Academic Council :
Item No. :

UNIVERSITY OF MUMBAI

Syllabus for S.Y.B.Sc.

Program : B.Sc.

Course : Forensic Science

(Credit Based Semester and Grading System with effect from the Academic Year 2016-2017)

S.Y.B.Sc. (Forensic Science) (Semester III) Credits
To be implemented from Academic Year 2016-2017

Class	Title	Class Room Instruction Face to Face						50 Hours = 1 Credit				
S.Y. Sem. I		Per Week		15 Weeks (Per Sem)		Per Sem (Hours)		Notional (Hours)		Credits		Total Credits
		L (50 Min)	P (50 Min)	L	P	L	P	L	P	L	P	
USFS 301	Forensic Science – III	3		45		36		100		2		2
USFS 302	Chemical Science - III	3		45		36		100		2		2
USFS 303	Physical Science – III	3		45		36		100		2		2
USFS 304	Biological Science – III	3		45		36		100		2		2
USFS 305	Psychology – III	3		45		36		100		2		2
USFS 306	Computer Science – III	3		45		36		100		2		2
USFS 307	Law - III	3		45		36		100		2		2
USFS 3P1	Forensic Science and Chemical Science Practical		6		90		72		100		2	2
USFS 3P2	Physical Science and Biological Science Practical		6		90		72		100		2	2
USFS 3P3	Psychology and Computer Science Practical		6		90		72		100		2	2
Total	**--**	**21**	**18**	**315**	**270**	**252**	**216**	**700**	**300**	**14**	**6**	**20**

B.Sc. (FORENSIC SCIENCE)

Semester III - Theory

Course Code	Title	Credits
USFS 301	**Forensic Science – III**	**2**
Unit No.	**Contents of Unit**	
Unit I	**Crime Reconstruction (CR)** 1.1 Introduction and difference between Police Investigation and Scientific Investigation, Role of Scientist at Crime Scene 1.2 Science of Crime Reconstruction, Methods of Crime Reconstruction, Role of Evidence in Reconstruction 1.3 Evidence Dynamics, Factors Affecting Evidence during Pre-discovery: Role of Offender/Victim, Weather/Climate, Decomposition, Insect Activity, Animal Predation, Fire 1.4 Post-discovery: Failure to Search Recovery, Premature Scene Cleanup, Packaging, Transportation, Storage and Chain of Custody 1.5 Trace Evidences: Fingerprint, Blood, Semen, Hair, Fibers, Paint, Glass, Soil, Dust, Footwear and Tire Traces, GSR, Tool Marks, Projectile Wipes, Explosive Residues, Trace Evidence Transfer and Interpretation in CR.	
Unit II	**Questioned Document** 2.1 Questioned Document: Nature, Scope, Significance, Handling of Documents, Integrity of Documents, Guidelines for Preservation. 2.2 Classification and Types of Document: Financial, Academic, Personal, Historical, Official and Non-official Records, Government Documents, Service Documents and Certificates 2.3 Preliminary Examination of Document 2.4 Handwriting, Development of Handwriting 2.5 Principles of Handwriting Identification, Natural Variation in Handwriting, General and Individual Characteristic of Handwriting 2.6 Standard Documents: Specimen Writing, Admitted Writing, Marking of Document 2.7 Instruments for Examination of Document	
Unit III	**Fingerprint** 3.1 Definition, History and Development 3.2 Dermatoglyphics, Embryology: Primary and Secondary Ridge Formation, Morphology and Anatomy of Dermal Skin.	

	3.3	Theories of Pattern Formation, Basic Fingerprint Patterns, Ridge Counting, Ridge Tracing
	3.4	Classification System in Fingerprints: Henry, Single Digit: Battley
	3.5	Recording of Fingerprints: Requirements, Procedure, Precautions, Purpose, Plain Print, Rolled Print and Palm Print. Post-mortem Fingerprinting: Fresh Corpus, Rigor Mortis, Mutilated, Decomposed, Drowned, Burned
	3.6	Conditions affecting Latent Prints, Search Method for Fingerprints on Crime Scene

Course Code	Title	Credits
USFS 302	**Chemical Science – III**	**2**

Unit No.	**Contents of Unit**
Unit I	**Bonding and Structures of Organic Compounds** 1.1 Allotropy of Carbon : Structure and properties of diamond, graphite, fullerenes and carbon nanotube 1.2 Electronic Effect :Dipole moment, polarizability, inductive effect, resonance effect, hyperconjugation 1.3 Hydrogen Bond : Nature, effect on melting point and boiling point, solubility in water, vader waals forces 1.4 Structures of Common Functional Groups :Geometry, electronic structure and their reactivity.
Unit II	**Study of Carbonyl Compounds and their Derivatives** 2.1 Aldehydes : Preparation, physical properties and chemical properties 2.2 Ketones : Preparation, physical properties and chemical properties 2.3 Acids : Preparation, physical properties and chemical properties. 2.4 Esters : Preparation, physical properties and chemical properties. 2.5 Amides : Preparation, physical properties and chemical properties.
Unit III	**Study of Aromaticity and N-containing Compounds** 3.1 Aromaticity : Characteristic properties of aromatic compounds, Huckel rule, aromaticity and antiaromaticity, Resonance energy. 3.2 Aromatic Hydrocarbon : Benzonoide Hydrocarbons : Benzene, naphthalene, anthracene and phenanthrene. 3.3 Amines (Aliphatic / Aromatic) : Preparation, physical properties and chemical properties. 3.4 Nitro Compounds : Preparation, physical properties and chemical properties.

Course Code	Title	Credits
USFS 303	**Physical Science – III**	**2**

Unit No.	**Contents of Unit**
Unit I	**Spectroscopy** 1.1 Introduction 1.2 Electromagnetic Spectrum 1.3 Sources of Radiations 1.4 Conventional Sources for UV, Visible and IR Rays 1.5 Shorter Wavelength Radiation (X-ray Tube) 1.6 Interaction of Radiation with Matter : Reflection, Absorption, Transmission, Fluorescence, Phosphorescence
Unit II	**Instrumentation Electronics** 2.1 Introduction to Electronic Components 2.1.1 Passive Component : Resisters, its types and Identification, Capacitors and its Classification. Inductors and its types, Transformers and its types 2.1.2 Active component : Diodes and its Identifications, Zener Diode, Transistors, FET, UJT 2.2 Electronics Circuits and Digital Electronics :Basics of LR, CR, LCR Circuits, Rectifier Circuits, Transistor and its Characteristics, Introduction to OPAM, Logic Gates and Their Applications 2.3 CRO : Construction, Working, Applications
Unit III	**Fire Arms** 3.1 History : Early Hand Cannons, The Matchlock, The Wheel Lock, The Flint Locks, The Snapehaunce 3.2 Firing System : The Pin Fire, Rim Dire, Dreyse Needle, Centre fire system 3.3 Weapon Types and Operation : Single Shot, Revolving Pistols, Self Loading Pistols, Rifles - Types and Operations 3.4 Proof Marks : Introduction, Types

Course Code	Title	Credits
USFS 304	**Biological Science – III**	**2**
Unit No.	**Contents of Unit**	
Unit I	**Biological Evidence Collection and Documentation** 1.1 Recognition of biological evidences encountered in various cases 1.2 Protection of biological evidences (blood, hair, semen, saliva, urine, fecal matter, menstrual blood etc.) at the crime scene 1.3 Search and collection of biological evidences 1.4 Packaging & Transportation of biological evidences 1.5 Documentation of biological evidences 1.6 Chain of custody	
Unit II	**Immunological Concepts and Techniques** 2.1 Antigen, Antibodies 2.2 Polyclonal antibodies 2.3 Monoclonal antibodies 2.4 Antigen Antibody interaction: precipitation, agglutination, zone of equivalence 2.5 Immunological Techniques : 2.5.1 Electrophoretic methods: Agarose gel, SDS Natured / Denatured 2.5.2 ELISA, Western Blotting, Hemagglutination, complement fixation 2.5.3 Immunochromatography 2.5.4 Immunodiffusion assays 2.5.5 Immunoelectrophoresis assays 2.5.6 Immunoprecipitation assays.	
Unit III	**Genetics** 3.1 Structure and properties of Chromosomes 3.2 Heterochromatin and Euchromatin 3.3 DNA: Structure, Properties, Types 3.4 DNA: Coding region (genes: housekeeping, regulatory), Non-coding regions: Tandem repeats, Interspersed repeats, Transposable elements 3.5 Sources used as DNA Evidence: autosomal DNA, mitochondrial DNA, gender typing 3.6 DNA extraction : Basic principles, Method of DNA Extraction (from biological fluid and bone) 3.7 DNA Quantification : Slot Blot Assay, Southern, Northern Blotting 3.8 DNA Amplification By Polymerase Chain Reaction 3.9 DNA Electrophoresis 3.10 DNA data-basing	

Course Code	Title	Credits
USFS 305	**Psychology – III**	**2**

Unit No.	**Contents of Unit**
Unit I	**Domains of Psychology – I** 1.1 Social Psychology : Introduction to social psychology, attitude, attitude formation and attitude change, attribution, aggression, social interaction and influence of social norms on behavior, non-verbal communication, interpersonal relationship (Interpersonal attraction), group psychology 1.2 Biological Psychology : Neurons, Sensory system, Development and plasticity of the brain, brain damage and recovery, Psychoactive drugs and addiction, hormones, Biology of emotions, fear, stress, anxiety, depression
Unit II	**Research Methods in Psychology** 2.1 Introduction to Research methods in Psychology : Importance, goals, need and types of research 2.2 Quantitative methods : Experimental and Non-experimental methods in psychology, Descriptive Statistics (Mean, Median, Mode, Frequency, Normal distribution, Central Tendency, Hypothesis testing, Probability, T-tests, Chi-Square, Correlation) Inferential Statistics (Analysis of variance, regression analysis, factor analysis) 2.3 Qualitative methods : Philosophy and Conceptual Foundations Methods for analysis, Textual Methods (Conversation analysis, Discourse Analysis, thematic analysis, Narrative Analysis), Field methods (Grounded Theory, Observation and Interview Inquiry)
Unit III	**Psychological Assessment** 3.1 Introduction : Definition and purpose, Types of tests, Applications 3.2 Overview of Psychological tests : Administration, Scoring and Interpretation of tests, Steps in Test Construction, characteristics of a good test, reliability, validity 3.3 Assessment of Cognitive abilities (Intelligence tests), Personality (Measurement of interests, values and attitudes), Aptitude and Achievement test (Distinguishing between Aptitude and Achievement tests and its types)

Course Code	Title	Credits
USFS 306	**Computer Science – III**	**2**

Unit No.	**Contents of Unit**
Unit I	**HTML** 1.1 Introduction of HTML 1.2 How Web Browser Works 1.3 HTML Tags : HTML, HEAD, TITLE, BODY 1.4 HTML Tags : B, U, I, H, BR 1.5 Ordered and Unordered Lists 1.6 Links and Images 1.7 Table 1.8 Form 1.9 Style
Unit II	**JavaScript** 2.1 Introduction to JavaScript : Adding JavaScript to HTML Document, History and Use of JavaScript 2.2 JavaScript Core Feature : Basic Definitions, Variables, Flow Control Statement, Loops, Inputs and Output in JavaScript 2.3 Operators Expression and Statements
Unit III	**PHP** 3.1 Introduction to PHP : How PHP Works on Web Server 3.2 Variable, Operators and Expressions : Data Types, Variable, Constants, Operators 3.3 Control Statements : If, '?' Operator, Switch, Loops 3.4 Date, String Operations 3.5 Session, Cookies

Course Code	Title	Credits
USFS 307	**Law – III**	**2**

Unit No.	**Contents of Unit**
Unit I	**Offence Affecting Human Body** 1.1 Culpable Homicide and Murder 1.2 Dowry Death 1.3 Attempt to Murder 1.4 Causing Miscarriage, Causing Miscarriage without Woman's Consent 1.5 Hurt and Grievous Hurt 1.6 Wrongful Restraint and Wrongful Confinement 1.7 Force, Criminal Force and Assault 1.8 Assault or Criminal Force to Women with Intent to Outrage her Modesty 1.9 Kidnapping and Abduction 1.10 Sexual Offence and Rape 1.11 Unnatural Offence 1.12 Cruelty by Husband or Relative of Husband
Unit II	**Offence Against Property** 2.1 Theft, Punishment for Theft, Theft in Dwelling House etc. 2.2 Theft by Clerk or Servant of Property in Possession of Master 2.3 Extortion and Punishment for Extortion 2.4 Robbery and Dacoity 2.5 Punishment for Robbery and Dacoity 2.6 Dishonest Misappropriation of Property 2.7 Criminal Breach of Trust and its Punishment 2.8 Stolen Property 2.9 Cheating and Punishment for Cheating
Unit III	**Offence Relating to Document** 3.1 Forgery, Making a False Document and Punishment for Forgery 3.2 Forgery of Record of Court or of Public Register 3.3 Forgery of Valuable Security, Will, etc. 3.4 Forgery for Purpose of Cheating 3.5 Forgery for Purpose of Harming Reputation 3.6 Forged Document or Electronic Record 3.7 Using as Genuine a Forged Document or Electronic Record 3.8 Counterfeiting Currency-Notes or Bank-Notes, Using as Genuine, Forged or Counterfeit Currency-Note or Bank Notes 3.9 Possession of Forged or Counterfeit Currency Notes or Bank Notes 3.10 Making or Possessing Instruments or Materials for Forging or Counterfeiting Currency-Notes or Bank Notes 3.11 Making or Using Documents Resembling Currency-Note or Bank- note

B.Sc. (FORENSIC SCIENCE)

Semester III – Practical

Note : Every Department is advised to arrange maximum number of experiments from list provided or experiments based on theory syllabus having forensic relevance. However, minimum seven experiments should be reported in journal for the purpose of certification.

Course Code	Title	Credits
USFS 3P1	**Forensic Science and Chemical Science Practical**	**2**
Practical No.	**Title of the Practical**	**No. of Practical**
Forensic Science Practical		
1	Reconstruct the Crime Scene (Homicide, Suicide, Theft, Robbery, Sexual Assault, Firearms Cases)	1
2	Collection and Identification of Hair (Trace Evidence), Determination of Medullary Index of Human Hair and Animal Hair	1
3	Examination of the Cross-section Characteristics of Various Body Hair	1
4	Determination of Scale Count and Scale Index of Body Hair	1
5	Identification of Hair Subjected to Chemical Process (Dyes and Bleach)	1
6	Recording of Rolled and Plain Fingerprint for Ten Digit Classification	1
7	Collection and Identification of Fingerprint Pattern	1
8	Study of Palm Prints and Characteristic Features	1
9	Examination of Paint Chips by Stereo Microscope	1
10	Collection and Examination of Blood Stain	1
11	To Study Crime Scene Reconstruction Methods	1
12	To Perform Rough/Final Sketch of Crime Scene	1
13	Study the Effect of Various Conditions on the Development of Latent Prints	1
14	Collection, Handling and Preservation of Documents	1
15	To Perform Preliminary Examination of Document	
16	To Study Natural Variation of Handwriting	1
17	Examination and Identification of General and Individual Characteristics of Handwriting	1
Chemical Science Practical		
1	Systematic Identification of Organic Compounds.(8 compounds)	08
2	Preparation of Organic derivatives. (4 Derivatives)	04
3	Organic Estimation.(3 Estimation)	03

urse Code	Title	Credits
USFS 3P2	**Physical Science and Biological Science Practical**	**2**
Practical No.	**Title of the Practical**	**No. of Practical**
Physical Science Practical		
1	Investigations of fake documents using UV light.	1
2	Thermal Analysis of given sample using DSC/TGA	1
3	Gravimetric analysis (density measurement of given samples)	1
4	Testing of Electronic/Electrical components/parts	1
5	Testing of Electronic/Electrical circuits	1
6	LDR characteristics and Photosensitive relay using LDR	1
7	LCR series resonance	1
8	Bridge rectifier (to study load regulation)	1
9	Transistor (CE) characteristics	1
10	De'Morgan's Theorems	1
11	Ex-or gate, NAND and NOR as universal building blocks	1
12	Study of absorption coefficient of given Sample	1
13	Study of transmission coefficient of given Sample	1
14	Examination of Fire Arm according to Arms Act	1
15	Dismantling and assembling of firearms	1
16	Use of CRO	
Biological Science Practical		
1	Collection and packaging biological evidences	1
2	To determine titre of antisera.	1
3	To perform Immunodiffusion test for species of origin. a. Ouchterlony assay b. Radial immunodiffusion assay	2
4	To perform electrophoresis for separation of various polymorphic enzymes.	1
5	Blood grouping from stains of blood, semen, saliva and other body fluids by Absorption inhibition, Absorption-elution and mixed agglutination technique, determination of Secretor/non secretor status	3
6	Extraction and isolation of DNA from a. From blood b. From saliva c. From hair d. From Plant source	4

Course Code	Title	Credits
USFS 3P3	**Psychology and Computer Science Practical**	**2**
Practical No.	**Title of the Practical**	**No. of Practical**
Psychology Practical		
1	Social Psychology (T-P Leadership questionnaire, Rosenberg Self-esteem scale, Assertiveness scale, Social Distance Scale, FIRO-B(interpersonal relationship orientation), Sodhi's Attitude Scale, Effect of competition on performance, Thurston's Interest Schedule)	3
2	Developmental Psychology (Adjustment of elderly people, Scholastic aptitude test, Embedded figures test)	2
3	Apperception test	1
4	Practical based on Qualitative Research Method (Survey, Interview, Observation, Projective/Semi Projective Tests)	2
5	Practical based on Quantitative Research Method a. Descriptive Statistics (Mean, Median, Mode, Frequency, Normal distribution, Central Tendency, Hypothesis testing, Probability, T-tests, Chi-Square, Correlation b. Inferential Statistics (Analysis of variance, regression analysis, factor analysis)	3
6	Psychological Testing and Assessment (NEO-FFI/MMPI, WAIS/WISC)	2
Computer Science Practical		
1	HTML Programming – Basic	1
2	HTML Programming - Links and Image	2
3	HTML Programming – Forms	2
4	JavaScript Programming – Basic	1
5	JavaScript Programming - Conditions and Loops	2
6	JavaScript - User Interaction	2
7	PHP Programming – Basic	1
8	PHP Programming - Variables, Conditions, Loops	2
9	PHP Programming - Catching Data from HTML Form	2

B.Sc. (FORENSIC SCIENCE)

Semester III – References

USFS 301: Forensic Science – III

Sr. No.	Reference Books
1	The Forensic Laboratory Handbook procedure and practice Ashraf Mozayani, Carla Noziglia.
2	Crime reconstruction W. Jerry Chisum, Brent E. Turvey.
3	Practical Crime Scene Analysis and Reconstruction Ross M. Gadner and tom Bevel.
4	Fundamental of Forensic Science Max M. Houck and Jay A. Siegel
5	Introduction to Criminalistics Barry A.J. Fisher. WilliamJ.Tilstone.
6	Crime scene to the court the essential of forensic science, Peter White.
7	Technique of crime scene investigation by Barry A J Fisher, David R. Fisher.
8	Crime scene management scene specific methods by Raul Sutton, Keith Trueman.
9	Crime scene investigation by Jaqueline T fish, Larry S. Miller.
10	Henry lee's crime scene Handbook by Henry C Lee.
11	Suspect document, Wilson R. Harrison
12	Scientific examination of questioned documents by Jan Seaman Kelly.
13	Questioned document by Albert S. Osborn.
14	Handwriting Forensic, By Dr. B. R. Sharma.
15	Forensic document examination principle and practices by Katherine M. Koppenhaber.
16	Introduction to Criminalistics by Richard Saferstein.
17	Handwriting and fingerprint analysis in criminal trail and investigation by B L Bansal and Rajiv Raheja
18	Forensic science in criminal investigation and trail by B R Sharma.
19	Forensic Handwriting Identification fundamental concept and principle by Ron N Morris.
20	Advances in fingerprint technology, 2nd edition, Henry C Lee and R E Gaensslen.
21	Fingerprint analysis and understanding, by Mark R Hawthorne.
22	Fingerprint revolutionized with illustration by F Brewster.
23	Firearms and fingerprint by Edward Hueske.
24	Fingerprint identification by SurinderNath.
25	Forensic science and its related issues by V N Sehgal and Surinder Nath

USFS 302 : Chemical Science – III

Sr. No.	Reference Books
1	Organic Chemistry by Morrison and Boyd.
2	Organic Chemistry by John McMurry VthEdn. 1999.
3	Organic Chemistry by Graham Solomans.
4	Organic Chemistry by I.L.FinarVol.II VthEdn.
5	Organic Chemistry, 2nd Edition by Marye Anne Fox, James, K Whitesell
6	Organic Recation Simplicity and Logic by Pierre Laszol
7	Advanced Organic Chemistry Part-A, 5th Edition by Francis A. Cary and Richard J. Sundberg.
8	Vogel's Text book of Practical Organic Chemistry, 5th Edition

USFS 303 : Physical Science – III

Sr. No.	Reference Books
1	Modern Spectroscopy, Fourth Edition, J. Michael Hollas
2	Modern Physics – Concepts and Applications, Sanjiv Puri
3	Practical Approach to Electronic Circuit Design By D. S. Mantri and G.P. Jian.
4	Electronic Principles By Albert Malvino and D. J. Bates.
5	OP-Amp and Linear Integrated Circuits By Ramakant Gaikwad.
6	Electronic Instrumentations By H. C. Kalsi.
7	Measurements, Instrumentation and Experiment Design in Physics and Engineering By Michel Sayer.
9	Digital Electronics by Malnino
10	Digital Electronics by Flloyd
11	Principle of Electronic by V.K. Gupta
12	Engineering Physics by Gaur and Gupta
13	Criminalistics – An Introduction to Forensic Science By Richard Saferstein.
14	Handbook of Firearms and Ballistics Examination and Interpreting Forensic Evidence by Brain J Heard.
15	Firearm in criminal investigation and trials by B.R.Sharma

USFS 304 : Biological Science – III

Sr. No.	Reference Books
1.	Forensic Biology – Richard Li
2.	Practical Skills in Forensic Science – Alan Langford, John Dean et al
3.	Fundamentals of Forensic DNA Typing – John M. Butler
4.	Scientific & Legal Applications of Bloodstain Pattern Interpretation – Stuart H. James Molecular & cell biology by Lodish.
5.	Cell biology by Bruce Alberts
6.	Cell by Cooper
7.	Cell & Molecular biology by Karp
8.	Cell Biology by C.B. Powar
9.	Genetics by Gardner
10.	Genetics by Russel
11.	Genetics by Klug et al
12.	Genetics by Strickberger
13.	Molecular Biology by David Friefilder
14.	Molecular Biology by Clark
15.	Molecular Biology of Gene by Watson
16.	Molecular biology by T.A. Brown
17.	Lehninger Biochemistry by Nelson & Cox
18.	Biochemistry by Stryer
19.	Biochemistry by Zubay
20.	Biochemistry by Satyanarayan
21.	Immunology by Kuby
22.	Immunology by Riott
23.	Immunology by Tizard
24.	Microbiology by Prescott
25.	Microbiology by Tortora
26.	Microbiology by Pelzcar
27.	Microbial forensics-Roger G . Breeze
28.	Forensic medicine-Umadethan
29.	Forensic Anthropology-Angi M christenseng
30.	Forensic entomology, 2ndedtn: Jason H Byrd, James L Castner, CRC press
31.	The science of forensic entomology –David B. Rivers
32.	Forensic entomology-Dorothy Gennard

USFS 305 : Psychology – III

Sr. No.	Reference Books
1	Baron. R.A. , Byrne, D.& Bhardwaj. G (2010).Social Psychology(12thEd).New Delhi: Pearson
2	Deaux.K & Wrightsman, L. (2001).Social Psychology. California: Cole Publishing
3	Misra, G. (1990) .Applied Social Psychology. New Delhi: Sage.
4	Misra, G. (2009). Psychology in India, Volume 4: Theoretical and Methodological Developments (ICSSR survey of advances in research). New Delhi: Pearson.
5	Alcock, J. E., Carment, D. N., Sadava, S.N., Collins, J. E. & Green J. M. (1998). A textbook of social psychology. Scarborough, Canada: PrenticeHall.
6	Aronson, E., Wilson, T. D., & Akert, R. M. (2010). Social Psychology(7thEd.). Upper Saddle River, NJ: Prentice Hall.
7	Taylor,S.E., Peplau,L.A. & Sears,D.O. (2006). Social Psychology (12th Ed). New Delhi: Pearson
8	Baumeister, R. F., & Bushman, B. J. (2008). Social Psychology and Human Nature. International student edition, Thomson Wadsworth USA.
9	Delamater, J. D., & Myers, D. J. (2007). Social Psychology(6^{th} edi.), Thomson.Wadsworth International student edition, USA
10	Franzoi, S. L. (2003). Social Psychology.(3rd ed.). New York McGraw Hill co.
11	Kenrick, D. T., Newberg, S. L., & Cialdini, R. B. (2007). Social Psychology: Goals in Interacton. (4^{th} edi.). Pearson Education Allyn and Bacon, Boston.
12	Aron, A., Aron, E.N., & Coups, E.J. (2007).Statistics for Psychology. (4Th Ed.)India: Pearson Education, Prentice Hall.
13	King, B.M. & Minium, E.W. (2007).Statistical Reasoning in the Behavioral Sciences. (5^{th} Ed.) USA: John Wiley.
14	Coakes, S. J.,Steed, L., & Ong,C. (2009). SPSS: Analysis Without Anguish Using Version 16.0 for Windows.Milton,QLD: Wiley Students Edition.
15	Field, A. (2009). Discovering Statistics using SPSS (3^{rd} Ed).New Delhi :Sage
16	Breakwell, G. M., Hammon, S, Fife-Shaw, C., & Smith, J. (2006). Research methods in psychology (3^{rd} edition). London: Sage.
17	Haslam, S. A., & McGarty, C. (2003). Research methods and statistics in psychology. London: Sage.
18	Aiken, L. R., & Groth-Marnet, G. (2009). Psychological testing and assessment(12^{th} Ed.) New Delhi: Pearson Education.
19	Gregory, R. J. (2005). Psychological testing: History, principles, and applications(5^{th} edition). New Delhi: Pearson Education.
20	Howell, D. C. (2010). Statistical methods for psychology. Belmont: Wadsworth.
21	Kaplan, R. M., & Saccuzzo, D. P. (2005). Psychological testing: Principles, applications and issues. New Delhi: Cengage.
22	Singh, A. K.(2008). Tests, measurement research methods in behavioural sciences. Patna: Bharti Bhawan.

USFS 306 : Computer Science - III

Sr. No.	Reference Books
1	HTML and CSS Design and Build Websites, Jon Duckett, Wiley Publication, ISBN 978-1-118-00818-8
2	Javascript 2.0 - The Complete Reference. Thomas Powell, Mc-Graw Hill Publication,
3	Core PHP Programming, Third Edition, Leon A Tkinson, Prentice Hall PTR, ISBN 0-13-046346-9

Sr. No.	Additional References
1	Computer Networking by Tanenbaum
2	Computer Security Basics by Rick Lehtines
3	Cyber Forensic by Mareculla Menendez
4	Computer Forensic by Newman
5	Data Communication and Networking by Forouzan
6	Network and System Security by John Vacca
7	Security Policies and Implementation Issue by Robert Jahnson
8	Introduction to Computer by Rammohan Joshi
9	Basics of Computer by P. K. Singh
10	Computer Basics by Micheal Miller
11	Internet by John Hamilton
12	The Internet Basics by Jason Whittaker
13	Basic Electronics by V. K. Mehta
14	Digital Electronics by R. K. Jain
15	Introduction to Networking by Charles Severance
16	Python for Informatics – Exploring Information – Version 2.7.2 by Charles Severance

USFS 307 : Law - III

Sr. No.	Reference Book	Referred Units	Referred Pages
1	K. D. Gaur, The Indian Penal Code	Unit I, II and III	1 to 914

Sr. No.	**Additional References**
1	Ratanlal and Dhirajlal, The Indian Penal Code, Wadhwa and Co., New Delhi
2	Justice M. R. Malik, Criminal Manual (Criminal Major Acts), Professional Books Publishers, 2014
3	S.C Sarkar, The Indian Penal Code, Dwivedi Law Agency, New Delhi
4	The Indian Penal Code (Bare Act), Universal Law Publishers Co., New Delhi
5	Batuk Lal, Commentary on The Indian Penal Code, Orient publishing Company, New Delhi

S.Y.B.Sc. (Forensic Science) (Semester IV) Credits
To be implemented from Academic Year 2016-2017

Class	Title	Class Room Instruction Face to Face						50 Hours = 1 Credit				
S.Y. Sem. IV		Per Week		15 Weeks (Per Sem)		Per Sem (Hours)		Notional (Hours)		Credits		Total Credits
		L (50 Min)	P (50 Min)	L	P	L	P	L	P	L	P	
USFS 401	Forensic Science – IV	3		45		36		100		2		2
USFS 402	Chemical Science - IV	3		45		36		100		2		2
USFS 403	Physical Science – IV	3		45		36		100		2		2
USFS 404	Biological Science – IV	3		45		36		100		2		2
USFS 405	Psychology – IV	3		45		36		100		2		2
USFS 406	Computer Science – IV	3		45		36		100		2		2
USFS 407	Environmental Studies	3		45		36		100		2		2
USFS 4P1	Forensic Science and Chemical Science Practical		6		90		72		100		2	2
USFS 4P2	Physical Science and Biological Science Practical		6		90		72		100		2	2
USFS 4P3	Psychology and Computer Science Practical		6		90		72		100		2	2
Total	**--**	**21**	**18**	**315**	**270**	**252**	**216**	**700**	**300**	**14**	**6**	**20**

B.Sc. (FORENSIC SCIENCE)

Semester IV - Theory

Course Code	Title	Credits
USFS 401	**Forensic Science – IV**	**2**
Unit No.	**Contents of Unit**	
Unit I	**Crime Scene Reconstruction (CSR)** 1.1 Role of Police officers, Forensic Scientists and Forensic Pathologists at the Crime Scene 1.2 Resolving Significant Investigative Questions in CSR, Role of Protocol in Reconstruction 1.3 Bloodstain Pattern Analysis to Crime Scene Reconstruction, Reconstruction using Bloodstain Evidences 1.4 Role of Forensic Pathologist/Medico-legal Expert, Body Examination at the Crime Scene, Collection of Biological Fluids, Scene Reconstruction, Medical Autopsy and Examination of Traumatic Injury, Inquest Report by Police. 1.5 Reconstruction of Various Crime Scenes (Vehicular Accidents, Bomb Blast Cases, Arson Cases, Bride Burning Cases) 1.6 Collection of Data: Videography, Photography, Measurements, Analysis of Data 1.7 Writing of CSR Reports, Court Room Testimony	
Unit II	**Impression evidences** 2.1 Poroscopy: Individuality, Variation and Reliability of Pores, Method of Collection and Recording of Pores; Edgeoscopy : Examination and Significance 2.2 Palm prints: Volar pads, Thenar, Eminence, Hypothenar, Longitudinal Crease, Proximal and Distal Transverse Crease 2.3 Gait pattern: Significance and Analysis, Parameters in Gait: Direction Line, Walking Line, Foot Line, Foot Angle, Step Length, Step Breadth, Principle Angle, Examination and Determination of Age, Sex, Stature, Physical State 2.4 Chelioscopy: Significance, Morphology and Anatomy of Lip, Tsuchi-hashi Classification, Methods of Collection and Recording of Lip Print	
Unit III	**Fingerprint Development** 3.1 Fingerprint at Crime Scene: Chance, Patent, Plastic and Latent 3.2 Morphology and Anatomy of Sweat Gland: Eccrine Gland, Sebaceous	

		Gland, Apocrine Gland; Chemical Constituents of Sweat Gland: Water, Inorganic, Organic, Metallic and Drugs etc.
	3.3	Fingerprint Development-Physical Methods: Fingerprint Powders, Luminescent Powders (Fluorescent and Phosphorescent), Metallic Fingerprint powders
	3.4	Chemical Fuming and Enhancement (Iodine Fuming, Iodine Solution Method, Cyanoacrylate, Super Glue, Ninhydrin Method, DFO Method, Silver Nitrate Method)
	3.5	Instrumental (Laser), Digital Finger Print Identification, Automated Fingerprint Identification System
	3.6	Legal Aspects of Fingerprint Evidence and Court Testimony

Course Code	Title	Credits
USFS 402	**Chemical Science – IV**	**2**
Unit No.	**Contents of Unit**	
Unit I	**Introduction to Analytical Chemistry** 1.1 Introduction, chemical analysis, application of chemical analysis 1.2 Sampling : Methods of Sampling, common techniques, instrumental methods, other techniques and factors affecting on choice of methods 1.3 Qualitative Analysis : Introduction, Errors, Accuracy, Precision, methods of expressing accuracy and precision 1.4 Classification of Errors, significant figures and computations, distribution of random errors 1.5 Types of Qualitative Analysis : Macroanalysis, Semimicro analysis, Microanalysis, Ultramicro analysis	
Unit II	**Inorganic Qualitative Analysis** 2.1 Introduction and basic principle 2.2 Common Ion Effect : Introduction, Definition, Applications of common ion effect 2.3 Solubility Product : Introduction, Definition, factor affecting on solubility product and applications of solubility Product 2.4 Buffer Solution : Definition, Types and Applications	
Unit III	**Qualitative and Quantitative Analysis of Organic Compounds** 3.1 Qualitative Analysis : Types of Organic compounds, Characteristic tests and Classification, Reactions of different functional groups, Analysis of binary mixtures. 3.2 Quantitative Analysis : Estimation of C,H,(O) by combustion tube, Detection of Nitrogen, Sulphur, Halogens and Phosphorus by Lassigen's test. 3.3 Estimation of Nitrogen,Sulphur and Phosphate : Estimation of "N" by Duma's, Kjeldahl's Method, estimation of halogens, sulphur and Phosphate by Carious Method. 3.4 Determination of Empirical and Molecular Formula and Numerical Problems	

Course Code	Title	Credits
USFS 403	**Physical Science – IV**	**2**
Unit No.	**Contents of Unit**	
Unit I	**Electronic Circuits** 1.1 Wave form Generators :Working Principle of oscillators, Wave form generators; sine, square, triangular, saw tooth 1.2 Modulation and Demodulation : Introduction to Fourier transform, Amplitude Modulation; Principle, Modulation Index and Percentage modulation, Side-bands and frequency domain, Amplitude modulation circuits, amplitude demodulations. Frequency modulation; Principles, Phase modulations, side-bands modulation Index, Frequency modulations and demodulation circuit, Difference between AM and FM 1.3 Active Filters : Low pass, High pass, Band pass, All pass filters 1.4 Signal Converters **:** ADC, DAC and counters 1.5 Wave Shaping Circuits **:** Wave Clipping, Clamping circuits and Timer circuits	
Unit II	**Ammunitions** 2.1 Rim fire 2.2 Centre fire 2.3 Case less 2.4 Blank ammunition 2.5 Tear gas 2.6 Grenade launcher 2.7 Dummy 2.8 Primer cap types 2.9 Berdan primer 2.10 Boxer primer 2.11 Cartridge cases : Rimless, semi-rimmed, rimmed, belted 2.12 Bullet and its types 2.13 Shotgun ammunition : Shotgun slugs	
Unit III	**Ballistics** 3.1 Introduction to Ballistics 3.2 Types of ballistics : internal, external and terminal Ballistics 3.3 Velocity recoil 3.4 Theory of recoil 3.5 Barrel pressure measurement 3.6 Ballistic coefficient 3.7 Angle of elevation of the barrel	

Course Code	Title	Credits
USFS 404	**Biological Science – IV**	**2**

Unit No.	**Contents of Unit**
Unit I	**Introduction to Forensic Anthropology** 1.1 Analysis of Skeletal Remains 1.2 Forensic Anthropology 1.2.1 Skeletal system and bone formation 1.2.2 Estimation of Age , Sex and race 1.2.3 Estimation of time since death 1.2.4 Human v/s animal bone morphology 1.3 Facial Reconstruction 1.4 Forensic Odontology 1.4.1 Development of Dental structure 1.4.2 Estimation of Age, Sex and Rac 1.4.3 Bitemark Analysis
Unit II	**Microbial Forensics** 2.1 Microbial organisms of forensic significance : *Bacillus athracis, Clostridium botulinum.* 2.2 Understanding Bioterrorism : Types of biological agents – Category A, B, C 2.3 Planning and response to bioterrorism : Preparedness, Biosurveillance, Biodefence 2.4 Epidemiology of Bioterrorism, Punishments for Bioterrorism act under Prevention of Terrorism Act, 2002.
Unit III	**Forensic Entomology** 3.1 Forensic entomology :Introduction, history and development 3.2 Post Mortem Interval : role of entomology in determination of PMI 3.3 Introduction of forensically important insects : Necrophagous Species (Sarcosaprophages {Calliphoridae, Sarcophagidae, Muscidae, and Dermestidae} Coprophages {Scarabaeidae and Muscidae} Dermatophages {Dermestidae, Tineidae.}) Necrophagous Predaceous Species: (Ants (Formicidae), Silphid beetles, Clerid beetles) predaceous Species (Histeridae, Staphylinidae.) Parasitic Species (endoparasitic wasps)

Curse Code	Title	Credits
USFS 405	**Psychology – IV**	**2**

Unit No.	**Contents of Unit**
Unit I	**Domains of Psychology – II** 1.1 Cognitive Psychology- Introduction-Nature, theme and introduction to Cognitive Psychology, mental imagery, verbal learning, language comprehension and production, problem solving, reasoning and decision making 1.2 Individual Differences- Introduction and history of individual difference, Identification and measurement, characteristics of Intelligence tests and its types, emotional quotient, gender differences
Unit II	**Introduction to Forensic Psychology** 2.1 History 2.2 Introduction to Forensic Psychology - Definition, Importance and scope of Forensic Psychology 2.3 Various roles, duties and services provided by Forensic Psychologists 2.4 Risk Assessment within Forensic Psychology. 2.5 Forensic Psychology in India 2.6 Psychological Assessment- Tests which are used in Forensic Psychological Assessment- Aptitude and Achievement Tests, Neuropsychological Tests 2.7 Difference between Forensic Evaluation and Clinical Psychological Assessment.
Unit III	**Psychology of Violence and Sexual Offending** 3.1 Violence- Definition, Nature of Violence- Self directed, Interpersonal, family and community interpersonal and collective 3.2 Types- Physical, Sexual, emotional, psychological, spiritual and cultural. 3.3 Theories of sexual offending 3.4 Working with sexual offenders 3.5 Relationship between sexual offending and mental disorders 3.6 Psychological impacts of violence and sexual offences, Post-traumatic stress disorder, Family violence and victimization.

Course Code	Title	Credits
USFS 406	**Computer Science – IV**	**2**
Unit No.	**Contents of Unit**	
Unit I	**Basic Python Programming** 1.1 Variable, Expression, Statements 1.2 Conditional Execution 1.3 Iterations 1.4 Functions 1.5 Strings	
Unit II	**Advanced Python Programming** 2.1 File Handling 2.2 Dictionaries 2.3 Regular Expressions 2.4 Accessing Web Content	
Unit III	**Introduction to DBMS and SQL** 3.1 Introduction to Database Systems 3.2 Entity Relationship Model, Normalization 3.3 SQL Basics : Statements, Names, Data Types, Null Values, Built in Function. 3.4 Simple Queries : Selecting Columns, Duplicate Rows, Row Selection, Comparison Operators, Sorting Data 3.5 Multi-Table Queries : Simple Joins, Outer Join 3.6 Summary Queries : Column Function, Grouped Queries, Having Clause	

Course Code	Title	Credits
USFS 407	**Environmental Studies**	**2**
Unit No.	**Contents of Unit**	**No. of Lectures**
Unit I	**Multidisciplinary Nature of Environmental Studies** 1.1 Definition 1.2 Scope and importance 1.3 Need for public awareness	2
Unit II	**Natural Resources** 2.1 Renewable and non-renewable resources **:** Natural resources and associated problems 2.1.1 Forest resources : Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people 2.1.2 Water resources : Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. 2.1.3 Mineral resources : Use and exploitation, environmental effects of extracting and using mineral resources, case studies. 2.1.4 Food resources : World food problems, changes caused by agriculture and over-grazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. 2.1.5 Energy resources : Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies. 2.1.6 Land resources : Land as a resource, land degradation, man induced landslides, soil erosion and desertification. 2.2 Role of an individual in conservation of natural resources. 2.3 Equitable use of resources for sustainable lifestyles.	8
Unit III	**Ecosystems** 3.1 Concept of an ecosystem. 3.2 Structure and function of an ecosystem. 3.3 Producers, consumers and decomposers. 3.4 Energy flow in the ecosystem. 3.5 Ecological succession. 3.6 Food chains, food webs and ecological pyramids. 3.7 Introduction, types, characteristic features, structure and function of the following ecosystems : 3.7.1 Forest ecosystem	6

	3.7.2 Grassland ecosystem 3.7.3 Desert ecosystem 3.7.4 Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)	
Unit IV	**Biodiversity and its conservation** 4.1 Introduction - Definition : genetic, species and ecosystem diversity. 4.2 Biogeographical classification of India 4.3 Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values 4.4 Biodiversity at global, National and local levels. 4.5 Inida as a mega-diversity nation 4.6 Hot-sports of biodiversity. 4.7 Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts. 4.8 Endangered and endemic species of India 4.9 Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity.	8
Unit V	**Environmental Pollution** 5.1 Definition 5.2 Cause, effects and control measures of : 5.2.1 Air pollution 5.2.2 Water pollution 5.2.3 Soil pollution 5.2.4 Marine pollution 5.2.5 Noise pollution 5.2.6 Thermal pollution 5.2.7 Nuclear hazards 5.3 Solid waste Management : Causes, effects and control measures of urban and industrial wastes. 5.4 Role of an individual in prevention of pollution. 5.5 Pollution case studies. 5.6 Disaster Management : floods, earthquake, cyclone and landslides.	8
Unit VI	**Social Issues and the Environment** 6.1 From Unsustainable to Sustainable development 6.2 Urban problems related to energy 6.3 Water conservation, rain water harvesting, watershed management 6.4 Resettlement and rahabilitation of people; its problems and concerns. Case Studies 6.5 Environmental ethics : Issues and possible solutions. 6.6 Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies. 6.7 Wasteland reclamation. 6.8 Consumerism and waste products. 6.9 Environment Protection Act.	7

	6.10 Air (Prevention and Control of Pollution) Act. 6.11 Water (Prevention and control of Pollution) Act 6.12 Wildlife Protection Act 6.13 Forest Conservation Act 6.14 Issues involved in enforcement of environmental legislation. 6.15 Public awareness.	
Unit VII	**Human Population and the Environment** 7.1 Population growth, variation among nations. 7.2 Population explosion - Family Welfare Programme. 7.3 Environment and human health. 7.4 Human Rights. 7.5 Value Education. 7.6 HIV/AIDS. 7.7 Women and Child Welfare. 7.8 Role of Information Technology in Environment and human health. 7.9 Case Studies.	6
Unit VIII	**Field work** 8.1 Visit to a local area to document environmental assets river/forest/grassland/hill/mountain 8.2 Visit to a local polluted site Urban/Rural/Industrial/Agricultural 8.3 Study of common plants, insects, birds. 8.4 Study of simple ecosystems-pond, river, hill slopes, etc. (Field work Equal to 5 lecture hours)	**5**

B.Sc. (FORENSIC SCIENCE)

Semester IV – Practical

Note : Every Department is advised to arrange maximum number of experiments from list provided or experiments based on theory syllabus having forensic relevance. However, minimum seven experiments should be reported in journal for the purpose of certification.

Course Code	Title	Credits
USFS 4P1	**Forensic Science and Chemical Science Practical**	**2**
Practical No.	**Title of the Practical**	**No. of Practicals**
Forensic Science Practical		
1	Reconstruction of Crime Scene Based on Case Studies	1
2	Examination of Blood Stain Patterns	1
3	Development of Fingerprint using Physical Methods	1
4	Development of Fingerprint using Iodine/Ninhydrin/Silver Nitrate/Cyanoacrylate Methods	1
5	Examination of Plastic Prints	1
6	Photography of Fingerprints	1
7	Examination of Lip Prints	1
8	Gait Pattern Analysis	1
9	Tracing Bare Foot Print using Transparent Plastic Sheet	1
10	Casting of Footwear using POP	1
11	Study the Effect of Various Conditions on Latent Prints and their Development	1
Chemical Science Practical		
1	Estimation of Ca and Mg in dolamite ore	1
2	Talcum powder analysis	1
3	Estimation of strength of sodium thiosulfate by iodometryusing starch indicator	1
4	Permangnetometry :To determine the strength of commercial hydrogen peroxide using $KMnO_4$ as an oxidant	1
5	Dichromatometry : Simultaneous estimation of Fe(II) and Fe(III) in a solution using $K_2Cr_2O_7$ as an oxidant	1
6	Iodimetry :To estimate the amount of Vitamin-C in a given Vitamin-C tablet (Celin)	1
7	Iodometry : a. To estimate the amount of Cu(II) present in the given solution of $CuSO_4$ b. To determine the available chlorine in the commercial sample of bleaching powder.	2
8	Complexometry : To determine the amount of Ca(II) present in the commercial milk powder using EDTA as a chelating titrant.	1

9	Gravimetry : a. To determine the amount of Ni present in the sample of steel as $[Ni(DMG)_2]$ b. To determine the amount of Pb present in the sample of solder alloy as $PbCrO_4$.	2
10	Colorimetry :To determine the amount of Iron present in an Iron tablet, Fefol, using SCN^- as complexing agent	1
11	Solubility measurements : To determine the solubility of Benzoic acid in water at room temperature, by alkalimetry	1
12	To estimate the acid neutralising capacity of an antacid (tablet/syrup) using standard alkali solution	1
13	To estimate the amount of aniline or its derivative by bromination followed by iodometry	1
14	To determine the molecular weight of the given organic compound by Rast's Camphor method by exploiting depression in freezing point of camphor	1

Course Code	Title	Credits
USFS 4P2	**Physical Science and Biological Science Practical**	**2**
Practical No.	**Title of the Practical**	**No. of Practical's**
Physical Science Practical		
1	Classification and measurements of bullets	1
2	Waveform generator	1
3	Study of AM modulation	1
4	Study of FM modulation	1
5	Study of low pass Active filters	1
6	Study of High pass Active filters	1
7	Analog to Digital Convertor	1
8	Digital to Analog Convertor	1
9	Wave clipping using diodes	1
10	Wave Clamping using diodes	1
Biological Science Practical		
1	Determination of age from skull sutures	1
2	Determination of sex from skull	1
3	Determination of sex from Pelvis	1
4	Determination of age from dentition	1
5	DNA extraction from microbial source	1
6	Isolation of microorganisms of forensic significance using Plating techniques	1
7	Collection ,packaging and preservation of entomological evidence	3
8	Identification of orders of insects and other arthropods of forensic significance	1
9	Mounting of mouth parts & legs of Insects of forensic importance	1

Course Code	Title	Credits
USFS 4P3	**Psychology and Computer Science Practical**	**2**
Practical No.	**Title of the Practical**	**No. of Practical**
Psychology Practical		
1	Cognitive Psychology (Memory process, Test on creativity, Strategies in Problem Solving/Nine Dot Problem)	3
2	Correlation Coefficient on Raven's Standard Progressive Matrices (SPM) and Abstract Reasoning (AR)	3
3	Emotional Intelligence Test	1
4	Bhatia's Battery of Intelligence	1
5	Kohs Block test	1
6	Reaction Time	1
7	Aggression test- C.G.Pati	1
8	Medico Psychological Questionnaire- J.Bharatraj	1
Computer Science Practical		
1	Python Programming – Basic	1
2	Python Programming - Simple Arithmetic	1
3	Python Programming - Conditions, Loops	2
4	Python Programming - File Handling	2
5	Python Programming - Web Content Accessing	1
6	Python Programming - Use of Regular Expressions	2
7	SQL – DDL and DML	2
8	SQL – Select	1
9	SQL - Advanced	3

B.Sc. (FORENSIC SCIENCE)

Semester IV – References

USFS 401: Forensic Science – IV

Sr. No.	Reference Books
1	The Forensic Laboratory Handbook procedure and practice Ashraf Mozayani, Carla Noziglia.
2	Crime reconstruction W. Jerry Chisum, Brent E. Turvey.
3	Practical Crime Scene Analysis and Reconstruction Ross M. Gadner and tom Bevel.
4	Fundamental of Forensic Science Max M. Houck and Jay A. Siegel
5	Introduction to Criminalistics Barry A.J. Fisher. WilliamJ.Tilstone.
6	Crime scene to the court the essential of forensic science, Peter White.
7	Technique of crime scene investigation by Barry A J Fisher, David R. Fisher.
8	Crime scene management scene specific methods by Raul Sutton, Keith Trueman.
9	Crime scene investigation by Jaqueline T fish, Larry S. Miller.
10	Henry lee's crime scene Handbook by Henry C Lee.
11	Suspect document, Wilson R. Harrison
12	Scientific examination of questioned documents by Jan Seaman Kelly.
13	Questioned document by Albert S. Osborn.
14	Handwriting Forensic, By Dr. B. R. Sharma.
15	Forensic document examination principle and practices by Katherine M. Koppenhaber.
16	Introduction to Criminalistics by Richard Saferstein.
17	Handwriting and fingerprint analysis in criminal trail and investigation by B L Bansal and Rajiv Raheja
18	Forensic science in criminal investigation and trail by B R Sharma.
19	Forensic Handwriting Identification fundamental concept and principle by Ron N Morris.
20	Advances in fingerprint technology, 2nd edition, Henry C Lee and R E Gaensslen.
21	Fingerprint analysis and understanding, by Mark R Hawthorne.
22	Fingerprint revolutionized with illustration by F Brewster.
23	Firearms and fingerprint by Edward Hueske.
24	Fingerprint identification by SurinderNath.
25	Forensic science and its related issues by V N Sehgal and Surinder Nath
26	Forensic medicine and jurisprudence by S K Singhal
27	The Essentials of Forensic Medicine and Toxicology – Dr. KSN Reddy

USFS 402 : Chemical Science – IV

Sr. No.	Reference Books
1	Vogel's Text book of Quantitative Analysis sixth edition.
2	Text book of Macro and Semi micro Qualitative Analysis by A.J.Vogel,fifth edition.
3	Analytical Chemistry by G.D.Christian, sixth edition.
4	Quantitative Organic Analysis ,fourth edition A.J.Vogel,ELBS.
5	Analytical Chemistry by Skoog.
6	Instrumental Methods of Chemical Analysis- 6th edition Willard, Merritt, Dean and Settle
7	Analytical Chemistry by PCB's, 2nd Edition, Mitchell D. Erickson
8	Analytical Chemistry for Technicians, 3rd Edition, John Kenkel
9	Vogel's Qualitative Ingorganic Analysis, 7th Edition

USFS 403 : Physical Science – IV

Sr. No.	Reference Books
1	Principle of Electronics by V.K. Gupta
2	Digital Electronics by Malnino
3	Digital Electronics by Flloyd
4	Handbook of Firearms and Ballistics Examination and Interpreting Forensic Evidence by Brain J Heard
5	Firearms by B.R.Sharma

USFS 404 : Biological Science – IV

Sr. No.	Reference Books
1	Forensic Biology – Richard Li
2	Practical Skills in Forensic Science – Alan Langford, John Dean et al
3	Fundamentals of Forensic DNA Typing – John M. Butler
4	Scientific & Legal Applications of Bloodstain Pattern Interpretation – Stuart H. James Molecular & cell biology by Lodish.
5	Cell biology by Bruce Alberts
6	Cell by Cooper
7	Cell & Molecular biology by Karp
8	Cell Biology by C.B. Powar
9	Genetics by Gardner
10	Genetics by Russel
11	Genetics by Klug et al
12	Genetics by Strickberger
13	Molecular Biology by David Friefilder
14	Molecular Biology by Clark
15	Molecular Biology of Gene by Watson
16	Molecular biology by T.A. Brown
17	Lehninger Biochemistry by Nelson & Cox
18	Biochemistry by Stryer
19	Biochemistry by Zubay
20	Biochemistry by Satyanarayan
21	Immunology by Kuby
22	Immunology by Riott
23	Immunology by Tizard
24	Microbiology by Prescott
25	Microbiology by Tortora
26	Microbiology by Pelzcar
27	Microbial forensics-Roger G . Breeze
28	Forensic medicine-Umadethan
29	Forensic Anthropology-Angi M christenseng
30	Forensic entomology, 2ndedtn: Jason H Byrd, James L Castner, CRC press
31	The science of forensic entomology –David B. Rivers
32	Forensic entomology-Dorothy Gennard

USFS 405 : Psychology – IV

Sr. No.	Reference Books
1	Matlin, M.W. (2008). Cognition(7th Ed.). CA: John Wiley & Sons.
2	Riegler, B. R., & Riegler, G. R. (2008). Cognitive psychology Applying the science of the mind (2nd Ed.). New Delhi: Dorling Kindersley
3	Sternberg, R. J. (2009). Cognitive psychology(4th Ed.). Wadworth, Cengage Learning
4	Solso, R L. (2004). Cognitive psychology(6th Ed). New Delhi: Pearson Education
5	Schiffman, H.R. (2000). Sensation and perception: An integrated approach. New York: John Wiley
6	Bartol, C. & Bartol, A., (2001). Introduction to Forensic Psychology, Research and Application 3rdEdition
7	Bartol, C. & Bartol, A., (2008). Current Perspectives in Forensic Psychology and Criminal Behavior
8	Blackburn, R., (1993) The psychology of criminal conduct: Theory research and practice.Chichester: Wiley & Sons
9	Dhanda, A. (2000) Legal order and mental disorder. New Delhi: Sage
10	Harari, L. (1981) Forensic psychology. London: Batsford Academic.
11	Clark, H.H., & Chase, W.G.(1972) on the process of sentences against pictures. Cognitive Psychology,3, 472-571
12	Galotti, K.M.(2004) Cognitive Psychology: In and out of the laboratory. (3rd ed.) Wadsworth/ Thomson Learning.
13	Underwood. B.J.(1968). Experimental Psychology: An Introduction. NewYork: Appleton Century Croft Ltd.
14	Anastasi, A.& Urbina, S. (1997) Psychological Testing(7th ed.) International edition, Prentice Hall International, Inc.
15	Garret, H.E. (1973). Statistics in Psychology and Education. (6th ed.) Bombay: Vakils, Feffer and Simons Pvt.Ltd.
16	Surprenant, A.M., Francis, G., & Neath, I.(2005) . Cog lab Reader. Thomson Wadsworth
17	Criminology by Larry Siegel
18	Handbook of Forensic Psychology by Dr. Vimala Veerraghavan
19	Van Hasselt, V.B & Herson, M. (Eds). (2000). Aggression and Violence:An introductory Text. Needham Heights, MA:Allyn & Bacon

USFS 406 : Computer Science - IV

Sr. No.	Reference Books
1	Python for Informatics, Charles Severance, //Open source creative license.
2	SQL the Complete Reference, Third Edition, James R . Groff, Mc-Graw Hill Publications

Sr. No.	Additional References
1	HTML and CSS Design and Build Websites by John Duckett
2	Introduction to Networking by Charles Severance
3	Computer Networking by Tanenbaum
4	Computer Security Basics by Rick Lehtines
5	Cyber Forensic by Mareculla Menendez
6	Computer Forensic by Newman
7	Data Communication and Networking by Forouzan
8	Network and System Security by John Vacca
9	Security Policies and Implementation Issue by Robert Jahnson
10	Introduction to Computer by Rammohan Joshi
11	Basics of Computer by P. K. Singh
12	Computer Basics by Micheal Miller
13	Internet by John Hamilton
14	The Internet Basics by Jason Whittaker
15	Basic Electronics by V. K. Mehta
16	Digital Electronics by R. K. Jain

USFS 407 : Environmental Studies

Sr. No.	Reference Book	Referred Units	Referred Pages
1	(eBook) - Text Book for Environmental Studies for Undergraduate Courses of All Branches of Higher Education, Erach Bharucha for University Grant Commission	I toVIII	1 to 270