



Syllabus
Gyanmanjari Science College
Semester-6 (B.Sc)

Subject: Forensic Toxicology-BSCFS16311

Type of course: Major

Prerequisite: Basic understanding of human physiology (organs, blood circulation, and metabolism), chemistry (organic and analytical techniques), and fundamentals of forensic science is recommended.

Rationale: This course introduces students to the study of toxic substances, their detection. It covers the principles of toxicology, methods of isolation and identification of toxins from biological samples, interpretation of toxicological findings, and their significance in medico-legal investigations.

Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks					Total Marks
CI	T	P		SEE		CCE			
				Theory	Practical	MSE	LWA/V	ALA	
3	0	2	4	75	25	30	20	50	200

Legends: CI-Class Room Instructions; T – Tutorial; P - Practical; C – Credit; SEE - Semester End Evaluation; MSE- Mid Semester Examination; LWA - Lab Work Assessment; V – Viva voce; CCE-Continuous and Comprehensive Evaluation; ALA- Active Learning Activities.

Course Content:

Unit No	Course Content	Hrs	% Weightage
1	Forensic Toxicology: Introduction & concept of Forensic Toxicology, different branches of toxicology, examination & its significance, Collection & preservation of viscera, blood, urine etc. for toxicological analysis in various cases.	11	25%
2	Poisons: Classification of poisons, mode of action & factors modifying	13	25%



	the action of poisoning. Extraction and isolation of poison, Medico legal procedures in poisoning (Accidental, suicidal & homicidal). Plant poison, Animal poison, Metallic poison, Chemical poison and miscellaneous.		
3	Narcotics & Psychotropic Drugs: Definition of Narcotics drugs & Psychotropic drugs, drug as constituents, drugs of abuse. Introduction & classification of drugs abuse in sports (doping), Date rape drugs. The Poisons Act, 1919, and Section 284 of IPC, 1860 (Negligent conduct with respect to poisonous substance). Narcotic Drugs & Psychotropic Substances Act.	11	25%
4	Environmental Toxicology Introduction to Environmental Toxicology, Environmental Contaminants, Bioaccumulation and Biodegradation of toxicants, Environmental pollution concepts and assessment strategies, Impact of water, food and air in Environmental Toxicology. Impact of Toxins on body	10	25%

Continuous Assessment:

Sr. No	Active Learning Activities	Marks
1	Case Study Analysis – Poison Detection: Students will be given real-world case studies of poisoning incidents. They will analyze the toxicological evidence, identify the possible poison involved, and prepare a short report discussing medico-legal implications.	10
2	Laboratory Simulation – Sample Preservation & Chain of Custody: Students will perform a mock collection and preservation of biological samples (viscera, blood, urine) following proper forensic protocols, and maintain a chain of custody record for submission.	10
3	Debate/Role Play – Drug Abuse and Law: Students will be divided into groups representing forensic scientists, law enforcement, and defense lawyers. They will conduct a structured debate on a case involving narcotic drug abuse and present their arguments based on toxicological findings and legal frameworks.	10



4	Environmental Toxin Risk Mapping Project: Students will research local environmental contamination issues (industrial pollutants, pesticides, heavy metals) and create a risk map or infographic showing sources, possible exposure routes, and health effects on the population.	10
5	Attendance	10
Total		50

List of Practical:

Sr. No	Descriptions	Unit No	Hrs
1	Isolation and purification of poison.	All Unit	03
2	To carry out extraction and examination of Daturastramonium.		03
3	To carry out extraction and examination of Tobacco.		03
4	To carry out extraction and examination of Semecarpus Anacardium.		03
5	To carry out extraction and examination of cannabis.		03
6	To carry out extraction and examination of cannabis.		03
7	To separate drugs of abuse by thin layer chromatography.		03
8	Spot tests for common poisons (arsenic, cyanide, organophosphates, barbiturates) using simple color reactions.		03
9	Extraction of alkaloids (e.g., caffeine from tea/coffee) and their identification by chemical tests.		03
10	Determination of heavy metals (lead, mercury) in water sample using simple qualitative tests.		03
		Total	30

Suggested Specification table with Marks (Theory):75

Distribution of Theory Marks (Revised Bloom's Taxonomy)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage	10%	40%	30%	20%	00	00

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcome:

After learning the course the students should be able to:	
CO1	Explain the concept, branches, and significance of forensic toxicology and demonstrate the correct procedures for collection and preservation of biological samples (viscera, blood, urine) for toxicological analysis.
CO2	Classify different types of poisons, describe their mode of action, and evaluate medico-legal procedures in cases of poisoning (accidental, suicidal, homicidal).
CO3	Interpret the definition, classification, and legal aspects of narcotic and psychotropic drugs, including their abuse, forensic implications, and relevant legal provisions such as the Poisons Act and IPC Section 284.
CO4	Analyze the impact of environmental contaminants, bioaccumulation, and toxins on living organisms, and assess strategies for pollution control and environmental toxicology management.

Instructional Method:

The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

From the content 10% topics are suggested for flipped mode instruction.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory

The internal evaluation will be done on the basis of Active Learning Assignment

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

Reference Books:

[1] S.B. Karch, The Pathology of Drug Abuse, CRC Press, Boca Raton (1996).

[2] R. Saferstein, Criminalistics, Prentice Hall, New Jersey (2004).

[3] Parikh, forensic toxicology.

[4] Nandi's, forensic medicine and toxicology.

[5] Nandi's, forensic medicine and toxicology. Boca Raton (1997).

