INTEGRAL UNIVERSITY, LUCKNOW

INTEGRAL INSTITUTE OF ALLIED HEALTH SCIENCES & RESEARCH

DEPARTMENT OF PARAMEDICAL SCIENCES

BACHELOR OF SCIENCE IN FORENSIC SCIENCE (B.FS.)

SYLLABUS

YEAR/ SEMESTER: II/III

Integral University, Lucknow
Department of Paramedical Sciences
Study and Evaluation Scheme

Program: B.Sc. FS Semester-III

S. N.	Course code	Course Title	Type of Paper	Period Per hr/week/sem			Evaluation Scheme				Sub. Total	Credit	Total Credits
				L	T	P	CT	TA	Total	ESE			
THEORIES													
1	FS201	Forensic Medicine	Core	2	1	0	40	20	60	40	100	2:1:0	3
2	FS202	Forensic Physics- I	Core	2	1	0	40	20	60	40	100	2:1:0	3
3	FS203	Forensic Biology-I	Core	2	1	0	40	20	60	40	100	2:1:0	3
4	FS204	Forensic Psychology	Core	2	1	0	40	20	60	40	100	2:1:0	3
5	CH219	Forensic Chemistry-I	Core	2	1	0	40	20	60	40	100	2:1:0	3
6	ES101	Environmental Study	Core	2	1	0	40	20	60	40	100	2:1:0	3
PRACTICAL													
1	FS205	Forensic Medicine-Lab	Core	0	0	2	40	20	60	40	100	0:0:1	1
2	CH220	Forensic Chemistry –I-Lab	Core	0	0	2	40	20	60	40	100	0:0:1	1
3	FS206	Forensic Physics-I – Lab	Core	0	0	2	40	20	60	40	100	0:0:1	1
4	FS207	Forensic Biology-I - Lab	Core	0	0	2	40	20	60	40	100	0:0:1	1
5	FS208	Forensic Psychology-Lab	Core	0	0	2	40	20	60	40	100	0:0:1	1
Total				**12**	**06**	**10**	**440**	**220**	**660**	**440**	**1100**	**23**	**23**

S. N.	Course code	Course Title	Type of Paper	Attributes							United Nation Sustainable Development Goal (SDGs)
				Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
THEORIES											
1	FS 201	Forensic Medicine	Core	√	√	√	√		√	√	3,4
2	FS 202	Forensic Physics- I	Core	√	√	√			√	√	3,4
3	FS 203	Forensic Biology-I	Core	√	√	√			√	√	3,4
4	FS 204	Forensic Psychology	Core	√	√	√			√	√	3,4
5	CH219	Forensic Chemistry-I	Core	√	√	√			√	√	3,4
6	ES 101	Environmental Study	Core	√	√	√		√	√	√	3,4
PRACTICAL											
1	FS 205	Forensic Medicine-Lab	Core	√	√	√	√		√	√	3,4
2	CH220	Forensic Chemistry –I-Lab	Core	√	√	√			√	√	3,4
3	FS 206	Forensic Physics-I – Lab	Core	√	√	√			√	√	3,4
	FS 207	Forensic Biology-I - Lab	Core	√	√	√			√	√	3,4
	FS 208	Forensic Psychology-Lab	Core	√	√	√			√	√	3,4

L: Lecture **T:** Tutorials **P:** Practical **CT:** Class Test **TA:** Teacher Assessment **ESE:** End Semester Examination,
AE= Ability enhancement, DSE- Discipline Specific Elective, **Sessional Total:** Class Test + Teacher Assessment **Subject Total:** Sessional Total + End Semester Examination (ESE)

Integral University, Lucknow

Effective from Session: 2023-24							
Course Code	**FS201**	**Title of the Course**	**FORENSIC MEDICINE**	**L**	**T**	**P**	**C**
Year	**II**	**Semester**	**III**	**2**	**1**	**0**	**3**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives	To understand and identification of informed Medico-legal responsibility.						

Course Outcomes	
CO1	After studying this paper, the students will know about the basic of death investigations.
CO2	After studying this paper, the students will know about the role of forensic medicine in court.
CO3	After studying this paper, the students will know about the basic introduction and Objectives of Medical autopsy
CO4	After studying this paper, the students will know about the basic of thanatology.
CO5	After studying this paper, the students will know about the basic introduction, classification, and significance of Wounds and injuries.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**DEATH INVESTIGATIONS**	**Death Investigations:** Fundamental aspects and scope of forensic medicine. Approaching the crime scene of death. Documentary evidence: -Medical certificates, medical reports, dying declaration. Understanding laws and ethics of medical practice.	6	CO1
2	**ROLE OF FORENSIC MEDICINE IN COURT**	**Role Of Forensic Medicine In Court:** Meaning, Scope, and types of Inquest, Oath and affirmation, Nature and Powers of Criminal Courts in India, Procedure of calling a witness to court.	6	CO2
3	**MEDICAL AUTOPSY**	**Medical Autopsy:** Introduction and objectives, rules for medico-legal autopsy, external and internal examination of the body, collection of ante-mortem and post-mortem samples, autopsy report. Virtual autopsy: Introduction, purpose, benefits, and procedure.	6	CO3
4	**THANATOLOGY**	**Thanatology:** Definition of death. Types of death (somatic and molecular). Medico-legal aspects of death – Causes of death such as asphyxia (strangulation, hanging, drowning etc.), electrocution, thermal trauma, heat burns, starvation, natural death, sudden death etc. Changes after death (immediate, early, and late changes) and Determination of time since death.	6	CO4
5	**WOUNDS AND INJURIES**	**Wounds And Injuries**: Definition of wounds and injuries and laws governing them. Types of injuries: Abrasions, grazes, lacerations, Bruises, contusions, Punctured wounds, incised wounds, and identification ante – mortem, post – mortem injuries. Medico–legal aspects of wounds; Determining the age of the injury, Identifying the difference between suicidal, homicidal, and accidental injuries.	6	CO5

Reference Books:

1. Forensic medicine and toxicology: principles and practice, Professor Krishna Vij Publisher: Elsevier, 5 Edition,2014.
2. Practical Aspects of Forensic Medicine, Dr T.D. Dogra Dr. AD Agrawal Jaypee publishers,2014
3. Parikh's textbook of medical jurisprudence, forensic medicine and toxicology Professor C. K. Parikh, CBS; 6 dition,2007
4. The essentials of forensic medicine and toxicology Professor K.S. Narayan Reddy Jaypee Brothers Medical Publishers; 34th edition2017.
5. Principles of forensic medicine Professor Apurva Nandy New Central Book Agency; 3rd Revised edition edition2010.
6. A Textbook of Medical Jurisprudence and Toxicology Dr. Jaising P. Modi (Edited by Justice K Kannan, Lexis Nexis; 24th edition 2012.
7. NB. R. Sharma, Forensic Science in Criminal Investigation and Trials(6th Edition).
8. Saferstein, Richard, Criminalistics - An Introduction to Forensic Science, 6th Ed. Prentice-Hall, New Jersey,

e-Learning Source:

1. https://youtu.be/WobgHMVr3k8
2. https://youtu.be/L0eZtNZ8CE8
3. https://youtu.be/uUav053YGmU

Course Articulation Matrix: (Mapping of COs with POs and PSOs)

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO4	PSO5
CO1	3	2	2	3	3	3	2	3	2	2	2	3	2	3	3	2
CO2	2	3	3	2	2	3	2	3	3	3	2	2	3	2	2	3
CO3	3	3	3	2	2	2	3	2	2	3	3	3	3	3	3	3
CO4	2	2	2	3	3	2	3	2	3	2	2	3	2	3	2	3
CO5	2	2	2	2	2	1	2	3	2	2	2	3	2	2	3	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
		Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
FS201	BASICS OF FORENSIC MEDICINE	√	√	√			√	√	**3,4**

Integral University, Lucknow

Effective from Session: 2023-24							
Course Code	**FS202**	**Title of the Course**	**FORENSIC PHYSICS- I**	**L**	**T**	**P**	**C**
Year	**II**	**Semester**	**III**	**2**	**1**	**0**	**3**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives	Understand and to appreciate the breadth and diversity of Physical science in respect of forensic science.						

Course Outcomes	
CO1	Basic introduction and forensic analysis of paint evidences.
CO2	Basic introduction, importance and forensic analysis of glass evidences.
CO3	Types, composition and examination of soil evidences.
CO4	Introduction of cement and its examination.
CO5	Basic introduction, importance and forensic analysis of fiber evidences.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**PAINT**	**Paint -** Types of paint and their composition, collection and preservation of paint evidence. Macroscopic and microscopic studies of paint evidence, pigment distribution, micro-chemical analysis- solubility test, chemical and instrumental analysis of paint evidence, interpretation of paint evidence.	6	CO1
2	**GLASS**	**Glass** -Types of glass and their composition. Glass fractures and markings- rib marks, hackle marks, cone fractures, wavy, backward fragmentation, concentric and radial fractures. Examination of glass evidence-Color, fluorescence, physical measurements, refractive index, density gradient, beck-line, specific gravity examination, and elemental analysis of glass evidence.	6	CO2
3	**SOIL**	**Soil-** Classification and composition of the soil, sample preparation, removal of contaminants, Collection, and preservation of soil evidence, Forensic analysis, and examination of soil-color, molecular particle size distribution, turbidity test, pH measurements, microscopic examination, density gradient analysis, ignition-loss test, elemental analysis, interpretation of soil evidence, soil microbes significance of soil evidence and soil microbes.	6	CO3
4	**CEMENT AND CONCRETE-CEMENT**	**Cement and Concrete-Cement-** bromo form test, fineness test, ignition-loss test. Identification of adulterated cement. Mortar and concrete analysis.	6	CO4
5	**FIBRE**	**Fiber:** Introduction, Types of fibers, nature, location, collection, identification tests, forensic significance and comparison of fiber. Examination- microscopic examination, optical properties; refractive index, birefringence, dye analysis. Physical fit and chemical testing. Dye analysis by TLC, IR-micro spectroscopy. Difference between natural and man-made fibers.	6	CO5

Reference Books:

1. Caddy, B; Forensic Examination of Glass and Paint Analysis and Interpretation, CRC Press, New York,2001.
2. Shaw, D; Physics in the Prevention and Detection of Crime, Contem Phys. Vol.17,1976.
3. Safer stein, R; Forensic Science Handbook. Vol. I,II, (Edition), Prentice Hall, New Jersey,1988.
4. Sharma, B.R; Forensic Science in Criminal Investigation and Trials (3rd Edition.), Universal Law Publishing Co., New Delhi, 2001.
5. Working Procedure Manual- Physics, BPR&D Publication.2000
6. B. R. Sharma, Forensic Science in Criminal Investigation and Trials(6th Edition).

e-Learning Source:

1. https://youtu.be/LpndOfsq_6M
2. https://youtu.be/yHkhju99CZM
3. https://youtu.be/FTg6YpOntz0

Course Articulation Matrix: (Mapping of COs with POs and PSOs)

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	3	2	2	3	3	2	3	3	2	2	3	3	3	3
CO2	3	3	3	3	3	3	2	2	3	2	3	3	3	3	3	2	2
CO3	2	3	2	3	2	2	2	2	3	2	3	3	3	2	2	3	3
CO4	3	2	2	3	2	2	3	3	2	3	2	2	3	3	3	3	3
CO5	2	2	3	3	3	2	3	3	3	2	2	3	3	3	3	2	2

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
		Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
FS202	FORENSIC PHYSICS- I	√	√	√			√	√	3,4

Integral University, Lucknow

Effective from Session: 2023-24							
Course Code	**FS203**	**Title of the Course**	**FORENSIC BIOLOGY-I**	**L**	**T**	**P**	**C**
Year	**II**	**Semester**	**III**	**2**	**1**	**0**	**3**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives	Aims To Provide Students the Specific Biological Skills that are very important in the forensic science workplace and gain an appreciation of the different biology evidence types and their applications in the investigative process.						

Course Outcomes: After the successful course completion, learners will develop following attributes:	
CO1	To understand about introduction and forensic significance of biological evidences.
CO2	Students will be able to apply basic principle and procedure of crime scene investigation.
CO3	To understand about the basic introduction and forensic examination of hair and fiber.
CO4	To understand about introduction, significance and tests of different types of body fluids in crime scene investigation.
CO5	To learn about different types of bloodstain pattern analysis.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**FORENSIC BIOLOGY**	**Forensic Biology-** Introduction, Evidence of Biological Importance, Nature, the scope of crime scene presence and characterization of blood, semen, saliva, urine, sweat, vomit, botanical materials, diatoms, wildlife samples, and other biological evidence. **Crime Scene Investigation of Biological Evidence:** Protection, Recognition, Search & Collection, Documentation Packaging & Transportation of Biological Evidence encountered in various cases.	6	CO1
2	**FORENSIC DIATOMOLOGY**	**Forensic Diatomology:** Diatoms: Nature, classification, location, structure, life cycle, extraction from various body tissues including bone marrow, preparation of slides, methods of identification and comparison, forensic significance.	6	CO2
3	**HAIR & FIBER**	**Hair & Fiber:** **Hair:** Hair trichology – Nature, Importance, location, structure, Collection and tests for determination of origin, biochemistry, and forensic aspects of hair. **Fiber:** Introduction, source, importance and types of fiber, natural (plant, animal, and mineral), synthetic (nylon, polyester, terylene, carbon nanotube fiber), and blended (terrycloth, rayon)	6	CO3
4	**FORENSIC FLUIDS**	**Forensic Fluids:** Definition, Properties, Significance, collection, preservation, preliminary and confirmatory test of Blood, Semen, Saliva, Sweat, and Urine.	6	CO4
5	**BLOODSTAIN PATTERN ANALYSIS**	**Bloodstain Pattern Analysis:** Bloodstain characteristics. Formation, types and forensic importance of bloodstain patterns. Cast-off bloodstain patterns. Projected bloodstain patterns. Contact bloodstain patterns. Blood spatters, Blood trails. Bloodstain drying times. Documentation of bloodstain pattern evidence.	6	CO5

Reference Books:

1. Forensic Biology by Richard Li CRC Press; 2nd edition (27 April2015).
2. Practical Skills in Forensic Science–Alan Langford, John Deane Tal Addison-Wesley Longman Ltd (February 1, 2005).
3. Scientific & Legal Applications of Bloodstain Pattern Interpretation – Stuart H. James CRC Press; Ist edition (June 29, 1998).
4. Saferstein, Richard, Criminalistics - An Introduction to Forensic Science, 6th Ed. Prentice-Hall, New Jersey, 1998.
5. Sharma, B. R., Forensic Science in Criminal Investigation and Trials (3rd Ed) Universal Law Publishing Co. Ltd. New Delhi, 2001.
6. B. R. Sharma, Forensic Science in Criminal Investigation and Trials(6th Edition).

e-Learning Source:

1. https://youtu.be/XKvhn9v6WUg
2. https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=eCJfy23Kjv3c0vICLa6VYg==#
3. https://youtu.be/0jltioeaEyY

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	3	3	2	3	3	2	2	3	3	2	3	3	2	2	3	2
CO2	3	3	3	3	2	3	2	3	3	2	3	2	2	3	3	3	3
CO3	3	3	2	2	3	2	3	3	2	2	2	3	3	2	3	2	3
CO4	3	2	2	3	3	3	2	2	2	3	3	3	3	3	3	3	3
CO5	3	2	3	3	3	2	2	3	3	3	3	2	2	3	2	3	2

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
FS203	FORENSIC BIOLOGY-I	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
		√	√	√			√	√	3,4

Integral University, Lucknow

Effective from Session: 2023-24							
Course Code	**FS204**	**Title of the Course**	**FORENSIC PSYCHOLOGY**	**L**	**T**	**P**	**C**
Year	**II**	**Semester**	**III**	**2**	**1**	**0**	**3**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives	This course is designed to introduce students to the interface of psychology and the law, with a specific focus on forensic psychology. Critical issues, such as Not Guilty by Reason of Insanity pleas, will be addressed. Students will be introduced to the roles and responsibilities of a forensic psychologist including psychological assessments, expert testimony, offender treatment, and correctional psychology.						

Course Outcomes	
CO1	To develop the basic understanding of forensic psychology, ethical standards and role of forensic psychologists.
CO2	To discuss about the different social learning theories and influencing factors. Concept of Juvenile delinquency, juvenile sex offenders, and anti-social personality disorder.
CO3	To develop a basic understanding about functioning and significance of different techniques in investigative psychology.
CO4	To develop knowledge about the application of forensic psychology in legal proceedings and a brief about Mc. Naughten rule of insanity.
CO5	To discuss about the legal aspects of forensic psychology with some provisions of Mental Health Act 1987.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**BASICS OF FORENSIC PSYCHOLOGY**	**Basics of Forensic Psychology--** History of Forensic Psychology, Define Forensic Psychology, Importance of Forensic Psychology, Concept of Forensic psychiatry, Ethical Standards of Forensic Psychology, Services provided by Forensic Psychologists.	6	CO1
2	**PSYCHOLOGY AND CRIMINAL BEHAVIOR**	**Psychology and Criminal Behavior** -Biological factors, social learning theories, psychological factors, Serial murderers. Psychology of terrorism. Juvenile Delinquency: Definition, Concept of Juvenile delinquency, Child abuse (physical, sexual, emotional), juvenile sex offenders, antisocial personality disorder.	6	CO2
3	**INVESTIGATIVE PSYCHOLOGY**	**Investigative Psychology** **1.** Criminal profiling **2.** Polygraph **3.** Norco Analysis **4.** BEOS **5.** voice stress analyzer	6	CO3
4	**PSYCHOLOGY AND LAW**	**Psychology and Law--**Application of Forensic Psychology in Civil and Criminal Legal Proceedings-Civil Proceedings- Assessment of Civil Competency, Criminal Proceedings**,** Psychological Disorders and Criminality**Mc Naughten rule insanity** – Nature of Insanity, Insanity Assessment, *Competency to* stand trial, Criminal responsibility, and insanity defence.	6	CO4
5	**LEGAL ASPECT-MENTAL HEALTH ACT, 1987**	**Legal aspect- Mental Health Act, 1987** [Reception Order, Object, Establishment or Maintenance of Psychiatric Hospitals and Psychiatric Nursing Homes, Procedures on Production of Mentally Ill Person in front of Magistrate]. Role of Psychiatric Hospitals and Psychiatric Nursing Homes in Criminal Justice system	6	CO5

Reference Books:

1. Criminal Profiling-An Introduction to Behavioral Evidence analysis', Brent Turvey, Academic Press; 4th edition (13May2011).
2. Handbook of Forensic Psychology', Prof Dr. Vimala Veera raghwan, Edition 1st, Elsevier.
3. Handbook of Forensic Psychology', Irving B. Weiner, Allen K. Hiss, Edition 3rd, 2006, Wiley Publication.
4. Theoretical Psychology', Mo Aziz Ali Beg, Sangeeta Gupta Beg, Vol [04], Edition 2nd, 2013, Global Vision Publishing House, New Delhi.
5. Abnormal Psychology-The Problem of Maladaptive Behavior', Irwin G. Sarson, Barbara R. Sarson, Edition11th, 2012, PHI Publication, New Delhi.
6. 'Abnormal Psychology', James N. Butcher, Susan M. Mineka, JillM. Hooley, Edition 15th, 2014, Pearson.
7. Psychological Interventions of Mental Disorders', S. K. Shrivastava, Nayanika Singh, Shivani Kant, Edition 1st, 2013, Sarup Book Publishers, PVT.LTD.
8. Psychology and Crime', Nageshwar Singh, Edition 1st,2013, RBSA Publishers, Jaipur.
9. Criminology' [2005] S. M. A. Qadri, fifth edition, EBC Publication, Lucknow
10. B. R. Sharma, Forensic Science in Criminal Investigation and Trials(6th Edition).
11. Saferstein, Richard, Criminalistics - An Introduction to Forensic Science, 6th Ed. Prentice-Hall, New Jersey,

e-Learning Source:

1. https://youtu.be/aflWenQNm18
2. https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=eCJfy23Kjy3c0vICLa6VYg==#
3. https://youtu.be/8Aw115vXNpQ

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	2	2	3	3	3	2	3	2	2	2	3	2	3	3	2	3
CO2	2	3	3	2	2	3	2	3	3	3	2	2	3	2	2	3	2
CO3	3	2	3	2	2	2	3	2	2	3	3	3	3	3	3	3	2
CO4	2	2	2	3	3	2	3	2	3	2	2	3	2	3	2	3	2
CO5	2	2	2	2	2	2	2	3	2	2	2	3	2	2	3	3	2

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
FS204	FORENSIC PSYCHOLOGY	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
		√	√	√			√	√	3,4

Integral University, Lucknow

Effective from Session: 2020-21							
Course Code	**CH219**	**Title of the Course**	**FORENSIC CHEMISTRY- I**	**L**	**T**	**P**	**C**
Year	**II**	**Semester**	**III**	**2**	**1**	**0**	**3**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives	Understand and to appreciate the breadth and diversity of analytical science in respect of forensic science.						

Course Outcomes: After the successful course completion, learners will develop following attributes:	
CO1	Define the quantity called mole. Learn Avogadro's number. Understand how the molar mass is related to formula mass of a substance and can calculate the mass of atom and molecules.
CO2	Students would develop the concepts of thermos gravimetric analysis and various volumetric analytical methods and their applications.
CO3	Students would restate difference between different modes of chromatographic separation: apply knowledge of qualitative and quantitative analysis in various fields of chemical, pharmaceutical industries extra.
CO4	Understand the working principal and application of various modern analytical techniques as well as their operation.
CO5	Understand the principal of nuclear chemistry and its application such as radiocarbon dating and radiotracers techniques along with nuclear decay, nuclear fission and nuclear fusion.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**BASIC CHEMICAL CALCULATIONS**	**Basic Chemical Calculations:** Introduction, Concept of atom, Mole and mole fraction, Methods of expressing the composition of mixtures (mass percent, volume percent, mole percent), equivalent weight, normality, molarity, molality.	6	CO1
2	**GRAVIMETRIC ANALYSIS**	**Gravimetric analysis:** Precipitation, digestion, filtration, washing, incineration, with reference to estimation of barium sulphate, volumetric analysis- standard solution, types of titrations- Acid-base or neutralization titration, complexometric titrations, redox titration, double titration method.	6	CO2
3	**SEPARATION TECHNIQUES**	**Separation techniques:** Chromatography, Classification of Chromatographic methods, Elution in column chromatography, chromatograms, distribution constant, retention time, stationary phase, mobile phase, principle of adsorption and partition chromatography, column chromatography; principle, adsorbents used, preparation of column, adsorption, elution.	6	CO3
4	**SPECTROSCOPIC TECHNIQUES**	**Spectroscopic Techniques:** Basic principles of spectroscopic methods. The use of UV, Visible, IR, 1HNMR, for the determination of structure of simple organic compounds.	6	CO4
5	**NUCLEAR CHEMISTRY**	**Nuclear Chemistry:** Natural and artificial radioactivity, binding energy, rate equation for nuclear decay, nuclear fission and nuclear fusion and their applications, group displacement law, isotopes and isobars, applications of radioactivity: radiocarbon dating and radio tracer techniques.	6	CO5

Reference Books:

1. Instrumental Method of Chemical Analysis. Chatwal & Anand, Himalaya Publication, 5th edition2004.
2. Introduction of Forensic Science in Crime Investigation by Dr. (Mrs.) R. Krishnamurthy, Selective & Scientific Books (2015).
3. Handbook of Instrumental Technique for Analytical Chemistry by Settle F. A, Prentice Hall; Har /Cdr edition (4 June 1997).
4. Laboratory Procedure Manual: Petroleum Products, Directorate of Forensic Science, MHA, Govt. of India, 2005.
5. Working Procedure Manual on Chemistry; Directorate of Forensic Science MHA Govt. of India.
6. Settle F. A.: Handbook of Instrumental Technique for Analytical Chemistry, Prentice Hall1997.

e-Learning Source:

1. https://www.youtube.com/live/0jp81ykaKw0?feature=share
2. https://youtu.be/DbE3qeyCPXs
3. https://youtu.be/0JohlY7fIYQ

Course Articulation Matrix: (Mapping of COs with POs and PSOs)

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	3	3	2	2	2	3	3	2	2	2	2	2	2	3
CO2	2	2	2	3	2	3	2	2	2	2	2	2	2	2	2	2	3
CO3	3	2	2	2	2	3	2	3	3	3	3	3	3	3	2	2	2
CO4	3	3	2	2	3	3	2	2	2	3	2	2	2	2	2	3	2
CO5	2	3	2	2	3	3	2	2	2	3	2	2	2	2	2	3	2

2- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
CH219	FORENSIC CHEMISTRY- I	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
		√	√	√			√	√	3,4

Integral University, Lucknow

Effective from Session: 2020-21							
Course Code	**ES101**	**Title of the Course**	**ENVIRONMENTAL STUDIES**	**L**	**T**	**P**	**C**
Year	**II**	**Semester**	**III**	**0**	**0**	**2**	**1**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives	The student will be made aware of our environment in general, natural resources, ecosystems, environmental pollution and social issues related to environment.						

Course Outcomes	
CO1	To study about the Environment and the ECO system.
CO2	To study about the Natural Resources.
CO3	To study about Biodiversity and Conservation
CO4	To study Environmental pollution, its policies and practices
CO5	To study Human Population and Environmental Ethics.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**INTRODUCTION TO ENVIRONMENT AND ECOSYSTEMS**	Environment, its components and segments, Multidisciplinary nature of Environmental studies, Concept of Sustainability and sustainable development, Environmental movements, Ecosystem, Structure & Function, Energy flow in the Ecosystem, Ecological Pyramids and Ecological Succession.	6	CO1
2	**NATURAL RESOURCES**	Energy Resources: Renewable and nonrenewable, Soil erosion and desertification, Deforestation, Water: Use and over exploitation, Impacts of large Dams, Case studies.	6	CO2
3	**BIODIVERSITY AND CONSERVATION**	Levels of biological diversity, Hot spots of biodiversity, India as a Mega Diversity Nation, Endangered and endemic species of India, Threats to Biodiversity, Conservation of Biodiversity, Ecosystem and biodiversity services.	6	CO3
4	**ENVIRONMENTAL POLLUTION, POLICIES AND PRACTICES**	Environmental pollution, Solid waste management, Ill effects of fireworks, Climate change, Ozone layer depletion, acid rain and impacts on human communities and Environment. Environmental Laws: Environment Protection Act, Wildlife protection Act, Forest conservation Act, Convention on Biological Diversity (CBD), Tribal rights, Human wildlife conflicts.	6	CO4
5	**HUMAN POPULATION AND THE ENVIRONMENT**	Human population growth: Impacts on environment, human health and welfare, Resettlement and rehabilitation of project affected persons, Environmental ethics, Environmental communication and public awareness, case studies.	6	CO5

1. Agarwal, K.C. 2001 Environmental; Biology, Nidi Pub. Ltd. Bikaner.
2. Glick, H.P.1993 water in crisis, Pacific Institute for studies in dev, Environment &security, Stockholm Env, Institute, Oxford Univ, Press 473p.
3. Cunningham W.P.2001.Cooper, T.H. Gorhani, E & Hepworth, Environmental encyclopedia, Jacob Publication House, Mumbai
4. Clark R.S. Marine Pollution, Calderon Press Oxford (TB).
5. Brunner R.C. 1989. Hazardous waste incineration, Mc Graw Hill.
6. Bharucha Erach, The Biodiversity of India, Mappin Pub. Pvt. Ltd., Ahemdabad-380, India.
7. De. A.K. Environmental chemistry Willey Eastern Limited.

e-Learning Source:

1. https://youtu.be/7egemK9U2ds
2. https://www.youtube.com/live/Nz30xpuc-L8?feature=share
3. https://youtu.be/TFIZqv3a-Ws

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	2	2	1	1	2	2	2	1	1	2	2	2	2	2	2	1
CO2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	1
CO3	1	1	1	2	2	2	2	1	1	1	1	1	1	1	2	2	2
CO4	1	1	1	2	1	1	2	2	2	1	2	2	2	2	2	1	2
CO5	2	1	2	2	1	1	2	2	2	1	2	2	2	2	2	1	2

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
		Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
ES101	ENVIRONMENTAL STUDIES					√			**3,4,11,16**

Integral University, Lucknow

Effective from Session: 2023-24							
Course Code	**FS205**	**Title of the Course**	**FORENSIC MEDICINE- LAB**	**L**	**T**	**P**	**C**
Year	**II**	**Semester**	**III**	**0**	**0**	**2**	**1**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives	To provide a detailed practical knowledge of different dimensions of forensic medicine in crime scene investigation.						

Course Outcomes	
CO1	Students will be able to design questionaries for the first responder offices and deal with media at crime scene.
CO2	Students will be able to design a checklist for forensic scientist at death scene.
CO3	Students will be able to analyze the bite marks
CO4	Students will be able to distinguish different types of injuries
CO5	Students will be able to understand the process of post-mortem and post-mortem findings.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**DEATH INVESTIGATIONS**	1. To design a questionnaire for the first responder to the death scene. 2. To design a checklist for the forensic scientists at the death scene.	2	CO1-5
2	**ROLE OF FORENSIC MEDICINE IN COURT**	3. To study the procedure of calling a witness in a court of law.	2	
3	**MEDICAL AUTOPSY**	4. To design a canvass form giving a description of an unidentified victim. 5. To study post-mortem findings of a cadaver.	2	
4	**THANATOLOGY**	6. To study different stages of changes after death. 7. To identify different causes of death.	2	
5	**WOUNDS AND INJURIES**	8. Collection, preservation, and analysis of bite marks. 9. To identify the range of fire based on firearm injuries	2	

Reference Books:

1. Forensic medicine and toxicology: principles and practice, Professor Krishna Vij Publisher: Elsevier ,5 edition ,2014.
2. Practical Aspects of Forensic Medicine, Dr T.D. Dogra Dr. AD Aggrawal jaypee publishers,2014
3. Parikh's textbook of medical jurisprudence, forensic medicine and toxicology Professor C. K. Parikh,CBS; 6 edition, 2007.
4. The essentials of forensic medicine and toxicology Professor K.S. Narayan Reddy Jaypee Brothers Medical Publishers; 34th edition 2017.
5. Principles of forensic medicine Professor Apurva Nandy New Central Book Agency; 3rd Revised edition edition 2010.
6. A Textbook of Medical Jurisprudence and Toxicology Dr. Jaising P. Modi (Edited by Justice K Kannan, Lexis Nexis; 24th edition 2012.
7. B. R. Sharma, Forensic Science in Criminal Investigation and Trials(6th Edition).
8. Saferstein, Richard, Criminalistics - An Introduction to Forensic Science, 6th Ed. Prentice-Hall, New Jersey,

e-Learning Source:

1. https://youtu.be/WobgHMVr3k8
2. https://youtu.be/L0eZtNZ8CE8
3. https://youtu.be/uUav053YGmU

Course Articulation Matrix: (Mapping of COs with POs and PSOs)

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	3	3	3	2	3	2	2	2	3	2	3	3	2	3
CO2	2	3	3	2	2	3	2	3	3	3	2	2	3	2	2	3	2
CO3	3	3	3	2	2	2	3	2	2	3	3	3	3	3	3	3	3
CO4	2	2	2	3	3	2	3	2	3	2	2	3	2	3	2	3	2
CO5	2	2	2	2	2	1	2	3	2	2	2	3	2	2	3	3	2

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
		Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
BO205	BASICS OF FORENSIC MEDICINE- LAB	√	√	√			√	√	3,4

Integral University, Lucknow

Effective from Session: 2020-21							
Course Code	**CH220**	**Title of the Course**	**FORENSIC CHEMISTRY- I LAB**	**L**	**T**	**P**	**C**
Year	**II**	**Semester**	**III**	**0**	**0**	**2**	**1**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives	To provide a detailed practical knowledge of different dimensions of chemical examinations pertaining to forensic examinations.						

Course Outcomes	
CO1	Students will be able to demonstrate the procedure of distillation and difference among various distillation
CO2	Students will be able to identify and compare the fibers
CO3	Students will be able to prepare the TLC
CO4	Students will be able to identify the polymers
CO5	Students will be able to perform centrifuge and extraction.

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1		**1-**	2	CO1-5
2		**2-**	2	
3		**3-**	2	
4		**4-**	2	
5		**5-**	2	

Reference Books:

1. Instrumental Method of Chemical Analysis. Chatwal & Anand, Himalya Publication, 5th edition 2004.
2. Settle F. A.: Handbook of Instrumental Technique for Analytical Chemistry, Prentice Hall 1997.
3. Introduction of Forensic Science in Crime Investigation by Dr. (Mrs.) R. Krishnamurthy, Selective & Scientific Books (2015).
4. Handbook of Instrumental Technique for Analytical Chemistry by Settle F. A, Prentice Hall; Har/Cdr edition (4 June 1997).
5. Laboratory Procedure Manual: Petroleum Products, Directorate of Forensic Science, MHA, Govt. of India, 2005
6. Working Procedure Manual on Chemistry; Directorate of Forensic Science MHA Govt. of India.

e-Learning Source:

1. https://youtu.be/ED8LHLQJvWU
2. https://youtu.be/CSAOdyEPrhg
3. https://youtu.be/Vz2la3947I0

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	3	3	2	2	2	3	3	2	2	2	2	2	2	3
CO2	2	2	2	3	2	3	2	2	2	2	2	2	2	2	2	2	3
CO3	3	2	2	2	2	3	2	3	3	3	3	3	3	3	2	2	2
CO4	3	3	2	2	3	3	2	2	2	3	2	2	2	2	2	3	2
CO5	2	3	2	2	3	3	2	2	2	3	2	2	2	2	2	3	2

2- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Attributes & SDGs

Course Code	**Course Title**	**Attributes**							**SDGs No.**
		Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
CH220	FORENSIC CHEMISTRY- I LAB	√	√	√			√	√	**3,4**

Integral University, Lucknow

Effective from Session: 2023-24							
Course Code	**FS206**	**Title of the Course**	**BASICS OF FORENSIC PHYSICS- I LAB**	**L**	**T**	**P**	**C**
Year	**II**	**Semester**	**III**	**0**	**0**	**2**	**1**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives	To provide a detailed practical knowledge of forensic analysis of different physical samples present at crime scene.						

Course Outcomes	
CO1	To perform the examination of soil and paint
CO2	To perform the forensic examination of glass
CO3	To identify the physical properties of soil
CO4	Analysis of paint pigments using instruments.
CO5	To compare the glass and soil sample found on crime scene.

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	**PAINT**	**1-** Examination of Paint chips/Paint evidence	5	CO1-5
2	**GLASS**	**2-** Examination of Glass fracture **3-** Determination of direction of impact on fractured glass sample **4-** Density examination of given glass sample	5	
3	**SOIL**	**5-** Preliminary examination of soil sample **6-** Density examination of given Soil sample	5	
4	**CEMENT AND CONCRETE-CEMENT**	**7-** Ignition test/Heat test for cement sample **8-** To examine the cement sample to detect the adulteration	5	
5	**FIBRE**	**9-** Ignition test/Heat test for fiber sample		

Reference Books:

1. Safer stein, R; Forensic Science Handbook. Vol. I, II, (Edition), Prentice Hall, New Jersey, 1988.
2. Shaw, D; Physics in the Prevention and Detection of Crime, Contemn Phys. Vol.17, 1976.
3. Caddy, B; Forensic Examination of Glass and Paint Analysis and Interpretation, CRC Press, New York, 2001.
4. B. R. Sharma, Forensic Science in Criminal Investigation and Trials(6th Edition).

e-Learning Source:

1. https://youtu.be/AJAy8M4m9nM
2. https://youtu.be/TlKaHu8WsV8
3. https://youtu.be/LpndOfsq_6M

Course Articulation Matrix: (Mapping of COs with POs and PSOs)

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	3	2	2	3	3	2	3	3	2	2	3	3	3	3
CO2	3	3	3	3	3	3	2	2	3	2	3	3	3	3	3	2	2
CO3	2	3	2	3	2	2	2	2	3	2	3	3	3	2	2	3	3
CO4	3	2	2	3	2	2	3	3	2	3	2	2	3	3	3	3	3
CO5	2	2	3	3	3	2	3	3	3	2	2	3	3	3	3	2	2

3- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Attributes & SDGs

Course Code	**Course Title**	**Attributes**							**SDGs No.**
		Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
FS206	BASICS OF FORENSIC PHYSICS- I LAB	√	√	√			√	√	**3,4**

Integral University, Lucknow

Effective from Session: 2023-24							
Course Code	**FS207**	**Title of the Course**	**BASICS OF FORENSIC BIOLOGY- I LAB**	**L**	**T**	**P**	**C**
Year	**II**	**Semester**	**III**	**0**	**0**	**2**	**1**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives	To provide a detailed practical knowledge of forensic analysis of different biological samples present at crime scene.						

Course Outcomes	
CO1	To perform the analysis and comparison of hair & fiber evidences.
CO2	To perform the presumptive test of blood found at crime scene using various methods.
CO3	To perform the confirmative test of blood found at crime scene using various methods.
CO4	To identify the blood group of given blood sample
CO5	To perform the species origin test from various biological samples

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**FORENSIC BIOLOGY**	1. Microscopic Comparison of Human Hair and Animal Hair 2. Techniques of species identification from various biological fluids **a.** Electrophoresis **b.** Precipitin tests 3. Acid Phosphatase test for semen	2	CO1-5
2	**FORENSIC DIATOMOLOGY**	4. Microscopic examination of spermatozoa 5. Detection of Amylase activity- Starch-Iodine Assay. 6. To carry out the microscopic examination of diatoms.	2	
3	**HAIR & FIBER**	7. Microscopic Comparison of Fibres	2	
4	**FORENSIC FLUIDS**	8. Presumptive Tests for Blood **a.** Phenolphthalein Assay **b.** Benzidine **c.** Leucomalachite Green (LMG) **d.** Luminol Test 9. Confirmatory Tests for Blood 10. Acid Phosphatase test for semen	2	
5	**BLOODSTAIN PATTERN ANALYSIS**	11. ABO Grouping & Rhesus Factor	2	

Reference Books:

1. Shaw, D; Physics in the Prevention and Detection of Crime, Contemn Phys. Vol.17, 1976.
2. Caddy, B; Forensic Examination of Glass and Paint Analysis and Interpretation, CRC Press, New York, 2001.
3. Safer stein, R; Forensic Science Handbook. Vol. I, II, (Edition), Prentice Hall, New Jersey, 1988.
4. B. R. Sharma, Forensic Science in Criminal Investigation and Trials(6th Edition).

e-Learning Source:

1. https://youtu.be/XKvhn9v6WUg
2. https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=eCJfy23Kjy3c0vICLa6VYg==#
3. https://youtu.be/0jltioeaEyY

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	3	3	2	3	3	2	2	3	3	2	3	3	2	2	3	2
CO2	3	3	3	3	2	3	2	3	3	2	3	2	2	3	3	3	3
CO3	3	3	2	2	3	2	3	3	2	2	2	3	3	2	3	2	3
CO4	3	2	2	3	3	3	2	2	2	3	3	3	3	3	3	3	3
CO5	3	2	3	3	3	2	2	3	3	3	3	2	2	3	2	3	2

4- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
		Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
FS206	BASICS OF FORENSIC PHYSICS- I LAB	√	√	√			√	√	**3,4**

Integral University, Lucknow

Effective from Session: 2023-24							
Course Code	**FS208**	**Title of the Course**	**BASICS OF FORENSIC PSYCHOLOGY- LAB**	**L**	**T**	**P**	**C**
Year	**II**	**Semester**	**III**	**0**	**0**	**2**	**1**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives	To provide a detailed practical knowledge of forensic psychology in criminal investigation.						

Course Outcomes	
CO1	To perform the psychological assessment of serial murder cases.
CO2	Case study on hypnosis was used as a means to detect deception
CO3	Analyze the thematic appreciation test
CO4	Case report study on word association test
CO5	Case study on narco analysis

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**BASICS OF FORENSIC PSYCHOLOGY**	1. To study and Discussion, a criminal case in which hypnosis 2. was used as a means to detect deception.	4	CO1-5
2	**PSYCHOLOGY AND CRIMINAL BEHAVIOR**	3. To review a crime case involving serial murders in India.	4	
3	**INVESTIGATIVE PSYCHOLOGY**	4. To prepare a case report on thematic appreciation test. 5. To prepare a case report on Minnesota multiphase personality inventory test. 6. To prepare a case report on thematic appreciation test. 7. To prepare a case report on word association test. 8. To cite a criminal case in which Narco analysis was used as a means to detect deception.	4	
4	**PSYCHOLOGY AND LAW**	9. To prepare a case report on Bhatia's battery of performance test of intelligence.	4	
5	**LEGAL ASPECT-MENTAL HEALTH ACT, 1987**	10. To Prepare a report on psychological traits of the accused.	4	

Reference Books:

1. Criminal Profiling-An Introduction to Behavioral Evidence analysis', Brent Turvey, Academic Press; 4th edition (13 May 2011).
2. Handbook of Forensic Psychology', Prof Dr. Vimala Veera raghwan, Edition 1st, Elsevier.
3. Handbook of Forensic Psychology', Irving B. Weiner, Allen K. Hiss, Edition 3rd 2006, Wiley Publication.
4. Theoretical Psychology', Moazziz Ali Beg, Sangeeta Gupta Beg, Vol[04], Edition 2nd, 2013, Global Vision Publishing House, New Delhi.
5. Abnormal Psychology-The Problem of Maladaptive behavior', Irwin G. Sarson, Barbara R. Sarson, edition 11th, 2012, PHI Publication, New Delhi.
7. Working Procedure Manual on Chemistry; Directorate of Forensic Science MHA Govt. of India.
8. Settle F. A.: Handbook of Instrumental Technique for Analytical Chemistry, Prentice Hall1997.
9. B. R. Sharma, Forensic Science in Criminal Investigation and Trials(6th Edition).
10. Saferstein, Richard, Criminalistics - An Introduction to Forensic Science, 6th Ed. Prentice-Hall, New Jersey,

e-Learning Source:

1. https://youtu.be/zIHS2n8dBgY
2. https://youtu.be/jIiaJKGjeDU
3. https://youtu.be/ijehxtIFQ9k

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	2	2	3	3	3	2	3	2	2	2	3	2	3	3	2	3
CO2	2	3	3	2	2	3	2	3	3	3	2	2	3	2	2	3	2
CO3	3	2	3	2	2	2	3	2	2	3	3	3	3	3	3	3	2
CO4	2	2	2	3	3	2	3	2	3	2	2	3	2	3	2	3	2
CO5	2	2	2	2	2	2	2	3	2	2	2	3	2	2	3	3	2

5- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
FS208	BASICS OF FORENSIC PSYCHOLOGY- LAB	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
		√	√	√			√	√	3,4

INTEGRAL UNIVERSITY, LUCKNOW

INTEGRAL INSTITUTE OF ALLIED HEALTH SCIENCES & RESEARCH

DEPARTMENT OF PARAMEDICAL SCIENCES

BACHELOR OF SCIENCE IN FORENSIC SCIENCE (B.FS.)

SYLLABUS

YEAR/ SEMESTER: II/IV

Integral University, Lucknow
Department of Paramedical Sciences
Study and Evaluation Scheme

Program: B.Sc. FS Semester-IV

S. N.	Course code	Course Title	Type of Paper	Period Per hr/week/sem			Evaluation Scheme				Sub. Total	Credit	Total Credits
				L	T	P	CT	TA	Total	ESE			
THEORIES													
1	FS 209	Forensic Anthropology	Core	3	1	0	40	20	60	40	100	31:0	4
2	FS210	Forensic Physics-II	Core	2	1	0	40	20	60	40	100	2:1:0	3
3	FS211	Forensic Biology-II	Core	2	1	0	40	20	60	40	100	2:1:0	3
4	FS212	Digital and Cyber Forensic- I	Core	2	1	0	40	20	60	40	100	2:1:0	3
5	FS213	Quality management in Laboratory	Core	2	1	0	40	20	60	40	100	2:1:0	3
6	CH227	Forensic Chemistry-II	Core	3	1	0	40	20	60	40	100	3:1:0	4
PRACTICAL													
1	FS214	Forensic Anthropology-Lab	Core	0	0	2	40	20	60	40	100	0:0:1	1
2	FS215	Forensic Physics II-Lab	Core	0	0	2	40	20	60	40	100	0:0:1	1
3	FS216	Forensic Biology –II- Lab	Core	0	0	2	40	20	60	40	100	0:0:1	1
4	FS217	Digital and cyber forensic–I –Lab	Core	0	0	2	40	20	60	40	100	0:0:1	1
5	CH228	Forensic Chemistry-II- Lab	Core	0	0	2	40	20	60	40	100	0:0:1	1
Total				**14**	**06**	**10**	**440**	**220**	**660**	**440**	**1100**	**25**	**25**

S. N.	Course code	Course Title	Type of Paper	Attributes							United Nation Sustainable Development Goal (SDGs)
				Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
THEORIES											
1	FS209	Forensic Anthropology	Core	√	√	√	√		√	√	3,4
2	FS210	Forensic Physics-II	Core	√	√	√			√	√	3,4
3	FS211	Forensic Biology-II	Core	√	√	√			√	√	3,4
4	FS212	Digital and Cyber Forensic- I	Core	√	√	√			√	√	3,4
5	FS213	Quality management in Laboratory	Core	√	√	√	√	√	√	√	3,4
6	CH227	Forensic Chemistry-II	Core	√	√	√			√	√	3,4
PRACTICAL											
1	FS214	Forensic Anthropology-Lab	Core	√	√	√	√		√	√	3,4
2	FS215	Forensic Physics II-Lab	Core	√	√	√			√	√	3,4
3	FS216	Forensic Biology –II- Lab	Core	√	√	√			√	√	3,4
4	FS217	Digital and cyber forensic–I –Lab	Core	√	√	√			√	√	3,4
5	CH228	Forensic Chemistry-II- Lab	Core	√	√	√			√	√	3,4

L: Lecture **T:** Tutorials **P:** Practical **CT:** Class Test **TA:** Teacher Assessment **ESE:** End Semester Examination,
AE= Ability enhancement, DSE- Discipline Specific Elective, **Sessional Total:** Class Test + Teacher Assessment **Subject Total:** Sessional Total + End Semester Examination (ESE)

Integral University, Lucknow

Effective from Session: 2023-24							
Course Code	**FS209**	**Title of the Course**	**FORENSIC ANTHROPOLOGY**	**L**	**T**	**P**	**C**
Year	**II**	**Semester**	**IV**	3	1	0	**4**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives	Forensic Anthropology is best described as the analysis of human remains for the medico legal purposes of establishing identity.						

Course Outcomes	
CO1	To discuss about the basic introduction and scope of forensic anthropology, study and identification of human bones for forensic consideration.
CO2	Developing the understanding about the different aspects of forensic odontology and forensic significances of bite marks.
CO3	To discuss about the importance of somatoscopy in personal identification.
CO4	To develop the knowledge about importance of somatometry in personal identification.
CO5	To discuss about the different techniques and their aspects in facial reconstruction for forensic case work.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**FORENSIC ANTHROPOLOGY**	**Forensic Anthropology -**Introduction, General Definition, Scope and Significance, Types of bones, Anatomy, and physiology of major bones like pelvis, limb bones, skull, clavicle, and sternum. Determination of sex, age, race, and stature through bones, Skull, Pelvis, and long bones. Advancement in age and sex determination of human skeleton system.	8	CO1
2	**FORENSIC ODONTOLOGY**	**Forensic Odontology-** Types of teeth and their comparative anatomy. Role and scope of odontology in forensic science. Identification of skeleton remains in mass disasters. Estimation of age from teeth: eruption sequence, Gustafson's Method, dental anomolies and their importance. Advancement in forensic odontology. **Bite marks-** Introduction, photography, lifting, preservation and Forensic significance of bite marks. Legal aspects of bite marks.	8	CO2
3	**PERSONAL IDENTIFICATION-SOMATOSCOPY**	**Personal Identification -Somatoscopy–**observation of hair on head, forehead, eyes, root of nose, nasal bridge, nasaltip, chin, Darwin'stubercle, earlobes, supra-orbital ridges, physiognomic ear breadth, the circumference of head. Importance of somatoscopy in personal identification. Introduction and forensic application of Scar marks and occupational marks.	8	CO3
4	**ANTHROPOMETRY (SOMATOMETRY, OSTEAMETRY AND CRANIOMETRY)–**	**Anthropometry (Somatometry, Osteametry and Craniometry)–** measurements of skull, head, face, nose, cheek, ear, hand and foot, bodyweight, height. Indices - cephalic index, nasal index, cranial index, upper facial index. Importance of anthropometry in personal identification.	8	CO4
5	**FACIAL RECONSTRUCTION**	**Facial Reconstruction** - Portrait Parle/Bertillon System. Facial reconstruction from skeleton, Superimposition technique, Video analysis. Importance of tissue depth in facial reconstruction. Advancement in facial reconstruction. Genetic and congenital anomalies–causes, types, identification and their forensic significance.	8	CO5

Reference Books:

1. M.Y. Iscan and S.R. Loth, The scope of forensic anthropology in, Introduction to Forensic Sciences, 2nd Ed., W.G. Eckert (Ed.), CRC Press, Boca Raton (1997).
2. D. Ubelaker and H. Scammell, *Bones*, M. Evans & Co., New York (2000).
3. S.Rhine, *Bone* Voyage: A Journey in Forensic Anthropology, University of Mexico Press, Mexico (1998).
4. Introduction to Forensic Anthropology, Steven N. Byers, Pearson/ Allyn & Bacon; 3rd edition (December 1, 2008).
5. Forensic Anthropology Laboratory Manual, Steven N. Byers, Pearson Education, USA, 2011.
6. Forensic Anthropology: Current Methods and Practice, Angi *M.* Academic Press; 1st edition (5 March 2014)
7. Christensen, Nicholas V. Passalacqua and Eric J. Bartelink, Academic Press, USA, 2014.
8. B. R. Sharma, Forensic Science in Criminal Investigation and Trials(6th Edition).
9. Saferstein, Richard, Criminalistics - An Introduction to Forensic Science, 6th Ed. Prentice-Hall, New Jersey,

e-Learning Source:

1. https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=eCJfy23Kjy3c0vICLa6VYg==#
2. https://youtu.be/wh1tJ1xu8_M
3. https://youtu.be/9Z84bOxBbGU

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	3	3	3	2	3	2	2	3	2	2	2	3	2	3	2	3
CO2	3	2	2	3	2	2	3	2	3	2	2	3	2	3	3	2	2
CO3	3	3	3	2	3	2	3	2	3	2	3	3	3	2	2	3	2
CO4	3	3	2	3	2	3	3	3	2	3	3	3	2	3	3	2	3
CO5	2	3	3	2	3	2	3	2	3	2	3	2	3	3	3	3	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
FS209	FORENSIC ANTHROPOLOGY	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
		√	√	√	√		√	√	3,4

Integral University, Lucknow

Effective from Session: 2023-24							
Course Code	**FS210**	**Title of the Course**	**FORENSIC PHYSICS-II**	**L**	**T**	**P**	**C**
Year	**II**	**Semester**	**IV**	**2**	**1**	**0**	**3**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives	The student will develop an understanding and importance of Physics in Forensic Science.						

Course Outcomes	
CO1	To develop the deep understanding and knowledge about different types of tool marks, their examination and significances in crime scene investigation
CO2	Developing the understanding of Foot/Footwear/Tyre Impression, their forensic examination protocols and gait pattern analysis
CO3	To discuss about the basic principles of photography, technique used in photography, Videography and Crime Scene & laboratory photography.
CO4	To develop the deep understanding about the Restoration of erased / obliterated marks on different surfaces.
CO5	To discuss about the principles, Working and Applications of Electrostatic Dust Lifting Kit (DLK), LUMA light, Video Spectral Comparator (VSC), Electrostatic Developing Apparatus (ESDA) in the field of forensic science.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**TOOL MARKS**	**Tool Marks-**Types and formation of tool marks- compression marks, striated marks, combination of compression and striated marks, repeated marks .Class characteristics and individual characteristics, crime scene processing of tool marks, Photographic examination of tool marks and cut marks on clothes and walls etc. Significances of tool marks.	6	CO1
2	**IMPRESSIONS AT CRIME SCENE**	**Impressions at Crime Scene:** Foot/Footwear/ Tyre Impression, Collection, Tracing, Lifting, Casting of impressions, Enhancement of Footwear Impression, Analysis & comparison of foot impressions, Moulds, Gait Pattern analysis and identification.	6	CO2
3	**FORENSIC PHOTOGRAPHY**	**Forensic Photography-**Basic principles of Photography, Techniques of black & white and color photography, Types of cameras and basic terminologies used in photography, developers and fixers; Types of photography; Modern development in photography- digital photography, working and basic principles of digital photography; Surveillance photography. Videography and Crime Scene &laboratory photography.	6	CO3
4	**RESTORATION OF ERASED/ OBLITERATED MARKS**	**Restoration of erased / obliterated marks-** Method of making-cast, punch, engrave; methods of obliteration, method of restoration- etching (etchings for different metals), magnetic, electrolytic etc., recording of restored marks – restoration of marks on wood, leather, polymer etc.	6	CO4
5	**FORENSIC PHYSICS TOOLS**	Principles, Working and Applications in Forensic Science. **1.** Electrostatic Dust Lifting Kit (DLK) **2.** Forensic Light Source **3.** Video Spectral Comparator (VSC) **4.** Gas Chromatography	6	CO5

Reference Books:

1. Houck, M.M& Siegel, J.A; Fundamentals of Forensic Science, Academic Press, London, 2 n d Edition 2010.
2. Sharma, B.R; Forensic Science in Criminal Investigation & Trials, Universal Publishing Co., New Delhi, Fifth edition 2016.
3. Nanda B.B and Tewari, R.K; Forensic Science in India- A vision for the Twenty First Century, Select Publisher, New Delhi, Select publishers (2014).
4. Robertson and Vignaux; Interpreting Evidence, John Wiley, New York, 1995.
5. H.L. Blitzer and J.Jacobia; Forensic Digital Imaging and Photography, I st Edition Academic Press, London, 2002.
6. Forensic Medical Investigation of Motor Vehicle Incidence By Michel P. Burke,CRC Press ,2016.
7. B. R. Sharma, Forensic Science in Criminal Investigation and Trials(6th Edition).
8. Saferstein, Richard, Criminalistics - An Introduction to Forensic Science, 6th Ed. Prentice-Hall, New Jersey,

e-Learning Source:

1. https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=eCJfy23Kjy3c0vICLa6VYg==#
2. https://youtu.be/LZBXvD7TaxA

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
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CO2	3	2	2	3	2	2	3	2	3	2	3	3	2	3	2	2	3
CO3	2	3	3	2	3	2	3	3	2	3	3	2	3	3	3	2	3
CO4	3	3	2	3	2	3	3	3	2	3	3	2	2	3	3	2	3
CO5	3	3	3	3	3	2	3	3	3	2	3	3	3	3	3	3	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
		Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
FS210	FORENSIC PHYSICS-II	√	√	√			√	√	3,4

Integral University, Lucknow

Effective from Session: 2023-24							
Course Code	**FS211**	**Title of the Course**	**FORENSIC BIOLOGY-II**	**L**	**T**	**P**	**C**
Year	**II**	**Semester**	**IV**	**2**	**1**	**0**	**3**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives	To demonstrate the Forensic Biology and their role in crime scene investigation.						

Course Outcomes	
CO1	To develop the deep understanding and knowledge about basics concepts of forensic entomology, forensic significances of entomological evidence during death investigations
CO2	Developing the understanding about the botanical evidence encounter in forensic investigation, Dendrography, Limnology and Dendrochronology.
CO3	To discuss about the fundamentals and significance of wildlife forensic
CO4	To develop the sound knowledge about the types and identification of microbial organisms of forensic significance
CO5	To discuss about the dimensions of Forensic ornithology and its importance

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**FORENSIC ENTOMOLOGY**	**Forensic Entomology:** General entomology and arthropod biology, Insects of forensic importance. Collection of entomological evidence during death investigations. Determining the age of blow fly life cycle stages, Introduction, forensic entomological application, and factors influencing of insect succession on carrion and its relationship to determine time since death.	6	CO1
2	**FORENSIC BOTANY**	**Forensic Botany:** Introduction, Scope, and Significance, Various types of evidence related to forensic botany like **1.Wood**: types of wood and anatomy, methods of identification, and comparison. **2. Leaves**: Identification of various types of leaves and their anatomy, and methods of comparison. **3.Seeds**: identification and analysis. Documentation of botanical evidence. Endangered plants. Introduction and importance of Dendrochronology.	6	CO2
3	**WILDLIFE FORENSICS AND LAW**	**Wildlife forensic and laws:** Introduction and Significance of wildife forensics. Types of wildlife evidences, such as skin, fur, bone, horn, teeth, flowers, plants etc. Wildlife crime, commodities in the trade, Trade level, value of trade, prevention of wildlife crime. Importance of Wildlife (Protection) Act – 1972(flora and fauna species).Identification of pug marks of various animals.	6	CO3
4	**MICROBIAL FORENSIC AND FORENSIC ORNITHOLOGY**	**Microbial Forensic and Forensic Ornithology:** Introduction, identification, types and forensic significance of microbial organisms. Bioterrorism. **Forensic Ornithology:** Introduction, flight and means of locomotion, forensic significance.	6	CO4
5	**FORENSIC PALYNOLOGY**	**Forensic Palynology:** Pollens or pollen grains: Structure, function, methods of identification, and comparison of Seeds and Spores: structure and formation in fungi, gymnosperm, and angiosperm. Forensic Importance of Pollen and Spores.	6	CO5

Reference Books:

1. Forensic Biology by Richard Li CRC Press; 2 edition (27 April 2015).
2. A textbook of medical jurisprudence and toxicology- Modi Lexis Nexis; First edition (22 April 2016).
3. Wildlife forensic investigation-Principles and practice: Cooper and Cooper, CRC press ,2013.
4. Forensic Palynology in the United States of America (1990)- Bryant, V.M. Jr, Milden Hall, D.C. and Jones, J.G.14. PP.193-208.
5. Microbial forensics -Roger Breeze, Bruce Bud Owle, Steven E. Schutzer, Elsevier.
6. B. R. Sharma, Forensic Science in Criminal Investigation and Trials(6th Edition).
7. Saferstein, Richard, Criminalistics - An Introduction to Forensic Science, 6th Ed. Prentice-Hall, New Jersey.

e-Learning Source:

1. https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=eCJfy23Kjy3c0vICLa6VYg==#
2. https://youtu.be/gbfo60qSzeQ

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
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CO2	3	2	2	3	2	2	3	2	3	2	3	3	2	3	2	2	3
CO3	3	3	3	2	3	2	3	3	2	3	2	2	3	2	3	3	2
CO4	2	3	2	3	2	3	3	3	2	3	3	2	2	3	3	2	3
CO5	3	2	3	3	3	2	3	3	3	3	3	3	3	2	3	3	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
FS211	FORENSIC BIOLOGY-II	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
		√	√	√			√	√	**3,4**

Integral University, Lucknow

Effective from Session: 2023-24							
Course Code	**FS212**	**Title of the Course**	**DIGITAL & CYBER FORENSIC-I**	**L**	**T**	**P**	**C**
Year	**II**	**Semester**	**IV**	**2**	**1**	**0**	**3**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives	To provide insight of cyber forensic investigation and technical issues related to it. To learn about cyber security tools, possible security issues, cyber-attacks and concealment techniques.						

Course Outcomes	
CO1	To develop the deep understanding and knowledge about basics concepts of cyber forensic investigation, digital evidence collection, evidence preservation along with search and seizure of computers.
CO2	Developing the understanding about the basic concepts of security technologies such as certification and key distribution, digital signature protocols for transactions, SSL, SET etc.
CO3	To discuss about the security issues and different types of attacks in digital & cyber forensic, firewalls and implementation of security policies
CO4	To develop the sound knowledge about the cyber security such as software and hardware-based security, Strategies for a Secure Network and The Ethics of Computer Security.
CO5	To discuss about the Cryptography Techniques and their types, Data Hiding on NTFS with Alternate data Streams

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	**BASIC OF CYBER FORENSICS**	**Basic of Cyber Forensics —** Define Cyber Forensic, Introduction & Importance of Cyber Forensic Investigation, Types of Cyber Crime, Cyber forensic Investigation procedure, Types of digital evidence, Collection, Preservation and packaging of Digital evidence, Types of digital evidence, Cyber Forensic Investigation Tools, , Types of Computer forensics, Cyber forensic investigation technique	6	CO1
2	**FORENSIC TECHNOLOGY & INVESTIGATION**	**Forensic Technology & amp; Investigation-** Introduction to Digital forensics, Extraction of information from the hard disk. Data recovery and deleted files, Password cracking, E-mail tracking and analysis. Encryption and decryption methods. Introduction to Biometrics: face, iris and fingerprint recognition, Audio-video evidence collection, Preservation and Forensic Analysis.	6	CO2
3	**SECURITY ISSUES**	**Security Issues** –Operating system, Viruses and Worms, Digging for Worms, Trojan horse, trap door, super zapping, logic bombs, types of Attacks (Active and Passive), Stealing Passwords, Bugs and Backdoors, Social Engineering, Denial- of Service, etc, Firewalls, Biometric Security Systems, Packet Filters, Application- Level Filtering, Circuit- Level Gateways, Dynamic Packet Filters, Packet Filtering, SSL (Secure Socket Layer), SET Secure Electronic Transaction)	6	CO3
4	**CYBER SECURITY**	**Cyber Security-** Introduction to Cyber Security, Importance of Cyber security, Implementing Hardware and software Based Security, Security Standards and protocols, Forensic Analysis of OS artifact, Internet Artifacts, File System Artifacts, Registry Artifacts, Application Artifacts, The Ethics of Computer Security, Security Threats and levels,	6	CO4
5	**CRYPTOGRAPHY TECHNIQUES**	**Cryptography Techniques-** Introduction to Cryptography, Types of Cryptographic Algorithms: (Secret Key Cryptography, Public Key Cryptography, Hash Function), technique in cryptography, application and advantage of cryptography, Electronic Signature, Introduction to Stegnography, Reversing the Stegnographic Process	6	CO5

Reference Books:

1. File System Forensic Analysis by Brian Carrier, Publisher: Addison-Wesley Professional.
2. Cyber Law & Crimes (IT Act 2000 & Computer Crime Analysis) by Barkha & Ram Mohan, Publisher: Asian Law House, Hyderabad.
3. Firewalls and Internet Security: Repelling the Wily Hacker, Second Edition, Addison.
4. E-Commerce: The Cutting Edge of Business by Kamlesh K. Bajaj & Debjani Nag, Tata McGraw Hill.
5. Cyberlaw Simplified Vivek Sood, TMG.
6. Tata McGraw Hill Reference Cyber Law and E-Commerce, David Baumer, J C Poindexter, TMG.
7. B. R. Sharma, Forensic Science in Criminal Investigation and Trials(6th Edition).
8. Saferstein, Richard, Criminalistics - An Introduction to Forensic Science, 6th Ed. Prentice-Hall, New Jersey.

e-Learning Source:

1. https://youtu.be/23oYYMrvAsk
2. https://youtu.be/nL2vHJ53Wr4
3. https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=eCJfy23Kjy3c0vICLa6VYg==#

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	3	2	3	3	3	2	3	2	3	2	3	3	2	3	3
CO2	2	2	2	3	3	2	3	2	3	2	3	3	2	3	2	2	2
CO3	3	3	3	2	3	3	3	3	2	3	2	2	3	2	3	3	2

CO4	3	3	2	3	2	3	3	3	2	3	3	2	2	3	3	2	3
CO5	2	3	2	2	3	2	3	2	3	3	2	3	3	2	3	3	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
FS212	DIGITAL & CYBER FORENSIC-I	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
		√	√	√	√		√	√	**3,4**

Integral University, Lucknow

Effective from Session: 2023-24							
Course Code	**FS213**	**Title of the Course**	**QUALITY MANAGEMENT IN LABORATORIES**	**L**	**T**	**P**	**C**
Year	**I**	**Semester**	**IV**	**2**	**1**	**0**	**3**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives	The Objective of this course is to introduce the students with the Quality management system and requirements for the competence of testing and calibration, the technical requirements needed in a laboratory.						

Course Outcomes	
CO1	To discuss about the basic concepts of quality management as per ISO/IEC 17025 and general requirements for the competence of testing and calibration laboratories.
CO2	Developing the understanding about the basic concept of laboratory management and information system.
CO3	To discuss about the importance of laboratory accreditation & certification and various accreditation and certification bodies.
CO4	To develop the understanding about Report Writing and Evidence Evaluation in respect of Crime Scene and Laboratory findings.
CO5	To discuss about the different cases of Special Importance, Pertaining to forensic examination.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**QUALITY MANAGEMENT (ISO/IEC 17025)**	**Quality Management (ISO/IEC 17025):**Introduction and importance of quality management in laboratories, General requirements for the competence of testing and calibration laboratories. Management requirement: control of records, Technical requirements: Personnel, environmental condition for tests. Test and calibration method and method of validation. Equipment, Safety measures of equipments. Measurement traceability.	6	CO1
2	**LABORATORY MANAGEMENT (METHODS AND SAMPLING)**	**Laboratory Management (methods and sampling)**: Selection verification and validation of the method using in laboratories. Sampling, Handling of test and calibration items, Assuring the quality of test calibration results and reporting the results	6	CO2
3	**ACCREDITATION AND CERTIFICATION BODIES**	**Accreditation and certification bodies**- NABL, ISO, IEC, BIS, ASCLD/LAB, ABC, IAI	6	CO3
4	**REPORT WRITING AND EVIDENCE EVALUATION**	**Report Writing and Evidence Evaluation:** Components of reports and Report formants in respect of Crime Scene and Laboratory findings. Court Testimony- admissibility of expert Examination in chief, cross examination and re examination, Ethics in Forensic Science	6	CO4
5	**CASE STUDIES**	**Case Studies:** Cases of Special Importance, pertaining to forensic examination Biology and Serology, Toxicology, documents, fingerprints, ballistics, Voice identifications, Tape authentication and cyber crime.	6	CO5

Reference Books:

1. International Standard on General requirements for the competence of testing and calibration laboratories, 1st Ed., 1999-12-15, ISO/IEC 17025:1999(E).
2. Crime Laboratory by Oster burg.
3. William L. Duncan: Total Quality, Key Terms and Concepts.
4. Murray S. Cooper: Quality control in the Pharmaceutical Industry.
5. John T. Rabbitt, Peter A Bergh: The ISO 9000 Book.
6. NABL -113
7. NABL -113A

e-Learning Source:

1. https://youtu.be/2HxxfynCLlI
2. https://youtu.be/7Z6lgesaKl4
3. https://youtu.be/DW6PBrcptCg

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
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CO3	3	2	2	2	3	3	2	2	2	3	2	2	3	2	3	3	2
CO4	3	3	2	3	2	3	3	3	2	3	3	2	2	3	3	2	3
CO5	2	3	2	2	3	2	3	2	3	3	2	3	3	2	3	3	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
		Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
FS213	QUALITY MANAGEMENT IN LABORATORIES	√	√	√			√	√	3,4, 11

Integral University, Lucknow

Effective from Session: 2020-21							
Course Code	**CH227**	**Title of the Course**	**FORENSIC CHEMISTRY-II**	**L**	**T**	**P**	**C**
Year	**II**	**Semester**	**IV**	3	1	0	4
Pre-Requisite	**NIL**	**Co-requisite**	**Nil**				
Course Objectives	Understand and to appreciate the breadth and diversity of analytical science in respect of forensic science.						

Course Outcomes	
CO1	To understand the analysis of traces of petroleum products in forensic exhibits and adulteration of petroleum products
CO2	To understand the Chemistry of fire, cause and origin of fire & forensic examination of fire/arson cases.
CO3	To understand the absorption, detoxication and excretion of alcohol. Analytical techniques used for the analysis of alcohol.
CO4	To understand the Analytical techniques for analysis of exhibits involved in food and other materials.
CO5	To understand the examination and legal aspects of gold, silver, sugar, salts, fertilizers, Detective dyes

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**Petroleum and Petroleum Products**	Commercial uses of different petroleum fractions. Analysis of traces of petroleum products in forensic exhibits. Adulteration of petroleum products.	8	CO1
2	**Arson and Fire**	Chemistry of fire, difference between Arson and Fire, cause of fire and origin of fire Material and Chemicals use in initiating fire and arson Examination of scene of fire/arson, recognition and collection of evidence, packing labelling and forwarding of exhibits, and forensic detection of arson cases.	8	CO2
3	**Study of Analysis of Beverages**	Introduction, Definition of alcohol and illicit liquor, Alcoholic and non-alcoholic beverages and their composition, Proof spirit, absorption, detoxication and excretion of alcohol, problems in alcohol cases and difficulties in diagnosis, Alcohol and prohibition, Consequences of drunken driving, Analytical techniques used for the analysis of alcohol.	8	CO3
4	**Food adulteration**	Introduction, Prevention of food adulteration, Analytical techniques for analysis of exhibits involved in food and other material.	8	CO4
5	**Miscellaneous**	Characteristics, examination and legal aspects of gold, silver, sugar, salts, fertilizers, Detective dyes- cases and importance in trap cases.	8	CO5

Reference Books:

1. Safer stein, R; Forensic Science Handbook. Vol. I, II, (Ed.), Prentice Hall, New Jersey, 1988.
2. Working Procedure Manual; Chemistry BPR&D Publication, 2000.
3. Sharma, B.R; Forensic Science in Criminal Investigation and Trials (3rd edition), Universal Law Publishing Co., New Delhi, 2001.
4. J.D. DeHaan, *Kirk's Fire Investigation*, 3rd Edition, Prentice Hall, New Jersey (1991).
5. W.J. Tilstone, M.L. Hastrup and C. Hald, Fisher's, *Techniques of Crime Scene Investigation*, CRC Press, Boca Raton (2013).
6. S. Ballou, M. Houck, J.A. Siegel, C.A. Crouse, J.J. Lentini and S. Palenik in *Forensic Science*, D.H. Ubelaker (Ed.), Wiley-Blackwell, Chichester (2013).

e-Learning Source:

1. https://youtu.be/dz6EgD-Rwwk
2. https://youtu.be/M8KaHdAUBPM
3. https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=eCJfy23Kjy3c0vICLa6VYg==#

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	3	2	2	3	3	2	3	3	2	3	2	3	2	2	3	3
CO2	3	2	2	3	2	2	3	2	2	2	2	3	2	3	2	2	3
CO3	2	3	3	2	3	2	3	2	2	2	3	2	3	2	2	3	2
CO4	2	3	2	3	2	3	3	3	2	3	3	3	2	3	3	2	3
CO5	2	3	3	2	3	2	2	2	3	2	3	2	3	3	3	3	2

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
CH227	FORENSIC CHEMISTRY-II	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
		√	√	√			√	√	3,4

Integral University, Lucknow

Effective from Session: 2023-24							
Course Code	**FS214**	**Title of the Course**	**FORENSIC ANTHROPOLOGY- LAB**	**L**	**T**	**P**	**C**
Year	**II**	**Semester**	**IV**	**0**	**0**	**2**	**1**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives	To provide a detailed practical knowledge of forensic anthropology in criminal investigation.						

Course Outcomes	
CO1	Students will be able to determine the age, race and sex from the skeletal remains.
CO2	Students will be able to identification and description of bones and their measurements.
CO3	Students will be able to determine differences between animal and human bones
CO4	Students will be able to perform somatometric measurements on living subjects
CO5	Students will be able to carry out craniometric measurements of human skull.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**FORENSIC ANTHROPOLOGY**	1. To study the identification of sex from pelvis. 2. To study the identification of sex from skull.	2	CO1
2	**FORENSIC ODONTOLOGY**	3. To determine the identification of age from teeth. 4. Preparation of Dental chart. 5. To analyze and preserve bite marks.	2	CO2
3	**PERSONAL IDENTIFICATION-SOMATOSCOPY**	6. To investigate the differences between animal and human bones.	2	CO3
4	**ANTHROPOMETRY (SOMATOMETRY, OSTEAMETRY AND CRANIOMETRY)–**	7. To perform somatometric measurements on living subjects. 8. To estimate stature from long bone length and skull.	2	CO4
5	**FACIAL RECONSTRUCTION**	9. To carry out cranio metric measurements of human skull.	2	CO5

Reference Books:

1. M.Y. Iscan and S.R. Loth, The scope of forensic anthropology in, Introduction to Forensic Sciences, 2nd Ed., W.G. Eckert (Ed.), CRC Press, Boca Raton (1997).
2. D. Ubelaker and H. Scammell, *Bones*, M. Evans & Co., New York (2000).
3. S.Rhine, *Bone* Voyage: A Journey in Forensic Anthropology, University of Mexico Press, Mexico (1998).
4. Introduction to Forensic Anthropology, Steven N. Byers, Pearson/ Allyn & Bacon; 3rd edition (December 1, 2008).
5. Forensic Anthropology Laboratory Manual, Steven N. Byers, Pearson Education, USA, 2011.
6. B. R. Sharma, Forensic Science in Criminal Investigation and Trials(6th Edition).
7. Saferstein, Richard, Criminalistics - An Introduction to Forensic Science, 6th Ed. Prentice-Hall, New Jersey.

e-Learning Source:

1. https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=eCJfy23Kjy3c0vICLa6VYg==#
2. https://youtu.be/wh1tJ1xu8_M
3. https://youtu.be/9Z84bOxBbGU

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	3	3	3	2	3	2	2	3	2	2	2	3	2	3	2	3
CO2	3	2	2	3	2	2	3	2	3	2	2	3	2	3	3	2	2
CO3	3	3	3	2	3	2	3	2	3	2	3	3	3	2	2	3	2
CO4	3	3	2	3	2	3	3	3	2	3	3	3	2	3	3	2	3
CO5	2	3	3	2	3	2	3	2	3	2	3	2	3	3	3	3	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Attributes & SDGs

Course Code	**Course Title**	**Attributes**							**SDGs No.**
FS214	FORENSIC ANTHROPOLOGY-LAB	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	**3,4**
		√	√	√	√		√	√	

Integral University, Lucknow

Effective from Session: 2023-24							
Course Code	**FS215**	**Title of the Course**	**FORENSIC PHYSICS- II**	**L**	**T**	**P**	**C**
Year	**II**	**Semester**	**IV**	**0**	**0**	**2**	**1**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives	To provide a detailed practical knowledge of forensic physics in criminal investigation.						

Course Outcomes: After the successful course completion, learners will develop following attributes:	
CO1	To examine the tool marks and other impressions present over the crime scene
CO2	To perform crime exhibits photography
CO3	To perform crime scene videography
CO4	To perform crime scene photography and processing
CO5	To compare glass samples by refractive index method.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**TOOL MARKS**	1. To identify and compare tool marks.	2	CO1
2	**IMPRESSIONS AT CRIME SCENE**	2. To take photographs of crime scene exhibits at different angles using different filters.	2	CO2
3	**FORENSIC PHOTOGRAPHY**	3. To record videography of a crime scene. 4. To carry out the photography of indoor crime scenes. 5. To carry out the photography of outdoor crime scenes	2	CO3
4	**RESTORATION OF ERASED/ OBLITERATED MARKS**	6. Restoration techniques of tool mark impressions and casting footprints.	2	CO4
5	**FORENSIC PHYSICS TOOLS**	7. To study the tool mark evidences in different light sources.	2	CO5

Reference Books:

1. Houck, M.M& Siegel, J.A; Fundamentals of Forensic Science, Academic Press, London, 2nd Edit io n2010.
2. Sharma, B.R; Forensic Science in Criminal Investigation & Trials, Universal Publishing Co., New Delhi, Fifth edition 2016.
3. Nanda B.B and Tewari, R.K; Forensic Science in India- A vision for the Twenty First Century, Select Publisher, New Delhi, Select publishers (2014).
4. Robertson and Vignaux; Interpreting Evidence, John Wiley, New York, 1995.
5. H.L. Blitzer and J.Jacobia; Forensic Digital Imaging and Photography, Ist. Edition Academic Press, London, 2002.
6. Forensic Medical Investigation of Motor Vehicle Incidence By Michel P. Burke, CRC Press ,2016.
7. B. R. Sharma, Forensic Science in Criminal Investigation and Trials(6th Edition).

e-Learning Source:

1. https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=eCJfy23Kjy3c0vICLa6VYg==#
2. https://youtu.be/LZBXvD7TaxA

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	2	3	2	2	3	3	3	3	3	2	3	2	2	3	3
CO2	3	2	2	3	2	2	3	2	3	2	3	3	2	3	2	2	3
CO3	2	3	3	2	3	2	3	3	2	3	3	2	3	3	3	2	3
CO4	3	3	2	3	2	3	3	3	2	3	3	2	2	3	3	2	3
CO5	3	3	3	3	3	2	3	3	3	2	3	3	3	3	3	3	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
		Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
FS215	FORENSIC PHYSICS- II	√	√	√			√	√	3,4

Integral University, Lucknow

Effective from Session: 2023-24							
Course Code	**FS216**	**Title of the Course**	**FORENSIC BIOLOGY-II LAB**	**L**	**T**	**P**	**C**
Year	**II**	**Semester**	**IV**	**0**	**0**	**2**	**1**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives	To provide a detailed practical knowledge of forensic biology in criminal investigation.						

Course Outcomes: After the successful course completion, learners will develop following attributes:	
CO1	To identify and culture the bacteria of forensic significance
CO2	To examine the feathers of birds for the identification
CO3	Identification and examination of arthropods for forensic significances
CO4	Examination of diatoms
CO5	Assessment of evidences related to wild-life

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**FORENSIC ENTOMOLOGY**	1. Identification of orders of insects and other arthropods of forensic significance. 2. To determine the age of blow fly life cycle stages. 3. To prepare a case report on forensic entomology.	2	CO1
2	**FORENSIC BOTANY**	4. To cite a criminal case in which diatoms have served as forensic evidence.	2	CO2
3	**WILDLIFE FORENSICS AND LAW**	5. To prepare a case report on problems of wildlife forensics. **6.** Perform the Pug marks identification and examination.	2	CO3
4	**MICROBIAL FORENSIC AND FORENSIC ORNITHOLOGY**	**7.** To study the characteristics of different birds feather.	2	CO4
5	**FORENSIC PALYNOLOGY**	8. To carry out the microscopic examination of pollen grains.	2	CO5

Reference Books:

1. Houck, M.M & Siegel, J.A; Fundamentals of Forensic Science, Academic Press, London, 2nd Edition 2010
2. Sharma, B.R; Forensic Science in Criminal Investigation & Trials, Universal Publishing Co., New Delhi, Fifth edition 2016.
3. Nanda B.B and Tewari, R.K; Forensic Science in India- A vision for the Twenty First Century, Select Publisher, New Delhi, Select publishers (2014).
4. Robertson and Vignaux; Interpreting Evidence, John Wiley, New York, 1995.
5. B. R. Sharma, Forensic Science in Criminal Investigation and Trials (6th Edition).

e-Learning Source:

1. https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=eCJfy23Kjy3c0vICLa6VYg==#
2. https://youtu.be/gbfo60qSzeQ

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	3	3	2	3	3	2	3	2	3	2	3	2	2	3	3
CO2	3	2	2	3	2	2	3	2	3	2	3	3	2	3	2	2	3
CO3	3	3	3	2	3	2	3	3	2	3	2	2	3	2	3	3	2
CO4	2	3	2	3	2	3	3	3	2	3	3	2	2	3	3	2	3
CO5	3	2	3	3	3	2	3	3	3	3	3	3	3	2	3	3	3

2- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
		Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
FS216	FORENSIC BIOLOGY-II LAB	√	√	√	√		√	√	**3,4**

Integral University, Lucknow

Effective from Session: 2023-24							
Course Code	**FS217**	**Title of the Course**	**DIGITAL & CYBER FORENSIC-I LAB**	**L**	**T**	**P**	**C**
Year	**II**	**Semester**	**IV**	**0**	**0**	**2**	**1**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives	To provide a detailed practical knowledge of digital & cyber forensic in criminal investigation.						

Course Outcomes: After the successful course completion, learners will develop following attributes:	
CO1	To perform the crime scene processing of digital evidences
CO2	To learn about the different digital forensic tools used for the CSI
CO3	To learn about the Cryptography
CO4	To learn about the Stegnography
CO5	Study the cases related to Biometric Techniques

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1.	**BASIC OF CYBER FORENSICS**	1. Identification, Seizure, Search of Digital media and Digital Evidence Collection 2. Demonstration of various Forensic tools like Partition magic, Encase etc.	6	CO1
2.	**FORENSIC TECHNOLOGY & INVESTIGATION**	3. Data Recovery, Deleted File Recovery viewing small Disk and open tool or Software. 4. Case study of Biometric Techniques.	6	CO2
3.	**SECURITY ISSUES**	5. Demonstration of other Concealment Techniques	6	CO3
4.	**CYBER SECURITY**	6. Demonstration of Concealment Techniques (Steganography)	6	CO4
5.	**CRYPTOGRAPHY TECHNIQUES**	7. Demonstration of Concealment Techniques (Cryptography PGP)	6	CO5

Reference Books:

1. File System Forensic Analysis by Brian Carrier, Publisher: Addison-Wesley Professional.
2. Cyber Law & Crimes (IT Act 2000 & Computer Crime Analysis) by Barkha & Ram Mohan, Publisher: Asian Law House, Hyderabad.
3. Firewalls and Internet Security: Repelling the Wily Hacker, Second Edition, Addison.
4. E-Commerce: The Cutting Edge of Business by Kamlesh K. Bajaj & Debjani Nag, Tata McGraw Hill.
5. Cyberlaw Simplified Vivek Soo.
6. B. R. Sharma, Forensic Science in Criminal Investigation and Trials (6th Edition).

e-Learning Source:

1. https://youtu.be/23oYYMrvAsk
2. https://youtu.be/nL2vHJ53Wr4
3. https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=eCJfy23Kjy3c0vICLa6VYg==#

Course Articulation Matrix: (Mapping of COs with POs and PSOs)

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	3	2	3	3	3	2	3	2	3	2	3	3	2	3	3
CO2	2	2	2	3	3	2	3	2	3	2	3	3	2	3	2	2	2
CO3	3	3	3	2	3	3	3	3	2	3	2	2	3	2	3	3	2
CO4	3	3	2	3	2	3	3	3	2	3	3	2	2	3	3	2	3
CO5	2	3	2	2	3	2	3	2	3	3	2	3	3	2	3	3	3

3- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
		Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
FS217	DIGITAL & CYBER FORENSIC-I LAB	√	√	√	√		√	√	3,4

Integral University, Lucknow

Effective from Session: 2020-21							
Course Code	**CH228**	**Title of the Course**	**FORENSIC CHEMISTRY-II LAB**	**L**	**T**	**P**	**C**
Year	**II**	**Semester**	**IV**	**0**	**0**	**2**	**1**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives	To provide a detailed practical knowledge of forensic chemistry in criminal investigation.						

Course Outcomes: After the successful course completion, learners will develop following attributes:	
CO1	To perform the analysis of residue material in fire and arson cases
CO2	To perform the analysis of petroleum products
CO3	To perform the analysis of food adulteration
CO4	To perform the analysis of alcohols
CO5	To prepare a case report on a case involving arson.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
UNIT 1-5		Analysis of residue material in fire and arson cases by TLC/, UV- spectrophotometric.	2	CO1-5
		Examination of chemicals used in Trap cases by UV-visible spectroscopy.	2	
		To carry out analysis of petroleum products.	2	
		To analyze arsonaccelerators	2	
		To prepare a case report on a case involving arson.	2	
		Identification of food adulteration. -vegetable oil, Cold drinks etc.	2	
		Detection and determination of various adulterants in alcohol, by color tests.	2	
		To identify ethyl / methyl alcohol	2	
		Thin layer chromatography of Food adulterants.	2	

Reference Books:

1. Safer stein, R; Forensic Science Handbook. Vol. I, II, (Ed.), Prentice Hall, New Jersey, 1988.
2. Working Procedure Manual; Chemistry BPR&D Publication, 2000.
3. D. DeHaan, *Kirk's Fire Investigation*, 3rd Edition, Prentice Hall, New Jersey (1991).
4. W.J. Tinstone, M.L. Hastrup and C. Hald, Fisher's, *Techniques of Crime Scene Investigation*, CRC Press, Boca Raton (2013).
5. Ballou, M. Houck, J.A. Siegel, C.A. Crouse, J.J. Lentini and S. Pale Nik in *Forensic Science*, D.H. Ubelaker (Ed.), Wiley- Blackwell, Chichester (2013).

e-Learning Source:

1. https://youtu.be/dz6EgD-Rwwk
2. https://youtu.be/M8KaHdAUBPM
3. https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=eCJfy23Kjy3c0vICLa6VYg==#

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	3	2	2	3	3	2	3	3	2	3	2	3	2	2	3	3
CO2	3	2	2	3	2	2	3	2	2	2	2	3	2	3	2	2	3
CO3	2	3	3	2	3	2	3	2	2	2	3	2	3	2	2	3	2
CO4	2	3	2	3	2	3	3	3	2	3	3	3	2	3	3	2	3
CO5	2	3	3	2	3	2	2	2	3	2	3	2	3	3	3	3	2

4- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
FS218	FORENSIC CHEMISTRY-II LAB	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
		√	√	√			√	√	3,4