



**ROYAL GLOBAL UNIVERSITY**  
— GUWAHATI —

**ROYAL SCHOOL OF LIFE SCIENCES  
(RSLSC)**

**Department of Forensic Science**

**Course Structure & Syllabus  
(Based on National Education Policy 2020)**

**For Undergraduate Programme**

**B.Sc. IN FORENSIC SCIENCE  
(4 Years Single Major)**

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## TABLE OF CONTENTS

Sl. No.	Contents	Page no.
1	Preamble	2
2	Introduction	3
3	Approach To Curriculum Planning	4 - 15
4	Award Of Degree	16 - 17
5	Graduate Attributes	18 - 20
6	Programme Learning Outcomes	20 - 22
7	Programme Specific Outcome	22
8	Teaching Learning Process	23
9	Assessment Methods	24
10	Programme Structure	25 - 28
11	Detailed Syllabus 1 <sup>st</sup> Semester	29 - 37
12	Detailed Syllabus 2 <sup>nd</sup> Semester	38 - 46
13	Detailed Syllabus 3 <sup>rd</sup> Semester	47 - 56
14	Detailed Syllabus 4 <sup>th</sup> Semester	57 - 65

## *Preamble*

The National Education Policy (NEP) 2020 conceives a new vision for India's higher education system. It recognizes that higher education plays an extremely important role in promoting equity, human as well as societal well-being and in developing India as envisioned in its Constitution. It is desired that higher education will significantly contribute towards sustainable livelihoods and economic development of the nation as India moves towards becoming a knowledge economy and society.

If we focus on the 21st century requirements, the higher education framework of the nation must aim to develop good, thoughtful, well-rounded, and creative individuals and must enable an individual to study one or more specialized areas of interest at a deep level, and also develop character, ethical and Constitutional values, intellectual curiosity, scientific temper, creativity, spirit of service, and twenty-first-century capabilities across a range of disciplines including sciences, social sciences, arts, humanities, languages, as well as professional, technical, and vocational subjects.

Towards the attainment of holistic and multidisciplinary education, the flexible curricula of the University will include credit-based courses, projects in the areas of community engagement and service, environmental education, and value-based education. As part of holistic education, students will also be provided with opportunities for internships with local industries, businesses, artists, crafts persons, and so on, as well as research internships with faculty and researchers at the University, so that students may actively engage with the practical aspects of their learning and thereby improve their employability.

The undergraduate curriculums are diverse and have varied subjects to be covered to meet the needs of the programs. As per the recommendations from the UGC, introduction of courses related to Indian Knowledge System (IKS) is being incorporated in the curriculum structure which encompasses all of the systematized disciplines of Knowledge which were developed to a high degree of sophistication in India from ancient times and all of the traditions and practices that the various communities of India—including the tribal communities—have evolved, refined and preserved over generations, like for example Vedic Mathematics, Vedangas, Indian Astronomy, Fine Arts, Metallurgy, etc.

At RGU, we are committed that at the societal level, higher education will enable each student to develop themselves to be an enlightened, socially conscious, knowledgeable, and skilled citizen who can find and implement robust solutions to its own problems.

## ***1. Introduction***

The National Education Policy (NEP) 2020 clearly indicates that higher education plays an extremely important role in promoting human as well as societal well-being in India. As envisioned in the 21st-century requirements, quality higher education must aim to develop good, thoughtful, well-rounded, and creative individuals. According to the new education policy, assessments of educational approaches in undergraduate education will integrate the humanities and arts with Science, Technology, Engineering and Mathematics (STEM) that will lead to positive learning outcomes. This will lead to develop creativity and innovation, critical thinking and higher-order thinking capacities, problem-solving abilities, teamwork, communication skills, more in-depth learning, and mastery of curricula across fields, increases in social and moral awareness, etc., besides general engagement and enjoyment of learning. and more in-depth learning.

The NEP highlights that the following fundamental principles that have a direct bearing on the curricula would guide the education system at large, viz.

- i. Recognizing, identifying, and fostering the unique capabilities of each student to promote her/his holistic development.
- ii. Flexibility, so that learners can select their learning trajectories and programmes, and thereby choose their own paths in life according to their talents and interests.
- iii. Multidisciplinary and holistic education across the sciences, social sciences, arts, humanities, and sports for a multidisciplinary world.
- iv. Emphasis on conceptual understanding rather than rote learning, critical thinking to encourage logical decision-making and innovation; ethics and human & constitutional values, and life skills such as communication, teamwork, leadership, and resilience.
- v. Extensive use of technology in teaching and learning, removing language barriers, increasing access for Divyang students, and educational planning and management.
- vi. Respect for diversity and respect for the local context in all curricula, pedagogy, and policy. Equity and inclusion as the cornerstone of all educational decisions to ensure that all students can thrive in the education system and the institutional environment are responsive to differences to ensure that high-quality education is available for all. Rootedness and pride in India, and its rich, diverse, ancient, and modern culture, languages, knowledge systems, and traditions.

## **2. Approach towards Curriculum Planning:**

### **2.1. Credits in Indian Context:**

#### **2.1.1. Choice Based Credit System (CBCS) by UGC**

Under the CBCS system, the requirement for awarding a degree or diploma or certificate is prescribed in terms of the number of credits to be earned by the students. This framework is being implemented in several universities across States in India. The main highlights of CBCS are as below:

- The CBCS provides flexibility in designing curriculum and assigning credits based on the course content and learning hours.
- The CBCS provides for a system wherein students can take courses of their choice, learn at their own pace, undergo additional courses and acquire more than the required credits, and adopt an interdisciplinary approach to learning.
- CBCS also provides opportunity for vertical mobility to students from a bachelor's degree programme to masters and research degree programmes.

### **2.2. Definitions:**

#### **2.2.1. Academic Credit**

An academic credit is a unit by which a course is weighted. It is fixed by the number of hours of instructions offered per week. As per the National Credit Framework.

**1 Credit = 30 NOTIONAL CREDIT HOURS (NCH)**

**Yearly Learning Hours = 1200 Notional Hours (@40 Credits x 30 NCH)**

<b>30 Notional Credit Hours</b>		
<b>Lecture/Tutorial</b>	<b>Practicum</b>	<b>Experiential Learning</b>
1 Credit = 15 -22 Lecture Hours	10-15 Practicum Hours	0-8 Experiential Learning Hours

#### **2.2.2. Course of Study:**

Course of study indicates pursuance of study in Graphic Design. The Graphic Design course shall offer Major Courses (Core), Minor Courses, Skill Enhancement Courses (SEC), Value Added Courses (VAC), Ability Enhancement Compulsory Courses (AECCs) and Interdisciplinary courses.

### **2.2.3. Disciplinary Major:**

The major would provide the opportunity for a student to pursue in-depth study of a particular subject in Graphic Design. Students may be allowed to change major within the broad discipline at the end of the second semester by giving her/him sufficient time to explore interdisciplinary courses during the first year. Advanced-level disciplinary/interdisciplinary courses, a course in research methodology, and a project/dissertation will be conducted in the seventh semester. The final semester will be devoted to seminar presentation, preparation, and submission of project report/dissertation. The project work/dissertation will be on a topic in the disciplinary programme of study or an interdisciplinary topic.

### **2.2.4. Disciplinary/interdisciplinary minors:**

Students will have the option to choose courses from disciplinary/interdisciplinary minors and skill-based courses. Students who take a sufficient number of courses in a discipline or an interdisciplinary area of study other than the chosen major will qualify for a minor in that discipline or in the chosen interdisciplinary area of study. A student may declare the choice of the minor at the end of the second semester, after exploring various courses.

### **2.2.5. Courses from Other Disciplines (Interdisciplinary):**

All UG students are required to undergo 3 introductory-level courses relating to any of the broad disciplines given below. These courses are intended to broaden the intellectual experience and form part of liberal arts and science education. Students are not allowed to choose or repeat courses already undergone at the higher secondary level (12th class) in the proposed major and minor stream under this category.

*i. Natural and Physical Sciences:* Students can choose basic courses from disciplines such as Natural Science, for example, Biology, Botany, Zoology, Biotechnology, Biochemistry, Chemistry, Physics, Biophysics, Astronomy and Astrophysics, Earth and Environmental Sciences, etc.

*ii. Mathematics, Statistics, and Computer Applications:* Courses under this category will facilitate the students to use and apply tools and techniques in their major and minor disciplines. The course may include training in programming software like Python among others and applications software like STATA, SPSS, Tally, etc. Basic courses under this category will be helpful for science and social science in data analysis and the application of quantitative tools.

**iii. Library, Information, and Media Sciences:** Courses from this category will help the students to understand the recent developments in information and media science (journalism, mass media, and communication)

**iv. Commerce and Management:** Courses include business management, accountancy, finance, financial institutions, fintech, etc.,

**v. Humanities and Social Sciences:** The courses relating to Social Sciences, for example, Anthropology, Communication and Media, Economics, History, Linguistics, Political Science, Psychology, Social Work, Sociology, etc. will enable students to understand the individuals and their social behavior, society, and nation. Students be introduced to survey methodology and available large-scale databases for India. The courses under humanities include, for example, Archaeology, History, Comparative Literature, Arts & Creative expressions, Creative Writing and Literature, language(s), Philosophy, etc., and interdisciplinary courses relating to humanities. The list of Courses can include interdisciplinary subjects such as Cognitive Science, Environmental Science, Gender Studies, Global Environment & Health, International Relations, Political Economy and Development, Sustainable Development, Women's, and Gender Studies, etc. will be useful to understand society.

**2.2.6. Ability Enhancement Courses (AEC):** Modern Indian Language (MIL) & English language focused on language and communication skills. Students are required to achieve competency in a Modern Indian Language (MIL) and in the English language with special emphasis on language and communication skills. The courses aim at enabling the students to acquire and demonstrate the core linguistic skills, including critical reading and expository and academic writing skills, that help students articulate their arguments and present their thinking clearly and coherently and recognize the importance of language as a mediator of knowledge and identity. They would also enable students to acquaint themselves with the cultural and intellectual heritage of the chosen MIL and English language, as well as to provide a reflective understanding of the structure and complexity of the language/literature related to both the MIL and English language. The courses will also emphasize the development and enhancement of skills such as communication, and the ability to participate/conduct discussion and debate.

**2.2.7. Skill Enhancement Course (SEC):** These courses are aimed at imparting practical skills, hands-on training, soft skills, etc., to enhance the employability of students and should

be related to Major Discipline. They will aim at providing hands-on training, competencies, proficiency, and skill to students. SEC course will be a basket course to provide skill-based instruction. For example, SEC of English Discipline may include Public Speaking, Translation & Editing and Content writing.

### **2.2.8. Value-Added Courses (VAC):**

**i. *Understanding India:*** The course aims at enabling the students to acquire and demonstrate the knowledge and understanding of contemporary India with its historical perspective, the basic framework of the goals and policies of national development, and the constitutional obligations with special emphasis on constitutional values and fundamental rights and duties. The course would also focus on developing an understanding among student-teachers of the Indian knowledge systems, the Indian education system, and the roles and obligations of teachers to the nation in general and to the school/community/society. The course will attempt to deepen knowledge about and understanding of India's freedom struggle and of the values and ideals that it represented to develop an appreciation of the contributions made by people of all sections and regions of the country, and help learners understand and cherish the values enshrined in the Indian Constitution and to prepare them for their roles and responsibilities as effective citizens of a democratic society.

**ii. *Environmental science/education:*** The course seeks to equip students with the ability to apply the acquired knowledge, skills, attitudes, and values required to take appropriate actions for mitigating the effects of environmental degradation, climate change, and pollution, effective waste management, conservation of biological diversity, management of biological resources, forest and wildlife conservation, and sustainable development and living. The course will also deepen the knowledge and understanding of India's environment in its totality, its interactive processes, and its effects on the future quality of people's lives.

**iii. *Digital and technological solutions:*** Courses in cutting-edge areas that are fast gaining prominences, such as Artificial Intelligence (AI), 3-D machining, big data analysis, machine learning, drone technologies, and Deep learning with important applications to health, environment, and sustainable living that will be woven into undergraduate education for enhancing the employability of the youth.

**iv. *Health & Wellness, Yoga education, sports, and fitness:*** Course components relating to health and wellness seek to promote an optimal state of physical, emotional, intellectual, social, spiritual, and environmental well-being of a person. Sports and fitness activities will be organized outside the regular institutional working hours. Yoga education would focus on



preparing the students physically and mentally for the integration of their physical, mental, and spiritual faculties, and equipping them with basic knowledge about one's personality, maintaining self-discipline and self-control, to learn to handle oneself well in all life situations. The focus of sports and fitness components of the courses will be on the improvement of physical fitness including the improvement of various components of physical and skills-related fitness like strength, speed, coordination, endurance, and flexibility; acquisition of sports skills including motor skills as well as basic movement skills relevant to a particular sport; improvement of tactical abilities; and improvement of mental abilities.

### **2.2.9. Summer Internship /Apprenticeship:**

The intention is induction into actual work situations. All students must undergo internships / Apprenticeships in a firm, industry, or organization or Training in labs with faculty and researchers in their own or other HEIs/research institutions during the *summer term*. Students should take up opportunities for internships with local industry, business organizations, health and allied areas, local governments (such as panchayats, municipalities), Parliament or elected representatives, media organizations, artists, crafts persons, and a wide variety of organizations so that students may actively engage with the practical side of their learning and, as a by-product, further improve their employability. Students who wish to exit after the first two semesters will undergo a 4-credit work-based learning/internship during the summer term to get a UG Certificate.

**2.2.9.1. Community engagement and service:** The curricular component of 'community engagement and service' seeks to expose students to the socio-economic issues in society so that the theoretical learnings can be supplemented by actual life experiences to generate solutions to real-life problems. This can be part of summer term activity or part of a major or minor course depending upon the major discipline.

**2.2.9.2. Field-based learning/minor project:** The field-based learning/minor project will attempt to provide opportunities for students to understand the different socio-economic contexts. It will aim at giving students exposure to development-related issues in rural and urban settings. It will provide opportunities for students to observe situations in rural and urban contexts, and to observe and study actual field situations regarding issues related to socioeconomic development. Students will be given opportunities to gain a first-hand understanding of the policies, regulations, organizational structures, processes, and programmes that guide the development process. They would have the opportunity to gain an

understanding of the complex socio-economic problems in the community, and innovative practices required to generate solutions to the identified problems. This may be a summer term project or part of a major or minor course depending on the subject of study.

#### **2.2.10. Indian Knowledge System:**

In view of the importance accorded in the NEP 2020 to rooting our curricula and pedagogy in the Indian context all the students who are enrolled in the four-year UG programmes should be encouraged to take an adequate number of courses in IKS so that the *total credits of the courses taken in IKS amount to at least five per cent of the total mandated credits (i.e. min. 8 credits for a 4 yr. UGP)*. The students may be encouraged to take these courses, preferably *during the first four semesters of the UG programme*. At least half of these mandated credits should be in courses in disciplines which are part of IKS and are related to the major field of specialization that the student is pursuing in the UG programme. They will be included as a part of the total mandated credits that the student is expected to take in the major field of specialization. The rest of the mandated credits in IKS can be included as a part of the mandated Multidisciplinary courses that are to be taken by every student. All the students should take a Foundational Course in Indian Knowledge System, which is designed to present an overall introduction to all the streams of IKS relevant to the UG programme. The foundational IKS course should be broad-based and cover introductory material on all aspects. Wherever possible, the students may be encouraged to choose a suitable topic related to IKS for their project work in the 7/8th semesters of the UG programme.

#### **2.2.11. Experiential Learning:**

One of the most unique, practical & beneficial features of the National Credit Framework is assignment of credits/credit points/ weightage to the experiential learning including relevant experience and professional levels acquired/ proficiency/ professional levels of a learner/student. Experiential learning is of two types:

- a. Experiential learning as part of the curricular structure of academic or vocational program. E.g., projects/OJT/internship/industrial attachments etc. This could be either within the Program- internship/ summer project undertaken relevant to the program being studied or as a part time employment (not relevant to the program being studied- up to certain NSQF level only). In case where experiential learning is a part of the curricular structure the credits would be calculated and assigned as per basic principles of NCrF i.e., 40 credits for 1200 hours of notional learning.
- b. Experiential learning as active employment (both wage and self) post completion of an academic or vocational program. This means that the experience attained by a person after

undergoing a particular educational program shall be considered for assignment of credits. This could be either Full or Part time employment after undertaking an academic/ Vocation program.

In cases where experiential learning is as a part of employment the learner would earn credits as weightage. The maximum credit points earned in this case shall be double of the credit points earned with respect to the qualification/ course completed. The credit earned and assigned by virtue of relevant experience would enable learners to progress in their career through the work hours put in during a job/employment.

### **2.3. Distribution of Credits:**

'*Credit*' is recognition that a learner has completed a prior course of learning, corresponding to a qualification at a given level. For each such prior qualification, the student would have put in a certain volume of institutional or workplace learning, and the more complex a qualification, the greater the volume of learning that would have gone into it. Credits quantify learning outcomes that are subject achieving the prescribed learning outcomes to valid, reliable methods of assessment.

The *credit points* will give the learners, employers, and institutions a mechanism for describing and comparing the learning outcomes achieved. The credit points can be calculated as credits attained multiplied with the credit level.

The workload relating to a course is measured in terms of credit hours. A credit is a unit by which the coursework is measured. It determines the number of hours of instruction required per week over the duration of a semester (minimum 15 weeks).

Each course may have only a lecture component or a lecture and tutorial component or a lecture and practicum component or a lecture, tutorial, and practicum component, or only practicum component.

A course can have a combination of *lecture credits, tutorial credits, practicum credits and experiential learning credits*.

The following types of courses/activities constitute the programmes of study. Each of them will require a specific number of hours of teaching/guidance and laboratory/studio/workshop activities, field-based learning/projects, internships, and community engagement and service.

- **Lecture courses:** Courses involving lectures relating to a field or discipline by an expert or qualified personnel in a field of learning, work/vocation, or professional practice.

- **Tutorial courses:** Courses involving problem-solving and discussions relating to a field or discipline under the guidance of qualified personnel in a field of learning, work/vocation, or professional practice. Should also refer to the Remedial Classes, flip classrooms and focus on both Slow and Fast Learners of the class according to their merit.
- **Practicum or Laboratory work:** A course requiring students to participate in a project or practical or lab activity that applies previously learned/studied principles/theory related to the chosen field of learning, work/vocation, or professional practice under the supervision of an expert or qualified individual in the field of learning, work/vocation or professional practice.
- **Seminar:** A course requiring students to participate in structured discussion/conversation or debate focused on assigned tasks/readings, current or historical events, or shared experiences guided or led by an expert or qualified personnel in a field of learning, work/vocation, or professional practice.
- **Internship:** A course requiring students to participate in a professional activity or work experience, or cooperative education activity with an entity external to the education institution, normally under the supervision of an expert of the given external entity. A key aspect of the internship is induction into actual work situations. Internships involve working with local industry, government or private organizations, business organizations, artists, crafts persons, and similar entities to provide opportunities for students to actively engage in on-site experiential learning.
- **Studio activities:** Studio activities involve the engagement of students in creative or artistic activities. Every student is engaged in performing a creative activity to obtain a specific outcome. Studio-based activities involve visual- or aesthetic-focused experiential work.
- **Field practice/projects:** Courses requiring students to participate in field-based learning/projects generally under the supervision of an expert of the given external entity.
- **Community engagement and service:** Courses requiring students to participate in field-based learning/projects generally under the supervision of an expert of the given external entity. The curricular component of ‘community engagement and service’ will involve activities that would expose students to the socio-economic issues in society so that the theoretical learnings can be supplemented by actual life experiences to generate solutions to real-life problems.

**Table:1: Course wise Distribution of Credits**

Broad Category of Course	Minimum Credit Requirement	
	3-year UG	4-Year UG
Major (Core)	60	80
Minor Stream	24	32
Interdisciplinary	9	9
Ability Enhancement Courses (AEC)	8	8
Skill Enhancement Courses (SEC)	9	9
Value Added Courses common for all UG	6	6
Summer Internship	4	4
Research Project / Dissertation	NA	12
<b>Total</b>	<b>120</b>	<b>160</b>

**Table 2: Credit Distribution for 3-year Course**

Semester	Course Credits							
	Major	Minor	ID	AEC	SEC	VAC	SI	Total
I	6	3	3	2	3	3	0	<b>20</b>
II	6	3	3	2	3	3	0	<b>20</b>
III	8	4	3	2	3	0	0	<b>20</b>
IV	12	6	0	2	0	0	0	<b>20</b>
V	12	4	0	0	0	0	4	<b>20</b>
VI	16	4	0	0	0	0	0	<b>20</b>
	<b>60</b>	<b>24</b>	<b>9</b>	<b>8</b>	<b>9</b>	<b>6</b>	<b>4</b>	<b>120</b>

**Table 3: Credit Distribution for 4-year Course**

Semester	Course Credits								Total
	Major	Minor	ID	AEC	SEC	VAC	SI	RP	
I	6	3	3	2	3	3	0	0	20
II	6	3	3	2	3	3	0	0	20
III	8	4	3	2	3	0	0	0	20
IV	12	6	0	2	0	0	0	0	20
V	12	4	0	0	0	0	4	0	20
VI	16	4	0	0	0	0	0	0	20
VII	16	4	0	0	0	0	0	0	20
VIII	4	4	0	0	0	0	0	12	20
	<b>80</b>	<b>32</b>	<b>9</b>	<b>8</b>	<b>9</b>	<b>6</b>	<b>4</b>	<b>12</b>	<b>160</b>

## 2.4. Levels of Courses

### 2.4.1 NHEQF levels:

The NHEQF levels represent a series of sequential stages expressed in terms of a range of learning outcomes against which typical qualifications are positioned/located. NHEQF level 4.5 represents learning outcomes appropriate to the first year (first two semesters) of the undergraduate programme of study, while Level 8 represents learning outcomes appropriate to the doctoral-level programme of study.

**Table: 4: NHEQF Levels**

NHEQF level	Examples of higher education qualifications located within each level	Credit Requirements
Level 4.5	Undergraduate Certificate. Programme duration: First year (first two semesters) of the undergraduate programme, followed by an exit 4-credit skills-enhancement course(s).	40
Level 5	Undergraduate Diploma. Programme duration: First two years (first four semesters) of the undergraduate programme, followed by an exit 4-credit skills-enhancement course(s) lasting two months.	80
Level 5.5	Bachelor's Degree. Programme duration: First three years (Six semesters) of the four-year undergraduate programme.	120

NHEQF level	Examples of higher education qualifications located within each level	Credit Requirements
Level 6	Bachelor's Degree (Honours/ Honours with Research). Programme duration: Four years (eight semesters).	160
Level 6	Post-Graduate Diploma. Programme duration: One year (two semesters) for those who exit after successful completion of the first year (two semesters) of the 2-year master's programme	160
Level 6.5	Master's degree. Programme duration: Two years (four semesters) after obtaining a 3- year Bachelor's degree (e.g. B.A., B.Sc., B.Com. etc.).	80
Level 6.5	Master's degree. Programme duration: One year (two semesters) after obtaining a 4 -year Bachelor's degree (Honours/ Honours with Research) (e.g. B.A., B.Sc., B.Com. etc.).	40
Level 7	Master's degree. (e.g., M.E./M.Tech. etc.) Programme duration: Two years (four semesters) after obtaining a 4-year Bachelor's degree. (e.g., B.E./B.Tech. etc.)	80
Level 8	Doctoral Degree	Credits for course work, Thesis, and published work

## 2.5. Course Code based on Learning Outcomes:

Courses are coded based on the learning outcomes, level of difficulty, and academic rigor.

The coding structure is as follows:

- i. 0-99: *Pre-requisite courses*** required to undertake an introductory course which will be a pass or fail course with no credits. It will replace the existing informal way of offering bridge courses that are conducted in some of the colleges/ universities.
- ii. 100-199: *Foundation or introductory courses*** that are intended for students to gain an understanding and basic knowledge about the subjects and help decide the subject or discipline of interest. These courses may also be prerequisites for courses in the major subject. These courses generally would focus on foundational theories, concepts, perspectives, principles, methods, and procedures of critical thinking in order to provide a broad basis for taking up more advanced courses.
- iii. 200-299: *Intermediate-level courses*** including subject-specific courses intended to meet the credit requirements for minor or major areas of learning. These courses can be part of a major and can be pre-requisite courses for advanced-level major courses.
- iv. 300-399: *Higher-level courses*** which are required for majoring in a disciplinary/interdisciplinary area of study for the award of a degree.

v. **400-499: *Advanced courses*** which would include lecture courses with practicum, seminar-based course, term papers, research methodology, advanced laboratory experiments/software training, research projects, hands-on-training, internship/apprenticeship projects at the undergraduate level or First year post-graduate theoretical and practical courses.

vi. **500-599: *Courses at first-year PG degree level*** for a 2-year post-graduate degree programme

vii. **600-699: *Courses for second year of 2-year PG*** or 1-year post-graduate degree programme

viii. **700 -799 & above:** Courses limited to doctoral students.



### ***3. Award of Degree in Forensic Science***

The structure and duration of undergraduate programmes of study offered by the University as per NEP 2020 include:

**3.1. Undergraduate programmes** of either 3 or 4-year duration with Single Major, with multiple entry and exit options, with appropriate certifications:

**3.1.1. UG Certificate:** Students who opt to exit after completion of the first year and have secured 40 credits will be awarded a UG certificate if, in addition, they complete one vocational course of 4 credits during the summer vacation of the first year. These students are allowed to re-enter the degree programme within three years and complete the degree programme within the stipulated maximum period of seven years.

**3.1.2. UG Diploma:** Students who opt to exit after completion of the second year and have secured 80 credits will be awarded the UG diploma if, in addition, they complete one vocational course of 4 credits during the summer vacation of the second year. These students are allowed to re-enter within a period of three years and complete the degree programme within the maximum period of seven years.

**3.1.3. 3-year UG Degree:** Students who will undergo a 3-year UG programme will be awarded UG Degree in the Major discipline after successful completion of three years, securing 120 credits and satisfying the minimum credit requirement.

**3.1.4. 4-year UG Degree (Honours):** A four-year UG Honours degree in the major discipline will be awarded to those who complete a four-year degree programme with 160 credits and have satisfied the credit requirements as given in table 2 in Section 5.

**3.1.5. 4-year UG Degree (Honours with Research):** Students who secure 75% marks and above in the first six semesters and wish to undertake research at the undergraduate level can choose a research stream in the fourth year. They should do a research project or dissertation under the guidance of a Faculty Member of the University. The research project/dissertation will be in the major discipline. The students who secure 160 credits, including 12 credits from a research project/dissertation, will be awarded UG Degree (Honours with Research).

(Note: ***UG Degree Programmes with Single Major:*** A student must secure a minimum of 50% credits from the major discipline for the 3-year/4-year UG degree to be awarded a single major. For example, in a 3-year UG programme, if the total number of credits to be earned is 120, a student of Mathematics with a minimum of 60 credits will be awarded a B.Sc. in Mathematics with a single major. Similarly, in a 4-year UG programme, if the total number

of credits to be earned is 160, a student of Chemistry with a minimum of 80 credits will be awarded a B.Sc. (Hons./Hon. With Research) in Chemistry in a 4-year UG programme with single major. Also, the **4-year Bachelor's degree programme with Single Major** is considered as the preferred option since it would allow the opportunity to experience the full range of holistic and multidisciplinary education in addition to a focus on the chosen major and minors as per the choices of the student.)

**Table: 5: Award of Degree and Credit Structure with ME-ME**

<b>Award</b>	<b>Year</b>	<b>Credits to earn</b>	<b>Additional Credits</b>	<b>Re-entry allowed within (yrs)</b>	<b>Years to Complete</b>
UG Certificate	1	40	4	3	7
UG Diploma	2	80	4	3	7
3-year UG Degree (Major)	3	120	x	x	x
4-year UG Degree (Honours)	4	160	x	x	x
4-year UG Degree (Honors with Research):	4	160	Students who secure cumulative 75% marks and above in the first six semesters		

## 4. Learning Outcomes

### 4.1 The Graduate Attributes

As per the NHEQF, each student on completion of a programme of study must possess and demonstrate the expected **Graduate Attributes** acquired through one or more modes of learning, including direct in-person or face-to-face instruction, online learning, and hybrid/blended modes. The graduate attributes indicate the quality and features or characteristics of the graduate of a programme of study, including learning outcomes relating to the disciplinary area(s) relating to the chosen field(s) of learning and generic learning outcomes that are expected to be acquired by a graduate on completion of the programme(s) of study.

The graduate profile/attributes include,

- capabilities that help widen the current knowledge base and skills,
- gain and apply new knowledge and skills,
- undertake future studies independently, perform well in a chosen career, and
- play a constructive role as a responsible citizen in society.

The graduate profile/attributes are acquired incrementally through development of cognitive levels and describe a set of competencies that are transferable beyond the study of a particular subject/disciplinary area and programme contexts in which they have been developed.

Graduate attributes include,

- **learning outcomes that are specific to disciplinary areas** relating to the chosen field(s) of learning within broad multidisciplinary/interdisciplinary/ transdisciplinary contexts.
- **generic learning outcomes** that graduate of all programmes of study should acquire and demonstrate.

**Table: 6: The Learning Outcomes Descriptors and Graduate Attributes**

Sl.no.	Graduate Attribute	The Learning Outcomes Descriptors (The graduates should be able to demonstrate the capability to:)
GA1	Disciplinary Knowledge	acquire knowledge and coherent understanding of the chosen disciplinary/interdisciplinary areas of study.
GA 2	Complex problem solving	solve different kinds of problems in familiar and non-familiar contexts and apply the learning to real-life situations.

<b>Sl.no.</b>	<b>Graduate Attribute</b>	<b>The Learning Outcomes Descriptors</b> <i>(The graduates should be able to demonstrate the capability to:)</i>
GA 3	Analytical & Critical thinking	apply analytical thought including the analysis and evaluation of policies, and practices. Able to identify relevant assumptions or implications. Identify logical flaws and holes in the arguments of others. Analyse and synthesize data from a variety of sources and draw valid conclusions and support them with evidence and examples.
GA 4	Creativity	create, perform, or think in different and diverse ways about the same objects or scenarios and deal with problems and situations that do not have simple solutions. Think ‘out of the box’ and generate solutions to complex problems in unfamiliar contexts by adopting innovative, imaginative, lateral thinking, interpersonal skills, and emotional intelligence.
GA 5	Communication Skills	listen carefully, read texts and research papers analytically, and present complex information in a clear and concise manner to different groups/audiences. Express thoughts and ideas effectively in writing and orally and communicate with others using appropriate media.
GA 6	Research-related skills	develop a keen sense of observation, inquiry, and capability for asking relevant/ appropriate questions. Should acquire the ability to problematize, synthesize and articulate issues and design research proposals, define problems, formulate appropriate and relevant research questions, formulate hypotheses, test hypotheses using quantitative and qualitative data, establish hypotheses, make inferences based on the analysis and interpretation of data, and predict cause-and-effect relationships. Should develop the ability to acquire the understanding of basic research ethics and skills in practicing/doing ethics in the field/ in personal research work.
GA 7	Collaboration	work effectively and respectfully with diverse teams in the interests of a common cause and work efficiently as a member of a team.
GA 8	Leadership readiness/qualities	plan the tasks of a team or an organization and setting direction by formulating an inspiring vision and building a team that can help achieve the vision.
GA 9	Digital and technological skills	use ICT in a variety of learning and work situations. Access, evaluate, and use a variety of relevant information sources and use appropriate software for analysis of data.

<b>Sl.no.</b>	<b>Graduate Attribute</b>	<b>The Learning Outcomes Descriptors</b> <i>(The graduates should be able to demonstrate the capability to:)</i>
GA 10	Environmental awareness and action	mitigate the effects of environmental degradation, climate change, and pollution. Should develop the technique of effective waste management, conservation of biological diversity, management of biological resources and biodiversity, forest and wildlife conservation, and sustainable development and living.

## 4.2. Program Learning Outcomes

The outcomes described through learning outcome descriptors are attained by students through learning acquired on the completion of a programme of study relating to the chosen fields of learning, work/vocation, or an area of professional practice. The term ‘programme’ refers to the entire scheme of study followed by learners leading to a qualification. Individual programmes of study will have defined learning outcomes that must be attained for the award of a specific certificate/diploma/degree.

The programme learning outcomes focusses on knowledge and skills that prepare students for further study, employment, and responsible citizenship.

**Table: 7: The Programme Learning Outcome Descriptors**

<b>Sl.no.</b>	<b>Programme Learning Outcome</b>	<b>The Programme Learning Outcomes Descriptors</b> <i>The graduates will acquire the following:</i>
PLO 1	Knowledge of Forensic Science	<ul style="list-style-type: none"> <li>• The student will be able to identify the ethics of crime, types of crimes and its impact on the society.</li> <li>• Students will be able to understand the different laws related to crime, its punishment and psychology behind crimes.</li> <li>• The students will be able to understand and outline the hierarchy of organizations associated with criminal law, forensic evidence evaluation processes and functions of different government organizations</li> <li>• Students will be able to understand the role of chemistry, physics, biology and molecular tools in forensic science.</li> <li>• The importance of digital tools and cyber-crime can be understood through this course.</li> <li>• Students will be able to demonstrate the experimental techniques and methods of their area of specialization in Forensic Science.</li> </ul>

<b>Sl.no.</b>	<b>Programme Learning Outcome</b>	<b>The Programme Learning Outcomes Descriptors</b> <i>The graduates will acquire the following:</i>
PLO 2	Develop the ability to solve complex problems	An increased understanding of fundamental concepts and their applications of scientific principles is expected at the end of this course. Students will become critical thinkers and acquire problem solving capabilities.
PLO 3	Develop Critical and analytical thinking skills	The students will be able to apply analytical thought including the analysis and evaluation of policies, and practices in the field of crime and civil cases. Ability to understand and skills will be enhanced for identifying problems and issues relating to Forensic Science.
PLO 4	Develop and Demonstrate Creativity	A student will be able to demonstrate, perform, or think in different and diverse ways by using tools and techniques. The students will be able to deal with problems and situations that do not have simple solutions. They will be able to think 'out of the box' and generate solutions to complex problems in unfamiliar contexts by adopting innovative, imaginative, lateral thinking, interpersonal skills and emotional intelligence
PLO 5	Develop effective Communication Skills	The students will develop the ability to listen carefully, read texts and research papers analytically, and present complex information in a clear and concise manner to different groups/audiences through various means of communication. A student will be able to express thoughts and ideas effectively in writing, through experiments and also orally and communicate with others using appropriate technologies.
PLO 6	Develop Research-related Skills	A student will develop a keen sense of observation, inquiry, and capability for asking relevant/ appropriate questions. Should acquire the ability to problematize, synthesize and articulate issues and design research proposals, define problems, formulate appropriate and relevant research questions, formulate hypotheses, test hypothesis using quantitative and qualitative data, establish hypotheses, make inferences based on the analysis and interpretation of data, and predict cause-and-effect relationships. Students will develop the ability to acquire the understanding of basic research ethics and skills in practicing/doing ethics in the field/ in personal research work.
PLO 7	Develop the ability to Collaborate and execute teamwork	Capable to work effectively and respectfully with diverse teams in the classroom and in the field, in the interests of a common cause and work efficiently as a member of a team.

Sl.no.	Programme Learning Outcome	The Programme Learning Outcomes Descriptors <i>The graduates will acquire the following:</i>
PLO 8	Develop Leadership Qualities	Students will learn team workmanship in order to serve efficiently institutions, industry and society. Students will also strengthen their ethical and moral values and shall be able to deal with psychological weaknesses.
PLO 9	Develop technological and Digital skills	Students will acquire digital skills and integrate the fundamental concepts with modern tools.
PLO 10	Develop the ability to Identify & address the Environmental Issues	A student will identify the effects of environmental degradation, climate change, and pollution. They will develop the technique and illustrate awareness on effective waste management, conservation of biological diversity, management of biological resources and biodiversity, forest and wildlife conservation, and sustainable development and living by producing different Information Education and Communication (IEC) materials.

#### 4.3. Programme specific Learning Outcomes (PSOs):

**PSO1.** A student completing the course can understand different specializations of Forensic Science such as definitions related to Forensic Science, an introductory concept about Forensic Science, criminal laws, constitution, Forensic Chemistry, Forensic Biology, forensic toxicology, crime and society.

**PSO2.** The student completing the course is trained in various analytical techniques of forensic biology, forensic chemistry, ballistics, handwriting recognition and identification used in questioned documents examination, biometry and fingerprint analysis.

**PSO3.** The student completing the course can design and execute experiments related to forensic science which will help in the solving all forms of crimes in India. Students are also familiarized with the use of digital tools and databases in solving various crimes.

**PSO4.** The student completing the course can execute short research projects incorporating various tools and techniques in any of the basic specializations of Forensic Science under supervision.

## ***5. Teaching Learning Process***

Teaching and learning in this programme involve classroom lectures as well as tutorial and remedial classes.

**Tutorial classes:** Tutorials allow closer interaction between students and teacher as each student gets individual attention. The tutorials are conducted for students who are unable to achieve average grades in their weekly assessments. Tutorials are divided into three categories, viz. discussion-based tutorials (focusing on deeper exploration of course content through discussions and debates), problem-solving tutorials (focusing on problem solving processes and quantitative reasoning), and Q&A tutorials (students ask questions about course content and assignments and consolidate their learning in the guiding presence of the tutor).

**Flip classroom:** Flip classroom allows lecture content from face-to-face class time to before class by assigning it as homework. This allows for more interactive forms of learning to take place during class.

**Remedial classes:** The remedial classes are conducted for students who achieve average and above average grades in their weekly assessments. The focus is laid to equip the students to perform better in the exams/assessments. The students are divided into small groups to provide dedicated learning support. Tutors are assigned to provide extra time and resources to help them understand concepts with advanced nuances. Small groups allow tutors to address their specific needs and monitor them. Following methods are adopted for tutorial and remedial classes:

- Written assignments and projects submitted by students
- Project-based learning
- Group discussions
- Home assignments
- Class tests, quizzes, debates organized in the department
- Seminars and conferences
- Extra-curricular activities like cultural activities, community outreach programmes etc.
- Field trip, excursions, study tour, interacting with eminent authors, etc.

**Experiential Learning:** Experiential learning is a part of the curricular structure of the Graphic Design program. E.g., projects/OJT/internship/industrial attachments etc. This could be either within the program- internship/ summer project undertaken relevant to the program being studied or as a part time employment.



## 6. Assessment Methods

Sl. No.	Components of evaluation	Marks	Frequency	Code	Weightage (%)
<b>A. Continuous Evaluation</b>					
i.	Analysis/ Class Test	Combination of any 3 from i. to v. with 5 marks each (15 marks)	1 – 3	C	25%
ii	Home assignments		1 – 3	H	
iii	Project		1	P	
iv	Seminar		1 – 2	S	
v	Viva-Voce/ Presentations		1 – 2	V	
vi	Mid sem Examinations	10	1	Q/CT	
vii	Attendance	5	Every month	A	5%
<b>B. Semester End Evaluation</b>					
i.	Semester End examination	70	1	SEE	70%
<b>Total</b>					100%

## 7. Programme Structure

<b>B.Sc. (HONOURS) FORENSIC SCIENCE PROGRAMME STRUCTURE</b>				
<b>1<sup>ST</sup> SEMESTER</b>				
<b>Sl.No</b>	<b>Subject Code</b>	<b>Names of subjects</b>	<b>Course level</b>	<b>Credits</b>
<b>MAJOR / CORE COURSES</b>				
1	FSC142M101	Introduction to Forensic Science	100	2
2	FSC142M141	Introduction to Forensic Science (P)	100	1
3	FSC142M102	Crime & Society	100	3
<b>MINOR COURSE</b>				
4	FSC142N101	Basic Forensic Biology	100	3
<b>INTER DISCIPLINARY COURSE</b>				
5	IKS992K101	Introduction to Indian Knowledge System -1	100	3
<b>SKILL ENHANCEMENT COURSE (SEC)</b>				
6	FSC142S101	Forensic Photography and Documentation	100	3
<b>ABILITY ENHANCEMENT COURSE (AEC)</b>				
7	CEN982A101 & CEN982A102	Communicative English and Behavioral Science-I	100	2
<b>VALUE ADDED COURSE (VAC)</b>				
8	VAC 1	One Course from a Basket of Available Courses to be Selected	100	3
<b>TOTAL CREDITS FOR THE SEMESTER</b>			<b>20</b>	

<b>2ND SEMESTER</b>				
<b>Sl.No.</b>	<b>Subject Code</b>	<b>Names of subjects</b>	<b>Course level</b>	<b>Credits</b>
<b>MAJOR / CORE COURSES</b>				
1	FSC142M201	Criminal Law	100	3
2	FSC142M202	Basics of Forensic Chemistry	100	2
3	FSC142M212	Basics of Forensic Chemistry (P)	100	1
<b>MINOR COURSE</b>				
4	FSC142N201	Cyber Forensics	100	3
<b>INTERDISCIPLINARY COURSE</b>				
5	IDC - 2	Introduction to Indian Knowledge System -2	100	3
<b>SKILL ENHANCEMENT COURSE (SEC)</b>				
6	FSC142S201	Handwriting Identification and Recognition	100	2
7	FSC142S211	Handwriting Identification and Recognition (P)	100	1
<b>ABILITY ENHANCEMENT COURSE (AEC)</b>				
8	AEC 2	Communicative English and Behavioral Science-II	100	2

VALUE ADDED COURSE (VAC)				
9	VAC 2	One Course from a Basket of Available Courses to be Selected	100	3
<b>TOTAL CREDITS FOR THE SEMESTER</b>			<b>20</b>	

3RD SEMESTER				
Sl.No.	Subject Code	Names of subjects	Course level	Credits
<b>MAJOR/ CORE COURSES</b>				
1	FSC142M301	Forensic Dermatoglyphics	200	3
2	FSC142M312	Forensic Dermatoglyphics (P)	200	1
3	FSC142M303	Forensic Physics	200	3
4	FSC142M314	Forensic Physics (P)	200	1
<b>MINOR COURSE</b>				
5	FSC142N341	Crime Scene Investigation	200	4
<b>INTERDISCIPLINARY COURSE</b>				
6	IDC - 3	One Course from a Basket of Available Courses to be Selected	200	3
<b>SKILL ENHANCEMENT COURSE (SEC)</b>				
7	FSC142S341	Introduction to Digital Forensics	200	3
<b>ABILITY ENHANCEMENT COURSE (AEC)</b>				
8	AEC 3	Communicative English and Behavioral Science-II	200	2
<b>TOTAL CREDITS FOR THE SEMESTER</b>			<b>20</b>	

4TH SEMESTER				
Sl.No.	Subject Code	Names of subjects	Course level	Credits
<b>MAJOR/ CORE COURSES</b>				
1	FSC142M401	Forensic Psychology	200	4
2	FSC142M402	Analytical Methods-I	200	4
3	FSC142M403	Forensic Anthropology and Odontology	200	3
4	FSC142M414	Forensic Anthropology and Odontology (P)	200	1
<b>MINOR COURSES</b>				
5	FSC142N401	Technical Methods	200	3
6	FSC142N402	Accident Investigation-Motor Vehicles	200	3
<b>ABILITY ENHANCEMENT COURSE (AEC)</b>				
7	AEC 4	Communicative English and Behavioral Science-II	200	2
<b>TOTAL CREDITS FOR THE SEMESTER</b>			<b>20</b>	

<b>5TH SEMESTER</b>				
<b>Sl.No.</b>	<b>Subject Code</b>	<b>Names of subjects</b>	<b>Course level</b>	<b>Credits</b>
<b>MAJOR/ CORE COURSES</b>				
1	FSC142M541	Forensic Toxicology	300	4
2	FSC142M542	Forensic Biology	300	4
3	FSC142M543	Questioned Document	300	4
<b>MINOR COURSES</b>				
4	FSC142N501	Biometrics And Emerging Techniques	300	4
<b>INTERNSHIP</b>				
6	FSC142M504	Internship / Research Project	NA	4
<b>TOTAL CREDITS FOR THE SEMESTER</b>				<b>20</b>
<b>6TH SEMESTER</b>				
<b>Sl.No.</b>	<b>Subject Code</b>	<b>Names of subjects</b>	<b>Course level</b>	<b>Credits</b>
<b>MAJOR/ CORE COURSES</b>				
1	FSC142M601	Analytical Methods-II	300	4
2	FSC142M642	Forensic Ballistics	300	4
3	FSC142M643	Molecular Biology	300	4
4	FSC142M644	Forensic Medicine and Medical Jurisprudence	300	4
<b>MINOR COURSES</b>				
4	FSC142N601	Forensic Linguistics	300	4
<b>TOTAL CREDITS FOR THE SEMESTER</b>				<b>20</b>

**7TH SEMESTER**

<b>Sl.No.</b>	<b>Subject Code</b>	<b>Names of subjects</b>	<b>Course level</b>	<b>Credits</b>
<b>MAJOR/CORE COURSES</b>				
1	FSC142M741	Forensic Entomology	400	4
2	FSC142M742	Forensic Serology	400	4
3	FSC142M703	Biometrics and Emerging Techniques	400	4
4	FSC142M714	Practical (entomology and serology)	400	4
<b>MINOR COURSE</b>				
5	FSC142N701	Forensic Data Analysis and Interpretation	400	4
<b>TOTAL CREDITS FOR THE SEMESTER</b>			<b>20</b>	

**8TH SEMESTER**

<b>Sl.No.</b>	<b>Subject Code</b>	<b>Names of subjects</b>	<b>Course level</b>	<b>Credits</b>
<b>MAJOR/CORE COURSES</b>				
1	FSC142M841	Advanced Tools and Technique in Forensic Science	400	4
<b>MINOR COURSE</b>				
2	FSC142N801	Research Methodology	400	4
<b>DISSERTATION/RESEARCH PROJECT</b>				
3	FSC142M822	Research Project Dissertation	400	12
<b>MAJOR COURSES IN LIEU OF DISSERTATION</b>				
4	FSC142M803	Microbes and Viruses	400	4
5	FSC142M804	DNA Typing	400	4
6	FSC142M805		400	4
<b>TOTAL CREDITS FOR THE SEMESTER</b>			<b>20</b>	

## 8. Detailed Syllabus

### SEMESTER – I

<b>Paper Sl. No.</b>	Paper - I	<b>Scheme of Evaluation</b>	T&P
<b>Name of the Course</b>	Introduction to Forensic Science	<b>L-T-P-C</b>	2-0-0-2
<b>Type of Course</b>	Major/Core	<b>Credits Assigned</b>	2
<b>Paper Code</b>	FSC142M141	<b>Level of the Course</b>	100

**Pre-requisite:** Basic knowledge of biology, chemistry, physics (up to class 12), political science and history (up to class 10)

**Course objective:** To introduce and learn the basic concepts forensic science and its history, and to develop an idea about its organizational structure and functions and its components in India.

<b>Course Outcome:</b> After successful completion of the course, student will be able to		
<b>Sl.No.</b>	<b>Course Outcome</b>	<b>Blooms Taxonomy Level</b>
CO1	<b>define</b> the concept of forensic science, learn the history, its scope, and applications.	BT1
CO2	<b>understand</b> the various organizations of forensic laboratory and agencies involved in crime detection and investigation	BT2
CO3	<b>construct</b> the knowledge of tools and technique related to forensic science.	BT3
CO4	<b>categorize</b> the different components and its importance in knowing the subject	BT4

<b>Module</b>	<b>Course content</b>	<b>Lectures</b>
<b>I</b>	<b>Concepts in forensic science:</b> Definition and scope of forensic science; Functions of Forensic Science; Evidence; classification of evidence: according to Indian Evidence Act, based on nature of evidence, class and individual evidence; Principles of forensic science; Frye Rule; Daubert Standards; Terminologies in forensic science: First responder, chain of custody, mahazaar, FIR and its types.	<b>11</b>
<b>II</b>	<b>History and development of Forensic Science:</b> Historical aspects of forensic science; Definitions and concepts in forensic science; Branches of Forensic Science, History and development of police Administration in India.	<b>11</b>

Module	Course content	Lectures
III	<p><b>Organizational set up of Forensic Science Laboratories in India:</b> Hierarchical set up of Central Forensic Science Laboratories, State Forensic Science Laboratories, Fingerprint Bureaus, National Crime Records Bureau, Police &amp; Detective Training Schools, Bureau of Police Research &amp; Development, Directorate of Forensic Science and Mobile Crime Laboratories.</p> <p><b>Scene of Crime:</b> Definition of scene of crime, Types of scenes of crime- Indoor, Outdoor and mobile; Protection and Preservation of scene of crime - Videography, Photography, Sketching; Types of sketching, Searching methods and its types.</p>	11
IV	<p><b>Quality Assurance and Ethics in Forensic Science:</b> Importance of quality assurance in forensic science; Laboratory accreditation and standards (e.g., ISO 17025), Ethical principles and codes of conduct in the forensic field, Overview of ethics in forensic science, Ethical considerations in testifying as an expert witness</p>	11
<b>Total</b>		<b>44</b>

**National Credit Hours for the course:** 30 x 2 = 60 NCH

<b>Distribution of Credits</b>		
Lecture/ Tutorial	Practicum	Experiential Learning
44	0	16 Laboratory Visit, Field Trips, Group Work, Discussions, Presentations and Quiz

***Suggested Readings:***

**Textbooks:**

1. Introduction to Forensic Sciences (2nd Edition). CRC Press. James, S. H., Nordby, J. J., Bell, S. (2014).
2. Forensic Science in Crime Investigation. Asia Law House. S Nath, R. C. (2013). Forensic Science and Crime Investigation: Abhijeet Publications.

**Reference Books:**

1. Saferstein, R. (2017). Criminalistics: An Introduction to Forensic Science. Pearson.

## SEMESTER – I

<b>Paper Sl. No.</b>	Paper - I	<b>Scheme of Evaluation</b>	T&P
<b>Name of the Course</b>	Introduction to Forensic Science (P)	<b>L-T-P-C</b>	0-0-2-1
<b>Type of Course</b>	Major/Core	<b>Credits Assigned</b>	1
<b>Paper Code</b>	FSC142M141	<b>Level of the Course</b>	100

**Pre-requisite:** Basic knowledge of biology, chemistry, physics (up to class 12), political science and history (up to class 10)

**Course objective:** To introduce and learn the basic concepts forensic science and its history, and to develop an idea about its organizational structure and functions and its components in India.

<b>Course Outcome:</b> After successful completion of the course, student will be able to		
<b>Sl.No.</b>	<b>Course Outcome</b>	<b>Blooms Taxonomy Level</b>
CO1	<b>define</b> the concept of forensic science, learn the history, its scope, and applications.	BT1
CO2	<b>understand</b> the various organizations of forensic laboratory and agencies involved in crime detection and investigation	BT2
CO3	<b>construct</b> the knowledge of tools and technique related to forensic science.	BT3
CO4	<b>categorize</b> the different components and its importance in knowing the subject	BT4

<b>Module No.</b>	<b>List Of Practical</b>	<b>Hours</b>
<b>I</b>	1. How to write an FIR and types of FIR.	3
	2. The use if searching methods for crime scene (outdoor and indoor SOC)	4
<b>II</b>	3. Outdoor Crime scene Investigation ( Accident)	4
	4. Indoor Crime scene Investigation (Murder)	4
<b>III</b>	5. Sketching and its types	3
	6. Collection, packing, labeling and forwarding of evidence.	3
<b>IV</b>	7. Introduction to Lab and Safety Protocols in Forensic Science Laboratory	4
	8. Preliminary Examination of unknown samples.	5
Total		30



## SEMESTER – I

<b>Paper Sl. No.</b>	Paper - 2	<b>Scheme of Evaluation</b>	Theory
<b>Name of the Course</b>	Crime and Society	<b>L-T-P-C</b>	3-0-0-3
<b>Type of Course</b>	Major/Core	<b>Credits Assigned</b>	3
<b>Paper Code</b>	FSC142M102	<b>Level of the Course</b>	100

**Course objective:** The goal of the course is to help the students adopt the forensic professionalism philosophy. Students will learn about the importance of ethical issues in improving the criminal justice system. The ethical rules for researchers will help to raise the standard of study.

<b>Course Outcome :</b> After successful completion of the course, student will be able to		
<b>Sl.No.</b>	<b>Course Outcome</b>	<b>Blooms Taxonomy Level</b>
CO1	<b>define</b> the importance of criminology and penology for crime detection.	BT1
CO2	<b>understand</b> the usage of the acts and laws pertaining to forensic science.	BT2
CO3	<b>apply</b> knowledge about theoretical perspectives on crime.	BT3
CO4	will be able to understand the <b>relationship</b> of crime and society.	BT4

<b>Module</b>	<b>Course content</b>	<b>Le ctu re</b>
<b>I</b>	<b>Introduction to Sociology of crime:</b> Definition and characteristics of crime in modern society, Causes of crime (social, economic, political, cultural, biological, atmospheric, geographical and other). Classification of crime and offences. <b>Types of crime and its causes:</b> Property crimes, public order crimes, violent crimes, cyber crimes, juvenile delinquency, Society-Criminal interaction and various types of crimes in India.	<b>15</b>
<b>II</b>	<b>Basics of Criminology:</b> Theories of criminal behavior-classical, positivist, sociological. Criminal anthropology. Criminal profiling. Understanding modus operandi. Investigative strategy. Role of media.	<b>15</b>
<b>III</b>	<b>Crime:</b> Hate crimes, organized crimes and public disorder, domestic violence and workplace violence; Sexual offence, Dowry and Dowry Death, White collar crimes, Juvenile delinquency. Social change and crime.	<b>15</b>

	Psychological Disorders and Criminality. Situational crime prevention. Drug addiction and crime.	
<b>IV</b>	<b>Criminal Justice System:</b> Broad components of criminal justice system. Policing styles and principles. Police's power of investigation. Filing of criminal charges. Community policing. Policing a heterogeneous society. Correctional measures and rehabilitation of offenders. Human rights and criminal justice system in India; Punishment and its types, Prison and its types.	<b>15</b>
<b>Total</b>		<b>60</b>

**National Credit Hours for the course:** 30 x 3 = 90 NCH

<b>Distribution of Credits</b>		
<b>Lecture/ Tutorial</b>	<b>Practicum</b>	<b>Experiential Learning</b>
60	0	30 Laboratory Visit, Field Trips, Group Work, Discussions, Presentations and Quiz Doing case studies, assignments, quiz and brain storming sessions

**Text Books:**

1. Banshi Dhar Dwivedi; 'A - Z Criminology' Centrum Press, New Delhi, 2009
2. Chokalingam.K; Criminology (Tamil) Parvathi Printers, Chennai.
3. Amodh K.Kanth; Juvenile Justice: The Indian Context and Prayas Experiment 'Kumarappa Rockless Award Lecuture, Annyak Conference of the Indian Society of Criminology' , Chennai-2002.

**SEMESTER – I**

<b>Paper Sl. No.</b>	Paper - 3	<b>Scheme of Evaluation</b>	Theory
<b>Name of the Course</b>	Basic Forensic Biology	<b>L-T-P-C</b>	3-0-0-3
<b>Type of Course</b>	Minor	<b>Credits Assigned</b>	3
<b>Paper Code</b>	FSC142N101	<b>Level of the Course</b>	100

**Course objective:** The objective of this subject is to enable the students to develop the knowledge of basics of biology and its application.

<b>Course Outcome :</b> After successful completion of the course, student will be able to
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Sl.No.	Course Outcome	Blooms Taxonomy Level
CO1	<b>define</b> the basics of biology and its uses in forensic science	BT1
CO2	<b>explain</b> the differences between plant, animal and microbes	BT2
CO3	<b>experiment with</b> various specimens and study them in detail.	BT3
CO4	<b>analyze</b> and <b>apply</b> the concept of genetics and inheritance in different living organisms	BT4

Module	Course content	Lecture
<b>I</b>	<b>Plant and Animal Biology:</b> Cell: Organelles and their Functions, Difference between Eukaryotic and Prokaryotic Cell, Difference between Plant and Animal Cell. Cell Division: Definition, Meiosis and Mitosis. Plants: Algae, Bryophyta, Pteridophyta and Gymnospermae; Animals: Non-chordates, chordates; Forensic aspects of Botany: Palynology and Limnology;	<b>15</b>
<b>II</b>	<b>Human Biology: Elementary tissues of the body:</b> epithelial, muscular; Definition and formation of skin. Layers of skin (over all anatomy), glands associated with skin; Organization of Organs and systems in the human body: Digestive, Circulatory, Respiratory, Excretory, skeletal.	<b>15</b>
<b>III</b>	<b>Microbiology:</b> Microbes; Bacteria: Classification; gram staining; diseases and prevention; Antibiotics; Virus: Classification; diseases and prevention; Fungi: Classification; diseases and prevention; Parasites: Classification; diseases and prevention; Beneficial microbes; Forensic aspects of Microbiology; Biological warfare.	<b>15</b>
<b>IV</b>	<b>Genetics and Inheritance:</b> Heredity and variation; Mendelian inheritance; Chromosomes and genes; Karyotyping: Banding techniques; DNA and RNA. Mt DNA: structure, types, Mutations-Polymorphism Significance in Forensic.	<b>15</b>
<b>Total</b>		<b>60</b>

**National Credit Hours for the course:** 30 x 3 = 90 NCH

Distribution of Credits		
Lecture/ Tutorial	Practicum	Experiential Learning
60	0	30 Laboratory Visit, Field Trips, Group Work, Discussions, Presentations and Quiz

**Text Books:**

1. Agarwal (2018). Modern textbook of Botany, Universal Publication. Ananthanarayanan (2017).
2. A textbook of Microbiology, The Orient Blackswan. Gennard, D. (2013).
3. Forensic entomology: an introduction. Wiley. Gunn. A (2006).
4. Essentials of Forensic Biology, Chichester: John Wiley & Sons, Ltd. Gunn, A. (2011).
4. Essential forensic biology. John Wiley & Sons. Pelczar. M, (2001). Microbiology, McGraw Hill Education.

**Reference Books:**

1. Saferstein, R (2004). Forensic Science Handbook; Vol; III; New Jersey; Prentice Hall.
2. Talwar. G. P (2002). Textbook of Biochemistry and Human Biology, Prentice Hall India Learning Private Limited.
3. Verma. P. S (2004). Cell Biology Genetics Molecular Biology Evolution and Ecology, S Chand.

**SEMESTER – I**

<b>Paper Sl. No.</b>	Paper - 4	<b>Scheme of Evaluation</b>	T&P
<b>Name of the Course</b>	Forensic Photography and Documentation	<b>L-T-P-C</b>	2-0-2-3
<b>Type of Course</b>	Skill Enhancement Course	<b>Credits Assigned</b>	3
<b>Paper Code</b>	FSC142S141	<b>Level of the Course</b>	100

**Course objective:** The objective of the course is to guide the students to enhance their hand skills with different photography techniques and documents.

<b>Course Outcome :</b> After successful completion of the course, student will be able to		
<b>Sl.No.</b>	<b>Course Outcome</b>	<b>Blooms Taxonomy Level</b>
CO1	<b>remember</b> the basics of hand rendering techniques	BT1
CO2	<b>explain</b> key terminologies technically used in the field of photography.	BT2
CO3	<b>apply</b> different techniques through different situation/ cases	BT3
CO4	analyze different types of photographing techniques	BT4

<b>Module</b>	<b>Course content</b>	<b>Lecture</b>
<b>I</b>	<b>Optics:</b> Refraction and reflection, Total internal reflection, Lens combination, Interference, Polarization(introduction, Brewster's law, polarizer and analyzer), Diffraction and its types. Fiber optics(structure, classification, and application)	<b>11</b>
<b>II</b>	<b>Introduction to camera and photography:</b> Historical development of photography, significance and objective of utilizing photography in law Enforcement and Crime Investigation. Types of Subject Brightness. Basic terms, principles and concepts of photography. Types of camera and components of camera with use.	<b>11</b>
<b>III</b>	<b>Sketching and photographing methods:</b> Crime scene Photography, General Direction, over-all view, mid-range view, close-up view photography. Crime Scene Sketching. Photographs admissible in court.	<b>11</b>
<b>IV</b>	<b>Document Photography:</b> Basic Principles and techniques of black & white and color photograph. Specialized photography- UV, IR, transmitted light and side light photography, contact Photography, Microphotography, Photomicrography. Digital watermarking and digital imaging..	<b>11</b>
<b>Total</b>		<b>44</b>

<b>Module No.</b>	<b>List Of Practical</b>	<b>Hours</b>
<b>I</b>	1. Study in detail about the working and procedure of compound, stereo and light microscopes.	5
<b>II</b>	2. Determine the resolving power of various microscope.	5
<b>III</b>	3. Sketching and its types	5
	4. How to write a report	5
<b>IV</b>	5. Application of different photography in SOC.	5
	6. Study reflection, refraction with the help of a Glass slab.	5
<b>Total</b>		<b>30</b>

<b>Distribution of Credits</b>		
<b>Lecture/ Tutorial</b>	<b>Practicum</b>	<b>Experiential Learning</b>
44	30	16 Laboratory Visit, Field Trips, Group Work, Discussions, Presentations and Quiz

***Suggested Readings:***

- 1) FORENSIC PHOTOGRAPHY - PRACTITIONER'S GUIDE: A PRACTITIONER'S GUIDE
- 2) Weiss, S. (2022). Handbook of Forensic Photography (1st ed.). CRC Press.  
<https://doi.org/10.4324/9781003047964>

## SEMESTER – II

<b>Paper Sl. No.</b>	Paper - 1	<b>Scheme of Evaluation</b>	Theory
<b>Name of the Course</b>	Criminal Law	<b>L-T-P-C</b>	3-0-0-3
<b>Type of Course</b>	Major/Core	<b>Credits Assigned</b>	3
<b>Paper Code</b>	FSC142M201	<b>Level of the Course</b>	100

**Prerequisite: Basic knowledge of biology of class XII.**

**Course objective:** To provide the students with the knowledge of important laws pertaining to forensic science and the criminal justice system.

<b>Course Outcome :</b> After successful completion of the course, student will be able to		
<b>Sl.No.</b>	<b>Course Outcome</b>	<b>Blooms Taxonomy Level</b>
CO1	<b>remember</b> the constitution and Indian acts	BT1
CO2	<b>understand</b> laws related to forensic science	BT2
CO3	<b>apply</b> these laws while practicing in the field/labs	BT3
CO4	<b>appraise</b> the provisions of the Indian Penal Code with respect to the offences.	BT4

<b>Modules</b>	<b>Course content</b>	<b>Lecture</b>
<b>I</b>	<b>Law to Combat Crime I:</b> Classification – civil, criminal cases. Essential elements of crime; Constitution and hierarchy of criminal courts. Definitions of- IPC, CrPC, IEA. Criminal Procedure Code(CrPC) Cognizable and non-cognizable offences. Bailable and non-bailable offences. Sentences which the court of Chief Judicial Magistrate may pass. Summary trials – Section 260(2). Judgements in abridged forms – Section 355.	<b>15</b>
<b>II</b>	<b>Law to Combat Crime II:</b> Indian Penal Code pertaining to offences against persons (life) – Sections 121A, 299, 300, 302, 304A, 304B, 307, 309, 319, 320, 324, 326, 351, 354, 359, 362. Sections 375 & 377 and their amendments. Indian Penal Code(IPC) pertaining to offence against property Sections – 378, 383, 390, 391, 405, 415, 420, 441, 463, 489A, 497, 499, 503, 511. Indian Evidence Act – Evidence and rules of relevancy in brief. Expert witness. Cross examination and re-examination of witnesses. Article 32, 45, 46, 47, 57, 58, 60, 73, 135,	<b>15</b>

	136, 137, 138, 141. Section 293 in the code of criminal procedure. Witness and its types.	
<b>III</b>	<b>Constitution of India:</b> Preamble, Fundamental Rights, Directive Principles of State Policy. – Articles 14, 15, 20, 21, 22, 51A. FIR, Panchnama, Inquest( Police and magistrate) , Dying declaration, Dying deposition, Sub-poena(summons).	<b>15</b>
<b>IV</b>	<b>Acts Pertaining to Socio-economic and Environmental Crimes:</b> Narcotic, Drugs and Psychotropic Substances Act. Essential Commodity Act. Drugs and Cosmetics Act. Explosive Substances Act. Arms Act. Dowry Prohibition Act. Prevention of Food Adulteration Act. Prevention of Corruption Act. Wildlife Protection Act. I.T. Act. Environment Protection Act. Untouchability Offences Act	<b>15</b>
<b>Total</b>		<b>60</b>

<b>Distribution of Credits</b>		
<b>Lecture/ Tutorial</b>	<b>Practicum</b>	<b>Experiential Learning</b>
60	0	30 Laboratory Visit, Field Trips, Group Work, Discussions, Presentations and Quiz

### **Text Books:**

1. D.A. Bronstein, Law for the Expert Witness, CRC Press, Boca Raton (1999).
2. Vipa P. Sarthi, Law of Evidence, 6th Edition, Eastern Book Co., Lucknow (2006).
3. A.S. Pillia, Criminal Law, 6th Edition, N.M. Tripathi Pvt Ltd., Mumbai (1983).

### **Reference Books:**

1. R.C. Nigam, Law of Crimes in India, Volume I, Asia Publishing House, New Delhi (1965).
5. (Chief Justice) M. Monir, Law of Evidence, 6th Edition, Universal Law Publishing Co. Pvt. Ltd., New Delhi (2002).

## **SEMESTER – II**

<b>Paper Sl. No.</b>	Paper - 2	<b>Scheme of Evaluation</b>	Theory
<b>Name of the Course</b>	Basics of Forensic Chemistry	<b>L-T-P-C</b>	2-0-0-2
<b>Type of Course</b>	Major/Core	<b>Credits Assigned</b>	2
<b>Paper Code</b>	FSC142M202	<b>Level of the Course</b>	100



**Course objective:** To introduce the students to the basic concepts of chemistry and forensic chemistry.

<b>Course Outcome :</b> After successful completion of the course, student will be able to		
<b>Sl.No.</b>	<b>Course Outcome</b>	<b>Blooms Taxonomy Level</b>
CO1	<b>remember</b> the use of chemicals and chemistry.	BT1
CO2	<b>understand</b> the use of chemistry in examination of various evidences	BT2
CO3	<b>examining</b> . the different petroleum products and explosive Substances	BT3
CO4	<b>distinguishing</b> the concept of alcoholic and non-alcoholic beverages in solving various crimes/cases	BT4

<b>Modules</b>	<b>Course content</b>	<b>Lecture</b>
<b>I</b>	<b>Structure of atom:</b> Quantum and wave mechanical approaches to the structure of atom, <b>Periodic classification and Properties:</b> (a)Mendeleev, Modern, Extended and long form. (b) Periodic properties: Atomic and ionic radii, crystal co-ordination no., Radius ratio, factors influencing magnitude of ionic radii. Periodic variations of atomic and ionic radii. Ionization energy, electron affinity and electro-negativity. : <b>Structure of Organic Molecules:</b> Electronic theory of bonding. Wave mechanical model of Atom and Chemical bonding. Atomic Orbital theory, Nature and types of Covalent bond. Hybridization. Electro negativity Polarity Resonance. Hydrogen bonding..	<b>11</b>
<b>II</b>	<b>Petroleum and Petroleum Products:</b> Introduction to Petroleum Products, Properties,Distillation and fractionation of petroleum. Commercial uses of different petroleum fractions. Analysis of petroleum products. Analysis of traces of petroleum products in forensic exhibits. Comparison of petroleum products. Adulteration of petroleum products. <b>Phenolphthalein in trap case:</b> Chemistry and Forensic examination of Phenolphthalein used in Bribe trap cases, and related legal issues.	<b>11</b>
<b>III</b>	<b>Analysis of beverages:</b> Classification of beverages, Fermented and Distilled methods, Analysis of Beverages: Alcoholic and non-alcoholic beverages and their composition, Characteristics of Beer, wines and Whisky, Congeners in alcoholic beverages, Analysis of alcoholic beverages as per BIS and PFA Act. Distinction between licit and illicit liquors.	<b>11</b>
<b>IV</b>	<b>Fire and Arson:</b> Light and Flame, Chemistry of Fire, Combustion reaction, Fire Triangle, Fire Tetrahedron; Backdraft, Thermochemistry of Fire, Heat Capacity and Phase changes, Accelerants & types of accelerants, Combustible and Flammable liquids, Flash point, Fire point, Ignition point, Auto Ignition point, vapour density, vapour pressure, Fire extinguisher. Conditions for fire, Fire scene patterns. Location of point of ignition. Recognition of type of fire. Searching the fire scene.	<b>11</b>

	<b>Arson:</b> Legal Definition, Arson motives, Degrees of Arson, Collection and preservation of arson evidence. Analysis of fire debris and ignitable liquid residue. Post-flashover burning. Scientific investigation and evaluation of clue materials. Information from smoke staining.	
<b>Total</b>		<b>44</b>

<b>Distribution of Credits</b>		
<b>Lecture/ Tutorial</b>	<b>Practicum</b>	<b>Experiential Learning</b>
60	0	30 Laboratory Visit, Experimenting, Group Work, Discussions, Presentations and Quiz

### ***Suggested Readings***

1. Modi's (1988) Medical Jurisprudence & Toxicology, M. M. Trirathi Press Ltd. Allahabad,.
2. Saferstein, R (1982) Forensic Science Hand Book, Vol I, II and III, Pretince Hall, NI.
3. Saferstein, R (2000) Criminalistics.
4. DFS -Working Procedure Manual- Chemistry, Explosives
5. DFS Manuals of Forensic Chemistry and Narcotics.

### **SEMESTER – II**

<b>Paper Sl. No.</b>	Paper - 3	<b>Scheme of Evaluation</b>	T&P
<b>Name of the Course</b>	Basics of Forensic Chemistry (P)	<b>L-T-P-C</b>	0-0-2-1
<b>Type of Course</b>	Major/Core	<b>Credits Assigned</b>	1
<b>Paper Code</b>	FSC142M212	<b>Level of the Course</b>	100

**Course objective:** To introduce the students to the basic concepts of chemistry and forensic chemistry.

<b>Course Outcome : After successful completion of the course, student will be able to</b>		
<b>Sl.No.</b>	<b>Course Outcome</b>	<b>Blooms Taxonomy Level</b>
CO1	<b>remember</b> the use of chemicals and chemistry.	BT1
CO2	<b>understand</b> the use of chemistry in examination of various evidences	BT2
CO3	<b>examining</b> . the different petroleum products and explosive Substances	BT3
CO4	<b>distinguishing</b> the concept of alcoholic and non-	BT4

	alcoholic beverages in solving various crimes/cases	
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Module No.	List Of Practical	Hours
I	1. To study the boiling and melting points of different petroleum products.	4
	2. To identify the dyes present in Petroleum products using TLC.	4
II	3. Characterization and analysis of adulteration of Petroleum products.	4
	4. Identifying the bribe and trap cases with help of phenolphthalein	4
III	5. Learning the chemistry of fire	4
IV	6. Examination of ethanol.	5
	7. Examination of methanol.	5
Total		30

### SEMESTER – II

<b>Paper Sl. No.</b>	Paper - 4	<b>Scheme of Evaluation</b>	T&P
<b>Name of the Course</b>	Cyber Forensics	<b>L-T-P-C</b>	2-0-2-3
<b>Type of Course</b>	Minor	<b>Credits Assigned</b>	3
<b>Paper Code</b>	FSC142N201	<b>Level of the Course</b>	100

**Course objective:** To enable learner to understand, explore and acquire a critical understanding about Cyber Law. To develop competencies for dealing with frauds and deceptions (Confidence Tricks, Scams) and other Cyber Crimes e.g., Child Pornography etc. that are taking place via the internet.

Course Outcome : After successful completion of the course, student will be able to		
Sl.No.	Course Outcome	Blooms Taxonomy Level
CO1	<b>remember</b> the basics of computer science in daily world	BT1
CO2	<b>understand</b> the characteristics, properties, potential of cyber space.	BT2
CO3	develop the understanding of relationship between forensic science and cyberspace and <b>illustrate</b> the impact of it.	BT3
CO4	<b>analyze</b> the in-depth knowledge of Information Technology Act and Legal Frame Work of Right To Privacy, Piracy, Data Security and Data Protection	BT4

<b>Module</b>	<b>Course content</b>	<b>Lecture</b>
<b>I</b>	<b>Introduction to the Course:</b> The Development of Information and Communication Technology (ICT) and Social Change; Definition of Cyber Crime and its Position in the Crime Typology; Key Concepts in the Course, i.e. Information Technology, Information System, Information Society, and Cybercrime	<b>11</b>
<b>II</b>	Relation and Impact of the Development of ICT on the Emergence of Cyber Crime: Relation and Impact of the Development of e-Business and e-Commerce on the Emergence of Cyber Crime; Relation and Impact of the Development of Hardware, Software, and Data Resources on the Emergence of Cyber Crime; Relation and Impact of the Development of Telecommunication, Network, and the Internet on the Emergence of Cyber Crime	<b>11</b>
<b>III</b>	Classification of computer crimes, computer virus and types, computer worms, Trojan Horse, trap door, super zapping, logic bomb, salami logic, characteristics of computer crime and criminals.; Criminological Theories which Explain Cyber Crime; Computer Fraud; Hacktivism; Cyberpornography	<b>11</b>
<b>IV</b>	<b>Computer Forensics:</b> Introduction, Nature of digital evidence, Sources of digital evidence, Retrieval and analysis of digital evidence, Computer security and its relationship to computer forensics Hate Crimes and Cyberterrorism, Piracy, Cyberstalking, Privacy Violation, and Identity Theft, Prevention of the Cyber Crime, Policing the Cyber Crime,	<b>11</b>
<b>Total</b>		<b>44</b>

<b>Module No.</b>	<b>List Of Practical</b>	<b>Hours</b>
<b>I</b>	E-mail tracing and further examination	5
	Cases involving cyber crime and its verdict	5
<b>II</b>	Study peripherals, components of a computer system	4
	IP address tracing	4
<b>III</b>	To study methods of encryption and decryption	4
<b>IV</b>	Collection and seizure of magnetic media	4
	To recover data from hard disk	4
<b>Total</b>		<b>30</b>

<b>Distribution of Credits</b>		
<b>Lecture/ Tutorial</b>	<b>Practicum</b>	<b>Experiential Learning</b>

44	30	16 Discussions, Presentations and Quiz
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**References:**

1. Siegel, Larry J. (2016). Criminology: Theories, Patterns, and Typologies (12th Ed.). Cengage Learning.
2. Clough, Jonathan. (2010). Principles of Cybercrime. Cambridge University Press.
3. Yar, Majid. (2006). Cybercrime and Society. Sage Publications Ltd.

**SEMESTER – II**

<b>Paper Sl. No.</b>	Paper - 5	<b>Scheme of Evaluation</b>	T&P
<b>Name of the Course</b>	Handwriting Identification And Recognition	<b>L-T-P-C</b>	2-0-0-2
<b>Type of Course</b>	Skill Enhancement Course	<b>Credits Assigned</b>	2
<b>Paper Code</b>	FSC142S201	<b>Level of the Course</b>	100

**Course objective:** To impart the knowledge on the importance of examining questioned documents in crime cases, tools required for examination of questioned documents, the significance of comparing hand writing samples and understand the importance of detecting frauds and forgeries by analyzing questioned documents.

<b>Course Outcome :</b> After successful completion of the course, student will be able to		
<b>Sl.No.</b>	<b>Course Outcome</b>	<b>Blooms Taxonomy Level</b>
CO1	<b>learn</b> the basic characteristics of handwriting recognition	BT1
CO2	<b>understand</b> the characteristics, properties, physical and visual potential of film and photography	BT2
CO3	<b>apply</b> learnt concepts to their work and apply different steps followed in handwriting recognition	BT3
CO4	<b>analyze</b> and apply the theoretical knowledge of handwriting knowledge in questioned document examination	BT4

<b>Module</b>	<b>Course content</b>	<b>Lecture</b>
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<b>I</b>	<b>Handwriting identification:</b> Basis of handwriting identification. Development of Individuality in Handwriting Comparison of Handwriting: Natural Variations, Characteristics of handwriting-scope and application. Class and individual characteristics. Arrangement, alignment, margin, slant, speed, pressure, spacing, line quality, embellishments, movement and pen lifts. Factors influencing handwriting- physical, mechanical, genetic and physiological.	<b>11</b>
<b>II</b>	<b>Handwriting Examination:</b> Basis of handwriting comparison. Collection of handwriting samples. Forgery and its types and characteristics, identification and examination of forgeries, Counterfeiting. Examination of altered and erased documents. Tools used in handwriting examination. <b>Decipherment of secret indented and charred documents:</b> Preservation of documents, Examination of seal and other mechanical impressions, examination of sequence of intersecting of strokes. Standards for Comparison and Disguise etc.	<b>11</b>
<b>III</b>	<b>Handwriting Recognition:</b> Basis of handwriting recognition. Off-line and on-line handwriting recognition. Steps involved in handwriting recognition- pre-processing, feature extraction and classification. Applications of handwriting recognition.	<b>11</b>
<b>IV</b>	<b>Basic tools for examination of Documents:</b> Application of Basic tools for the examination of Questioned document, Ultraviolet, Visible and Fluorescence Spectroscopy, Stereo-zoom Microscopy, Photomicrography, Microphotography. Video Spectral Comparator, Electrostatic Detection Apparatus.	<b>11</b>
<b>Total</b>		<b>44</b>

<b>Distribution of Credits</b>		
<b>Lecture/ Tutorial</b>	<b>Practicum</b>	<b>Experiential Learning</b>
60	0	30 Discussions, Presentations and Quiz, Case Solving

**TEXTBOOKS & REFERENCE BOOKS:**

1. O. Hilton, Scientific Examination of Questioned Documents, CRC Press, Boca Raton (1982).
2. A.A. Moenssens, J. Starrs, C.E. Henderson and F.E. Inbau, Scientific Evidence in Civil and Criminal Cases, 4th Edition, Foundation Press, New York (1995).
3. Albert S. Osborn; Questioned Documents, 2nd Ed., Universal Law Pub., Delhi.

## SEMESTER – II

<b>Paper Sl. No.</b>	Paper - 6	<b>Scheme of Evaluation</b>	T&P
<b>Name of the Course</b>	Handwriting Identification And Recognition (P)	<b>L-T-P-C</b>	0-0-2-1
<b>Type of Course</b>	Skill Enhancement Course	<b>Credits Assigned</b>	1
<b>Paper Code</b>	FSC142S211	<b>Level of the Course</b>	100

**Course objective:** To impart the knowledge on the importance of examining questioned documents in crime cases, tools required for examination of questioned documents, the significance of comparing hand writing samples and understand the importance of detecting frauds and forgeries by analyzing questioned documents.

<b>Course Outcome :</b> After successful completion of the course, student will be able to		
<b>Sl.No.</b>	<b>Course Outcome</b>	<b>Blooms Taxonomy Level</b>
CO1	<b>learn</b> the basic characteristics of handwriting recognition	BT1
CO2	<b>understand</b> the characteristics, properties, physical and visual potential of film and photography	BT2
CO3	<b>apply</b> learnt concepts to their work and apply different steps followed in handwriting recognition	BT3
CO4	<b>analyze</b> and apply the theoretical knowledge of handwriting knowledge in questioned document examination	BT4

<b>Module No.</b>	<b>List Of Practical</b>	<b>Hours</b>
<b>I</b>	1. Identification of Handwriting Individual Characteristics	3
	2. Comparison of handwritings.	3
	3. Study of natural variations and fundamental divergences in handwriting.	3
<b>II</b>	4. Detection of Simulated forgery.	3
	5. Detection of traced forgery.	3
<b>III</b>	6. Decipherment of Secret handwriting	3
	7. Study of Disguise in handwriting.	3
<b>IV</b>	8. Case study 1	3
	9. Case study 2	3
	10. Case Study 3	3
<b>Total</b>		<b>30</b>

### SEMESTER – III

<b>Paper Sl. No.</b>	Paper - 1	<b>Scheme of Evaluation</b>	T&P
<b>Name of the Course</b>	Forensic Dermatoglyphics	<b>L-T-P-C</b>	3-0-0-3
<b>Type of Course</b>	Major/Core	<b>Credits Assigned</b>	3
<b>Paper Code</b>	FSC142M301	<b>Level of the Course</b>	200

**Course objective:** The objective of this course is to impart complete knowledge to students regarding the various aspects of Forensic dactyloscopy. The importance of development, collection, preservation fingerprints and as well as other impressions encountered at a crime scene.

<b>Course Outcome :</b> After successful completion of the course, student will be able to		
<b>Sl.No.</b>	<b>Course Outcome</b>	<b>Blooms Taxonomy Level</b>
CO1	<b>define</b> fingerprints and other prints.	BT1
CO2	<b>understand</b> the importance of collection and analysis of fingerprints and other prints.	BT2
CO3	<b>acquire</b> knowledge of the development and collection methods of different variety of prints found at scene of crime.	BT3
CO4	<b>analyse</b> and compare the samples of different types of prints.	BT4

<b>Modules</b>	<b>Course content</b>	<b>Lecture Hours</b>
<b>I</b>	<b>Basics of Fingerprinting:</b> Introduction and with special reference to India. Biological basis of fingerprints. Formation of ridges. Fundamental principles of fingerprinting, ridge counting, ridge tracing, ridge characteristics.	<b>15</b>
<b>II</b>	<b>Fingerprint characteristics/ minutiae:</b> Types of fingerprint pattern, characteristics/ minutiae of fingerprints, plain rolled fingerprints. Classification of fingerprints- Henry's system, Secondary classification, sub- secondary classification, final classification and key classification.	<b>15</b>
<b>III</b>	<b>Development of Fingerprints:</b> sweat and its composition, types of fingerprints, development of fingerprints (physical and chemical). Application of light sources in fingerprint detection. Preservation of developed fingerprints. Modern methods of fingerprinting, Automated Fingerprint Identification System.	<b>15</b>
<b>IV</b>	<b>Other prints/ impressions:</b> Introduction to prints/ impressions, Importance of footprints. Gait pattern and gait pattern analysis. Collection, tracing, lifting and casting of footprints, Palm prints, Lip prints, forensic examination of lip prints, Ear prints and their significance.	<b>15</b>



<b>Total</b>	<b>60</b>
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**Notional Credit Hours for the course = 30 x 3 = 90**

<b>Distribution of Credits</b>		
<b>Lecture/ Tutorial</b>	<b>Practicum</b>	<b>Experiential Learning</b>
60	0	30 Laboratory Visit, Experimenting, Group Work, Discussions, Presentations and Quiz

### ***Suggested Readings***

1. J.E. Cowger, Friction Ridge Skin, CRC Press, Boca Raton (1983).
2. D.A. Ashbaugh, Quantitative-Qualitative Friction Ridge Analysis, CRC Press, Boca Raton (2000).
3. C. Champod, C. Lennard, P. Margot and M. Stoilovic, Fingerprints and other Ridge Skin Impressions, CRC Press, Boca Raton (2004).
4. Lee and Gaenslen's, Advances in Fingerprint Technology, 3rd Edition, R.S. Ramotowski (Ed.), CRC Press, Boca Raton (2013).

### **SEMESTER – III**

<b>Paper Sl. No.</b>	Paper - 2	<b>Scheme of Evaluation</b>	T&P
<b>Name of the Course</b>	Forensic Dermatoglyphics (P)	<b>L-T-P-C</b>	0-0-2-1
<b>Type of Course</b>	Major/Core	<b>Credits Assigned</b>	1
<b>Paper Code</b>	FSC142M312	<b>Level of the Course</b>	200

**Course objective:** To introduce the students to the basic concepts of Forensic Dermatoglyphics and other prints importance.

<b>Course Outcome : After successful completion of the course, student will be able to</b>		
<b>Sl.No.</b>	<b>Course Outcome</b>	<b>Blooms Taxonomy Level</b>
CO1	<b>define</b> types of fingerprints	BT1

CO2	<b>understand</b> the importance of collection, preservation of fingerprints.	BT2
CO3	<b>identify</b> different types of fingerprints prints based on class and individual characteristics.	BT3
CO4	<b>analyse</b> fingerprints and other prints such lip prints, footprints and ear prints.	BT4

Module	Course content	Lecture Hours
<b>I</b>	1. To record plain and rolled fingerprints 2. To conduct Primary classification of fingerprint. 3. To conduct physical methods of fingerprint detection (powder method)	<b>7</b>
<b>II</b>	4. To conduct chemical methods of fingerprint detection 5. Comparison of fingerprints by class and individual characteristics 6. To use different light sources for enhancing developed fingerprints	<b>8</b>
<b>III</b>	7. To prepare cast of foot prints 8. To prepare cast of shoe print 9. Development and lifting of latent fingerprints using fluorescent powder on colourful surface	<b>7</b>
<b>IV</b>	10. Collection and comparison of palm prints. 11. Comparison and identification of lip prints. 12. Case study on fingerprint identification.	<b>8</b>
<b>Total</b>		<b>30</b>

Notional Credit Hours for the course = 30 x 1 = 30

Distribution of Credits		
Lecture/ Tutorial	Practicum	Experiential Learning
0	30	0 Laboratory Visit, Experimenting, Group Work, Discussions, Presentations and Quiz

### SEMESTER – III

<b>Paper Sl. No.</b>	Paper - 3	<b>Scheme of Evaluation</b>	T&P
<b>Name of the Course</b>	Forensic Physics	<b>L-T-P-C</b>	3-0-0-3

<b>Type of Course</b>	Major/Core	<b>Credits Assigned</b>	3
<b>Paper Code</b>	FSC142M303	<b>Level of the Course</b>	200

**Course objective:** The course aims to provide the students with knowledge of types of glass and their composition. It aims to impart forensic aspects of fibre examination and examination of tool marks. It will help the students to better understand the physical evidence, its importance and application of different examination for various evidence.

<b>Course Outcome :</b> After successful completion of the course, student will be able to		
<b>Sl.No.</b>	<b>Course Outcome</b>	<b>Blooms Taxonomy Level</b>
CO1	<b>define</b> concept of Forensic Physics and its importance in forensic science.	BT1
CO2	<b>compare</b> various glass sample and its importance in forensic science.	BT2
CO3	<b>apply</b> various techniques used in examination of physical evidence	BT3
CO4	<b>categorize</b> and classify various tool marks and patterns.	BT4

<b>Module</b>	<b>Course content</b>	<b>Lecture</b>
<b>I</b>	<b>Glass:</b> Composition of glass and types of glasses-soda-lime, borosilicate, safety glass, laminated, light sensitive, tampered / toughened, wire glass, coloured glass. Matching and comparison of glass. Forensic examinations of glass fractures, rib marks, hackle marks, cone fracture, wavy, backward fragmentation, concentric and radial fractures.	<b>14</b>
<b>II</b>	<b>Paint evidence:</b> collection, packaging and preservation. Analysis by destructive and nondestructive methods. Importance of paint evidence in hit and run cases. Fiber evidence – artificial and man-made fibres. Collection of fiber evidence. Identification and comparison of fibres.	<b>16</b>
<b>III</b>	<b>Soil:</b> its types and composition of soil, sample preparation, removal of contaminants, colour, molecular particle size distribution, turbidity test, pH, microscopic examination. <b>Fibers:</b> artificial and man- made fibres. Collection of fibre evidence. Identification and comparison of fibres.	<b>15</b>
<b>IV</b>	<b>Tool marks:</b> 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. Collection, preservation and matching of tool marks.	<b>15</b>

<b>Total</b>	<b>60</b>
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**Notional Credit Hours for the course = 30 x 3 = 90**

<b>Distribution of Credits</b>		
<b>Lecture/ Tutorial</b>	<b>Practicum</b>	<b>Experiential Learning</b>
60	0	30 Discussions, Presentations and Quiz, Case Solving

**TEXTBOOKS & REFERENCE BOOKS:**

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

**SEMESTER – III**

<b>Paper Sl. No.</b>	Paper - 4	<b>Scheme of Evaluation</b>	T&P
<b>Name of the Course</b>	Forensic Physics (P)	<b>L-T-P-C</b>	0-0-2-1
<b>Type of Course</b>	Major/Core	<b>Credits Assigned</b>	1
<b>Paper Code</b>	FSC142M314	<b>Level of the Course</b>	200

**Course objective:** It will help the students to better understand the physical evidence, its importance and application of different examination for various evidence.

<b>Course Outcome :</b> After successful completion of the course, student will be able to		
<b>Sl.No.</b>	<b>Course Outcome</b>	<b>Blooms</b>

		<b>Taxonomy Level</b>
CO1	<b>define</b> concept of Forensic Physics and its importance in forensic science.	BT1
CO2	<b>compare</b> various glass sample and its importance in forensic science.	BT2
CO3	<b>apply</b> various techniques used in examination of physical evidence	BT3
CO4	<b>categorize</b> and classify various tool marks and patterns.	BT4

<b>Module</b>	<b>Course content</b>	<b>Lecture Hours</b>
<b>I</b>	1. General comparison of soil. 2. Density gradient analysis of soil sample. 3. Comparison of identity of small glass pieces by flotation method.	<b>07</b>
<b>II</b>	4. Determination of refractive index of glass. 5. Restoration of erased identification mark. 6. Comparison of strings/ threads/ ropes.	<b>08</b>
<b>III</b>	7. Physical and chemical analysis of paint samples. 8. Comparison of tool marks. 9. Comparison of paint chips under microscope.	<b>07</b>
<b>IV</b>	10. Microscopic examination of various fibers. 11. Physical matching of broken pieces of different object. 12. Case study.	<b>08</b>
<b>Total</b>		<b>30</b>

**Notional Credit Hours for the course = 30 x 1 = 30**

<b>Distribution of Credits</b>		
<b>Lecture/ Tutorial</b>	<b>Practicum</b>	<b>Experiential Learning</b>
0	30	0 Laboratory Visit, Experimenting, Group Work, Discussions, Presentations and Quiz

**SEMESTER – III**

<b>Paper Sl. No.</b>	<b>Paper - 5</b>	<b>Scheme of Evaluation</b>	<b>T&amp;P</b>

<b>Name of the Course</b>	Crime Scene Investigation	<b>L-T-P-C</b>	4-0-0-4
<b>Type of Course</b>	Minor	<b>Credits Assigned</b>	4
<b>Paper Code</b>	FSC142N301	<b>Level of the Course</b>	200

**Course objective:** To enable learner to understand, explore and acquire a critical understanding about the methods of securing, searching and documenting crime scenes. The art of collecting, packaging, and preserving different types of physical and trace evidence at crime scenes. The legal importance of chain of custody. The tools and techniques for analysis of different types of crime scene evidence.

<b>Course Outcome :</b> After successful completion of the course, student will be able to		
<b>Sl.No.</b>	<b>Course Outcome</b>	<b>Blooms Taxonomy Level</b>
CO1	<b>define</b> and classify the crime scene and types.	BT1
CO2	<b>understand</b> the principle/ laws of forensic science.	BT2
CO3	<b>identify</b> different types of evidences like physical and trace evidence.	BT3
CO4	<b>analyse</b> the nature, collection and preservation of physical evidences	BT4

<b>Module</b>	<b>Course content</b>	<b>Lecture</b>
<b>I</b>	<b>Types of crime scenes:</b> definition of crime scene, indoor and outdoor. Securing and isolating the crime scene. Crime scene search methods. Safety measures at crime scenes. Legal considerations at crime scenes. Documentation of crime scenes, Duties of first responders at crime scenes	<b>23</b>
<b>II</b>	<b>Crime scene evidences:</b> Classification of crime scene evidence, physical and trace evidence, Locard principle. Collection, labelling, sealing of evidence. Hazardous evidence. Preservation of evidence. Chain of custody. Reconstruction of crime scene.	<b>22</b>
<b>III</b>	<b>Physical evidences:</b> Glass evidence, Matching of glass samples by mechanical fit and refractive index measurements, Paint evidence, collection, packaging and preservation, Importance of paint evidence in hit and run cases, Cloth evidence, comparison of cloth samples.	<b>22</b>
<b>IV</b>	<b>Trace evidences-</b> Fibre evidence, Identification and comparison of fibres. Soil evidence, collection and comparison of soil samples. Hair evidence, Tool mark evidence. Classification of tool marks. Forensic importance of tool marks.	<b>23</b>
<b>Total</b>		<b>90</b>

**Notional Credit Hours for the course = 30 x 4 = 120**

<b>Distribution of Credits</b>		
<b>Lecture/ Tutorial</b>	<b>Practicum</b>	<b>Experiential Learning</b>
90	0	30 Discussions, Presentations and Quiz, Case Solving

**TEXTBOOKS & REFERENCE BOOKS:**

1. Sharma, B.R.: Forensic Science in Criminal Investigation and Trials, Central Law Agency, Allahabad, 1974.
2. Saferstein: Forensic Science Handbook, Vol I, II & III, Prentice Hall Inc. USA.
3. Saferstein: Criminalistics, 1976, Prentice Hall Inc. USA.
4. Siegel, J. A., Saukko, P. J. And Knupfer, G.C., Encyclopedia of Forensic Sciences, Academic Publishers, London.

**SEMESTER – III**

<b>Paper Sl. No.</b>	<b>Paper - 6</b>	<b>Scheme of Evaluation</b>	<b>T&amp;P</b>
<b>Name of the Course</b>	Introduction to Digital Forensics	<b>L-T-P-C</b>	3-0-0-3
<b>Type of Course</b>	Skill Enhancement Course	<b>Credits Assigned</b>	3
<b>Paper Code</b>	FSC142S301	<b>Level of the Course</b>	200

**Course objective:** After studying this paper, students will know the fundamental and forensic examinations of digital evidence. The legal and privacy issues of digital evidence, the tools of cyber forensics and the types of cybercrime.

<b>Course Outcome : After successful completion of the course, student will be able to</b>		
<b>Sl.No.</b>	<b>Course Outcome</b>	<b>Blooms Taxonomy Level</b>
CO1	<b>learn</b> the basic digital forensics.	BT1

CO2	<b>understand</b> the characteristics The cases which fall under the purview of digital crimes.	BT2
CO3	<b>apply</b> learnt concepts to their work and apply different steps followed in handwriting recognition	BT3
CO4	<b>analyze</b> and apply the theoretical knowledge of handwriting knowledge in questioned document examination	BT4

Module	Course content	Lecture Hours
I	<b>Fundamentals and Concepts:</b> Fundamentals of computers Hardware and accessories. Memory and processor. Methods of storing data. Operating system. Software. Introduction to network, LAN, WAN and MAN.	15
II	<b>Digital Forensic I:</b> Cyber Crime and digital evidence, types of cybercrimes, digital evidence, nature of digital Evidence, precautions while dealing with digital Evidence. Introduction to Cyber forensic, Cyber forensic investigation process.	16
III	<b>Computer Crimes:</b> Definition and types of computer crimes. Distinction between computer crimes and conventional crimes. Reasons for commission of computer crimes. Breaching security and operation of digital systems. Computer virus, and computer worms – Trojan horse, trap door, super zapping, logic bombs. Types of computer crimes.	14
IV	<b>Computer Forensics Investigations:</b> Seizure of suspected computer. Preparation required prior to seizure. Protocol to be taken at the scene. Extraction of information from the hard disk. Treatment of exhibits.	15
<b>Total</b>		<b>60</b>

**Notional Credit Hours for the course = 30 x 3 = 90**

<b>Distribution of Credits</b>		
Lecture/ Tutorial	Practicum	Experiential Learning
60	0	30 Discussions, Presentations and Quiz, Case Solving



### **TEXTBOOKS & REFERENCE BOOKS:**

1. R.K. Tiwari, P.K. Sastry and K.V. Ravikumar, Computer Crimes and Computer Forensics, Select Publishers, New Delhi (2003).
2. C.B. Leshin, Internet Investigations in Criminal Justice, Prentice Hall, New Jersey (1997).
3. R. Saferstein, Criminalistics, 8th Edition, Prentice Hall, New Jersey (2004).
4. E. Casey, Digital Evidence and Computer Crime, Academic Press, London (2000).

### SEMESTER – IV

<b>Paper Sl. No.</b>	Paper - 1	<b>Scheme of Evaluation</b>	T&P
<b>Name of the Course</b>	Forensic Psychology	<b>L-T-P-C</b>	4-0-0-4
<b>Type of Course</b>	Major/Core	<b>Credits Assigned</b>	4
<b>Paper Code</b>	FSC142M401	<b>Level of the Course</b>	200

**Course objective:** The objective of this course is to impart knowledge about forensic psychology and its applications. The legal aspects of forensic psychology, its significance of criminal profiling, and the importance of psychological assessment in gauging criminal behavior.

<b>Course Outcome :</b> After successful completion of the course, student will be able to		
<b>Sl.No.</b>	<b>Course Outcome</b>	<b>Blooms Taxonomy Level</b>
CO1	<b>define</b> psychology, nature, and its goals.	BT1
CO2	<b>understand</b> the importance of sensation, adaptation, gestalt principle.	BT2
CO3	<b>acquire</b> knowledge of tools of deceptions.	BT3
CO4	<b>analyse</b> and compare the classification of psychiatric disorders	BT4

<b>Modules</b>	<b>Course content</b>	<b>Lecture</b>
<b>I</b>	<b>Basics of forensic psychology:</b> Define forensic psychology, nature, definition and its goals, History of Psychology, branches of psychology, early schools of psychology, current psychological perspective- biological, psychodynamic, behavioristic, humanistic, cognitive, and cultural. Modern perspectives, and Scientific Study methods in psychology- Naturalistic Observation, Experimental, Case Studies and Survey. Careers, qualification and professional specialties in psychology.	<b>22</b>
<b>II</b>	<b>Basic psychological process:</b> Sensation- selection, sensory adaptation, analysis and coding. Perception- sensing, perceiving, classifying, gestalt principles. Neurons -structure and function, synapse, and neurotransmitters, Neuron and Nerves; Building the Network, Central Nervous System and Peripheral Nervous System, The Brain-structure and function, Glandular system.	<b>23</b>
<b>III</b>	<b>Psychological disorders:</b> Classification of psychiatric disorders- Common Psychiatric Disorders- Schizophrenia, Bipolar Disorders, Anxiety Disorders, Phobia, Personality Disorder, Attention Deficit Hyperactive Disorder, Psychology of Serial murderers, terrorism	<b>22</b>
<b>IV</b>	<b>Detection and deception:</b> Tools of detection- interviews, non-verbal detection, statement analysis, voice stress analyzer,	<b>23</b>

	hypnosis. Polygraphy, its ethical and legal aspects. Narco analysis and Brain Fingerprinting – principle and theory, ethical and legal issues. Brain electrical oscillation signatures- principle, technique and legal aspects.	
<b>Total</b>		<b>90</b>

**Notional Credit Hours for this course: 30 x 4 = 120**

<b>Distribution of Credits</b>		
<b>Lecture/ Tutorial</b>	<b>Practicum</b>	<b>Experiential Learning</b>
90	0	30 Laboratory Visit, Experimenting, Group Work, Discussions, Presentations and Quiz

### **Suggested Readings**

1. A.A. Moenssens, J. Starrs, C.E. Henderson and F.E. Inbau, Scientific Evidence in Civil and Criminal Cases, 4th Edition, The Foundation Press, Inc., New York (1995).
2. R. Saferstein, Criminalistics, 8th Edition, Prentice Hall, New Jersey (2004).
3. J.C. DeLadurantey and D.R. Sullivan, Criminal Investigation Standards, Harper & Row, New York (1980).
4. J. Niehaus, Investigative Forensic Hypnosis, CRC Press, Boca Raton (1999)

### **SEMESTER – IV**

<b>Paper Sl. No.</b>	Paper - 2	<b>Scheme of Evaluation</b>	T&P
<b>Name of the Course</b>	Analytical Methods-I	<b>L-T-P-C</b>	4-0-0-4
<b>Type of Course</b>	Major/Core	<b>Credits Assigned</b>	4
<b>Paper Code</b>	FSC142M402	<b>Level of the Course</b>	200

**Course objective:** The objective of this course is to impart knowledge about various tools and techniques used in forensic science.

<b>Course Outcome : After successful completion of the course, student will be able to</b>		
<b>Sl.No.</b>	<b>Course Outcome</b>	<b>Blooms Taxonomy Level</b>
CO1	<b>define</b> the importance of microscope in the field of forensic science.	BT1
CO2	<b>understand</b> the working principle of spectrophotometer.	BT2
CO3	<b>acquire</b> knowledge about various chromatographic techniques.	BT3
CO4	<b>analysis</b> using the x-ray based techniques in forensic	BT4

	science. and compare the classification of psychiatric disorders	
<b>Modules</b>	<b>Course content</b>	<b>Lecture</b>
<b>I</b>	<b>Microscopy:</b> Microscope - History, Components of Microscope, Types of Microscope: Single Lens (Simple) Microscope, Compound Microscope, Light Microscope.	<b>22</b>
<b>II</b>	<b>Spectroscopy:</b> Spectrophotometer - Principle, Instrumentation, Beer-Lambert's Law, Applications, UV-Visible Spectroscopy, Applications, Infrared Spectroscopy ,Applications, Limitations.	<b>23</b>
<b>III</b>	<b>Chromatography:</b> Chromatography - History, Principle, Components, Types of Chromatography: Paper Chromatography, Column Chromatography, Thin-Layer Chromatography.	<b>22</b>
<b>IV</b>	<b>X-Ray and X-Ray based Techniques:</b> X-Rays, X-Ray Diffraction (XRD) Analysis, Principle, Instrumentation, Working, Applications, Advantages and Disadvantages.	<b>23</b>
<b>Total</b>		<b>90</b>

**Notional Credit Hours for this course: 30 x 4 = 120**

<b>Distribution of Credits</b>		
<b>Lecture/ Tutorial</b>	<b>Practicum</b>	<b>Experiential Learning</b>
90	0	30 Laboratory Visit, Experimenting, Group Work, Discussions, Presentations and Quiz

### **Suggested Readings**

1. D.A. Skoog, D.M. West and F.J. Holler, Fundamentals of Analytical Chemistry, 6th Edition, Saunders College Publishing, Fort Worth (1992).
2. W. Kemp, Organic Spectroscopy, 3rd Edition, Macmillan, Hampshire (1991).
3. J.W. Robinson, Undergraduate Instrumental Analysis, 5th Edition, Marcel Dekker, Inc., New York (1995).
4. D.R. Redsicker, The Practical Methodology of Forensic Photography, 2nd Edition, CRC Press, Boca Raton (2000).

### SEMESTER – IV

<b>Paper Sl. No.</b>	Paper - 3	<b>Scheme of Evaluation</b>	T&P
<b>Name of the Course</b>	Forensic Anthropology and Odontology	<b>L-T-P-C</b>	3-0-0-3
<b>Type of Course</b>	Major/Core	<b>Credits Assigned</b>	3
<b>Paper Code</b>	FSC142M403	<b>Level of the Course</b>	200

**Course objective:** To impart the knowledge on the importance of examining human skeleton and non- human skeleton in crime cases, basic concept of stature identification, gender detection and odontological studies and its importance in bite mark identification.

<b>Course Outcome :</b> After successful completion of the course, student will be able to		
<b>Sl.No.</b>	<b>Course Outcome</b>	<b>Blooms Taxonomy Level</b>
CO1	<b>learn</b> the basic characteristics of handwriting recognition	BT1
CO2	<b>understand</b> the characteristics, properties, physical and visual potential of film and photography	BT2
CO3	<b>apply</b> learnt concepts to their work and apply different steps followed in handwriting recognition	BT3
CO4	<b>analyze</b> and apply the theoretical knowledge of handwriting knowledge in questioned document examination	BT4

<b>Module</b>	<b>Course content</b>	<b>Lecture Hours</b>
<b>I</b>	<b>Forensic Anthropology:</b> Definition, scope and objectives, nature, formation, and identification of human bones. Determination of age, sex, stature from skeletal material, Anatomy of different bones.	<b>15</b>
<b>II</b>	<b>Somatoscopy:</b> Introduction, Observation of various regions of body, scar marks and occupational marks, forensic significance in personal identification. <b>Somatometry:</b> Introduction, forensic significance in personal identification .Measurements of head, face, nose, cheek, ear, hand and foot, body weight, height.	<b>15</b>
<b>III</b>	<b>Facial reconstruction:</b> Photographic Super Imposition, Video-Superimposition, Roentgen graphic Superimposition. Use of somatoscopic and craniometric methods in reconstruction.	<b>15</b>

<b>IV</b>	<b>Forensic Odontology:</b> Development and scope, role in mass disaster. Structural variation in teeth, types of teeth- functions, determination of age from teeth: eruption sequence, Gustafson's method, dental anomalies, their significance in personal identification.	<b>15</b>
<b>Total</b>		<b>60</b>

**Notional Credit Hours for this course: 30 x 3 = 90**

<b>Distribution of Credits</b>		
<b>Lecture/ Tutorial</b>	<b>Practicum</b>	<b>Experiential Learning</b>
60	0	30 Discussions, Presentations and Quiz, Case Solving

**TEXTBOOKS & REFERENCE BOOKS:**

1. Beals, R.L. and Hoijer, H. An Introduction to Anthropology. Macmillan, New York, 1965.
2. Biswas, G. (2021) Review of Forensic Medicine and Toxicology. Jaypee Brothers Medical Publishers.
3. Clement, J. G. and Ranson, D. L. (Eds.) Craniofacial Identification in Forensic Medicine, Oxford University Press, New York, 1998.
4. Comas, J. A Manual of Physical Anthropology. Charles C. Thomas, Springfield, 1960.
5. Cummins, H. and Midlo, C. Finger Prints, Palms and Soles: An Introduction to Dermatophysics. Blackiston Co., Philadelphia, 1944.
6. El-Najjar, M. Y. and McWilliams, K. R. Forensic Anthropology. Charles C. Thomas, 1978.

**SEMESTER – IV**

<b>Paper Sl. No.</b>	Paper - 4	<b>Scheme of Evaluation</b>	T&P
<b>Name of the Course</b>	Forensic Anthropology and Odontology (P)	<b>L-T-P-C</b>	0-0-2-1
<b>Type of Course</b>	Major	<b>Credits Assigned</b>	1
<b>Paper Code</b>	FSC142M414	<b>Level of the Course</b>	200

**Course objective:** To impart the knowledge on the importance of forensic anthropology in identification of persons, its different techniques of facial reconstruction and their forensic importance, and significance of somatoscopy and somatometry.

<b>Course Outcome : After successful completion of the course, student will be able to</b>		
<b>Sl.No.</b>	<b>Course Outcome</b>	<b>Blooms Taxonomy Level</b>
CO1	<b>recall</b> the basic concept of human skeleton.	BT1
CO2	<b>understand</b> the concept of age determination.	BT2
CO3	<b>apply</b> various methods and techniques in determining of various age, sex, and gender.	BT3
CO4	<b>compare</b> the human and non- human skeleton.	BT4

**Detailed syllabus:**

Practical would be based on the theory syllabus and would broadly include the following:

<b>Module</b>	<b>Course content</b>	<b>Lecture Hours</b>
<b>I</b>	1. Osteology: Human skeleton axial and appendicular skeleton. 2. Determination of sex from skull and pelvis. 3. Determination of age from skull sutures.	<b>7</b>
<b>II</b>	4. Determination of age from dentition. 5. To perform osteometric measurements on long bones and estimation of statures. 6. To perform craniometric measurements on skull.	<b>8</b>
<b>III</b>	7. To perform somatometric measurement on living subject. 8. To investigate the difference between animal and human bones. 9. Demonstration of bone and dental pathology.	<b>8</b>
<b>IV</b>	10. Somatoscopy: Morphological observations of different body characters. 11. Human and non-human bone case study. 12. To conduct portrait parley using photo fit identification kit.	<b>7</b>
<b>Total</b>		<b>30</b>

**Notional Credit Hours for this course: 30 x 1 = 30**

Distribution of Credits		
Lecture/ Tutorial	Practicum	Experiential Learning
0	30	0 Discussions, Presentations and Quiz, Case Solving

#### SEMESTER – IV

<b>Paper Sl. No.</b>	Paper - 5	<b>Scheme of Evaluation</b>	T&P
<b>Name of the Course</b>	Technological Methods	<b>L-T-P-C</b>	3-0-0-3
<b>Type of Course</b>	Minor	<b>Credits Assigned</b>	3
<b>Paper Code</b>	FSC142N401	<b>Level of the Course</b>	200

**Course objective:** The objective of this course is to know about the principles and applications of various tools and techniques used in forensic science.

Course Outcome : After successful completion of the course, student will be able to		
Sl.No.	Course Outcome	Blooms Taxonomy Level
CO1	<b>define</b> the role that a microscope plays in the discipline of forensic science.	BT1
CO2	<b>understand</b> the working principle of different spectroscopy techniques	BT2
CO3	<b>apply</b> various chromatography techniques in forensic science.	BT3
CO4	<b>analysis</b> of the samples using the x-ray based techniques in forensic science.	BT4

Modules	Course content	Lecture
<b>I</b>	<b>Microscopy:</b> Microscope - History, Components of Microscope, Single Lens (Simple) Microscope, Compound Microscope, Fluorescence Microscope, Stereo Microscope, Comparison Microscope, Light Microscope.	<b>15</b>
<b>II</b>	<b>Spectroscopy:</b> SSpectrophotometer - Principle, Instrumentation, Beer-Lambert's Law, Applications, UV-Visible Spectroscopy, Applications, Infrared Spectroscopy, Applications, Limitations.	<b>15</b>



<b>III</b>	<b>Chromatography:</b> Chromatography - History, Principle, Components, Paper Chromatography, Column Chromatography, Thin-Layer Chromatography.	<b>15</b>
<b>IV</b>	<b>X-Ray and X-Ray based Techniques:</b> X-Rays, X-Ray Diffraction (XRD) Analysis, Principle, Instrumentation, Working, Applications, Advantages and Disadvantages.	<b>15</b>
<b>Total</b>		<b>60</b>

**Notional Credit Hours for this course: 30 x 3 = 90**

<b>Distribution of Credits</b>		
<b>Lecture/ Tutorial</b>	<b>Practicum</b>	<b>Experiential Learning</b>
60	0	30 Laboratory Visit, Experimenting, Group Work, Discussions, Presentations and Quiz

### **Suggested Readings**

1. D.A. Skoog, D.M. West and F.J. Holler, Fundamentals of Analytical Chemistry, 6th Edition, Saunders College Publishing, Fort Worth (1992).
2. W. Kemp, Organic Spectroscopy, 3rd Edition, Macmillan, Hampshire (1991).
3. J.W. Robinson, Undergraduate Instrumental Analysis, 5th Edition, Marcel Dekker, Inc., New York (1995).
4. D.R. Redsicker, The Practical Methodology of Forensic Photography, 2nd Edition, CRC Press, Boca Raton (2000).

### **SEMESTER – IV**

<b>Paper Sl. No.</b>	Paper - 6	<b>Scheme of Evaluation</b>	T&P
<b>Name of the Course</b>	Accident Investigation- Motor Vehicles	<b>L-T-P-C</b>	3-0-0-3
<b>Type of Course</b>	Minor	<b>Credits Assigned</b>	3
<b>Paper Code</b>	FSC142N402	<b>Level of the Course</b>	200

**Course objective:** The objective of this course is to study the significance of photographs in accident cases, the importance of physical and trace evidences, and the outcome of accidental analysis.

<b>Course Outcome :</b> After successful completion of the course, student will be able to		
<b>Sl.No.</b>	<b>Course Outcome</b>	<b>Blooms Taxonomy Level</b>

CO1	<b>Define</b> the types of accidental injuries.	BT1
CO2	<b>Understand</b> the importance of tire marks and skid marks in accident cases.	BT2
CO3	<b>Acquire</b> knowledge about Pre- and post-crash movements.	BT3
CO4	<b>Analysis</b> of tachograph charts.	BT4

<b>Modules</b>	<b>Course content</b>	<b>Lecture Hours</b>
<b>I</b>	<b>Road Accidents:</b> Importance of accident scene, Forensic information sources, Eyewitness - its importance, assessment of vehicle damage, Visibility conditions, accident site photographs.	<b>15</b>
<b>II</b>	<b>Surface Markings :</b> Tire marks, skid marks, scuff marks etc, and their importance, abandoned vehicles, Importance of air bags in vehicle accidents, Maintenance of vehicles, speed estimation, Railway accidents and its analysis.	<b>15</b>
<b>III</b>	<b>Analysis of accidents:</b> Pre- and post-crash movements, Collision model, Occupants's kinematics, Types of accidental injuries, Biomechanics of injuries, investigations of Hit and run cases, analysis trace evidence found at accident sites.	<b>16</b>
<b>IV</b>	<b>Tachographs:</b> tachograph data - its forensic significance, Tachograph charts and analysis, Accuracy of speed record, Effects of tire slipping, Route tracing, Falsification signals.	<b>14</b>
<b>Total</b>		<b>60</b>

**Notional Credit Hours for this course: 30 x 3 = 90**

<b>Distribution of Credits</b>		
<b>Lecture/ Tutorial</b>	<b>Practicum</b>	<b>Experiential Learning</b>
60	0	30 Laboratory Visit, Experimenting, Group Work, Discussions, Presentations and Quiz

### **Suggested Readings**

1. T.S. Ferry, Modern Accident Investigation and Analysis, Wiley, New York (1988).
2. D. Lowe, The Tachograph, 2nd Edition, Kogan Page, London (1989).
3. T.L. Bohan and A.C. Damask, Forensic Accident Investigation: Motor Vehicles, Michie Butterworth, Charlottesville (1995).
4. S.C. Batterman and S.D. Batterman in Encyclopedia of Forensic Sciences, Volume 1, J.A. Siegel, P.J. Saukko and G.C. Knupfer (Eds.), Academic Press, London (2000).