

Bachelor of Science (Forensic Science)
(Choice Based Credit System)
SYLLABUS

SEMESTER I

DSC1 A – CRIMINOLOGY

Total Credits (LTP): 2 + 1 + 1 = 4

Total Hours: 48hrs

Objective:

1. To understand about the concepts of criminology, theories of crime
2. To know criminal behaviour and patterns of criminals
3. To understand the social problems and prevention

Learning Outcomes:

1. Learns about characteristics and importance of criminology
2. Understands the psychological behaviour of the criminals
3. Learns about the patterns of criminals and related social issues

Module-I:

8hrs

Introduction to Criminology: Definition, Nature, Scope, Importance and Relationship with other social sciences. Criminal Law-Definition, meaning, origin and characteristics. Meaning, Definitions and Characteristics of crime.

Module- II

10hrs

Schools of Criminology: Ancient theories of crime (Pre-Scientific) Demonological and Freewill. Scientific Theories: Typological, Socialistic, Cartographic and Sociological.

Module- III

12hrs

Criminal Behaviour: Psychological and Psychiatric Explanation to crime, Criminal profiling. Understanding modus operandi. Investigative strategy. Role of media.

Module- IV

10hrs

Patterns of Criminals: Habitual, Professional Criminals, White Collar criminals.

Module- V

8hrs

Social Problems: Meaning, Causes & Prevention's: Juvenile Delinquency, Prostitution, Dowry menace, Drug abuse.

DSC1B - Practical

1. Study of newspaper and analysis of the crime cases reported.
2. To review past criminal cases and elucidate which theory best explains the criminal behavior of the accused.
3. To review crime cases where criminal profiling assisted the police to apprehend the accused.
4. To cite examples of crime cases in which the media acted as a pressure group.
5. To evaluate the post-trauma stress amongst victims of racial discrimination.
6. To correlate deviant behavior of the accused with criminality (take a specific example).

Suggested Readings

1. Sutherland and Cressy : Principles of Criminology
2. Reckless W.C. : Crime Problem
3. Paranjape N.V. : Criminology and Penology.
4. PonnianN : Criminology and penology.
5. Ram Ahuja : Criminology

DSC2A-FORENSIC CHEMISTRY

Total Credits: 3 + 0 + 1 = 4

Total Hours: 50hrs

Objective:

- a. The applications of chemistry to forensic science.
- b. Fundamental principles and functions of chemistry.
- c. The divisions in a chemistry laboratory.

Learning Outcomes:

- a. The significance of chemistry to forensic science.
- b. The fundamental principles and functions of chemistry.
- c. The divisions in a chemistry laboratory

Module I:

10 hrs

Fundamental Chemistry: Atomic Structure and Chemical Bonding Bohr atomic model and Limitations, De Broglie Equation, Heisenberg's Uncertainty principle, Atomic orbital, significance of Ψ & Ψ^2 . Quantum numbers and significance. Hybridization, Ionic bond, Covalent and non-covalent bonding.

Thermodynamics and Mixtures-Definition of thermodynamic terms – types of systems – intensive and extensive properties –concept of internal energy, enthalpy, heat and work, reversible and irreversible process. Solutions and colligative properties. Colloids- Emulsion. Application in medicine.

Module II:

10hrs

Chemical Kinetics: Principles in the separation of cations in qualitative analysis- Applications of common ion effect and solubility product. Applications of electrodes in the analysis-EMF, Nernst equation, Galvanic cell, Reference electrodes. Theory of acids and bases, Bronsted theory, Lewis theory, Theory of titrimetric analysis – Acid base, Redox and complexometric titrations – Acid-base, Redox and complexometric indicators.

Rates of reactions – Various factors influencing rate of reactions – order and molecularity- zero, first, second and third order reactions. Units of rate constants. Influence of temperature on reaction rates, Arrhenius equation, calculation of Arrhenius parameters, and Collision theory of reaction rate. **Organic reactions:** Nucleophilic and electrophilic substitution, Elimination.

Module III:**08hrs**

Environmental and Nuclear Chemistry: Introduction – Environment and its segments, Ecosystem, Bio, geo, chemical cycles of C,N,P&S. Hydrochemistry – Hydrological cycles, water resources and aquatic ecosystems – water quality parameters – Dissolved Oxygen, BOD, COD– Detection of F^- , Cl^- , SO_4^{2-} , NO_3^- , PO_4^{3-} , acidity and alkalinity of H_2O – pollutants of water, sewage, industrial effluents-soap and detergents, pesticides, fertilizers and heavy metals.

Brief discussion about Air Pollution –green house effect, global warming, acid rain. Noise Pollution and Radiation pollution.

Nuclear forces, n/p ratio-nuclear stability, Radioactive decay,nuclear fission, fusion, Detection of radioisotopes. Application of radio isotopes (radio diagnosis and therapy, C-14 dating).

Module IV:**14hrs**

Analytical Chemistry: Accuracy and precision – Classification of errors, calibration of weights and measuring vessels, sampling. **Forensic Analysis of petroleum products:**Introduction to petroleum products and adulteration in petroleum products. Analysis of Petrol, Kerosene and Diesel as per BIS Specifications.**Forensic Analysis of beverages:**Introduction to Alcoholic and non-alcoholic beverages. Analysis of alcoholic beverages, country made liquor, illicit liquor and medicinal preparations containing alcohol as constituents. Analysis of non-alcoholic beverages like tea, coffee.

Module V:**08hrs**

Bribe Trap Cases: Examination of Chemicals (Phenolphthalein) used in Bribe trap cases. **Dyes:** Introduction to Dyes, Types of Dyes Analysis of Dyes used in petrol and kerosene, paints and fibers.**Adulterated Food Analysis:** Analysis of samples taken under Food Adulteration Act.

References

1. Environmental Chemistry – A.K.De
2. Quatum Chemistry – R.K.Prasad Revised third edition
3. Principles of Inorgqanic Chemistry-B.Rpuri, L.R.Sharma, K.C kalia
4. Principles of Physical Chemistry ByPuri, Sharma &Pathania
5. Text book of Organic Chemistry – ArunBahal and Bahal B.S
6. Organic chemistry – Vol I and II, I.L Finar
7. C.A. Watson; Official and Standardized Methods of Analysis, Royal Society Of Chemistry, UK

8. Feigl; Spot Test in Inorganic Analysis, Elsevier Pub. New Delhi

9. Feigl; Spot Test in Organic Analysis, Elsevier Pub. New Delhi

Web links:

www.docbrown.info

www.visionlearning.com

www.khanacademy.org

Bribe cases: www.ndtv.com

DSC2B - FORENSIC CHEMISTRY: Practical

Credit: 1TOTAL MARKS-Practical: 20+10 (30M)

- 1. Inorganic Qualitative Analysis:** Salt Analysis. Determination of inorganic composition of soil.
- 2. Volumetric Analysis:**
Acidimetry and alkalimetry :Standardisation hydrochloric acid. Estimation of sodium hydroxide, Estimation of sulphuric acid, Estimation of potassium carbonate, Estimation of NaOH and Na₂CO₃ in a mixture, Estimation of barium.
Permanganometry :Standardization of potassium permanganate using standard oxalic acid, Standardization of potassium permanganate using standard Mohr's salt, Estimation of ferrous iron, Estimation of oxalic acid, Estimation of calcium.
- 3. Determination of Physical Constants:**
Determination of melting point, Determination of boiling point
- 4. Detection of Elements in Organic Compounds:**
Determination of methyl and ethyl alcohol.
- 5. Study of Water Quality**
- 6. Analysis of phenolphthalein in bribe cases**
- 7. Analysis of food samples by chemical methods**

References

1.G.H.Jeffery, J.Bassett, J.Mendham and R.C. Denny 'Vogel's Text book of Quantitative Chemical Analysis' 5th Edition ELBS.

2.I.M.Kolthoff and E.A. Sanderson, Quantitative Chemical Analysis

3. C.A. Watson; Official and Standardized Methods of Analysis, Royal Society Of Chemistry, UK

4. Feigl; Spot Test in Inorganic Analysis, Elsevier Pub. New Delhi

5. Feigl; Spot Test in Organic Analysis, Elsevier Pub. New Delhi

DSC3A - Forensic Science-I

Total Credits (LTP): 3 + 1 + 1 = 5

Total Hours: 50hrs

Objective:

1. To know about the concept, organizational setups of forensic science
2. To understand about the applications of forensic science, laboratories and facilities

Learning Outcomes:

1. Learns about the basic principles, historical aspects, growth and hierarchical setup of forensic science
2. Learns about the applications, duties, code of conduct, ethics in forensic science

Module I **10hrs**

Introduction to Forensic Science: Definitions, concepts scope and historical aspects of Forensic Science. Principles of forensic science. Frye case and Daubert standard.

Module II **12hrs**

Organizational setup of Forensic Science Laboratories in India: Hierarchical set up of Central Forensic Science Laboratories, State Forensic Science Laboratories, Fingerprint Bureaus, Growth of Forensic Science Laboratories in India – Central and State level laboratories

Module III **10hrs**

Application of Forensic Science-I: National Crime Records Bureau, Police & Detective Training Schools, Bureau of Police Research & Development, Directorate of Forensic Science and Mobile Crime Laboratories. Police Academies. Police dogs. Services of crime laboratories. Basic services and optional services.

Module **IV**
10hr

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Application of Forensic Science-II: Various divisions in the FSL – Ballistics, Biology, Chemistry Documents, Physics, Psychology, Serology, Toxicology and services provided by various FSLs

Module V **8hrs**

Forensic science laboratories and facilities: Forensic science in international perspectives in INTERPOL and FBI. Duties and Code of Conduct and ethics of forensic scientists. Data depiction. Report writing.

DSC3B - PRACTICAL :

1. To study the history of crime cases from 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 review how the Central Fingerprint Bureau, New Delhi, coordinates the working of State Fingerprint Bureau
5. To examine the hierarchical set up of different forensic science establishments and suggest improvements.
6. To compare and contrast the role of a Police Academy and a Police Training School.

Suggested Readings

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).

English I

Total Credits (LTP): 2+ 1 + 0 = 3

Total Hours: 45hrs

Semiosis – I

Introduction: The Paper introduces some of the most delightful and instructive poems and prose pieces in English to the students beginning their undergraduate course. The literary texts in the Paper provide powerful contexts to understand human situations in our world and show how they are expressed in English language. The five units of the Language Component strengthen the student's English vocabulary and understanding of English sentence structure. C1 and C2 components, which consist of Test and Assignment, ensure that the students are learning well and prepare them for C3, the semester exam; the one-mark, five-marks and ten-marks questions in the examination are designed to evaluate language comprehension and textual understanding.

Poetry (1 Lecture hour per week):

1. The Oxford Clerk – Geoffrey Chaucer
2. Shall I Compare Thee – William Shakespeare
3. Sparkles from the Wheel – Walt Whitman
4. Where the Mind is without Fear – Rabindranath Tagore
5. The Tiger and the Deer – Sri Aurobindo

Prose (1 Lecture hour per week):

1. Toba Tek Singh – Saadat Hasan Manto
2. The Clay Mother-in-law: A South Indian Folktale (Collected by A. K. Ramanujan)
3. On the Way to Goregaon – B. R. Ambedkar

Language Component and Literary Activity (2 Tutorial hours per week):

1. Homophones (Words often confused)
2. Articles
3. Verbs in relation to tense, person and number of the subject
4. Prepositions (of place, time, position)
5. Reading Comprehension (of an unseen passage)

Hindi I

Title of the Paper- Hindi Kahani Sahitya aur Vyavaharik Hindi

Total Credits (LTP): 2+ 1 + 0 = 3

Total Hours: 45hrs

Unit-1.2.3 –Katha Parikrama Edited by Dr. Namdev Gouda, Jawahar Pustkalaya, SadarBazara, Mathura, (UP) 281001(Last Four Omitted)

Unit-4 : Vyavaharik Hindi

Portion Prescribed –

- Vartalap Ka ArthaurKoushal - Sunana, Bolana, Padana, Likhna, VaiyaktikVartalap, Paraspar Vartalap
- BolnaKoushal – Parichaya – Khud Ka Parichay, Mitra ka Parichay, SamuhParichay, UchharanKoushal –DekhakarUchcharan Karna, Vartalap – Bank mein, DaakGhar Mein, Railway Station, Bazar, Ek se Sau takGinti.
- PadhnaKoushal – Man hi Man Padhna, SaswarPadhna, AnuchedPadhna, Anuvaad-chhotechhotevakyon ka anuvaad, Angreji- hindi- kanandameinAnuvaad.
- LikhnaKoushal – Aavedan Patra, Parichay Patra, Chhutti Patra Shikayati Patra, VigyapanLekhan.

Books Recommended –

- Hindi Shikshan- Dr. Shikha Chaturvedi – R. lal Book Depot. Meratha
- Hindi Shaikshan- Dr. Uma Mangal – Aarya Book Depot. New Delhi

Environmental Studies

Total Credits (LTP): 2+ 1 + 0 = 3

Total Hours: 45hrs

Unit 1: Introduction to Environmental Studies

- Multidisciplinary nature of environmental studies; Components of environment: Atmosphere, hydrosphere, lithosphere, biosphere. Scope and importance; Concept of sustainability and sustainable development.

Unit 2: Ecosystems

- What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem: food chains, food webs and ecological succession.
- Case studies of the following ecosystems:
 - a) Forest ecosystem
 - b) Grass land ecosystem
 - c) Desert ecosystem
 - d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Unit 3: Natural Resources: Renewable and Non-renewable Resources

- Land resources and land use change; Land degradation, soil erosion and desertification.
- Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal Populations.
- Water: Use and over- exploitation of surface and ground water, floods, droughts, conflicts over water (international & inter- state).
- Energy resources: Renewable and non renewable energy sources, Use of alternate energy sources, growing energy needs case studies.

Unit 4: Biodiversity and Conservation

- Levels of biological diversity: genetic, species and ecosystem diversity; Biogeographic zones of India; Biodiversity patterns and global biodiversity hot spots
- India as a mega-biodiversity nation; Endangered and endemic species of India
- Threats to biodiversity: Habitat loss, poaching of wildlife, man-wildlife conflicts biological invasions; Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.
- Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.

Unit 5: Environmental Pollution

- Environmental pollution: types, causes, effects and controls; Air, water, soil and noise pollution
- Nuclear hazards and human health risks
- Solid waste management: Control measures of urban and industrial waste.
- Pollution case studies.

Unit 6: Environmental Policies & Practices

- Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture
- Environment Laws: Environment Protection Act; Air (Prevention & Control of Pollution) Act; Water (Prevention and control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act.
International agreements: Montreal and Kyoto protocols, UNFCCC (The United Nations Framework Convention on Climate Change, CBD (Convention on Biological Diversity) and IUCN (International Union for Conservation of Nature).
- Nature reserves, tribal populations and rights, and human wildlife conflicts in Indian context.

Unit 7: Human Communities and the Environment

- Human population growth: Impacts on environment, human health and welfare.
- Resettlement and rehabilitation of project affected persons; case studies.
- Disaster management: floods, earthquake, cyclones and landslides.
- Environmental movements: Chipko, Silent valley, Bishnois of Rajasthan.
- Environmental ethics: Role of Indian and other religions and cultures in environmental conservation.
- Environmental communication and public awareness, case studies (e.g., CNG vehicles in Delhi).

Unit 8: Field work

- Visit to an area to document environmental assets: river/ forest/ flora/fauna, etc.
- Visit to a local polluted site-Urban/Rural/Industrial/Agricultural
- Visit to Industries for study on Occupational health and safety.
- Study of Biodiversity and protected areas.
 - Study of Solid waste management/drinking/waste-water treatment plant etc.

Suggested Readings:

1. Carson, R. 2002. *Silent Spring*. Houghton Mifflin Harcourt.
2. Gadgil, M., & Guha, R. 1993. *This Fissured Land: An Ecological History of India*. Univ. of California Press.

3. Gleeson, B. and Low, N. (eds.) 1999. *Global Ethics and Environment*, London, Routledge.
4. Gleick, P.H. 1993. *Water in Crisis*. Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute, Oxford Univ. Press.
5. Groom, Martha J., Gary K. Meffe, and Carl Ronald Carroll. *Principles of Conservation Biology*. Sunderland: Sinauer Associates, 2006.
6. Grumbine, R. Edward, and Pandit, M. K. 2013. Threats from India's Himalaya dams. *Science*, 339:36--37.
7. McCully, P. 1996. *Rivers no more: the environmental effects of dams* (pp.29--64). Zed Books.
8. McNeill, John R. 2000. *Something New Under the Sun: An Environmental History of the Twentieth Century*.
9. Odum, E. P., Odum, H. T. & Andrews, J. 1971. *Fundamentals of Ecology*. Philadelphia: Saunders.
10. Pepper, I. L., Gerba, C. P. & Brusseau, M. L. 2011. *Environmental and Pollution Science*. Academic Press.
11. Rao, M. N. & Datta, A. K. 1987. *Waste Water Treatment*. Oxford and IBH Publishing Co. Pvt. Ltd.
12. Raven, P. H., Hassenzahl, D. M. & Berg, L. R. 2012. *Environment*. 8th edition. John Wiley & Sons.
13. Rosencranz, A., Divan, S., & Noble, M. L. 2001. *Environmental law and policy in India. Tripathi 1992*.
14. Sengupta, R. 2003. *Ecology and economics: An approach to sustainable development*. OUP.
15. Singh, J. S., Singh, S. P. and Gupta, S. R. 2014. *Ecology, Environmental Science and Conservation*. S. Chand Publishing, New Delhi.
16. Sodhi, N. S., Gibson, L. & Raven, P. H. (eds). 2013. *Conservation Biology: Voices from the Tropics*. John Wiley & Sons.
17. Thapar, V. 1998. *Land of the Tiger: A Natural History of the Indian Subcontinent*.
18. Warren, C. E. 1971. *Biology and Water Pollution Control*. WB Saunders.
19. Wilson, E. O. 2006. *The Creation: appeal to save life on earth*. New York: Norton.
20. World Commission on Environment and Development. 1987. *Our Common Future*. Oxford University Press.
21. www.nacwc.nic.in
22. www.opcw.org

Note:

1. Tutorials Topics will be from syllabus.
2. Weekly two hours of Lectures (Two Credits) and two hours (One Credits) of Tutorials with minimum 20 to 30 Students in a batch for Tutorials.
3. The examination question paper may have the same Pattern as adopted for the other subjects and the paper has to account for 100 marks with 3hrs duration for examination.

SEMESTER II

DSC4A - BIOCHEMISTRY

Total Credits: 2 +1 + 1 = 4

Total Hours: 50hrs

Objective:

- a. The applications of biochemistry to forensic science.
- b. Fundamental principles and functions of biochemistry.
- c. The divisions in a biochemistry laboratory.

Learning Outcomes:

- a. The significance of biochemistry to forensic science.
- b. The fundamental principles and functions of biochemistry.
- c. The divisions in a biochemistry laboratory.

Module I:

10hrs

Biomolecules I: Carbohydrates: Structure and classification of carbohydrates, monosaccharides, disaccharides and polysaccharides. Chemistry of polysaccharides: Homopolysaccharides and heteropolysaccharides, starch, cellulose, glycogen, bacterial cell wall polysaccharides, blood group polysaccharides.

Amino acids: Nomenclature, classification and buffering properties, zwitterionic structure, reaction of amino acids, unusual amino acids, non protein amino acids. **Peptide bond:** Features of the peptide bond, naturally occurring peptides; glutathione, enkephalins and endorphins. Elucidation of structure of proteins - Isolation of proteins; overview of purification and criteria of purity. **Determination of primary structure:** Sequencing strategies; N-terminal and C-terminal, sequencing methods. Automated sequencers.

Module II:

10hrs

Biomolecules II: Lipids: Classification of lipids; oils, fats, and waxes. Occurrence and properties of fatty acids, esters of fatty acids, cholesterol, phospholipids, glycolipids, sphingolipids, cerebrosides and gangliosides.

Nucleic Acids: Isolation of DNA and RNA from biological sources. Physicochemical properties of nucleic acids, melting of DNA, T_m ; factors affecting T_m , C_{ot} curve, classification of DNA based on C_{ot} curve. Sequencing of DNA: Maxam Gilbert method, dideoxy method.

Module III:**12hrs**

Biochemistry of Physiology:**Blood:** Composition, cell types red blood cells and white blood cells and their function. Hemostasis, blood clotting, digestion of clot, anticoagulants, blood volume, blood pressure and serum enzymes.**Respiratory System:** Lungs, structure and functions, exchange of gases, **Excretory System:** Ultra structure of the nephron, formation of urine. **Hepatobiliary System:** Anatomy of the liver, cells types. Secretory and excretory function and formation of bile.**Digestive System:** GI tract, digestion and absorption of carbohydrates, proteins and lipids. Function of HCl. **Muscle physiology:** Skeletal muscle and smooth muscle, muscle proteins.

Module IV:**08hrs**

Biochemistry of Nutrition and Immunology: Carbohydrates: Dietary sources, dietary fiber, essentiality of carbohydrates. **Proteins:** Essential amino acids, nutritional classification of proteins, supplementary value of proteins, protein malnutrition. **Fats:** Sources, invisible fat, essential fatty acids, PUFA. **Vitamins:** Classification, source, deficiency symptoms Fat soluble and water soluble vitamins.

Minerals and Water metabolism: Macro and micro nutrients, sources, requirements, functions and deficiency symptoms. **Immunology:** Historical development and milestones in immunology. Vaccines and Vaccination.

Toxicity: Xenobiotics, heavy metals, pesticide poisoning.

Module V:**10hrs**

Clinical Biochemistry: Tests for liver function: Enzyme assay (SGOT, SGPT, Alkaline phosphatase, GGT), Total protein, albumin / globulin ratio and their significance. **Test for kidney function:** Urea and creatinine estimation and their significance. **Test for heart function:** Blood pressure (cystolic and diastolic), lipid profile (cholesterol, triglycerides, HDL, LDL estimation) and their importance. **Test for lung function:** Chest X-ray, Spirometry. **Test for Brain function:** EEG, MRI, CT. **Test for Surgery:** Bleeding time, clotting time. **Blood:** Total cell count, differential count, erythrocyte sedimentation rate. **Non communicable diseases:** Diabetes: Blood sugar, urine sugar, glucose tolerance test, HbA1c. **Hyper tension:** Lipid profile, electrolyte (sodium, potassium, chloride and bicarbonate) investigation.

Doping in sports.**References**

1. Biochemistry – Satyanarayana and Chakrapani
2. Principles of Biochemistry – Lehninger
3. Biochemistry-Jeremy Berg, Jihn L Tymczko and LubertStryer
4. Principles of Biochemistry – Donald Voet, Charlotte W. Pratt and Judith G Voet

5. Text book of Medical Biochemistry – MN Chatterjea and RanaShinde
6. Biochemistry for Students – VK Malhotra and Jaypee
7. Human Physiology and Biochemistry for physical therapy and occupational Therapy- A.K.Jain
8. Text Book of Physiology-Guyton (Arthur)

Web links:

www.cvphysiology.com

www.khanacademy.org

Basics of biochemistry-online learning.harvard.edu

Clinical Biochemistry- blog.feedspot.com

Physiology-Journals.physiology.org

DSC4B - BIO-CHEMISTRY: PRACTICAL

Credit 01

TOTAL MARKS- 20+10 (30M)

1. Preparation of buffer,

Preparation of cell homogenates; Preparation of chloroplast, mitochondria and nuclei.

Extraction of neutral lipids, phospholipids and estimation of phospholipids.

Iodine number, saponification value, acid value, peroxide value.

Colorimetry; applications of Beer-Lambert's law, determination of extinction coefficient,

Colorimetric and titrimetric estimation of sugars and proteins. Estimation of protein by Biuret and Lowry's methods. Estimation of sugar by DNS and anthrone methods.

Separation of proteins by Native and SDS-PAGE

2. Experiments in Enzymology

Enzymes: LDH and alkaline phosphatase from body fluid.

Specific activity, pH and temperature optimum.

3. Experiments in Immunology and Clinical Biochemistry

Estimation of pyruvate, ascorbic acid, iron, calcium, phosphorus in the body fluids

Lipid profile: Total cholesterol, Triglycerides in serum.

Diabetic profile: Fasting blood sugar, Post prandial blood sugar.

Renal function test: Urea and creatinine in urine.

Liver function test: Estimation of Bilirubin, Albumin and globulin ratio.

Blood grouping.

References

1. An introduction to practical biochemistry- David T Plummer.
2. Biochemical Methods- Sadasivam
3. Practical Clinical Biochemistry-Harold Varley

DSC5A - Forensic Science – II

Total Credits: 2 + 1 + 1

Total Hours: 48hrs

Objectives:

1. To know about the principles, types and application of photography, videography, microscopes in forensic science
2. To study about the chromatographic, spectroscopic evidence, ultraviolet, infrared and Neutron activation analysis

Learning Outcomes:

1. Learns about the basic applications of Forensic photography, Microscopy
2. Learns the usage and analysis of various instrumentation applied in forensic science

Module I

10hrs

Forensic photography: 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.

Module II

8hrs

Microscopy : Fundamental principles. Different types of microscopes. Electron microscope. Comparison Microscope. Forensic applications of microscopy.

Module III

10hrs

Instrumentation – I: Sample preparation for chromatographic and spectroscopic evidence.

Chromatographic methods- Fundamental principles and forensic applications of thin layer chromatography, gas chromatography and liquid chromatography. Spectroscopic methods.

Module IV

12hrs

Instrumentation- II: Fundamental principles and forensic applications of Ultraviolet-visible spectroscopy, infrared spectroscopy, atomic absorption spectroscopy, atomic emission spectroscopy and mass spectroscopy. X-ray spectrometry.

Module V

8hrs

Instrumentation– III: Colorimetric analysis and Lambert-Beer law. Electrophoresis – fundamental principles and forensic applications. Neutron activation analysis – fundamental principles and forensic applications.

DSC 5B: Practical

1. To Photograph exhibits at a laboratory setting using different filters
2. To record Videographs of the evidence materials.
3. To carry out thin layer chromatography of two coloured samples.
4. To carry out separation of organic compounds by paper chromatography.
5. To identify drug samples using UV-Visible spectroscopy

Suggested Readings

1. D.A. Skoog, D.M. West and F.J. Holler, Fundamentals of Analytical Chemistry, 6th Edition, Saunders College Publishing, Fort Worth(1992).
2. W. Kemp, Organic Spectroscopy, 3rd Edition, Macmillan, Hampshire (1991).
3. J.W. Robinson, Undergraduate Instrumental Analysis, 5th Edition, Marcel Dekker, Inc., New York(1995).
4. D.R. Redsicker, The Practical Methodology of Forensic Photography, 2nd Edition, CRC Press, Boca Raton(2000).

DSC6A-Criminalistics

Total Credits (LTP): 3 + 0 + 2 = 5

Total Hours: 48hrs

Objective:

1. To study about the nature, types, safety measures, legal aspects of crime scenes,
2. To know about crime scene documentation, evaluation and tracing

Learning Outcomes:

1. Learns about the crime scene management and related legal considerations
2. Learns to collect documentation, reconstruct, evaluate, trace and identify the crime

Module I

8hrs

Crime Scene Management I: Crime Scene-nature and types of crime scenes. Duties of first responders at crime scenes. Securing and isolating the crime scene. Crime scene search methods.

Module II

12hrs

Crime Scene Management II: Safety measures at crime scenes. Legal considerations at crime scenes. Coordination between police personnel and forensic scientists at crime scenes. The evaluation of 5Ws (who?, what?, when?, where?, why?) and 1H (how?). Crime scene logs.

Module III

8hrs

Crime Scene Documentation and Evaluation: Documentation of crime scenes – sketching; Photography, videography, and recording notes; Reconstruction of crime scene.

Module IV

12hrs

Crime Scene Evidence: Classification of crime scene evidence – physical and trace evidence. Locard principle. Collection, labeling, sealing of evidence. Hazardous evidence. Preservation of evidence. Chain of custody.

Module V

8hrs

Trace Evidence: Glass evidence collection, packaging, analysis. Matching of glass samples by mechanical fit.

Paint evidence – collection, packaging and preservation, role of paint evidence in hit and run cases.

Fiber and Cloth evidence – Collection of fibre evidence.

Soil evidence – importance, location, collection and comparison of soil samples

Practical

1. To examine simulated crime scene and prepare a report on evaluation of crime scene.

2. To Sketch and Photograph a crime scene and various articles
3. To reconstruct a crime scene (outdoor and indoor).
4. To compare soil samples by density gradient method.
5. To compare paint samples by physical matching method.
6. To compare paint samples by thin layer chromatography method.
7. To compare glass samples by refractive index method.
8. To identify and compare toolmarks.

Suggested Readings

1. M. Byrd, *Crime Scene Evidence: A Guide to the Recovery and Collection of Physical Evidence*, CRC Press, Boca Raton (2001).
2. T.J. Gardener and T.M. Anderson, *Criminal Evidence*, 4th Ed., Wadsworth, Belmont (2001).
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.J. Tilstone, M.L. Hastrup and C. Hald, *Fisher's, Techniques of Crime Scene Investigation*, CRC Press, Boca Raton (2013).

English II

Total Credits (LTP): 2+ 1 + 0 = 3

Total Hours: 45 Hours

Semiosis – II

Introduction: The students who are now familiar with the two important forms of literature – poetry and prose – explore more in these forms, which come with a slightly higher level of difficulty in this Paper. The literary pieces here deal with life in its varied hues most tellingly. The Language Component addresses the importance of achieving clarity in speaking and writing. C1, C2 and C3 goals are the same as in the previous semester.

Poetry (1 Lecture hour per week):

1. On His Blindness – John Milton
2. Sower – Victor Hugo (Translated by Toru Dutt)
3. Once upon a Time – Gabriel Okara
4. I am not that Woman – Kishwar Naheed
5. Remembrance – Mamang Dai

Prose (1 Lecture hour per week):

1. Pepe – Maxim Gorky
2. My Greatest Olympic Prize – Jesse Owens
3. Letters from *The Diary of a Young Girl* – Anne Frank

Language Component and Literary Activity (2 Tutorial hours per week):

1. Punctuation (capitalization, comma, period, question mark, exclamation mark, quotation marks and apostrophe)
2. Framing Questions (with wh-words & yes/no questions)
3. Use of Negatives
4. Linkers (Conjunctions)
5. Reading Comprehension (of an unseen passage)

Hindi II

Title of the Paper – Hindi Gadya Sahitya aur Hindi Patrakarita

Total Credits (LTP): 2+ 1 + 0 = 3

Total Hours: 45hours

Unit-1,2,3 :Gadya Pratibha, Edited by Dr. Basavaraj K.Baraker, JavaharPusatkalaya, Sadar Bazar, Mathura, (UP) 281001 (Omitted 2,4,6,8,10,12,.14, 16,18, 20, 22)

Unit- 4: Hindi Patrakrita

Portion Prescribed:

- Hindi Patrakarita- Artha, paribhshaaurPrakar, Patrakarita – Mission se profession tak, Hindi Patrakrita ka SankshiptaItihas,
- Samachar LekhanKala, Sampadak ka Dayitva aur Gun, Sampadakiya, Shirshak,Vigyapan, Kartoan,
- JansancharkeMadhyam, Jansanchar Ki Bhasha, VigyapanLekhan, PrushthaSajja
- Hindi kepramukhaPatrakar – Bhartendu Harishchandra, Mahaveer Prasad Dwivedi, Premchand, Nirala, Agney, Dharmveer Bharati, Kamleshwar, Prabhat Joshi,HindikiPramukhaPatrikayenaur Samachar Patra, UdantaMartand, Saraswati, Banaras Akhabar, DharmYug,

Books Recommended-

- Hindi Patrakrita – Dr. Pratibha Mudliar
- PatrakaritaPariveshaurPravrutiyaan- Dr. PrithvirajPandey,LokbharatiPrakashan, Allahabad
- PatrakaritaVimarsh –Dr. Ramesh Varma – SamvetPrakashan, Kanpur

Constitution of India

Total Credits: 2 + 1 + 0=3

Total Hours: 45 hrs

Module 1:

1. Meaning and importance of Constitution
2. Making of Indian Constitution
3. Salient features and preamble

Module 2:

1. Fundamental Rights
2. Fundamental Duties
3. Directive Principles

Module 3: Union Government

1. Lok Sabha & Rajya Sabha (Composition, Powers and Functions)
2. President & Prime Minister (Powers, Functions, Position)
3. Supreme Court - Powers, Functions, Position

Module 4: Major Functionalities

1. Union Public Service Commission
2. Election Commission
3. Planning Commission

Books for reference-

1. Indian Constitution-Durga Das Basu.
2. Indian Constitution – M.V. Pylee.
3. Indian Government and Politics- J.C. Johri.
4. Indian Government- S.R. Maheshwari.
5. Indian Government and Politics- J.C. Jooehri.
6. India's Constitution -- Faida
7. Indian Government and Politics - Dr. S.N. Dubey.
8. Indian Political System- R.C. Agarwal.
10. Indian Constitution --Vidhya Bhushan and Vishnu Bhagawan.
11. Bharathada sarkara matthu Rajakiya- Dr. H.M. Rajshekara
12. Bharathada sarkara matthu Rajakiya- Dr. K.J. Suresha.