SHRI DAVARA UNIVERSITY

NAYA RAIPUR (C.G.)

PROGRAMME CURRICULUM

FOR

BACHELOR OF FORENSIC SCIENCE
SEMESTER-IV
(EFFECTIVE FROM THE SESSION 2024-2028)

SHRI DAVARA UNIVERSITY

FOUR-YEAR UNDERGRADUATE PROGRAMME
FACULTY OF FORENSIC SCIENCE (2024-2028)
COURSE STRUCTURE
SEMESTER - IV

S.NO	COURSE CODE	COURSE TITLE	TEACHING HOURS PER WEEK				EXAMINATION SCHEME				
DISCIPLINE SPECIFIC COURSE			**L**	**T**	**P**	**C**	**THEORY**		**PRAC TIC AL**		**TO TAL MARKS**
							EX	**IN**	**EX**	**IN**	
1.	BSFS401	Forensic Chemistry	2	2	0	3	70	30	-	-	100
2.	BSFS402	Forensic Serology	2	0	1	3	70	30	-	-	100
3.	BSFS403	Forensic Toxicology	2	1	1	3	70	30	-	-	100
DISCIPLINE SPECIFIC ELECTIVE											
4.	BSFS404	Quality and Laboratory Management	2	1	0	3	70	30	-	-	100
ABILITY ENHANCEMENT COURSE											
5.	BSFS405	Communicative English And Soft Skill	2	0	0	2	35	15	-	-	50
SKILL ENHANCEMENT COURSE											
6.	BSFS406	Green Technology	1	1	0	2	35	15	-	-	50
PRACTICAL LAB											
7.	BSFS407P	Practicals based on Forensic Chemistry	0	0	2	2	35	15	-	-	50
8.	BSFS408P	Practicals based on Forensic Toxicology	0	0	2	2	35	15	-	-	50
Total Contact Hours per Week: 30		**Total Credit:**				**20**	**Total Mark**				**600**

SHRI DAVARA UNIVERSITY

FOUR-YEAR POSTGRADUATE PROGRAMME
FACULTY OF FORENSIC SCIENCE (2024-2028)
COURSE STRUCTURE
SEMESTER - II

PART-A: Introduction			
Program: (Certificate/Diploma/Degree/Honors)		**B.Sc. Forensic Science**	**Session: 2024-2028**
Course Code	**BSFS401**		
Course Title	**Forensic Chemistry**		
Course Type	**Discipline Specific Course (DSC)**		
Pre-requisite(if any)	**As per programme**		
Course Learning Outcomes (CLO)	● Conduct preliminary and micro-chemical tests to identify forensic exhibits and industrial products. ● Utilise GC-MS, ICP-MS, and thermal analysis to characterise polymers, inks, and trace materials. ● Detects accelerants, explosives, and gunshot residues through advanced chemical and metallic profiling. ● Perform quantitative and qualitative analysis of legal and illicit alcoholic beverages and medicinal preparations.		
Credit Value	**4 Credits**	**Credit =60 Hours-learning & Observation**	
Total Marks	**Max. Marks: =100**	**Min Passing Marks: 40**	

PART -B: Content of the Course		
	Total No. of Teaching-learning Periods (01 Hr. per period) -60 Periods (60 Hours)	
Unit	**Topics (Course contents)**	
I	**Forensic Chemistry Introduction**: ● Types of cases/exhibits, preliminary screening, presumptive test, inorganic analysis, micro-chemical methods of analysis, examination procedures involving standard methods and instrumental techniques.	**15**
II	● Quantitative and qualitative forensic analysis of organic and inorganic industrial products, ● chemical fertilizers, insecticides, metallic and non-metallic products, ● consumer items such as gold, silver, tobacco, tea, sugar, salts, acids, and alkalis etc.	**15**
III	**Trace Evidence and Materials Analysis:** ● Fire debris analysis: accelerants (petroleum products) via headspace GC-MS and solvent extraction. ● Explosives and gunshot residue: detection of nitrates, peroxides, and metal particles (ICP-MS, LIBS). ● Polymers and inks: Characterization using thermal analysis (TGA, DSC) and **isotope** ratio MS.	**15**

IV	**Analysis of beverages**: alcoholic and non-alcoholic, country-made liquor, illicit liquor and medicinal preparations containing alcohol and drugs as constituents.	15

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PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended-

1. Forensic Chemistry by Suzanne Bell
2. Criminalistics: An Introduction to Forensic Science by Richard Saferstein & Tiffany Roy
3. Analytical Chemistry in Forensic Science by Aman Tyagi
4. Chemical Analysis of Firearms, Ammunition, and Gunshot Residue by James Smyth Wallace

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods: Maximum Marks: 100 Marks
Continuous Internal Assessment (CIA): 30 Marks
Marks End Semester Exam (ESE): 70 Marks

Continuous Internal Assessment (CIA): 30 (By Course Teacher)	**Internal Test/Quiz:20+20 Assignment/ Semenar-10 Total Marks-30**	**Better marks out of the two Tot Quiz + obtained marks in Assignment shall be considered against 15 Marks**

End Semester Exam (ESE):70	**Three sections (A,B &C)** **Section A : Objective (10*1=10 Marks)** **Section B: Short answer type (5*4=20 Marks)** **Section C : Descriptive answer type qts 1 out of 2 from each- (4*10=40 Marks)**

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FOUR- YEAR POSTGRADUATE PROGRAMME
FACULTY OF FORENSIC SCIENCE (2024-2028)
COURSE STRUCTURE
SEMESTER - II

PART-A: Introduction			
Program: (Certificate/Diploma/Degree Honors)		**B.Sc. Forensic Science**	**Session: 2024-2028**
Course Code	**BSFS402**		
Course Title	**Forensic Serology**		
Course Type	**Discipline Specific Course (DSC)**		
Pre-requisite(if any)	**As per programme**		
Course Learning Outcomes (CLO)	● Perform preliminary and confirmatory tests to identify, collect, and preserve biological fluids like blood, semen, and saliva. ● Analyse the structure and function of the immune system, including antigens, haptens, and the five classes of immunoglobulins. ● Execute ABO, Rh, and Mn blood grouping techniques to identify genetic markers from fresh samples and forensic stains. ● Differentiate between human and animal biological origins using advanced immunodiffusion and immunoelectrophoresis techniques.		
Credit Value	**4 Credits**	**Credit =60 Hours-learning & Observation**	
Total Marks	**Max. Marks: =100**	**Min Passing Marks: 40**	

PART -B: Content of the Course

Total No. of Teaching-learning Periods (01 Hr. per period) -60 Periods (60 Hours)

Unit	Topics (Course contents)	
I	**Introduction to Serology:** ● Definition, Types of body fluids (Blood, Semen, Saliva, Sweat, Urine) their properties, Significance, collection, preservation, preliminary and confirmatory tests.	**15**
II	**Introduction to Immunology:-** ● Definition of Immunology, Immune system, Immune response, ● Innate & Acquired Immune System, Antigens, Haptenes and Adjuvant. ● Immunoglobulin – Structure, types, physiochemical properties and functions.	**15**
III	**Serogenetic markers:-** ● Blood groups – biochemistry and genetics of ABO, Rh, Mn systems, ● Methods of ABO blood grouping from blood stains and other fluids / stains, semen, saliva, sweat, their forensic significance.	**15**
IV	**Determination of Origin of Species**:- ● Determination of human and animal origin from body fluids / stains viz. blood, semen, saliva, sweat, through immuno- diffusion and immuno – electrophoresis techniques.	**15**

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PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended-

1. Criminalistics: An Introduction to Forensic Science by Richard Saferstein
2. Lab Manual in Forensic Serology by Li Richard
3. Kuby Immunology by Jenni Punt, Sharon Stranford, Patricia Jones, and Judith A. Owen
4. Forensic Serology by Shrikant H. Lade

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods: Maximum Marks: 100 Marks
Continuous Internal Assessment (CIA): 30 Marks
Marks End Semester Exam (ESE): 70 Marks

Continuous Internal Assessment (CIA): 30 (By Course Teacher)	**Internal Test/Quiz:20+20 Assignment/ Semenar-10 Total Marks-30**	**Better marks out of the two Tot Quiz + obtained marks in Assignment shall be considered against 15 Marks**

End Semester Exam (ESE):70	**Three sections (A,B &C)** **Section A : Objective (10*1=10 Marks)** **Section B: Short answer type (5*4=20 Marks)** **Section C : Descriptive answer type qts 1 out of 2 from each- (4*10=40 Marks)**

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FOUR- YEAR POSTGRADUATE PROGRAMME
FACULTY OF FORENSIC SCIENCE (2024-2028)
COURSE STRUCTURE
SEMESTER - II

PART-A: Introduction		
Program: (Certificate/Diploma/Degree Honors)	**B.Sc. Forensic Science**	**Session: 2024-2028**
Course Code	**BSFS403**	
Course Title	**Forensic Toxicology**	
Course Type	**Discipline Specific Course (DSC)**	
Pre-requisite(if any)	**As per programme**	
Course Learning Outcomes (CLO)	● Classify narcotic, psychotropic, and designer drugs based on their chemical properties, physiological effects, and forensic examination techniques. ● Apply the NDPS Act, Drugs and Cosmetics Act, and WADA regulations to the forensic investigation of drug abuse and sports doping. ● Execute laboratory protocols to detect inorganic poisons like heavy metals and organic toxins such as pesticides and corrosive agents. ● Evaluate the toxicology of plant and animal toxins and "date rape" drugs in the context of drug-facilitated crimes and death investigations.	
Credit Value	**4 Credits**	**Credit =60 Hours-learning & Observation**
Total Marks	**Max. Marks: =100**	**Min Passing Marks: 40**

PART -B: Content of the Course		
Total No. of Teaching-learning Periods (01 Hr. per period) -60 Periods (60 Hours)		
Unit	**Topics (Course contents)**	
I	● Introduction, classification of drugs of abuse, ● Narcotic drugs and psychotropic substances, ● Drugs and Cosmetics Act, Excise Act, NDPS Act.	**15**
II	● **Inorganic Poisons**: Heavy metals (Arsenic, Mercury, Lead, Thallium) and anions (Cyanide, Fluoride). ● **Organic Poisons:** Volatile substances (Ethanol, Methanol), pesticides (Organophosphates, Carbamates), and corrosive agents.	**15**
III	● **Drugs of Abuse**: Narcotics (Opiates), Stimulants (Cocaine, Amphetamines), Depressants (Benzodiazepines), and Hallucinogens (LSD, Cannabis). ● **Plant and Animal Toxins:** Common poisonous plants (Datura, Ricin) and snake/scorpion venoms.	**15**

IV	• Designer drugs and their forensic examination, • Drug-Facilitated Crimes: Toxicology of "date rape" drugs (GHB, Rohypnol). • Doping in Sports: Detection of performance-enhancing drugs and WADA regulations.	**15**

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PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended-

1. **V.V. Pillay:** *Textbook of Forensic Medicine and Toxicology*.
2. **Anil Aggrawal:** *Textbook of Forensic Medicine and Toxicology*.
3. **B.S. Nabar:** *Forensic Science in Crime Investigation*.
4. **Richard Saferstein:** *Criminalistics: An Introduction to Forensic Science*.
5. **Richard Li:** *Forensic Biology*.

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods: Maximum Marks: 100 Marks
Continuous Internal Assessment (CIA): 30 Marks
Marks End Semester Exam (ESE): 70 Marks

Continuous Internal Assessment (CIA): 30 (By Course Teacher)	**Internal Test/Quiz:20+20 Assignment/ Semenar-10 Total Marks-30**	**Better marks out of the two Tot Quiz + obtained marks in Assignment shall be considered against 15 Marks**

End Semester Exam (ESE):70	**Three sections (A, B &C)** **Section A : Objective (10*1=10 Marks)** **Section B: Short answer type (5*4=20 Marks)** **Section C : Descriptive answer type qts 1 out of 2 from each- (4*10=40 Marks)**

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FOUR-YEAR POSTGRADUATE PROGRAMME
FACULTY OF FORENSIC SCIENCE (2024-2028)
COURSE STRUCTURE
SEMESTER - II

PART-A: Introduction			
Program: (Certificate/Diploma/Degree Honors)		**B.Sc. Forensic Science**	**Session: 2024-2028**
Course Code	**BSFS404**		
Course Title	**Quality and Laboratory Management**		
Course Type	**Discipline Specific Elective (DSE)**		
Pre-requisite(if any)	**As per programme**		
Course Learning Outcomes (CLO)	● Apply ISO/IEC 17025 standards to manage laboratory operations, including document control, method validation, and equipment calibration. ● Construct professional forensic reports and demonstrate effective courtroom skills during examination-in-chief and cross-examination. ● Utilise Laboratory Information Management Systems (LIMS) and safety protocols to ensure efficient, ethical, and secure forensic examinations. ● Analyse complex forensic cases involving digital fraud, voice authentication, and diverse physical evidence through standardised validation methods.		
Credit Value	**4 Credits**	**Credit =60 Hours-learning & Observation**	
Total Marks	**Max. Marks: =100**	**Min Passing Marks: 40**	

PART -B: Content of the Course		
	Total No. of Teaching-learning Periods (01 Hr. per period) -60 Periods (60 Hours)	
Unit	**Topics (Course contents)**	
I	**Quality Management (ISO/IEC 17025)** ● General requirements for the competence of testing and calibration laboratories, Introduction, Scope, ● Management requirements: Organization, Quality System, Document Control, Test and calibration methods and methods validation, Equipment, measurement traceability, Sampling, Handling of test and calibration items, assuring the quality of test calibration results and reporting the results.	**15**
II	**Report Writing and Evidence Evaluation**: ● Components of reports and Report formats in respect of Crime Scene and Laboratory findings. ● Court Testimony- Admissibility of expert testimony, per Court preparations & court appearance, Examination in chief, cross-examination and re-examination, ● Ethics in Forensic Science.	**15**
III	● Laboratory Management, ● Laboratory information management system, ● Validation and safety equipment.	**15**

IV	**Cases of Special Importance:** ● Pertaining to forensic examination (Biology, serology, chemistry, toxicology) documents, fingerprints, ballistics, photography and physics, ● Voice identifications, Tape authentication ● Computer frauds pertaining to forensic examination of cases.	15

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PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended-

1. **B. R. Sharma:** *Forensic Science in Criminal Messages and Trials*.
2. **V. N. Sehgal:** *Forensic Science - Laboratory Management*.
3. **A.S.C.S. Rao:** *Forensic Science: Quality Assurance and Quality Control*.
4. **Max M. Houck:** *Forensic Science Education and Administration*.

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods: Maximum Marks: 100 Marks
Continuous Internal Assessment (CIA): 30 Marks
Marks End Semester Exam (ESE): 70 Marks

Continuous Internal Assessment (CIA): 30 (By Course Teacher)	**Internal Test/Quiz:20+20 Assignment/ Semenar-10 Total Marks-30**	**Better marks out of the two Tot Quiz + obtained marks in Assignment shall be considered against 15 Marks**

End Semester Exam (ESE):70	**Three sections (A,B &C)** **Section A : Objective (10*1=10 Marks)** **Section B: Short answer type (5*4=20 Marks)** **Section C : Descriptive answer type qts 1 out of 2 from each- (4*10=40 Marks)**

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PART-A: Introduction		
Program: (Certificate/Diploma/Degree Honors)	**B.Sc. Forensic Science**	**Session: 2024-2028**
Course Code	**BSFS405**	
Course Title	**Communicative English and Soft skills**	
Course Type	**Ability Enhancement Course**	
Pre-requisite(if any)	**As per programme**	
Course Learning Outcomes (CLO)	After completion of this course, the students will be able to: ● Learn deviant use of English both in written and spoken forms. ● Understand the importance of communication in English. ● Apply the ability to improve competence in using the English language. ● Analyze the importance of reading skills. ● Develop language for speaking with confidence.	
Credit Value	**2 Credits**	**Credit =30 Hours-learning & Observation**
Total Marks	**Max. Marks: =50**	**Min Passing Marks: 20**

PART -B: Content of the Course

Total No. of Teaching-learning Periods (01 Hr. per period) -60 Periods (60 Hours)

Unit	Topics (Course contents)	
I	**What is communication?** ● Purpose of Communication, ● Types of Communication (Verbal and Non- Verbal), ● The motivating factors (Intrinsic and Extrinsic) Barriers of Communication (Internal and External).	**15**
II	**Building Vocabulary** ● Use of Dictionary ● Building Vocabulary through synonyms and antonyms, ● Use of Phrasal Verbs, Idioms and Phrases	**15**
III	**Conversation in English (Performance Based)** A) Reading: Very short stories (Gift of Magi, Cinderella, The Selfish Giant, Stories from Panchatantra), Newspaper reports/Fact-based articles, Diction and tone, Identifying topic sentences, Reading aloud: Reading an article/report. B) Spoken English for the Real world and Situational Dialogues) (any four)	**15**

	• Call Center: Talking to service Providers, Professional Enquiries, Talking with peers/seniors. • Bank: for opening an account (seeking information on loans/FDs/other schemes. • Office: (seeking information regarding job vacancy) • Market (asking for price of an object, discount etc), • Restaurant: (asking for the special dish • At the Railway Station/ Bus Station enquiry: (Arrival and departure of buses/trains) • Hotel: Booking a room, asking tariff rate • Travel agency: (Asking to book tickets fares, finding vacancies in hotels) C) Greetings and Common Etiquettes: Introducing oneself; Invitation; Making Requests; Expressing Gratitude; Complimenting and Congratulating, Expressing Sympathy; Apologizing; Complaining and Expressing Regret	
IV	**Presentation skills (Performance Based):** • Effective oral presentation, Characteristics of good oral presentation. Use of quotations and anecdotes. Ways of Oral Presentation (Seminar, Viva-voce, Interview, Power Point etc.) Gestures/Mannerism during oral presentation. Media methods used for effective oral presentation, Body Language, Attire.	**15**

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PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended-

- Fluency in English - Part II, Oxford University Press, 2006.
- Enrich Your English, OUP, SR Inthira and V. Saraswathi, CIEFL, 1997
- Oxford A-Z of English Usage, ed. Jeremy Butterfield, OUP, 2007.
- Longman Dictionary of Common Errors, N.D. Turton and J.B. Heaton, Longman, 1998
- Contemporary Communicative English, S Chand
- Malhotra Prerna, Deb Dulal Halder, (2019) Communication Skills: Theory and Practice, Eighth Edition, BookAge Publications, New Delhi

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods: Maximum Marks: 50 Marks
Continuous Internal Assessment (CIA): 20 Marks
Marks End Semester Exam (ESE): 30 Marks

Continuous Internal Assessment (CIA): 30 (By Course Teacher)	**Internal Test/Quiz:20+20 Assignment/ Semenar-10 Total Marks-30**	**Better marks out of the two Tot Quiz + obtained marks in Assignment shall be considered against 15 Marks**

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End Semester Exam (ESE):70	**Three sections (A,B &C)** **Section A : Objective (10*1=10 Marks)** **Section B: Short answer type (5*4=20 Marks)** **Section C : Descriptive answer type qts 1 out of 2 from each- (4*10=40 Marks)**
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PART-A: Introduction			
Program: (Certificate/Diploma/Degree Honors)	**B.Sc. Forensic Science**		**Session: 2024-2028**
Course Code	**BSFS406**		
Course Title	**Green Technology**		
Course Type	**Skill Enhancement Course**		
Pre-requisite(if any)	**As per programme**		
Course Learning Outcomes (CLO)	**At the end of this course, the students will be able to:-** **Analyze green technology systems using sustainability metrics and life-cycle assessment.** **Evaluate emerging technologies for carbon capture, renewable energy, and waste valorization.** **Design integrated solutions addressing environmental challenges with economic viability.** **Critically assess policy, market, and social dimensions of green technology deployment.** **Communicate technical concepts to diverse stakeholders using evidence-based approaches**		
Credit Value	**2 Credits**	**Credit =30 Hours-learning & Observation**	
Total Marks	**Max. Marks: =50**	**Min Passing Marks: 20**	

PART -B: Content of the Course

Total No. of Teaching-learning Periods (01 Hr. per period) -60 Periods (60 Hours)

Unit	Topics (Course contents)	
I	**Foundations of Green Technology & Sustainability: -** 1. Concepts of Green Chemistry, 2. Green Engineering, and Process Intensification. **Understanding Sustainable Development: -** 1. Ecological, Economic, and social dimensions. 2. Systems perspective and intergenerational justice in sustainability.	**15**
II	**Green Synthesis, Catalysis & Nanotechnology: -** 1. Green oxidation, photochemical reactions, 2. Microwave and Ultrasound-assisted reactions. 3. Synthesis of Green Reagents and Solvents.	**15**
III	**Green Infrastructure & Built Environment: -** 1. Net-zero buildings, passive design, smart materials 2. LEED, BREEAM, GRIHA certification frameworks **3.** Urban metabolism & nature-based infrastructure **Sustainable Mobility & Transportation: -** Electric/hydrogen vehicles, charging infrastructure Sustainable aviation fuels, green shipping	**15**

	Mobility-as-a-Service (MaaS) & urban planning integration **Innovation Ecosystems & Scaling Strategies: -** 1. Technology readiness levels (TRL), pilot-to-commercial pathways 2. Green finance: ESG investing, green bonds, impact funds **3.** Public-private partnerships & innovation policy	
IV	**Waste Valorization & Upcycling: -** 1. Advanced recycling: chemical, enzymatic, pyrolysis 2. Plastic-to-fuel, e-waste recovery, critical minerals extraction **3.** Industrial symbiosis & eco-industrial parks **Sustainable Materials & Green Manufacturing: -** 1. Bio-based polymers, mycelium materials, green composites 2. Additive manufacturing for resource efficiency **3.** Cradle-to-Cradle design & material passports **Water-Energy-Food Nexus Technologies: -** 1. Advanced wastewater treatment (membrane bioreactors, electrochemical) 2. Precision agriculture, vertical farming, aquaponics 3. Resource recovery: nutrients, biogas, reclaimed water **Digital Enablers for Circularity: -** 1. IoT for resource tracking, blockchain for supply chain transparency 2. AI/ML for predictive maintenance & material optimization 3. Digital twins for industrial decarbonization	**15**

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PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended-

1. Kumar,H.D.(1999).Introductory Phycology.Affiliated East-West.Press Pvt.Ltd.Delhi.2nd edition.
2. 2.Tortora,G.J.,Funke,B.R.,Case,C.L.(2010).Microbiology:An Introduction,Pearson Benjamin Cummings,
3. U.S.A.10th edition.
4. 3.Sethi,I.K.and Walia,S.K.(2011).Text book of Fungi &Their Allies,MacMillan Publishers Pvt.Ltd.,Delhi.
5. 4.Aggarwal,S.K.2009.Foundation Course in Biology,A one books Pvt.Ltd.,New Delhi.
6. 5.Aneja,K.R.1993.Experiments in Microbiology,Pathology and Tissue Culture,VishwaPrakashan,NewDelhi.
7. 6..Annie Ragland,2012.Algae and Bryophytes,Saras Publication,Kanyakumari,India
8. 7.Basu,A.N.1993.Essentials of Plant Viruses,Vectors and Plant diseases,New Age International,New Delhi.
9. 8.Chopra.G.L.1984.A text book of Algae,Rastogi publications,Meerut,India
10. 9.Dubey,R.C.and Maheshwari.D.K.2012.Practical Microbiology,S.Chand &Company,Pvt.Ltd.,NewDelhi.

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods: Maximum Marks: 50 Marks
Continuous Internal Assessment (CIA): 20 Marks
Marks End Semester Exam (ESE): 30 Marks

Continuous Internal Assessment (CIA): 30 (By Course Teacher)	**Internal Test/Quiz:20+20 Assignment/ Semenar-10 Total Marks-30**	**Better marks out of the two Tot Quiz + obtained marks in Assignment shall be considered against 15 Marks**

End Semester Exam (ESE):70	**Three sections (A,B &C)** **Section A : Objective (10*1=10 Marks)** **Section B: Short answer type (5*4=20 Marks)** **Section C : Descriptive answer type qts 1 out of 2 from each- (4*10=40 Marks)**

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