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: I/I

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

Program: B.Sc. FS Semester-I

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.	FS113	Basics of Forensic Science	Core	2	1	0	40	20	60	40	100	2:1:0	3
2.	FS120	Biology-I	Core	2	1	0	40	20	60	40	100	2:1:0	3
3.	FS105	Physics-I	Core	2	1	0	40	20	60	40	100	2:1:0	3
4.	FS114	Criminal Law	Core	2	1	0	40	20	60	40	100	2:1:0	3
5.	CH117	General Chemistry-I	Core	2	1	0	40	20	60	40	100	2:1:0	3
6.	LN101	Basics of Professional Communication	Core	2	1	0	40	20	60	40	100	2:1:0	3
7.	CS103	Introduction to Computers	Core	2	1	0	40	20	60	40	100	2:1:0	3
PRACTICAL													
1.	FS121	Biology-I-Lab	Core	0	0	2	40	20	60	40	100	0:0:1	1
2.	FS109	Physics-I-Lab	Core	0	0	2	40	20	60	40	100	0:0:1	1
3.	CH121	General Chemistry-I-Lab	Core	0	0	2	40	20	60	40	100	0:0:1	1
Total				**14**	**07**	**06**	**400**	**200**	**600**	**400**	**1000**	**24**	**24**

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.	FS113	Basics of Forensic Science	Core	√	√	√	√		√	√	3,4
2.	FS120	Biology-I	Core	√	√	√			√	√	3,4
3.	FS105	Physics-I	Core	√	√	√			√	√	3,4
4.	FS114	Criminal Law	Core	√	√	√			√	√	3,4
5.	CH117	General Chemistry-I	Core	√	√	√			√	√	3,4
6.	LN101	Basics of Professional Communication	Core	√	√	√	√		√	√	3,4
7.	CS103	Introduction to Computers	Core	√	√	√			√	√	3,4
PRACTICAL											
1.	FS121	Biology-I-Lab	Core	√	√	√			√	√	3,4
2.	FS109	Physics-I-Lab	Core	√	√	√			√	√	3,4
3.	CH121	General Chemistry-I-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: 2019-20							
Course Code	**FS113**	**Title of the Course**	**BASICS OF FORENSIC SCIENCE**	**L**	**T**	**P**	**C**
Year	**I**	**Semester**	I	**2**	**1**	**0**	**3**
Pre-Requisite	Nil	**Co-requisite**	Nil				
Course Objectives	The objective is to introduce the students to forensic science and give a brief idea about the history and developments of the field, related laws & ethics, and organizational structure of forensic science laboratories.						

Course Outcomes	
CO1	Students will have abundant knowledge and understanding about the types, nature & characteristics of crime and will be able to discuss the present scenario of crime in India.
CO2	Students will be able to understand the terminologies used in criminal proceedings and will be able to classify different types of crime and objects of punishments.
CO3	Students will have abundant knowledge about the history and development of the forensic science and its principles, Specific contribution of Scientists in the field of Forensic Science.
CO4	Students will have abundant knowledge at the end of the course. Familiarize oneself with the organization of a forensic science laboratory.
CO5	Students will be able to understand the ethical role and responsibilities of a forensic expert.

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	**CRIME SCENARIO IN INDIA**	1. Introduction to crime and history, Sociological aspects of crime and criminals in society. 2. Types of crime and its causes – property crimes, public order crimes, violent crimes, cyber-crimes, juvenile delinquency. 3. Society-Criminal interaction and various types of crimes in India. 4. Criminal behavior - Theories and literature studies, criminal inheritance, and factors responsible.	6	CO1
2	**CRIMINOLOGY & LAW**	1. Definition of law, court, judge, Basic terminologies in law. 2. Law to combat crime, classification of civil & criminal cases, the difference between civil & criminal cases. 3. Essential elements of criminal law. 4. The object of punishment, kind of punishment.	6	CO2
3	**DEVELOPMENTAL GROWTH OF FORENSIC SCIENCE**	1. Introduction to Forensic science – nature, need, and function. 2. Laws and Principles, basics of Forensic Science. 3. Historical development and scope of Forensic Science in India. 4. Specific contribution of scientists in the field of forensic science.	6	CO3
4	**FORENSIC SCIENCE LABORATORIES AND FACILITIES**	1. Organizational setup of the forensic science lab and other national & international agencies: - FSL, CFSL, GEQD, NICFS, CID, CBI, Central Detective Training Schools, NCRB, NPA (National Police Academy). 2. Services and functionalities provided by various FSLs. 3. Various divisions in the FSL – Ballistics, Biology, Chemistry Documents, Physics, Psychology, Serology, Toxicology.	6	CO4
5	**FORENSIC ETHICS**	Forensic Ethics- Introduction, Definition, Scope, Ethics in Forensic Science, Professionalism, and ethics: Importance of professional ethics, the importance of professional ethics to science practitioners, development of code of conduct and code of ethics for Forensic Science; Application of codes and ethics, how ethical requirements impact the daily work of a forensic scientist; Ethical dilemmas and their resolution.	6	CO5

Reference Books:

1. W.J. Tilstone, M.L. Hastrup, and C. Hald, Fisher's Techniques of Crime Scene Investigation, CRC
2. R. Saferstein, Criminalistics, 8th Edition, Prentice Hall, New Jersey (2004).
3. W.G. Eckert and R.K. Wright in Introduction to Forensic Sciences, 2nd Edition, W.G. Eckert (ED.), CRC Press, Boca Raton (1997).
4. S.H. James and J.J. Nord by, Forensic Science: An Introduction to Scientific and investigative Techniques, 2nd Edition, CRC Press, Boca Raton (2005)
5. Mc Robbie DW, Moore EA, Graves MJ. MRI from Picture to B.B. Nanda and R.K. Tiwari, Forensic Science in India: A Vision for the Twenty-First Century, Select Publishers, New Delhi (2001).

e-Learning Source:

1. https://www.youtube.com/watch?v=PYyB7-wTaRA
2. https://youtu.be/8ID3VGP_-NA

	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	3	2	3	3	2	3	3	2	3	3	3	2	3	2
CO2	3	3	2	3	3	2	3	2	3	3	3	2	2	3	3	2
CO3	3	3	3	2	3	3	3	3	3	3	2	2	3	2	3	3
CO4	3	3	2	3	3	3	3	3	2	3	3	3	3	3	2	3
CO5	3	2	3	3	3	2	3	3	2	3	2	3	2	3	3	3

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

Attributes & SDGs

Course Code	**Course Title**	**Attributes**							**SDGs No.**
FS113	**BASICS OF FORENSIC SCIENCE**	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
		√	√	√	√		√	√	**3,4**

Integral University, Lucknow

Effective from Session: 2019-20							
Course Code	**FS120**	**Title of the Course**	**BIOLOGY-I**	**L**	**T**	**P**	**C**
Year	**I**	**Semester**	**I**	**2**	**1**	**0**	**3**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives	The objective is to introduce the students to the basic principles & concepts of biology, anatomy & physiology of humans, plant morphology & microbiology.						

Course Outcomes	
CO1	Students will be able to review the history and development of cell biology, and organic & biochemical compounds.
CO2	Students will be able to explain the plant morphology and anatomy.
CO3	Students will have a basic understanding of human physiology and anatomy.
CO4	Students will have abundant knowledge at the end of the course. Familiarize oneself with microbiology and biotechnology.
CO5	At the end of the course, students will understand the basic concepts of evolution & genetics.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**CELL BIOLOGY, ORGANIC AND BIOCHEMICAL COMPOUND**	**1.** Cell theory, Cell Structure and Function in Prokaryotes and Eukaryotes. **2.** Unicellular and Multicellular organisms. **3.** Composition of the blood, the study of blood components and their functions. **4.** Properties, Classification, and function of carbohydrates, proteins, nucleic acids, and lipids.	6	CO1
2	**PLANT MORPHOLOGY AND ANATOMY**	**1.** Principles of Taxonomy and systems of classification of angiosperms (Bentham and Hooker) and Gymnosperms (Chamberlain). **2.** Mechanical and conducting tissue systems in plants. **3.** Morphology of root, leaf, stem, flowers, and their modifications. **4.** Anatomy of mono and dicot roots, leaves, and stems - secondary growth, growth rings, calculation of life of the wood.	6	CO2
3	**HUMAN PHYSIOLOGY AND ANATOMY**	**1.** Nutrition – BMR **2.** Skeletal Muscle physiology and Nervous system Physiology. **3.** Respiratory system physiology - exchange of gases. **4.** Mechanism of blood circulation. Morphological study of human body parts and regions - Gross and Microscopic.	6	CO3
4	**MICROBIOLOGY AND BIOTECHNOLOGY**	**1.** Microscopy - Principles and types. Historical introduction to microbiology. **2.** Basics of Microbiology and concepts of Pure culture techniques. **3.** Broad classification of microorganisms. **4.** Recombinant DNA technology and its application, Western and Southern Blot techniques.	6	CO4
5	**EVOLUTION AND GENETICS**	**1.** Origin of life and Geological time scale. **2.** Theories and evidence of evolution - Darwinism, Lamarckism, fossil record, and biochemical evidence. **3.** Origin and Concept of Species - specification and isolation, geographical and reproductive. **4.** Genetic Materials - Structural organization and functions. **5.** Mendelian Principles, Mendel's Laws and Ratio. **6.** Sex-linked inheritance, sex determination and crossing over – Karyotyping analysis, Chromosomal mapping, DNA and RNA structural types.	6	CO5

Reference Books:

1. Karp, G. 2010. Cell and Molecular Biology: Concepts and Experiments. 6th Edition. John Wile & amp; Sons. Inc.
2. Cooper, G.M. and Hausman, R.E. 2009. The Cell: A Molecular A roach. 5th.
3. Dr. R. Krishna murti- Forensic Biology.
4. R. Li- Forensic Biology.

e-Learning Source:

1. https://www.youtube.com/watch?v=Fdvl-9bNCF8
2. https://www.youtube.com/watch?v=cHIB8601KQQ
3. https://www.youtube.com/watch?v=E4a8g1o72AM&list=PLfrg90_WmE12AiWW63XX0XDQGQ_ywtLLx

	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	3	2	3	2	1	3	1	2	3	2	3	2	1	2	2
CO2	1	3	2	3	2	2	3	2	3	3	3	2	2	3	3	2	3
CO3	2	2	3	2	2	3	3	2	3	3	2	2	1	1	3	1	2
CO4	3	3	2	3	1	3	3	3	2	3	3	1	3	3	2	3	3
CO5	2	2	2	1	2	2	1	3	2	1	2	3	2	3	2	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	
FS120	BIOLOGY-I	√	√	√			√	√	**3,4**

Integral University, Lucknow

Effective from Session: 2019-20							
Course Code	**FS105**	**Title of the Course**	**PHYSICS-I**	**L**	**T**	**P**	**C**
Year	**I**	**Semester**	**I**	**2**	**1**	**0**	**3**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives	**T**he objective is to introduce the students to the basic principles & concepts of Physical science.						

Course Outcomes: After the successful course completion, learners will develop following attributes:	
CO1	After studying this unit, the students will understand the concepts of quantum mechanics and mechanics.
CO2	The students will be able to understand thermal physics & related laws with their applications.
CO3	The students will be able to demonstrate electromagnetic physics and electric field.
CO4	The students will be able to demonstrate general physic phenomena.
CO5	After studying this paper, the students will know the basic concepts of nuclear physics.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**MECHANICS**	Force, conservative and non-conservative force, rotational motion of inertia, expression of M.I. of regular shaped bodies. Kepler's law. Acceleration due to gravity. Simple Harmonic motion and compound pendulum. Newton's law of motion.	6	CO1
2	**THERMAL PHYSICS**	Concept of temperature, ideal gas equation, and its law. Vander Waal's equation, reversible and irreversible process, Zeroth law, first, the second and third law of thermodynamics. Carnot's cycle.	6	CO2
3	**ELECTROMAGNETISM**	Coulomb's law. Electric field, Magnetic field due to current, Gauss's theorem and its application, Ampere's law, Kirchhoff's law, and their applications.	6	CO3
4		Wheat-stone bridge and its sensitivity. Rectifiers, Amplifiers, semiconductors, and their type of junction. Paramagnetic, diamagnetic, ferromagnetic materials and properties.	6	CO4
5	**NUCLEAR PHYSICS**	Nuclear forces, nuclear models (elementary idea): Concept of nuclear quantum number, magic numbers. Nuclear Reactions: Artificial radioactivity, transmutation of elements, fission, fusion Radio Activity Half-life Period, Nuclear Reactor.	6	CO5

Reference Books:

Engineering Physics Seventh Enlarged, Revised Edition, 2004.

M.N. Avadhanulu and P.G. Kshirsagar, S. Chand and Company Ltd. ISBN 81-219- 0817-5.

Modern Physics Concept and Applications – Sanjeev Puri, Narosa Publication.

A Textbook of advanced Practical Physics – Samir Kumar Ghosh, New Central Book Agency – (3rd edition)

e-Learning Source:

1. https://www.youtube.com/watch?v=aD58U3Ib0ng
2. https://www.youtube.com/watch?v=0XkoFm6bZb8&list=PLSmRC4W4cwRtFHUzvqW-cXJC_iYqROQLt
3. https://www.youtube.com/watch?v=NK-BxowMIfg&list=PLB1A0BF14EB31C3BE

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	2	1	3	1	2	3	2	1	2	1	2	2
CO2	1	3	2	1	2	3	3	2	3	3	3	2	2	3	3	2	3
CO3	2	2	3	2	2	2	1	2	3	3	2	2	1	1	3	1	1
CO4	2	3	2	2	3	3	2	3	2	3	3	1	3	3	2	3	3
CO5	2	2	2	1	2	2	1	2	2	1	2	3	2	3	2	2	2

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

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
FS105	PHYSICS-I	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
		√	√	√			√	√	**3,4**

Integral University, Lucknow

Effective from Session: 2019-20							
Course Code	**FS114**	**Title of the Course**	**CRIMINAL LAW**	**L**	**T**	**P**	**C**
Year	**I**	**Semester**	**I**	**2**	**1**	**0**	**3**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives							

Course Outcomes	
CO1	After studying this the students will have the basic understanding of definitions and terminologies used in legal proceedings.
CO2	After completing this the students will have the basic understanding of law to combat crime.
CO3	After studying this course, the students will know the Acts and provisions of the Constitution of India related to forensic science and specific sections of IPC, IEA & CrPC.
CO4	The students will understand the police organization setup and their functions.
CO5	After studying the students will know about the Acts governing socio-economic crimes and environmental crimes.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**DEFINITIONS OF LAW**	**Definitions-**of Law, Court, Judge, Basic Terminology in Law, Introduction to Criminal Procedure Code, FIR, Difference between civil and Criminal Justice, Object of Punishment, Kinds of Punishment.	6	CO1
2	**LAW TO COMBAT CRIME**	**Law to Combat Crime-** Classification – civil, criminal cases. Essential elements of criminal law. Constitution and hierarchy of criminal courts. Criminal Procedure Code. Cognizable and non-cognizable offenses. Bailable and non-bailable offenses. Sentences which the court of Chief Judicial Magistrate may pass.	6	CO2
3	**LAWS SPECIFIC TO FORENSIC SCIENCE**	**Laws specific to Forensic Science:** **Bhartiya Nyaya Sanhita 2023** - pertaining to offenses against persons – Sections 148, 100,101,103, 106, 80, 109,114, 116,118(1),118(2),130,74, 137, 137(2). Sections related to rape – 63,64,68,70,71 **Bhartiya Sakshya Adhiniyam 2023–** Evidence and rules of relevancy in brief. Expert witness. Cross- examination and re-examination of witnesses. Sections 26, 39(1), 39(2), 41(1), 52, 53, 55, 72,140,141,142 146 **Bhartiya Nagarik Suraksha Sanhita 2023 –** Sections 326,327, 328 & 329 in the BNSS	6	CO3
4	**POLICE SCIENCE**	**Police science:** definition and scope-Police organization under central government: general information about their structure and function BPR&D, CBI, IB, RAW, NCRB, NICFS, NPA, UT Police Force. International Police Organization: INTERPOL- history, structure general and special notices. State Police organization: general organization of police at the state and range level. Police organization at the district level.	6	CO4
5	**ACTS IN FORENSIC SCIENCES**	Acts Pertaining to Socio-economic and Environmental Crimes. Dowry Prohibition Act. Immoral Traffic Prevention Act. Wildlife Protection Act. Environment Protection Act. Untouchability Offences Act.	6	CO5

Reference Books:

1. D.A. Bronstein, Law for the Expert Witness, CRC Press, Boca Raton 4th edition (2011).
2. Vipa P. Sarthi, Law of Evidence, 6th Edition, Eastern Book Co., Lucknow (2006).
3. A.S. Pillai, Criminal Law, 6th Edition, N.M. Tripathi Pvt Ltd., Mumbai (1983).
4. R.C. Nigam, Law of Crimes in India, Volume I, Asia Publishing House, New Delhi (1965).
5. (Chief Justice) M. Monir, Law of Evidence, 6th Edition, Universal Law Publishing Co. Pvt. Ltd., New Delhi (2002)

e-Learning Source:

1. https://www.youtube.com/watch?v=S10LGeWPDIA
2. https://www.youtube.com/watch?v=kq7K156IaEY
3. https://www.youtube.com/watch?v=W_FpLzqe75I

	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	2	2	3	1	2	3	2	3	2	3	2	2
CO2	2	3	2	1	2	3	3	2	3	3	3	3	2	3	3	2	3
CO3	3	2	3	2	2	2	3	2	3	2	2	2	2	3	2	3	2
CO4	2	3	2	2	3	3	2	3	2	3	3	3	3	3	2	3	3
CO5	3	2	2	3	2	2	3	3	2	3	2	3	2	3	2	2	2

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

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
FS114	CRIMINAL LAW	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
		√	√	√	√		√	√	**3,4**

Integral University, Lucknow

Effective from Session: 2019-20							
Course Code	**CH117**	**Title of the Course**	**GENERAL CHEMISTRY-I**	**L**	**T**	**P**	**C**
Year	**I**	**Semester**	**I**	**2**	**1**	**0**	**3**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives	The objective is to introduce the students to the basic principles &concepts of organic, inorganic, and physical chemistry.						

Course Outcomes	
CO1	After studying this course, the students will know the basic concepts of inorganic chemistry; atomic structure.
CO2	After completion, the students will have the understanding of the periodic properties, periodic table, and applications in predicting and explaining chemical behavior.
CO3	The students will have the knowledge about organic chemistry and structure bonding & hybridization.
CO4	After completion, the students will have the understanding of the mechanism of organic reaction.
CO5	The students will have the basic understanding of the gaseous state and its aspects.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**INORGANIC CHEMISTRY**	**INORGANIC CHEMISTRY** **Atomic Structure**: Idea of de Broglie matter waves, Heisenberg uncertainty principle, atomic orbitals, Schrodinger wave equation, the significance of Ψ and Ψ2, quantum numbers, radial, and angular wavefunctions and probability distribution curves, shapes of s, p, d orbitals. Aufbau and Pauli exclusion principles, Hund's multiplicity rule. Electronic configurations of the elements.	6	CO1
2	**PERIODIC PROPERTIES**	**Periodic Properties** Atomic and ionic radii, ionization energy, electron affinity, and electronegativity definition, effective nuclear charge, methods of determination or evaluation, trends in the periodic table, and applications in predicting and explaining the chemical behavior.	6	CO2
3	**ORGANIC CHEMISTRY**	**ORGANIC CHEMISTRY** **Structure Bonding** Hybridization and its effect on bond length and bond angles, bond energy, localized and delocalized chemical bond, inductive, resonance, hyperconjugation, hydrogen bonding, van der Waals interactions.	6	CO3
4	**MECHANISM OF ORGANIC REACTIONS**	**Mechanism of Organic reactions:** Homolytic and heterolytic bond breaking. Types of reagents electrophiles and nucleophiles, Types of organic reactions. Energy considerations. Reactive intermediates-carbocations, carbanions, free radicals, carbenes, arynes, and nitrenes (with examples). Assigning formal charges in intermediates and other ionic species.	6	CO4
5	**PHYSICAL CHEMISTRY**	**PHYSICAL CHEMISTRY** **Gaseous State** Postulates of the kinetic theory of gases, deviation from ideal behavior, van der Waals equation of state. Critical Phenomena: PV isotherms of real gases, continuity of states, the isotherms of van der Waals equation, the relationship between critical constants and van der Waals constants, the law of corresponding states, reduced equation of state. Problems Molecular velocities: Root means square, average, and most probable velocities.	6	CO5

Reference Books:

1. M. Barrow: Physical Chemistry Tata McGraw Hill, 2007.
2. Cotton & G. Wilkinson: Basic Inorganic Chemistry,
3. John Wiley, Miessler, G. L. & Donald, A. Tarry. Inorganic Chemistry 3rd Edition, Pearson, 2009 ISBN.

e-Learning Source:

1. https://www.youtube.com/live/I-74HF7o7bg?feature=share
2. https://youtu.be/F_cBOZl0KfU
3. https://youtu.be/PQechXuFoyI

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	1	2	3	2	2	3	3	3	2	2	2	2	1	2	2
CO2	2	2	2	2	2	3	1	2	3	3	3	3	2	2	3	2	3
CO3	2	3	3	2	2	2	3	2	1	2	2	2	1	3	2	1	2
CO4	3	3	2	1	3	1	2	3	2	3	3	3	3	2	2	3	3
CO5	2	2	2	3	2	2	3	3	2	3	2	3	2	3	2	2	2

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

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
CH117	GENERAL CHEMISTRY-I	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
		√	√	√			√	√	**3,4**

Integral University, Lucknow

Effective from Session: 2019-20							
Course Code	**LN101**	**Title of the Course**	**BASICS OF PROFESSIONAL COMMUNICATION**	**L**	**T**	**P**	**C**
Year	**I**	**Semester**	**I**	**2**	**1**	**0**	**3**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives	The major objective of the course is to develop professional communication skills among the students.						

Course Outcomes	
CO1	After studying this course, the students will know the meaning & importance of professional communication as well as effective professional communication.
CO2	After studying this course, the students will understand the language through literature like essays and short stories.
CO3	After studying this course, the students will know the basic concepts and knowledge of vocabulary.
CO4	After studying this course, the students will have the understanding and practice of basic grammar.
CO5	After completion of this course, the students will have the knowledge, understanding, and skills in report writing & business letter writing.

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	**PROFESSIONAL COMMUNICATION**	**1.** Professional Communication: Meaning & importance **2.** Essentials of Effective Communication **3.** Barriers to Effective Communication	6	CO1
2	**LANGUAGE THROUGH LITERATURE**	**1. Essays:** "The Effect of the Scientific Temper on Man" by Bertrand Russell "The Aims of Science and Humanities" by Moody E. Prior **2. Short Stories:** "The Meeting Pool" by Ruskin Bond "The Portrait of a Lady" by Khushwant Singh	6	CO2
3	**BASIC VOCABULARY**	**1.** Euphemism, One-word Substitution, Synonyms, Antonyms **2.** Homophones, Idioms and Phrases, Common mistakes **3.** Confusable words and expressions	6	CO3
4	**BASIC GRAMMAR**	**1.** Articles, Prepositions, Tenses **2.** Concord (Subject-Verb agreement), Verbs: kinds & uses **3.** Degrees of Comparison	6	CO4
5	**BASIC COMPOSITION**	**1.** Report writing: What is a report? Kinds and objectives of reports, writing reports **2.** Business Letter Writing: Introduction to business letters, types of business letters, Layout of business letters, Letter of Enquiry / Complaint	6	CO5

Reference Books:

1. Lata, Pushpa & Kumar, Sanjay. Communication Skills, Oxford University Press-2012
2. Quintanilla, Kelly M. & Wahl, Shawn T. Business and Professional Communication, Sage Publications India Pvt. Ltd-2011
3. Juneja, Om P & Mujumdar, Aarati.Business Communication: Techniques and Methods, Orient Black Swan-2010
4. Arora, V. N. & Chandra, Lakshmi. Improve Your Writing: From Comprehensive to Effective Writing, Oxford University Press-2010 (For the prescribed essays- "The Effect of the Scientific Temper on Man" by Bertrand Russell & "The Aims of Science and Humanities" by Moody E. Prior)

e-Learning Source:

1. https://www.youtube.com/watch?v=jQx_jZxdCbs
2. https://www.sciencedirect.com/topics/psychology/linguistictheory#:~:text=Linguistic%20Theory%20was%20formed%20by,to%20all%20typically%20developing%20humans
3. https://linguistics.ucla.edu/undergraduate/what-is-linguistics/
4. https://www.thoughtco.com/noam-chomsky-4769113

	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	1	2	1	3	2	1	2	1	2	3	2	3	2	1	2	2
CO2	1	3	2	2	2	2	3	2	3	2	2	2	2	3	3	2	2
CO3	2	2	3	2	2	3	3	2	2	2	2	2	1	1	2	1	2
CO4	1	2	2	3	1	3	1	1	1	3	2	1	3	3	2	3	3
CO5	2	2	2	1	2	2	1	3	2	1	2	3	2	3	2	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	
LN101	BASICS OF PROFESSIONAL COMMUNICATION	√	√	√			√	√	**3,4, 11**

Integral University, Lucknow

Effective from Session: 2019-20							
Course Code	**CS103**	**Title of the Course**	**INTRODUCTION TO COMPUTERS**	**L**	**T**	**P**	**C**
Year	**I**	**Semester**	**I**	**2**	**1**	**0**	**3**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives	The main objective of the course is to provide fundamental knowledge of computers, windows, MS word, and Power point.						

Course Outcomes	
CO1	After completion, the students will know the fundamentals of computers and computer systems.
CO2	After studying, the students will be able to understanding the basic concepts of DOS commands.
CO3	The students will have the basic understanding of the windows.
CO4	After studying this course, the students will know the basics of MS Word.
CO5	After studying this course, the students will have the basic knowledge, understanding, and concepts of presentation software.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**COMPUTER FUNDAMENTALS**	What is a computer? Components of a computer system. Classification of computers. Types of computers. A brief history of the evolution of computers and generation of computers. Computer hardware and software. Input/ Output devices.	6	CO1
2	**DOS**	Elementary knowledge of DOS commands DIR, CLS, DATE, TIME, MD, CD, RD, RENAME, DEL, BACKUP, RESTORE, COPY, SCANDISK, CHKDSK.	6	CO2
3	**WINDOWS**	Difference between windows and DOS. Basic Features - Date, Time, Time Zone, Display, Screen Saver, Fonts, Mouse, and mouse pointers. Using accessories such as a calculator, paintbrush, CD player, etc. Use of Windows Explorer for moving and copying files. Introduction to MS Office and its integrated nature.	6	CO3
4	**MS-WORD**	Starting Word, new documents, entering text, changing text, aligning, underlining, and justifying text. Use of tabs. Tables - creation, adding rows and columns, splitting, and combining cells, Borders. Saving, closing, and operating documents. Adding headers and footers. Print preview, and print a document. Mail merge: creating main document and data source. Adding and removing fields from the data source.	6	CO4
5	**POWERPOINT (PRESENTATION SOFTWARE)**	The basic concept of presentation software. Standard, Formatting, and drawing toolbars in PowerPoint and their use. Creating and opening a presentation. Creating, deleting, opening, and copying slides. Closing and saving a presentation. Use of slide sorter, adding header/footer. Use of master slides and color box. Use of animation features. Inserting pictures, resizing pictures. Inserting organization chart. Use of auto content wizard.	6	CO5

Reference Books:

1. A First Course in Computers: Saxena, Vikas Publishing House.
2. Fundamentals of Computer science - M. Afshar Alam.
3. Fundamental of Information Technology by D. S. Yadav- New age International.

e-Learning Source:

1. https://youtu.be/Ojqdty-Oh1M
2. https://youtu.be/F7kXXsEq2Vc
3. https://youtu.be/YHSLkNzLuqc

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	1	1	2	1	1	2	1	2	1	2	3	2	1	2	1	2	2
CO2	2	2	2	2	2	2	3	2	3	2	2	2	2	3	3	2	1
CO3	1	2	1	2	2	2	1	2	2	2	1	2	1	1	2	1	2
CO4	2	2	2	3	1	3	1	1	1	1	2	1	3	3	1	3	3
CO5	2	2	2	1	2	2	1	3	2	1	2	3	2	1	2	2	2

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

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
CS103	INTRODUCTION TO COMPUTERS	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
		√	√	√				√	**3, 4**

Integral University, Lucknow

Effective from Session: 2019-20							
Course Code	**FS121**	**Title of the Course**	**BIOLOGY-I-LAB**	**L**	**T**	**P**	**C**
Year	**I**	**Semester**	**I**	**0**	**0**	**2**	**1**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives	The main objective of the course is to provide fundamental of Human Biology.						

Course Outcomes	
CO1	To analyse the sugar, protein, lipids, nucleic acids and to demonstrate the unicellular & multicellular organisms
CO2	To understand the morphology of RBCs.
CO3	To understand the xylem and phloem.
CO4	Study of anatomical features of secondary growth in angiosperms stem and root.
CO5	To demonstrate the different systems in human body.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	CELL BIOLOGY, ORGANIC AND BIOCHEMICAL COMPOUND PLANT MORPHOLOGY AND ANATOMY HUMAN PHYSIOLOGY AND ANATOMY MICROBIOLOGY AND BIOTECHNOLOGY EVOLUTION AND GENETICS	Qualitative analysis of sugars, proteins, lipids, and nucleic acids	30 hrs	CO1
2		Demonstration of Unicellular & Multicellular Organisms.		
3		Study of morphological types of red blood cells		CO2
4		Study of morphological plant parts with modification		
5		Study of conducting tissue- Xylem and phloem elements in Angiosperms and Gymnosperms as seen in L.S. and R.L.S.		CO3
6		Study of anatomical features of secondary growth in angiosperms stem and root.		
7		Demonstration of Skeletal Muscles		CO4
8		Demonstration of Nervous System		
9		Demonstration of Respiratory System		
10		Demonstration of Circular System		CO5
11		Preparation of media and sterilization		

Reference Books:

1. Karp, G. 2010. Cell and Molecular Biology: Concepts and Experiments. 6th Edition. John Wile & amp; Sons. Inc.
2. Cooper, G.M. and Hausman, R.E. 2009. The Cell: A Molecular A roach. 5th.
3. Dr. R. Krishna murti- Forensic Biology.
4. R. Li- Forensic Biology.

e-Learning Source:

1. https://www.youtube.com/watch?v=Fdvl-9bNCF8
2. https://www.youtube.com/watch?v=cHIB8601KQQ
3. https://www.youtube.com/watch?v=E4a8g1o72AM&list=PLfrg90_WmE12AiWW63XX0XDQGQ_ywtLLx

	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	3	2	3	2	1	3	1	2	3	2	3	2	1	2	2
CO2	1	3	2	3	2	2	3	2	3	3	3	2	2	3	3	2	3
CO3	2	2	3	2	2	3	3	2	3	3	2	2	1	1	3	1	2
CO4	3	3	2	3	1	3	3	3	2	3	3	1	3	3	2	3	3
CO5	2	2	2	1	2	2	1	3	2	1	2	3	2	3	2	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	
FS121	BIOLOGY-I-LAB	√	√	√			√	√	**3,4**

Integral University, Lucknow

Effective from Session: 2019-20							
Course Code	**FS109**	**Title of the Course**	**PHYSICS-I- LAB**	**L**	**T**	**P**	**C**
Year	**I**	**Semester**	**I**	**0**	**0**	**2**	**1**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives	The main objective of the course is to provide fundamental of Physics and important in Forensic science.						

Course Outcomes	
CO1	Understand the SOP of various instruments used in physics lab.
CO2	Learn to determine the value of 'g' by various methods.
CO3	Learn to find the Moment of Inertia.
CO4	To verify Newton's law of cooling.
CO5	To determine the Moment of Inertia

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**MECHANICS**	1. Standard operating procedures for using Vernier Caliper, Micrometer Screw Gauge, Travelling Microscope.	30 hrs	CO1-5
2	**THERMAL**	2. To determine the value of 'g' by a compound pendulum.		
3	**PHYSICS**	3. To determine the value of 'g' by a Kater's pendulum.		
4	**ELECTROMAG NETISM**	4. To find the Moment of Inertia of a fly wheel about its own axis of rotation OR (To find angular		
5	**NUCLEAR**	5. Acceleration of a fly wheel.		
6	**PHYSICS**	6. To verify Newton's law of cooling.		
7		7. To determine the Moment of Inertia of a given irregular body using a Torson pendulum.		

Reference Books:

1. Engineering Physics Seventh Enlarged, Revised Edition 2004, M.N. Avadhanulu and P.G. Kshirsagar, S. Chand and Company Ltd. ISBN 81-219-0817-5
2. Optics – Ajoy Ghatak (3rd Edition) Mc. Graw Hill Co.
3. Modern Physics Concept and Applications – Sanjeev Puri, Narosa Publication.
4. Advanced Practical Physics – Workshop and Flint Little Hampton Book Services Ltd; 9th Revised edition (1 December 1951).
5. A Text book of advanced Practical Physics – Samir Kumar Ghosh, New Central Book Agency – (3rdedition).

e-Learning Source:

1. https://www.youtube.com/watch?v=aD58U3Ib0ng
2. https://www.youtube.com/watch?v=0XkoFm6bZb8&list=PLSmRC4W4cwRtFHUzvqW-cXJC_iYqROQLt
3. https://www.youtube.com/watch?v=NK-BxowMIfg&list=PLB1A0BF14EB31C3BE

	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	2	1	3	1	2	3	2	1	2	1	2	2
CO2	1	3	2	1	2	3	3	2	3	3	3	2	2	3	3	2	3
CO3	2	2	3	2	2	2	1	2	3	3	2	2	1	1	3	1	1
CO4	2	3	2	2	3	3	2	3	2	3	3	1	3	3	2	3	3
CO5	2	2	2	1	2	2	1	2	2	1	2	3	2	3	2	2	2

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

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
FS109	BASICS OF PHYSICS - LAB	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
		√	√	√				√	3,4

Integral University, Lucknow

Effective from Session: 2019-20							
Course Code	**CH121**	**Title of the Course**	**GENERAL CHEMISTRY- I LAB**	**L**	**T**	**P**	**C**
Year	**I**	**Semester**	**I**	**0**	**0**	**2**	**1**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives	The main objective of the course is to provide fundamental of General chemistry and also the chemical importance in forensic sciences.						

Course Outcomes	
CO1	Understand the SOP of various instruments used in chemistry lab.
CO2	Standardization of liquid, and determination of surface tension of the liquid.
CO3	To conduct the pH metric measurement.
CO4	Students will be able to determine the functional groups.
CO5	Students will be able to detect the elements of the chemical compound.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**INORGANIC CHEMISTRY PERIODIC PROPERTIES ORGANIC CHEMISTRY MECHANISM OF ORGANIC REACTIONS PHYSICAL CHEMISTRY**	1. Introduction to Chemistry laboratory apparatus and instruments.	30 hrs.	CO1-5
2		2. Standardization of given liquid by primary standard.		
3		3. To determine surface tension of the given liquid by using stalagmometer.		
4		4. To determine relative viscosity of given organic liquids by viscometer (Four liquids).		
5		5. pH metric measurement: • To prepare buffers and standardization of pH meter. • Determine the molarity of HCL pH-metrically provided M/10 NaOH		
6		6. Determination of functional groups.		
7		7. Analysis of acid and basic radicals.		
8		8. Detection of elements.		

Reference Books:

1. Principles of Physical Chemistry and Puri, Sharma and Pathania, Vishal Publishing Company, 46th Edition 2013.
2. Organic Chemistry by Moris and Boyed, Pearson Publishing, 7th edition 2011.
3. Text book of organic chemistry by Arun Bahl and B. S. Bahl, S. Chand Publishing, 2016.

e-Learning Source:

1. https://www.youtube.com/live/I-74HF7o7bg?feature=share
2. https://youtu.be/F_cBOZl0KfU
3. https://youtu.be/PQechXuFoyI

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	1	2	3	2	2	3	3	3	2	2	2	2	1	2	2
CO2	2	2	2	2	2	3	1	2	3	3	3	3	2	2	3	2	3
CO3	2	3	3	2	2	2	3	2	1	2	2	2	1	3	2	1	2
CO4	3	3	2	1	3	1	2	3	2	3	3	3	3	2	2	3	3
CO5	2	2	2	3	2	2	3	3	2	3	2	3	2	3	2	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	
FS107	GENERAL CHEMISTRY- I LAB	√	√	√				√	**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: I/II

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

Program: B.Sc. FS Semester-II

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	FS122	Biology-II	Core	3	1	0	40	20	60	40	100	3:1:0	4
2	FS123	Crime Scene Investigation	Core	3	1	0	40	20	60	40	100	3:1:0	4
3	FS124	Physics-II	Core	3	1	0	40	20	60	40	100	3:1:0	4
4	FS125	Innovations in Forensic Science	Core	2	1	0	40	20	60	40	100	2:1:0	3
5	CH119	General Chemistry-II	Core	3	1	0	40	20	60	40	100	3:1:0	4
6	LN131	Effective Communication and Media Studies in English	Core	2	1	0	40	20	60	40	100	2:1:0	3
PRACTICAL													
1	FS126	Biology-II-Lab	Core	0	0	2	40	20	60	40	100	0:0:1	1
2	FS127	Crime Scene Investigation-Lab	Core	0	0	2	40	20	60	40	100	0:0:1	1
3	FS128	Physics-II-Lab	Core	0	0	2	40	20	60	40	100	0:0:1	1
4	CH122	General Chemistry-II-Lab	Core	0	0	2	40	20	60	40	100	0:0:1	1
Total				**16**	**06**	**08**	**400**	**200**	**600**	**400**	**1000**	**26**	**26**

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	FS122	Biology-II	Core	√	√	√			√	√	3,4
2	FS123	Crime Scene Investigation	Core	√	√	√	√		√	√	3,4
3	FS124	Physics-II	Core	√	√	√			√	√	3,4
4	FS125	Innovations in Forensic Science	Core	√	√	√			√	√	3,4
5	CH119	General Chemistry-II	Core	√	√	√			√	√	3,4,11
6	LN131	Effective Communication and Media Studies in English	Core	√	√	√				√	4
PRACTICAL											
1	FS126	Biology-II-Lab	Core	√	√	√			√	√	3,4
2	FS127	Crime Scene Investigation-Lab	Core	√	√	√	√		√	√	3,4
3	FS128	Physics-II-Lab	Core	√	√	√			√	√	3,4
4	CH122	General 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: 2019-20							
Course Code	**FS122**	**Title of the Course**	**BIOLOGY-II**	**L**	**T**	**P**	**C**
Year	**I**	**Semester**	**II**	3	1	0	**4**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives	The objective is to introduce the students to the basic principles & concepts of biology, immunology, and genetics.						

Course Outcomes	
CO1	Understanding about the basics of immunology, immune system, virology & bacteriology.
CO2	Understanding B cells/ T cells, antigen & antibody.
CO3	A Basic understanding of Genetics & RNA.
CO4	Understanding the basics of DNA.
CO5	Understand the basic concepts of DNA quantification, PCR & DNA electrophoresis.

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	**IMMUNOLOGY-I**	Immunity and Immune System Cells and Organs of the Immune System • Types of Immunity: Humoral and Cellular Immunity • Virology and Bacteriology - structure, genetics, and diseases	8	CO1
2	**IMMUNOLOGY-II**	B cell / T cell development, diversity, and recognition Antigen & Antibody- structure, transplantation and types, immune system disorders. Various types of microbial cultures Failures of Body defenses	8	CO2
3	**GENETICS**	Structure & properties of Chromosomes Heterochromatin &Euchromatin RNA: Structure & Types	8	CO3
4	**DNA**	Structure, Properties, Types of DNA Sources used as DNA Evidence Role of DNA evidence in Forensic Science	8	CO4
5	**DNA QUANTIFICATION**	DNA Quantification: Slot Blot Assay, Southern Northern Blotting DNA Amplification by Polymerase Chain Reaction DNA Electrophoresis, DNA data-basing	8	CO5

Reference Books:

1. Karp, G. 2010. Cell and Molecular Biology: Concepts and Experiments. 6th Edition. John Wile & amp; Sons. Inc.
2. Cooper, G.M. and Hausman, R.E. 2009. The Cell: A Molecular A roach. 5th
3. Dr. R. Krishnamurthy- Forensic Biology
4. R. Li- Forensic Biology

e-Learning Source:

1 https://www.youtube.com/live/ojwx83jCctg?feature=share
2 https://youtu.be/37jyDyuj1Y4
3 https://youtu.be/3dMtbd2z91o

	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	3	2	2	3	3	3	2	2	2	2	3	2	2
CO2	2	2	2	2	2	2	3	2	3	3	3	3	2	2	3	2	3
CO3	2	3	2	2	2	2	3	2	3	2	2	2	3	3	2	1	2
CO4	3	3	2	2	3	3	2	3	2	2	2	3	3	2	2	3	2
CO5	2	2	2	3	2	2	3	3	2	3	2	3	2	3	2	2	2

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

Attributes & SDGs

Course Code	**Course Title**	**Attributes**							**SDGs No.**
FS122	BIOLOGY-II	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
		√	√	√			√	√	**3,4**

Integral University, Lucknow

Effective from Session: 2019-20							
Course Code	**FS123**	**Title of the Course**	**CRIME SCENE INVESTIGATION**	**L**	**T**	**P**	**C**
Year	**I**	**Semester**	**II**	3	1	0	**4**
Pre-Requisite	**Nil**	**Co-requisite**	Nil				
Course Objectives	The objective of the course is to develop a basic understanding of crime scene and crime scene investigation.						

Course Outcomes	
CO1	Students will be able to review the various types and aspects of crime.
CO2	List the services performed by crime investigators, crime laboratories, and medical examiners.
CO3	Students will be able to discuss the role of a forensic scientist in crime scene and steps involved in crime scene investigation.
CO4	After completion, students will be able to discuss about the role of physical evidences at the crime scene.
CO5	Students will be able to demonstrate the different types of investigative techniques.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**CRIME**	Definition & causation, types of crime, brief ideas about White-collar crime, professional crime, organized crime, etc., modus operandi & Corpus Delicti, the present scenario of crime in India. Processing of crime scene.	8	CO1
2	**CRIME SCENE INVESTIGATION**	Definition of Crime Scene. Classification of crime Scene: Indoor & Outdoor, Primary & Secondary, Macroscopic & Microscopic crime scene, Conveyance crime scene. Significance of crime Scene. Aim of scientific investigation. Argument and Ethics of Crime Scene.	8	CO2
3	**STAGES IN CSI**	Protection of Crime Scene, Recognition of evidence, searching of evidence, Documentation of crime scene and evidence, Collection of evidence, Marking of Evidence, Packaging of Evidence, Analysis of evidence, Interpretation of result, Reporting of result & expert testimony.	8	CO3
4	**PHYSICAL EVIDENCE**	Definition, classification of physical evidence, types of physical evidence, sources of physical evidence, signification and value of physical evidence, and the linkage between crime scene, victim, and criminal. Protection, Sketching, and Photography: Collecting and Packing physical clues from the scene of the crime in case of Hit and Run, Burglary, Housebreaking, Road accident, Theft and Dacoity, arson, and shooting. Reconstruction and evaluation of the scene of the crime.	8	CO4
5	**INVESTIGATIVE TECHNIQUES**	Criminals, Criminal behavior, Criminal profiling, Portrait parley, Polygraph analysis, Narco analysis, Brain Fingerprinting, Voice stress analysis & Speaker profiling.	8	CO5

Reference Books:

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

e-Learning Source:

1. https://youtu.be/HvYXFNPW3KA
2. https://youtu.be/Qj42UYmHh6Y
3. https://youtu.be/2xBL1xIZ72E

	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	3	3	2	3	3	3	3	2	2	2	2	3	3	2
CO2	2	2	3	3	2	3	3	2	3	3	3	3	2	2	3	2	3
CO3	3	3	3	2	2	2	3	2	3	2	2	2	3	3	3	3	3
CO4	3	3	2	2	3	3	2	3	3	2	3	3	3	2	3	3	2
CO5	3	2	3	3	2	2	3	3	2	3	2	3	2	3	2	2	3

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

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
FS123	CRIME SCENE INVESTIGATION	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
		√	√	√			√	√	**3,4**

Integral University, Lucknow

Effective from Session: 2019-20							
Course Code	**FS124**	**Title of the Course**	**PHYSICS-II**	**L**	**T**	**P**	**C**
Year	**I**	**Semester**	**II**	**3**	**1**	**0**	**4**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives	The main objective of the course is to develop an understanding of sound, optics, laser, and electronic circuits.						

Course Outcomes	
CO1	To understand the sound and its various aspects.
CO2	Understand optics and their dimensions.
CO3	Able to demonstrate types and properties of laser & fiber optics.
CO4	Will be able to demonstrate X-rays and their aspects.
CO5	Understand the basic concepts of electronic circuits & digital electronics.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**STUDY OF SOUND**	Velocity of sound, noise and sound intensity measurement, echo, reverberation, Sabine's Formula, absorption coefficient, the acoustics of buildings, and factors affecting the acoustics of buildings. Sound distribution in an auditorium, introduction to ultrasonic, production of ultrasonic waves, applications of ultrasonic.	8	CO1
2	**OPTICS**	• **Interference:** Coherent sources, conditions of interference, Fresnel's bi-prism experiment, interference in thin films, wedge-shaped film, Newton's ring. • **Diffraction:** Single slit and double slit diffraction, diffraction grating, Raleigh's criterion of the limit resolution, resolving power of telescope and microscope. • **Polarization:** Polarization of light, Brewster's law, Malus law, the phenomenon of double refraction, the geometry of calcite crystal, optic axis, principal section, ordinary and extraordinary rays, construction and working of Nicol prism. Plane circularly and elliptically polarized light, Their production, and analysis. Retardation Plates, optical activity, specific rotation, polarimeters.	8	CO2
3	**LASER & FIBER OPTICS**	Production of LASER, Types of LASERS, Properties, and applications of LASER, Optical fibers, Propagation of light through optical fiber, Angle of acceptance and numerical aperture, losses, Solar cells.	8	CO3
4	**X-Rays**	Origin of X-rays, continuous and characteristic X-ray spectra, Mosley's law, absorption of X-rays, Diffraction of X-rays, Bragg's law, Bragg's spectrometer, practical applications of X-ray, X-ray Machine.	8	CO4
5	**ELECTRONICS CIRCUITS & DIGITAL ELECTRONICS**	Basics of LR, CR, LCR circuits, Rectifier circuits, Timer circuits, Transistor and its characteristics, Introduction to OPAM, remote sensing and controlling, Photosensors, Logic gates, and their applications, Flip-flops and counters.	8	CO5

Reference Books:

1. Engineering Physics Seventh Enlarged, Revised Edition2004,
2. M.N. Avadhanulu and P.G. Kshirsagar, S. Chand and Company Ltd. ISBN 81-219- 0817-5.
3. Modern Physics Concept and Applications – Sanjeev Puri, Narosa Publication.
4. A Textbook of advanced Practical Physics – Samir Kumar Ghosh, New Central Book Agency – (3rd edition)

e-Learning Source:

1. https://youtu.be/YbxhRu19rls
2. https://www.youtube.com/live/UT_GhR7ZnJI?feature=share
3. https://youtu.be/zQHiN34YAIQ

	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	3	3	2	2	3	3	3	3	2	2	3	2	3	2	2
CO2	3	3	3	3	2	3	2	2	3	2	3	3	3	2	2	3	3
CO3	3	2	3	2	3	2	3	3	2	3	2	3	3	2	2	3	3
CO4	2	3	3	3	2	3	3	3	3	3	3	2	3	2	3	2	2
CO5	2	3	2	2	3	3	3	2	3	3	2	3	2	3	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	
FS124	PHYSICS-II	√	√	√			√	√	**3,4**

Integral University, Lucknow

Effective from Session: 2019-20							
Course Code	**FS125**	**Title of the Course**	**INNOVATION IN FORENSIC SCIENCE**	**L**	**T**	**P**	**C**
Year	**I**	**Semester**	**II**	**3**	**1**	**0**	**3**
Pre-Requisite	**Nil**	**Co-requisite**	Nil				
Course Objectives	The Objective of this course is to introduce the students to recent trends and newly introduced technologies in the field of forensic science so that they can understand and fulfill the requirements of the field.						

Course Outcomes	
CO1	Understanding the concept of digital vehicle forensics.
CO2	Understanding biosensors and their forensic application.
CO3	Understanding the concepts of drone forensic.
CO4	Understanding the block chain technology.
CO5	Understanding the Immunochromatography and forensic application.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**DIGITAL VEHICLE FORENSICS**	Driverless cars, wealth of digital information, such as recent destinations, favorite locations, routes, and personal data (e.g., call logs, contact lists, SMS messages, pictures, and videos).	6	CO1
2	**BIOSENSORS**	Introduction to biosensor technology, Prostate-specific antigen (PSA) detection in forensic samples: Miniaturization of Surface Plasmon Resonance (SPR) Immunosensors: Multi-Metal-Deposition, Detection of Microbial Biosensors: Chemical Sensors.	6	CO2
3	**DRONE FORENSIC**	Introduction to drone technology, Threats imposed by Drones, Electronic Configurations of Drones, Architectural Efficiency of Drones, Drone Controllers, Digital Evidence, Flight Log File Analysis, Data Storage Analysis, Case Study on Criminal Usage of Drones.	6	CO3
4	**BLOCK CHAIN-BASED SOLUTIONS**	What are cryptocurrencies, Public vs. private block chain technology, Proof of work (vs. proof of scale), What is Bitcoin? vs Bitcoin cash? Cloud forensic, IOT. Types of Evidence in Cloud of Things.	6	CO4
5	**IMMUNOCHROMATOGRAPHY**	Introduction, theory, Procedure and forensic application.	6	CO5

Reference Books:

1. Pioneers in Forensic Science: Innovations and Issues in Practice Hardcover –10 August 2017 by Kelly M. Pyrek.
2. Biosensor Developments: Application in crime detection by Vijayata Singh.
3. Cloud Forensics: Challenges and Blockchain Based Solutions by Omi Akter
4. Drone Forensics: The Impact and Challenges by ATKINSON, S

e-Learning Source:

1. https://youtu.be/Fpsu7RXbBYM
2. https://youtu.be/NBIPhAk7LwI
3. https://youtu.be/YJyXfjbBmc8

	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	3	2	3	3	3	3	3	3	2	3	3	2	3	2	2
CO2	2	3	3	2	2	3	2	2	3	2	3	3	3	3	2	3	3
CO3	3	2	3	2	3	2	3	3	2	3	2	2	3	3	2	3	3
CO4	3	3	3	3	2	3	3	3	3	3	3	2	3	3	3	2	2
CO5	3	3	3	3	3	3	3	2	3	3	2	3	2	3	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	
FS125	INNOVATION IN FORENSIC SCIENCE	√	√	√			√	√	**3,4**

Integral University, Lucknow

Effective from Session: 2019-20							
Course Code	**CH119**	**Title of the Course**	**GENERAL CHEMISTRY-II**	**L**	**T**	**P**	**C**
Year	**I**	**Semester**	**I**	**3**	**1**	**0**	**4**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives	The objective of the course is to develop of understanding of Inorganic chemistry, Organic chemistry, and Physical chemistry.						

Course Outcomes	
CO1	Basic concepts of inorganic chemistry & ionic solids.
CO2	Basics of chemical bonding.
CO3	Understanding the Stereochemistry of Organic Compounds.
CO4	General understanding and knowledge of colloidal state.
CO5	Understanding of thermodynamics and their laws

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	**INORGANIC CHEMISTRY**	**Ionic Solids:** Ionic structures, radius ratio effect and coordination number, limitation of radius ratio rule, lattice defects, semiconductors, lattice energy and Born-Haber cycle, solvation energy and solubility of ionic solids, polarizing power and polarizability of ions, Fajan's rule. Metallic bond-free electron, valence bond, and band theories.	8	CO1
2	**ORGANIC CHEMISTRY**	**Chemical Bonding:** Covalent Bond; Valence bond theory and its limitations, directional characteristics of covalent bond, various types of hybridization, and shapes of simple inorganic molecules and ions. Valence shell electron pair repulsion (VSEPR) theory to NH3, H3O+, SF4, ClF3, ICl2- and H2O. MO theory, homonuclear and heteronuclear (CO and NO) diatomic molecules, bond strength, and bond energy, percentage ionic character from dipole moment, and electronegativity difference.	8	CO2
3	**INTRODUCTION TO STEREOCHEMISTRY OF ORGANIC COMPOUNDS**	Concept of isomerism. Optical isomers, enantiomers, and diastereomers, chiral and achira molecules with two stereogenic centers, absolute configuration, sequences rules, D & L and R & S systems of nomenclature. Geometrical isomerism - E & Z system of nomenclature, in alkenes oximes and cyclopropane derivative compounds.	8	CO3
4	**PHYSICAL CHEMISTRY**	**Colloidal State**: Definition of colloids, classification of colloids. Sols: properties -kinetic, optical, and electrical; stability of colloids, protective colloids, Hardy- Schulze rule, gold number. Emulsions: types of emulsions, preparation. Gels: classification, preparation, and properties.	8	CO4
5	**THERMODYNAMICS**	The first law of thermodynamics: statement, the definition of internal energy and enthalpy, Heat capacity. Heat capacities at constant volume and pressure and their relationship. Joule-Thomson coefficient and inversion temperature. Calculation of w, q, dU & dH for the expansion of ideal gases under isothermal and adiabatic conditions for a reversible process. Problems.	8	CO5

Reference Books:

1. Concise Inorganic Chemistry- by J.D. Lee
2. Organic Chemistry: 12th Edition (June 2017), by T.W. Graham Solomons, Craig B. Fryhle, Scott A. Synder
3. Modern Approach to Chemical Calculations- by R. C. Mukherjee
4. Principles of Thermodynamics- by Jean-Philippe Ansermet, 2018

e-Learning Source:

1. https://www.youtube.com/live/I-74HF7o7bg?feature=share
2. https://youtu.be/F_cBOZl0KfU
3. https://youtu.be/PQechXuFoyI

	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	3	2	2	2	3	2	1	3	2	3	3	2	3	2	2
CO2	2	2	2	3	3	3	2	3	2	2	2	3	2	2	2	3	3
CO3	2	2	2	2	3	3	3	2	2	3	2	3	2	2	2	3	2
CO4	2	3	3	3	2	2	3	2	3	3	2	2	3	2	3	2	3
CO5	3	3	2	2	3	2	3	2	2	1	2	3	2	3	2	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	
CH119	GENERAL CHEMISTRY-II			√					**3,4, 11**

Integral University, Lucknow

Effective from Session: 2023-2024							
Course Code	**LN131**	**Title of the Course**	**Effective Communication and Media Studies in English**	**L**	**T**	**P**	**C**
Year	**I**	**Semester**	II	**2**	**1**	**0**	**3**
Pre-Requisite	10+2	**Co-requisite**	UG				

Course Objectives

The students will be able to:

- Developing the art of communication and learning basic skills of conversation.
- Knowledge of Professional and Media Skill Development, Career enhancement tips and goal-oriented learning.
- Basic concept of Phonetics, Voice and Accent.
- Students will learn academic learning and descriptive writing.

Course Outcomes

CO1	Students will be able to develop Formal and Informal Spoken skills, learn career development skills and learn to have clear idea of goal setting.
CO2	Students will learn about the importance and usage of mass media and ways to develop their media skills.
CO3	Academic Writing will help students to format and structure the content they create which will help them to be professional writers and bloggers.
CO4	The unit will help students to learn and develop better conversation skills in formal and informal setup. They will learn the proper usage and pronunciation in various accent enabling them to converse in competitive environment.
CO5	The unit enables students to put all the theoretical knowledge to practice, assuring complete learning and implementation.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**Communication in Practice**	Do's and Don'ts of Formal and Informal Communication Tips on Career Management- Setting Clear Goals, Skill Development, Network Building and Professional Relationship Etiquette, Knowing Aptitude and Values. Classroom Practice- JAM (Just A Minute) Extempore, Rebuttal, Forum, Role Play.	7hrs	CO1
2	**Mass Communication and Journalism**	Introduction to Mass Communication. Types of Mass Communication/ Mass Media Impact of Globalization on Mass Media Socio Political Impact of Digital Media Advertisement- Ethical and Unethical Advertisement, Jingles, Tag Lines, Punch Lines, Media Writing	7hrs	CO2
3	**Fundamentals of Academic Writing**	The four main types of academic writing- Descriptive, Analytical, Persuasive and Critical. Writing Book Review, Introduction to Descriptive Writing Techniques and Features of Descriptive Writing - Character, Place and Travel Description, Event, Movie and Food description.	7hrs	CO3
4	**Conversation Skills**	Phonetics- Learning Speech Mechanism (Voice and Accent) • Introduction- Self and Other-Guest Speaker / Colleague • Polite Conversational Etiquette • Varieties of English Language; their difference in terms of Pronunciation, Vocabulary and Spelling: - British -American	7hrs	CO4
5	**Academic Project**	• Creating News Bytes • Writing News Report • Creating Jingles and Tag Lines for Famous Brands. • Writing Editorial on a Topical Subject • Writing Film Reviews • Travelogue	4hrs	CO5

Reference Books:

1. Kumar, SanjayandPushpLata.CommunicationSkills.OxfordUniversityPress, Oxford 2011.
2. Raman, Meenakshi, and Sangeeta Sharma. *Technical Communication: Principals and Practice*. Second Edition, OxfordUniversityPress, 2012.
3. Raina, Roshan Lal, Iftikhar Alam, and Faizia Siddiqui. *Professional Communication*. Himalaya PublicationHouse2012.
4. Agarwal, Malti.ProfessionalCommunication.Krishna'sEducationalPublishers.2016.
5. Carnegie, Dale. *How to Win Friends and Influence People in theDigitalAge*.SimonandSchuster.2012.
6. Covey, Stephen R. *The Seven Habits of Highly SuccessfulPeople*.FreePress.1989.
7. Verma, KC.TheArtofCommunication.Kalpaz.2013.
8. Alred, G. J., Brusaw, C. T., & Oliu, W. E. (2011). Handbook of Technical Writing, Tenth Edition (10th ed.). St. Martin's Press
9. Sherman, Barbara.(2014). Skimming and Scanning Techniques. Liberty University Press.
10. Barker, Alan. (2011). Improve Your Communication Skills. Kogan Page Pub. [later edited version to be added if any]

11Seely, John. (1998). The Oxford Guide to Effective Writing and Speaking. Oxford UP.

e-Learning Source:

1. http://www.uptunotes.com/notes-professional-communication-unit-i-nas-104...
2. https://www.docsity.com/en/subjects/professional-communication/
3. https://lecturenotes.in/download/note/22690-note-for-communication-skills-for-profession...
4. https://www.files.ethz.ch/isn/125396/1154_trystnehru.pdf
5. https://kr.usembassy.gov/martin-luther-king-jr-dream-speech-1963/#:~:text=I%20have%20a%20dream%20that,skin%20but%20by%20their%20.

	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	PSO6	PSO7
CO1	3	1	1	2	2	1	2	3	3	1	2	2	3	2	2	3	2	3
CO2	3	3	2	2	2	2	2	1	2	2	2	3	2	2	3	3	3	3
CO3	3	2	2	3	2	3	3	2	2	3	2	3	2	3	3	3	3	3
CO4	2	3	1	2	3	1	2	2	3	3	3	3	3	3	2	2	2	2
CO5	3	2	2	1	2	3	3	3	2	3	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.
LN131	**Effective Communication and Media Studies in English**	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
		√	√	√				√	**3,4, 6**

Integral University, Lucknow

Effective from Session: 2019-20							
Course Code	**FS126**	**Title of the Course**	**BIOLOGY-II-LAB**	**L**	**T**	**P**	**C**
Year	**I**	**Semester**	**II**	0	0	2	**1**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives							

Course Outcomes	
CO1	To perform the examination of blood groups.
CO2	To perform the physical and chemical examination of body fluids.
CO3	To conduct the isolation of chromosomal DNA.
CO4	To perform the chromatography to separate the amino acids, sugars, and lipids.
CO5	To isoloate the DNA from different cells.

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	1. Antigen-Antibody reaction (Blood Groupings)		30 hrs.	CO1-5
2	2. Study of body Cavity fluids (Physical & Chemical Examination)			
3	3. Isolation of Chromosomal DNA			
4	4. Chromatography- Separation of Amino acids, sugars, lipids using Paper chromatography and thin layer Chromatography. Determine RF values			
5	5. Isolation of DNA From: a. Bacterial Cells b. Animal Cells c. Plant Cells			

Reference Books:

1. Karp, G. 2010. Cell and Molecular Biology: Concepts and Experiments. 6th Edition. John Wile & amp; Sons. Inc.
2. Cooper, G.M. and Hausman, R.E. 2009. The Cell: A Molecular A roach. 5th
3. Dr. R. Krishnamurthy- Forensic Biology

e-Learning Source:

1. https://youtu.be/tOXvKYtbn-s
2. https://youtu.be/vvMau5KQnzY
3. https://youtu.be/zyt8YkpNkWk

	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	3	2	2	3	3	3	2	2	2	2	3	2	2
CO2	2	2	2	2	2	2	3	2	3	3	3	3	2	2	3	2	3
CO3	2	3	2	2	2	2	3	2	3	2	2	2	3	3	2	1	2
CO4	3	3	2	2	3	3	2	3	2	2	2	3	3	2	2	3	2
CO5	2	2	2	3	2	2	3	3	2	3	2	3	2	3	2	2	2

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

Attributes & SDGs

Course Code	**Course Title**	**Attributes**							**SDGs No.**
FS126	BIOLOGY-II-LAB	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
		√	√	√			√	√	**3,4**

Integral University, Lucknow

Effective from Session: 2019-20							
Course Code	**FS127**	**Title of the Course**	**CRIME SCENE INVESTIGATION-LAB**	**L**	**T**	**P**	**C**
Year	**I**	**Semester**	**II**	0	0	2	**1**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives							

Course Outcomes: After the successful course completion, learners will develop following attributes:	
CO1	Students will be able to perform the crime scene investigation of homicide and suicide crime scenes.
CO2	Students will be able to perform the crime scene investigation of road accidents and hit-and-run crime scene.
CO3	Students will be able to perform the crime scene investigation of hanging cases.
CO4	Students will be able to perform the crime scene processing and forwarding of physical evidences pertaining to various criminal cases.
CO5	Students will be able to give the court testimony of expert evidences in different types of crimes.

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	**CRIME CRIME SCENE INVESTIGATION STAGES IN CSI PHYSICAL EVIDENCE INVESTIGATIVE TECHNIQUES**	To perform mock homicide crime scene investigation.	30 hrs.	CO1-5
2		To perform mock suicide crime scene investigation.		
3		To perform mock hit-and-run crime scene investigation.		
4		To perform mock hanging crime scene investigation.		
5		Searching, Collection, packaging, preservation, handling, and forwarding of Physical evidences in different crimes.		
6		To perform mock court testimony of expert evidences in different types of crimes.		

Reference Books:

1. McRobbie DW, Moore EA, Graves MJ. MRI from Picture to B.B. Nanda and R.K. Tiwari, Forensic Science in India: A Vision for the Twenty-First Century, Select Publishers, New Delhi (2001).
2. M.K. Bhasin and S. Nath, Role of Forensic Science in the New Millennium, University of Delhi, Delhi (2002).
3. S.H. James and J.J. Nord by, Forensic Science: An Introduction to Scientific and investigative Techniques, 2nd Edition, CRC Press, Boca Raton (2005)
4. W.G. Eckert and R.K. Wright in Introduction to Forensic Sciences, 2nd Edition, W.G. Eckert (ED.), CRC Press, Boca Raton (1997).
5. R. Saferstein, Criminalistics, 8th Edition, Prentice Hall, New Jersey (2004).

e-Learning Source:

1. https://youtu.be/tIwOrNR9kvo
2. https://youtu.be/9bR0yd4QfmU
3. https://youtu.be/MV4DAuR1O1M

	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	3	3	2	3	3	3	3	2	2	2	2	3	3	2
CO2	2	2	3	3	2	3	3	2	3	3	3	3	2	2	3	2	3
CO3	3	3	3	2	2	2	3	2	3	2	2	2	3	3	3	3	3
CO4	3	3	2	2	3	3	2	3	3	2	3	3	3	2	3	3	2
CO5	3	2	3	3	2	2	3	3	2	3	2	3	2	3	2	2	3

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

Attributes & SDGs

Course Code	**Course Title**	**Attributes**							**SDGs No.**
FS127	CRIME SCENE INVESTIGATION-LAB	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
		√	√	√			√	√	**3,4**

Integral University, Lucknow

Effective from Session: 2019-20							
Course Code	**FS128**	**Title of the Course**	**PHYSICS-II-LAB**	**L**	**T**	**P**	**C**
Year	**I**	**Semester**	**II**	0	0	2	1
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives							

Course Outcomes: After the successful course completion, learners will develop following attributes:	
CO1	To determine the intensity of sound.
CO2	To analyze the different characteristics of light.
CO3	To examine the RI of liquid using the laser.
CO4	LDR characteristics & LCR series resonance
CO5	To examine the Ex-or gate, NAND and NOR as universal building blocks

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**STUDY OF SOUND**	Sound Intensity measurement	30 hrs.	CO1-5
2		Ultrasonic interferometer		
3		Determination of the wavelength of sodium light by Fresnel's bi-prism.		
4	**OPTICS**	Wedge shaped film		
5	**LASER & FIBER OPTICS**	Newton's rings		
6		Laser parameter		
7	**X-Rays**	Solar cell		
8	**ELECTRONICS CIRCUITS &**	Refractive index of liquid by using LASER		
9		Transistor (CE) characteristics		
10	**DIGITAL ELECTRONICS**	LDR characteristics		
11		LCR series resonance		
12		Ex-or gate, NAND and NOR as universal building blocks		

Reference Books:

1. Engineering Physics Seventh Enlarged, Revised Edition2004,
2. M.N. Avadhanulu and P.G. Kshirsagar, S. Chand and Company Ltd. ISBN 81-219- 0817-5.
3. Modern Physics Concept and Applications – Sanjeev Puri, Narosa Publication.
4. A Textbook of advanced Practical Physics – Samir Kumar Ghosh, New Central Book Agency – (3rd edition)

e-Learning Source:

1. https://youtu.be/rfc8nPKwLWY
2. https://youtu.be/jat1Vb0ZHnU
3. https://youtu.be/P-RA1FdlDic

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	3	3	2	2	3	3	3	3	2	2	3	2	3	2	2
CO2	3	3	3	3	2	3	2	2	3	2	3	3	3	2	2	3	3
CO3	3	2	3	2	3	2	3	3	2	3	2	3	3	2	2	3	3
CO4	2	3	3	3	2	3	3	3	3	3	3	2	3	2	3	2	2
CO5	2	3	2	2	3	3	3	2	3	3	2	3	2	3	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	
FS128	PHYSICS-II-LAB	√	√	√				√	**3,4**

Integral University, Lucknow

Effective from Session: 2019-20							
Course Code	**CH122**	**Title of the Course**	**GENERAL CHEMISTRY-II-LAB**	**L**	**T**	**P**	**C**
Year	**I**	**Semester**	**II**	0	0	2	**1**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives							

Course Outcomes: After the successful course completion, learners will develop following attributes:	
CO1	Students will be able to detect the functional groups of Carboxylic acid, Phenol, Alcohol
CO2	Students will be able to detect the functional groups of Aldehyde and Ketone
CO3	Students will be able to detect the functional groups of Ester and Amine
CO4	Students will be able to prepare the inorganic compounds like Chrome Alum and Ferrous Ammonium Sulphate
CO5	Students will be able to prepare the inorganic compounds like Copper Tetrammine Complex and Cupraammonium Sulphate.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**INORGANIC CHEMISTRY ORGANIC CHEMISTRY INTRODUCTION TO STEREOCHEMISTRY OF ORGANIC COMPOUNDS PHYSICAL CHEMISTRY THERMODYNAMICS**	Detection of the following functional group present in the given mono-functional organic compounds. a) Carboxylic acid. b) Phenol c) Alcohol d) Aldehyde. e) Ketone. f) Ester. g) Amine	30 hrs.	CO1-5
2		Preparation of the following inorganic compounds; a) Chrome Alum. b) Ferrous Ammonium Sulphate (Mohr's Salt). c) Copper Tetrammine Complex. d) Cupraammonium Sulphate.		

Reference Books:

1. Concise Inorganic Chemistry- by J.D. Lee
2. Organic Chemistry: 12th Edition (June 2017), by T.W. Graham Solomons, Craig B. Fryhle, Scott A. Synder
3. Modern Approach to Chemical Calculations- by R. C. Mukherjee
4. Principles of Thermodynamics- by Jean-Philippe Ansermet, 2018
5. Concise Inorganic Chemistry- by J.D. Lee

e-Learning Source:

1. https://youtu.be/k9ztRgs1L1Q
2. https://youtu.be/60h-OR9SJjQ
3. https://youtu.be/-ZLjzt-kA4g

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	3	2	2	2	3	2	1	3	2	3	3	2	3	2	2
CO2	2	2	2	3	3	3	2	3	2	2	2	3	2	2	2	3	3
CO3	2	2	2	2	3	3	3	2	2	3	2	3	2	2	2	3	2
CO4	2	3	3	3	2	2	3	2	3	3	2	2	3	2	3	2	3
CO5	3	3	2	2	3	2	3	2	2	1	2	3	2	3	2	3	3

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

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
CH122	GENERAL CHEMISTRY-II-LAB	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
		√	√	√				√	**3,4**