BFST-108	Basics of Accountancy I	3	05	05	30	40
BFST-109	English	3	05	05	30	40

Lab Course

Sr. No.	Paper Code	Title of the Paper	Exam	Journal	Case study/Seminar/Tour/Home Assignment	Punctuality
	BFSP-110	Basics of Forensic Science And Basics of Criminal Law I	30	5	5	5
	BFSP-111	Basics of Forensic physics And Basics of Forensic Chemistry I	30	5	5	5
	BFSP-112	Basics of Forensic Biology And Basics of Forensic Psychology I	30	5	5	5
	BFSP-113	Basics Computer And Digital Forensic I & Basics of Accountancy I	30	5	5	5

B: B.Sc. FS: Forensic Science T: Theory, P: Practical

B.Sc.-I Semester–II

Sr. No.	Paper Code	Title of the Paper	Period /Week	Examination Marks			
				Mid Test	Online Test	Theory	Total
1	BFST-201	Criminology II	3	05	05	30	40
2	BFST-202	Criminal Law II	3	05	05	30	40
3	BFST-203	Basics of Forensic Chemistry II	3	05	05	30	40
4	BFST-204	Basics of Forensic Physics II	3	05	05	30	40
5	BFST-205	Basics of Forensic Biology II	3	05	05	30	40
6	BFST-206	Basics of Forensic Psychology II	3	05	05	30	40
7	BFST-207	Basics of Computer & Digital Forensics II	3	05	05	30	40
8	BFST-208	Basics of Statistics II	3	05	05	30	40
9	BFST-209	English	3	05	05	30	40

Lab Course

Sr. No.	Paper Code	Title of the Paper	Exam	Journal	Case study/Seminar/Tour/Home Assignment	Punctuality
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BFSP-210	Basics of Forensic Science And Basics of Criminal Law II	30	5	5	5
BFSP-211	Basics of Forensic physics And Basics of Forensic Chemistry II	30	5	5	5
BFSP-212	Basics of Forensic Biology And Basics of Forensic Psychology II	30	5	5	5
BFSP-213	Basics Computer And Digital Forensic II and Basics of Accountancy II	30	5	5	5

B: B.Sc. FS: Forensic Science T: Theory, P: Practical

* Theory & Practical lectures of 48 minutes each

* Total marks for B.Sc. Part -I including English=1100

* Total credits for B.Sc. Part I Semester I & II=52

* AECC- Ability Enhancement Compulsory Course (1A &1B)-English

	Semester	Paper No.	Title of Paper
Year First	I	BFST-101	Basics of Forensic Science I
		BFST-102	Criminal Law I
		BFST-103	Basics of Chemistry I
		BFST-104	Basics of Physics I
		BFST-105	Basics of Biology I
		BFST-106	Basics of Psychology I
		BFST-107	Basics of Computer & Digital Forensics I
		BFST-108	Basics of Accountancy I
		BFST-109	English
	II	BFSP-110	Basics of Forensic Science And Basics I of Criminal Law I
		BFSP-111	Basics of physics And Basics of Chemistry I
		BFSP-112	Basics of Biology And Basics of Psychology I
		BFSP-113	Basics of Digital and Cyber Forensics And Basics of Accountancy I
		BFST-201	Criminology II

	BFST-202	Criminal Law II
	BFST-203	Basics of Chemistry II
	BFST-204	Basics of Physics II
	BFST-205	Basics of Biology II
	BFST-206	Basics of Psychology II
	BFST-207	Basics of Computer & Digital Forensics II
	BFST-208	Basics of Statistics II
	BFST-209	English
	BFSP-210	Basics of Forensic Science And Basics of Criminal Law II
	BFSP-211	Basics of physics And Basics of Chemistry II
	BFSP-212	Basics of Biology And Basics of Psychology II
	BFSP-213	Basics of Digital and Cyber Forensics And Basics of Accountancy II

Objectives of the Course:

The Universal Declaration of Human Rights directs the member nations to create such conditions under which the ideals of free human beings, enjoying civil and political freedom from fear and want, can be achieved. The Constitution of India, through its various articles, strives to ensure security and safety of citizens in accordance with the principles of Universal Declaration of Human Rights. However, crime is a violation of these principles. In a country like India, where the majority of population is uneducated, social set up is heterogeneous, public-police relations are of very cordial, poverty is rampant, employment widespread, it is not surprising that crime rate is increasing exponentially.

If we have to create conditions conducive to harmonious development, we must mitigate the crime rate. This can best be achieved by relying on the support of the forensic science system. Unfortunately, in our country, forensic science is not viewed as a core investigative skill in crime detection. In fact, there is a lack of understanding of the forensic process itself. It is for this reason that less than 10% of the police cases are, at present, being referred for forensic examination. Less than 5% are solved by the application of forensic science. They are solved by a third degree method—

a practice which the human rights organizations will not allow in days to come.

In the majority of serious crime cases, hi-tech measures are being adopted by perpetrators of crime. The countermeasures have to be more sophisticated to surpass them. This calls for strengthening the foundations of forensic science at national level. It is with this aim that we are to initiate a B.Sc.(Hons.) Course In Forensic Science.

The following are the objectives of this course.

1. To emphasize the importance of scientific methods in crime detection.
2. To disseminate information on the advancements in the field of forensic science.
3. To highlight the importance of forensic science for perseverance of the society.
4. To review the steps necessary for achieving highest excellence in forensic science.
5. To generate talented human resources, commiserating with the latest requirements of forensic science.
6. To provide a platform for students and forensic scientists to exchange views, chalk-out collaborative programs and work in a holistic manner for the advancement of forensic science.

Eligibility:

* Passed Class XII from a recognized Board in sciences team.

* The admission will be done on merit basis taking in to consideration the aggregate marks obtained in the following three subjects:

i] Physics

i] Chemistry

iii] Any one out of Mathematics or Biology in whichever subject the candidate has scored higher marks.

B.Sc. Part I (SEMESTER-I) BFST-101

Basics of Forensic Science I

Credits: 2

Course Objectives: Students should:

1. Learn the History & Development of Forensic Science in India
2. Study the Divisions of Forensic Science Laboratories.
3. Study the Crime Scene And Physical Evidence
4. Study Forensic Science in India and International Perspective of Forensic Science

Unit-I: History Development of Forensic Science in India [09]

Historical aspects of forensic science, Definitions and concepts in forensic science, Pioneers of forensic science, Basic principles and branches of forensic science, Functions of forensic science, Need of forensic science Frye case and Dauber standard, Scope of Forensic science.

Unit-II: Divisions of Forensic Science Laboratories. [09]

Introduction to Forensic Science ,Physics division, Chemistry division, Biology division, Serology division, Ballistics division, Toxicology division, Questioned document division, Fingerprint division, Photography division, Evidence collection division, Prohibition division, Digital and Cyber Division etc.

Unit-III: Crime Scene and Physical Evidence [09]

Crime Scene Processing, Chain of Custody, Common type of Physical evidence, Significance of Physical evidence, Collection and Packaging of Physical evidence.

Unit-IV: Forensic Science in India and International Perspective of Forensic Science [09]

DFSS, CFSL, SFSL, RFSL, Mobile Crime Laboratories, Government Examiners of Questioned Documents, Central and Divisional Fingerprint Bureaus, National Crime Records Bureau, Police & Detective Training Schools, Bureau of Police Research & Development, police Academies, Police dogs.

Forensic science in international perspectives, setup of:-INTERPOL, FBI, CIA, CSI, Ameripol, Europol, Frontex, Duties of forensic scientists, Code of conduct for forensic scientists, Qualifications of forensic scientists, Data depiction, Report writing.

Reference Books:

1. B.B. Nanda and R.K.Tiwari,*Forensic Science in India: A Vision for the Twenty First Century*, Select Publishers, New Delhi(2001).
2. M. K. Bhasin and S.Nath, *Role of Forensic Science in the New Millennium*, University of Delhi, Delhi(2002).
3. S.H.James and J.J.Nordby,*Forensic Science: An Introduction to Scientific and Investigative Techniques*, 2nd Edition, CRC Press, Boca Raton(2005).
4. W.G. Eckert and R.K.Wright in *Introduction to Forensic Sciences*, 2nd Edition, W.G. Eckert (ED.), CRC Press, Boca Raton(1997).
5. R.Saferstein, *Criminalistics*, 8th Edition, Prentice Hall, New Jersey(2004).
6. W.J.Tilstone, M.L. Hastrup and C.Hald, *Fisher's Techniques of Crime Scene Investigation*, CRC Press, Boca Raton(2013).

Course Outcomes:

Unit–I: After completion of the unit, Students are able to:

- * Learn the origin of forensic science, its basic principles and functions.

Unit–II: After completion of the unit, Students are able to:

- * Understand the different divisions of Forensic Science.
- * Understand the function and structure of Forensic Science Laboratories And Its Setup.

Unit–III: After completion The Unit, Students are able to:

- * Understand the crime scene processing.

- * Understand different type of Physical Evidence

Unit-IV:After Completion The Unit,Students are able to:

- * Understand National and international perspective of Forensic Science.

BFST-102: Criminal Law I
Credits:2

Course Objectives: Students should:

1. Learn the Elements of Criminal Procedure Code related to forensic science.
2. Study the Acts and provisions of the Constitution of India related to forensic science.
3. Study the Acts governing socio-economic crimes.
4. Study Acts governing environmental crimes.

Unit 1:- Introduction to law **[09]**
Classification – civil, criminal cases. Essential elements of criminal law. Hierarchy of criminal courts. Classification of offences. Constitution of India - Preamble, Fundamental Rights, Directive Principles of State Policy – Articles 14, 15, 20, 21, 22, 51A.

Unit 2:- Substantive and Procedural law section – I **[09]**
Introduction to Criminal Procedure Code. Indian Penal Code pertaining to offences against persons –Sections 299, 300, 302, 304A, 304B, 307, 309, 319, 320, 324, 326, 351, 354, 359,362. Sections 37, 376 & 377 and their amendments.

Unit - 3 : Substantive and Procedural law section – II **[09]**
Indian Penal Code pertaining to offences against property Sections – 378, 383, 390, 391, 405, 415, 420, 441, 463, 489A, 497, 499, 503,511.

Unit 4 :- Substantive and Procedural law section – III **[09]**
Indian Evidence Act – Evidence and rules of relevancy in brief. Expert witness. Cross examination and re-examination of witnesses. Sections 32, 45, 46, 47, 57, 58, 60, 73, 135, 136, 137, 138, 141of IEA. Section 293 in the code of Criminal Procedure.

Reference Books:

1. D.A.Bronstein, LawfortheExpertWitness, CRCPress, BocaRaton (1999).4 to 200
2. Vipap.Sarthi, LawofEvidence, 6thEdition, EasternBookCo.,Lucknow(2006).4 to 65
3. A.S.Pillai, CriminalLaw, 6thEdition, N.M.TripathiPvtLtd., Mumbai (1983). 5 to 180
- 4.R.C.Nigam,*Law of Crimes in India*, Volume I, Asia Publishing House, New Delhi(1965).5 to 120
- 5.(ChiefJustice)M.Monir,*LawofEvidence*,6thEdition,UniversalLawPublishingCo.Pvt.Ltd., NewDelhi(2002). 4 to 80

CourseOutcomes:**Unit-I:After completion of the unit, Students are able to:**

1. Students should able to understand hierarchy of courts
2. Students should able to understand different types of offences

Unit-II: After completion of the unit, Students are able to:

1. Students should be able to understand procedures of court trials.

Unit-III: After completion of the unit, Students are able to:

1. StudentsshouldabletounderstandaboutBasicsRightsinConstitutionofIndia

Unit-IV: After completion of the unit, Students are able to:

1. Students should be able to define Drugs, Psychotropic substances.
2. Student should able to understand essential commodity act
3. Students should able to explain several aspects of arms and explosive act

BFST-103: Basics of Forensic Chemistry I

Credit:2

Course Objectives :

Students should:

1. Study of IUPAC Nomenclature and their examples.
2. Study of Natural Products.
3. Study of Introduction of drugs, dyes, polymer, insecticides. Pesticides
4. Study of Instrumentation of chromatographic technique.

Unit-I: Reactive Intermediate and related reaction [09]

Basics of chemistry, Reactive Intermediate and related reaction Carbocation Carbanion, Free radical, Carbene, Nitrene, Benzene, Normality, Morality

Unit-II: IUPAC Nomenclature and Introduction of Natural products [09]

Alkanes, alkenes, alkynes, haloalkanes, alcohol, ether, aldehyde, ketone, Carboxylic acid, nitro group. Introduction of Natural products: Carbohydrates, Amino acids.

Unit-III: Introduction to Chemical compounds [09]

Introduction of Petroleum Products, Dyes, Drugs, Paints, Polymer, Insecticides, Pesticides.

Unit - IV: Chromatography [09]

Introduction to Chromatography, Definition of Chromatography, Types of chromatography, Theoretical principle underlying chromatographic techniques, theories of chromatography, Development of Chromatogram, Qualitative and quantitative Analysis by chromatography.

Reference Books:

1. G. D. Christian Analytical Chemistry 6th edition, Publisher : Wiley, Hoboken, New Jersey, United States. (555-558)
2. S. B. Karch, The Pathology of Drug Abuse, CRC Press, Boca Raton (1996).
3. Morisand Boyed, Organic Chemistry Pearson, London, England. (1-39)

4. Gupta Kumar Heterocyclic chemistry Vol I and Vol II Springer, Salmon Tower Building New York City, United States. (58, 66)
5. S. V. Bhat Natural Products, Springer, Salmon Tower Building New York City, United States. (1-40)
6. Skoog, Hollerand Crouc Instrumental Analysis, Cengage Learning 20 Channel Center Street Boston, MA 02210, USA. (696- 793

Learning outcomes:

Unit-1

1. Students will know the definition of reactive intermediate.
2. Students will understand the all reactive intermediate and their all reactions inorganic chemistry.

Unit-II

1. Students will be able to know the IUPAC nomenclature and their various examples.
2. Students will understand the is mean by natural products i.e. carbohydrates and amino Acids.

Unit-III

1. Students will be able to know the introduction to all chemical compounds.
2. And identifying their chemical compounds.

Unit-IV

1. Students will be able to know all the chromatographic methods.
2. And their principles, instrumentation, working and their advantages and applications.

BFST-104 : Basics of Forensic Physics I

Credits:2

Course Objectives: Students should:

1. Understand the viscosity of liquids.
2. Understand the applications of LASER in forensic science.
3. Study the basic concept of Optics.
4. Study the different types of microscopes and Forensic application of microscopy.

Unit 1: - Fluid mechanics

Introduction to fluids, Pressure in a fluid, Pascal's law, Atmospheric Pressure and Barometer, Archimedes' Principle, Pressure difference and Buoyant Force in accelerating fluids, Steady and Turbulent Flow, Equation of continuity, Bernoulli's Principle, Application of Bernoulli's equation, Applications of fluid mechanics in Forensic Science

Unit 2: - Laser

A brief history of lasers, Einstein's prediction: The Three Processes, Einstein's relations (qualitative discussion only). Pumping schemes. Characteristics of lasers, Types of lasers: Ruby laser, He-Ne laser, Applications of lasers in Forensic Science.

Unit 3: - Optics

Introduction to development of optics, Types of Lens, Lens maker's formula, Cardinal points of an optical system, Aberration, Types of Aberration: Monochromatic, chromatic, Interference in thin film- Thin films, Interference due to transmitted light, Newton's rings.

Unit 4: - Microscopy -I

Fundamental principles of microscopy, Principle, construction, working, well labelled diagram, Application in Forensic science of simple microscope, compound microscope, binocular microscope, comparison microscope, Stereo microscope.

Suggested Readings:-

1. Symon Keith, Mechanics (Third ed.). (Addison-Wesley, 1971),144-49
2. Viscosity of liquids and gases (<http://hyperphysics.phy-astr.gsu.edu/Hbase/tables/viscosity.html>)
3. Sears and Zeemansky, University Physics, XI th edition, Pearson education. 312-320
4. H.C. Verma, Concepts of Physics, (Bharati Bhavan Publishers 2017) 255-280
5. M. N. Avadhanulu,S. Chand, An introduction to Lasers – Theory and Applications (Ref. 2, 11.7.1 – 11.7.4)
6. Mott Robert Pearson Benjamin Cummir, Applied Fluid Mechanics, (VI Edition,
7. Pearson Education/Prentice Hall International, New Delhi) 40-60
8. D. S. Mathur, Properties of Matter, (Shamlal Charitable Trust New Delhi) 75-80
9. Bradbury, The Microscope, past and present. (1968 Pergamon Press) 144-160
10. Werner Nachtigall, Exploring With the Microscope (1995, Sterling Publishing) 25-50

Course Outcomes:**Unit–I:-After completion of the unit, Students are able to:**

- * Understand the behavior and properties of fluids.
- * Get the knowledge about viscosity of liquids.

Unit–II:-After completion of the unit, Students are able to:

- * Understand basics of LASER
- * State the applications of laser in forensic science

Unit-III:-After completion of the unit, Students are able to:

- * Students will be able to know different types of lens, Lens Equation.
- * Students will able to know different types of aberration

Unit-IV:-After completion of the unit, Students are able to:

- * Understand how an image is formed in a compound microscope.
- * Understand significance and applications of microscopy for Forensic Science

BFST-105 : Basics of Forensic Biology I

Credit:2

Course Objectives: Students should:

1. Study the importance of Human Physiology.
2. Study the basic principle of human anatomy.
3. Study the basic knowledge of genetics.
4. Study the basic principle of anatomy.
5. Study human anatomy and physiology to solve the forensic cases.
6. Learn the significance of cell cytology.

Unit I: Cell biology:

[09]

Origin of life and theories of evolution, geological time scale, Discovery of cell, The cell theory, Ultra structure of prokaryotic & eukaryotic cell-(both plant and animal cells), Structural organization and functions of plasma membrane and cell wall of prokaryotes & eukaryotes. Cellular Organelles and Cytoskeleton structures (Microtubules, Microfilaments and Intermediate filaments).

Unit II: Plant physiology:

[09]

Plant anatomy, morphology of leaves, stem, flowers, roots, classification and taxonomy and system of classification of angiosperms (Bentham and Hooker) and Gymnosperms (chamberlain) scale. Mechanical and conducting tissue systems in plants Introduction to Insect biology: types of insects and their forensic significance.

Unit III: Basic instrumentation:

[09]

Beer and Lambert's law, colorimetry and spectrophotometry (UV & IR), principle, methods and application of chromatography, Basics of PCR, electrophoresis, centrifugation, Gel documentation, and its forensic applications.

Unit IV: Biochemistry:

[09]

Properties, Classification of Amino acids, Properties, Classification of proteins, Properties, Classification of enzymes, Properties, Classification of nucleic acid, Properties, Classification of carbohydrates , Properties, Classification of lipids, Properties, Classification of vitamins.

Suggested Readings:

1. Nelson and Cox, W.H Freeman, Lehninger Principles of Biochemistry 5th ed.(2005). (Unit IV -239-255,273-279,343-355)
2. Praful B. Godkar, Clinical Biochemistry,third edition (Unit IV)
3. P.K Gupta, Rastogi publications Cell and molecular biology 3rd ed.(Unit I)
4. J. Michael Hollas John, Wiley and sons, Modern Spectroscopy 4th ed.(2004). (Unit I)

5. Trevor Palmer, Prentice Hall/Ellis Horwood, Understanding enzymes 4th ed.(1995).
(Unit IV)
6. B.K Verma, Introduction to taxonomy of Angiosperms: PHI-learning pvt. ltd. New Delhi
(2011) (Unit II)
7. S Chand, Cell biology, genetics, Molecular biology, evolution and ecology
(1 sep.2004) (Unit 1)

Course Outcomes :

Unit-I After completion of unit students are able to :

- * Learn & understand Discovery of cell and cell theory.
- * To differentiate between structure of prokaryotic & eukaryotic cell
- * Understand the Cellular Organelles and Cytoskeleton structures

Unit-II After completion of unit students are able to :

- * Understand the Plant anatomy
- * To differentiate between classification of Angiosperms and Gymnosperms.
- * To study the basics of Insect biology

Unit-III After completion of unit students are able to:

- * Learn about Beer and Lambert's law.
- * b. To understand the principle, methods and application of chromatography
- * Understand the electrophoresis and PCR technique.
- * Understand the Gel documentation, and its forensic applications.

Unit-IV After completion of unit students are able to:

- * Students will understand the macromolecules
- * Students will learn classification and functions of macromolecules.

BFST106 : Basics of Forensic Psychology I

Credit:2

Course Objectives: Student should

1. Able to learn the overview of psychology and its applications.

2. Able to learn Basics of psychology.
3. Able to learn Biological perspectives of behavior.
4. Study importance of psychology and cognition, intelligence
5. Learn tools and techniques required for detection of deception.
6. Study critical assessment of advanced forensic techniques like polygraph, Narco Analysis and brain electrical oscillation signatures.

Unit I: The Science of Psychology [Perception]:

[09]

What is Psychology –Nature, Definition and its Goals, History of Psychology, Psychology: The Science, Early Schools of Psychology, Modern Perspectives, and Scientific Study Methods in Psychology- Naturalistic Observation, Experimental, Case Studies and Survey.

Unit II: Biological Perspectives of Behavior:

[09]

Neurons-structure and function, synapse, and neurotransmitters, Neuron and Nerves; Building the Network, Central Nervous System and Peripheral Nervous System, The Brain-structure and function, Glandular system. Sensation and Perception-Definition, Perceptual constancies, Gestalt Principle of Perception-perceptual organization and Grouping of Stimuli in Perceptual Organization, Depth Perception, Errors in Perception-Illusion, Hallucination, Individual Factors in Perception.

Unit-III Introduction to Cognition:

[09]

Attention, Factors Influencing Attention, Types of Attention, Thinking-mental images, concepts, prototypes, Problem Solving and Decision Making, Problems with Problem Solving.

Unit-IV Introduction to Intelligence:

Definition of Intelligence, Measuring Intelligence-concept in measuring intelligence (C.A., M.A., I.Q), Theories of Intelligence, Emotional intelligence, Individual Differences in Intelligence- mental retardation, giftedness, What is Psychological Tests?, Types of Tests, Characteristics of a good test.

ReferenceBooks:

1. Ciccarelli, S. K. & Meyer G. E., Psychology (New Delhi, Pearson Education,2006), 1-304.
2. Morgan C.T., King R.A., Weisz J.R., SchoplerJ., Introduction to Psychology (McGraw-Hill Book Co.,1986)
3. Kimble G.A., Garnezy Principles of General Psychology, 3rd ed., (New York),1-90.
4. Baran R.A.Psychology, (New Delhi; Pearson Education Pvt. Ltd. 2001),5-205
5. Edward E. Smith, Stephen M. Kosslyn, Cognitive Psychology Mind and Brain' (New Delhi, Pearson Education.)1-30.

Course Outcomes:

Unit I: After completion of unit students are able to:

- * Students will be able to understand Psychology.
- * Students will be able to understand Scientific methods in psychology

Unit II: After completion of unit students are able to:

- * Students will be able to know the nervous system and its function
- * Students will be able to know Sensation and Perception.
- * Students will understand about Illusion, Hallucinations.

Unit III: After completion of unit students are able to:

- * Students will be able to know the Cognition
- * Students will understand the attention
- * Students will be able to know the decision making and problem solving

Unit IV: After completion of unit students are able to:

- * Students will understand about Intelligence.
- * Students will understand the psychological tests.

BFST-107: Basics of Computer & Digital Forensics I

Credit-2

Course Objectives: *Student should :*

1. Learn the overview of Digital & Cyber Forensic and its applications.
2. Learn the basics of Basics of computers.
3. Study basics of operating system, networking, file system.
4. Study the types of digital crimes and vulnerability.
5. Learn basic tools and Softwares required for analysis of Cyber crimes.
6. Study elements involved in investigation of digital crimes.

Unit 1

Fundamentals of computers

[09]

Basics of Computers: Computer organization, Input and Output devices, Central Processing Unit, types of Memory – RAM, ROM etc. Understanding working of internal and external Storage devices. Memory units, memory structure and management

Unit 2

Introduction to Software's, Hardware's and Logic Gates

[09]

Software and hardware, understanding applications, data representations, integers, real, binary, octal, hexadecimal & their conversions. Logic gates – Negation, OR, AND, XOR etc.

Unit 3 *Basics of Operating system*

[09]Introduction to Operating System, process management, Concurrency, scheduling, Synchronization, Examples of operating Systems – Windows and Dos, Linux. Types of Computers, Internal and external parts of computers - connectors, sockets etc.

Unit 4

File allocation tables and Basics of networking

[09]

File Systems and Networking, FAT12, FAT16, FAT32, NTFS, Ext2, Ext3 & HFS.
Learning extensions, File system management.

Reference Books:

1. Rajmohan Joshi : *Introduction to Computers* : Isha Books Publication, Delhi :2006 : Page No (1-22)
2. Prof. S. Venkatachalam :*Introduction to Computers* : Educational Publisher, New Delhi : 1999
3. Reema Thareja : *Fundamentals of Computers* : Oxford Publication : 4 June 2014
4. Morley D : *Understanding Computers today & tomorrow 14th Edition* : Cengage Learning Publication : Feb 2012
5. P.K.Singh : *Introduction To Computer Networks* : VK Global Publications Pvt Ltd; 2020th edition (1 January 2020); VK Global Publications Pvt Ltd : 1 Jan 2020
6. G. Manjunath B.E :*COMPUTER Basics* : Vasani Publications : 1 Jan 2010
7. R.C.Joshi,Shashikala Tapaswi : Wiley Publication: *Operating Systems* : 7 June 2005
8. Dr. R.C. Joshi : Basic operating system: Publisher Dreamtech Press India Pvt. Ltd

Course Outcomes:

Unit-I After completion of unit students are able to:

- a. Learn & understand the basics of Computer Systems.
- b. To differentiate between file type and their functions
- c. Learn the types of connection used for establishment of Networks.

Unit-II

After completion of unit students are able to:

1. Understand the difference between Software & Hardware
2. Understand Data Representation System.
3. Understand to Explain the Several Applications of Data Representation System.

Unit-III

After completion of unit students are able to:

- a. Learn about the importance of Operating Systems.
- b. Understand the types of Operating System
- c. Understand the basic concepts related to the operating System.

- d. Understand the types of Software's.
- e. Know the Structure of Motherboard.
- f. Understand and Explain the Several types of Computers

Unit-IV

After completion of unit students are able to:

- a. Understand File Allocation Table & types of Files.
- b. Understand the File System Management.

BFST-108
Basics of Forensic Accountancy I

Credits:2

Course Objectives :Student should

1. Learn the overview of Arithmetic And Geometric Progressions.
2. Study Differential equations and its types.
3. Learn Modern Concepts of Forensic Accounting and Investigative Strategies.
4. Study the Fraud Investigation and Documents Examination

Unit - 1: Arithmetic And Geometric Progressions

[09]

Definitions of A.P. and G.P., Formulae for nth term And sum to n terms of A.P .and G.P., Simple examples

Unit-2:Differential equation

[09]

Definition of ordinary differential equation and degree, order of Differential equation Exact differential equation with simple examples. Linear differential equation $dy + P(x)dx = Q(x)dx$ method of solution with simple examples. Bernoulli's differential equation with examples. Application of differential equation

- i] Growth And Decay Problems
- ii] Newton's Law Of Cooling With Examples.

Unit-3:Modern Concepts of Forensic Accounting and Investigative Strategies

[09]

Forensic Accounting: Introduction Principles of accounting: Basic concepts of forensic accounting Understanding Frauds, Fraud examination methodology: Introduction to Financial Statements, Money laundering: Basic concepts of money laundering, historical context laws related money laundering: various methods followed in money laundering: international money laundering council Financial examinations, fraud, theft, embezzlement, fictitious vendor schemes, tracing of matrimonial assets, reconstruction of income and expenses Occupational frauds and abuses Asset misappropriation Fraudulent disbursement Billing schemes Fraud involving Credit Cards and Cheques.

Unit-4:Fraud Investigation Documents Examination

[09]

Fraudulent financial statement schemes Fictitious revenues Concealed liabilities and expenditures Red flags – associated improper disclosures and improper assets valuation Understanding frauds in various sector: Frauds in Insurance, Frauds in Health Care, Frauds in Banking, Frauds in Tax, Frauds in Stock Market/Securities, Consumer Frauds

Frauds in Public Sector, Frauds in Contract and procurement
Evidence collection analysis- data interpretation- reporting
Whistleblowers and responses to fraud: whistleblower theory and whistleblowing practice
Frauds on intellectual property rights and implications .

ReferenceBooks:

- 1] Algebra and geometry by GV.Kumbhojkar.
- 2] Calculus And Differential Equation (Phadke Prakashan).Prof.L.G.Kulkarni,
Dr.P.B.Jadhav
- 3] Shantinakaran- Text Book of Matrice.

Course Outcomes:

Unit-I:After completion of unit students are able to:

1. Understand and Definition of Arithmetic And Geometric Progressions.
2. Understand the Arithmetic And Geometric Progressions with examples.

Unit-II:After completion of unit students are able to:

1. Understand the Differential equation and ordinary differential equation
2. Understand the Application of differential equation.

Unit-III:After completion of unit students are able to:

1. Understand the Forensic Accounting
2. Understand Basic concepts of money laundering

Unit-IV:After Completion Of Unit Students Are Able To:

1. Understand the Fraud Investigation & Documents Examination.
2. Understanding frauds in various sector.

Practical Semester I : BFSP 110
Basics of Forensic Science & Basics of Criminal Law I Section I-
Basics of Forensic Science

Credit:2

Sr.no.	Forensic Science Practical
1	To study the history of crime cases from a forensic science perspective.
2	To cite examples of crime cases in which apprehensions arose because of Daubert Standards.
3	To Review The sections of forensic science at INTERPOL and compare with those in Central Forensic Science Laboratories in India. Include Suggestions For Improvements If Any.
4	To study the annual reports of National Crime Records Bureau and depict the data on different type of crime cases by way of smartart/templates.
5	To write report on different type of crime cases.

Note: Minimum 4 Practicals should be conducted. Reference Books:

1. B.B.Nanda and R.K.Tiwari, *Forensic Science in India: A Vision for the Twenty First Century*, Select Publishers, New Delhi (2001).
2. M.K.Bhasin and S.Nath, *Role of Forensic Science in the New Millennium*, University of Delhi, Delhi (2002).
3. S.H.James and J.J.Nordby, *Forensic Science: An Introduction to Scientific and Investigative Techniques*, 2nd Edition, CRC Press, Boca Raton (2005).
4. W.G. Eckert and R.K. Wright in *Introduction to Forensic Sciences*, 2nd Edition, W.G.Eckert (ED.), CRC Press, Boca Raton (1997).
5. R.Saferstein, *Criminalistics*, 8th Edition, Prentice Hall, New Jersey (2004).
6. W.J.Tilstone, M.L.Hastrup and C. Hald, *Fisher's Techniques of Crime Scene Investigation*, CRC Press, Boca Raton (2013).

Course Outcomes:

After Completion Of The Unit Students Will Be Able To:

1. Learn about the cognizable and non-cognizable offences
2. Understand the powers of limitation of the JMFC.
3. Understand the Murder and Rape cases.

**Section II -
Criminal
Law I
Credit:2**

Course Objectives: Students should

1. Learn about the cognizable and non-cognizable offences
2. Study the powers of limitation of the JMFC.
3. Study a crime case of Murder, Rape.
4. Study importance of Expert witness.

Sr.no.	Criminal Law
1	To prepare a schedule of five cognizable and five non-cognizable offences.
2	To study the powers and limitations of the Court of Judicial Magistrate of First Class.
3	To prepare a schedule of the offences which may be tried under Section 260(2) of Criminal Procedure Code.
4	To study a crime case in which an accused was punished on charge of murder under Section 302.
5	To study a crime case in which an accused was punished on charge of rape Under Section 375.
6	To cite example of a case in which the opinion of an expert was called for under Section 45 of the Indian Evidence Act.

Note: Minimum 4 practical should be conducted. Reference books:

1. D.A. Bronstein, *Law for the Expert Witness*, CRC Press, Boca Raton (1999).
2. Vipa P. Sarthi, *Law of Evidence*, 6th Edition, Eastern Book Co., Lucknow (2006).
3. A.S. Pillia, *Criminal Law*, 6th Edition, N.M. Tripathi Pvt Ltd., Mumbai (1983).
4. R.C. Nigam, *Law of Crime in India*, Volume I, Asia Publishing House, New Delhi (1965).
5. (Chief Justice) M. Monir, *Law of Evidence*, 6th Edition, Universal Law Publishing Co. Pvt. Ltd., New Delhi (2002).

Course Outcomes:

After completion of the unit, Students will be able to:

1. Learn about the cognizable and non-cognizable offences
2. Understand the powers of limitations of the JMFC.
3. Understand the Murder and Rape cases.

BFSP111

Basics of Forensic Physics I & Basics of Forensic Chemistry Credit-2

Section I- Basics of Physics I

Course Objectives:

Students should

1. Learn about basics of measurement in physics
2. Determine Poisson's ratio, Young's modulus
3. Learn handling of the spectrometer
4. Determine wavelength of given laser source

Credit-2

Sr. no.	Basics of Physics Practical
1	To determine the Poisson's Ratio of a hollow rubber tube.
2	To determine Young's modulus(Y)of the wooden bar.
3	To determine the coefficient of viscosity of water by Poiseuille's methods
4	Determine Refractive index by using liquid lens
5	To Calibrate a Spectrometer using a mercury source.
6	To study the Zener diode as voltage regulator
7	To determine the wave length of given(He-Ne LASER) LASER source by using plane diffraction grating.
8	To study the Exponential Decay of Amplitude of simple pendulum
9	To determine the Frequency of a.c. mains by sonometer using a wire of magnetic/non-magnetic material.

Reference Books:

1. Malvino, Electronics Principles, (7 th Edition TaTa Mc-GrawHills) 120-150
2. V. K. Mehta, Principles of Electronics, S. Chand Publication New Delhi. 80-100
3. Ramakant Gaikwad, Op Amp and Linear integrated circuits, Prentice Hall of India Pub. 210-214
4. Botkar, Integrated Circuits, Khanna Publications, New Delhi 16-20
5. Malvino and Leech, Digital Principles and Applications, (Tata Mc-Graw Hills Pub.) 110-113
6. D.R. Redsicker, the practical methodology of forensic Photography, (2 nd Edition ,CRC Press, Boca Raton, 2000) 21-30
6. Bradbury S, The Microscope, past and present. (Pergamon Press 1968) 40-45

Course Outcomes:

After completion of the practicals, Students are able to:

1. Handle electrical instruments
2. Understand measuring skills in electrical instruments.
3. Understand theoretical concepts by performing experiments.
4. Develop awareness of minimizing errors.

Section II –Basics of Chemistry I Course Objectives:

Students should

1. Preparation & standardization of chemical Solutions.
2. Learn estimation of Acetamide
3. Determine the surface tension of given liquid
4. Learn Water analysis.

Credit-2

Sr. no.	Basics Chemistry Practical
1	Preparation & standardization Of H_2SO_4 Solution.
2	Preparation & standardization Of HCl Solution
3	Estimation of Acetamide
4	To determine the surface tension of given liquid
5	Organic Qualitative Analysis(3compound)
6	Determination of amount of acetic acid in commercial vinegar
7	Water analysis
8	Volumetric estimation Of Potassium Permanganate
9	To prepare the chromatographic plate by using silica gel G.

Note: Minimum 4 Practical should be conducted.

Suggested Readings:

1. G. D. Christian Analytical Chemistry 6th edition, Publisher : Wiley, Hoboken, New Jersey, United States. (742, 750, 753, 780)
2. S.B. Karch, The Pathology of Drug Abuse, CRC Press, Boca Raton (1996).
3. Morisand Boyed, Organic Chemistry Pearson, London, England. (1-39)
4. Gupta Kumar Heterocyclic chemistry Vol I and Vol II Springer, Salmon Tower Building New York City, United States. (58,66)

Course Outcomes:

After completion of the practices, Students are able to:

1. Handle chemical instruments.
2. Understand measuring skills in chemical instruments and maintain the standardization
3. Understand the qualitative analysis of organic compound.
4. Learn the volumetric estimation Of Potassium Permanganate

BFSP-112

Basics of Forensic Biology I & Basics of Forensic Psychology I Section I-

Basics of Biology I

Credit:2

Course Objectives:

Students should

1. Learn the basic knowledge about instrumentation.
2. Study the nature of qualitative analysis.
3. Study of enzyme and its effect of substrate concentration
4. Study the gram staining method

Practicals:-

1. Study of instruments: Microscope, Autoclave, Hot air oven, incubator, pH meter, colorimeter, centrifuge, Laminar air flow
2. Qualitative analysis of sugar, proteins, lipids and nucleic acids
3. Study of Enzyme(Amylase), study the effect of substrate concentration on enzyme activity
4. Estimation of DNA by DPA method & RNA by orcinol method
5. Staining Techniques, Simple, Negative staining, Gram Staining,
6. Study of aseptic techniques- preparation of cotton plugs for test tubes and pipettes, wrapping of petri- plates and pipettes, transfer of media and inoculum.
Staining of bacteria : a) Simple staining b) Gram's staining c) cell wall/ endospore/ capsule staining
7. Study of beer-lamberts law using colorimeter
8. Study of conducting tissue, -xylem and phloem elements in angiosperms and Gymnosperms as seen in L.S. and R.C.S

Note: Minimum 4 practical's should be conducted.

Reference Books:

1. Handbook of Media for clinical and public health microbiology by Ronald Atlas.

2. Stain and Staining procedure by Desai and Desai.
3. Forensic Biology-Richard Li
4. Experimental microbiology by rakesh patel, Vol.I
5. Cell biology, genetics, Molecular biology, evolution and ecology-by Schand (1sep.2004)

Course Outcomes:

After completion of the unit, Students will be able to:

1. Learn about the handling of various instruments
2. Understand the Gram staining method.
3. Understand the aseptic techniques in laboratory.
4. Understand the tissue system of xylem and phloem elements

Section II

Basics of Forensic Psychology I

Course Objectives: Students should

1. Learn about the Serial Learning.
2. Learn about the Recall recognition.
3. Learn about the Bilateral transfer and maze learning
4. Learn about the span of Attention, types of behavior pattern
5. Learn about the Anxiety, Expression, and Illusion.

Practicals:-

- 1 Serial Learning
- 2 Recall-Recognition
- 3 Bilateral Transfer
- 4 Maze learning
- 5 Span of Attention
- 6 Habit interference
- 7 Type A/B behavior patterns- Upinder Dhar& Jain M
- 8 Sinha's Comprehensive Anxiety Test – A.K.P. Sinha & L.N.K. Sinha
- 9 Facial expression
- 10 Illusion (Muller-Lyre)

Note: Minimum 4 practical's should be conducted.

ReferenceBooks:

1. Upinder Dhar& Jain M .-Type A/B behavior patterns-
2. A.K.P. Sinha & L.N.K. Sinha- Sinha's Comprehensive Anxiety Test –
3. Illusion (Muller-Lyre)
4. Serial Learning
5. Recall-Recognition
6. Bilateral Transfer
7. Maze learning
8. Span of Attention

9. Habit interference

Course Outcomes:

After completion of the Practicals, Students will be able to:

1. Students understand about the Serial Learning.
2. Understand about the Recall recognition.
3. Understand about the Bilateral transfer and maze learning
4. Understand about the span of Attention, types of behavior pattern
5. Understand about the Anxiety, Expression, and Illusion.

BFSP113
Basics of Computer & Digital Forensics & Basics of Accountancy I
Section-I Basics of Computer & Digital Forensics

Credit:

2

Course Objectives:

Students should

1. Learn about the use of Internet by visiting different URL, online sites.
2. Learn about the Hardware & Peripheral of Computer.
3. Study about the storage devices.
4. Study the use of Internet by using LAN.
5. Learn about Reading & Writing data on Storage Devices.

List of Practicals:

1. Working with windows file (creation ,modification, deletion, attributes) folder (Creation, nesting, attributes)
2. Working with external storage devices using windows- Reading and writing data On floppy, CD, DVD, USB thumb drive
3. Working with external storage devices using Linux-reading writing data on Floppy, CD, DVD, USB, thumb drive.
4. Understanding LAN-client/server, user creation, password protection.
5. Use of internet- visiting websites with given URL, Searching in Formation using Search engine.
6. Working with hard drive and cloud storage.
7. Introduction to computer hardware and peripherals.

Note: Minimum 4 Practical's should be conducted.

Reference Books:

1. *A Practical Guide to Computer Forensics Investigation* by Released December 2014
Publisher(s): Pearson IT Certification ISBN: 9780132756174.
2. Nihad A. Hassan, *Digital Forensics Basics: A Practical Guide Using Windows OS*,
February26, 2019 by.

3. Joakim Kavrestad, *Basics of Digital Forensics: Theory, Methods, and Real-Life Applications*, 1st Ed.2018Edition.
4. *Handbook of Digital Forensics and Investigation* ,1st Edition, Elsevier Publication
26th October 2009.

Course outcomes:

After completion of the unit, students are able to:

1. Learn about the Use of Computer Hardware, Software & Peripherals.
2. Learn the Role of Digital & Cyber Forensic in Investigation of Cyber Crimes.

SectionII: Basics Accountancy

Course Objectives:

Students should

1. Learn about the differential equation, Growth & decay
2. Learn about the differential equation, Newton's law of cooling
3. Study about Eigen values & Eigenvectors.
4. Study the Exact differential equation.

Credit:2

Sr. no.	Basics Accountancy Practical
1	Applications of differential equation, Growth & decay
2	Applications of differential equation, Newton's law of cooling
3	Eigen values & Eigenvectors
4	Complex numbers: Geometrical representation of complex numbers (Argand's diagram) Graphical representation of Z , $Z_1 + Z_2$, $Z_1 - Z_2$, $Z_1 \cdot Z_2$, Z_2 / Z_1 , $[Z - a] = b$.
5	Exact differential equation
6	Example on unit and controllability

Note: Minimum 4 Practical should be conducted.

Reference Books:

- 1] Algebra and geometry by G.V. Khumbojkar.
- 2] Calculus and differential equation (Phadakeprakashan). Prof.L.G.Kulkarni, Dr.P. B.Jadhav

3] Shantinakaran- Text Book of Matrice

Course Outcomes:-

After completion of the practicals, Students are able to:

1. Understand the differential equation, growth.
2. Understand the Newton's law of cooling.
3. Understand the Exact differential equation.
4. Learn the example on unit and controllability.

SEMESTER:II

BFST-201 CRIMINOLOGY-II

Credits:2

Course Objectives:

Students should

1. Know the importance of criminology.
2. Know the causes of criminal behavior.
3. Know the significance of criminal profiling to mitigate crime.
4. Know the consequences of crime in society.
5. Know the elements of criminal justice system.

Unit- 1: Basics of Criminology

[09]

Definition, aims and scope, Theories of criminal behavior – classical, positivist, sociological. Criminal anthropology, Criminal profiling, Understanding modus operandi. Investigative strategy, Role of media

Unit-2: Crime

[09]

Elements, nature, causes and consequences of crime, Deviant behavior, Hate crimes, organized crimes and public disorder, domestic violence and workplace violence, White collar crimes, Victimology, Juvenile delinquency. Social change and crime, Psychological Disorders and Criminality. Situational crime prevention.

Unit-3: Criminal Justice System

[09]

Broad components of criminal justice system, Policing styles and principles. Police's power of investigation, Filing of criminal charges, Community policing. Policing a heterogeneous society, Correctional measures and rehabilitation of offenders, Human rights and criminal justice system in India.

Unit-4: Cyber Crimes and digital evidence

[09]Cyb

er crimes and digital evidence: what is cyber crime, types of cyber crimes, digital evidence, Digital Vs Physical Evidence, Nature of Digital Evidence, Precautions, while dealing with Digital Evidence.

Reference Books:

1. D.E.Zulawski and D.E. Wicklander, Practical Aspects of Interview and Interrogation, CRC Press, Boca Raton (2002).
2. R. Saferstein, Criminalistics, 8th Edition, Prentice Hall, New Jersey (2004).
3. J.L. Jackson and E. Barkley, Offender Profiling: Theory, Research and Practice, Wiley, Chichester (1997). R. Gupta, Sexual Harassment at Workplace, LexisNexis, Gurgaon (2014).

Course Outcomes:**Unit-I: After completion of the unit, Students are able to:**

1. Understand criminology
2. Understand criminal profiling, and other concepts of investigation

Unit-II: After completion of the unit, Students are able to:

1. Understand concepts regarding Nature and types of crimes.
2. Understand different psychological disorders

Unit-III: After completion of the unit, Students are able to:

1. Understand criminal justice system
2. Understand regarding human rights, Rehabilitation

Unit-IV**After completion of unit students are able to:**

1. Students will be able to learn the difference between Physical evidence &
2. Digital evidence.
3. Students will be able to learn & understand concept of Cyber Crimes.
4. Students will be able to learn the types of Cyber Crimes.

BFST-202
Criminal Law-II
Credits 2

Course Objectives:

Students should:

1. Learn the Dowry Prohibition Act, Prevention of Food Adulteration Act, Prevention Of Corruption Act
2. Study the Wildlife Protection Act, I.T.Act.2000 and it Amendments, Environment Protection Act
3. Study the Drugs and Cosmetics act, Explosive substances act, Arms act
4. Study the NDPS ACT, Essential Commodity act.

Unit - 1: Major acts – I

[09]

Dowry Prohibition Act. Prevention of Food Adulteration Act. Prevention of Corruption Act.

Unit - 2: Major acts – II

[09]

Wild life Protection Act. I.T.Act. 2000 and its amendments. Environment Protection Act. Right to Information Act

Unit – 3: Major acts – III

[09]

Drugs and Cosmetics Act. Explosive Substances Act. Arms Act

Unit - 4: Major acts – IV

[09]

Narcotic Drugs and Psychotropic Substances Act. Essential Commodity Act.

Reference Books:

1. Himanshu Bangia, NDPS Bare Act The Bright Law House, New Delhi (2017) 3 to 62
2. GOI, The Prevention of Food Adulteration Act, 1954- Bare Act, Universal/LexisNexis(2021) 4 to 200

3. The Explosives Act, 1884 : Bare Act Commercial Law Publishers (2019)
4. Arms Act, 1959, Professional Book Publishers (2020)
5. The Information Technology Act, 2000 Bare Act, Universal (2020)
6. Justice M. R. Mallick, Professional's Manual Of Environment (Protection) Act, 1986, Professional Book Publishers, Delhi (2015)
7. Lawmann, Lawmann's Wild Life (Protection) Act, 1972 - Bare Act, Lawmann's (2020)(3 to 124)
8. Universal, The Right To Information Act, 2005 (Bare Act), Universal, (2018)(1 to 45)
9. Universal's, The Prevention Of Corruption Act, 1988 – Bare Act, Universal Publications, (2020)
10. Professional Book Publishers Delhi, The Drugs And Cosmetics Act, 1940 Along With Rules, 1945, Professional Book Publishers Delhi, (2018) (4 To 250)
11. Lawmann's, Lawmann's Essential Commodities Act, 1955 - Bare Act, Lawmann's (2020), (3 to 156)
12. L&JP, The Dowry Prohibition Act 1961, Law & Justice Publishing Co. (2021)

Course Outcomes:

Unit–I: After completion of the unit, Students are able to:

1. Understand the Dowry Prohibition act and Prevention of Food adulteration act & its provisions.
2. Understand the Prevention of Corruption act.

Unit–II: After completion of the unit, Students are able to:

1. Understand the Wildlife Protection act and I.T. act & its amendments.
2. Understand the Environment protection act and Untouchability offences act

Unit–III: After completion of the unit, Students are able to:

1. Understand the Drugs and Cosmetics act and Explosives substances act.
2. Understand the Arms act

Unit–IV: After completion of the unit, Students are able to:

1. Understand the Narcotic Drugs and Psychotropic Substances Act.

2. Understand the Essential Commodity act.

BFST-203 Basics Forensic Chemistry-II

Course Objectives: Student should

1. Learn the importance of chemical kinetics.
2. Learn The ionic solid and covalent bonding
3. Learn the concept of hybridization.
4. Understand the Thermodynamics.

Credits:2

Unit-1: Chemical Kinetics

[09]

Introduction, Rate of reaction, Definition and units of rate constant. Factors affecting rate of reaction. (Nature of reactant, Concentration, pressure, temperature and catalyst.) Order and Molecularity of reaction, First order reaction: (Derivation not expected). Characteristics of first order reaction. Pseudo- uni-molecular reactions.

Examples: i) Hydrolysis of methyl acetate ii) Inversion of cane sugar.

Unit-2: Ionic Solid and Covalent Bonding

[09]

Definition of bonds 2. Formation of ionic bonds Energetic of ionic bond formation Born-Haber cycle Fajan's rule NaCl structure, Lewis theory-Octet rule, exception to octet rule, Valence bond theory(VBT).

Unit-3: Hybridization

[09]

Concept of hybridization–Definition, different types of hybridization, Geometry of molecules Valence Shell Electron Pair Repulsion (VSEPR) Theory.

Unit-4: Thermodynamics**[09]**

Introduction (Basic terms involved in thermodynamics), Statement of Zeroth law ,First law and Third law. Spontaneous & non-spontaneous processes—definitions, distinguishing points and examples. Second law of thermodynamics and its different statements.

Reference Books:

1. Puri, Sharma and Pathania, Principles of Physical Chemistry, Vishal Publishing House, 44th Edition Jaladhar July 1962, (525-557)
2. Gurdeep Raj GOEL, Advanced Physical Chemistry Publishing House, 36th Edition
3. Bahl, Tuli and Bahl, Essentials of Physical Chemistry, New Delhi, India (1-450)
4. Soni and Dharmarha, Text Book of Physical Chemistry, Sultan Chand & Sons, 2016 (unit VI)
5. Puri, Sharma and Kalia, Principles of inorganic chemistry, Milestone publisher, Delhi India., (137-200, 201 – 233, 313 – 327)
6. J. E. Huheey, Inorganic Chemistry, 4th edition, Harper Collins college publishers, (92-134, 300, 538-557, 655, 662)
7. Shriver and Atkins, Inorganic Chemistry, 3rd edition, Great Britain by Oxford University press, W. H. Freeman and Company 41 Madison Avenue, New York, NY 10010. (1-147)
8. J.D. Lee, Concise Inorganic Chemistry, CHAPMAN & HALL. Tokyo, Melbourne, Madras., 30-354)
9. Day and Selbin, Theoretical Inorganic Chemistry,, 2nd edition, DARAYAGANJ NEW DELHI 181 DL
10. S. Glasstone, Thermodynamics for chemists,

Course Outcomes:**Unit- I: after completion of the unit, Students are able to:**

- * Know the introduction of chemical kinetics and their rate of reaction.
- * Understand first order reaction and their characteristics and pseudo unimolecular reaction.

Unit-II: After completion of the unit, Students are able to:

- * Know basic terms in thermodynamics and their all laws and statement.
- * Study spontaneous and non-spontaneous processes.

Unit- III: After completion of the unit, Students are able to:

- * Know all types of bonds and their formation.
- * Understand formation Born-Haber cycle Fajan's rule NaCl structure, Lewis theory, exception to octet rule, valence bond theory (VBT).

Unit -IV: After completion of the unit, Students are able to:

* Understand concept of hybridization different types of hybridization and their geometry of molecules.

* Study valence shell electron pair repulsion (vsepr) theory

BFST204
Basics of Physics-II

Course Objectives:

Students should:

- * Learn application of radioactivity.
- * Study basic concept of electronics, logic gates and derived logic gates.
- * Know physics of photography and its applications for forensic science
- * Understand the principles and working of microscopy.

Unit - I: Radioactivity

[09]

Review of nuclear composition, nuclear properties and half-life, Radioactive decay Schemes, Applications of Radioisotope, Carbon dating, Radiometric dating.

Unit - II: Electronics

[09]

Basics of LR, CR, LCR Circuits, Bridge Rectifier with δ filter, Difference between regulated and unregulated power supply, Definition of Line and Load regulation, series and Shunt regulators. Basic logic gates: OR, AND, NOT, Derived gates: NOR, NAND, XOR, with symbols and truth tables, De Morgan's theorems and its verification

Unit - III: Photography

[09]

Physics of light, properties UV, Visible, IR, property of color Basic principles and applications of photography in forensic Science, 3D photography, photographic evidence, Infrared and Ultraviolet photography, Digital photography, Videography, Crime scene and laboratory photography

Unit - IV: Microscopy II

[09]

Principle, construction, working, well labelled diagram, Application in Forensic science of Electron microscopes: Scanning electron microscope, Transmission electron microscope, Phase contrast microscope, Dark field microscope, Fluorescence microscope,

Reference Books:

1. Malvino, Electronics Principles, (7 th Edition TaTa Mc-GrawHills) 120-150
2. V. K. Mehta, Principles of Electronics, S. Chand Publication New Delhi. 80-100
3. Ramakant Gaikwad, Op Amp and Linear integrated circuits, Prentice Hall of India Pub. 210-214
4. Botkar, Integrated Circuits, Khanna Publications, New Delhi 16-20
5. Malvino and Leech, Digital Principles and Applications, (Tata Mc-Graw Hills Pub.) 110-113
6. D.R. Redsicker, the practical methodology of forensic Photography, (2 nd Edition ,CRC Press, Boca Raton, 2000) 21-30
7. Bradbury S, The Microscope, past and present. (Pergamon Press 1968) 40-45

Course Outcomes:

Unit-I: After completion of the unit students are able to:

- * Describe the concept of radioactivity and half life.
- * Know different types of radioactive decay.

Unit-II: After completion of the unit students are able to:

- * To learn types logic of gates
- * To verify the De-morgans theorem with its truth table

Unit-III : After completion of the unit students are able to:

- * Learn usefulness of photography and Videography for recording the crime scenes.
- * Understand applications of photography for crime scene investigation.

Unit-IV : After completion of the unit students are able to:

- * Know concept of Microscopy
- * Learn the applications of microscopy to the forensic science.

BFST-205

Basics of Forensic Biology-II

Course Objectives: I

Students should:

1. Learn the basic concepts of microbiology.
2. Study the basic knowledge of DNA, RNA
3. Study the basic knowledge of human physiology.
4. Study the basic principle of Immunology.

Unit 1 Basics of microbiology:

[09]

Concept of pure culture technique, stains and staining techniques, Control of Microorganisms: Physical & Chemical methods of control, microscopy principle and types of Microscopy, Broad classification of microorganisms

Unit 2 Basic concepts of genetics:

[09]

Genetic material – Discovery, experiments, composition and structure of DNA and RNA, organization of DNA in chromosomes, DNA replication, genetic code, protein synthesis, Mendelian principles, sex linkage and sex determination systems, Introduction to recombinant DNA technology, its applications in health, agriculture, industries & forensics.

Unit 3 Human physiology:

[09]

Introduction to Nervous system, respiratory system, digestive system, circulatory system, endocrine system, blood and its function, composition of blood, formation of blood cells, types of blood cells, and blood groups

Introduction to osteology and odontology: Human skeletal system, Formation of bones, different types of bones, ossification, Dental structure of humans, types of teeth and arrangement.

Unit 4 Immunity:

[09]

Definition, types-natural, acquired, active, passive. Antigens-Definition, types of antigens, Factors influencing antigenicity; Antibody-Definition, structure, types, properties and functions of Immunoglobulin, Agglutination, Precipitation.

Reference Books:

1. P.K Gupta, Rastogi publications, Cell and molecular biology 3rd ed.
2. Kuby's Immunology, Goldsby, Kindt, Osborne, W.H Freeman and company, New York 6th ed.(unit IV Page no.4 to 21)
3. Roitt :Essential Immunology (Unit IV Page no. 1 to 21)
4. Trevor Palmer, Prentice Hall/Ellis Horwood, Understanding enzymes 4th ed.(1995)
5. A Fersht, W.H Freeman and Company Enzyme Structure and Mechanism (1977)
6. Upadhyay &Nath, Himalaya Publishing house Biophysical Chemistry (2010)
7. Satyanarayan, Biochemistry (2008)3rd ed.
8. Dubey and Maheshwari, S.Chand and company, Practical Microbiology New Delhi.
9. Nelson and Cox, W.H Freeman, Lehninger Principles of Biochemistry 5th ed.(2005).

Course Outcomes:**Unit-I****After completion of unit students are able to:****Unit-II****After completion of unit students are able to:**

- * Understand the basic concepts of genetics
- * To differentiate composition and structure of DNA and RNA
- * To study the Mendelian principles.

Unit-III**After completion of unit students are able to:**

- * Learn about Human physiology.
- * To understand the composition of blood, its types and blood group analysis.
- * Understand the Human skeletal system

Unit-IV**After completion of unit students are able to:**

- * Students will understand the Immune system.
- * Students will learn the Antigen and Antibody types.
- * Understand the antigen and antibody agglutination and precipitation

BFST-206
Basics of Forensic Psychology- II

Course Objectives:

Students should:

1. Learn overview of Forensic psychology and its applications.
2. Learn about the Learning and theories of Learning
3. Learn about the Memory and Forgetting.
4. Learn about the motivation and emotions
5. Learn importance of personality.

Credit:2

Unit-I Learning:

[09]

Definition of Learning, Types of Learning, Theories of Learning-Classical Conditioning, Operent Conditioning, Trial-Error Learning, Insight Learning, Cognitive Learning Theory-Tolman's Latent Learning, Bandura's Observation Learning Theory.

Unit-II Memory :

[09]

Definition of Memory, Memory process, Models of Memory-Level Processing Model, Parallel Distribution Processing Model, Information Processing Model sensory memory, short-term Memory and long-term memory, Retrieval Cues, Forgetting, Forgetting Curve, Causes of Forgetting.

Unit-III Motivation and Emotion:

[09]

Definition of Motivation, Types of Motives, Approaches of Motivation-instinct approach, drive-reduction approach, arousal approach, incentive approach, Humanistic approach; Maslow's hierarchy of needs, Frustration and Conflicts. Definition of Emotion, Elements of Emotion, Theories of Emotion- James Lange's theory, Cannon-Bard's theory, Schachter-Singer's theory

Unit-IV Personality:

[09]

Definition of Personality, Theories of Personality- Psychoanalytic Theory- Sigmund Freud, Jung and Adler, Behavioral Model, Social Cognitive model-Bandura's reciprocal determinism and self-efficacy, Humanistic Model Carl Roger and self-concept, Trait theories of Personality- Allport's Theory, Cattell's Theory, The Big Five Model, Biological Model, Assessment of Personality.

Reference Books:

1. Ciccarelli, S. K. & Meyer G. E. Psychology (New Delhi; Pearson Education, 2006)174-535.

2. Morgan C.T., King R.A., Weisz J.R., Schopler J., Introduction to Psychology, (McGraw-Hill Book Co. 1986)
Kimble G.A., Garnezy Principles of General Psychology,3rd ed., New York),1-90.
3. Baran R.A. Psychology, (New Delhi; Person Education Pvt. Ltd. 2001),5-205
4. Edward E. Smith, Stephen M. Kosslyn, Cognitive Psychology Mind and Brain' (New Delhi, Pearson Education.) 1-30.
5. Parameswaran, E.G., Beena C. Tata Invitation to Psychology(McGraw-Hil, New Delhi.)
6. Dr. Padhye V.S. Manashatra-EkParichay (Aurangabad; RenukaPrakashan,2004)
7. Thakkar P., Dr. Ambekar A. Psychology-An Introduction.

Course Outcomes:

Unit – I:

- * Students will understand the learning.
- * Students will understand the theories of learning

Unit – II

- * Students will able to understand the Memory
- * Students will able to understand the memory model
- * Student will able to understand the forgetting.

Unit – III

- * Students will able to understand the motivation.
- * Students will able to understand the Emotions

Unit – IV

- * Students will able to understand the Personality.
- * Students will able to understand the trait theory of personality
- * Students will able to understand the Assessment of personality.

BFST-207
Basics of Computer and Digital Forensic-II

Course Objectives:

Credit:2

Student should:

1. Learn the overview of Digital & Cyber Forensic and its applications.
2. Learn basics of Basics of computers.
3. Study basics of operating System, networking, file system.
4. Study the types of digital crimes and vulnerability.
5. Learn basic tools and Software's required for analysis of Cyber-crimes.
6. Study elements involved in investigation of digital crimes.

Unit-1

Basics of Networking

[09]

Basics of Networking-Types of topologies, LAN, MAN, WAN, SAN, CAN etc.
Types of internet connections (Dialup, DSL, Cable, broadband, leasedline, satellite, Wi-Fi, 3G-4G) ISP, IP grouping.

Unit-2

Basics of Internet

[09]

Introduction to Internet web and cloud based application, World Wide Web, E-mails, Chat, Search Engines, Types of portals, Networking Protocols.

Unit- 3

Network Security

[09]

Network Security Threats, Vulnerabilities, Access control, Virus, Trojans, Security plan and policies.

Unit 4

Cyber Crimes and digital evidence

[09]

Cyber crimes and digital evidence: what is cyber crime, types of cyber crimes, digital evidence, Digital Vs Physical Evidence, Nature of Digital Evidence, Precautions, while dealing with Digital Evidence.

Reference Books:

1. Rajmohanjoshi4 : Introduction to Computers : 30 Oct 2006
2. S. Vankatachalam, *Introduction to Computers*: Published by Pitambar Publishing Company (P) Ltd. ISBN-13: 978-81-209-1115-4, ISBN: 81-209-1115-6
3. P K Singh, *Basic of Computer* by, V k Global Publication 2015
4. Michael miller: *Computer basic Absolute Beginner's Guide*, by, Pearson Publication, 9th Edition: 2020
5. Dr. R. C. Joshi : *Basic operating system*, Dream tech PressPublication,2005
6. Wendell Odom : *Computer Networking*, Published by: Cisco Press 800 East 96th Street Indian apolis, IN46240USA, September 2011.
7. V. S. Bagad : *Data communication system: Technical*, publication 2009
8. Beasley Jeffrey S : *Networking Essential*, Pears on Education India Publication
9. Ron Chernow : *Internet*, Penguin Books; Reprint edition : 19 oct 2016

Course Outcomes:**Unit-I:**

After completion of unit students are able to:

1. Learn the basic concepts related to Networking.
2. Understand the Networking & Its types.
3. Understand the types of Internet Connections.
4. Learn the technology related Networking.

Unit-II:

After completion of unit students are able to:

1. Understand the Basic concept of Internet & its Applications.
2. Learn Online Applications & its use in real time.
3. Learn the use of Networking Protocols related to Internet.
4. Understand the types and Use of web Portals by using internet.

Unit-III:

After completion of unit students are able to:

1. Understand the importance of Network security.
2. Learn the types of Networking Threats.
3. Learn the types of Cyber Crimes & its Preventive measures.

Unit-IV:

After completion of unit students are able to:

1. Students will be able to learn the difference between Physical evidence & Digital evidence
2. Students will be able to learn & understand concept of Cyber Crimes.
3. Students will be able to learn the types of Cyber Crimes

BFST-208

BasicsofStatistics-IICredit:2

CourseObjectives:Studentshould

1. Learnthebasicconceptinstatistics.
2. StudyMeasuresofcentraltendencyandmeasuresofdispersion.
3. StudytheCorrelationandRegression..
4. LearntheProbabilityandSampling

Unit-I:Basicsof Statistics

[09]

Introductiontostatisticsandcollectionofdata.,Meaningofstatistics,ScopeofstatisticsinBiologicalandmedicalsciences,PrimaryandSecondarydata,Classificationofdata,Inclusive and Exclusive methods, Discrete andContinuous frequency distribution.,CumulativefrequenciesGraphicalrepresentation:-Histogramandogivecurves

Unit-II:Measuresofcentraltendencyandmeasuresofdispersion

[09]

Measures of central tendency and measures of dispersion,Concept of measures ofcentraltendency,DefinitionsofA.M.,Median,Mode,Quartiles,Weightedmean,Examplesofungroupedandgroupeddata.,PropertiesofA.M.(statementonly),Methodsofobtainingmean &quartilesgraphically,Conceptofmeasuresofdispersion.AbsoluteandRelative measuresofdispersion,DefinitionsofRange,Q.D,S.Dandvariance,coefficientofvariation.Examplesongroupedandungroupeddata

Unit-III:CorrelationandRegression

[09]

Conceptofcorrelationbetweentwovariablesandtypesofcorrelation.Methodofobtainingcorrelation

- i] Byscattardiagrammethod
- ii] ByKarlPearsonCorrelationcoefficient

iii] By Spearman's Rank correlation coefficient with and without tie. Properties of correlation coefficient. Examples on ungrouped data, Concept of regression, Lines of regression. Regression coefficients and properties without proof., Examples on ungrouped data., Idea of multiple and partial correlation

Unit-IV: Probability and Sampling

[09]

- Definition of sample space, Outcomes, events, exhaustive events, Mutually exclusive events, Equally likely events, certain events, impossible events.,
 - Definition of probability, Limits of probability. Probability of complementary event, Additive law of probability.
 - Simple illustrative examples.
 - Definition of conditional probability, Multiplicative law of probability, Independent events, Simple illustrative examples.
 - Idea of population and sample. Simple Random
 - Sampling and Stratified Random sampling. Advantages and disadvantages of both the methods.
 - Testing of hypothesis Simple and composite hypothesis, Null and alternative hypothesis, types of errors, Critical region, Acceptance region, level of significance.
- 4.6 Tests of significance: Chi square tests, t tests and F

Reference Books:

- 1] Goon A. M., Gupta M. K. and Dasgupta B.: Basics of mathematical statistics vol. I & II. World Press, Calcutta.
- 2] Gupta & Kapoor: Basics of mathematical statistics.
- 3] Thingale T. K. and Dixit P. G. (2003): A textbook of paper- I for B. Sc. I, Nirali Publication, Pune.
- 4] Waiker and Lev: Elementary Statistical methods.
- 5] Rohatgi V. K. and Sauh A. K. M. D. E. (2002) An Introduction to probability and statistics (Jo

hnWiley&Sons-Asia).

6) ThigaleT.K.andDixitP.G.(2003):AtextbookOfpaperIIforB.Sc.I.

7) Meyer P.L. (1970): Introductory to probability and statistical Application. Addison Wesley.

Course Outcomes:

Unit-I: After completion of unit students are able to:

1. Understand the basics of Statistics.
2. Understand the Primary and Secondary data.
3. Learn the Inclusive and Exclusive methods.

Unit-II: After completion of unit students are able to:

1. Learn the Measures of central tendency and measures of dispersion.
2. Understand the Methods of obtaining mean.

Unit-III: After completion of unit students are able to:

1. Understand the Correlation and Regression.
2. Learn the scatter diagram method.
3. Learn the Properties of correlation coefficient.

Unit -IV : After completion of unit students are able to:

- 1 Understand the Probability and Sampling.
- 2 Learn the sample space.

Semester II Practical **BFSP-210**
Criminology II & Basics of Criminal Law II Section I: Criminology II
Credit: 2

Course Objectives: Students should

1. Learn about the Law of individuality, principle of exchange, progressive of change
2. Learn about the Law of comparison, analysis, Probability, Circumstantial Facts

Sr.no	Forensic Science practical
1	To study Law of individuality.
2	To study Locard's principle of exchange.
3	To study Law of progressive of change.
4	To study Law of comparison.
5	To study Law of analysis.
6	To study Law of Probability.
7	To study Law of Circumstantial Facts.

Note: Minimum 4 Practicals should be conducted. Reference Books

1. D.E. Zulawski
and D.E. Wicklander, *Practical Aspects of Interview and Interrogation*, CRC Press, Boca Raton (2002).
2. R. Saferstein, *Criminalistics*, 8th Edition, Prentice Hall, New Jersey (2004).
3. J.L. Jackson and E. Barkley, *Offender Profiling: Theory, Research and Practice*, Wiley, Chichester (1997). R. Gupta, *Sexual Harassment at Workplace*, Lexis Nexis, Gurgaon (2014).

Course Outcomes:

After completion of the unit, Students will be able to:

1. Understand the Law of individuality, principle of exchange, progressive of change
2. Understand the Law of comparison, analysis, Probability, Circumstantial Facts

Section–II Criminal Law- II Credit:2

Course Objectives: Students should

1. Learn about the Article 22 (5) of Indian Constitution and article 14 of Constitution of India right to equality
2. Study the case of Drugs and Cosmetics act, Explosive substances act, Arms act.
3. Study a crime case of 304 B of the Indian Penal Code

Sr. No.	Criminal Law practical
1	To cite a case where in a person was detained under Article 22(5) of the Indian Constitution. Express your views whether the rights of the person asenlisted in this Article were taken careof.
2	To cite a case under Article 14 of the Constitution of India wherein the Right to Equality before Law was allegedly violated.
3	To list the restrictions imposed on Right to Freedom of Worship under the Constitution of India.
4	To prepare a schedule of persons convicted under Narcotics, Drugs and Psychotropic Act statistically analyze the age group to which they belonged.
5	To study a case in which Drugs and Cosmetic Act was invoked.
6	To study a case in which Explosive Substances Act was invoked.
7	To study a case in which Arms Act was invoked.
8	In light of Section 304B of the Indian Penal Code,cite a case involving dowry death.
9	To study a case wherein the Untouchability Offences Act was invoked on the basis of Article of the Constitution of India.

Minimum 4 Practical should be conducted.

Reference Books:

1. NDPS Bare act

2. Prevention of Food Adulteration Bare Act.
3. NDPS Bare Act.
4. Explosive Substances Bare Act
5. Arms Bare Act.
6. I.T.Act.2000anditsamendmentsBareAct
- 7 Environment Protection Bare Act.
8. Wildlife Protection Bare Act.
9. Untouchability Offences Bare Act
10. Prevention of Corruption Bare Act.
11. Essential Commodity Act.
12. Dowry Prohibition Bare Act.

Course Outcomes:

After completion of the unit, Students will be able to:

1. Learn about the Article 22(5) of Indian Constitution and article 14 of Constitution of India right to equality
2. Understand the cases of Drugs and Cosmetics act, Explosive substances act, Arms act.
3. Understand the case of 304 B of the Indian Penal Code

Practical-BFSP-211
Basics of physics II & Basics of Chemistry II Section I:
Basics of Physics II Credit: 2

Course Objectives: Students should

1. Learn measuring skills in practical.
2. Understand basic and derived logic gates
3. Understand De-morgans Theorem
4. Learn voltage regulation and bridge rectifier

Sr.No.	Basics Physics Practical's
1	To determine the temperature coefficient of resistance of given coil.
2	To study the voltage regulation and calculate ripple factor of bridge rectifier with π filter.
3	Transistor(CE) characteristics : Output characteristics
4	To Study of Basic Logic Gates.
5	To study De Morgan's theorems
6	To determine the dc resistance of inductor (LCR series resonance)
7	To plot polar intensity distribution curve for an electric bulb using photo electric cell .
8	Spectrometer (determination of angle of prism A)
9	To determine M.I. of a rod using Bifilar suspension.
10	To determine the 'g' acceleration due to gravity using Kater's Pendulum.

Note: Minimum 4 Practical should be conducted.

Reference Books

1. H. Singh and P. S. Hemne B.Sc. Practical Physics, , S. Chand Publication, (4th edition, 2011) 20-60
2. C. L. Arora, B.Sc. Practical Physics, (S. Chand Publication, 1957) 69-79
3. White and Manning, Experimental College Physics, McGraw-Hill Book Company. (3rd edition 2011) 333-340
4. S. L. Gupta and V. Kumar, Practical Physics, Pragati Prakashan, (27th edition, 2010) 210-213

Course Outcomes:

After completion, students are able to:

1. Learn measuring skills in practical
2. Understand determine thermal conductivity and temperature coefficient of resistance

- Determine angle of prism
- Determine dc resistance of inductor.

Section II Basics of Chemistry II

Course Objectives: Students should:

- Learn measuring skills in practical.
- Will be able to interpret the chemical reaction rates.
- Understand Qualitative analysis
- Learn Estimation of Aspirin and Aniline

Sr. no	Forensic Chemistry practical
1	Heat of Ionization
2	Chemical Kinetics I :Hydrolysis of Methyl Acetate
3	Chemical Kinetics II: Study of Reaction Between $K_2S_2O_8$ & KI
4	Inorganic micro–Semi micro qualitative analysis
5	Determination of Viscosity of given liquids sample A & B
6	Volumetric estimation of Ferrous Ammonium Sulphate
7	Estimation of Aniline
8	Estimation of Aspirin

Note: Minimum 4 practicals should be conducted.

Reference Books:

- Puri, Sharma and Pathania, Principles of Physical Chemistry, Vishal Publishing House, 44th Edition Jaladhar July 1962, (525-557)
- Gurdeep Raj GOEL, Advanced Physical Chemistry Publishing House, 36th Edition
- Bahl, Tuli and Bahl, Essentials of Physical Chemistry, New Delhi, India (1-450)
- Soni and Dharmarha, Text Book of Physical Chemistry, Sultan Chand & Sons, 2016 (unit VI)
- Puri, Sharma and Kalia, Principles of inorganic chemistry, Milestone publisher, Delhi India., (137-200, 201 – 233, 313 – 327)
- J. E. Huheey, Inorganic Chemistry, 4th edition, Harper Collins college publishers, (92-134, 300, 538-557, 655, 662)
- DFSL manual.

Course Outcomes:

After completion of the unit, Students will be able to:

1. Learn about the Heat of Ionization, Hydrolysis of Methyl Acetate.
2. Understand the Study of Reaction between $K_2S_2O_8$ & KI, Semi micro qualitative analysis.
3. Understand the Estimation of Aniline & Aniline.

BFSP-212

Basics of Biology & Basics of Psychology-II

Section– I Basics of Biology-II

Credit:2

Course Objectives: Students should

1. Learn about the Morphological types of RBCs.
2. Study the Antigen Antibody reaction and Body fluids including Saliva, Urine, Blood, and Sweat.
3. Study the preparation of Buffers and PH determination.
4. Study the General test for Carbohydrates

Practicals-

Sr.No.	Forensic Biology
1	Study of morphological types of red blood cells
2	Antigen-antibody reaction (blood groupings)
3	Chromatography- i]separation of Amino acids, ii]sugars using paper chromatography
4	Mitochondria – Stained preparation of mitochondria from i)Onion peeling ii)Hydrilla leaf iii)Oral mucosa by using Janus Green B.
5	To study the Thin layer Chromatography, determination of RF values
6	Preparation of buffers (Phosphate buffer, acetate buffer)and determination of pH with pH meter
7	General test for carbohydrates and detection of unknown carbohydrate (Glucose,fructose,maltose,sucrose,xyloseandstarch)Benedict'sMethod

Minimum 4 Practical should be conducted.

Reference Books

1. Practical Microbiology: Dubey and Maheshwari, S. Chand and company, New Delhi.
2. Microbiology by Prescott, Herley and Klein, II nd edition.
3. Experimental biology: A laboratory manual: Abhijeet Dutta, Narosa publishing house
4. Essential immunology: Roitt.
5. Forensic Biology-Richard Li.
6. A laboratory Manual for human blood analysis-M.K.Bhasin.
7. Forensic Serology and blood examination–Dr.Archana tripathi

Course Outcomes:

After completion of the unit, Students will be able to:

1. Learn about the Morphological types of RBCs.
2. Understand the Antigen Antibody reaction and Body fluids including Saliva, Urine, Blood, Sweat.
3. Understand the preparation of Buffers and PH determination and General test for Carbohydrates.

Section–II **Basics of Psychology-II**

Credit:2

Course Objectives:

Students should

1. Learn the report writing of case study
2. Learn about intelligent test.
3. Learn to determine the personality of a subject by using various projective technique.
4. Understand the use of Narcoanalysis technique for detection of deception.

Practicals

1. Reaction time
2. Locus of control
3. Frustration test [Nairashyamaapa]-Chauhan N.S, Tiwari G.P.
4. Assertiveness test- TasneemNaqvi
5. Retention for meaningful & nonsense material
6. Depth Perception
7. Pass-along Test
8. Emotional Intelligence
9. Retroactive Inhibition
10. Proactive Inhibition

Minimum 4 Practical should be conducted.

Reference Books:

1. Frustration test [Nairashyamaapa]-Chauhan N.S, Tiwari G.P.
2. Assertiveness test- TasneemNaqvi
3. Reaction time

4. Locus of control
5. Retention for meaningful & nonsense material
6. Depth Perception
7. Retroactive Inhibition and Proactive Inhibition
8. Emotional Intelligence.

Course Outcomes:

After completion of the unit, Students will be able to:

1. Learn about the report writing of case study
2. Understand how to perform intelligent test.
3. Understand the personality of a subject by using various projective techniques.
4. Understand the use of Narcoanalysis technique for detection of deception.

BFSP-213
Basics of Digital and Cyber Forensics II & Basics of Statistics II
Section-I Basics of Computer & Cyber Forensic II

Course Objectives:

Credit:2

Students should

1. Learn about Creation & Sending about email.
2. Learn the Networking Commands.
3. Learn & Understand use of Microsoft Office suite.
4. Understand the Role of Firewall.
5. Learn to Trace email & study the content of Email.

Sr.No.	Basics of Computer and Cyber Forensic Practicals
1.	Use of E-mail, creating e-mail, Sending and Receiving e-mails with Attachments.
2.	Networking commands-like ping, IP-config, etc, with various switches.
3.	Tracing E-mail, finding senders IP address, of received email, tracing route of email Received using tool available on internet, e.g. Visual Trace Route etc.
4.	Working with Ms-office (word, excel, power-point).
5.	Understanding the working of Firewall

Note: Minimum 4 Practical should be conducted.

Reference Books:

1. *A Practical Guide to Computer Forensics Investigation*, by Released December 2014
Publisher (s): Pearson IT Certification ISBN: 9780132756174.
2. Nihad A. Hassan, *Digital Forensics Basics: A Practical Guide Using Windows OS*,
February 26, 2019.
3. Joakim Kavrestad, *Basics of Digital Forensics: Theory, Methods, and Real-Life Applications*, 1st ed. 2018 Edition.
4. *Handbook of Digital Forensics and Investigation*, 1st Edition, Elsevier Publication 2^{6th}
October 2009.

Course outcomes:

After completion of the unit, students are able to:

1. Learn about to Compose email & Sending, Receiving Process of Email.
2. Learn the Role of Digital & Cyber Forensic in Investigation of Cyber Crimes.

Section-II: Basics of Statistics-II Credit: 2

Course Objectives:

Students should

1. Learn about frequency distribution.
2. Understand the measures of central tendency.
3. Understand measures of Dispersion.
4. Learn testing of Hypothesis.

Sr.no.	Forensic Statistics
1	Frequency distribution – Graphical, Histogram, ogive curve [less & greater than].
2	Measures of central tendency (Grouped and Ungrouped) A.M., Median, Mode.
3	Measures of Dispersion – Range, s.d., C.V. combined s.d.
4	Correlation, Regression. Scattered diagram, Karl Pearson's correlation coefficient, eqn of Regression line
5	Testing of Hypothesis: Large sample test: Normal, proportion. Small sample test: χ^2 , t, f.

Note: Minimum 4 Practicals should be conducted. Reference Books:

Books:

- 1] Goon A.M., Gupta M.K. and Dasgupta B.: Basics of mathematical statistics vol. I & II. World Press, Calcutta.
- 2] Gupta & Kapoor: Basics of mathematical statistics.
- 3] Thingale T.K. and Dixit P.G. (2003): A textbook of paper-I for B.Sc.I, Nirali Publication, Pune.
- 4] Waiker and Lev: Elementary Statistical methods.
- 5] Rohatgi V.K. and Sauha A.K. MdE. (2002) An Introduction to probability and statistics (John Wiley & Sons-Asia)

Course outcomes:

After completion of the unit, students are able to:

- 1] Learn about the Histogram, ogive curve. 2]

- 3] Learn the mean, mode, median.
Understand the range, standard deviation