

BHAKTA KAVI NARSINH MEHTA UNIVERSITY JUNAGADH



COURSE STRUCTURE & SYLLABUS FOR UNDERGRADUATE PROGRAMME IN **Forensic Science**

(CORE COURSE FOR SEMESTER III& IV)
(As per Choice Based Credit System as recommended by UGC)

Revised syllabus of Semester – III & IV (S.Y. B.Sc.) FORENSIC SCIENCE
Effective from June 2019

This curriculum consists of two theory papers and two practicals. Syllabus has been divided in to two semesters (i.e. semester – III and IV). Students have to study one paper in each semester and two practicals based on theory papers. The course is to be completed by assigning six lectures for each theory and six lectures for each practical per week. Practical periods are inclusive of field study.

GENERAL DETAILS OF TEACHING HOURS AND COURSE CREDIT

Paper no.	Title of the papers	Lectures	Theory Credit	Practical Credit	Total Credit
III	SELPICNIRP DNA STPECNOC CISAB LACISYHP FO, DNA LAHCIMEHC LACITYLANA LACIGOLOIB SEUQINHCET– 1	60	04	03	07
IV	SELPICNIRP DNA STPECNOC CISAB LACISYHP FO, DNA LAHCIMEHC LACITYLANA LACIGOLOIB SEUQINHCET– 2	60	04	03	07

Pattern of Examination:

There will be one paper in theory and one practical for each semester. There should be two internal exams per semesters . An average 10 marks should be given for internal exams and that marks will be included in final aggregate results of the semester. Beside internal examination there are two assignments of the subjects should be submitted by the students and four surprise quizzes should be attended by the students. 10 marks for assignments and 10 marks for quizzes will be included in final results of the semester. Total 30 marks are internally assessed and 70 marks for external (University Exams) exams, per semester. A student's performance in every practical session is assessed and marks for a maximum of 15 is recorded. The semester exam pattern will be as follows. External practical evaluation will carry 35 marks, so total 50 marks for each practical per paper examination will be counted.

Total Scheme of evaluation

Semester	Theory						Practical		Total
	Internal				External	Total	Performance during practical sessions	External	
	Exam	Assignment	MCQ	Attendance					
III	10	10	05	05	70	100	15	35	50
IV	10	10	05	05	70	100	15	35	50

SKELETON OF THEORY EXAMINATION (EXTERNAL)

QUESTION 1 – UNIT 1		
Q 1 A	Objective type questions	4 Marks
Q 1 B	Answer in brief(Any 1 out of 2)	3 Marks
Q 1 C	Write a note on(Any 1 out of 2)	7 Marks
QUESTION 2 – UNIT 2		
Q 2 A	Objective type questions	4 Marks
Q 2 B	Answer in brief (Any 1 out of 2)	3 Marks
Q 2C	Write a note on (Any 1 out of 2)	7 Marks
QUESTION 3– UNIT 3		
Q 3 A	Objective type questions	4 Marks
Q 3 B	Answer in brief (Any 1 out of 2)	3 Marks
Q 3 C	Write a note on (Any 1 out of 2)	7 Marks
QUESTION 4 – UNIT 4		
Q 4 A	Objective type questions	4 Marks
Q 4 B	Answer in brief (Any 1 out of 2)	3 Marks
Q 4 C	Write a note on (Any 1 out of 2)	7 Marks
QUESTION 5 – UNIT 5		
Q 5 A	Objective type questions	4 Marks
Q 5 B	Answer in brief (Any 1 out of 2)	3 Marks
Q 5 C	Write a note on (Any 1 out of 2)	7 Marks
TOTAL MARKS : 70 TOTAL TIME : 2½ HOURS		

Student Startup and Innovation Policy (SSIP)

Government of Gujarat has developed a policy for providing assistance to Startups/ Innovation. Under this scheme, any individual/ group of individuals having innovative idea/ Concept will be eligible and/ or Universities/ education institutions, Incubation Centre/ PSUs/ R&D Institutions/ Private and other establishments will be eligible as an institution to support and mentor to innovators as approved by Committee. Startups in an economy's technology sectors are an important indicator of technological performance for several reasons.

Key Objectives

The Student Startup & Innovation Policy of Government of Gujarat aims to create an integrated, state-wide, university-based innovation ecosystem to support innovations and ideas of young students and provide a conducive environment for optimum harnessing of their creative pursuit.

1. Developing student centric Innovation and Pre-incubation Ecosystem for Students (IPIES)
2. Creating environment for creativity to flourish and an end-to-end support system in educational institutions to allow ample support to ideas for better execution
3. Build internal capacity of educational institutions and key components of the innovation ecosystem to enable deployed processes to make sustainable impact at scale
4. Create pathways for mind to market by harnessing and handholding projects/ research/ innovation/ ideas of students in Gujarat
5. Creating and facilitating sectoral and regional innovation efforts in state around educational institutions
6. Create a common platform to showcase, support and upscale innovations for motivating stakeholders as well as for an opportunity to create value for money and value for many
7. Leverage public system initiatives at state and central level, academia, industries and by other ecosystem stakeholders / domain experts and institutions to make an inclusive effort

Key Goals

1. Empower all universities to set-up and execute the broad agenda of innovation and pre-incubation
2. Aim to create an environment that converts at least 1% graduates into job creators by innovation and allied means
3. Support at least 1,000 student-led innovations per year and aim to file 1000 patents from universities in the state every year
4. Harness 500 student startups in the next 5 years, and upscale
5. Empower universities and educational institutes to build a robust Innovation and Pre-incubation support systems within
6. Create incentives, awards, appreciations and benchmarks for innovation and student startups and associated efforts at all layers
7. Build capacity for at least 200 educational institutes in the state in the next five years, to have a robust preincubation support for student / alumni startups and Innovations
8. Undertake strategic interventions to empower all universities in the state to develop full-fledged preincubation ecosystem in the next 5 years
9. Ensure that the innovation processes link academia, society and SMEs through systematic ways so that students and faculty solve their challenges and create further entrepreneurial opportunities

Under this scheme our **Bhakta Kavi Narsinh Mehta University, Junagadh** also provide facilities to fulfill objectives and goals of **SSIP**. Under this scheme following links are listed for online courses, which are available on portal. For each courses extra credit will provided.

- ✓ <https://swayam.gov.in>
- ✓ <https://onlinecourses.nptel.ac.in/>
- ✓ <https://www.edx.org/>
- ✓ <https://www.coursera.org/>

**FS-301: LACISYHP FO SELPICNIRP DNA STPECNOC CISAB, LAHCIMEHC
SEUQINHCET LACITYLANA LACIGOLOIB DNA-1**

Unit – I Basic Concepts - Atomic & Molecular Spectroscopy-II

- II.1 Molecular spectra: qualitative discussions of molecular binding, molecular orbital, types of molecular energies
- II.2 qualitative discussions of rotational, vibrational and electronic spectra, spectra of polyatomic molecules
- II.3 IR spectroscopy- correlation of infra red spectra with molecular structure, Fourier Transform, infrared and Raman spectroscopy, fluorescence and phosphorescence spectrophotometer.

Unit - II Principles of Genetics

- II.1 Principles of Mendelian genetics
- II.2 DNA and Histons
- II.3 Structure and function of chromosomes
- II.4 Modern concept of gene
- II.5 DNA replication and protein synthesis

Unit - III Immunology

- III.1 Concept of immunity, classification
- III.2 Hormonal and Cellular immunity
- III.3 Immunoglobulin: Structure, Function, Types
- III.4 Antigen: Nature
- III.5 Antigen - Antibody reaction (In-vitro & In-vivo)
- III.6 Hypersensitivity, Allergy, Auto-Immune Diseases

Unit – IV Different types of separation techniques

IV.1 Chemical separation techniques

IV.2 Chromatographic techniques: General principles and function of following chromatography

- Paper chromatography
- Column chromatography
- TLC
- Adsorption chromatography
- Partition chromatography
- Gas chromatography
- Gas- liquid chromatography
- Ion-exchange chromatography
- Exclusion (permeation) chromatography
- Affinity chromatography, HPLC

IV.3 Electrophoresis Technique:

IV.3.1 General Principles

IV.3.2 Factors affecting electrophoresis

IV.3.3 Low voltage thin sheet electrophoresis & High voltage electrophoresis

IV.3.4 Sodium dodecylsulphate (SDS) polyacrylamide gel electrophoresis, Isoelectric focusing (IEF), Isoelectrophoresis

IV.3.5 Preparative electrophoresis, Horizontal and Vertical Electrophoresis

Unit – V

V.1 Examination of Hair and Fibers : morphology of human hair, its microscopic examination, determination of origin, race, sex, site.

V.2 Type of fibers (with one example each), forensic aspects of fiber.

V.3 Microscopic examination of diatoms and its forensic importance in drowning cases.

V.4 Introduction to body fluids, Identification and examination of stains of body fluids like saliva and urine

Suggested Experiments:

1. Experiments on UV absorption of drug
2. Experiments on UV absorption of dyes
3. Experiments on UV absorption of Chemicals.
4. Experiments on IR spectroscopy of Paints
5. Experiments on IR spectroscopy of Drugs
6. Experiments on IR spectroscopy of Organic compounds.
7. Comparison of polythene films by IR spectrophotometer.
8. Experiments on Gas chromatography of mixture of organic compound.
9. Examination of saliva and its stains - biochemical test.
10. Examination of Urine - biochemical and microscopically examination.
11. Morphological and microscopic examination of hairs.
12. Morphological and microscopic examination of fibers.
13. Identification, classification and microscopic examination of Diatoms.
14. Separation of given mixture by ascending paper chromatography.
15. Separation of given mixture by thin layer chromatography

FS - 401 : BASIC CONCEPTS AND PRINCIPLES OF PHYSICAL, CHEMICAL AND BIOLOGICAL ANALYTICAL TECHNIQUES - 2**Unit – I Different types of Spectroscopy**

- I.1 Atomic absorption spectrometry: Instrumentation and techniques, interference in AAS, background correction methods, quantitative analysis
- I.2 Thermal analysis methods, Basic principles and theory, differential scanning calorimetric and differential analysis, thermalgravimetry
- I.3 Nuclear Magnetic Resonance spectroscopy: Basic principles, theory and Instrumentation

Unit – II Immuno-chemical Technique

- II.1 General Principles and properties of antigen antibody
- II.2 Production of antibodies
- II.3 Precipitin reaction, Gel immuno-diffusion, Immuno-electrophoresis, complement fixation, Radio Immuno Assay (RIA), ELISA, Fluorescence immuno assay.

Unit – III Petroleum products, arson residue and phenolphthalein

- VI.1 Petrol, Kerosene, Diesel, ATF, Lubricating Oil, Furnace oil, Grease and Solvents and Bio diesel as per IS Standard methods.
- VI.2 Fire: Causes, Chemistry and Behavior of fire, Analysis of Fire Evidence by Chemical and Instrumental methods.
- VI.3 Examination of Chemicals used in trap cases.

Unit – IV Forged Documents

- V.1 Examination of counterfeit currency notes, passport, credit card, and visa card
- V.2 Examination of seal and counterfeit coins.
- V.3 Examination of alterations, erasers, overwriting, addition and obliterations in documents

Unit –V Introduction of Cyber crime

- V.1 Introduction to digital forensic , Use of digitalization in banking sector
- V.2 Digital payments (cashless payment)
- V.3 Advantage and disadvantage of digital payments
- V.4 Risks in digital payment transaction
- V.5 Prevention of risks in digital payment transaction (security tips)
- V. 6 Types of other cyber crimes

Suggested Experiments:

1. To perform the antigen antibody reaction.
2. Examination of additions, alterations, and obliterations in the documents.
3. Examination of indented handwriting
4. Analysis of phenolphthalein in bribe cases
5. Examinations of petroleum products by using TLC.
6. Examinations of petroleum products by using UV spectrophotometer.
7. Experiments on Gas Chromatography / Gas Chromatography –Atomic Thermal Desorption analysis of Arson evidence and Organic volatile substances.
8. Examination of security documents (currency notes and passports)
9. Examination of security features of debit card, visa card and credit card.
10. Imaging of hard disc, restoration of deleted files, password cracking, e-mails. Tracking

References

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