Program and Course Structure

School of Allied Health Science

B.Sc.

(Forensic Science)

Program Code-SAH0120

1. Standard Structure of the Program at University Level

1.1 Vision, Mission and Core Values of the University

Vision of the University

To serve the society by being a global University of higher learning in pursuit of academic excellence, innovation and nurturing entrepreneurship.

Mission of the University

1. Transformative educational experience
2. Enrichment by educational initiatives that encourage global outlook
3. Develop research, support disruptive innovations and accelerate entrepreneurship
4. Seeking beyond boundaries

Core Values

- Integrity
- Leadership
- Diversity
- Community

Vision of the School

To steer the School of Allied Health Sciences towards excellence in academics, innovation and entrepreneurship by constant endeavors

Mission of the School

1. To create and sustain a stimulating and responsive academic inclusive environment.
2. To regularly enhance the teaching contents & techniques in keeping with current and future trends.
3. To provide a competitive and career-oriented programme.
4. To strengthen the main line medical and health services.

Core Values

- Skilled Professional
- Multidimensional
- Compassion
- Management

1.3 Programme Educational Objectives (PEO)

PEO1: To gain a knowledge of basic science application in forensic field.

PEO1: To gain knowledge of forensic examination of evidences and investigation of all types of evidences

PEO1: Develop a conceptual understanding of criminal justice systems, rule of evidence, legal system.

PEO1: They can apply their knowledge of forensic science in different Investigative agencies.

PEO1 Laboratory skills to exacting standards of precision and care.

1.3.2 Map PEOs with Mission Statements:

PEO Statements	School Mission 1	School Mission 2
PEO1:	**3**	**3**
PEO2:	**3**	**3**
PEO3:	**3**	**3**
PEO4:	**3**	**3**
PEO5:	**3**	**3**

Enter correlation levels 1, 2, or 3 as defined below:

1. **Slight (Low)** **2. Moderate (Medium)** **3. Substantial (High)**

1.3.3 Program Outcomes (PO's)

PO1 : Ability to acquire and apply knowledge and understanding of the chemical principles

PO2 : Ability to demonstrate thorough knowledge, understanding and skills in application of scientific methodology to undertake and report on experimental investigation.

PO3 : Possess high awareness of major issues and development of chemical research and competent in initiating, developing, and pursuing a scientific research.

PO4 : Ability to present technical, scientific and forensic information and arguments clearly and correctly, in written and oral presentation

PO5 : Ability to portray good interpersonal skills with high ability to work collaboratively as part of a team undertaking a range of different team roles

PO6 : Ability to act with integrity and good ethics in their profession and their obligation to society

PO7 : Ability to seek new knowledge, skills and manage relevant information from various sources.

PO8 : Ability to demonstrate knowledge and skills in analyzing and identifying business opportunities.

PO9 : Ability to demonstrate leadership, to take action and to get others involved.

PSO1 : This programme is an application-based programme where all the main stream science subject- Biology, Physics and chemistry are applied for the scientific investigation of crime.

PSO2 : It is a multidisciplinary, versatile and result oriented subject which dealt with different branches of science as well as law, medicine, medical jurisprudence and police.

PSO3 : Forensic techniques are used to process sample and evidences to solve crime.

1.3.4 Mapping of Program Outcome Vs Program Educational Objectives

	PEO1	PEO2	PEO3	PEO4	PEO5
PO1	3	3	1	3	3
PO2	3	3	3	3	3
PO3	3	3	2	3	3
PO4	2	3	3	3	3
PO5	2	2	2	2	2
PO6	3	3	3	3	3
PO7	3	3	3	3	3
PO8	3	3	2	2	2
PO9	2	2	2	3	2
PSO1	3	3	2	3	3
PSO2	3	3	3	3	3
PSO3	3	3	3	3	3

1. Slight (Low) **2. Moderate (Medium)** **3. Substantial (High)**

1.3.5 Program Outcome Vs Courses Mapping Table[1]:

Program Outcome Courses	Course Name	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PSO 1	PSO 2	PSO 3
Sem-1													
Cours101.1	Forensic sc. 1	3	3	3	3	3	3	3	3	3	3	3	3
Cours101.2	Physics 1	2	2	2	3	3	3	3	3	3	3	3	3
Cours101.3	Chemistry 1	3	3	3	3	3	3	3	3	3	3	3	3
Cours101.4.	Botany 1	3	3	3	3	3	3	3	3	3	3	3	3
Cours101.5.	Zoology 1	3	3	3	3	3	3	3	3	3	3	3	3
Cours101.6	English 1	1	1	1	3	3	3	3	3	3	1	1	1
Cours101.7	Physiology	2	2	2	1	1	1	1	1	1	3	3	3
Sem-2													
Cours201.1	Forensic sc. 2	3	3	3	3	3	3	3	3	3	3	3	3
Cours201.2	Physics 2	2	2	2	3	3	3	3	3	3	3	3	3
Cours201.3.	Chemistry 2	3	3	3	3	3	3	3	3	3	3	3	3
Cours201.4.	Botany 2	3	3	3	3	3	3	3	3	3	3	3	3
Cours201.5	Zoology 2	3	3	3	3	3	3	3	3	3	3	3	3
Cours201.6	English 2	1	1	1	3	3	3	3	3	3	1	1	1
Cours201.7	Project	3	3	3	3	3	3	3	3	3	3	3	3
Sem-3													
Course 301.1	Forensic sc. 3	3	3	3	3	3	3	3	3	3	3	3	3
Course 301.2	Physics 3	2	2	2	3	3	3	3	3	3	3	3	3
Cours301.3.	Chemistry 3	3	3	3	3	3	3	3	3	3	3	3	3
Cours301.4.	Botany 3	3	3	3	3	3	3	3	3	3	3	3	3
Cours301.5	Zoology 3	3	3	3	3	3	3	3	3	3	3	3	3
Cours301.6	English 3	1	1	1	3	3	3	3	3	3	1	1	1
Cours301.7	Internship	3	3	3	3	3	3	3	3	3	3	3	3
Cours301.8	Psychology	2	2	3	3	3	3	3	3	3	2	2	3

[1] Cel value will contain the correlation value of respective course with PO.

Sem-4													
Course 401.1	Forensic sc. 3	3	3	3	3	3	3	3	3	3	3	3	3
Course 401.2	Physics 3	2	2	2	3	3	3	3	3	3	3	3	3
Cours401. 3	Chemistry 3	3	3	3	3	3	3	3	3	3	3	3	3
Cours401. 4	Botany 3	3	3	3	3	3	3	3	3	3	3	3	3
Cours401. 5	Zoology 3	3	3	3	3	3	3	3	3	3	3	3	3
Cours401. 6	English 3	1	1	1	3	3	3	3	3	3	1	1	1
Cours401. 7	Project	3	3	3	3	3	3	3	3	3	3	3	3
Sem-5													
Course 501.1	Forensic sc. 3	3	3	3	3	3	3	3	3	3	3	3	3
Course 501.2	Physics 3	2	2	2	3	3	3	3	3	3	3	3	3
Cours501. 3	Chemistry 3	3	3	3	3	3	3	3	3	3	3	3	3
Cours501. 4	Botany 3	3	3	3	3	3	3	3	3	3	3	3	3
Cours501. 5	Zoology 3	3	3	3	3	3	3	3	3	3	3	3	3
Cours501. 5	English 3	1	1	1	3	3	3	3	3	3	1	1	1
Cours501. 6	Internship	3	3	3	3	3	3	3	3	3	3	3	3
Cours501. 7	Cyber Forensic	3	3	3	3	3	3	3	3	3	3	3	3
Sem-6													
Course 601.1	Forensic sc. 3	3	3	3	3	3	3	3	3	3	3	3	3
Course 601.2	Physics 3	2	2	2	3	3	3	3	3	3	3	3	3
Cours601. 3	Chemistry 3	3	3	3	3	3	3	3	3	3	3	3	3
Cours601. 4	Botany 3	3	3	3	3	3	3	3	3	3	3	3	3
Cours601. 5	Zoology 3	3	3	3	3	3	3	3	3	3	3	3	3
Cours601. 6	English 3	1	1	1	3	3	3	3	3	3	1	1	1
Cours601. 7	Cyber Forensic	3	3	3	3	3	3	3	3	3	3	3	3

1. Slight (Low) **2. Moderate (Medium)** **3. Substantial (High)**

Program Structure Template
School of Allied Health Science
B.Sc. (Forensic Science)

Batch: 2018-2021
Semester: I

S. No.	Paper ID	Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite	Type of Course[2]: 1. CC 2. AECC 3. SEC 4. DSE
				L	T	P			
THEORY SUBJECTS									
1.	35139	FSB 101	Forensic Science	2	1		3	Core	CC, AECC ,SEC
2.	35140	FSB 115	Physics	2	1		3	Core	CC, AECC
3.	35141	FSB 103	Chemistry	2	1		3	Core	CC, AECC
4.	35142	FSB 104	Botany	2	1		3	Core	CC, AECC
5.	35143	FSB 105	Zoology	2	1		3	Core	CC, AECC
6.	35144	FSB 130	English					**Elective**	SEC
7.	35145	FSB 131	Physiology					**Elective**	SEC
Practical/Viva-Voce/Jury									
1.	35174	FSB 151	Forensic Science LAB	0	0	4	2	Core	CC, AECC
2.	35175	FSB 152	Physics LAB	0	0	4	2	Core	CC, AECC
3.	35176	FSB 153	Chemistry LAB			4	2	Core	CC, AECC
4.	35177	FSB 154	Botany LAB			4	2	Core	CC, AECC
5.	35178	FSB 155	Zoology LAB			4	2	Core	CC, AECC
TOTAL CREDITS							**25**		

[2] CC: Core Course, AECC: Ability Enhancement Compulsory Courses, SEC: Skill Enhancement Courses, DSE: Discipline Specific Courses

Program Structure Template
School of Allied Health Science
B.Sc. (Forensic Science)
Batch: 2017-2020
Semester- II

S. No.	Paper ID	Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite	Type of Course[3]: 1. CC 2. AECC 3. SEC 4. DSE
				L	T	P			
THEORY SUBJECTS									
1.		FSB116	Forensic Science	2	1		3	Core	CC, AECC,SEC
2.		FSB117	Physics	2	1		3	Core	CC, AECC
3.		FSB118	Chemistry	2	1		3	Core	CC, AECC
4.		FSB119	Botany	2	1		3	Core	CC, AECC
5.		FSB120	Zoology	2	1		3	Core	CC, AECC
6.		FSB121	English					**Elective**	SEC
7.									
Practical/Viva-Voce/Jury									
1.		FSB151	Forensic Science LAB	0	0	4	2	Core	CC, AECC
2.		FSB152	Physics LAB	0	0	4	2	Core	CC, AECC
3.		FSB153	Chemistry LAB			4	2	Core	CC, AECC
4.		FSB154	Botany LAB			4	2	Core	CC, AECC
5.		FSB155	Zoology LAB			4	2	Core	CC, AECC
TOTAL CREDITS							**27**		

[3] CC: Core Course, AECC: Ability Enhancement Compulsory Courses, SEC: Skill Enhancement Courses, DSE: Discipline Specific Courses

Program Structure Template
School of Allied Health Science
B.Sc. (Forensic Science)
Batch: 2017-2020
Semester- III

S. No.	Paper ID	Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite	Type of Course[4]: 1. CC 2. AECC 3. SEC 4. DSE
				L	T	P			
THEORY SUBJECTS									
1.	35474	FSB 201	Forensic Science 3	2	1		3	Core	CC, AECC,SEC
2.	35475	FSB 202	Physics 3	2	1		3	Core	CC, AECC
3.	35476	FSB 203	Chemistry 3	2	1		3	Core	CC, AECC
4.	35477	FSB 204	Botany 3	2	1		3	Core	CC, AECC
5.	35478	FSB 205	Zoology 3	2	1		3	Core	CC, AECC
6.	35479	FSB 206	English 3					**Elective**	SEC
7.	35480	FSB 207	Psychology		1		1	Core	CC, AECC
8.	35481	FSB 208	Project				1	Core	CC, AECC
Practical/Viva-Voce/Jury									
1.	35482	FSB 251	Forensic Science 3 LAB	0	0	4	2	Core	CC, AECC
2.	35483	FSB 252	Physics 3 LAB	0	0	4	2	Core	CC, AECC
3.	35484	FSB 253	Chemistry 3 LAB			4	2	Core	CC, AECC
4.	35485	FSB 254	Botany 3 LAB			4	2	Core	CC, AECC
5.	35486	FSB 255	Zoology 3 LAB			4	2	Core	CC, AECC
6.	35487	FSB 256	Psychology 1 Lab			2	1	Core	CC, AECC
TOTAL CREDITS							**28**		

[4] CC: Core Course, AECC: Ability Enhancement Compulsory Courses, SEC: Skill Enhancement Courses, DSE: Discipline Specific Courses

Program Structure Template
School of Allied Health Science
B.Sc. (Forensic Science)
Batch: 2017-2020
Semester- IV

S. No.	Paper ID	Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite	Type of Course[5]: 1. CC 2. AECC 3. SEC 4. DSE
				L	T	P			
THEORY SUBJECTS									
1.		FSB130	Forensic Science 4	2	1		3	Core	CC, AECC,SEC
2.		FSB131	Physics 4	2	1		3	Core	CC, AECC
3.		FSB132	Chemistry 4	2	1		3	Core	CC, AECC
4.		FSB133	Botany 4	2	1		3	Core	CC, AECC
5.		FSB134	Zoology 4	2	1		3	Core	CC, AECC
6.		FSB135	English 4					**Elective**	SEC
7.									
Practical/Viva-Voce/Jury									
1.		FSB162	Forensic Science 4 LAB	0	0	4	2	Core	CC, AECC
2.		FSB163	Physics 4 LAB	0	0	4	2	Core	CC, AECC
3.		FSB164	Chemistry 4 LAB			4	2	Core	CC, AECC
4.		FSB165	Botany 4 LAB			4	2	Core	CC, AECC
5.		FSB166	Zoology 4 LAB			4	2	Core	CC, AECC
TOTAL CREDITS							**25**		

[5] CC: Core Course, AECC: Ability Enhancement Compulsory Courses, SEC: Skill Enhancement Courses, DSE: Discipline Specific Courses

Program Structure Template
School of Allied Health Science
B.Sc. (Forensic Science)
Batch: 2017-2020
Semester- V

S. No.	Paper ID	Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite	Type of Course[6]: 1. CC 2. AECC 3. SEC 4. DSE
				L	T	P			
THEORY SUBJECTS									
1.	35428	FSB 301	Forensic Science 5	2	1		3	Core	CC, AECC,SEC
2.	35429	FSB 302	Physics 5	2	1		3	Core	CC, AECC
3.	35430	FSB 303	Chemistry 5	2	1		3	Core	CC, AECC
4.	35431	FSB 304	Botany 5	2	1		3	Core	CC, AECC
5.	35432	FSB 305	Zoology 5	2	1		3	Core	CC, AECC
6.	35433	FSB 306	English 5					**Elective**	SEC
7.	35434	FSB 307	Project 2				1	Core	CC, AECC
8.	35435	FSB 308	Applied Digital and cyber forensic 1		1		1	Core	CC, AECC
Practical/Viva-Voce/Jury									
1.	35436	FSB 351	Forensic Science 5 LAB	0	0	4	2	Core	CC, AECC
2.	35437	FSB 352	Physics 5 LAB	0	0	4	2	Core	CC, AECC
3.	35438	FSB 353	Chemistry 5 LAB			4	2	Core	CC, AECC
4.	35439	FSB 354	Botany 5 LAB			4	2	Core	CC, AECC
5.	35440	FSB 355	Zoology 5 LAB			4	2	Core	CC, AECC
6.	35441	FSB 356	Digital & Cyber Forensic 1 Lab			2	1	Core	CC, AECC
TOTAL CREDITS							**28**		

FSB 301

[6] CC: Core Course, AECC: Ability Enhancement Compulsory Courses, SEC: Skill Enhancement Courses, DSE: Discipline Specific Courses

Program Structure Template
School of Allied Health Science
B.Sc. (Forensic Science)
Batch: 2017-2020
Semester- VI

S. No.	Paper ID	Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite	Type of Course[7]: 1. CC 2. AECC 3. SEC 4. DSE
				L	T	P			
THEORY SUBJECTS									
1.		FSB144	Forensic Science 6	2	1		3	Core	CC, AECC,SEC
2.		FSB145	Physics 6	2	1		3	Core	CC, AECC
3.		FSB146	Chemistry 6	2	1		3	Core	CC, AECC
4.		FSB147	Botany 6	2	1		3	Core	CC, AECC
5.		FSB148	Zoology 6	2	1		3	Core	CC, AECC
6.		FSB150	English 6					**Elective**	SEC
7.		FSB149	Applied Digital and cyber forensic 2		1		1	Core	CC, AECC
8.		FSB151	Internship				1		AECC, DSE
Practical/Viva-Voce/Jury									
1.		FSB173	Forensic Science 6 LAB	0	0	4	2	Core	CC, AECC
2.		FSB174	Physics 6 LAB	0	0	4	2	Core	CC, AECC
3.		FSB175	Chemistry 6 LAB			4	2	Core	CC, AECC
4.		FSB176	Botany 6 LAB			4	2	Core	CC, AECC
5.		FSB177	Zoology 6 LAB			4	2	Core	CC, AECC
6.		FSB178	Digital & Cyber forensic 2 lab			2	1	Core	CC, AECC
TOTAL CREDITS							**28**		

[7] CC: Core Course, AECC: Ability Enhancement Compulsory Courses, SEC: Skill Enhancement Courses, DSE: Discipline Specific Courses

School: SAHS		**Batch: 2019-2022**	
Program: BFS		**Current Academic Year: 2019**	
Branch: Forensic Science		**Semester: 1ST**	
1	Course Code	FSB101	
2	Course Title	Forensic science	
3	Credits	3	
4	Contact Hours (L-T-P)	2-1-0	
	Course Type	Compulsory	
5	Course Objective	1. To guide about basic concept and characteristic of crime. 2. Help students to understand present crime scenario in India. 3. Learn the application of scientific principles of forensic science for the purpose of CSI.	
6	Course Outcomes	CO1: Explains history & development of Forensic science. CO2: Illustrate the role of Forensic Scientist. CO3: Categorize the services performed by crime investigators, crime lab and medical examiners. CO4: Develop the skill of crime scene investigation.	
7	Course Description	The completion of this course help students in thorough knowledge about the crime, its history & establishment along with crime scene and its investigation.	
8	Outline syllabus		CO Mapping
	Unit 1	**CRIME SCENARIO IN INDIA**	
	A	Introduction to crime and history.	CO1, CO2
	B	Sociological aspects of crime and criminal in society.	CO1, CO2

	C	Definition of crime, characterstics of crime, A brief ideas about White collar crime, Professional crime, Organized crime, Present scenario of crime in india.	CO2
	Unit 2	**Types of Crime and Crime Scene**	
	A	Types of Crime and its causes – property crimes, public order crimes, violent crimes, cyber crimes, juvenile delinquency, Society – Criminal interaction and various types of crimes in India	CO3, CO4
	B	Definition of Crime Scene , Classification of crime Scene: indoor and outdoor, primary and secondary , macroscopic and microscopic crime scene, protectionof crime scene and its importance.	CO3, CO4
	C	Significance of crime scene, argument and ethics of crime scene, initial response, role of first responding officer, duty management.	CO3, CO4
	Unit 3	**Crime Scene and Investigation**	
	A	Forensic scientist, Investigating officers and their assigned role and duties.	CO3, CO4
	B	Role of the police and judiciaries, Fire Brigade, Medico-legal officers and other experts	CO3, CO4
	C	Physical evidence, Definition, classification of physical evidence, types of physical evidences, sources of physical evidence, signification and values of physical evidence, handling and packaging of physical evidences, linkage between crime scene, victim and criminal, study of special crime scene such as mass disaster, terror attack, geological scene and explosive etc.	CO3, CO4
	Unit 4	**Basics Development of Forensic Science**	

	A	Introduction Global History and Scope, Need and Development.			**CO1, CO2**
	B	Principles, emphasizing on specific contribution of Scientists in the field of Forensic Science.			**CO1, CO2**
	C	Branches of Forensic Science, Police Officers, Prosecution.			**CO1, CO2**
	Unit 5	**Forensic Labs and Their Legal Aspects**			
	A	Judicial Officers and Medico legal expert etc. Role and Qualifications of Forensic Scientists.			**CO1,CO2**
	B	Code of conduct for Forensic Scientists, Ethical issue in Forensic Science, professional structure and function of state and regional Forensic Science Laboratory, Central Forensic Science Laboratory and facility provided, Mobile Forensic Science Laboratory. Directorate of Forensic Science Service.			**CO1,CO2**
	C	Police and Forensic Scientist Relationship, Role of FSL in criminal investigation, Relationship between Forensic expert and judiciary officer, Importance of FSL, National and International scenario of FSL, facilities provided in FSL.			**CO1,CO2**
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	B.R.Sharma : Forensic science in criminal Investigation & Trails.			
	Other References	James.S.H and Nordby J.J: Forensic Science- An introduction to scientific and investigative techniques. Saferstein: Criminalistics - An introduction to Forensic Science.			

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch: 2019-20**	
Program: BFS		**Current Academic Year: 2019**	
Branch: Forensic Science		**Semester: 1ST**	
1	Course Code	FSB108	
2	Course Title	Forensic Science Lab	
3	Credits	2	
4	Contact Hours (L-T-P)	0-0-4	
	Course Status	Compulsory	
5	Course Objective	1. To guide the collection and preservation of various evidences. 2. To understand the importance and methods of photography at crime scene. 3. To understand the method of sketching of crime scene.	
6	Course Outcomes	CO1: To gain knowledge of collection, preservation and packaging of physical evidences. CO2: Understand the methods of Searching, sketching and photography of crime scene. CO3: Able to do photography of outdoor crime scene. CO4: Able to Investigate and collect evidence of Indoor crime scene.	
7	Course Description	The completion of this course students will be able to collect and pack all kind of evidences.	
8	Outline syllabus		CO Mapping
	Unit 1	**Use of Druggist's fold Methods**	**CO1,CO3,CO4**
		• Collection • Packaging • Forwarding	
	Unit 2	**Photography of Outdoor Crime Scene**	**CO2**
		• Overall photography	

		• Photography with Scale • Photography of Evidence			
	Unit 3	**Photography of Indoor Crime Scene**			**CO2**
		• Overall photography • Photography with Scale • Photography of Evidence			
	Unit 4	**Sketching of Crime Scene**			**CO2**
		• Briefing • Demo • Practical			
	Unit 5	**Collect and Preserve the physical evidence in hanging case**			**CO1,CO3,CO4**
		• Briefing • Demo • Practical			
	Mode of examination	Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	
	Text book/s*	-			
	Other References	-			

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch : 2019-20**
Program: BFS		**Current Academic Year: 2019**
Branch: Forensic Science		**Semester: 1ST**
1	Course Code	FSB115
2	Course Title	Physics

3	Credits	3	
4	Contact Hours (L-T-P)	2-1-0	
	Course Type	Compulsory	
5	Course Objective	1. Understanding basic laws, principals and phenomena in the area of fluid mechanics. 2. Solve statistic problem on basis of surface tension and also temperature effect on the basis of it. 3. To identify forces acting upon an object if given physical description of situation.	
6	Course Outcomes	CO1: To recall the presence of balanced or unbalanced forces to the state of motion. CO2: Understand the universal Newton's law CO3: Able to demonstrate general physics phenomena. CO4: To apply basic physics laws in daily concept.	
7	Course Description	The completion of this course students will be able to know the basic laws of physics.	
8	Outline syllabus		CO Mapping
	Unit 1	**Measurement and Vectors**	
	A	Unit of measurement	CO1, CO2
	B	Vectors, component notation, unit vectors	CO1, CO2
	C	Mgnitude of vectors, dot product, cross product	CO1, CO2
	Unit 2	**Newton's Law of Motion**	
	A	Kinematics: Linear motion, Projectile motion, uniform circular motion	CO1, CO2
	B	Dynamics: Newton's laws of motion, free body diagram, static and kinetic friction.	CO1, CO2
	C	Work and energy, Energy and momentum conservation, kinetic energy, gravitational potential energy, spring force and dpring potential energy, Elastic and non elastic collission, impact of a force	CO1, CO2
	Unit 3	**Fluids Mechanics**	
	A	Fluid statics: pressure in a fluid, measurement of pressure using open tube manometer and mercury barometer, variation of pressure with depth, hydraulic machines, Pascal's law, buoyancy and Archimedes principle	CO3
	B	Fluid dynamics: Equation of continuity, streamlines and streamlined flow, incompressible and ideal fluids, Bernoulli's equation, Venturi meter, Pitot tube,	CO3

		aerodynamic lift			
	C	Viscosity, Newton's law of viscosity, Real fluids, Poiseuille's equation, fluid drag, Stokes formula, turbulence and Reynolds number.			CO3
	Unit 4	**Elasticity and Surface Tension**			
	A	Elasticity, stress and strain.			CO3
	B	Hook's Law, Young's modulus, Shear modulus, Bulk modulus.			CO3
	C	Surface tension, capillarity.			CO3
	Unit 5	**Gravitational and oscillations**			
	A	Newton's law of Gravitational, Gravitational potential energy, escape velocity, circular and elliptical orbits, keepler's laws.			CO3
	B	Oscillations, Simple harmonic motion.			CO3
	C	Damed and forced oscillations, Resonance.			CO3
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	College physics- Serway and Vuille, Principles of physics- Halliday & Resnick.			
	Other References	Sear's & Zemansky's University physics- Young and Freedman.			

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch: 2019-20**
Program: BFS		**Current Academic Year: 2019**
Branch: Forensic Science		**Semester: 1st**
1	Course Code	FSB109
2	Course Title	Physics Lab
3	Credits	2
4	Contact Hours (L-T-P)	0-0-4

	Course Status	Compulsory	
5	Course Objective	1. To have an overview of the Newton's ring method. 2. To develop the basic knowledge of determining focal length. 3. To have an overview of Stefan's law of radiation.	
6	Course Outcomes	CO1: Able to determine the knowledge of the wavelength of monochromatic light using Several methods. CO2: To gain knowledge about Stefan's Law. CO3: To understand the focal length of the combination of two thin convergent lenses. CO4: To determine the specific rotation of cane sugar solution.	
7	Course Description	With the completion of this curriculum students will be able to determine the wavelength by using several methods.	
8	Outline syllabus		CO Mapping
	Unit 1	**To determine the wavelength of monochromatic light by Newton's Ring method**	**CO1**
		• Briefing • Demo • Practical	
	Unit 2	**To determine the wavelength of prominent lines of mercury by plane diffraction grating**	**CO1**
		• Briefing • Demo • Practical	
	Unit 3	**To determine the focal length of the combination of two thin convergent lenses separated by a distance with the help of a nodal-slide and verify the formula**	**CO3**
		• Briefing • Demo • Practical	
	Unit 4	**To determine the specific rotation of cane sugar solution with the help of a polarimeter**	**CO4**
		• Briefing	

		• Demo • Practical			
	Unit 5	**To verify Stefan's law of radiation**			**CO2**
		• Briefing • Demo • Practical			
	Mode of examination	Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	
	Text book/s*	B.Sc. Practical Physics- Harman Singh and PS Hemne.			
	Other References	-			

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch : 2019-20**
Program: BFS		**Current Academic Year: 2019**
Branch: Forensic Science		**Semester: 1st**
1	Course Code	FSB103
2	Course Title	Chemistry
3	Credits	3
4	Contact Hours (L-T-P)	2-1-0
	Course Type	Compulsory
5	Course Objective	1. Conceptual understanding of scientific methods and the proper use of significant figures. 2.Evaluate the type of molecular bonding in the covalent molecule and identify the orbital used for bonding. 3. Different physical properties of states of matter.

6	Course Outcomes	CO1: Describe concept of acidity and basicity, electrophiles and nucleophiles. CO2: Explain molecular activity in different states of matter. CO3: - Apply kinetic molecular theory of gas or the quantum mechanical theory of the atom to the solution of general chemistry problem. CO4: Solve quantitative chemistry problems.	
7	Course Description	The completion of this course students will be able to know about the acidity & basicity and all states of matter.	
8	Outline syllabus		CO Mapping
	Unit 1	**Gaseous State**	
	A	Gaseous States: Postulates of kinetic theory of gases, Gas Laws, deviation from ideal behaviour, van der Waals equation of state. Relationship between critical constants and van der Waals constants, the law of corresponding states	CO1, CO2,CO3
	B	Molecular Velocities: Root mean square, average and most probable velocities.	CO1, CO2,CO3
	C	Qualitative discussion of the Maxwell's distribution of molecular velocities, collision number, mean free path and collision diameter. Liquefaction of gases	CO1, CO2,CO3
	Unit 2	**Liquid and Solid State**	
	A	Liquid State: Intermolecular forces, structure of liquids (a qualitative description). Structural differences between solids, liquids and gases. Liquid crystals: Difference between liquid crystal, solid and liquid. Classification, structure of nematic, sematic and cholesteric phases and applications.	CO1, CO2,CO3
	B	Solid State: Definition of space lattice and unit cell. Laws of crystallography: (i) Law of constancy of interfacial angles (ii) Law of rationality of indices (iii) Law of symmetry - Symmetry elements in crystals	CO1, CO3
	C	X-ray diffraction: Derivation of Bragg's equation. Determination of crystal structure of NaCl and KCl. A brief introduction to point defects in crystals, semiconductors, superconductors and nanomaterials (only qualitative idea).	CO1, CO2,CO3
	Unit 3	**Atomic Structure**	
	A	Bohr's theory and its limitations, dual behavior of matter and radiation, de Broglie relation, Heisenberg Uncertainty	CO3,CO4

		principle			
	B	Hydrogen atom spectra. Radial and angular parts of the hydrogenic wavefunctions (atomic orbitals) and their variations for 1s, 2s, 2p, 3s, 3p and 3d orbitals (Only graphical representation).			CO3,CO4
	C	Significance of quantum numbers, orbital angular momentum and quantum numbers ml and ms. Shapes of s, p and d atomic orbitals, nodal planes. Spin quantum number (s) and magnetic spin quantum number (ms). Rules for filling electrons in various orbitals, Electronic configurations of the atoms. Stability of half-filled and completely filled orbitals, Anomalous electronic configurations.			CO3,CO4
	Unit 4	**Fundamental of Organic Chemistry Physical Effect, Electronic Displacements – I**			
	A	Classification of hydrocarbons. Nomenclature, methods of preparations, physical characteristics and chemical reactions of alkanes, cycloalkanes, alkenes and alkynes.			CO4
	B	Electromeric Effect, Resonance and Hyperconjugation. Cleavage of Bonds: Homolysis and Heterolysis			CO4
	C	Structure, shape and reactivity of organic molecules: Nucleophiles and electrophiles. Reactive Intermediates: Carbocations, Carbanions and free radicals. Strength of organic acids and bases: Comparative study with emphasis on factors affecting pK values.			CO4
	Unit 5	**Fudamental of Organic Chemistry Physical Effect, Electronic Displacement – II**			
	A	Aromaticity: Benzenoids and Hückel's rule. Stereochemistry Conformations: Ethane, butane and cyclohexane			CO4
	B	Interconversion of Wedge Formula, Newmann, Sawhorse and Fischer representations. Concept of chirality (up to two carbon atoms).			CO4
	C	Configuration: Geometrical and Optical isomerism; Enantiomerism, Diastereomerism and Meso compounds. Threo and erythro; D and L; cis – trans nomenclature; CIP Rules: R/ S (for upto 2 chiral carbon atoms) and E / Z Nomenclature (for up to two C=C systems).			CO4
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	

	Text book/s*	M. Barrow: Physical Chemistry Tata McGraw Hill (2007).	
	Other References	Cotton & G. Wilkinson: Basic Inorganic Chemistry, John Wiley, Miessler, G. L. & Donald, A. Tarr. Inorganic Chemistry 3rd Ed.(adapted), Pearson, 2009 ISBN	

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch: 2019-20**
Program: FSB		**Current Academic Year:**
Branch: Forensic Science		**Semester: 1st**
1	Course Code	FSB110
2	Course Title	Chemistry Lab
3	Credits	2
4	Contact Hours (L-T-P)	0-0-4
	Course Status	Compulsory
5	Course Objective	1. To use purification of organic compound by crystallization. 2. To have an overview of the detection of extra elements in inorganic compounds. 3. To develop knowledge about the end point of HCl by titration.
6	Course Outcomes	CO1: To gain knowledge about the estimation of Fe. CO2: To prepare the solution with different morality. CO3: To understand the detection of extra element in inorganic compounds. CO4: Able to demonstrate the purification of organic compound by crystallization.
7	Course Description	With the ending of this curriculum students will be having the basic knowledge about different methods like titration and crystallization and also have the overview of detection of organic and inorganic compounds.
8	Outline syllabus	CO Mapping

	Unit 1	**Preparation of solution with different morality, specially NaOH and standardization of NaOH using an indicator**	**CO1**
		• Briefing • Demo • Practical	
	Unit 2	**Estimation of Fe(II) ions by titrating it with $K_2Cr_2O_7$ using internal indicator**	**CO2**
		• Briefing • Demo • Practical	
	Unit 3	**Purification of organic compound by crystallization (from Water).**	**CO4**
		• Briefing • Demo • Practical	
	Unit 4	**Detection of extra elements in Inorganic Compound**	**CO3**
		• Briefing • Demo • Practical	
	Unit 5	**To determine the end point of HCl by titration it with NaOH volumetrically**.	**CO2**
		• Briefing • Demo • Practical	
	Mode of examination	Practical/Viva	
	Weightage Distribution	CA / MTE / ETE	
		60% / 0% / 40%	
	Text book/s*	B.D Khosla- Chemistry Practical book	
	Other References	Ahluwalia- Chemistry Practical Book	

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3

CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch : 2019-20**	
Program: FSB		**Current Academic Year: 2019**	
Branch: Forensic Science		**Semester: 1st**	
1	Course Code	FSB104	
2	Course Title	Botany	
3	Credits	3	
4	Contact Hours (L-T-P)	2-1-0	
	Course Type	Compulsory	
5	Course Objective	**1-** Able to identify common infectious agents and the diseases related to it. **2-** To provide a basic understanding of biology, taxonomy and phylogeny of fungi. **3-** Identify their chemical elements and difference between simple sugar and complex carbohydrates, proteins, lipids and nucleic acids.	
6	Course Outcomes	CO1: Knowledge of equipment used in microbiology. CO2: Able to prepare solid & liquid culture media of microbes. CO3: Demonstrate gram stain bacteria. CO4: Able to demonstrate temporary mount and identification of algae and fungi.	
7	Course Description	The completion of this course students will have a knowledge of microbiology along with their culture process and also about carbohydrates, lipids and proteins.	
8	Outline syllabus		CO Mapping
	Unit 1	**Microbiology**	
	A	Introduction to microbial world: Microbial nutrition, growth and metabolism.	CO1, CO2,CO3
	B	Bacteria: General characteristics; Types-archaebacteria, eubacteria, wall-less forms (mycoplasma).	CO1, CO2,CO3
	C	Viruses**:** Physiochemical and biological characteristics; general structure; replication (general account), DNA virus	CO1, CO2,CO3

		(T-phage), RNA virus (TMV).	
	Unit 2	**Mycology and Phycology**	
	A	Algae**:** General characteristics; Ecology and distribution; range of thallus organization	CO1, CO3
	B	Fungi: Introduction- General characteristics	CO1, CO3
	C	Lichens: General account, reproduction. Mycorrhiza: ectomycorrhiza and endomycorrhiza.	CO1, CO3
	Unit 3	**Economic Importance**	
	A	Microbe: Economic importance of viruses with reference to vaccine production, role in medicine and diagnostics, as causal organisms of plant diseases. Economic importance of bacteria with reference to their role in agriculture and industry (fermentation and medicine).	CO1, CO2,CO3
	B	Algae: Ecology and distribution; range of thallus organization. Role of algae in the environment, agriculture, biotechnology and industry	CO1, CO3
	C	Fungi: Ecology and Significance, range of thallus organization Lichens: Significance. Mycorrhiza: significance	CO1, CO3
	Unit 4	**General Account of Cell Structure and Reproduction**	
	A	Bacteria: Cell structure; Nutritional types; Reproduction-vegetative, asexual and recombination (conjugation, transformation and transduction).	CO1, CO3
	B	Algae: Cell structure and components; cell wall, pigment system, flagella; methods of reproduction.	CO1, CO3
	C	Fungi: Cell wall composition, nutrition, reproduction	CO1, CO3
	Unit 5	**Biomolecules**	
	A	Biomolecules: Types and significance of chemical bonds; Structure and properties of water; pH and buffers.	CO4
	B	Carbohydrates: Nomenclature and classification; Monosaccharides; Disaccharides; Oligosaccharides and polysaccharides. Lipids: Definition and major classes of	CO4

		storage and structural lipids; Fatty acids structure and functions; Essential fatty acids			
	C	Proteins**:** Structure of amino acids; Levels of protein structure-primary, secondary, tertiary and quarternary; Protein de-naturation and biological roles of proteins.Nucleic acids: Structure of nitrogenous bases; Structure and function of nucleotides; Types of nucleic acids.			CO4
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	-			
	Other References	-			

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch: 2019-20**
Program: FSB		**Current Academic Year: 2019**
Branch: Forensic Science		**Semester: 1st**
1	Course Code	FSB111
2	Course Title	Botany Lab
3	Credits	2
4	Contact Hours (L-T-P)	0-0-4
	Course Status	Compulsory
5	Course Objective	1. To develop the knowledge of equipments used in microbiology. 2. To have an overview of qualitative test. 3. To develop the knowledge of preparation of culture media.

6	Course Outcomes	CO1: Able to prepare culture media. CO2: Able to prepare temporary mount of Algae. CO3: To determine the qualitative test of carbohydrate, proteins and lipids. CO4: To gain knowledge about the equipments used in microbiology.			
7	Course Description	After the completion of this course students will have the basic knowledge of preparation of culture media including preparation of temporary mount and qualitative tests.			
8	Outline syllabus				CO Mapping
	Unit 1	**Knowledge of Equipments used in Microbiology**			
		• Spirit lamp and Hot air oven • Autoclave • Incubator			CO4
	Unit 2	**Qualitative Test**			
		• Carbohydrates • Protein • Lipids			CO3
	Unit 3	**Bacteria Gram Staining**			
		• Structure of bacteria • Positive gram staining • Negative Gram Staining			CO1
	Unit 4	**Preparation of Temporary Slides**			
		• Algae • Fungi • Differences in their structure			CO2
	Unit 5	**Preparation of culture media**			
		• Solid media • Liquid media • Culture growth in sheet media			CO1
	Mode of examination	Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	
	Text book/s*	-			
	Other	-			

	References		

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch : 2019-20**	
Program: FSB		**Current Academic Year: 2019**	
Branch: Forensic Science		**Semester: 1st**	
1	Course Code	FSB105	
2	Course Title	Zoology	
3	Credits	3	
4	Contact Hours (L-T-P)	2-1-0	
	Course Type	Compulsory	
5	Course Objective	**1-** Able to understand the structure and purpose of basic components of prokaryotes & eukaryotes. **2-** Able to understand the process of cell division in both somatic and germ cells. **3-** Able to understand complete process of fertilization, way of cleavage, embryonic dev. and formation of germ cell.	
6	Course Outcomes	CO1: Able to describe the function and composition of plasma membrane CO2: Identify membrane bound organelles in eukaryotic cell. CO3: Illustrate different parts, working and care of different types of microscopes. CO4: know about development of embryo and formation of germ cell.	
7	Course Description	The completion of this course students will be able to know all about cell and cell organelles, cell division.	
8	Outline syllabus		CO Mapping
	Unit 1	**Cytology I**	
	A	Ultra structure of different cell organelles of animal cell: Prokaryotic and Eukaryotic cells, Virus, Viroids,	CO1, CO2

		Mycoplasma, Prions	
	B	Plasma Membrane: Fluid mosaic model, various modes of transport across the membrane, mechanism of active and passive transport, endocytosis and exocytosis.	CO1, CO2
	C	Endoplasmic reticulum (ER): types, role of ER in protein synthesis and transportation in animal cell.	CO1, CO2
	Unit 2	**Cytology II**	
	A	Golgi complex: Structure, Associated enzymes and role of Golgi-complex in animal cell.	CO1, CO3
	B	Mitochondria: Mitochondrial DNA; as semiautonomous body, biogenesis, mitochondrial enzymes (only names), role of mitochondria.	CO1, CO3
	C	Lysosomes: Structure, enzyme and their role; polymorphism.	CO1, CO3
	Unit 3	**Cytology III**	
	A	Ribosomes: Types, biogenesis and role in protein synthesis	CO1, CO3
	B	Cytoskeleton: Microtubules, microfilaments, centriole and basal body. Cilia and Flagella	CO1, CO3
	C	Cytoskeleton Structure and Functions: Microtubules, Microfilaments and Intermediate filaments.	CO1, CO3
	Unit 4	**Cytology IV**	
	A	Nucleus Structure of Nucleus: Nuclear envelope, Nuclear pore complex, Nucleolus Chromatin: Euchromatin and Hetrochromatin, lampbrush chromosomes and polytene chromosomes	CO1, CO3
	B	Cell Division: Mitosis, Meiosis, Cell cycle and its regulation.	CO1, CO3
	C	Cell Signaling GPCR and Role of second messenger (cAMP)	CO1, CO3
	Unit 5	**Developmental Biology**	
	A	Historical perspective and basic concepts: stages of development, Cell-Cell interaction, Differentiation and growth.	CO4
	B	Gametogenesis, Spermatogenesis, Oogenesis; Types of eggs, Egg membranes; Fertilization (External and Internal): Changes in gametes, Blocks to polyspermy; General account of cleavage division: Planes and patterns of	CO4

		cleavage; Types of Blastula; Implantation of embryo in humans, Placenta (Structure, types and functions of placenta			
	C	Regeneration: Modes of regeneration, In vitro fertilization, Stem cell (ESC).			CO4
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	Karp, G. 2010. Cell and Molecular Biology: Concepts and Experiments. 6th Edition. John Wiley & Sons. Inc.			
	Other References	Cooper, G.M. and Hausman, R.E. 2009. The Cell: A Molecular Approach. 5th edition. ASM Press & Sunderland, Washington, D.C.; Sinauer Associates, MA.			

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch: 2019-20**
Program: BFS		**Current Academic Year: 2019**
Branch: Forensic Science		**Semester: 1st**
1	Course Code	FSB112
2	Course Title	Zoology Lab
3	Credits	2
4	Contact Hours (L-T-P)	0-0-4
	Course Status	Compulsory
5	Course Objective	1. To develop the knowledge of basic working of different microscopes. 2. To have an overview about the structure of cell and its organelles. 3. To develop a sense of cell division in somatic cell and generative cells.
6	Course	CO1: To gain the knowledge of working and basic principle of different

	Outcomes	microscopes. CO2: Study different types of cells with their specifications. CO3: Able to determine different cell division stages under the microscope. CO4: Able to identify different cell organelles under the microscope.	
7	Course Description	After the completion of this course curriculum students will be able to identify and differentiate between different types of cells and also have the basic knowledge about the cell division.	
8	Outline syllabus		CO Mapping
	Unit 1	**To study Different Microscope.**	**CO1**
		• Simple Microscope • Compound Microscope • Comparison Microscope	
	Unit 2	**Study of Cell.**	**CO2**
		• Prokaryotic Cell • Eukaryotic Cell • Animal and Plant Cell	
	Unit 3	**Study of slides**	**CO3**
		• Stages of Mitosis • Stages of Meiosis • Chick Embryo	
	Unit 4	**To comment upon the slides or microphotographs showing ultra structures of some cell types and cell organelles I**	**CO4**
		• Endoplasmic Reticulum • Mitochondria • Golgi Apparatus	
	Unit 5	**To comment upon the slides or microphotographs showing ultra structures of some cell types and cell organelles II**	**CO4**
		• Nucleus • Choloplast	

		• Cillia and Flagella			
	Mode of examination	Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	
	Text book/s*	-			
	Other References	-			

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch : 2019-20**
Program: FSB		**Current Academic Year: 2019**
Branch: Forensic Science		**Semester: 1st**
1	Course Code	FSB131
2	Course Title	Physiology
3	Credits	0
4	Contact Hours (L-T-P)	2-0-0
	Course Type	Compulsory
5	Course Objective	**1-** To understand the metabolic activity in human body. **2-**To understand the nature of endocrine gland and secretion. **3-** Able to describe the physiological function of human reproductive system.
6	Course Outcomes	CO1: Identify the sources and typical amount of fluid and nutrients. CO2: Describe the role and function of respiratory, excretory, nerves system etc. CO3: List the different type of muscles and their characteristics. CO4: Study about different endocrinal glands and their functions.
7	Course Description	The completion of this course students will be able to know about all the

		physiology of human being.	
8	Outline syllabus		CO Mapping
	Unit 1	**GENERAL & NERVE MUSCLE PHYSIOLOGY**	
	A	Components of cell, functions of cell organelles, transport across cell membrane, homeostasis & membrane potential.	CO1, CO2
	B	Structure , functions of nerve tissues.	CO1, CO2
	C	Neuromuscular junction, Difference between skeletal muscle, smooth muscle & cardiac muscle.	CO1, CO2
	Unit 2	**BLOOD & CVS**	
	A	Composition & functions of blood, plasma proteins & haemoglobin, Erythrocytes, leucocytes & platelets, blood coagulation, blood groups & immunity.	CO1, CO2
	B	Physiological anatomy of the heart & blood vessels, cardiac cycle.	CO1, CO2
	C	Heart sounds & ECG graph , Heart Rate, Cardiac Output, Blood Pressure & Pulse.	CO1, CO2
	Unit 3	**THE RESPIRATORY SYSTEM**	
	A	Physiological anatomy & functions of respiratory system	CO3
	B	Transport of Gases.	CO3
	C	Regulation of respiration & Hypoxia.	CO3
	Unit 4	**DIGESTIVE SYSTEM AND EXCRETORY SYSTEM**	
	A	Physiological anatomy and functions of GIT,Composition and functions of different dijestive juices , Digestion and Absorption in GIT.	CO1, CO3
	B	Physiological anatomy of kidney, structure and functions of excretory system, structure of nephron.	CO1, CO3
	C	Physiology of micturition and Regulation of Body Temperature in Humans.	CO1, CO3
	Unit 5	**ENDOCRINE AND REPRODUCTIVE SYSTEM**	
	A	General principles of endocrinology, Different endocrine glands and their functions	CO4
	B	Puberty, Spermatogenesis & semen.	CO4
	C	Mensturation, ovulation and contraception.	CO4
	Mode of	Theory	

	examination				
	Weightage Distribution	CA	MTE	ETE	
		100%	-	-	
	Text book/s*	Basic Anatomy and Physiology- Dr. N. Murugesh			
	Other References	Anatomy & physiology for nurses- Prof. A.K. Jain.			

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch : 2019-20**
Program: FSB		**Current Academic Year: 2019**
Branch: Forensic Science		**Semester: 1st**
1	Course Code	FSB130
2	Course Title	English
3	Credits	0
4	Contact Hours (L-T-P)	2-0-0
	Course Type	Compulsory
5	Course Objective	**1.** To equip students to minimize the linguistic barriers emerging in a different environment. **2-** To equip students to minimize the linguistic barriers emerging in a different environment. **3-** To equip students to minimize the linguistic barriers emerging in a different environment.
6	Course Outcomes	CO1: Develop writing skills. CO2: Develop Impressive Speaking Skills. CO3: To be able to speak confidently in the English language CO4: Listen and interpret main ideas to differentiate between opinions and facts.
7	Course Description	The completion of this course students will be able to minimize the

		linguistic barriers emerging in a different environment.			
8	Outline syllabus				CO Mapping
	Unit 1	**Basic elements of grammar**			
	A	Parts of speech			CO1, CO2
	B	Articles: A, An , The			CO1, CO2
	C	Tenses			CO1, CO2
	Unit 2	**Vocabulary enhancement**			
	A	Antonyms & Synonyms			CO1, CO3
	B	Homophones			CO1, CO3
	C	Homonyms			CO1, CO3
	Unit 3	**Reading comprehension**			
	A	Reading comprehension passage 1			CO1, CO3
	B	The Thief by Ruskin Bond			CO1, CO3
	C	Discussions Based on the text			CO1, CO3
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		100%	-	-	

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS	**Batch : 2019-20**
Program: FSB	**Current Academic Year: 2019**
Branch: Forensic	**Semester: 2nd**

Science			
1	Course Code	FSB116	
2	Course Title	Forensic Science	
3	Credits	3	
4	Contact Hours (L-T-P)	2-1-0	
	Course Type	Compulsory	
5	Course Objective	**1-** Able to explain the various social science, methods of inquiry. **2-** Gaining insight into the law and legal system. **3-** To provide knowledge and techniques required to improve product quality and process efficiency by identify and measuring production process.	
6	Course Outcomes	CO1: Enumerate criminal theory to explain criminal behaviour. CO2: They have all relative knowledge of Laws and testimony related to investigation & crime. CO3: They give knowledge of process and techniques of laboratory along with quality maintenance. CO4: Define structure & function of police organization.	
7	Course Description	After the completion of this course students will be able to demonstrate between several criminal cases and the power and limitations of first-class magistrate.	
8	Outline syllabus		CO Mapping
	Unit 1	**Criminology**	
	A	Definition of Law, Court, Judge, Introduction to Criminal Procedure Code, FIR, Object of Punishment, Kinds of Punishment, Primary and Sanctioning Rights.	CO1, CO2
	B	Classification – civil, criminal cases. Essential elements of criminal law. Constitution and hierarchy of criminal courts.	CO1, CO2
	C	Cognizable and non-cognizable offences. Bailable and non-bailable offences. Sentences which the court of Chief Judicial Magistrate may pass.	CO1, CO2
	Unit 2	**Police Organization**	
	A	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.	CO4
	B	International Police Organization: INTERPOLE- history, structure general and special notices.	CO4
	C	State Police organization: general organization of police at state	CO4

		and range level. Police organization at district level.	
	Unit 3	**Laws Specific to Forensic Science**	
	A	Indian Penal Code pertaining to offences against persons – Sections 121A, 299, 300, 302, 304A, 304B, 307, 309, 319, 320, 324, 326, 351, 354, 359, 362.	CO1, CO2
	B	Cr.P.C. – Sections 291,291A, 292 & 293 in the code of criminal procedure.	CO1, CO2
	C	Amendments in Sections related to Forensic Science: Sections 375 & 377 and their amendments.	CO1, CO2
	Unit 4	**Acts to related to Forensic Science and special Acts related to Society**	
	A	Indian Evidence Act – Evidence and rules of relevancy in brief. Expert witness. Cross examination and re-examination of witnesses, Sections 32, 45, 46, 47, 57, 58, 60, 73, 135, 136, 137, 138, 141.	CO1, CO2
	B	Acts Pertaining to Socio-economic and Environmental Crimes- Dowry Prohibition Act, Immoral Traffic Prevention Act,	CO1, CO2
	C	Wildlife Protection Act, Environment Protection Act, Untouchability Offences Act.	CO1, CO2
	Unit 5	**Quality Management**	
	A	Quality Management (ISO/IEC 17025) General requirements for the competence of testing and calibration laboratories, Introduction, Scope, Management requirements: organization, Quality System, Document Control, Test and calibration methods and methods validation.	CO3
	B	Equipment, measurement traceability, Sampling, Handling of test and calibration items, Assuring the quality of test calibration results and reporting the results.	CO3
	C	Accreditation and certification bodies- NABL, ISO, IEC, BIS, ASCLD/LAB, ABC, IAI..	CO3
	Mode of examination	Theory	
	Weightage Distribution	CA / MTE / ETE	
		30% / 20% / 50%	
	Text book/s*	IPC, Cr.P.C & I.E.A manual, Quality Management Manual	
	Other References	-	

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3

CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch: 2019-20**	
Program: FSB		**Current Academic Year: 2019**	
Branch: Forensic Science		**Semester: 2nd**	
1	Course Code	FSB151	
2	Course Title	Forensic science Lab	
3	Credits	2	
4	Contact Hours (L-T-P)	0-0-4	
	Course Status	Compulsory	
5	Course Objective	1. To have an overview of crime cases and criminal profiling assisting the police. 2. To have an overview of power and limitations of first class magistrate. 3. To develop the knowledge of studying crime cases with different sections.	
6	Course Outcomes	CO1: To understand the knowledge of various crime cases. CO2: Students will be able to differentiate between cognizable and non-cognizable offences. CO3: To understand different cases in which criminal profiling is helpful. CO4: Have the knowledge of power and limitations of first class magistrate.	
7	Course Description	After the completion of this course students will be able to demonstrate between several criminal cases and the power and limitations of first class magistrate.	
8	Outline syllabus		CO Mapping
	Unit 1	**To review past criminal cases and illucidate which theory best explain the criminal behavior of the accused.**	**CO1**
		• Briefing • Demo	

		• Practical	
	Unit 2	**To review crime cases where criminal profiling assisted the police to apprehend the accused**	**CO2**
		• Briefing • Demo • Practical	
	Unit 3	**To prepare a schedule of five cognizable and five non cognizable offences**.	**CO2, CO3**
		• Briefing • Demo • Practical	
	Unit 4	**To study the power and limitation of the court of judicial magistrate of the first class.**	**CO4**
		• Briefing • Demo • Practical	
	Unit 5	**To study a crime case in which an accused was punished on charge of murder under section 302.**	**CO1, CO3**
		• Briefing • Demo • Practical	
	Mode of examination	Practical/Viva	
	Weightage Distribution	CA: 60% / MTE: 0% / ETE: 40%	
	Text book/s*	-	
	Other References	-	

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch : 2019-20**	
Program: FSB		**Current Academic Year: 2019**	
Branch: Forensic Science		**Semester: 2nd**	
1	Course Code	FSB117	
2	Course Title	Physics	
3	Credits	3	
4	Contact Hours (L-T-P)	2-1-0	
	Course Type	Compulsory	
5	Course Objective	**1-** Students can understand analogy between translational and rotational kinematics. **2-** Develop understanding of mass, energy, heat, work, efficiency and real thermodynamics cycles and process. **3-** To gain knowledge and skill in understanding of sounds.	
6	Course Outcomes	CO1: Develop a qualitative understanding of rotational inertia. CO2: Able to describe a nature of wave and explain the distinction between wave motion & particle motion. CO3: Determine and calculate appropriate mass and energy transfers and properties to analyse selected transient control volume applications. CO4: Correctly apply the laws of thermodynamics.	
7	Course Description	After the completion of this course students will be able to determine and calculate several parameters like inertia, acceleration and viscosity of liquid.	
8	Outline syllabus		CO Mapping
	Unit 1	**Rotational Motion**	
	A	Rotational kinematics: angular displacement, angular velocity.	CO1, CO2
	B	Angular acceleration, rotation with constant angular acceleration.	CO1, CO2
	C	Rotational motion of a particle: torque on a particle, angular momentum of a particle.	CO1, CO2
	Unit 2	**Rigid Body Dynamics**	
	A	Rigid bodies: angular momentum of a rigid body, moment of inertia.	CO1, CO2
	B	Parallel axis theorem, perpendicular axis theorem, center of mass.	CO1, CO2

	C	Rigid body dynamics: Equations of motion of a rigid body, combined translation and rotation of a rigid body, rolling.			CO1, CO2
	Unit 3	**Wave motion, Sound and Ultrasound**			
	A	Transverse and longitudinal waves, superposition of waves, beats, standing waves, normal modes in organ pipes and strings			CO3
	B	Sound waves: speed of sound in solids, liquids and gases, sound intensity and decibel scale, resonance and natural frequency, sound spectrum, pitch and timbre of musical sound Doppler effect, shock waves, echo, reverberation, acoustics of buildings.			CO3
	C	Ultrasound: Production and application of ultrasonic waves.			CO3
	Unit 4	**Thermodynamics I**			
	A	Temperature, zeroth law of thermodynamics, heat capacity.			CO4
	B	Specific heat, molar heat capacity, heats of fusion and evaporation.			CO4
	C	Mechanisms of heat transfer: conduction, convection, and radiation, Stefan's law of radiation.			CO4
	Unit 5	**Thermodynamics II**			
	A	First law of thermodynamics, internal energy, work and heat, equilibrium, state variables, isothermal, isobaric and adiabatic processes.			CO4
	B	Second law of thermodynamics, entropy, carnot cycle, heat engines, refrigerators.			CO4
	C	Kinetic theory of gases, Maxwell distribution.			CO4
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	College physics- Serway and Vuille, Principles of physics- Halliday & Resnick.			
	Other References	Sear's & Zemansky's University physics- Young and Freedman.			

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2

CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch: 2019-20**	
Program: FSB		**Current Academic Year: 2019**	
Branch: Forensic Science		**Semester: 2nd**	
1	Course Code	FSB152	
2	Course Title	Physics Lab	
3	Credits	2	
4	Contact Hours (L-T-P)	0-0-4	
	Course Status	Compulsory	
5	Course Objective	1. To develop the knowledge of how to measure the acceleration due to gravity. 2. To have an overview of the moment of inertia. 3. Use to calculate the moment of inertia of different frequency shapes.	
6	Course Outcomes	CO1: To understand how to calculate the moment of inertia. CO2: To understand the process of measuring the acceleration due to gravity. CO3: Able to determine the coefficient of viscosity of water. CO4: Learn how to calculate the moment of inertia with different shapes.	
7	Course Description	After the completion of this course students will be able to determine and calculate several parameters like inertia, acceleration and viscosity of water.	
8	Outline syllabus		CO Mapping
	Unit 1	**To measure the acceleration due to gravity using a simple pendulum**.	**CO1**
		• Briefing • Demo • Practical	
	Unit 2	**To determine the moment of inertia of Flywheel about its axis of rotation.**	**CO1**
		• Briefing • Demo	

		• Practical	
	Unit 3	**To determine the coefficient of viscosity of water by Poiseuille's method.**	**CO2**
		• Briefing • Demo • Practical	
	Unit 4	**To determine the height of a building by the help of a Sextant.**	**CO2, CO3**
		• Briefing • Demo • Practical	
	Unit 5	**To calculate Moment of inertia of different irregular shapes**	**CO4**
		• Briefing • Demo • Practical	
	Mode of examination	Practical/Viva	
	Weightage Distribution	CA / MTE / ETE 60% / 0% / 40%	
	Text book/s*	B.Sc. Practical Physics- Harman Singh and PS Hemne.	
	Other References	-	

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch : 2019-20**
Program: FSB		**Current Academic Year: 2019**
Branch: Forensic Science		**Semester: 2nd**
1	Course Code	FSB118

2	Course Title	Chemistry	
3	Credits	3	
4	Contact Hours (L-T-P)	2-1-0	
	Course Type	Compulsory	
5	Course Objective	**1-** Able to recognize to write the mechanism of electrophilic aromatics substitution **2-** Fundamental understanding and application of thermodynamics. **3-** Understand the general trends in chemistry behind p and s block element.	
6	Course Outcomes	CO1: Able to predict chemical and physical properties of elements and compound in s & p blocks CO2: Concept of aromaticity and the main property of aromatic compounds. CO3: To distinguish between spontaneous and non-spontaneous process. CO4: Understand the concept of free energy.	
7	Course Description	After the completion of this course students will be able to develop a sense of process of purification of organic compound and also have the knowledge of different chemical compounds in the mixture.	
8	Outline syllabus		CO Mapping
	Unit 1	**Chemical Thermodynamics I**	
	A	What is thermodynamics? State of a system, state variables, intensive and extensive variables, concept of heat and work, thermodynamic equilibrium, thermodynamic properties, various types of systems and processes.	CO3,CO4
	B	First Law of thermodynamics. Calculation of work (w), heat (q), changes in internal energy (QU) and enthalpy (QH) for expansion or compression of ideal gases under isothermal and adiabatic conditions for both reversible and irreversible processes.	CO3,CO4
	C	Calculation of w, q, QU and QH for processes involving changes in physical states.	CO3,CO4
	Unit 2	**Chemical Thermodynamics II**	
	A	Various statements of Second Law of thermodynamics, concept of entropy, Gibbs free energy and Helmholtz energy, Calculations of entropy change and free energy change for reversible and irreversible processes under isothermal and adiabatic conditions.	CO3,CO4
	B	Criteria of spontaneity. Gibbs – Helmholtz equation. Maxwell's	CO3,CO4

		relations.	
	C	Statement of Third Law of thermodynamics and calculation of absolute entropies of substances.	CO3,CO4
	Unit 3	**Compounds of s block elements**	
	A	Concept of multicentre bonding (diborane).	CO1
	B	Structure, bonding and their important properties like oxidation/reduction, acidic/basic nature of the following compounds.	CO1
	C	Their applications in industrial, organic and environmental chemistry.	CO1
	Unit 4	**Compound of p block elements**	
	A	Hydrides and their classification (ionic, covalent and interstitial), structure and properties with respect to stability of hydrides of p- block elements.	CO1
	B	Hydrides of nitrogen (NH3, N2H4, N3H, NH2OH). Oxoacids of P, S and Cl.	CO1
	C	Halides and oxohalides: PCl3, PCl5, SOCl2 and SO2Cl2.	CO1
	Unit 5	**Aromatic Hydrocarbons**	
	A	Preparation (Case benzene): from phenol, by decarboxylation, from acetylene, from benzene.	CO2
	B	Sulphonic acid. Reactions : (Case benzene) : Electrophilic substitution: nitration, halogenation and sulphonation. Friedel-Craft's reaction (alkylation and acylation). (Upto 4 carbons on benzene).	CO2
	C	Side chain oxidation of alkyl benzenes (Upto 4 carbons on benzene).	CO2
	Mode of examination	Theory	
	Weightage Distribution	CA / MTE / ETE	
		30% / 20% / 50%	
	Text book/s*	Arun Bahl and B. S. Bahl: Advanced Organic Chemistry, S. Chand	
	Other References	-	

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3

CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch: 2019-20**	
Program: FSB		**Current Academic Year: 2019**	
Branch: Forensic Science		**Semester: 2nd**	
1	Course Code	FSB153	
2	Course Title	Chemistry Lab	
3	Credits	2	
4	Contact Hours (L-T-P)	0-0-4	
	Course Status	Compulsory	
5	Course Objective	1. To develop a sense for purification of organic compound. 2. To have an overview estimate of sodium carbonate. 3. To have the knowledge of different chemical compounds in the mixture.	
6	Course Outcomes	CO1: Learn the process of crystallization and distillation. CO2: Estimation of different chemical compounds in a mixture. CO3: Will be able to differentiate between anions and cations with the help of qualitative analysis. CO4: Able to understand the estimation of sodium carbonate.	
7	Course Description	After the completion of this course students will be able to develop a sense of process of purification of organic compound and also have the knowledge of different chemical compounds in the mixture.	
8	Outline syllabus		CO Mapping
	Unit 1	**Purification of organic compounds by crystallization (from water and alcohol) and distillation**.	**CO1**
		• Briefing • Demo • Practical	

	Unit 2	**Semi-micro qualitative analysis using H2S of mixtures not more than four ionic species (two anions and two cations and excluding insoluble salts) out of the following: Cations : Al3+, Ca2+, K+, Anions : Cl–, Br– , I–, F.**	**CO1, CO2**
		• Briefing • Demo • Practical	
	Unit 3	**Estimation of sodium carbonate using standardized HCl.**	**CO3**
		• Briefing • Demo • Practical	
	Unit 4	**Estimation of carbonate and hydroxide present together in a mixture.**	**CO3**
		• Briefing • Demo • Practical	
	Unit 5	**Estimation of carbonate and bicarbonate present together in a mixture.**	**CO4**
		• Briefing • Demo • Practical	
	Mode of examination	Practical/Viva	
	Weightage Distribution	CA: 60% / MTE: 0% / ETE: 40%	
	Text book/s*	B.D Khosla- Chemistry Practical book	
	Other References	Ahluwalia- Chemistry Practical Book	

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3

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

School: SAHS		**Batch : 2019-20**	
Program: FSB		**Current Academic Year: 2019**	
Branch: Forensic Science		**Semester: 2nd**	
1	Course Code	FSB120	
2	Course Title	Zoology	
3	Credits	3	
4	Contact Hours (L-T-P)	2-1-0	
	Course Type	Compulsory	
5	Course Objective	**1-**To identify the structural elements of protein, basic features of enzymes. **2-** Understanding Mendel's law and crossing mechanism. **3-** Able to describe central dogma.	
6	Course Outcomes	CO1: Able to define laws of genetics. CO2: To demonstrate and understanding of fundamental biochemical principles. CO3: Able to explain the process of replication, transcription and translation. CO4: Able to evaluate conclusion based on genetics data.	
7	Course Description	The students will have the knowledge and basic concepts of inheritance, will be able to apply the law of segregation and independent assortment in the human population.	
8	Outline syllabus		CO Mapping
	Unit 1	**Mendelian Genetics**	
	A	Concept of Dominance (Complete, Incomplete, and Co-dominance); Laws of Heredity: Segregation, Independent Assortment, Molecular biology of wrinkled seed; Test Cross, Back Cross.	CO1, CO4
	B	Modifications in Mendelian Di-hybrid Ratio; Epistasis, Pleiotropy, Multiple Allelism in Human Blood System,	CO1, CO4
	C	Human Mendelian Traits.	CO1, CO4
	Unit 2	**Sex Determination and Inheritance**	
	A	Sex determination in Drosophila: Chromosomal theory, origin of Gynanders and Intersexes, Genetic balance. Sex chromosome	CO1, CO4

		system and sex determination: XX/XO, XX/XY, ZZ/ZW and haploidy/ dipolidy type	
	B	Sex determination in human: Gene Dosage Compensation and Molecular basis of X-chromosome inactivation.	CO1, CO4
	C	Cytoplasmic inheritance: Sigma factor in Drosophila, Kappa particle inheritance. Chromosomal aneuploidy in human beings.	CO1, CO4
	Unit 3	**Chromosomes, DNA and Mutation**	
	A	Composition of chromatin and structural organization, Nucleosome model. Giant chromosomes: Lampbrush chromosomes and Polytene chromosomes.	CO1, CO4
	B	Chemistry of nucleic acids, DNA as genetic materials and Structural variants of DNA, DNA replication: Process, origin of replication, unwinding of DNA helix, role of primers, elongation, DNA repair mechanisms	CO1, CO4
	C	MUTATION : Point Mutation, Single gene disorder, Genetic Anomaly /Disorders/syndrome:- Down Syndrome, Turner's syndrome, Klinefelter syndromes chronic myeloid leukemia and "cri -du -chat" syndrome.	CO1, CO4
	Unit 4	**Gene Expression and rDNA technology**	
	A	Transcription and Translation in Prokaryotes. Post transcriptional modifications.	CO2
	B	Regulation of gene expression, Lac Operon and Tryp Operon.	CO2
	C	rDNA Technology: Introduction, Cloning Vectors, Restriction Enzymes and Cloning Methods, PCR, Gene Transfer Methods, Microarray. Ethical Issues in Genetics and Molecular Biology.	CO2
	Unit 5	**Biochemistry**	
	A	Elementary knowledge of functional groups (alcohols, thioalcohols acids, aldehydes, ketones, and amines) and their reaction; Hydrogen ion concentration and buffering mechanism	CO3
	B	Classification of carbohydrates; Characteristics of monosaccharides; Chemical classification of amino acids; Peptide Linkage; Types of Lipids; Hydrolysis of fats	CO3
	C	Enzymes: Types of enzymes; Conditions for enzymatic activity .Vitamins: Types of vitamins and micronutrients.	CO3
	Mode of	Theory	

	examination				
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	-			
	Other References	-			

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch: 2019-20**
Program: FSB		**Current Academic Year: 2019**
Branch: Forensic Science		**Semester: 2nd**
1	Course Code	FSB155
2	Course Title	Zoology Lab
3	Credits	2
4	Contact Hours (L-T-P)	0-0-4
	Course Status	Compulsory
5	Course Objective	1. To develop the knowledge of pattern of inheritance in human population. 2. To develop a sense between the sex influenced traits of long and short second finger. 3. Use to identify the presence of barr body in the buccal cavity.
6	Course Outcomes	CO1: Will be able to differentiate the sex influenced traits. CO2: Able to apply principle of segregation and independent assortment using color beads. CO3: Gain the knowledge of inheritance of morphogenetic traits in human population. CO4: Identify the presence of barr body in female buccal cavity.
7	Course Description	The students will have the knowledge and basic concepts of inheritance, will be able to apply the law of segregation and independent assortment in the human population.

8	Outline syllabus				CO Mapping
	Unit 1	**Simulation of principles of segregation and independent assortment using coloured beads. Application of law of probability.**			**CO1**
		• Briefing • Demo • Practical			
	Unit 2	**Study of pattern of inheritance in human population of the traits Rolling of tongue and interlocking.**			**CO3**
		• Briefing • Demo • Practical			
	Unit 3	**Study of the sex-influenced trait long vs. short second finger in relation to the Fourth finger (apply Hardy-Weinberg law.**			**CO2**
		• Briefing • Demo • Practical			
	Unit 4	**Study of mutants in Drosophila (Bar eye, white eye, yellow body, sepia eye, curled wing, Dumpy wing, vestigial wing and sepia eye-curled wing and curled wing-ebony body-sepia Eye.**			**CO4**
		• Briefing • Demo • Practical			
	Unit 5	**Identify the presence of Barr body in the female buccal cavity.**			**CO4**
		• Briefing • Demo • Practical			
	Mode of examination	Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	
	Text book/s*	-			

	Other References	-	

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch : 2019-20**	
Program: FSB		**Current Academic Year: 2019**	
Branch: Forensic Science		**Semester: 2nd**	
1	Course Code	FSB119	
2	Course Title	Botany	
3	Credits	3	
4	Contact Hours (L-T-P)	2-1-0	
	Course Type	Compulsory	
5	Course Objective	**1-** Focusing on main metabolic pathway in a living cell. **2-** Describe the distinguish traits of liverworts, hornworts and mosses **3-** Understand the scope and importance of plant pathology.	
6	Course Outcomes	CO1: They will be able to identify living entities that causes diseases in plants. CO2: Describe the general spore disposal mechanism of moss CO3: Classify Bryophytes and Teridophytes. CO4: Able to describe structure function and mechanism of action of enzymes.	
7	Course Description	On the completion of this course the students will have the knowledge and general account of morphology and characteristics of bryophytes and pteridophytes.	
8	Outline syllabus		CO Mapping
	Unit 1	**Phytopathology**	
	A	Terms and concepts; General symptoms; Geographical distribution of diseases; Etiology; Symptomology; Host-Pathogen relationships; Disease cycle and environmental relation; prevention and control of plant diseases.	CO1

	B	Bacterial diseases**:** Citrus canker and angular leaf spot of cotton. Viral diseases**:** Tobacco Mosaic viruses, vein clearing.	CO1
	C	Fungal diseases**:** Early blight of potato, Black stem rust of wheat, White rust of crucifers.	CO1
	Unit 2	**Mycology**	
	A	Mycology: Role of fungi in biotechnology; Application of fungi in food industry (Flavour & texture, Fermentation, Baking, Organic acids, Enzymes, Mycoproteins)	CO2
	B	Secondary metabolites (Pharmaceutical preparations); Agriculture (Biofertilizers); Mycotoxins.	CO2
	C	Biological control (Mycofungicides, Mycoherbicides, Mycoinsecticides, Myconematicides); Medical mycology.	CO2
	Unit 3	**Bioenergetics and Enzymes**	
	A	Bioenergetics**:** Laws of thermodynamics, concept of free energy, endergonic and exergonic reactions, coupled reactions, redox reactions. ATP: structure, its role as an energy currency molecule.	CO4
	B	Enzymes: Structure of enzyme: holoenzyme, apoenzyme, cofactors, coenzymes and prosthetic group; Classification of enzymes.	CO4
	C	Features of active site, substrate specificity, mechanism of action (activation energy, lock and key hypothesis, induced - fit theroy), Michaelis – Menten equation, enzyme inhibition and factors affecting enzyme activity.	CO4
	Unit 4	**Bryophytes**	
	A	Bryophytes**:** General characteristics, adaptations to land habit, Classification, Range of thallus organization. Classification (up to family).	CO3
	B	Morphology, anatomy and reproduction of Marchantia and Funaria. (Developmental details not to be included).	CO3
	C	Ecology and economic importance of bryophytes with special mention of *Sphagnum*.	CO3
	Unit 5	**Pteridophytes**	
	A	General characteristics, classification, Early land plants (*Cooksonia* and *Rhynia*). Classification (up to family),	CO3
	B	Morphology, anatomy and reproduction of *Selaginella*, *Equisetum* and *Pteris*. (Developmental details not to be included). Heterospory and seed habit, stelar evolution	CO3
	C	Ecological and economical importance of Pteridophytes.	CO3

	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	-			
	Other References	-			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch: 2019-20**
Program: FSB		**Current Academic Year: 2019**
Branch: Forensic Science		**Semester: 2nd**
1	Course Code	FSB154
2	Course Title	Botany lab
3	Credits	2
4	Contact Hours (L-T-P)	0-0-4
	Course Status	Compulsory
5	Course Objective	1. To develop the knowledge about the morphology of Riccia. 2. To develop the sense of transverse section of internodes for equisetum. 3. To have an overview of fungi.
6	Course Outcomes	CO1: To gain knowledge about several Pteridophytes. CO2: To understand the morphology of Riccia. CO3: To gain the knowledge of Gnetum (Male and female cones). CO4: Prepare the temporary mount of bryophytes.
7	Course Description	On the completion of this course the students will have the knowledge and general account of morphology and characteristics of bryophytes and pteridophytes.

8	Outline syllabus				CO Mapping
	Unit 1	Riccia – Morphology of thallus.			**CO2**
		• Briefing • Demo • Practical			
	Unit 2	Equisetum- Morphology, transverse section of inter node, longitudinal section of strobilus.			**CO1**
		• Briefing • Demo • Practical			
	Unit 3	Gnetum- Morphology (stem, male & female cones), transverse section of stem			**CO3**
		• Briefing • Demo • Practical			
	Unit 4	Introduction to the world of fungi (Unicellular, coenocytic/septate mycelium, ascocarps & basidiocarps).			**CO3**
		• Briefing • Demo • Practical			
	Unit 5	Temporary mount and identification of Bryophytes.			**CO4**
		• Briefing • Demo • Practical			
	Mode of examination	Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	
	Text book/s*	-			
	Other References	-			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3

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

School: SAHS		**Batch : 2019-20**	
Program: FSB		**Current Academic Year: 2019**	
Branch: Forensic Science		**Semester: 2nd**	
1	Course Code	FSB121	
2	Course Title	English	
3	Credits	0	
4	Contact Hours (L-T-P)	2-0-0	
	Course Type	Compulsory	
5	Course Objective	**1.** To equip students to minimize the linguistic barriers emerging in a different environment. **2-** Help students to understand different accents and standardise their existing English **3-** Guide the students to hone the basic communication skills, listening, speaking and reading. .	
6	Course Outcomes	CO1: Develop writing skills CO2: Learn to use correct sentence structure and punctuation CO3: Develop Impressive Speaking Skills. CO4: Cultivate and develop reading habits	
7	Course Description	Help students to understand different accents and standardise their existing English.	
8	Outline syllabus		CO Mapping
	Unit 1	**Basic elements of grammar**	
	A	Subject verb agreement.	CO1, CO2
	B	Active and passive voice.	CO1, CO2
	C	Question Tags.	CO1, CO2
	Unit 2	**Vocabulary enhancement**	
	A	One word substitutes.	CO1, CO2

	B	Phrasal verbs.			CO1, CO3
	C	Formation of words: suffixes and prefixes.			CO1, CO2
	Unit 3	**Reading comprehension**			
	A	The Last Leaf by O Henry : Reading text and discussions.			CO3
	B	Where the mind is without fear by Rabindranath Tagore : Critical appreciation and discussions.			CO3
	C	Comprehension and vocabulary based exercise.			CO3
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		100%	-	-	
	Text book/s*	-			
	Other References	-			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch : 2019-20**
Program: FSB		**Current Academic Year: 2019**
Branch: Forensic Science		**Semester: 3rd**
1	Course Code	FSB123
2	Course Title	Forensic Science-III
3	Credits	3
4	Contact Hours (L-T-P)	2-1-0
	Course Type	Compulsory
5	Course Objective	**1-** Complete and thorough knowledge regarding the various aspects of forensic serology. **2-** Develop and apply critical thinking and analytical skill of anthropology. **3-** Explains the key concept in population evolutionary and quantitative

		genetics.	
6	Course Outcomes	CO1: Able to identify and examine all biological fluids. CO2: Understand the range of molecular lab techniques used routinely in human forensic analysis and population genetics analysis. CO3: Describe cultural systems construction differently for various human groups. CO4: Able to explain different diversities.	
7	Course Description	After the completion of this course students will be able to have the knowledge of human skeletal system and differentiation between human and animal remains, about genetics related to Investigation and also all about the body fluids.	
8	Outline syllabus		CO Mapping
	Unit 1	**Forensic Biology and Serology I**	
	A	Analysis of Biological Fluid, Saliva, Semen, Vaginal Fluid, Urine, Sweat, Serological Concepts.	CO1, CO2
	B	Antigen /Antibodies, Polyclonal antibodies, Monoclonal antibodies, Antiglobulin. Serological Techniques, Electrophoretic Methods – Agarose gel, SDS, Natured/Denatured.	CO1, CO2
	C	Identification of Blood, Properties, Blood Grouping – Human & Non-human, Presumptive & Confirmatory Tests.	CO1, CO2
	Unit 2	**Forensic Biology and Serology II**	
	A	Human & Animal Hair morphology. Determination of human and animal origin from bones, hairs, nails, skin. Body tissue fluids / strains viz. blood, menstrual blood, semen, saliva, sweat, pus, vomit, etc., through immunodiffusion and immune – electrophoresis	CO1, CO2
	B	Serogenetic markers: - Blood groups – biochemistry and genetics of ABO, Rh, Mn systems, stains and other fluids / stains viz. menstrual blood, semen, saliva, sweat, tear, pus, vomit, hair, bone, nail blood specific ABH substances.	CO1, CO2
	C	Determination of secretor / non secretor Lewis antigen, Bombay Blood group, Polymorphic enzymes typing – PGM, GLO, ESD, EAP, AK, ADA, etc., and their forensic significance, HLA typing, role serogenetic markers in individualization, paternity	CO1, CO2

		disputes etc.	
	Unit 3	**Genetics and DNA**	
	A	• Structural & definitive properties of Chromosomes o Human Genome o Deoxyribose Nucleic Acid – Structural properties o Sources of DNA evidence ❖ DNA Extraction o Basic Principles o Method of DNA extraction ❖ DNA Quantification	CO1, CO2, CO3
	B	o Slot Blot Assay o Southern /Northern Blotting ❖ DNA Amplification by Polymerase Chain Reaction ❖ DNA Electrophoresis ❖ DNA databasing	CO1, CO2, CO3
	C	History of DNA fingerprinting, Human genetics – Heredity, Alleles, Mutations & Population Genetic, Molecular Biology of DNA.	CO1, CO2, CO3
	Unit 4	**Forensic Biotechnology**	
	A	Forensic Application of recombinant DNA technology/ Forensic Biotechnology, Human Genome Project, Variations, Polymorphism in DNA system – DNA markers RELP, RAPD, VNTRs, SNP, Autosomal – STR, Y-STR, Mitochondrial DNA.	CO1, CO2,CO3
	B	ForensicSignificance of DNA Profiling: - Application in disputed paternity cases, child swapping, Missing person's identity – immigration, veterinary & wild life and Agriculture cases, legal perspectives – legal standards for admissibility of DNA profiling, procedural and ethical concerns, status of development of DNA profiling in India and abroad.	CO1, CO2,CO3
	C	New and future technologies: DNA chips, SNPs and limitations of DNA Profiling..	CO1, CO2, CO3
	Unit 5	**Anthropology**	
	A	Introduction & History of Anthropology, Physical Anthropology & Human Variability, Understanding Archeology & Osteology, Scene Processing, Examining	CO1, CO2, CO3

		remains – Human or Animal / Old or New, Issues involved in development of biological profile, Issues in Identification, Age estimation in childhood and adulthood, Sexual Dimorphism, Population Ancestry, Stature estimation, Individualization & Identification, Evidence for cause and manner of death from bones, Documentation & Expert Witness Testimony.			
	B	Portrait Parle, Bertillon system, Facial reconstruction, Super- imposition techniques, Reconstruction based on craniometric and somatoscopic methods. Importance of tissue depth to reconstruct various facial features.			CO1, CO2, CO3
	C	Introduction & History of Odontology, Dental Training required, Expert Witness Testimony, Body Identification by Dental Records, Post Mortem Examination & Records, Antemortem examination & records, Record Analysis & Processing, Forensic Dentistry in Mass Disasters, Bite Mark, Collection of Bite mark evidence & comparison. Analysis – Time of Death, Response of Assailant or Victim.			CO1, CO2, CO3
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	Dr. R. Krishnamurty- Forensic biology			
	Other References	R.Li- Forensic biology			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch: 2019-20**
Program: FSB		**Current Academic Year: 2019**
Branch: Forensic Science		**Semester: 3rd**
1	Course Code	FSB156
2	Course Title	Forensic Science-III Lab
3	Credits	2

4	Contact Hours (L-T-P)	0-0-4	
	Course Status	Compulsory	
5	Course Objective	1. To develop knowledge about the age and sex. 2. To have an overview of long bones. 3. Use to identification and description of bones and their measurement.	
6	Course Outcomes	CO1: Able to determine the stature from long bones. CO2: To gain knowledge about how to differentiate the age and sex from skull, teeth and pelvic bone. CO3: To identify the human bones. CO4: To estimate stature of long bones.	
7	Course Description	After the completion of this course students will be able to have the knowledge of human skeletal system and differentiation between human and animal remains.	
8	Outline syllabus		CO Mapping
	Unit 1	**To determine the age from skull and teeth.**	**CO2**
		• Briefing • Demo • Practical	
	Unit 2	**To determine of sex from skull**	**CO2**
		• Briefing • Demo • Practical	
	Unit 3	**To determine sex from pelvis bone**	**CO3**
		• Briefing • Demo • Practical	
	Unit 4	**To study identification and description of bones and their measurements.**	**CO3**
		• Briefing • Demo • Practical	
	Unit 5	**To estimate stature from long bones.**	**CO4**

		• Briefing • Demo • Practical			
	Mode of examination	Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	
	Text book/s*	-			
	Other References	-			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch : 2019-20**
Program: FSB		**Current Academic Year: 2019**
Branch: Forensic Science		**Semester: 3rd**
1	Course Code	FSB124
2	Course Title	Physics-III
3	Credits	3
4	Contact Hours (L-T-P)	2-1-0
	Course Type	Compulsory
5	Course Objective	**1-** Basic knowledge of electrical quantities for understanding the impact of technologies. **2-** Explains electrostatic induction & polarization. **3-** Demonstrate the application of laser.
6	Course Outcomes	CO1: Explain working principles of laser. CO2: Analyse the intensity variation of light due to polarization, interference and diffraction.

		CO3: Able to apply all laws of electricity. CO4: Define AC and DC circuits along with its applications.	
7	Course Description	After the completion of this course students will be able to determine the wavelength and variations of magnetic fields.	
8	Outline syllabus		CO Mapping
	Unit 1	**Electricity and Magnetism- I**	
	A	Electric charge, Coulomb's law, electric field, Gauss law Electric potential, capacitance and dielectrics.	CO1, CO2
	B	Electric current, resistance, electromotive force, Ohm's law DC circuits, Kirchhoff's rules.	CO1, CO2
	C	Magnetic field due to a magnet, terrestrial magnetism Force on a charge in electric and magnetic fields.	CO1, CO2
	Unit 2	**Electricity and Magnetism II**	
	A	Biot-Savart law, Ampere's law.	CO1, CO2
	B	Faraday's law, Lenz's Law, Electromagnetic induction, Inductors, Self and mutual inductance.	CO1, CO3
	C	AC circuits, phasor diagrams.	CO1, CO2
	Unit 3	**Electric Machines and Relative Theories**	
	A	Electric machines: Transformers, electric motors and generators.	CO1, CO3
	B	Maxwell's equations, displacement current.	CO1, CO3
	C	Electromagnetic waves.	CO1, CO3
	Unit 4	**Optics I**	
	A	Reflection, refraction, total internal reflection, polarization.	CO1, CO3
	B	Thin lens, thick lens and lens combinations, aberrations.	CO1, CO3
	C	Interference and diffraction, interference in thin films, Young's double slit experiment, single slit diffraction.	CO1, CO3
	Unit 5	**Optics II**	
	A	Diffraction gratings, spectra, simple spectrophotometer.	CO1, CO3
	B	Laser physics: types, properties, production and applications of Lasers.	CO1, CO3
	C	Optical fibers, angle of acceptance and numerical aperture, losses, applications of optical fibers.	CO1, CO3
	Mode of examination	Theory	
	Weightage Distribution	CA: 30% / MTE: 20% / ETE: 50%	
	Text book/s*	College physics- Serway and Vuille, Principles of physics- Halliday & Resnick.	
	Other References	Sear's & Zemansky's University physics- Young and Freedman.	

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch: 2019-20**	
Program: FSB		**Current Academic Year: 2019**	
Branch: Forensic Science		**Semester: 3rd**	
1	Course Code	FSB157	
2	Course Title	Physics-III Lab	
3	Credits	2	
4	Contact Hours (L-T-P)	0-0-4	
	Course Status	Compulsory	
5	Course Objective	1. To develop a sense to determine the variation of magnetic field. 2. To have an overview of hysteresis curve. 3. Use to identify the speed of light.	
6	Course Outcomes	CO1: Understand to determine the wavelength of monochromatic light source by Frensel's biprism. CO2: Students will be able to determine the variation of magnetic field. CO3: To gain knowledge how to draw hysteresis curve. CO4: To evaluate the speed of light using Michelson morley experiment.	
7	Course Description	After the completion of this course students will be able to determine the wavelength and variations of magnetic fields.	
8	Outline syllabus		CO Mapping
	Unit 1	**To determine the variation of magnetic field along the axis of a current carrying coil and estimate the radius of the coil.**	**CO2**
		• Briefing • Demo • Practical	
	Unit 2	**To draw hysteresis curve (B-H curve) of a specimen in the form of a transformer on a C.R.O. And to determine its**	**CO3**

		hysteresis loss.	
		• Briefing • Demo • Practical	
	Unit 3	**To determine the specific resistance of the material of a given wire using Carey Foster's bridge.**	**CO1**
		• Briefing • Demo • Practical	
	Unit 4	**Find the speed of light using Michelson-Morley experiment.**	**CO4**
		• Briefing • Demo • Practical	
	Unit 5	**To determine wavelength of monochromatic light source (λ) by Fresnel's bi-prism.**	**CO1**
		• Briefing • Demo • Practical	
	Mode of examination	Practical/Viva	
	Weightage Distribution	CA: 60% / MTE: 0% / ETE: 40%	
	Text book/s*	B.Sc. Practical Physics- Harman Singh and PS Hemne.	
	Other References	-	

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch : 2019-20**	
Program: FSB		**Current Academic Year: 2019**	
Branch: Forensic Science		**Semester: 3rd**	
1	Course Code	FSB125	
2	Course Title	Chemistry-III	
3	Credits	3	
4	Contact Hours (L-T-P)	2-1-0	
	Course Type	Compulsory	
5	Course Objective	**1-** Comparing and contrasting kinetic and potential energy **2-** significance of the no., position in nuclear magnetic resonance spectra. **3-** Predict the direction and relative magnitudes of the dipole moments of molecules.	
6	Course Outcomes	CO1: To understand the meaning of term transition element and gain an appreciation of the characteristic properties of transition element CO2: Able to identify and solve chemical problems and explore new areas of research. CO3: Explains the bond angle for the hydride of all the elements through f using both the vsepr and hybridization model. CO4: To describe le-chatelier's principle and its applications.	
7	Course Description	After the completion of this course students will be able to evaluate and identify the heat capacity, enthalpy, melting point and mechanisms of several compounds.	
8	Outline syllabus		CO Mapping
	Unit 1	**Thermochemistry**	
	A	Important principles and definitions of thermochemistry. Concept of standard state and standard enthalpies of formations, integral and differential enthalpies of solution and dilution.	CO1, CO2
	B	Calculation of bond energy, bond dissociation energy and resonance energy from thermochemical data.	CO1, CO2
	C	Variation of enthalpy of a reaction with temperature – Kirchhoff's equation.	CO1, CO2
	Unit 2	**Chemical Equilibrium**	
	A	Free energy change in a chemical reaction. Thermodynamic derivation of the law of chemical equilibrium.	CO1, CO2
	B	Distinction between Q*G* and Q*G*ɵ, Le Chatelier's principle.	CO1, CO3
	C	Relationships between *Kp, Kc* and *Kx* for reactions involving ideal gases.	CO1, CO2
	Unit 3	**Transition Elements (3rd series)**	

	A	General group trends with special reference to electronic configuration, variable valency, colour, magnetic and catalytic properties, ability to form complexes and stability of various oxidation states (Latimer diagrams) for Mn, Fe and Cu.			CO3, CO4
	B	Lanthanides and actinides**:** Electronic configurations, Oxidation states, colour, magnetic properties.			CO3, CO4
	C	lanthanide contraction, separation of lanthanides (ion-exchange method only).			CO3, CO4
	Unit 4	**Alkyl Halide**			
	A	Alkyl Halides: (Upto 5 Carbons) Types of Nucleophilic Substitution (SN2, SN1 and SNi) reactions.			CO3, CO4
	B	*Preparation:* from alkenes *and* alcohols. *Reactions:* hydrolysis, nitrite & nitro formation, nitrile & iso-nitrile formation.			CO3, CO4
	C	Williamson's ether synthesis: Elimination vs substitution.			CO3, CO4
	Unit 5	**Aryl Halides**			
	A	Aryl Halides **:** *Preparation:* (Chloro, bromo and iodo-benzene case): from phenol, Sandmeyer & Gattermann reactions			CO3, CO4
	B	*Reactions (Chlorobenzene):* Aromatic nucleophilic substitution (replacement by –OH group) and effect of nitro substituent. Benzyne Mechanism: KNH2/NH3 (or NaNH2/NH3).			CO3, CO4
	C	Reactivity and Relative strength of C-Halogen bond in alkyl, allyl, benzyl, vinyl and aryl halides.			CO3, CO4
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	-			
	Other References	-			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch: 2019-20**
Program: FSB		**Current Academic Year: 2019**
Branch: Forensic Science		**Semester: 3rd**
1	Course Code	FSB158

2	Course Title	Chemistry-III Lab	
3	Credits	2	
4	Contact Hours (L-T-P)	0-0-4	
	Course Status	Compulsory	
5	Course Objective	1. To develop the knowledge of determination of heat capacity. 2. Use to estimation of magnesium and zinc by titration using EDTA. 3. To have an overview preparation and mechanism of various reactions.	
6	Course Outcomes	CO1: To evaluate the heat capacity of calorimeter for different volumes. CO2: To identify the melting point of bromination of phenol/ aniline. CO3: Understand the preparation and mechanism of various reactions. CO4: Determine the enthalpy of neutralization of hydrochloric acid with sodium hydroxide.	
7	Course Description	After the completion of this course students will be able to evaluate and identify the heat capacity, enthalpy, melting point and mechanisms of several compounds.	
8	Outline syllabus		CO Mapping
	Unit 1	**Determination of heat capacity of calorimeter for different volumes.**	**CO1**
		• Briefing • Demo • Practical	
	Unit 2	**Determination of enthalpy of neutralization of hydrochloric acid with sodium hydroxide.**	**CO4**
		• Briefing • Demo • Practical	
	Unit 3	**Preparations: Mechanism of various reactions involved to be discussed. Recrystallisation, determination of melting point and calculation of quantitative yields to be done.**	**CO1, CO2**
		• Bromination of Phenol/Aniline • Benzoylation of amines/phenols • Oxime and 2,4 dinitrophenylhydrazone of aldehyde/ketone	

	Unit 4	**Estimation of (i) Mg2+ or (ii) Zn2+ by complexometric titrations using EDTA.**			**CO3**
		• Briefing • Demo • Practical			
	Unit 5	**Estimation of total hardness of a given sample of water by complexometric titration.**			**CO2**
		• Briefing • Demo • Practical			
	Mode of examination	Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	
	Text book/s*	B.D Khosla- Chemistry Practical book			
	Other References	Ahluwalia- Chemistry Practical Book			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch : 2019-20**
Program: FSB		**Current Academic Year: 2019**
Branch: Forensic Science		**Semester: 3rd**
1	Course Code	FSB127
2	Course Title	Zoology-III
3	Credits	3
4	Contact Hours (L-T-P)	2-1-0
	Course Type	Compulsory
5	Course Objective	**1-** Demonstrate all characteristic of vertebrates.

		2- Effectively understand and convey scientific material from peer reviewed sources **3-** Review methods of estimating toxicity	
6	Course Outcomes	CO1: Able identify all organs and organ system of vertebrates. CO2: Critically evaluate and interpret scientific data information and lab result CO3: Demonstrate & understanding of legal, regulatory and ethical consideration related to toxicology. CO4: Apply the scientific methods and quantitative techniques to describe, monitor and understand environmental system.	
7	Course Description	After the completion of this course the students will be able to determine the scales and skeletal structure of vertebrates, they will also be able to understand the structure of scales, about toxicological elements present in environment.	
8	Outline syllabus		CO Mapping
	Unit 1	**Anatomy of Vertebrates I**	
	A	Integumentary System; Derivatives of integument w.r.t. glands and digital tips.	CO1, CO2
	B	Skeletal System; Evolution of visceral arches.	CO1, CO2
	C	Digestive System, Brief account of alimentary canal and digestive glands.	CO1, CO2
	Unit 2	**Anatomy of Vertebrates II**	
	A	Respiratory System Brief account of Gills, lungs, air sacs and swim bladder.	CO1, CO2
	B	Circulatory System; Evolution of heart and aortic arches, Urinogenital System; Succession of kidney, Evolution of urinogenital ducts.	CO1, CO2
	C	Nervous System Comparative account of brain, Sense Organs; Types of receptors, Control of Development– Gene activation, determination, induction, Differentiation, morphogenesis, intercellular communication, cell movements and cell death.	CO1, CO2
	Unit 3	**Environmental Toxicology**	
	A	Introduction and scope of toxicology.	CO3, CO4
	B	Survey of environmental toxicants and their biological and ecological ill-effects.	CO3, CO4
	C	Dose-response relationship: Graded, quantal and cumulative responses.	CO3, CO4
	Unit 4	**Toxicological Testimony, Methods and Translocation**	
	A	Outline of toxicological testing methods: Mortality tests (LC50/LD50 and safety margins/ Limits); Acute, subacute and chronic testing of local and systemic effects (Skin; Eye; Behavioural; Biochemical; Physiological; Histopathological; Haematological; Reproductive; Teratogenic; Carcinogenic).	CO3, CO4
	B	Translocation of chemicals: Membrane barriers; Storage depots;	

		Biotransformation sites; mixed multifunction oxidases. Selective toxicity in relation to translocation and biotransformation factors.			
	C	Outline of antidotal procedures.			CO3, CO4
	Unit 5	**Environmental Biology**			
	A	Ecosystem: General organization; Trophic structure; Energy flow; Ecological Pyramids; Basic types of biogeochemical cycles (chiefly nitrogen, phosphorus and sulphur).			CO3, CO4
	B	Community: Basic structure; Species diversity, dominance, distribution and succession. Population: Interspecific and intraspecific relations.			CO3, CO4
	C	Population in relation to public health. Conservation of natural resources with particular reference to wild Life conservation in India (chief endangered species and concept of wild Life reserves).			CO3, CO4
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	-			
	Other References	-			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch: 2019-20**
Program: FSB		**Current Academic Year: 2019**
Branch: Forensic Science		**Semester: 3rd**
1	Course Code	FSB160
2	Course Title	Zoology-III Lab
3	Credits	2
4	Contact Hours (L-T-P)	0-0-4
	Course Status	Compulsory
5	Course Objective	1. Develop the knowledge about Placoid, Cycloid scales.

		2. To have an overview of skeletal structure of vertebrates. 3. Develop the sense of induction of organo phosphorus poisoning.			
6	Course Outcomes	CO1: To gain the knowledge about the skeletal of vertebrates. CO2: To learn drug abuse schedules and control prescription. CO3: To identify the toxicity by the investigation. CO4: Able to understand the placoid, cycloid scales.			
7	Course Description	After the completion of this course the students will be able to determine the scales and skeletal structure of vertebrates, they will also be able to understand the structure of scales.			
8	Outline syllabus				CO Mapping
	Unit 1	**Study of placoid, cyclooid and ctenoid scales through permanent slides.**			**CO4**
		• Briefing • Demo • Practical			
	Unit 2	**Disarticulated skeleton of vertebrates**			**CO3**
		• Briefing • Demo • Practical			
	Unit 3	**Investigation used in diagnosis and management of toxicity.**			**CO2**
		• Briefing • Demo • Practical			
	Unit 4	**Drug abuse schedules and control prescription.**			**CO1**
		• Briefing • Demo • Practical			
	Unit 5	**Induction of organo phosphorus poisoning.**			**CO2**
		• Briefing • Demo • Practical			
	Mode of examination	Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	

	Text book/s*	-	
	Other References	-	

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch : 2019-20**	
Program: FSB		**Current Academic Year: 2019**	
Branch: Forensic Science		**Semester: 3rd**	
1	Course Code	FSB126	
2	Course Title	Botany-III	
3	Credits	3	
4	Contact Hours (L-T-P)	2-1-0	
	Course Type	Compulsory	
5	Course Objective	**1-** Review focus on sectors that effect the distribution and abundance of plant species **2-** To reconstruct the evolutionary history of plant life **3-** Differentiating vascular and non-vascular plant in terms of morphology and ecology.	
6	Course Outcomes	CO1: Enlist the variety of plant and their distinctive features. CO2: To recognize the major group of vascular plants and their phylogenetic relationship. CO3: Understand the habit, vegetative characteristic and plant morphology of angiosperm. CO4: Understand the diversity of gymnosperms.	
7	Course Description	After the completion of this course the students will be able to evolution and morphology of plants.	
8	Outline syllabus		CO Mapping
	Unit 1	**Plant Ecology**	
	A	Introduction, Ecological factors; Soil: Origin, formation,	CO1, CO2

		composition, soil profile. Water: States of water in the environment, precipitation types. Light and temperature: Variation Optimal and limiting factors.	
	B	Adaptation of hydrophytes and xerophytes. Plant communities; Characters; Ecotone and edge effect; Succession.	CO1, CO2
	C	Phytogeography; Principle biogeographical zones; Endemism.	CO1, CO2
	Unit 2	**Plant Taxonomy I**	
	A	Introduction to plant taxonomy; Identification, Classification, Nomenclature. Identification; Functions of Herbarium, important herbaria and botanical gardens of the world and India.	CO1, CO2
	B	Documentation: Flora, Keys: single access and multi-access, Taxonomic evidences from palynology, cytology, phytochemistry and molecular data.	CO1, CO3
	C	Taxonomic hierarchy; Ranks, categories and taxonomic groups Botanical nomenclature; Principles and rules (ICN); ranks and names; binominal system, typification, author citation, valid publication, rejection of names, principle of priority and its limitations.	CO1, CO2
	Unit 3	**Plant Taxonomy II**	
	A	Classification; Types of classification-artificial, natural and phylogenetic.	CO1, CO2
	B	Bentham and Hooker (upto series), Engler and Prantl (upto series).	CO1, CO2
	C	Biometrics, numerical taxonomy and cladistics; Characters; variations; character weighting and coding; cluster analysis; phenograms, cladograms (definitions and differences).	CO1, CO2
	Unit 4	**Gymnosperm**	
	A	General characteristics, classification. Classification (up to family).	CO4
	B	Morphology, anatomy and reproduction of *Cycas* and *Pinus*. (Developmental details not to be included).	CO4
	C	Ecological and economical importance.	CO4
	Unit 5	**Angiosperm**	
	A	Vegetative, Floral and Fruit morphology; Root: Different regions and general functions, types of root systems, Stem: Various parts, normal functions (Different types of buds, vegetative and reproductive), forms of stem.	CO3
	B	Leaf: Structure and normal functions. Simple and compound leaves, Seed: Definition, structure and types, Bracts, peduncle and inflorescence: Basic types and functions, Flower: Structure of a typical flower, definition and examples of different types of flowers. Introduction to the floral whorls.	CO3
	C	Fruits: Definitions of true, false and parthenocarpic fruits. Major types of fruits. Angiosperms: Unique features of angiosperms and diversity; identification, nomenclature and classification (Bentham & Hooker's system); primitive and advanced features;	CO3

		the international code of botanical nomenclature. Families: Major angiosperm families.			
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	-			
	Other References	-			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch: 2019-20**	
Program: FSB		**Current Academic Year: 2019**	
Branch: Forensic Science		**Semester: 3rd**	
1	Course Code	FSB159	
2	Course Title	Botany-III Lab	
3	Credits	2	
4	Contact Hours (L-T-P)	0-0-4	
	Course Status	Compulsory	
5	Course Objective	**1-** Review focus on sectors that effect the distribution and abundance of plant species **2-** To reconstruct the evolutionary history of plant life **3-** Differentiating vascular and non-vascular plant in terms of morphology and ecology.	
6	Course Outcomes	CO1: Understand about the Instruments used. CO2: To recognize the major group of vascular plants and their phylogenetic relationship. CO3: Understand the diversity of angiosperm. CO4: Understand the diversity of gymnosperms.	
7	Course Description	After the completion of this course the students will be able to determine evolution and morphology of plants.	
8	Outline syllabus		CO Mapping
	Unit 1	**Study of instruments used to measure microclimatic**	**CO1**

		variables: Soil Thermometer, anemometer, psychomotor/hygrometer, rain gauge and lux meter.	
		• Briefing • Demo • Practical	
	Unit 2	**Determination of pH of various soil and water sample**	
		• Briefing • Demo • Practical	CO1,CO2
	Unit 3	**Temporary slide preparation and identification of gymnosperms.**	**CO4**
		• Briefing • Demo • Practical	
	Unit 4	**Description, identification and classification of several angiosperms.**	**CO3**
		• Briefing • Demo • Practical	
	Unit 5	**Cycas-**	**CO3**
		• Briefing • Demo • Practical	
	Mode of examination	Practical/Viva	
	Weightage Distribution	CA: 60% / MTE: 0% / ETE: 40%	
	Text book/s*	-	
	Other References	-	

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3

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

School: SAHS		**Batch : 2019-20**	
Program: FSB		**Current Academic Year: 2019**	
Branch: Forensic Science		**Semester: 3rd**	
1	Course Code	FSB128	
2	Course Title	Psychology	
3	Credits	1	
4	Contact Hours (L-T-P)	1-0-0	
	Course Type	Compulsory	
5	Course Objective	**1-** Describes connection between knowledge gained in psychology to everyday life **2-** Describe selective attention and how illusion helps us to understand perception. **3-** To provide a solid foundation in criminal psychology	
6	Course Outcomes	CO1: Describe key concepts, principles and overreaching themes in psychology CO2: Explain how drugs effect consciousness CO3: Apply ethical standard to evaluate psychological practice. CO4: Demonstrate knowledge of the measure theoretical approaches and finding in psychology.	
7	Course Description	After the completion of this course the students will be able to know all about psychology used for Investigation.	
8	Outline syllabus		CO Mapping
	Unit 1	**Basics of Psychology**	
	A	History of psychology- Development of psychology, role of psychologist.	CO1, CO2
	B	Concept of psychology- Definition of psychology, goals of psychology.	CO1, CO2
	C	Different perspectives of psychology- Modern perspectives, Humanistic, cognitive, psychodynamic.	CO1, CO2
	Unit 2	**Psychological Research and Ethical issues**	
	A	The science and research method - Interview, observation.	CO1, CO3
	B	Case study method.	CO1, CO3

	C	Professional and Ethical issues in psychology - APA code of conduct for psychologist.			CO1, CO3
	Unit 3	**Consciousness and Perception**			
	A	Consciousness- Definition of consciousness, state of consciousness, Altered state of consciousness - Dreams, awake states including day dreaming.			CO1, CO3
	B	Sleep - Stages of sleep, Dreams - content, REM sleep and non - REM sleep. Altered state - Hypnosis, Meaning, Hypnotic Phenomena, Hypnotic stages. Attention and Awareness - Attention: Definition, characteristics.			CO1, CO3
	C	Sensation and perception - Basic concept in perception, problems in attention and perception, assessment attention and perception.			CO1, CO3
	Unit 4	**Psychology and Law**			
	A	Application of psychology in civil and legal proceedings - civil proceedings - assessment of civil competency, criminal proceedings.			CO4
	B	Mc Naughten rule insanity - nature of insanity, competency to stand trial.			CO4
	C	Assessment of personality - Questionnaires, Rating scales and Projective tests, Biological model assessment of Personality.			CO4
	Unit 5	**Investigative Psychology**			
	A	Criminal Profiling, Narco Analysis			CO4
	B	Polygraph Test			CO4
	C	BEOS			CO4
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	C.T.Morgan- Introduction to Psychology			
	Other References	R.J. Cohen- Psychological Testing and assessment			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch: 2019-20**	
Program: FSB		**Current Academic Year: 2019**	
Branch: Forensic Science		**Semester: 3rd**	
1	Course Code	FSB161	
2	Course Title	Psychology Lab	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Objective	**1-** Describes connection between knowledge gained in psychology to everyday life **2-** Describe selective attention and how illusion helps us to understand perception. **3-** To provide a solid foundation in criminal psychology	
6	Course Outcomes	CO1: Describe key concepts, principles and overreaching themes in psychology CO2: Explain how drugs effect consciousness CO3: Apply ethical standard to evaluate psychological practice. CO4: Demonstrate knowledge of the measure theoretical approaches and finding in psychology.	
7	Course Description	After the completion of this course the students will be able to know all about psychology used for Investigation.	
8	Outline syllabus		CO Mapping
	Unit 1	**To review a crime case involving serial murders. Comment on the psychological trail of the accused.**	**CO1**
		• Briefing • Demo • Practical	
	Unit 2	**To prepare a case report on Minnesota multiphase personality inventory test.**	**CO3**
		• Briefing • Demo • Practical	
	Unit 3	**To prepare a case report on thematic appreciation test**.	**CO4**
		• Briefing	

		• Demo • Practical	
	Unit 4	**To prepare a case report on thematic appreciation test**	**CO2**
		• Briefing • Demo • Practical	
	Unit 5	**To prepare a case report on word association test**	**CO3**
		• Briefing • Demo • Practical	
	Mode of examination	Practical/Viva	
	Weightage Distribution	CA: 60% / MTE: 0% / ETE: 40%	
	Text book/s*	-	
	Other References	-	

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch : 2019-20**
Program: FSB		**Current Academic Year: 2019**
Branch: Forensic Science		**Semester: 3rd**
1	Course Code	FSB-129
2	Course Title	English-III
3	Credits	0
4	Contact Hours (L-T-P)	2-0-0
	Course Type	Compulsory

5	Course Objective	**1-** To equip students to minimize the linguistic barriers emerging in a different environment. **2-** To equip students to minimize the linguistic barriers emerging in a different environment. **3-** To equip students to minimize the linguistic barriers emerging in a different environment.			
6	Course Outcomes	CO1: Understand the Importance of Communication CO2: Develop Impressive Speaking Skills. CO3: To be able to speak confidently in the English language CO4: Cultivate and develop reading habits			
7	Course Description	After the completion of this course the students will be able to minimize the linguistic barriers emerging in a different environment.			
8	Outline syllabus				CO Mapping
	Unit 1	**Basic elements of grammar**			
	A	Reported speech			CO1, CO2
	B	Conditional sentences: Type 1,2 &3			CO1, CO2
	C	Spotting the errors			CO1, CO2
	Unit 2	**Writing Skills**			
	A	Paragraph writing			CO1, CO2
	B	Summary writing			CO1, CO3
	C	Note making			CO1, CO2
	Unit 3	**Reading comprehension**			
	A	Short story : The Tiger in the Tunnel by Ruskin Bond			CO4
	B	An Astrologer's Day by R.K. Narayan from Malgudi Days			CO4
	C	Discussions and Text based activities on gerund, participle and infinitives.			CO4
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		100%	-	-	
	Text book/s*	-			
	Other References	-			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3

CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch : 2019-20**	
Program: FSB		**Current Academic Year: 2019**	
Branch: Forensic Science		**Semester: 3rd**	
1	Course Code	FSB122	
2	Course Title	Project-I	
3	Credits	1	
4	Contact Hours (L-T-P)	2-0-0	
	Course Status	Compulsory	
5	Course Objective	1. To know about the review of literature 2. To know about the research knowledge of particular topic. 3. To learn about the paper writing	
6	Course Outcomes	CO1: Understand the review of literature and its Importance. CO2: Understand about their topics CO3: Understand the related works about their topics CO4: Know to write the project and importance of it.	
7	Course Description	After completion of this project students will be able to understand about research methodology and development in their topics.	
8	Outline syllabus		CO Achievement
	Unit 1	**Introduction**	**CO2**
		A. Collect the material related to topic B. Make proper format C. Write it in your own words	
	Unit 2	**Case study**	**CO1, CO3**
		A. Collect the cases related to the topic B. Study the outcomes and analyse the shortcomings C. Include in your study	
	Unit 3	**Review of literature**	**CO1, CO3**
		A. Collect the research already done related to your topic B. Write it in your own language C. Proper formatting	

	Unit 4	**Conclusion**			**CO4**
		A. Write all what you have done in project B. If any more outcomes or more ideas can be used C. Formatting of project			
	Unit 5	**Finalisation & referencing**			**CO4**
		A. Writing of all references in proper format B. Do the final formatting C. Finalise whole project			
	Mode of examination	Jury/Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	
	Text book/s*	-			
	Other References				

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch : 2019-20**
Program: FSB		**Current Academic Year: 2019**
Branch: Forensic Science		**Semester: 4th**
1	Course Code	FSB130
2	Course Title	Forensic Science-IV
3	Credits	3
4	Contact Hours (L-T-P)	2-1-0
	Course Type	Compulsory
5	Course Objective	**1-** Able to understand the various types of drugs and toxic substances encountered in an investigation. **2-** To develop a basic level of knowledge around explosives **3-** Provides and introduction to the field of instrumentation
6	Course Outcomes	CO1: Will be able to describe varied toxicological science & symptoms of different toxins on body when administered.

		CO2: Learn about the basic of forensic chemistry CO3: Analyse the importance of petroleum products CO4: Examination of various forensic evidences on different instruments	
7	Course Description	After completion of this course student will be able to know about the Investigation and examination of chemicals, toxicological elements.	
8	Outline syllabus		CO Mapping
	Unit 1	**BASICS AND FORENSIC ASPECTS OF FORENSIC TOXICOLOGY**	
	A	Basics of Toxicology—Toxicology Introduction, Classification of Toxicology	CO1
	B	Forensic toxicology. Significance of toxicological findings. Techniques used in toxicology	CO1
	C	Toxicological analysis and chemical intoxication tests. Post-mortem Toxicology	CO1
	Unit 2	**TOXICOLOGICAL SUBSTANCES AND THEIR LEGAL PROCESSING**	
	A	Poisons-- Classification of poisons. Plant poisons, Animal poisons, Metallic Poisons. Physico-chemical Characteristics and mode of action of poisons. Accidental, suicidal and homicidal poisonings Signs and Symptoms of common poisoning and their antidotes. Metabolism and excretion of poisons	CO1, CO3
	B	Narcotics, Drugs and Psychotropic Substances-Definition of narcotics, drugs and psychotropic substances. Broad classification – Narcotics, stimulants, depressants and hallucinogens. General characteristics and common example of each classification. Drugs and psychotropic substances. Designer drugs. Tolerance, addiction and withdrawal symptoms of narcotics, drugs and psychotropic substance.	CO1, CO3
	C	Collection Preservation and analysis, Collection and preservation of viscera, blood and urine for various poison and drug cases. Introduction of Screening and Presumptive, chemical and instrumental analysis of drugs and poisons.	CO1, CO3
	Unit 3	**FORENSIC CHEMISTRY**	
	A	Introduction to Forensic chemistry, Chemical analysis of evidences: • Screening, sampling-methods of collection, different standard methods • Inorganic analysis • Micro-chemical method	CO3

	B	• General idea and basic principle of distillation, various types of distillation techniques • Sample treatment techniques – Centrifuge, Filtration, Evaporation, Crystallization • Distribution Law, Solvent extraction technique like LLE, SPE, SPME.	CO3
	C	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. • Food adulteration: Introduction, Prevention of food adulteration, Analytical techniques for analysis of exhibits involved in food and other material. • Characteristics, examination and legal aspects of gold, silver, sugar, salts, fertilizers, Detective dyes- cases and importance in trap cases.	CO3
	Unit 4	**FORENSIC EXPLOSIVES**	
	A	Petroleum and Petroleum Products- Commercial uses of different petroleum fractions. Analysis of traces of petroleum products in forensic exhibits. Adulteration of petroleum Products	CO3
	B	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	CO3
	C	Examination of scene of fire/arson, recognition and collection of evidence, packing labelling and forwarding of exhibits, and forensic detection of arson cases.	CO3
	Unit 5	**INSTRUMENTATION**	
	A	**GC:** Theoretical principles, instrumentations and technique, columns, stationary phases, detectors, Forensic applications. **HPLC:** theory, Instrumentation, Technique, column, detectors, LC-MS, Forensic applications. **Microscopy-** Stereomicroscope, Comparison microscope, Electron Microscopy TEM, SEM and their forensic Application. **Electrophoresis Technique:** General principles, Factors affecting electrophoresis, Sodium dodecylsulphate (SDS) Polyacrylamide	CO4

		gel electrophoresis, Agrose gel electrophoresis , Gel immune-diffusion, Immuno- electrophoresis			
	B	**Basic Spectroscopy**- Introduction, electromagnetic radiations, full range **AAS -** Introduction, Basic principles, Instrumentation and Techniques, Forensic applications. **MASS Spectroscopy** - Principle, Instrumentation and working, Forensic applications			CO4
	C	**UV-Visible –** principal absorbance, transmittance, Beer-Lambert's laws and its applications of UV-Visible **IR -**molecular spectra, electronics, vibrational, rotational spectra. Principles, diagrams, working and construction, uses and applications and IR spectroscopy.			CO4
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	Dr. S. N. Tiwari- Analytical methods in forensic Toxicology, Delvin S.- Explosives			
	Other References	Nicholas T Lappas- Forensic Toxicology			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch: 2019-20**
Program: FSB		**Current Academic Year: 2019**
Branch: Forensic Science		**Semester: 4th**
1	Course Code	FSB162
2	Course Title	Forensic Science- IV Lab
3	Credits	2
4	Contact Hours (L-T-P)	0-0-4
	Course Status	Compulsory/Elective
5	Course	**1-** Able to understand the various types of drugs and toxic substances

	Objective	encountered in an investigation. **2-** To develop a basic level of knowledge around explosives **3-** Provides and introduction to the field of instrumentation			
6	Course Outcomes	CO1: Will be able to describe varied toxicological science & symptoms of different toxins on body when administered. CO2: Learn about the basic of forensic chemistry CO3: Analyse the importance of petroleum products CO4: Examination of various forensic evidences on different instruments			
7	Course Description	After completion of this course student will be able to know about the Investigation and examination of chemicals, toxicological elements.			
8	Outline syllabus				CO Mapping
	Unit 1	**To carry out analysis of gasoline.**			**CO3**
		Brief Demonstration Experimentation			
	Unit 2	**To carry out analysis of diesel.**			**CO3**
		Brief Demonstration Experimentation			
	Unit 3	**To prepare a case report on a case involving arson.**			**C02**
		Brief Demonstration Experimentation			
	Unit 4	**To separate explosive substances using Thin Layer Chromatography**			**CO4**
		Brief Demonstration Experimentation			
	Unit 5	**To separate drugs of abuse by Thin Layer chromatography.**			**CO4**
		Brief Demonstration Experimentation			
	Mode of examination	Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	
	Text book/s*	-			
	Other References	-			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch : 2019-20**	
Program: FSB		**Current Academic Year: 2019**	
Branch: Forensic Science		**Semester: 4th**	
1	Course Code	FSB131	
2	Course Title	Physics-IV	
3	Credits	3	
4	Contact Hours (L-T-P)	2-1-0	
	Course Type	Compulsory	
5	Course Objective	**1-**Undestand the relationship between observation and theory and their use in building the basic concept of modern physics. **2-** Covers the physical understanding of matter from an atomic view point **3-** Understand basic concept of solid state physics	
6	Course Outcomes	CO1: Know the vocabulary and concept of modern physics CO2: To gain abroad knowledge of scientific theory and methods of their studies CO3: Able to demonstrate proficiency in mathematics CO4: Have a basic knowledge of crystal system.	
7	Course Description	After completion of this course student will be able to know about the modern physics its theory and basics of mathematics.	
8	Outline syllabus		CO Mapping
	Unit 1	**MODERN PHYSICS -I**	
	A	Black body radiation	CO1, CO2
	B	Plank's quantum hypothesis	CO1, CO2
	C	Einstein's photon hypothesis, photoelectric effect	CO1, CO2
	Unit 2	**MODERN PHYSICS-II**	
	A	Bohr model of hydrogen atom, quantization of angular momentum	CO1, CO2

	B	Explanation of discrete spectrum De Broglie's hypothesis, dual nature of matter			CO1, CO3
	C	Qualitative outline of Einstein's special and general theories of relativity, time dilation, length contraction, relativity of simultaneity, curved space-time, expanding universe, cosmology			CO1, CO2
	Unit 3	**SOLID STATE PHYSICS-I**			
	A	Crystal structure			CO1, CO2
	B	Bragg diffraction, X-ray crystallography			CO1, CO2
	C	Semiconductor physics, band theory of solids, conduction and valence bands, p and n type semiconductors, diodes, photodiodes, light emitting diodes (LED), Zener diodes, NPN, PNP and FET transistors.			CO1, CO2
	Unit 4	**SOLID STATE PHYSICS-II**			
	A	Magnetic materials: Paramagnetic, Diamagnetism, Ferromagnetism, Curie temperature, hysteresis			CO3
	B	Superconductivity, type 1 and type 2 superconductors, BCS theory and Cooper pairs			CO3
	C	Piezoelectricity			CO3
	Unit 5	**MATHEMETICAL PHYSICS**			
	A	First order differential equations			CO4
	B	Series method of solving second order ordinary differential equations			CO4
	C	Legendre functions, Bessel functions, Periodic functions and Fourier Series.			CO4
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	College physics- Serway and Vuille, Principles of physics- Halliday & Resnick.			
	Other References	Sear's & Zemansky's University physics- Young and Freedman.			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2

CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch: 2019-20**	
Program: FSB		**Current Academic Year: 2019**	
Branch: Forensic Science		**Semester: 4th**	
1	Course Code	FSB163	
2	Course Title	Physics-IV Lab	
3	Credits	2	
4	Contact Hours (L-T-P)	0-0-4	
	Course Status	Compulsory	
5	Course Objective	**1-**Undestand the relationship between observation and theory and their use in building the basic concept of modern physics. **2-** Covers the physical understanding of matter from an atomic view point **3-** Understand basic concept of solid state physics	
6	Course Outcomes	CO1: Know the vocabulary and concept of modern physics CO2: To gain abroad knowledge of scientific theory and methods of their studies CO3: Able to demonstrate proficiency in mathematics CO4: Have a basic knowledge of crystal system.	
7	Course Description	After completion of this course student will be able to know about the modern physics its theory and basics of mathematics.	
8	Outline syllabus		CO Mapping
	Unit 1	**To determine the Planck's constant by measuring radiation in a fixed spectral range.**	**CO1**
		Brief Demonstration Experimentation	
	Unit 2	**To study Solar cell characteristics**	**CO1**
		Brief Demonstration Experimentation	
	Unit 3	**Calculate the speed of ultrasonic waves in kerosene oil**	**CO4**
		Brief	

		Demonstration Experimentation	
	Unit 4	**To measure the phase difference between current and voltage in R-C and L-R circuits with the method of Lissajous figures by using a CRO**	**CO3**
		Brief Demonstration Experimentation	
	Unit 5	**To determine the velocity of sound using resonance tube**	**CO4**
		Brief Demonstration Experimentation	
	Mode of examination	Practical/Viva	
	Weightage Distribution	CA / MTE / ETE	
		60% / 0% / 40%	
	Text book/s*	B.Sc. Practical Physics- Harman Singh and PS Hemne.	
	Other References	-	

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch : 2019-20**
Program: FSB		**Current Academic Year: 2019**
Branch: Forensic Science		**Semester: 4th**
1	Course Code	FSB132
2	Course Title	Chemistry-IV
3	Credits	3
4	Contact	2-1-0

	Hours (L-T-P)		
	Course Type	Compulsory	
5	Course Objective	**1-** Able to describe the state of chemical equilibrium **2-** To understand key features of co-ordination compound **3-** Understand the properties of alcohol, ethanol and ether	
6	Course Outcomes	CO1: To describe buffer capacity CO2: Able to do Acetylation of several compound using conventional methods CO3: Examination of alcohol, ethanol and ether. CO4: To calculate value of pH, pOH and OH	
7	Course Description	After completion of this course student will be able to know about the equilibrium, pH and also examination of alcohol, ether & ethanol.	
8	Outline syllabus		CO Mapping
	Unit 1	**SOLUTIONS AND IONIC EQUILLIBRIA**	
	A	Thermodynamics of ideal solutions: Ideal solutions and Raoult's law, deviations from Raoult's law – non-ideal solutions. Vapor pressure-composition and temperature-composition curves of ideal and non-ideal solutions	CO1, CO2
	B	Distillation of solutions. Lever rule. Azeotropes. Partial miscibility of liquids: Critical solution temperature; effect of impurity on partial miscibility of liquids. Immiscibility of liquids. Principle of steam distillation. Nernst distribution law and its applications, solvent extraction.	CO1, CO2
	C	Strong, moderate and weak electrolytes, degree of ionization, factors affecting degree of ionization, ionization constant and ionic product of water. Ionization of weak acids and bases, pH scale, common ion effect, Salt hydrolysis-calculation of hydrolysis constant, degree of hydrolysis and pH for different salts. Buffer solutions. Solubility and solubility product of sparingly soluble salts – applications of solubility product principle	CO1, CO2
	Unit 2	**COORDINATION CHEMISTRY AND CRYSTAL FIELD THEORY**	
	A	Valence Bond Theory (VBT): Inner and outer orbital complexes of Cr, Fe, Co, Ni and Cu (coordination numbers 4 and 6)	CO1, CO2
	B	Structural and stereoisomerism in complexes with coordination numbers 4 and 6.	CO1, CO3
	C	Drawbacks of VBT. IUPAC system of Nomenclature.	CO1, CO2

		Crystal Field Theory: Crystal field effect, Octahedral symmetry. Crystal field stabilization energy (CFSE), Crystal field effects for weak and strong fields. Tetrahedral symmetry. Factors affecting the magnitude of Spectrochemical series. Comparison of CFSE for Oh and Td complexes, Tetragonal distortion of octahedral geometry. Jahn-Teller distortion. Square planar coordination			
	Unit 3	**ALCOHOLS**			
	A	*Preparation:* Preparation of 1 3 alcohols: using Grignard reagent, Ester hydrolysis, Reduction of aldehydes, ketones, carboxylic acid and esters			CO4
	B	*Reactions:* With sodium, HX (Lucas test), esterification,			CO4
	C	Oxidation (with PCC, alk. KMnO4, acid. Dichromate, con. HNO3). Oppeneauer oxidation *Diols:* (Upto 6 Carbons) oxidation of diols. Pinacol-Pinacolone rearrangement			CO4
	Unit 4	**PHENOLS**			
	A	*Preparation:* Cumene hydroperoxide method, from diazonium salts.			CO4
	B	*Reactions:* Electrophilic substitution: Nitration, halogenation and sulphonation. Reimer – Tiemann Reaction,			CO4
	C	Gattermann-Koch Reaction, Houben – Hoesch Condensation, Schotten – Baumann Reaction			CO4
	Unit 5	**ETHERS**			
	A	Aliphatic Ethers			CO4
	B	Aromatic Ethers			CO4
	C	Cleavage of Ethers with HI			CO4
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	-			
	Other References	-			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3

CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch: 2019-20**	
Program: FSB		**Current Academic Year: 2019**	
Branch: Forensic Science		**Semester: 4th**	
1	Course Code	FSB164	
2	Course Title	Chemistry-IV Lab	
3	Credits	2	
4	Contact Hours (L-T-P)	0-0-4	
	Course Status	Compulsory	
5	Course Objective	**1-** Able to describe the state of chemical equilibrium **2-** To understand key features of co-ordination compound **3-** Understand the properties of alcohol, ethanol and ether	
6	Course Outcomes	CO1: To describe buffer capacity CO2: Able to do Acetylation of several compound using conventional methods CO3: Examination of alcohol, ethanol and ether. CO4: To calculate value of pH, pOH and OH	
7	Course Description	After completion of this course student will be able to know about the equilibrium, pH and also examination of alcohol, ether & ethanol.	
8	Outline syllabus		CO Mapping
	Unit 1	**Estimation of (i) Mg2+ or (ii) Zn2+ by complexometric titrations using EDTA**	**CO1**
		Brief Demonstration Experimentation	
	Unit 2	**Estimation of total hardness of a given sample of water by complexometric titration**	**CO4**
		Brief Demonstration Experimentation	
	Unit 3	**Functional group tests for alcohols**	**CO3**
		Brief Demonstration Experimentation	
	Unit 4	**Functional group tests for Phenols**	**CO3**
		Brief	

		Demonstration Experimentation			
	Unit 5	**Acetylation of one of the following compounds: phenols (β -naphthol, vanillin, salicylic acid) by using conventional method**			**CO3**
		Brief Demonstration Experimentation			
	Mode of examination	Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	
	Text book/s*	B.D Khosla- Chemistry Practical book			
	Other References	Ahluwalia- Chemistry Practical Book			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch : 2019-20**
Program: FSB		**Current Academic Year: 2019**
Branch: Forensic Science		**Semester: 4th**
1	Course Code	FSB134
2	Course Title	Zoology-IV
3	Credits	3
4	Contact Hours (L-T-P)	2-1-0
	Course Type	Compulsory
5	Course Objective	**1-** Understand Animal physiology **2-** Focus on study and understanding of nature and their physiology **3-** Understand the economic importance of vector biology.

6	Course Outcomes	CO1: Gain knowledge of animal physiology CO2: Thought detail concept of digestive system, respiratory system etc. CO3: Understand the concept of aqua culture system. CO4: Be able to describe interaction between different organ system.	
7	Course Description	After completion of this course student will be able to know about the physiology of human being and also economical biology.	
8	Outline syllabus		CO Mapping
	Unit 1	**Animal Physiology -I**	
	A	Tissues Structure, location, classification and functions of epithelial tissue, connective tissue, muscular tissue and nervous tissue.	CO1, CO2
	B	Bone and Cartilage Structure and types of bones and cartilages, Ossification, bone growth and resorption	CO1, CO2
	C	Nervous System Structure of neuron, resting membrane potential, Origin of action potential and its propagation across the myelinated and unmyelinated nerve fibers; Types of synapse, Synaptic transmission and, Neuromuscular junction; Reflex action and its types - reflex arc; Physiology of hearing and vision	CO1, CO2
	Unit 2	**Animal Physiology –II**	
	A	Muscle: Histology of different types of muscle; Ultra structure of skeletal muscle; Molecular and chemical basis of muscle contraction; Characteristics of muscle twitch; Motor unit, summation and tetanus	CO1, CO2
	B	Reproductive System: Histology of testis and ovary; Physiology of male and female reproduction; Puberty, Methods of contraception in male and female.	CO1, CO4
	C	Endocrine System: Histology of endocrine glands - pineal, pituitary, thyroid, parathyroid, pancreas, adrenal; hormones secreted by them and their mechanism of action.	CO1, CO2
	Unit 3	**Endocrine System**	
	A	Classification of hormones; Regulation of their secretion	CO1, CO4
	B	Mode of hormone action, Signal transduction pathways for steroidal and non-steroidal hormones;	CO1, CO4
	C	Hypothalamus (neuroendocrine gland) - principal nuclei involved in neuroendocrine control of anterior pituitary and endocrine system; Placental hormones	CO1, CO4
	Unit 4	**Animal Pathology**	
	A	Life Cycle, Pathogenicity , clinical features, prophylaxis	CO1, CO4

	B	Pathogenic Helminthes parasites, clinical Features			CO1, CO4
	C	Control of pathogenic protozoan: Plasmodium, Entamoeba histolytica, Leishmania donovani Control and prophylaxis: Fasciola sp., Wuchereria, Ascaries			CO1, CO4
	Unit 5	**Medical and Applied Zoology**			
	A	Vector Biology: Mosquito (Anopheles Female), Yellow Fever, Dengue Fever, (Aedes)Filariasis (Culex Female), Japanese encephalitis, Plague			CO3
	B	NonVector Diseases: Typhoid, Cholera, Small pox			CO3
	C	General Account of Vaccine & Vaccination, Eradication Programme, drug Therapy			CO3
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	-			
	Other References	-			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch: 2019-20**
Program: FSB		**Current Academic Year: 2019**
Branch: Forensic Science		**Semester: 4th**
1	Course Code	FSB166
2	Course Title	Zoology-IV Lab
3	Credits	2
4	Contact Hours (L-T-P)	0-0-4
	Course Status	Compulsory
5	Course Objective	**1-** Understand Animal physiology **2-** Focus on study and understanding of nature and their physiology

		3- Understand the economic importance of vector biology.	
6	Course Outcomes	CO1: Gain knowledge of animal physiology CO2: Thought detail concept of digestive system, respiratory system etc. CO3: Understand the concept of aqua culture system. CO4: Be able to describe interaction between different organ system.	
7	Course Description	After completion of this course student will be able to know about the physiology of human being and also economical biology.	
8	Outline syllabus		CO Mapping
	Unit 1	**Study of permanent slide of endocrine gland: Thyroid, Adrenal, Pituitary, Testis, Ovary.**	**CO1**
		Brief Demonstration Experimentation	
	Unit 2	**To determine bleeding time and clotting time of human blood**	**CO4**
		Brief Demonstration Experimentation	
	Unit 3	**RBCs in different vertebrates and in different physiological condition**	**CO4**
		Brief Demonstration Experimentation	
	Unit 4	**Study of nitrogenous waste product of animal from different habitats**	**CO3**
		Brief Demonstration Experimentation	
	Unit 5	**Estimation of sugar in human blood.**	**CO4**
		Brief Demonstration Experimentation	
	Mode of examination	Practical/Viva	

	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	
	Text book/s*	-			
	Other References	-			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch : 209-20**	
Program: FSB		**Current Academic Year: 2019**	
Branch: Forensic Science		**Semester: 4th**	
1	Course Code	FSB133	
2	Course Title	Botany-IV	
3	Credits	3	
4	Contact Hours (L-T-P)	2-1-0	
	Course Type	Compulsory	
5	Course Objective	**1-**To describe the structure and function of plant anatomy **2-** Demonstrate and understanding of clinical and health maintenance **3-** To acquire specialized knowledge and understanding of selected aspects by mean of stem	
6	Course Outcomes	CO1: Demonstrate and understanding of fundamental biochemical principles CO2: To gain knowledge of basic lab techniques in both chemistry & biology CO3: Describe characteristic of living things CO4: Demonstrate basic structure & function of plant body	
7	Course Description	After completion of this course student will be able to know about the physiology & anatomy of plants.	
8	Outline syllabus		CO Mapping
	Unit 1	**PLANT ANATOMY**	
	A	Meristematic and permanent tissues; Root and shoot apical meristems Organs; Structure of dicot and monocot root stem and leaf	CO1, CO4

	B	Adaptive and protective systems; Epidermis, cuticle, stomata	CO1, CO4
	C	General account of adaptations in xerophytes and hydrophytes.	CO1, CO4
	Unit 2	**PLANT EMBRYOLOGY**	
	A	Structural organization of flower; Structure of anther and pollen; Structure and types of ovules; Types of embryo sacs	CO1, CO4
	B	Pollination and fertilization; Pollination mechanisms, Double fertilization	CO1, CO3
	C	Embryo and endosperm; Endosperm types, structure and functions; Dicot and monocot embryo	CO1, CO4
	Unit 3	**PLANT PHYSIOLOGY AND METABOLISM-I**	
	A	Plant-water relations; Importance of water, water potential; Transpiration and its significance; Factors affecting transpiration; Root pressure and guttation.	CO1, CO4
	B	Mineral nutrition; Essential elements, macro and micronutrients; Transport of ions across cell membrane, active and passive transport	CO1, CO4
	C	Photosynthesis; Photosynthetic Pigments (Chlorophyll a, b, xanthophylls, carotene); Photosystem I and II, Electron transport and mechanism of ATP synthesis; C3, C4; Photorespiration	CO1, CO4
	Unit 4	**PLANT PHYSIOLOGY AND METABOLISM-II**	
	A	Respiration; Glycolysis, anaerobic respiration Enzymes; Structure and properties; Mechanism of enzyme catalysis and enzyme inhibition	CO1, CO4
	B	Nitrogen metabolism; Biological nitrogen fixation; Nitrate and ammonia assimilation.	CO1, CO4
	C	Plant growth regulators; Physiological roles of auxins, gibberellins, cytokinins	CO1, CO4
	Unit 5	**BIOTECHNOLOGY**	
	A	Introduction to biotechnology, Plant tissue culture; Micropropagation; haploid production through androgenesis and gynogenesis; brief account of embryo & endosperm culture with their applications	CO2, CO3
	B	Recombinant DNA Techniques; Blotting techniques: Northern, Southern and Western Blotting, DNA	CO2, CO3

		Fingerprinting; Molecular DNA markers i.e. RAPD, RFLP, SNPs; DNA sequencing, PCR and Reverse Transcriptase-PCR. Hybridoma and monoclonal antibodies, ELISA and Immunodetection			
	C	Molecular diagnosis of human disease, Human gene Therapy.			CO2, CO3
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	-			
	Other References	-			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch: 2019-20**
Program: FSB		**Current Academic Year: 2019**
Branch: Forensic Science		**Semester: 4th**
1	Course Code	FSB165
2	Course Title	Botany-IV Lab
3	Credits	2
4	Contact Hours (L-T-P)	0-0-4
	Course Status	Compulsory
5	Course Objective	**1-**To describe the structure and function of plant anatomy **2-** Demonstrate and understanding of clinical and health maintenance **3-** To acquire specialized knowledge and understanding of selected aspects by mean of stem
6	Course Outcomes	CO1: Demonstrate and understanding of fundamental biochemical principles CO2: To gain knowledge of basic lab techniques in both chemistry & biology CO3: Describe characteristic of living things

		CO4: Demonstrate basic structure & function of plant body			
7	Course Description	After completion of this course student will be able to know about the physiology & anatomy of plants.			
8	Outline syllabus				CO Mapping
	Unit 1	**Study of meristems through permanent slides and photographs**			**CO1**
		Brief Demonstration Experimentation			
	Unit 2	**Tissues (parenchyma, collenchyma and sclerenchyma)**			**CO2**
		Brief Demonstration Experimentation			
	Unit 3	**Stem: Monocot: Zea mays; Dicot: Helianthus; Secondary: Helianthus (only Permanent slides).**			**CO2**
		Brief Demonstration Experimentation			
	Unit 4	**Root: Monocot: Zea mays; Dicot: Helianthus; Secondary: Helianthus (only Permanent slides).**			**CO3**
		Brief Demonstration Experimentation			
	Unit 5	**Dissection of embryo/endosperm from developing seeds.**			**CO4**
		Brief Demonstration Experimentation			
	Mode of examination	Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	
	Text book/s*	-			
	Other References	-			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2

CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch : 2019-20**	
Program: FSB		**Current Academic Year: 2019**	
Branch: Forensic Science		**Semester: 4th**	
1	Course Code	FSB135	
2	Course Title	English-IV	
3	Credits	0	
4	Contact Hours (L-T-P)	2-0-0	
	Course Type	Compulsory	
5	Course Objective	**1.**To equip students to minimize the linguistic barriers emerging in a different environment. **2-** To equip students to minimize the linguistic barriers emerging in a different environment. **3-** To equip students to minimize the linguistic barriers emerging in a different environment.	
6	Course Outcomes	CO1: Understand the Importance of Communication CO2: Develop Impressive Speaking Skills. CO3: To be able to speak confidently in the English language CO4: Cultivate and develop reading habits	
7	Course Description	After the completion of this course the students will be able to minimize the linguistic barriers emerging in a different environment.	
8	Outline syllabus		CO Mapping
	Unit 1	**Paragraph Writing**	
	A	Structure of a Paragraph.	CO1, CO2
	B	Features of a Paragraph: Unity, Coherence and Expansion.	CO1, CO2
	C	Construction of a Paragraph.	CO1, CO2
	Unit 2	**Public Speaking**	
	A	Choosing an Appropriate Pattern: Chronological, cause and Effect, Problem and Solution, Spatial, Deductive and Inductive.	CO1, CO3
	B	Selecting an Appropriate Method: Memorization, Extemporaneous, Impromptu, Manuscript.	CO1, CO3

	C	Making Speeches Interesting: ○ Making Beginnings Catchy: Using Wit and Humour, Questions, Quotations, Anecdotes ○ Non-Verbal Communication: Body Language, Paralinguistic. Public Speaking Sessions			CO1, CO3
	Unit 3	**Reading Skills**			
	A	Gift of the Magi (O.Henry)			CO1, CO3
	B	Idgah (Munshi Premchand)			CO1, CO3
	C	Discussions based on the tests			CO1, CO3
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		100%	-	-	
	Text book/s*	-			
	Other References	-			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch : 2019-20**
Program: FSB		**Current Academic Year: 2019**
Branch: Forensic Science		**Semester: 5th**
1	Course Code	FSB136
2	Course Title	Forensic Science-V
3	Credits	3
4	Contact Hours (L-T-P)	3-1-0
	Course Type	Compulsory
5	Course Objective	**1-**Able to apply modern methods of forensic analysis in lab **2-** In communicating or defending forensic evidence in oral or written

		3- To provide depth knowledge related to firearm	
6	Course Outcomes	CO1: To describe all type of marks and patters. CO2: Able to examine the all type physical evidence CO3: Able to analyze tool marks and firearms CO4: Able to do photography of crime scene.	
7	Course Description	After the completion of this course the students will be able to understand the Investigation and examination of footprint, tire marks, obliterated marks and their restoration along with fire-arm evidences and also understand the aspects of photography.	
8	Outline syllabus		CO Mapping
	Unit 1	**FORENSIC PHYSICS-I**	
	A	**Footprints**: Importance, Gait Pattern, Casting of footprints in Different medium, Taking Control samples. **Tire Marks**/prints and Skid marks, taking control samples, Forensic Significance	CO1, CO2
	B	**TOOL MARKS**- Types of tool marks- compression marks, striated marks, combination of compression and striated marks, repeated marks, class characteristics and individual characteristics, tracing and lifting of marks, Photographic examination of tool marks and cut marks on clothes and walls etc.	CO1, CO2
	C	**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.	CO1, CO2
	Unit 2	**FORENSIC PHYSICS- II**	
	A	**Paint** - Types of paint and their composition, cases involve, collection and preservation of paint evidences .microscopic analysis of paint pigments, micro-chemical analysis- solubility test, chemical and instrumental analysis of paint evidences. **Glass** -Types of glass and their composition. Matching and comparison. Forensic examinations of glass fractures- rib marks, hackle marks, cone fracture, wavy, backward fragmentation, concentric and radial fractures. Colour, fluorescence, physical measurements, refractive index, density gradient, becke-line, specific gravity examination and elemental analysis of glass evidence	CO1, CO2

	B	**Soil**- Types and composition of soil, sample preparation, removal of contaminants, colour, molecular particle size distribution, turbidity test, pH measurements, microscopic examination, density gradient analysis, ignition-loss test, elemental analysis, interpretation of soil evidence.	CO1, CO2
	C	**Fibres-** Types of fibres, forensic aspects of fibre examination- fluorescence, optical properties, refractive index, birefringence, dye analysis. Physical fit and chemical testing. TLC, IR-micro spectroscopy, Py-MS. Difference between natural and man-made fibres. Fibre comparison of dye Component	CO1, CO2
	Unit 3	**BALLISTICS**	
	A	Firearms-History and development of firearms. Classification of firearms. Weapon types and their operation. Firing mechanisms of different firearms. Internal ballistics – Definition, ignition of propellants, shape and size of propellants, manner of burning, and various factors affecting the internal ballistics: lock time, ignition time, barrel time, erosion, corrosion and gas cutting.	CO3
	B	External Ballistics – Vacuum trajectory, effect of air resistance on trajectory, base drag, drop, drift, yaw, shape of projectile and stability, trajectory computation, ballistics coefficient and limiting velocity, Measurements of trajectory parameters, introduction to automated system of trajectory computation and automated management of ballistic data.	CO3
	C	Terminal Ballistics – Effect of projectile on hitting the target: function of bullet shape, striking velocity, striking angle and nature of target, tumbling of bullets, effect of instability of bullet, effect of intermediate targets, and influence of range. Ricochet and its effects, stopping power.	CO3
	Unit 4	**FIREARMS**	
	A	Ammunition - Types of ammunition characteristics of different types of cartridges and bullets. Primers and priming compounds. Projectiles. Headstamp markings on ammunitions.	CO3
	B	Different types of marks produced during firing process on cartridge – firing pin marks, breech face marks, chamber marks, extractor and ejector marks.	CO3
	C	Firearm Evidence - Matching of bullets and cartridge	CO3

		cases in regular firearms. Identification of bullets, pellets and wads fired from improvised, country made firearms. Automated method of bullet and cartridge case comparison. Determination of range of fire and time of fire. Mechanisms of formation of gunshot residues. Methods of analysis of gunshot residues from shooting hands and targets, with special reference to clothings. Identification and nature of firearms injuries.	
	Unit 5	**CRIME SCENE PHOTOGRAPHY**	
	A	Forensic Photography-Basic principles of Photography, Techniques of black & white and color photography, cameras, lenses, shutters, depth of field, film; exposing, development and printing techniques	CO4
	B	Different kinds of developers and fixers; UV, IR, fluorescence illumination guided photography	CO4
	C	Modern development in photography- digital photography, Working and basic principles of digital photography; Surveillance photography. Videography and Crime Scene &laboratory photography.	CO4
	Mode of examination	Theory	
	Weightage Distribution	CA: 30% / MTE: 20% / ETE: 50%	
	Text book/s*	J.A. Seigel- Forensic science Basics, David R Redsicker- The Practical methodology of Forensic Photography	
	Other References	C.D.Duncan- Advance Crime scene photography	

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch: 2019-20**
Program: FSB		**Current Academic Year: 2019**
Branch: Forensic Science		**Semester: 5th**
1	Course Code	FSB167
2	Course Title	Forensic Science -V Lab

3	Credits	2			
4	Contact Hours (L-T-P)	0-0-4			
	Course Status	Compulsory			
5	Course Objective	**1-**Able to apply modern methods of forensic analysis in lab **2-** In communicating or defending forensic evidence in oral or written **3-** To provide depth knowledge related to firearm			
6	Course Outcomes	CO1: To describe all type of marks and patters. CO2: Able to examine the all type physical evidence CO3: Able to analyze tool marks and firearms CO4: Able to do photography of crime scene.			
7	Course Description	After the completion of this course the students will be able to understand the Investigation and examination of footprint, tire marks, obliterated marks and their restoration along with fire-arm evidences and also understand the aspects of photography.			
8	Outline syllabus				CO Mapping
	Unit 1	**To determine the gait pattern.**			**CO1**
		Study Enumerate the species Find out the individual character of Gait Pattern			
	Unit 2	**To determine the footprint**			**CO2**
		Collection Packing Preserving			
	Unit 3	**To carry out the comparison of fired bullets and fired cartridge case.**			**CO3**
		Brief Demonstration Experimentation			
	Unit 4	**To describe, with the aid of diagrams, the firing mechanisms of different types of firearms.**			**CO3**
		Brief Demonstration Experimentation			
	Unit 5	**To identify gunshot residue.**			**CO3**
		Brief Demonstration Experimentation			
	Mode of examination	Practical/Viva			
	Weightage	CA	MTE	ETE	

	Distribution	60%	0%	40%	
	Text book/s*	-			
	Other References	-			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch : 2019-20**	
Program: FSB		**Current Academic Year: 2019**	
Branch: Forensic Science		**Semester: 5th**	
1	Course Code	FSB137	
2	Course Title	Physics-V	
3	Credits	3	
4	Contact Hours (L-T-P)	2-1-0	
	Course Type	Compulsory	
5	Course Objective	**1**- Introduce the methods of mathematical physics **2-** To acquire working knowledge of quantum mechanics. **3-** An overview of modern nuclear and particle physics	
6	Course Outcomes	CO1: Student understand concepts in particles and nuclear physics CO2: Can understand key experiments in nuclear physics CO3: Describes structure of hydrogen atom and understanding of angular momentum CO4: Analyse all type of physical mathematical problems	
7	Course Description	After the completion of this course the students will be able to understand about quantum physics and nuclear physics.	
8	Outline syllabus		CO Mapping
	Unit 1	**MATHEMATICAL PHYSICS-II**	
	A	Linear algebra: linear vector spaces, matrices, linear transformations, eigenvectors and eigenvalues	CO1, CO2
	B	Elementary review of multivariate calculus, partial	CO1, CO2

		derivatives	
	C	Second order linear partial differential equations, separation of variables method	CO1, CO2
	Unit 2	**QUANTUM PHYSICS-I**	
	A	Quantum states and observables, Hilbert space	CO1, CO3
	B	Schrodinger equation	CO1, CO3
	C	Heisenberg uncertainty principle	CO1, CO3
	Unit 3	**QUANTUM PHYSICS-II**	
	A	Particle in a box	CO1, CO3
	B	Harmonic oscillator	CO1, CO3
	C	Discussion of solution of Schrodinger equation for Hydrogen atom	CO1, CO3
	Unit 4	**NUCLEAR PHYSICS**	
	A	Nuclear composition, nuclear binding energy, fission and fusion	CO1, CO2
	B	Radioactive decay, half-life, applications of Radio Isotopes, Radiometric dating	CO1, CO2
	C	Radiation Detection, Geiger Mueller counter	CO1, CO2
	Unit 5	**PARTICLE PHYSICS**	
	A	Fermions and bosons, Standard model of fundamental particles	CO4
	B	Leptons and quarks, baryons and mesons	CO4
	C	Fundamental forces of nature, weak nuclear force and strong nuclear force	CO4
	Mode of examination	Theory	
	Weightage Distribution	CA / MTE / ETE	
		30% / 20% / 50%	
	Text book/s*	College physics- Serway and Vuille, Principles of physics- Halliday & Resnick.	
	Other References	Sear's & Zemansky's University physics- Young and Freedman.	

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch: 2019-20**	
Program: FSB		**Current Academic Year: 2019**	
Branch: Forensic Science		**Semester: 5th**	
1	Course Code	FSB168	
2	Course Title	Physics-V Lab	
3	Credits	2	
4	Contact Hours (L-T-P)	0-0-4	
	Course Status	Compulsory	
5	Course Objective	**1**- Introduce the methods of mathematical physics **2-** To acquire working knowledge of quantum mechanics. **3-** An overview of modern nuclear and particle physics	
6	Course Outcomes	CO1: Student understand concepts in Optics. CO2: Can understand key experiments in diffraction & Refraction. CO3: Describes structure of hydrogen atom and understanding of angular momentum CO4: Analyse all type of physical mathematical problems	
7	Course Description	After the completion of this course the students will be able to understand about quantum physics and nuclear physics.	
8	Outline syllabus		CO Mapping
	Unit 1	**Experiments of fibre optic communication systems.**	**CO1**
		Establish a fibre optic analogue link. Establish a fibre optic digital link. Study of Bending Loss.	
	Unit 2	**To determine the diameter of thin wire by diffraction using laser.**	**CO2**
		Brief Demonstration Experimentation	
	Unit 3	**To determine the wavelength of laser light by diffraction at a single slit.**	**CO2**
		Brief Demonstration Experimentation	
	Unit 4	**To determine slit width of single and double slit by using Laser**	**CO2**
		Brief Demonstration Experimentation	

	Unit 5	**To determine wavelength of laser light using measuring scale**			**CO4**
		Brief Demonstration Experimentation			
	Mode of examination	Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	
	Text book/s*	B.Sc. Practical Physics- Harman Singh and PS Hemne.			
	Other References	-			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch : 2019-20**
Program: FSB		**Current Academic Year: 2019**
Branch: Forensic Science		**Semester: 5th**
1	Course Code	FSB138
2	Course Title	Chemistry-V
3	Credits	3
4	Contact Hours (L-T-P)	2-1-0
	Course Type	Compulsory
5	Course Objective	**1-** Understand the effect of pressure on solubility **2-** To provide the understanding of relation between the structures, chemical bond **3-** Utilize reductive amination for the synthesis of amines
6	Course Outcomes	CO1: Identify & classify of organic molecules CO2: Predict the physical properties of organic chemicals based on their structure CO3: Able to know the principle various classes of organo-metallic compounds

		CO4: Able to know the importance & application of organo-metallic compounds	
7	Course Description	After the completion of this course the students will be able to understand about organo-metallic compound and their chemical nature.	
8	Outline syllabus		CO Mapping
	Unit 1	**PHASE EQUILIBRIUM**	
	A	Phases, components and degrees of freedom of a system, criteria of phase equilibrium. Gibbs Phase Rule and its thermodynamic derivation	CO1, CO2
	B	Derivation of Clausius – Clapeyron equation and its importance in phase equilibrium.	CO1, CO2
	C	Phase diagrams of one-component systems (water and sulphur) and two component systems involving eutectics, congruent and incongruent melting points (lead-silver, FeCl3-H2O and Na-K only).	CO1, CO2
	Unit 2	**CONDUCTANCE**	
	A	Conductivity, equivalent and molar conductivity and their variation with dilution for weak and strong electrolytes.	CO1, CO2
	B	Kohlrausch law of independent migration of ions. Transference number and its experimental determination using Hittorf and Moving boundary methods. Ionic mobility.	CO1, CO2
	C	Applications of conductance measurements: determination of degree of ionization of weak electrolyte, solubility and solubility products of sparingly soluble salts, ionic product of water, hydrolysis constant of a salt. Conductometric titrations (only acid-base).	CO1, CO2
	Unit 3	**ORGANOMETALLIC COMPOUNDS**	
	A	Definition and Classification with appropriate examples based on nature of metal-carbon bond (ionic, σ ,π and multicentre bonds). Structures of methyl lithium, Zeiss salt and ferrocene. EAN rule as applied to carbonyls.	CO3, CO4
	B	Preparation, structure, bonding and properties of mononuclear and polynuclear carbonyls of 3d metals. π - acceptorbehaviour of carbon monoxide.	CO3, CO4
	C	Synergic effects (VB approach). (MO diagram of CO can be referred to for synergic effect to IR frequencies).	CO3, CO4
	Unit 4	**ALDEHYDES**	
	A	(Formaldehyde, Acetaldehyde, Benzaldehyde)	CO1
	B	*Preparation:* from acid chlorides and from nitriles.	CO1
	C	*Reactions* – Reaction with HCN, ROH, NaHSO3, NH2-G derivatives. Iodoform test. Aldol Condensation, Cannizzaro's reaction, Wittig reaction, Benzoin condensation	CO1
	Unit 5	**KETONES**	

	A	Acetone			CO2
	B	*Preparation:* from acid chlorides and from nitriles.			CO2
	C	*Reactions* – Reaction with HCN, ROH, NaHSO3, NH2-G derivatives. Iodoform test. Aldol Condensation, Wittig Reaction			CO2
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	-			
	Other References	-			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch: 2019-20**
Program: FSB		**Current Academic Year: 2019**
Branch:Forensic Science		**Semester: 5th**
1	Course Code	FSB169
2	Course Title	Chemistry -V Lab
3	Credits	2
4	Contact Hours (L-T-P)	0-0-4
	Course Status	Compulsory
5	Course Objective	**1-** Understand the effect of pressure on solubility **2-** To provide the understanding of relation between the structures, chemical bond **3-** Utilize reductive amination for the synthesis of amines
6	Course Outcomes	CO1: Identify & classify of organic molecules CO2: Predict the physical properties of organic chemicals based on their structure CO3: Able to know the principle various classes of organo-metallic compounds CO4: Able to know the importance & application of organo-metallic compounds

7	Course Description	After the completion of this course the students will be able to understand about organo-metallic compound and their chemical nature.			
8	Outline syllabus				CO Mapping
	Unit 1	**Preparation of any two of the following complexes and measurement of their conductivity:**			**CO1**
		tetraamminecarbonatocobalt (III) nitrate tetraamminecopper (II) sulphate Potassium trioxalatoferrate (III) trihydrate			
	Unit 2	**Compare the conductance of the complexes with that of M/1000 solution of NaCl, MgCl2 and LiCl3.**			**CO1**
		Brief Demonstration Experimentation			
	Unit 3	**Semicarbazone of any one of the following compounds: acetone, ethyl methyl ketone, cyclohexanone, benzaldehyde**			**CO3**
		Brief Demonstration Experimentation			
	Unit 4	**Aldol condensation using either conventional or green method**			**CO3**
		Brief Demonstration Experimentation			
	Unit 5	**Phase equilibria: Construction of the phase diagram using cooling curves or ignition tube method: a. simple eutectic and b. congruently melting systems**			**CO1**
		Brief Demonstration Experimentation			
	Mode of examination	Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	
	Text book/s*	B.D Khosla- Chemistry Practical book			
	Other References	Ahluwalia- Chemistry Practical Book			

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3

Cos												
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch : 2019-20**	
Program: FSB		**Current Academic Year: 2019**	
Branch: Forensic Science		**Semester: 5th**	
1	Course Code	FSB140	
2	Course Title	Zoology-V	
3	Credits	3	
4	Contact Hours (L-T-P)	2-1-0	
	Course Type	Compulsory	
5	Course Objective	**1-** To outline the major transition in evolution from the origin **2-** Describe poor public health functions **3-** To understand the fundamental of immunology	
6	Course Outcomes	CO1: Able to identify current public health problems CO2: Knowledge of the structure and function of major organ system CO3: Knowledge of antibody and antigens CO4: Able to perform analyse and observation in whole organism biology	
7	Course Description	After the completion of this course the students will be able to understand about public health and hygiene, evolution & human behaviour along with Immunology.	
8	Outline syllabus		CO Mapping
	Unit 1	**EVOLUTION**	
	A	**History of diversified life:** Geological Time Scale and Geological Era, Zoogeographical regions (Oriental, Australian and Ethiopian Regions/Realms **Introductions to evolutionary Theories:** Lamarckism, Darwinism, Neo Darwinism	CO4
	B	**Source of heredity variation and evolution:** Isolation, Natural Selection, types, Speciation, Evolution of Man and Horse	CO4
	C	**Hardy Weinberg law of Equilibrium:** Genetic Drift,	CO4

		Founder effect	
	Unit 2	**ANIMAL BEHAVIOR**	
	A	Concepts and pattern of Behaviors: Innate Behaviors, learned behavior	CO4
	B	Social organization in insects: Honey Bee, Migration in Birds	CO4
	C	Parental Care in fishes and Amphibian	CO4
	Unit 3	**PUBLIC HEALTH AND HYGIENE**	
	A	Introduction to public health and hygiene. Determinants and factors affecting health and hygiene. Pollution and associated hazards; water and air borne diseases. Prevention of diseases through health education and environment improvements	CO1
	B	Classification of foods (micro and macro nutrients). Balanced diet and malnutrition. Diseases caused by deficiency of proteins, vitamins and minerals.	CO1
	C	Infectious agents responsible for diseases in humans. Communicable diseases such as measles, polio, chickungunya, rabies, leprosy, tuberculosis, AIDS, hepatitis and their preventive measures. Non-communicable diseases such as hypertension, coronary heart disease, stroke, diabetes, obesity, mental ill-health, cancer and their preventive measures.	CO1
	Unit 4	**IMMUNOLOGY-I**	
	A	Introduction to Immunity: Innate immunity, Adaptive immunity. Cell mediated and humoral immune responses Cell and organs of the Immune System.	CO2, CO3
	B	Cell and organs of immune system: Types of immune cells, lymphoid and myeloid, Primary and secondary lymphoid organs	CO2, CO3
	C	Humoral immunity: Antigen, Function of B cell Cell mediated immunity: Function of T-Cells	CO2, CO3
	Unit 5	**IMMUNOLOGY-II**	
	A	**Antigens:** Antigenicity and immunogenicity, Immunogens, Factors influencing immunogenicity, Band T-Cell epitopes.	CO2, CO3
	B	**Immunoglobulins:** Antibody structure and function, antibody isotypes, Applications Monoclonal antibodies.	CO2, CO3

	C	**Hypersensitivity:** Type-I hypersensitivity- allergens, mast cell degranulation, mediators of type-I reaction, Type-II-antibody mediated cytotoxic, Type-III and Type IV hypersensitivity.			CO2, CO3
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	-			
	Other References	-			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch: 2019-20**
Program: FSB		**Current Academic Year: 2019**
Branch: Forensic Science		**Semester: 5th**
1	Course Code	FSB171
2	Course Title	Zoology-V Lab
3	Credits	2
4	Contact Hours (L-T-P)	0-0-4
	Course Status	Compulsory/Elective
5	Course Objective	**1-** To outline the major transition in evolution from the origin **2-** Describe poor public health functions **3-** To understand the fundamental of immunology
6	Course Outcomes	CO1: Able to identify current public health problems CO2: Knowledge of the structure and function of major organ system CO3: Knowledge of antibody and antigens CO4: Able to perform analyse and observation in whole organism biology
7	Course	After the completion of this course the students will be able to understand

	Description	about public health and hygiene, evolution & human behaviour along with Immunology.			
8	Outline syllabus				CO Mapping
	Unit 1	**Protein estimation by Colorimeter**			**CO2**
		Brief Demonstration Experimentation			
	Unit 2	**Test of biomolecules**			**CO1**
		Carbohydrates Proteins Lipids			
	Unit 3	**Actions of salivary amylase under optimum conditions**			**CO3**
		Brief Demonstration Experimentation			
	Unit 4	**Determination of ABO blood Group**			**CO3**
		Brief Demonstration Experimentation			
	Unit 5	**DNA separation on Gel**			**CO4**
		Brief Demonstration Experimentation			
	Mode of examination	Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	
	Text book/s*	-			
	Other References	-			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS	**Batch : 2019-20**
Program: FSB	**Current Academic Year: 2019**
Branch:Forensic	**Semester: 5th**

Science			
1	Course Code	FSB139	
2	Course Title	Botany-V	
3	Credits	3	
4	Contact Hours (L-T-P)	2-1-0	
	Course Type	Compulsory	
5	Course Objective	**1-** Introduce the basic principle and concept of plant pathology **2-** Identify the sources of genetic variation to conduct breeding program. **3-** Scope and necessity of applied botany	
6	Course Outcomes	CO1: Understand the diversity among bacteria & virus CO2: Understand the fungal diseases CO3: Understand the causes and prevention of pollution CO4: Able to understand quantitative inheritance and plant breeding system	
7	Course Description	After the completion of this course the students will be able to understand about Applied botany.	
8	Outline syllabus		CO Mapping
	Unit 1	**ENVIRONMENTAL BOTANY**	
	A	Ecology: Environmental factors, Ecological adaptations, Plant Succession, Ecosystem (Structure and functions).	CO3
	B	Environmental pollution: air, water, soil, radioactive, thermal and noise pollutions, their sources, effects and control. (Greenhouse effect, ozone depletion and acid rain). CO2 enrichment and climate change	CO3
	C	Biodiversity and Phytogeography: biotic communities and populations, their characteristics and population dynamics. Natural vegetation of India, static and dynamic plant geography, basic principles governing geographical distribution of plants, endemism.	CO3
	Unit 2	**APPLIED BIOLOGY**	
	A	Forestry : Silviculture – General silvicultural practices, special approaches; Silviculture of important trees *Acacia nilotica, Albizzia lebbeck, Butea monosperma,Dalbergia sisoo, Emblica officinalis, Tectona grandis*	CO4
	B	Agroforesrty – scope and necessity; agro-forestry systems under different agro-ecological zones; role of multipurpose trees and NTFPs	CO4

	C	JFM: principles, objectives, methodology, scope, benefits and role of NGOs.			CO4
	Unit 3	**PLANT BREEDING-I**			
	A	Plant Breeding; Introduction and objectives.			CO4
	B	Breeding systems: modes of reproduction in crop plants.			CO4
	C	Quantitative inheritance: Concept, mechanism, examples. Monogenic vs polygenic Inheritance			CO4
	Unit 4	**PLANT BREEDING-II**			
	A	Inbreeding depression and heterosis; Genetic basis of inbreeding depression and heterosis; Applications.			CO4
	B	Crop improvement and breeding; Role of mutations; Polyploidy; Distant hybridization			CO4
	C	Role of biotechnology in crop improvement.			CO4
	Unit 5	**METHODS OF CROP IMPROVEMENT**			
	A	Introduction: Centres of origin and domestication of crop plants, plant genetic resources; Acclimatization			CO2
	B	Selection methods: For self-pollinated, cross pollinated and vegetative propagated plants			CO2
	C	Hybridization: For self, cross and vegetative propagated plants Procedure, advantages and limitations.			CO2
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	-			
	Other References	-			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch: 2019-20**
Program: FSB		**Current Academic Year: 2019**
Branch: Forensic Science		**Semester: 5th**
1	Course Code	FSB170

2	Course Title	Botany-V Lab	
3	Credits	2	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Objective	**1-** Introduce the basic principle and concept of plant pathology **2-** Identify the sources of genetic variation to conduct breeding program. **3-** Scope and necessity of applied botany	
6	Course Outcomes	CO1: Understand the sex related experiments CO2: Understand the experimental genetics CO3: Understand the diseases related to genetics CO4: Able to understand quantitative inheritance and plant breeding system	
7	Course Description	After the completion of this course the students will be able to understand about Applied botany.	
8	Outline syllabus		CO Mapping
	Unit 1	**Chromosome mapping using point test cross data.**	**CO1**
		Brief Demonstration Experimentation	
	Unit 2	**Pedigree analysis for dominant and recessive autosomal and sex linked traits.**	**CO1,CO2**
		Brief Demonstration Experimentation	
	Unit 3	**Incomplete dominance and gene interaction through seed ratios (9:7, 9:6:1, 13:3, 15:1, 12:3:1, 9:3:4).**	**CO1,CO2**
		Brief Demonstration Experimentation	
	Unit 4	**Blood Typing: ABO groups & Rh factor**	**CO1,CO2**
		Brief Demonstration Experimentation	
	Unit 5	**Study of aneuploidy: Down's, Klinefelter's and Turner's syndromes.**	**CO3**
		Brief Demonstration Experimentation	
	Mode of examination	Practical/Viva	

	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	
	Text book/s*	-			
	Other References				

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch : 2019-20**	
Program: FSB		**Current Academic Year: 2019**	
Branch: Forensic Science		**Semester: 5th**	
1	Course Code	FSB141	
2	Course Title	Cyber-I	
3	Credits	1	
4	Contact Hours (L-T-P)	1-0-0	
	Course Type	Compulsory	
5	Course Objective	**1-** Basic knowledge of computer **2-** Describes the structure of file system **3-** Describe Internet security	
6	Course Outcomes	CO1: Basic knowledge of RAM & ROM. CO2: Demonstrate and understanding data representation CO3: Describe internet reading CO4: Examination of Internet fraud	
7	Course Description	After the completion of this course the students will be able to understand basics of computer and Internet security.	
8	Outline syllabus		CO Mapping
	Unit 1	**BASICS OF COMPUTER**	
	A	Computer organization, Components of computer - Input & Output devices, CPU.	CO1
	B	Memory Hiearchy and types of Memory (RAM and ROM	CO1

		and their types) external storage devices			
	C	Application software and system software			CO1
	Unit 2	**DATA REPRESENTATION**			
	A	Integers, real, binary			CO2
	B	octal, hexadecimal & their conversations			CO2
	C	Legal gates - Negation, OR, AND, XOR etc and their combinations.			CO2
	Unit 3	**OPERATING SYSTEM**			
	A	Basics of operating system, memory structure, concurrency			CO2
	B	Scheduling, synchronization and memory management, process description and control.			CO2
	C	Introduction to operating system (Batch operating system, Distributed operating system etc).			CO2
	Unit 4	**FILE SYSTEM AND NETWORKING**			
	A	Introduction to file systems - FAT12, FAT16, FAT32, NTFS, EXT2, EXT3 & HFS.			CO3
	B	Structure of file system, inode etc.			CO3
	C	Basics of networking - Introduction to Networking types of topologies LAN, MAN, WAN and related terminologies, Networking Devices (Switches, Hub, bridge).			CO3
	Unit 5	**INTRODUCTION TO INTERNET**			
	A	World Wide Web, E-mail, chat, Search Engine, Network security- Threats Introduction to Security and Security model (CIAtriad), Vulnerabilities, Introduction to security and security model.			CO4
	B	Incident Response - Introduction, computer security incident, goal of incident response, who is involved in incident response process, incident response methodology, formulate a response strategy			CO4
	C	Investigate the incident, preparing for incident response, overview of pre incident preparation.			CO4
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*				
	Other References				

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3

Cos												
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch: 2019-20**	
Program: FSB		**Current Academic Year: 2019**	
Branch: Forensic Science		**Semester: 5th**	
1	Course Code	FSB172	
2	Course Title	Cyber-I Lab	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Objective	**1-** Basic knowledge of computer **2-** Describes the structure of file system **3-** Describe Internet security	
6	Course Outcomes	CO1: Basic knowledge of RAM & ROM. CO2: Demonstrate and understanding data representation CO3: Describe internet reading CO4: Examination of Internet fraud	
7	Course Description	After the completion of this course the students will be able to understand basics of computer and Internet security.	
8	Outline syllabus		CO Mapping
	Unit 1	**Finding results of different logics gates and their combinations.**	**CO2**
		Brief Demonstration Experimentation	
	Unit 2	**Working with windows files (Creation, modification, deletion, attributes) folders (creation, nesting, attributes).**	**CO1**
		Brief Demonstration Experimentation	

	Unit 3	**Working with Linux file (creation, modification, deletion, attributes) folder (creation, nesting attributes)**			**CO2**
		Brief Demonstration Experimentation			
	Unit 4	**Working with external storage device using windows - reading and writing data on floppy, CD, DVD, USB Thumb drive**			**CO3**
		Brief Demonstration Experimentation			
	Unit 5	**Working with external storage device using Linux - reading writing data on floppy, CD, DVD, USB thumb drive**			**CO4**
		Brief Demonstration Experimentation			
	Mode of examination	Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	
	Text book/s*	-			
	Other References				

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch : 2019-20**
Program: FSB		**Current Academic Year: 2019**
Branch: Forensic Science		**Semester: 5th**
1	Course Code	FSB142
2	Course Title	English-V

3	Credits	0	
4	Contact Hours (L-T-P)	2-0-0	
	Course Type	Compulsory	
5	Course Objective	**1-** To equip students to minimize the linguistic barriers emerging in a different environment. **2-** To equip students to minimize the linguistic barriers emerging in a different environment. **3-** To equip students to minimize the linguistic barriers emerging in a different environment.	
6	Course Outcomes	CO1: Understand the Importance of Communication CO2: Develop Impressive Speaking Skills. CO3: To be able to speak confidently in the English language CO4: Cultivate and develop reading habits	
7	Course Description	After the completion of this course the students will be able to minimize the linguistic barriers emerging in a different environment.	
8	Outline syllabus		CO Mapping
	Unit 1	**Creative Writing**	
	A	Dialogue Writing	CO1, CO2
	B	Short Story Writing: Elements of a Short Story: Setting, Characterization, Plot, Conflict, Climax, Resolution, Writing a Story Tasks: Complete the story, Change the resolution of the story, write a story on a given theme.	CO1, CO2
	C	Essay Writing Movie Review: Discussing the themes, Script, Dialogues and Characterization, Appraising the Elements of the Movie: Setting and Location, Props and Colours, Camera Work, Acting, Background Music.	CO1, CO2
	Unit 2	**Speaking Skills**	
	A	Group Discussion: Objective of a GD, Types of GD, Dos and Don'ts of a GD, Effective Body Language in a GD, Leadership Skills in GD	CO1, CO2
	B	Extempore: Purpose, Features of a Good Extempore, Dos and Don'ts, Extempore Session	CO1, CO3
	C	Debates: Purpose, Features of a Good Debate, Preparing for a Debate, Dos and Don'ts, The Three Minute Debate Planner, Debate Session	CO1, CO2
	Unit 3	**Reading Texts and Movie Review**	
	A	The Refund by Fritz Karinthy	CO4

	B	The Kid by Charles Chaplin (Movie Review)			CO4
	C	Discussions Based on the text			CO4
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		100%	-	-	
	Text book/s*				
	Other References				

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch : 2019-20**	
Program: FSB		**Current Academic Year: 2019**	
Branch: Forensic Science		**Semester: 5th**	
1	Course Code	FSB143	
2	Course Title	Project-II	
3	Credits	1	
4	Contact Hours (L-T-P)	2-0-0	
	Course Status	Compulsory	
5	Course Objective	1. To know about the review of literature 2. To know about the research knowledge of particular topic. 3. To learn about the paper writing	
6	Course Outcomes	CO1: Understand the review of literature and its Importance. CO2: Understand about their topics CO3: Understand the related works about their topics CO4: Know to write the project and importance of it.	
7	Course Description	After completion of this project students will be able to understand about research methodology and development in their topics.	

8	Outline syllabus				CO Achievement
	Unit 1	**Introduction**			**CO1**
		A. Collect the details & theory related to topics B. Formatting C. Writing in your project			
	Unit 2	**Review of Literature**			**CO2**
		A. Collection B. Analysis of all Papers regarding Topics C. Include in your project			
	Unit 3	**Material and methods**			**CO2**
		A. Decide the population B. Make the pattern for collection C. Collection			
	Unit 4	**Experiments Performed**			**CO3**
		A. Decide the methods B. Instrument Requirements C. Analyse your samples			
	Unit 5	**Finalisation**			**CO4**
		A. Result B. Discussion C. Referencing			
	Mode of examination	Jury/Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	
	Text book/s*	-			
	Other References				

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch : 2019-20**
Program: FSB		**Current Academic Year: 2019**
Branch: Forensic Science		**Semester: 6th**
1	Course Code	FSB144

2	Course Title	Forensic Science-VI	
3	Credits	3	
4	Contact Hours (L-T-P)	2-1-0	
	Course Type	Compulsory	
5	Course Objective	**1-** Knowledge of documents examination **2-** Fingerprint analysis methods **3-** Describes medico-legal aspects of Death	
6	Course Outcomes	CO1: Able to classify all types of fingerprint CO2: Able to describe all changes in body after death CO3: Able to Examine all types of fraud in documents CO4: Able to examine fingerprints	
7	Course Description	After the completion of this course the students will be able to understand the examination of documents, handwriting and fingerprint and also about the medico-legal aspects.	
8	Outline syllabus		CO Mapping
	Unit 1	**QUESTIONED DOCUMENTS – I**	
	A	Functions of a Forensic Document Examiner: - Required training and education. Collection protocols of writing standards and process of comparison. Various writing features and their estimation. General and individual characteristics of handwriting. Identification of writer of anonymous writings. Application of Forensic Stylistics/Linguistics in the identification of writer.	CO3
	B	Examination of built-up documents and determination of sequence of strokes. Determination of age of documents by examining various factors.	CO3
	C	Identification and comparison of typescripts: - Identification of typist, various types of printing processes, printing and machine defects, and alterations in typed text. Various types of typewriting devices: - examination of typewriters with proportional letter spacing, electronic typewriters, dot matrix, inkjet & laser printers, machines used for printing security documents, cheques, and currency notes, etc.	CO3
	Unit 2	**QUESTIONED DOCUMENTS – II**	
	A	Photocopy & photocopier examination: - photocopier identification, visual photocopy examination, photocopy	CO3

		forgery. Paper & watermark examination: - Paper size and thickness, paper opacity, colour and brightness, understanding watermarks. Examination of alterations, erasures, overwriting, additions and obliterations	
	B	Decipherment of secret writings, indentations & charred documents. Physical comparison of documents, examination of seal rubber & other mechanical impressions.	CO3
	C	Examination of counterfeit currency notes, Indian Passports/Visas, Stamp Papers, Postal Stamps etc. Examination of fake credit cards and electronic documents.	CO3
	Unit 3	**FINGERPRINTS**	
	A	Basics of Fingerprints- Introduction and history, with special reference to India. Biological basis of fingerprints. Formation of ridges. Fundamental principles of fingerprinting.	CO1, CO4
	B	Types of fingerprints. Types of Fingerprint patterns. Fingerprint characteristics/minutiae. Plain and rolled fingerprints. Ridge counting. Significance of poroscopy and edgeoscopy.	CO1, CO4
	C	Development of Fingerprints - Constituents of sweat residue. Latent fingerprints' detection by physical and chemical techniques. Mechanism of detection of fingerprints by different developing reagents. Application of light sources in fingerprint detection. Preservation of developed fingerprints. Digital imaging for fingerprint enhancement. Fingerprinting the deceased.	CO1, CO4
	Unit 4	**FORENSIC MEDICINE -I**	
	A	Global Medical Jurisprudence, Legal Procedure in India: - Police inquest, Magistrate's inquest, Coroner's inquest, Oath and affirmation.	CO2
	B	Documentary evidence: - Medical certificates, medical reports, dying declaration. Understanding laws and ethics of medical practice.	CO2
	C	Medico legal aspects of death: - Diagnosis of death- somatic & molecular,early and intermediate changes following death, late changes after death- putrefaction, autolysis, bacterial action, factors affecting these changes. Determination of time since death, including by histopathological methods.	CO2

	Unit 5	**FORENSIC MEDICINE -II**			
	A	Medico legal investigation of sexual offences, including examination of victims and suspects.			CO2
	B	Medico legal aspects of death:- causes of death such as asphyxia, thermal trauma, heat burns, starvation, natural death, sudden death, death by accident.			CO2
	C	Medico legal aspects of wounds: - medical and legal definition of wounds, types of mechanical and regional injuries, aging of wounds, difference between suicidal, homicidal and accidental wounds.			CO2
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	-			
	Other References	-			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch: 2019-20**
Program: FSB		**Current Academic Year: 2019**
Branch: Forensic Science		**Semester: 6th**
1	Course Code	FSB173
2	Course Title	Forensic Science-VI Lab
3	Credits	2
4	Contact Hours (L-T-P)	0-0-4
	Course Status	Compulsory
5	Course Objective	**1-** Knowledge of documents examination **2-** Fingerprint analysis methods **3-** Describes medico-legal aspects of Death

6	Course Outcomes	CO1: Able to classify all types of fingerprint CO2: Able to describe all changes in body after death CO3: Able to Examine all types of fraud in documents CO4: Able to examine fingerprints	
7	Course Description	After the completion of this course the students will be able to understand the examination of documents, handwriting and fingerprint and also about the medico-legal aspects.	
8	Outline syllabus		CO Mapping
	Unit 1	**To record plain and rolled fingerprints.**	CO1
		To identify different fingerprint patterns To identify Core To identify tri-radii.	CO1
	Unit 2	**To record rolled Fingerprints to carry out ridge tracing and ridge counting.**	**CO4**
		Brief Demonstration Experimentation	
	Unit 3	**To identify Handwriting Characters**	**CO3**
		Brief Demonstration Experimentation	
	Unit 4	**To study natural variation in handwriting**	**CO3**
		Brief Demonstration Experimentation	
	Unit 5	**To compare handwriting samples**	**CO3**
		Brief Demonstration Experimentation	
	Mode of examination	Practical/Viva	
	Weightage Distribution	CA / MTE / ETE 60% / 0% / 40%	
	Text book/s*	-	
	Other References	-	

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3

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

School: SAHS		**Batch : 2019-20**	
Program: FSB		**Current Academic Year: 2019**	
Branch: Forensic Science		**Semester: 6th**	
1	Course Code	FSB145	
2	Course Title	Physics-VI	
3	Credits	3	
4	Contact Hours (L-T-P)	2-1-0	
	Course Type	Compulsory	
5	Course Objective	**1-**Understanding of the basic electrical principles & electronic system **2-** To give the knowledge about various components among signal conditioning **3-** To make student familiar with most important methods including digital filter design	
6	Course Outcomes	CO1: Defines the techniques of modern digital signal processing CO2: Explains the application of sensors in daily life CO3: Design analog signal conditioner CO4: Apply knowledge to design different power supply	
7	Course Description	After the completion of this course the students will be able to understand about the modern digital signalling.	
8	Outline syllabus		CO Mapping
	Unit 1	**ELECTRONICS**	
	A	Basics of LR, RC, LCR circuits	CO1, CO2
	B	Diode and Transistor characteristics	CO1, CO2
	C	Rectification using diodes, Timer circuits, Printed circuit board and IC manufacturing	CO1, CO2
	Unit 2	**CIRCUITS**	
	A	Amplification using an Operational amplifier (OPAMP)	CO1, CO2
	B	Logic gates AND, OR, NOT, NAND, NOR, XOR gates	CO1, CO3

	C	Flip- flops and counters.			CO1, CO2
	Unit 3	**SENSORS AND SIGNALS – I**			
	A	Temperature sensors: Thermistors, thermocouples, RTD's, Infrared sensors Pressure sensors: Piezoelectric			CO1, CO3
	B	Proximity and displacement sensors: LVDT, capacitive, magnetic, ultrasonic Acceleration sensors: Gyroscopes, accelerometers			CO1, CO3
	C	Light sensors (photodiode, photo multiplier tube) Sound sensors (microphone) Touch sensors (capacitive)			CO1, CO3
	Unit 4	**SENSORS AND SIGNALS- II**			
	A	Analog signals generated by sensors			CO1, CO3
	B	Analog to Digital (AtoD) and Digital to Analog (DtoA) convertors			CO1, CO3
	C	Uses of Amplitude modulated (AM) and Frequency Modulated (FM) signals			CO1, CO3
	Unit 5	**DIGITAL SIGNAL PROCESSING**			
	A	Digital signals from analog signals Sampling, audio as 1D signal, image as 2D signal			CO2
	B	Fourier transforms, Fast Fourier Transform (FFT)			CO2
	C	Frequency domain filtering: spectrum, power spectrum, low pass, band pass, high pass filters			CO2
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	College physics- Serway and Vuille, Principles of physics- Halliday & Resnick.			
	Other References	Sear's & Zemansky's University physics- Young and Freedman.			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch: 2019-20**	
Program: FSB		**Current Academic Year: 2019**	
Branch: Forensic Science		**Semester: 6th**	
1	Course Code	FSB174	
2	Course Title	Physics-VI Lab	
3	Credits	2	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Objective	**1-**Understanding of the basic electrical principles & electronic system **2-** To give the knowledge about various components among signal conditioning **3-** To make student familiar with most important methods including digital filter design	
6	Course Outcomes	CO1: Defines the techniques of modern digital signal processing CO2: Explains the application of sensors in daily life CO3: Design analog signal conditioner CO4: Apply knowledge to design different power supply	
7	Course Description	After the completion of this course the students will be able to understand about the modern digital signalling.	
8	Outline syllabus		CO Mapping
	Unit 1	**To sketch the following basic op-amp circuits and explain the operation of each:**	**CO1**
		Positive and negative Feedback Summing and Differential amplifier Integrator and differentiator	
	Unit 2	**To study the frequency response of a common emitter amplifier stage and to experimentally verify theoretical results.**	**CO1**
		Brief Demonstration Experimentation	
	Unit 3	**Draw the waveform and study the circuit of op-amp for getting full gain**.	**CO2**
		Brief	

		Demonstration Experimentation			
	Unit 4	**To design a 6.2 volts D.C. Power supply using zener diode and to study its ripple factor and load regulation.**			**CO3**
		Brief Demonstration Experimentation			
	Unit 5	**Study of charging and discharging of series RC circuit and determine the time constant.**			**CO4**
		Brief Demonstration Experimentation			
	Mode of examination	Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	
	Text book/s*	B.Sc. Practical Physics- Harman Singh and PS Hemne.			
	Other References	-			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch : 2019-20**
Program: FSB		**Current Academic Year: 2019**
Branch: Forensic Science		**Semester: 6th**
1	Course Code	FSB146
2	Course Title	Chemistry-VI
3	Credits	3
4	Contact Hours (L-T-P)	2-1-0

	Course Type	Compulsory	
5	Course Objective	**1-** Provides the principle and Kinetic tools in chemical reactions. **2-** Provide the detail of bio-inorganic chemistry **3-** Study of bio-molecules	
6	Course Outcomes	CO1: Describe chemical structure, properties and function of bio-molecules CO2: Explains about half-life reactions. CO3: Explains theories of reaction rates. CO4: Able to explore new area of research in chemistry**.**	
7	Course Description	After the completion of this course the students will be able to understand about the bio molecules and bio-inorganic chemistry.	
8	Outline syllabus		CO Mapping
	Unit 1	**CHEMICAL KINETICS -I**	
	A	The concept of reaction rates. Effect of temperature, pressure, catalyst and other factors on reaction rates.	CO1, CO2
	B	Order and molecularity of a reaction.	CO1, CO2
	C	Derivation of integrated rate equations for zero, first and second order reactions (both for equal and unequal concentrations of reactants).	CO1, CO2
	Unit 2	**CHEMICAL KINETICS- II**	
	A	Half–life of a reaction. General methods for determination of order of a reaction.	CO1, CO3
	B	Concept of activation energy and its calculation from Arrhenius equation.	CO1, CO3
	C	Theories of Reaction Rates: Collision theory and Activated Complex theory of bimolecular reactions. Comparison of the two theories (qualitative treatment only).	CO1, CO3
	Unit 3	**BIO- INORGANIC CHEMISTRY**	
	A	A brief introduction to bio-inorganic chemistry.	CO1
	B	Role of metal ions present in biological systems with special reference to Na+, K+ and Mg2+ ions	CO1
	C	Role of Na/K pump; Role of Mg2+ ions in energy production and chlorophyll. Role of Ca2+ in blood clotting, stabilization of protein structures and structural role (bones).	CO1
	Unit 4	**CARBOHYDRATES**	
	A	Classification, and General Properties, Glucose and Fructose (open chain and cyclic structure),	CO1,CO4
	B	Determination of configuration of monosaccharides, absolute configuration of Glucose and Fructose, Mutarotation, ascending and descending in	CO1

		monosaccharides.			
	C	Structure of disacharrides (sucrose, cellobiose, maltose, lactose) and polysacharrides (starch and cellulose) excluding their structure elucidation.			CO1
	Unit 5	**AMINO ACIDS, PEPTIDES AND PROTEINS**			
	A	*Preparation of Amino Acids:* Strecker synthesis, using Gabriel's phthalimide synthesis. Zwitter ion, Isoelectric point and Electrophoresis.			CO1
	B	*Reactions of Amino acids*: ester of –COOH group, acetylation of –NH2 group, complexation with Cu2+ ions, ninhydrin test.			CO1
	C	Overview of Primary, Secondary, Tertiary and Quaternary Structure of proteins. Determination of Primary structure of Peptides by degradation Edmann degradation (N-terminal) and C–terminal (thiohydantoin and with carboxypeptidase enzyme). Synthesis of simple peptides (upto dipeptides) by N-protection (t-butyloxycarbonyl and phthaloyl) & C-activating groups and Merrifield solidphase synthesis.			CO1
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	-			
	Other References	-			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch: 2019-20**
Program: FSB		**Current Academic Year: 2019**
Branch: Forensic Science		**Semester: 6th**
1	Course Code	FSB175
2	Course Title	Chemistry-VI Lab

3	Credits	2	
4	Contact Hours (L-T-P)	0-0-4	
	Course Status	Compulsory	
5	Course Objective	**1-** Provides the principle and Kinetic tools in chemical reactions. **2-** Provide the detail of bio-inorganic chemistry **3-** Study of bio-molecules	
6	Course Outcomes	CO1: Describe chemical structure, properties and function of bio-molecules CO2: Explains about half life reactions. CO3: Explains theories of reaction rates. CO4: Able to explore new area of research in chemistry**.**	
7	Course Description	After the completion of this course the students will be able to understand about the bio molecules and bio-inorganic chemistry.	
8	Outline syllabus		CO Mapping
	Unit 1	**Comparison of the strengths of HCl and H2SO4 by studying kinetics of hydrolysis of Methyl acetate.**	**CO2**
		Brief Demonstration Experimentation	
	Unit 2	**Saponification of ethyl acetate.**	**CO3**
		Brief Demonstration Experimentation	
	Unit 3	**Identify and separate the sugars present in the given mixture by paper chromatography.**	**CO1**
		Brief Demonstration Experimentation	
	Unit 4	**Identify and separate the components of a given mixture of 2 amino acids (glycine, aspartic acid, glutamic acid, tyrosine or any other amino acid) by paper chromatography**	**CO1**
		Brief Demonstration Experimentation	
	Unit 5	**Study the Kinetics of Acid hydrolysis of methyl acetate with hydrochloric acid, volumetrically or conducto-metrically**	**CO4**

		Brief Demonstration Experimentation			
	Mode of examination	Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	
	Text book/s*	B.D Khosla- Chemistry Practical book			
	Other References	Ahluwalia- Chemistry Practical Book			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch : 2019-20**
Program: FSB		**Current Academic Year: 2019**
Branch: Forensic Science		**Semester: 6th**
1	Course Code	FSB148
2	Course Title	Zoology-VI
3	Credits	3
4	Contact Hours (L-T-P)	2-1-0
	Course Type	Compulsory
5	Course Objective	**1-** Can make interference of some specific random process **2-** Understand different behaviour pattern **3-** Economical uses of different animals in industries.
6	Course Outcomes	CO1: Able to describe industrial uses of cattle CO2: Able to describe economical use of bee and silk worms CO3: Demonstrate and understanding of the central concept of modern statistical theory and their probable foundation CO4: Select from use and interpret result of principle methods, statistical interference and designs.

7	Course Description	After the completion of this course the students will be able to understand about the biostats & economical zoology.	
8	Outline syllabus		CO Mapping
	Unit 1	**BIOSTATICS**	
	A	Data: Primary Data, Secondary data, Frequency distribution and tally marks Data presentation: Diagrammatic: Histogram and Pie Diagram, Graphical	CO3, CO4
	B	Measurement of central tendency: Mean, Median, Mode Measurement of Variation: Standard deviation, Standard error	CO3, CO4
	C	Test of Significance: Student 't' test	CO3, CO4
	Unit 2	**ECONOMIC ZOOLOGY -I**	
	A	Bee-keeping and Bee Economy (Apiculture): Varieties of honey bees and Bee pasturage; Setting up an apiary, Rearing equipments, handling of bees, artificial diet.	CO1, CO2
	B	Diseases of honey bee, American and Honey extraction techniques; Physico-chemical analysis of honey.	CO1, CO2
	C	Other beneficial products from bee.	CO1, CO2
	Unit 3	**ECONOMIC ZOOLOGY – II**	
	A	Silk and Silk Production (Sericulture): Different types of silk and silkworms in India; Rearing of Bombyx mori – Rearing racks and trays, disinfectants, rearing appliances, black boxing, Chawki rearing, bed cleaning, mountages, harvesting of cocoons	CO1, CO2
	B	Silkworm pests and parasites: Uzi fly, Dermestid beetles, and their management	CO1, CO2
	C	Silk reeling techniques; Quality assessment of silk fibre.	CO1, CO2
	Unit 4	**ANIMAL HUSBANDRY – I**	
	A	Aquaculture Brood stock management; Induced breeding of fish and prawn, Management of hatchery of fish; Management of nursery, rearing and stocking ponds.	CO1, CO2
	B	Preparation and maintenance of fish aquarium; Preparation of compound diets for fish; Role of water quality in aquaculture.	CO1, CO2
	C	Fish diseases: Bacterial, viral and parasitic; Preservation and processing of harvested fish; Fishery by-products.	CO1, CO2
	Unit 5	**ANIMAL HUSBANDRY- II**	
	A	Dairy/Poultry Farming: Introduction; Indigenous and exotic breeds.	CO1, CO2
	B	Rearing, housing, feed and rationing.	CO1, CO2

	C	Commercial importance of dairy and poultry farming; Dairy/poultry farm management; Visit to any Dairy farm/Poultry farm.			CO1, CO2
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	-			
	Other References	-			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch: 2019-20**
Program: FSB		**Current Academic Year: 2019**
Branch: Forensic Science		**Semester: 6th**
1	Course Code	FSB177
2	Course Title	Zoology-VI Lab
3	Credits	2
4	Contact Hours (L-T-P)	0-0-4
	Course Status	Compulsory
5	Course Objective	**1-** Can make interference of some specific random process **2-** Understand different behaviour pattern **3-** Economical uses of different animals in industries.
6	Course Outcomes	CO1: Able to describe industrial uses of cattle CO2: Able to describe economical use of bee and silk worms CO3: Demonstrate and understanding of the central concept of modern statistical theory and their probable foundation CO4: Select from use and interpret result of principle methods, statistical interference and designs.
7	Course Description	After the completion of this course the students will be able to understand about the biostats & economical zoology.

8	Outline syllabus				CO Mapping
	Unit 1	**Study of paddy pests and pests of sugarcane.**			CO1, CO2
		Brief Demonstration Experimentation			
	Unit 2	**Study of some economic importance of Fishes.**			CO1, CO2
		Brief Demonstration Experimentation			
	Unit 3	**Determination of mean, median, mode.**			**CO3, CO4**
		Brief Demonstration Experimentation			
	Unit 4	**Determination of Deviation.**			**CO3, CO4**
		Brief Demonstration Experimentation			
	Unit 5	**Graphical representation of statistical data.**			**CO3, CO4**
		Brief Demonstration Experimentation			
	Mode of examination	Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	
	Text book/s*	-			
	Other References	-			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch : 2019-20**
Program: FSB		**Current Academic Year: 2019**
Branch: Forensic Science		**Semester: 6th**
1	Course Code	FSB147

2	Course Title	Botany-VI	
3	Credits	3	
4	Contact Hours (L-T-P)	2-1-0	
	Course Type	Compulsory	
5	Course Objective	**1-** Study about techniques and its applications **2-** Study about HPLC and Mass spectrometry **3-** Scientific research on globally relevant problems in crop and soil sciences	
6	Course Outcomes	CO1: To understand the strength limitation and creative use of techniques CO2: Able to explain external factors affecting soil CO3: Understand the breath and dept of soil knowledge associated with their discipline. CO4: Able to work all techniques like Imaging techniques, Spectrometry, chromatography etc.	
7	Course Description	After the completion of this course the students will be able to understand about the soil and techniques used in botany.	
8	Outline syllabus		CO Mapping
	Unit 1	**IMAGING AND RELATED TECHNIQUES**	
	A	Principles of microscopy; Light microscopy; Fluorescence microscopy; Confocal microscopy	CO1, CO4
	B	Use of fluorochromes: Flow cytometry (FACS)	CO1, CO4
	C	Applications of fluorescence microscopy: Chromosome banding, FISH, chromosome painting; Transmission and Scanning electron microscopy – sample preparation for electron microscopy, cryofixation, negative staining, shadow casting, freeze fracture, freeze etching.	CO1, CO4
	Unit 2	**CELL FRACTIONATION**	
	A	Differential and density gradient centrifugation, sucrose density gradient, $CsCl_2$ gradient	CO1, CO4
	B	Analytical centrifugation, ultracentrifugation	CO1, CO4
	C	Marker enzymes.	CO1, CO4
	Unit 3	**ANALYTICAL TECHNIQUES**	
	A	Radioisotopes: Use in biological research, auto-radiography, pulse chase experiment.	CO1, CO4
	B	Spectrophotometry: Principle and its application in biological research.	CO1, CO4
	C	Chromatography: Principle; Paper chromatography; Column chromatography, TLC, GLC, HPLC, Ion	CO1, CO4

		exchange chromatography; Molecular sieve chromatography; Affinity chromatography.			
	Unit 4	**CHARACTERIZATION OF PROTEINS AND NUCLEIC ACIDS**			
	A	Mass spectrometry; X-ray diffraction; X-ray crystallography			CO1, CO4
	B	Electrophoresis: AGE, PAGE			CO1, CO4
	C	Electrophoresis: SDS- PAGE			CO1, CO4
	Unit 5	**SOIL SCIENCE AND ECOSYSTEM**			
	A	**Soil Science:** Lithosphere, Soil forming rocks and minerals, weathering of parent rocks, major processes of soil formation, Different types of soil degradation, Soil conservation and reclamation problem of soil.			CO2, CO3
	B	**Environmental Pollution:** Earth environmental biosphere, Atmosphere pollution, CO_2 and ecosystems, Ozone depletion, water pollution, BOD, Pesticides pollution, radioactive pollution, Problem of soil wastes, Monitoring and control of pollution.			CO2, CO3
	C	**Conservation:** Major India biomass, conservation of renewable resources, causes of extinction, Endangered Indian flora, natural reserves and germ plasma bank.			CO2, CO3
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	-			
	Other References	-			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS	**Batch: 2019-20**
Program: FSB	**Current Academic Year: 2019**
Branch: Forensic	**Semester: 6th**

Science			
1	Course Code	FSB176	
2	Course Title	Botany-VI Lab	
3	Credits	2	
4	Contact Hours (L-T-P)	0-0-4	
	Course Status	Compulsory	
5	Course Objective	**1-** Study about techniques and its applications **2-** Study about HPLC and Mass spectrometry **3-** Scientific research on globally relevant problems in crop and soil sciences	
6	Course Outcomes	CO1: To understand the strength limitation and creative use of techniques CO2: Able to explain external factors affecting soil CO3: Understand the breath and dept of soil knowledge associated with their discipline. CO4: Able to work all techniques like Imaging techniques, Spectrometry, chromatography etc.	
7	Course Description	After the completion of this course the students will be able to understand about the soil and techniques used in botany.	
8	Outline syllabus		CO Mapping
	Unit 1	**To study blotting techniques**	**CO1**
		Southern Blotting Northern Blotting Western Blotting	
	Unit 2	**To Separate nitrogenous bases by paper chromatography.**	**CO1**
		Brief Demonstration Experimentation	
	Unit 3	**To separate sugars by Thin layer chromatography.**	**CO4**
		Brief Demonstration Experimentation	
	Unit 4	**To separate chloroplast pigments by column chromatography.**	**CO4**
		Brief Demonstration Experimentation	
	Unit 5	**Demonstration of ELISA**	**CO4**
		Brief Demonstration Applications	
	Mode of	Practical/Viva	

	examination				
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	
	Text book/s*	-			
	Other References	-			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch : 2019-20**	
Program: FSB		**Current Academic Year: 2019**	
Branch: Forensic Science		**Semester: 6th**	
1	Course Code	FSB149	
2	Course Title	Cyber-II	
3	Credits	1	
4	Contact Hours (L-T-P)	1-0-0	
	Course Type	Compulsory	
5	Course Objective	**1-** To provide and understanding computer forensic fundamentals **2-** Apply the methods for preservation of digital evidence **3-** Identify methods for data recovery	
6	Course Outcomes	CO1: Explain the role of digital forensics in the field of information assurance and cyber security. CO2: Illustrate the methods for data recovery, evidence collection CO3: Summarize duplication and preservation of digital evidence CO4: Create a method for gathering, accessing and applying new and existing legislation and industry trends specific to practice digital forensic	
7	Course Description	After the completion of this course the students will be able to understand about the cyber forensic their investigation & examination.	
8	Outline syllabus		CO Mapping
	Unit 1	**CYBER FORENSIC**	

	A	Introduction to computer /Cyber forensic			CO1, CO2
	B	Cyber forensic steps(identification, seizure, acquisition, authentication, presentation, preservation) Who is computer forensic expert.			CO1, CO2
	C	Cyber forensic investigation process, the goal of the forensic investigation, why investigate, using email inapporiately, useof internet, email, or Pc in a non work related properly infraction, auditing vs/ cyber forensic.			CO1, CO2
	Unit 2	**BIOMETRIC**			
	A	What is Biometric, Use of Biometric, Model of Biometric system? Various types of Biometric Method, User acceptance, Evaluating accuracy.			CO1, CO3
	B	Advantages and disadvantages of biometric.			CO1, CO3
	C	General biometric system (identification and verification), general architecture, comparison of different biometric technologies, what make biometric difficult.			CO1, CO3
	Unit 3	**EVIDENCE COLLECTION**			
	A	Volatile Evidence collection			CO2
	B	Non volatile Evidences collection (safeback, gettime, filet, and excel, getfree swapfile and getswap, getslack, temporary files).			CO2
	C	Detailed procedure for obtaining a bit stream backup of hard drive, file system(details of file system, data structure of file system, data recovery in different file system)**.**			CO2
	Unit 4	**ANALYTICAL TOOLS**			
	A	Concealment technique: Introduction to cryptography, types of cryptogrphic algorithms (secret key cryptography, public key cryptography, hash function).			CO3
	B	Electronic signature, stenography, reversing the stenographic process, cloaking techniques (data hide and seek).			CO3
	C	Renaming files, manipulating file system, data hiding on NTFS with alternate data stream.			CO3
	Unit 5	**CYBER FORENSIC TOOLS AND UTILITIES**			
	A	Introduction, examining a breadth of product, cyber tools good, better, best: what the right incident response tool for your organization.			CO1,CO4
	B	Tool review forensic toolkit, encase, cyber check suites, what is disk imaging etc.			CO1,CO4
	C	Specification for forensic tool tested.			CO1,CO4
	Mode of examination	Theory			
	Weightage	CA	MTE	ETE	

	Distribution	30%	20%	50%	
	Text book/s*	-			
	Other References	-			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch: 2019-20**	
Program: FSB		**Current Academic Year: 2019**	
Branch: Forensic Science		**Semester: 6th**	
1	Course Code	FSB178	
2	Course Title	Cyber-II Lab	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Objective	**1-** To provide and understanding computer forensic fundamentals **2-** Apply the methods for preservation of digital evidence **3-** Identify methods for data recovery	
6	Course Outcomes	CO1: Explain the role of digital forensics in the field of information assurance and cyber security. CO2: Illustrate the methods for data recovery, evidence collection CO3: Summarize duplication and preservation of digital evidence CO4: Create a method for gathering, accessing and applying new and existing legislation and industry trends specific to practice digital forensic	
7	Course Description	After the completion of this course the students will be able to understand about the cyber forensic their investigation & examination.	
8	Outline syllabus		CO Mapping
	Unit 1	**Identification, seizure, search of digital media.**	**CO1**
		Brief Demonstration Application	

	Unit 2	**Data Recovery, Deleted Files Recovery viewing small Disk.**			**CO3**
		Brief Demonstration Application			
	Unit 3	**Viewing Small Disk MBR.**			**CO4**
		Brief Demonstration Application			
	Unit 4	**Crime Scene Evidence Collection.**			**CO2**
		Brief Demonstration Experimentation			
	Unit 5	**Demonstration of various Forensic tools like Partition magic, Encase etc.**			**CO2**
		Brief Demonstration Application			
	Mode of examination	Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	
	Text book/s*	-			
	Other References	-			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS		**Batch : 2019-20**
Program: FSB		**Current Academic Year: 2019**
Branch: Forensic Science		**Semester: 6th**
1	Course Code	FSB150
2	Course Title	English-VI
3	Credits	0
4	Contact	2-0-0

	Hours (L-T-P)		
	Course Type	Compulsory	
5	Course Objective	**1-** To equip students to minimize the linguistic barriers emerging in a different environment. **2-** Help students to understand different accents and standardize their existing English **3-** Guide the students to hone the basic communication skills, listening, speaking and reading.	
6	Course Outcomes	CO1: Understand the Importance of Communication CO2: Develop Impressive Speaking Skills. CO3: To be able to speak confidently in the English language CO4: Cultivate and develop reading habits	
7	Course Description	After the completion of this course the students will be able to minimize the linguistic barriers emerging in a different environment.	
8	Outline syllabus		CO Mapping
	Unit 1	**Fundamentals of Communication**	
	A	Communication: Process of Communication, ○ Technical and General Communication, Importance of Professional Communication, ○ Different Forms of Communication: Verbal, Non-Verbal, Intrapersonal, Interpersonal ○ Flow of Communication in an Organization: Upwards, Downwards, Diagonal and Horizontal.	CO1, CO2
	B	The Basics of Communication: Accuracy, Brevity and Clarity.	CO1, CO2
	C	Indianisms	CO1, CO2
	Unit 2	**Formal Writing**	
	A	Formal Letter Writing: ○ Elements of structure, ○ Elements of style, ○ Types of letter: Inquiry letter, Order letter, Complaint letter, Invitation letter, and Application.	CO1, CO3
	B	Email Writing ○ Advantages and Disadvantages ○ Email Etiquette ○ Dos and Don'ts	CO1, CO3
	C	Interoffice Memorandum	CO1, CO3
	Unit 3	**Speaking Skills**	
	A	Presentation Skills: ○ Team Presentation,	CO4

		○ Making PowerPoint Presentation ○ Importance of Visual Aid ○ Body Language ○ Paralinguistic	
	B	Job Interviews ○ Process ○ Stages in Job Interviews ○ Types: Telephonic, Video Conferencing, Technical, Behavioural, Stress, Aptitude Test ○ Desirable Qualities ○ Use Proper Verbal and Non-Verbal Cues ○ Preparation: Know the company, Know yourself, Review Common Interview Questions ○ Interview Sessions	CO4
	C	Impromptu: ○ Introduction ○ Difference between an extempore and Impromptu ○ Delivering a Good Impromptu speech ○ Impromptu Session	CO4
	Mode of examination	Theory	
	Weightage Distribution	CA: 30% / MTE: 20% / ETE: 50%	
	Text book/s*	-	
	Other References	-	

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3
CO2	3	3	2	2	3	2	3	3	2	2	3	2
CO3	2	3	2	3	3	3	3	3	2	2	3	3
CO4	3	3	3	3	3	3	3	3	3	3	2	2

School: SAHS	**Batch : 2019-20**	
Program: FSB	**Current Academic Year: 2019**	
Branch: Forensic	**Semester: 6th**	

Science					
1	Course Code	FSB151			
2	Course Title	Internship			
3	Credits	1			
4	Contact Days	7			
	Course Status	Compulsory			
5	Course Objective	1. Able to understand the field work 2. Able to handle real evidences & Crime Scene 3. Able to work in Forensic Labs			
6	Course Outcomes	CO1: Understand the protocols of forensic labs CO2: Understand to handle live cases CO3: Understand to handle live evidences CO4: Understand to examine on crime scene			
7	Course Description	After completion of this Internship student know the handling and examining of real cases.			
8	Outline syllabus				CO Achievement
	Unit 1	**Guidelines for Students**			
		A. Decide their Divisions in forensic lab for working B. Explore the decided division and related cases and its examination. C. Write the Training report			CO1, CO2, CO3, CO4
	Unit 2	**Guidelines for Faculties**			
		A. Faculty should perform at least one site visit during the internship in order to access interns progress. B. Faculty should complete the end term evaluation on the basis of report submitted by students. C. Faculty should provide the guidelines of Internship and evaluation to the students and also submit the feedback.			
	Mode of examination	Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	2	2	2	2	2	3

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

1-Slight (Low)
2-Moderate (Medium)
3-Substantial (High)

Signature of HOD