



B.Sc.

BIOCHEMISTRY

Curriculum and Syllabus

(Based on Choice Based Credit System)

Effective from the Academic year

2018-2019

Department of Biochemistry

School of Life Sciences

B.Sc. BIOCHEMISTRY
REGULATIONS

VELS INSTITUTE OF SCIENCE TECHNOLOGY AND ADVANCED STUDIES

B. Sc BIOCHEMISTRY

UNDER GRADUATE DEGREE COURSE

REGULATIONS

(Effective from the Academic Year 2018-19)

1. ELIGIBILITY FOR ADMISSION

Candidates for admission to the first year B.Sc. Biochemistry degree course shall be required to have passed the higher secondary examination with one of the subjects as Biology or Zoology/ botany/biochemistry or other examinations accepted as equivalent there to by the syndicate, subject to such other conditions as may be prescribed therefore.

2. ELIGIBILITY FOR AWARD OF THE DEGREE

A candidate shall be eligible for the award of the Degree only if he/ she has undergone the prescribed course of study in the University for a period of not less than three academic years, passed the examinations of all the six semesters prescribed earning 120 credits and fulfilled such conditions as have been prescribed therefore.

3. DURATION

a) Each academic year shall be divided into two semesters. The first academic year shall comprise the first and second semesters, the second academic year the third and fourth semesters and the third academic year the fifth and sixth semesters respectively.

b) The odd semesters shall consist of the period from July to November of each year and the even semesters from January to May of each year. There shall be not less than 90 working days for each semester.

4. ATTENDANCE

Students coming late will not be given attendance. Attendance is recorded for each hour separately. One hour of absence for each session is considered as being absent for the entire session. No student is permitted to absent himself/herself without prior sanction of leave. If a student absent himself/herself for a week without leave, his/her name will be removed from the rolls. He/She has to get permission for re-admission after furnishing valid reasons.

Students appearing for the university examinations must have a minimum of 75 % attendance, failing which they will not be permitted to write the examinations. However, the University may condone the attendance shortage of 10 % after collecting a condonation fee from the students who have secured 65 to 74 % of attendance.

5. COURSE OF STUDY

The Main Subject of study for Bachelor Degree shall consist of the following.

[1] FOUNDATION COURSES: the course shall comprise the study of:

(a) PART –I Tamil or any other Modern (Indian or Foreign) or Classical Languages;

(b) PART- II English

[2] CORE COURSES consisting of Main Subjects and Practicals,

[3] ELECTIVE COURSES consisting of (a) Discipline Specific Electives (b) Generic Electives (c) Skill Enhancement Electives related to the Main Subject of Study and (d) Practicals, etc., (if any). Course structure is furnished at the end of the regulations.

6. COMPULSORY EXTENSION SERVICE

A candidate shall be awarded a maximum of 2 credits for Compulsory Extension Service. All the students shall have to enroll for NSS//NSO (Sports & Games) Rotaract/ Youth Red Cross or any other service organizations in the University and shall have to put in compulsory minimum attendance of 20 hours in any one semester which shall be duly certified by the Head of the Department before the end of that semester. If a student lacks 20 hours attendance in one semester, he/ she shall have to compensate the same during the subsequent years.

7. SCHEME OF EXAMINATION

The University follows semester pattern with Credit Based Semester System (CBSS). The Under-graduate course is for six semesters. The students have to earn minimum credits assigned by the Board of Studies to become eligible for the award of the degree.

For the students admitted from the academic year 2015-2016, the components of Continuous assessment and semester end examination marks are 40% and 60% respectively.

A passing minimum mark in continuous assessment is not necessary to get a pass. The statement of marks will be issued to the students on par with International Standard incorporating Weighted Average Marks (WAM) and Grade Point Average (GPA) for each semester.

Registration for exams - All candidates shall register their names for the first semester examinations and will be permitted to proceed up to final year irrespective of their failure in any of the semester examinations. The candidates should register for all the arrear subjects of earlier semesters along with the current semester subjects.

Practical examination -Practical examinations will be conducted at the end of the respective semesters.

8. INTERNAL ASSESSMENT

The revised break-up marks of continuous assessment as applicable to UG course has been shown as below

S.No.	Test Component	UG
1.	Three C.A. class tests	15 (3x5)
2.	Assignment/Class Seminar	05
3.	Model Examinations	05
4.	Attendance	05
5.	Aptitude of the student	05
6.	Student's assessment by the Faculty	05

9. DISTRIBUTION OF MARKS FOR ATTENDANCE

S.No.	Percentage of Attendance	Marks
1.	91 % to 100 %	05
2.	75 % to 90 %	04
3.	65 % to 74 %	03
4.	Less than 65 %	00

10. REVALUATION OF ANSWER SCRIPTS

Revaluation of answer scripts for the current semester is permissible. The students have to apply for revaluation in the prescribed format within 10 days from the date of publication of results along with prescribed fee.

11. SUPPLEMENTARY EXAMINATION

A supplementary examination will be conducted during the month of July/August for Final semester students who have failed in one or two subjects so as to enable the students to qualify for the course to get their degree instead of waiting for another six months (i.e., till December) to appear for the failed subjects.

12. REQUIREMENTS FOR PROCEEDING TO SUBSEQUENT SEMESTER

Candidates shall register their names for the First Semester Examination after the admission in the UG Courses.

Candidates shall be permitted to proceed from the First Semester upto Final Semester irrespective of their failure in any of the Semester Examinations subject to the condition that the candidates should register for all the arrear subject of earlier semesters along with current (subsequent) semester subjects.

Candidates shall be eligible to go to subsequent semester, only if they earn sufficient attendance as prescribed therefore by the Board of Management from time to time, provided in case of a candidate earning less than 50% of attendance in any one of the semester due to any extraordinary circumstance such as medical grounds, such candidates who shall produce Medical Certificate issued by the Authorized Medical Attendant (AMA), duly certified by the Dean/Director & Head of the Department, shall be permitted to proceed to the next semester and to complete the Course of Study. Such candidates shall have to repeat the missed Semester by rejoining after completion of Final Semester of the Course, after paying the fee for the break of study as prescribed by the University from time to time.

13. CLASSIFICATION OF SUCCESSFUL CANDIDATES

Successful candidates passing the examinations and securing marks (i) 60 percent and above and (ii) 50 percent and above but below 60 percent in the aggregate shall be declared to have passed the examination in the FIRST and SECOND Class, respectively. All other successful candidates shall be declared to have passed the examination in THIRD Class.

14. RANKING

Candidates who pass all the subjects as prescribed for the Course in the FIRST APPEARANCE ITSELF ALONE are only eligible for Classification / Distinction.

15. TRANSITORY PROVISION

Candidates who have undergone the course of study prior to the academic year will be permitted to appear for the examinations under those Regulations for a period of TWO years. Thereafter, they will be permitted to appear for the examination only under the regulations then in force.

**B.Sc (BIOCHEMISTRY)
CURRICULUM**

Total Credits - 140

CATEGORY	TITLE OF THE PAPER	Hours / Week			CREDITS
		L	T	P	
LANG	Tamil I / Hindi I/French I	5	0	0	5
ENG	English I	5	0	0	5
CORE	Biomoleules I	6	0	0	5
CORE	Nutritional Biochemistry	6	0	0	4
CORE	Practical I- Qualitative Analysis of Biomoleules	0	0	4	2
CORE	Practical II- Nutritional Biochemistry	0	0	4	2
CORE	TOTAL	22	0	8	23
LANG	Tamil II / Hindi II/French II	5	0	0	5
ENG	English II	5	0	0	5
CORE	Biomoleules II	6	0	0	5
CORE	Biochemical Techniques	6	0	0	4
CORE	Practical – III Biochemical Preparation Techniques	0	0	4	2
CORE	Practical – IV – Biochemical Separation Techniques	0	0	4	2
	TOTAL	22	0	8	23
LANG	Tamil III / Hindi III/French III	5	0	0	5
ENG	English III	5	0	0	5
CORE	Enzymes & Intermediary Metabolism – I	5	0	0	4
CORE	Clinical Biochemistry I	5	0	0	4

CORE	Practical V - Hematology	0	0	4	2
CORE	Practical VI – Enzymology and Clinical Biochemistry I	0	0	4	2
SEC	Soft Skills - I	2	0	0	2
	TOTAL	22	0	8	24
LANG	Tamil IV / Hindi IV / French IV	5	0	0	5
ENG	English IV	5	0	0	5
CORE	Enzymes & Intermediary Metabolism - II	5	0	0	4
CORE	Clinical Biochemistry - II	5	0	0	4
CORE	PRACTICAL VII- Enzymology and Clinical Biochemistry II	0	0	6	3
AECC	Environmental Studies	2	0	0	1
SEC	Soft Skills - II	2	0	0	2
	TOTAL	24	-	6	24
DSE	Discipline Specific Elective I	6	0	0	5
DSE	Discipline Specific Elective II	6	0	0	5
DSE	Discipline Specific Elective III	6	0	0	5
DSE	PRACTICAL VIII –DSE	0	0	6	3
GE	Generic Elective I	4	0	0	3
SEC	NSS	2	0	0	2
	TOTAL	23	0	6	23
DSE	Discipline Specific Elective IV	6	0	0	6

DSE	Discipline Specific Elective V	6	0	0	6
GE	Generic Elective II	4	0	0	3
SEC/VAC	-	2	0	0	2
DE	Project Work	0	0	12	6
	TOTAL	18	0	12	23
					140

List of Electives

List of Discipline Specific Electives

1. Microbiology& Immunology
2. Clinical Nutrition
3. Basics of Molecular Biology
4. Biotechnology
5. Nutrition and Health
6. Essentials of Endocrinology
7. Lifestyle diseases
8. Developmental Biology
9. Cancer Biology
10. Physiology

List of Generic Electives

1. Introduction to Bioinformatics
2. Principles of Genetics
3. Statistics
4. Pathological Basis of Diseases
5. Natural Resources Management
6. Intellectual Property Rights
7. Herbal Technology
8. Pharmacology
9. Disaster Management
10. Consumer Affairs

List of Skill Enhancing Courses

1. Soft Skills I
2. Soft Skills II
3. NSS
4. Entrepreneurship Development
5. Medical Lab Diagnostics
6. Techniques in Forensic Science

SYLLABUS
CORE COURSES

Course Objective

Biomolecules is to study about the structure and biological function of molecule, that is present in living organisms, including large macromolecules such as proteins, polysaccharides, lipids, and nucleic acids, as well as small molecules such as primary metabolites, secondary metabolites, and natural products.

UNIT I

Classification of carbohydrates, stereoisomerism and optical isomerism of Sugars, anomeric forms and mutarotation. Occurrence, structure and biological importance of mono, di and polysaccharides. Reactions of carbohydrates due to the presence of hydroxyl group, aldehyde and ketone groups (18 hrs).

UNIT II

Structure, function and biological importance of important carbohydrate derivatives-chitin, pectin, heparin, proteoglycans, sialic acids, blood group polysaccharides. Bacterial cell wall polysaccharides, Glycoproteins (18 hrs).

UNIT III

Classification and structures of amino acids. Physical and chemical properties of amino acids. Essential and non-essential amino acids. Non protein amino acids.

Proteins-Classification based on solubility, shape, composition and function. Properties of proteins. Denaturation and renaturation of proteins. Structure of peptide bond. Isolation and Purification of Proteins (18 hrs).

UNIT IV

Protein structure-Primary, secondary, tertiary and quaternary (helix and pleated sheet) structures of protein. Forces stabilizing the secondary, tertiary and quaternary structures of proteins. Chemical synthesis of polypeptides-solid phase peptide synthesis. Determination of the amino acid sequence of a polypeptide chain. Biologically important peptides-structure and functions (18 hrs).

UNIT V

Vitamins-Fat soluble and water soluble vitamins-structure and function. Coenzymes and their structures.

Antibiotics-Structure and functions of Penicillin, Streptomycin and Chloromycetin (18 hrs).

Recommended books

1. Text book of Biochemistry-West & Todd.
2. Text book of Biochemistry-A. Lehninger.
3. Chemistry of natural products-Chatwal.
4. Text book of Biochemistry-O.P. Agarwal.
5. Text book of Biochemistry-Jain.
6. Hand book of Biochemistry-Sathynarayana

NUTRITIONAL BIOCHEMISTRY

6 0 0 4

Course objectives

To get a knowledge of diet and nutrition for normal persons, patients and special cases. Students should also aware about the categories and significance of various forms of foods.

Unit 1 Basic concepts of Nutrition (12)

Introduction and history of nutrition, relation between good nutrition and health, Concepts of malnutrition (Kwashiorkar and marasmus) and over nutrition with examples, Methods of assessing nutritional status, Anthropometric measurements and indices – linear measurement, height, weight, head, chest and mid upper arm circumference.

Unit 2 Food (12)

Food Groups: Definition and Functions of food – physiological functions of foods, ICMR Five food Groups and its significance, Food Pyramid.

Unit 3 Energy (12)

Definition, energy value of food, Basal metabolism, Energy cost of physical activities, BMR unit, Factors affecting BMR, RQ, SDA, Thermic effect of food, Estimation of total energy needs, Energy balance.

Unit 4 Nutrition Deficiency Disorders (12)

Clinical signs of nutritional deficiency disorders, Methods of assessing nutritional deficiency disorder – Biophysical method , Biochemical test, Indirect method – Vital statistics, Assessment of socio economic status, diet survey

Unit 5 Macro and Micromolecules (12)

Definition, classification and food sources of carbohydrate, protein, lipid, fibre. Minerals and Vitamins - Functions, food sources, requirements and effects of deficiency. Water – Distribution in body, functions, requirement, Dehydration - Causes, effects and prevention,

Total : 60 hours

Text Books

1. Swaminathan, Advanced Textbooks of food and Nutrition, Vol 1, 2, BAPPCO Press, 2005
2. Viswanath Sardesai, Introduction to Clinical nutrition, 3rd edition, 2011

Reference Books

1. Geissler C, Powers H. Human Nutrition. Edinburgh: Elsevier Churchill Livingstone, 2010.
2. Roach, J.O. and Benyon, S, Crash course - Metabolism and Nutrition, London: Mosby, 2003
3. Payner and barker, Advancing Dietetics and Clinical Nutrition, 1st edition, 2010.

PRACTICAL – I QUALITATIVE ANALYSIS OF BIOMOLECULES

0 0 4 2

Course objectives

This course is concerned with basic lab skills. These skills include the accurate use of pipettes, making solutions, and safety measurements along with the identification of biomolecules such as carbohydrates, proteins and aminoacids by suitable tests.

1. Qualitative analysis of monosaccharides – aldoses
2. Qualitative analysis of monosaccharides – ketoses
3. Qualitative analysis of reducing disaccharides
4. Qualitative analysis of non-reducing disaccharides
5. Qualitative analysis of polysaccharides
6. Qualitative analysis of pentoses
7. Qualitative analysis of aromatic amino acids
8. Qualitative analysis of sulphur containing amino acids
9. Qualitative analysis of basic amino acids
10. General colour reactions of protein
11. Denaturation and precipitation of proteins
12. Hydrolysis of proteins and colour reactions of hydrolysate

Text Books

- 1 J. Jayaraman, Laboratory Manual in Biochemistry. New Age International Publishers. 2011.
- 2 [S. Sadasivam](#), [A. Manickam](#), Biochemical Methods. New age publishers. 2009.

Reference Books

- 1 Harold Varley, Practical Clinical Biochemistry, CBS. 6 edition, 2006.
- 2 S. K. Sawhney, Randhir Singh, Introductory Practical Biochemistry. Alpha Science International, Ltd. 2 edition, 2005.

Course objectives

The goal of this course is to develop laboratory skills required for modern biochemical and molecular studies of nutrition and its role in health and disease. This includes the quantitative analysis and interpretation of results. It is also useful to develop core skills that prepare students for a career in laboratory-based research in the biomedical sciences.

1. Determination of ash content of food sample
2. Determination of moisture content of food sample
3. Determination of carbohydrate by anthrone method
4. Determination of protein by Lowry method
5. Determination of lipid from plant source
6. Estimation of amino acids by Ninhydrin method
7. Estimation of inorganic phosphorous
8. Determination of iron content from dates
9. Estimation of Vitamin A from plant source
10. Estimation of Vitamin E from plant source
11. Estimation of Vitamin C from plant source
12. Estimation of nucleic acids-DNA/ RNA from tubers

Text Books

1. J.Jayaraman, Laboratory Manual in Biochemistry. New Age International Pvt Ltd Publishers. 2011 (Paperback).
2. [S. Sadasivam](#), [A. Manickam](#), Biochemical Methods. New age publishers. 2009 (paperback).
3. S. K. Sawhney, Randhir Singh, Introductory Practical Biochemistry. Alpha Science International, Ltd. 2nd edition, 2005.

Reference Books

1. Harold Varley, Practical Clinical Biochemistry, CBS. 6th edition, 2006.
2. Hans Bisswanger, Practical Enzymology. Wiley VCH. 2nd Edition, 2011.
3. Robert Eisenthal, Enzyme Assays: A Practical Approach (Practical Approach Series). Oxford University Press, U.S.A. 2nd edition, 2002.

BIOMOLECULES – II

6005

Course Objective

Biomolecules is to study about the structure and biological function of molecule, that is present in living organisms, including large macromolecules such as proteins, polysaccharides, lipids, and nucleic acids, as well as small molecules such as primary metabolites, secondary metabolites, and natural products.

UNIT I

Definition and classification of lipids. Fatty acids - classification, nomenclature, structure and properties. Classification, structure and function of prostaglandins, triacylglycerols. Chemical properties of fats - iodine value, Sap value, acid number, Rancidity, Rm value (18 hrs)

UNIT II

Chemical properties and functions of phospholipids and their structures. Lecithins, cephalins, phosphatidyl serine, phosphatidyl inositol, plasmalogens, glycolipids (cerebrosides and gangliosides), isoprenoids and sterols (cholesterol and zymosterol), steroids (steroid hormones, bile acids and bile salts). Biological significance of fats. (18 hrs)

UNIT III

Nature of genetic material. Isolation of RNA and DNA. Composition of RNA and DNA. Structure of purine and pyrimidines, nucleosides and nucleotides (18 hrs).

UNIT IV

Size and structure of different types of DNA-A, B, Z types of DNA. Structure and role of different types of RNA. Properties of nucleic acids. (18 hrs).

UNIT V

Hetero cyclic rings of biologically important compounds. Structure and biological importance of pyridine, pyrrole, quinoline, pyrimidine, purine, pteridine, thiazole, imidazole and indole ring containing compounds. Porphyrin - structure and biologically important compounds containing porphyrin ring, bile pigments - structure and biological importance (18 hrs).

Recommended books

1. The Biochemistry of nucleic acids - R.L. Adam and others.
2. Text book of biochemistry - West and Todd.
3. Text book of biochemistry - O. P. Agarwal..
4. Text book of biochemistry – Jain.
5. Principles of biochemistry – Lehninger.
6. Text book of biochemistry - Sathya Narayana.

Course objectives

Advanced instrumental techniques are used to understand the theoretical principles involved in Bioinstrumentation which may be used for the determination of nutrients, major ions and trace elements, biological samples together with the analytical techniques. Some of these techniques are particularly useful for the detailed analysis of recent methodologies used in the chemical analysis of biota as discussed in the chapter.

Unit I Homogenisation and Centrifugation (12)

Buffers – pH, pOH, examples of buffers. Methods of cell disruption and tissue homogenization: mechanical (homogenizer, sonicator, French press) and non-mechanical methods (physical, chemical and enzymatic methods). Principle and applications of centrifugation techniques- differential, density gradient and Ultra-centrifugation.

Unit II Chromatography (12)

Introduction to chromatography. Principle and applications of chromatographic techniques- paper, thin layer, gel filtration, ion- exchange, affinity chromatography, GLC and HPLC.

Unit III Electrophoresis and Electrochemical Techniques (12)

Electrophoresis- principles and applications of paper, polyacrylamide (native and SDS) and agarose gel electrophoresis.

Principles of electrochemical techniques. Glass electrode, Hydrogen electrode and Oxygen electrode - principle, instrumentation and its applications.

Unit IV Spectroscopy (12)

Colorimetry and Spectrophotometry- Laws of light absorption- Beer-Lambert law. Principle, Instrumentation and applications of UV- visible spectroscopy; Fluorescence spectroscopy; Flame photometry, Infrared spectroscopy; NMR and ESR spectroscopy.

Unit V Radioactivity (12)

Radioactivity, Radioactive decay, units of radio activity. Detection and measurement of radioactivity- GM counter, scintillation counter. Biological applications of radioisotopes and Radiation

Total : 60hours**Text Books**

1. Keith Wilson and John Walker, Principles and techniques of Practical Biochemistry -Seventh edition, Cambridge University Press 2010
2. Asokan P, Analytical biochemisrty Biochemistry, Chinna publication 2009.

Reference Books

1. Holme.D.J. and Peck.H. Longman, Analytical Biochemistry, 3rd edition, 1998.
2. Plummer. D. T. An introduction to practical Biochemistry. Tata McGraw-Hill, 1998.
3. Chatwal, G & Anand, S.Instrumental methods of chemical analysis. Himalaya Publishing House.2005.
4. K.Sawhney and Randhir Singh, Introductory Practical Biochemistry. Narosa Publications House, 2001.

PRACTICAL – III BIOCHEMICAL PREPARATION TECHNIQUES

0 0 4 2

Course objectives

Aim of this Lab is to focus on the separation of biomolecules by different chromatographic techniques like Paper, TLC, Column and quantification of those molecules in selected source.

1. Preparation of solutions- Normal, Molar, Molal solutions.
2. Preparation of buffers-Tris, Citrate, Acetate and Phosphate Buffers.
3. Preparation of starch from potatoes.
4. Preparation of casein from milk.
5. Preparation of lactalbumin from milk.
6. Preparation of haemoglobin from blood.
7. Preparation of albumin from eggs.
8. Preparation of lecithin from eggs.
9. Isolation of Glycogen from liver tissue.
10. Isolation of chlorophyll from spinach leaves.
11. Isolation of Protein by Ammonium sulphate fractionation.
12. Preparation of cellulose from plant material.

Text Books

1. J. Jayaraman, Laboratory Manual in Biochemistry. New Age International Pvt Ltd Publishers. 2011 (Paperback).
2. [S. Sadasivam](#), [A. Manickam](#), Biochemical Methods. New age publishers. 2009 (paperback).

Reference Books

1. Harold Varley, Practical Clinical Biochemistry, CBS. 6 edition, 2006.
2. Hans Bisswanger, Practical Enzymology. Wiley VCH. 2nd Edition, 2011.

PRACTICAL IV - BIOCHEMICAL SEPARATION TECHNIQUES 0042

Course objectives

Aims to isolate and separation of biomolecules from various sources analyse the presence of specific molecules in isolated sample by different qualitative tests and estimate those molecules in each source.

1. Separation of sugars by ascending paper chromatography.
2. Separation of sugars by descending paper chromatography.
3. Separation of sugars by two dimensional chromatography.
4. Separation of amino acids by ascending paper chromatography
5. Separation of amino acids by descending paper chromatography.
6. Separation of aminoacids by two dimensional chromatography.
7. Separation of amino acids by radial paper chromatography.
8. Separation of sugars by thin layer chromatography.
9. Separation of amino acids by thin layer chromatography.
10. Separation of lipids by thin layer chromatography.
11. Separation of plant pigments by column chromatography.
12. Separation of proteins by Gel Filtration Chromatography. (Demonstration)

Text Books

1. J. Jayaraman, Laboratory Manual in Biochemistry. New Age International Pvt Ltd Publishers. 2011 (Paperback).
2. [S. Sadasivam](#), [A. Manickam](#), Biochemical Methods. New age publishers. 2009 (paperback).

Reference Books

1. Harold Varley, Practical Clinical Biochemistry, CBS. 6 edition, 2006.
2. S. K. Sawhney, Randhir Singh, Introductory Practical Biochemistry. Alpha Science International, Ltd. 2 edition, 2005.

Course objectives

The course was structured to enlighten the importance the enzymes in biological system and to understanding of the kinetics of enzyme catalyzed reactions and use of immobilized enzymes.

Unit I Introduction to Enzymes (12)

Introduction - Definition, Enzyme units, Functions of enzymes. Classification of enzymes. Isoenzymes. Enzyme specificity, Active site, Mode of Enzyme action - Lock and key theory and induced fit theory, Factors affecting enzyme activity - pH, temperature, enzyme concentration.

Unit II Enzyme Kinetics (12)

Derivation of Michaelis - Menton Equation. Enzyme inhibition - Competitive, non- competitive and uncompetitive inhibitions (with reference to Example and graphical representation).

Unit III Carbohydrate metabolism I (12)

Fate of dietary carbohydrates. Glycolysis with energetic & regulation, Cori cycle, Futile cycles in carbohydrate metabolism. Metabolism of Glycogen, TCA cycle - Energetics and its regulation.

Unit IV Carbohydrate metabolism II (12)

Pentose phosphate pathway and its significance. Uronic acid pathway. Gluconeogenesis pathway and significance. Glyoxylate cycle.

Unit V Biological Oxidation (12)

Introduction -free energy - free energy of hydrolysis of ATP and other organophosphates. Role of High energy compounds - Electron transport chain- Components and reactions of ETC. Role of ETC - Oxidative Phosphorylation - Chemiosmotic hypothesis. P/O ratio, uncouplers of oxidative phosphorylation.

Total : 60 hours

Text Book

1. T. Palmer & P. L. Bonner, Enzymes - Biochemistry, Biotechnology, Clinical Chemistry, 2007, Elsevier Store, Second Edition.

Reference Books

1. Donald Voet and Judith Voet, Fundamentals of Biochemistry, 2006, 2nd edition 2006, Wiley Asia student edition
2. Robert K Murray , Daryl Granner and Victor W Rodwell, Harper's illustrated biochemistry, 2006, 27th edition Mc Graw Hill international edition
3. M.N.Chatterjea and Ranashinde, Text book of Medical biochemistry, 2005, 6th edition Jaypee Brothers Medical Publisher (P) Ltd.
4. Champe and Harvey, Lippincott's illustrated biochemistry, 2007, 4th edition.

Course objectives

The course aims to provide an advanced understanding of the biochemical mechanisms and pathophysiological processes responsible for common biochemical disorders. The course provides an overview of normal and abnormal metabolic functions, the impact of disorders on metabolic processes, an overall picture about the molecular basis of diseases and novel strategies to prevent the diseases.

Unit I Basic concepts of clinical Biochemistry (12)

A brief review of Units and abbreviations used in expressing concentrations and standard solutions. Specimen collection and processing (blood, urine and feces), anti-coagulants and preservatives for blood and urine. Transport of specimens.

Unit II Disorders of the blood (12)

Hematology - Anemia and its types – anemias related to shape and size of RBC, anemias due to nutritional deficiencies, anemias due to excessive destruction of RBC. Disorders of Blood clotting pathway. Hemophilias.

Unit III Diseases related to carbohydrate metabolism (12)

Blood glucose regulation, hypo and hyperglycemia. Diabetes mellitus-types, Diagnosis, clinical manifestations and metabolic alterations. Glycosuria, galactosemia and fructosuria. Glycogen storage diseases. Lactose intolerance.

Unit IV Diseases related to aminoacids and nucleic acid metabolism (12)

Etiology, clinical manifestation, diagnosis and treatment of phenyl ketonuria, cystinuria, alkaptonuria, albinism and tyrosinemia. Hypo and hyperuricemia, Gout.

Unit V Diseases related to lipid metabolism (12)

Serum lipids in diseases with special reference to cholesterol, lipidosis, triglyceridemia. hypo and hypercholesterolemia. Clinical features of atherosclerosis and fatty liver.

Total : 60 hours

Text Books

1. M.N. Chatterjee & Ranashinde, Text Book of Medical Biochemistry. Jaypee Brothers Medical Publisher (P) Ltd. 6th edition (2006).
2. Carl A. Burtis, Edward R. Ashwood and David E. Bruns (eds), Tietz Textbook of Clinical Chemistry and Molecular Diagnosis. 5th edition, 2012.
1. Thomas M. Devlin, Biochemistry with clinical correlation. John Wiley & Sons. 7th Ed, 2010.
2. Allan Gaw, Michael J. Murphy, Rajeev Srivastava, Robert A. Cowan, Denis St. J. O'Reilly, Clinical Biochemistry, 5th edition, 2013.
3. Graham Basten, Introduction to Clinical Biochemistry, Interpreting Blood Results. Book Boon. 2nd edition, 2011.

Course objectives

To get knowledge and hands on training in hematological studies. The student will be able to gain immense knowledge related to blood analysis which is an important facet of clinical Biochemistry.

1. Estimation of Hemoglobin by Drabkins Method
2. Estimation of Hemoglobin by Sahli's Method
3. RBC Count
4. WBC count-Total Count
5. WBC count-Differential Count
6. Platelet Count
7. ESR
8. Preparation of blood smears,
9. Blood Grouping
10. Packed cell Volume
11. Bleeding time
12. Clotting time

Text Books

1. J. Jayaraman, Laboratory Manual in Biochemistry. New Age International Pvt Ltd Publishers. 2011 (Paperback).
2. [S. Sadasivam](#), [A. Manickam](#), Biochemical Methods. New age publishers. 2009 (paperback).
3. S. K. Sawhney, Randhir Singh, Introductory Practical Biochemistry. Alpha Science International, Ltd. 2nd edition, 2005.

Reference Books

1. Harold Varley, Practical Clinical Biochemistry, CBS. 6th edition, 2006.
2. Hans Bisswanger, Practical Enzymology. Wiley VCH. 2nd Edition, 2011.
3. Robert Eisenthal, Enzyme Assays: A Practical Approach (Practical Approach Series). Oxford University Press, U.S.A. 2nd edition, 2002.

PRACTICAL - VI -ENZYMOMOLOGY & CLINICAL BIOCHEMISTRY I

0 0 4 2

Course objectives

The course introduces students to various practical aspects of enzymology, combined with assessment of clinical reasoning skills and stimulates the students interest in learning the structure, function and kinetics of enzyme and their correlation in disease conditions.

1. Determination of Optimum pH of Acid Phospatase
2. Determination of Optimum temperature of Acid Phospatase.
3. Determination of specific activity of Acid Phospatase.
4. Determination of Optimum pH of Alkaline Phospatase
5. Determination of specific activity of Alkaline Phospatase
6. Estimation of protein by Lowry method.
7. Estimation of blood glucose by Ortho-Toluidiene method.
8. Estimation of blood glucose by Anthrone method.
9. Estimation of serum bilirubin by Malloy & Evelyn method.
10. Estimation of total protein and A: G ratio.
11. Estimation of blood urea by diacetyl monoxime method.
12. Estimation of serum creatinine by Jaffe's method.

ooks

1. J. Jayaraman, Laboratory Manual in Biochemistry. New Age International Pvt Ltd Publishers. 2011 (Paperback).
2. S. Sadasivam, A. Manickam, Biochemical Methods. New age publishers. 2009 (paperback).

Reference Books

1. Harold Varley, Practical Clinical Biochemistry, CBS. 6th edition, 2006.
2. Hans Bisswanger, Practical Enzymology. Wiley VCH. 2nd Edition, 2011.
3. Robert Eisenthal, Enzyme Assays: A Practical Approach (Practical Approach Series). Oxford University Press, U.S.A. 2nd edition, 2002.

Course objectives

The course was structured to enlighten the importance the enzymes in biological system and to understanding of the kinetics of enzyme catalyzed reactions and use of immobilized enzymes.

Unit I Enzymes (12)

Coenzymes, metalloenzymes, multienzyme complexes, Isoenzymes. Enzyme regulation: General mechanism of enzyme regulation, feedback inhibition and feedforward stimulation. Covalent modification of enzymes. Allosteric enzymes. Regulation of enzymic activity by products and substrates.

Unit II Metabolism of Lipids I (12)

Fate of absorbed dietary lipids. Oxidation of fatty acids - Beta oxidation, alpha oxidation and omega oxidation. Metabolism of Ketone bodies - Formation, Utilization, Excretion and significance.

Unit III Biosynthesis of lipids (12)

Biosynthesis of fatty acid. Metabolism of Triglyceride, Phospholipids and cholesterol. Biosynthesis of saturated and unsaturated fatty acids.

Unit IV Metabolism of proteins (12)

Introduction, fate of dietary proteins, catabolism of amino acids - transamination, oxidative and non-oxidative deamination, decarboxylation- urea cycle and its regulation.

Unit V Metabolism of nucleic acids (12)

Introduction, fate of dietary nucleic acids, catabolism of purine and biosynthesis of purine nucleotides- denovo synthesis and salvage pathways. Regulation of purine biosynthesis. Catabolism of pyrimidines and biosynthesis of pyrimidine nucleotides. De novo synthesis and salvage pathways, regulation of pyrimidine synthesis.

Total : 60 hours

Text Book

1. Donald Voet and Judith Voet, Fundamentals of Biochemistry, 2006, 2nd edn, Wiley Asia.

Reference Books

1. Robert K Murray , Daryl Granner and Victor W Rodwell, Harper's illustrated biochemistry, 2006, 27th edition, Mc Graw Hill international edition
2. M.N.Chatterjea and Ranashinde, Text book of Medical biochemistry, 2005, 6th edition, Jaypee Brothers Medical Publisher (P) Ltd.
3. David L Nelson and Michael M Cox, Principles of biochemistry 2007, 4th edition. W.H. Freeman company New York

PRACTICAL – VII ENZYMOLOGY & CLINICAL BIOCHEMISTRY II
0 0 6 3

Course objectives

The course introduces students to various practical aspects of enzymology, combined with assessment of clinical reasoning skills and stimulates the students interest in learning the structure, function and kinetics of enzyme and their correlation in disease conditions.

1. Determination of Optimum pH of Salivary Amylase.
2. Determination of specific activity of Salivary Amylase.
3. Determination of enzyme activity of Lactate Dehydrogenase
4. Determination of enzyme activity of Serum Glutamate Oxaloacetate Transaminase
5. Determination of enzyme activity of Serum Glutamate Pyruvate Transaminase
6. Estimation of serum uric acid by phosphotungstate method.
7. Estimation of serum cholesterol by Zaks method.
8. Estimation of serum triglycerides
9. Estimation of serum phospholipids
10. Qualitative Analysis of Urine for the presence of normal and abnormal constituents.

Text Books

1. J. Jayaraman, Laboratory Manual in Biochemistry. New Age International Pvt Ltd Publishers. 2011 (Paperback).
2. S. Sadasivam, A. Manickam, Biochemical Methods. New age publishers. 2009 (paperback).
3. S. K. Sawhney, Randhir Singh, Introductory Practical Biochemistry. Alpha Science International, Ltd. 2nd edition, 2005.

Reference Books

1. Harold Varley, Practical Clinical Biochemistry, CBS. 6th edition, 2006.
2. Hans Bisswanger, Practical Enzymology. Wiley VCH. 2nd Edition, 2011.

SYLLABUS
DISCIPLINE SPECIFIC ELECTIVES

Unit – I

History and scope of Microbiology. Classification of microbes. Ultra structure of Bacteria , Fungi , virus , Algae. beverages. Antimicrobial agents – physical and chemical agents. Antiseptics and sterilants.

Unit – II

Clinical Microbiology: Infection – types of infection, method of infection, factors influencing infection. Normal microbial flora and pathogenic microbes. Bacterial diseases - typhoid, cholera. Viral diseases - Hepatitis, HIV.

Unit – III

Immunity and its types- innate immunity, acquired immunity, active and passive immunity, Vaccines - commonly used toxoid vaccines, killed vaccines, live attenuated vaccines. Cells of the immune system. Lymphoid organs – Thymus, Bone marrow, Spleen, ..

Unit – IV

Immunoglobulins- structure, function and types. Antigens- nature, immunogenicity, haptens., Humoral and cellular immunity. Complement pathway,

Unit V

Hypersensitivity reactions- type I, II, III, IV. Immunological tolerance. Transplantation immunology- Mechanism of Host Vs Graft rejection - Bone marrow transplantation.

Reference Books

1. Microbiology – Panicker – 2500 6th edition, orient Longman , Hyderabad.
2. Microbiology – M.J.Pelzar, 5th edition (2005), Tata mac hran, Hill New Delhi.
3. Principles of Microbiology – Atlas RM 1997, WCB Publishers.
4. Kuby immunology 4th edition- Goldsby et al., Freeman and Co. 2000.
5. Immunology 3rd edition- Roitt et al., Mosby publishers 1993.
6. Cellular and molecular immunology 2nd edition Abbas et al., W.S.Saunders 1994.
7. Immunology V- The immune system in health and disease. Janeway Jr.Paul, Travers and Co., 2001.
8. Essential Immunology (8th Edition), Ivan Roitt, 1994. Blackwell Scientific Publication. Immunology W.H. Freeman and Company.
9. Abdul .K. Abbas. Andrew .K. Litchmen and Jordan, 1997, Cellular and Molecular
10. Immunology, 3rd Edn. W.B. Saunder Company.
11. Weir, D.M. and Stewart, J., 1997, Immunology, 8th Edn., Churchill Livingston, New York.

CLINICAL NUTRITION

6 0 0 5

Course objectives

To get a knowledge of diet and nutrition for normal persons, patients and special cases. Students should also aware about the categories and significance of various forms of foods.

Unit 1 Basic concepts of Nutrition (12)

Introduction and history of nutrition, relation between good nutrition and health, Concepts of malnutrition (Kwashiorkar and marasmus) and over nutrition with examples, Methods of assessing nutritional status, Anthropometric measurements and indices – linear measurement, height, weight, head, chest and mid upper arm circumference.

Unit 2 Food (12)

Food Groups: Definition and Functions of food – physiological functions of foods , ICMR Five food Groups and its significance, Food Pyramid.

Unit 3 Energy (12)

Definition, energy value of food, Basal metabolism, Energy cost of physical activities, BMR unit, Factors affecting BMR, RQ, SDA, Thermic effect of food, Estimation of total energy needs, Energy balance.

Unit 4 Nutrition Deficiency Disorders (12)

Clinical signs of nutritional deficiency disorders, Methods of assessing nutritional deficiency disorder – Biophysical method , Biochemical test, Indirect method – Vital statistics, Assessment of socio economic status, diet survey

Unit 5 Macro and Micromolecules (12)

Definition, classification and food sources of carbohydrate, protein, lipid, fibre. Minerals and Vitamins - Functions, food sources, requirements and effects of deficiency. Water – Distribution in body, functions, requirement, Dehydration - Causes, effects and prevention,

Total : 60 hours

TextBooks

3. Swaminathan, Advanced Textbooks of food and Nutrition, Vol 1, 2, BAPPCO Press, 2005
4. Viswanath Sardesai, Introduction to Clinical nutrition, 3rd edition, 2011

Reference Books

4. Geissler C, Powers H. Human Nutrition. Edinburgh: Elsevier Churchill Livingstone, 2010.
5. Roach, J.O. and Benyon, S, Crash course - Metabolism and Nutrition, London: Mosby, 2003
6. Payner and barker, Advancing Dietetics and Clinical Nutrition, 1st edition, 2010.

Course objectives

Molecular biology deals with nucleic acids and proteins and how these molecules interact within the cell to promote proper growth, division, and development. It is a large and ever-changing discipline. This course will emphasize the molecular mechanisms of DNA replication, repair, transcription, protein synthesis, and gene regulation in different organisms.

Unit 1 DNA as the vehicle of inheritance (12)

Experimental evidence -Griffith, McLeod, McCarty and Avery, Hershey-Chase experiments. Definition of Gene, organization of genes. Coding and non-coding DNA in prokaryotes and Eukaryotes - unique, moderately repetitive and highly repetitive DNA sequence, Satellite DNA. Cot value.

Unit 2 DNA Replication (12)

DNA replication in prokaryotes - mode of replication, Semiconservative modes of replication. An overview of replication - replication eye, replication forks, semi discontinuous replication, Okazaki fragments, RNA primers. Enzymes of replication- DNA polymerases I, II, III, Topoisomerases, Helicases binding proteins and ligases. Inhibitors of replication.

Unit 3 DNA Mutation and Repair (12)

DNA Mutation - definition, types of mutation, causes of mutation – chemical and physical agents. DNA Repair - types of damages, repair by direct reversal of damage, excision repair, recombination repair, SOS repair.

Unit 4 Transcription (12)

Transcription - Prokaryotic & Eukaryotic RNA polymerases - Enzyme structure, role of sigma factor, promoter, closed and open promoter complexes. Initiation, elongation and termination of prokaryotic RNA synthesis. Genetic Code - Basic features of genetic code. Deciphering of Genetic code. Wobble Hypothesis.

Unit 5 Translation (12)

Protein biosynthesis - activation of amino acids, initiation, elongation and termination in prokaryotes. Post translation modifications. Inhibitors of translation. Regulation of gene expression in prokaryotes. Operon concept - Positive and negative regulation of lac operon.

Total : 60 hours**Text Books**

1. De Robertis, Cell and molecular biology. Dhanpat Rai Publisher, 8th Edition, 2001.
2. Nalini Chandar, Susan Viselli, Lippincott Illustrated Reviews: Cell and Molecular Biology. LWW; North American Edition (2010).
3. [Robert Franklin Weaver](#), Molecular Biology. Mc-Graw Hill science, 5th edition, 2011.

Reference Books

1. [Benjamin Lewin](#), Genes IX. Jones & Bartlett Learning; 9th edition (2007).
2. [Harvey Lodish](#), [Arnold Berk](#) & [Chris A. Kaiser](#), Molecular Cell Biology. W. H. Freeman; 6th edition (2007).

IMMUNOBIOLOGY

6 0 0 5

Course objectives

The paper ascertains that the Biochemists have strong ideas about immunity, antigens, antibodies against them, mechanism of action of immune system .

Unit 1 Immunity (12)

Immunity and its types. Innate Immunity, acquired immunity, active and passive immunity. Humoral and cellular immunity. Complement pathway.

Unit 2 Immunoglobins (12)

Immunoglobins - structure and function, types of immunoglobulins. Antigens – factors determining antigenicity, haptens. Cells involved in antibody formation, differentiation of lymphocyte, clonal selection theory, cooperation of T-cell with B-cell, secretion of antibody.

Unit 3 Antigen Antibody interactions (12)

Antigen Antibody interactions – precipitation, agglutination, complement fixation reaction, tissue typing, ELISA, RIA, immunofluorescence. Monoclonal antibody - preparation and application in biology.

Unit 4 Hypersensitivity (12)

Hypersensitivity reactions – type I, II, III, IV. Immunological tolerances and autoimmune diseases. Vaccines – active and passive immunization, commonly used vaccines - toxoid vaccines, killed vaccines, live attenuated vaccines, bacterial polysaccharide vaccines.

Unit 5 Transplantation and Cancer Immunology (12)

Transplantation immunology – clinical manifestations, bone marrow and organ transplants. Cancer immunology – tumor antigens, immune response to tumors, immunotherapy. AIDS – structure of HIV, destruction of T cells, immunological syndrome of AIDS, AIDS vaccine.

Total : 60 hours

Text Book

12. Roitt, Brostoff, Mal, Immunology, 6th edition, 2001

Reference Books

1. Panicker , Microbiology, orient Longman , Hyderabad, 6th edition, 2005.
2. M.J.Pelzar, Microbiology, Tata mac hran, Hill New Delhi, 5th edition, 2005.
3. Donald.M.Weir, Immunology, John Stewart, 7th edition, 1993
4. P.M.Lydyard, A.Whelan, M.W. Fanger, Immunology, 2003
5. Jacqueline Sharon, Williams & Williens, Immunology,1998

Course objectives

The content of the syllabus consist of basic biotechnology and its application such as new tools , products developed by biotechnologists such as cell culture, transgenic animals, Genetic engineering are useful in research, agriculture, industry and the clinic. It also helps to understand the Basic principles involved in Intellectual properties rights, scope and importance of marketing and its systems.

Unit 1 Biotechnological Tools (12)

Biotechnology: Definition and scope, types and branches of biotechnology. Recombinant DNA technology – Basic techniques – cutting and joining of DNA molecules, Methods of gene transfer - transfection, electroporation, Selection and screening of recombinants. Insertional inactivation. Role of enzymes - Restriction endo nucleases, DNA ligases, Reverse transcriptase, DNA polymerase. Use of Linkers and Adapters, homopolymer tailing.

Unit 2 Cloning Vectors and Techniques (12)

Cloning vectors – Plasmids, M 13 phage, cosmids, Yeast artificial vectors(YAC). Plasmid Copy number. PCR – principle, types and applications. Techniques of cloning - Southern, Northern and Western blotting techniques, DNA hybridization techniques.

Unit 3 Animal biotechnology (12)

Animal biotechnology – Cell and organ culture. Gene transfer methods into animal cells, production of medically important biomolecules – Insulin, growth hormone, monoclonal antibodies and interferons.

Unit 4 Plant biotechnology (12)

Plant biotechnology – Gene transfer in plants – physical, chemical and biological methods. Genetic engineering of plants for pest resistance, herbicide resistance, stress tolerance and nitrogen fixation.

Unit 5 Nanotechnology (12)

Nanotechnology – Introduction and application of nanotechnology in tissue engineering, nucleic acid, enzymes, cancer and organ transplantation

Total : 60 hours**Text Books**

1. Sathyanarayana, Biotechnology, Books and allied Publishers, 3rd edition, 2006
2. RC Dubey, Text book of Biotechnology, S. Chand & Co, 2009

Reference Books

1. Brown TA “Gene cloning: An introduction” Nelson Thornes, 3rd edition, 1995
2. William.J. Thieman, Michael A. Pallidino. Introduction to biotechnology. Pearson Publication. 2nd edition, 2013
3. SS Purohit. Biotechnology Fundamentals and applications. Agrobios Publication. 4th edition. 2007
4. SB Primrose & R Twyman. Principles of gene manipulation and genomics. Blackwell publishing. 7th edition. 2006.

Course objectives

To get a knowledge of diet and nutrition for normal persons, patients and special cases. Students should also aware about the categories and significance of various forms of foods.

Unit 1 Overview of nutrition (12)

An overview of nutrition, food choices, the nutrients, Nutrition assessment, diet and health, planning a healthy diet, digestion absorption and transport of food, regulation of digestion and absorption

Unit 2 Macronutrients (12)

The carbohydrates, sugars, Starch and fibers, Glucose in the body, Health effects and recommended intakes of sugars, starch and fibers. Alternatives to sugar, lipids in the body, Recommended intake of lipids. Alternative to fat. Proteins-energy malnutrition, Health effects of protein, Vegetarian diets

Unit 3 Energy (12)

Energy balance and body composition, The calories of foods provide, body weight, body composition and health, weight, management, overweight-and underweight, Causes of obesity, Treatments of obesity.

Unit 4 Micronutrients (12)

An overview of Vitamins, water and major minerals, Trace minerals, Antioxidant nutrients and phytochemicals in disease prevention.

Unit 5 Minerals (12)

Calcium roles in the body, calcium deficiency. Iron deficiency, Iron toxicity, Osteoporosis and calcium, Zinc deficiency, zinc toxicity, Functional foods

Total: 60hours**TextBooks**

1. Swaminathan, Advanced Textbooks of food and Nutrition, Vol 1, 2 ed, BAPPCO Press, 2005
2. Viswanath Sardesai, Introduction to Clinical nutrition, 3rd edition, 2011

Reference Books

1. Geissler C, Powers H. Human Nutrition. Edinburgh: Elsevier Churchill Livingstone, 2010.
2. Roach, J.O. and Benyon, S, Crash course - Metabolism and Nutrition, London: Mosby, (2003)
3. Payner and barker, Advancing Dietitics and Clinical Nutrition, 1st edition, 2010.
4. Edited by Jim Mann & A.Stewart Truswell, Essentials of human nutrition, 3rd oxford university, 2008

Course objectives

This paper ascertains that the biochemists get an accurate information about various hormones, functions, mechanism of action, and related disorders.

Unit 1 Basic Concept of Hormones (12)

Hormones– Definition, Classification of hormones – Peptide hormones and Steroid hormones. Circulation and transport in blood. Feedback Regulation of hormones. Mechanism of hormone action – receptors, second messengers. The hypothalamus and its hormones.

Unit 2 Pituitary hormones (12)

Pituitary gland –Adenohypophysis and adenohypophysial hormones, their regulation. Structure of Neurohypophysis and functions of neurohypophysial hormones, their regulation. Pathophysiology.

Unit 3 Thyroid hormones (12)

Thyroid gland – structure and thyroid hormones. Synthesis of T3 and T4.Functions, Transport and regulation of thyroid hormones. Pathophysiology. Parathyroid gland: physiological roles and pathophysiology of parathyroid hormones.

Unit 4 Pancreatic hormones (12)

Pancreatic hormones - insulin, glucagon, somatostatin - physiological role and related disorders. Gastrointestinal hormones - Types and functions.

Unit 5 Adrenal hormones (12)

Adrenal gland-structure, cortical and medullary hormones-physiological role and related disorders. Sex Hormones: Male sex hormone – androgens (testosterone) and female sex hormone (estrogen and progesterone) – role in menstrual cycle, and pregnancy.

Total : 60

hours**Text Books**

1. Prakash.S.Lohar, Endocrinology, MJP Publishers, 2005
2. R.Radheshyam, Textbook of Endocrinology, Neha Publishers, 2012.

Reference Books

1. **Hadley ME**, The vertebrate **endocrine** system, in. **Endocrinology**, 4th **Ed** (Prentice Hall, NJ) 1996.
2. C. Guyton, MD and John E. Hall, Textbook of Medical Physiology, 11th Edition, 2006
3. Larsen: Williams Textbook of Endocrinology, 10th ed. , 2003 Elsevier

Course objectives

The objective is to make a connection between knowledge of anatomy and physiology and real-world situations, including healthy lifestyle decisions and homeostatic imbalances.

Unit 1 Nutrition in various stages of life (12)

Life Cycle nutrition, pregnancy and lactation, Nutrition during pregnancy and lactation. Maternal health, Practices incompatible with pregnancy, Fetal alcohol syndrome.

Nutrition in infancy, childhood Nutrition and adolescence The early development of chronic diseases, Nutrition in adulthood and later years. Illness and nutrition status, Nutrition Medications and complementary therapies Nutrition intervention

Unit 2 Nutrition in GI disorders (12)

Nutrition and disorders of the gastro intestinal tract, parenteral nutrition . Nutrition in Severe stress, Nutrition and diabetes mellitus, Complication of diabetes mellitus, Treatment of diabetes, Medical Nutrition therapy for diabetes, Mastering diabetes control.

Unit 3 Nutrition for cardio disorders (12)

Nutrition and disorders of the heart blood vessels and lungs. Atherosclerosis, hypertension, prevention and treatment of heart disease, Diet strategies, Drug therapy, Acute respiratory failure, The metabolic syndrome.

Unit 4 Nutrition in Renal disorders (12)

Nutrition and Renal disease, kidney stones and treatment, the nephrotic syndrome, Renal failure, kidney transplants and diet, Dialysis and Nutrition, Nutrition and liver disorders, Fatty liver and hepatitis, Cirrhosis, Gall stones, Nutrition,

Unit 5 Nutrition in Cancer and HIV (12)

Cancer and HIV infection, How cancer develops, Consequence of cancer, Treatment for cancer, Medical Nutrition therapy. How HIV develops, Consequences of HIV infection. Medical Nutrition Therapy. Ethical issues in Nutrition care

Total : 60 hours

Text Books

1. Carl A. Burtis and Edward R. Ashwood . Tietz Textbook of Clinical Chemistry and Molecular Diagnostics, 5th edition, 2012. Saunders Publication.
2. M N Chatterjee and Rana shinde. Textbook of Medical Biochemistry, 8th ed, 2011. Jaypee Publishers.

Reference books

1. Thomas M. Devlin. Biochemistry with Clinical Correlation, 7th edition, John Wiley & Sons
2. Harold Varley, Practical Clinical Biochemistry, fourth edition, 2005. CBS Publisher

STEM CELL BIOLOGY

6 0 0 5

Course objectives

This paper aims to provide thorough information on the basic properties of stem cells and the regulation at molecular level. It also describes the application of stem cell technology in the therapy of different diseases.

Unit 1 Introduction to Stem Cells (12)

Definition, Classification and Sources. Embryonic Stem Cells. adult, haematopoietic, fetal, cord blood, placenta, bone marrow, primordial germ cells, cancer stem cells, induced pluripotent stem cells.

Unit 2 Stem cell characterizations (12)

Isolation & characterizations, markers & their identification, growth factor requirements and their maintenance in culture. Feeder and feeder free cultures. Cell cycle regulators in stem cells. Molecular basis of stem cell renewal and differentiation, Metaplasia and transdifferentiation. Molecular basis of pluripotency and stem cell niche

Unit 3 Genetic and Epigenetic Gene Regulation in Stem Cells (12)

Chromatin modification and transcriptional regulation, chromatin modifying factors, epigenetic regulation – expression of receptors, chromosomal inactivation, imprinting mechanism in *Drosophila*, *C. elegans* and mammals. Hypoxic condition and gene expression (pre implantation stage), stem cell communications – gap junctions, cell fusion, HOX genes, upstream transcriptional factors, embryonic genes.

Unit 4 Application of Stem Cells (12)

Overview of embryonic and adult stem cells for therapy Neurodegenerative diseases; Parkinson's, Alzheimer, Spinal Cord Injuries and other brain Syndromes; Tissue system Failures; Diabetes; Cardiomyopathy; Kidney failure; Liver failure; Cancer; Hemophilia etc.

Unit 5 Regulations and Ethics (12)

Human Embryonic Stem Cells and Society, Human stem cells research: Ethical consideration; Stem cell religion consideration; Stem cell based therapies: Pre clinical regulatory consideration and Patient advocacy.

Total : 60 hours

Text Books

1. Kiessling, A.A. Human Embryonic Stem cells. Jones & Barlett Publishers. (2nd Ed.) 2006
2. Lanza, R. Essentials of Stem Cell Biology. Academic Press. (1st Ed.) 2005.

Reference Books

1. Turksen, K. Adult Stem Cells. Humana Press, Inc., 1st Ed, 2004
2. Thomson, J et al. Handbook of Stem Cells: Embryonic/ Adult and Fetal Stem cells (Vol. 1 & 2). Academic Press., 1st Ed, 2004.
3. Institute of Medicine (Corporate author). Stem cells and the future of regenerative medicine. National Academy Press. 1st Ed. 2002.

Course objectives

The course considers primarily the embryological development with an emphasis on histogenesis and histology. The course deals with the process of differentiation to many different types of cells and tissues which function in an integrated way as each new organism develops. The course also provides some of the events and processes which occur during animal growth and development, as the animal develops from an egg and a sperm into an adult organism.

Unit 1 Overview (12)

Developmental Biology - an overview: Introduction of animal development: Development among unicellular eukaryotes –*Acetabularis*, *Naegleria*. The origins of sexual reproduction. Fertilization: structure of gametes, recognition of sperm and egg –action at distance and contact of gametes.

Unit 2 Embryonic development in animals (12)

Early Embryonic Development in animals: Blastula formation, Types of Cleavage, Gastrulation and formation of germ layers in animals.

Unit 3 Organogenesis (12)

Organogenesis in animals – an overview: Tissue organization and stem cells; development of nervous system, mesodermal and endodermal organs. Organogenesis –vulva formation in *Caenorhabditis elegans*

Unit 4 Embryonic developments in plants (12)

Early Embryonic Development in plants: Gametogenesis, Fertilization, Embryo sac development and double fertilization in plants

Unit 5 Cell death (12)

Cell death and regeneration: Concept of regeneration; programmed cell death; aging and senescence.

Total : 60 hours

Text Books

1. T. Subramoniam, Molecular developmental biology. 2nd Edition, 2011.
2. Manju Yadav, Molecular Developmental Biology. Discovery Publishing Pvt.Ltd. 2008.
3. Abhilash Jain, Advanced developmental biology. 2010.

Reference Books

1. Scott F. Gilbert, Susan Singer, Developmental Biology. Sinauer Associates Inc.; 8th ed. 2005
2. Jonathan M. W. Slack, Essential Developmental Biology. Wiley-Blackwell. 3rd Ed, 2012.
3. Fred Wilt and Sarah Hake, Principles of Developmental Biology. First edition, 2003

Course objectives

This curriculum is designed to provide students a broad understanding of the molecular, genetic, cell biological and pathobiological aspects of cancer. Students will also learn about the current state of clinical diagnosis, treatment of human cancers, and hurdles to overcome to realize its potential.

Unit 1 Introduction (12)

Growth characteristics of cancers cells; neoplasia, anaplasia, metaplasia and hyperplasia, types of cancer benign, malignant, metastatic cancers. Carcinomas, sarcomas, adenomas, haemopoetic cancers. Characteristics of cancer cells, changes in cell membrane structure and functions.

Unit 2 Oncogenes (12)

Provirus, provirus, oncogenes and proto oncogenes. Mechanism of carcinogenic transformation by oncogenes, viral oncogenes. Tumor suppressor genes - properties, mechanism of tumor suppressor genes in cancer induction with special reference to P53 gene.

Unit 3 Carcinogenesis (12)

Principles of carcinogenesis- chemical carcinogenesis, stages in chemical carcinogenesis - Initiation, promotion and progression. Physical carcinogenesis – X-ray radiation . Viral carcinogenesis. Free radicals and antioxidants in cancer.

Unit 4 Tumour markers (12)

Tumour markers- types of tumour markers. Apoptosis in cancer Cell death by apoptosis role of caspases . Death signaling pathways mitochondrial and death receptor pathways.

Unit 5 Diagnosis and Treatment (12)

Cancer screening diagnosis and treatment. RIA and ELISA. Strategies of anticancer drug therapy chemotherapy , gene therapy, Immunotherapy and radiotherapy.

Total : 60 hours**Text Books**

1. Vincent.T, Devita, Cancer-Principles & practice of oncology, 3rd edition, 2014.
2. Momna Hejmadi, Introduction to Cancer Biology. 2nd edition.

Reference Books

1. Kinnell Parchment G. Mc. R. E, Perantoni. The Biological Basis of Cancer, Cambridge University Press, 2nd Edition, , 2006
2. Lauren Pecorino, Molecular Biology of Cancer: Mechanisms, Targets, and Therapeutics Oxford University Press; 3 edition, 2012.

Course objectives

The course provide deep insights about the basic and recent techniques involved in plant and animal cell culture and its potential application

Unit 1 Basics of animal cell culture (12)

Animal Cell Culture: Historical Background, Importance and progress in Animal Cell Culture Technology, Biology of Animal Cell; Laboratory setup and equipments, aseptic technique, different cell culture media and supplements, Importance of Serum and Serum Free Media, preparation and sterilization of cell culture media and supplements. Conventional plant breeding, tissue culture media, Sterilization and agents of sterilization, initiation and maintenance of callus and suspension cultures.

Unit 2 Cell culture techniques (12)

Different tissue culture techniques; Disaggregation of tissue and primary culture; Types of primary culture; Chicken embryo fibroblast culture; Chicken liver and kidney culture; Secondary culture; Trypsinization; Cell separation ; Continuous cell lines; and Anchorage independent cells and cultures; Organ culture.

Unit 3 Plant tissue culture (12)

Protoplast isolation, culture and fusion; Organogenesis, somatic embryogenesis. Transfer and establishment of whole plants in soil. Shoot tip culture, and production of virus free plants, embryo culture and embryo rescue. Selection of hybrid cells and regeneration of hybrid plants; Symmetric and asymmetric hybrids, cybrids, anther, pollen and ovary culture for production of haploid plants and homozygous lines. Somaclonal variation. Cryopreservation and DNA banking for germplasm conservation.

Unit 4 Gene transfer methods (12)

Measurement of viability and cytotoxicity; characterization of cultured cell; cell cloning and selection; Cell synchronization; Transfection and transformation of cell; Plant transformation technology- Basis of tumor formation; Hairy root; Features of Ti and Ri plasmids; Use of Ti and Ri as Vectors; Binary vectors; Methods of nuclear transformation; viral vectors; vector less or direct DNA transfer Particle bombardment, electroporation, micro injection;

Unit 5 Applications (12)

Commercial scale production of animal cells, stem cells & their application; Over view of embryonic and adult stem cells for therapy; Neuro degenerative disease; Parkinsons, Alzheimer, Spinal cord injuries and other brain syndromes; Tissue system failures; Diabetes; Cardiomyopathy; Kidney failure; Liver failure, Cancer, Hemophilia, Application of cell culture technology in production of human and animal vaccines and pharmaceutical proteins.

Total : 60 hours

Text Books

1. **Bhojwani, Sant Saran, Dantu, Prem Kumar.** Plant Tissue Culture: An Introductory Text. Springer 2013
2. Adrian Slater, Nigel Scott, and Mark Fowler. Plant Biotechnology. The Genetic Manipulation of Plants 2nd edition, 2008. Oxford University Press.
3. SS Purohit. Biotechnology Fundamentals and applications. 4th ed. Agrobios Publication. 2007

Reference Books

1. Biotechnology and genomics. PK Gupta. Rastogi Publication. 2nd reprint. 2006
2. **Roberta H. Smith.** Plant Tissue Culture. 3rd Edition. 2013. Academic press.

NEUROBIOLOGY

6005

Course objectives

This paper aims to provide a basic understanding of the nervous system, Structure and functional relationship and integration of the nervous tissue networking and Insights into neurotransmission

Unit 1 Nervous System (12)

Neuron - Neurocellular anatomy, neural membrane, classification of neuron, nerve fibers, axonal transport, neural growth, neuroglia, nervous system, blood brain barrier, cerebrospinal fluid

Unit 2 Signalling (12)

Neuronal signaling - Membrane potentials, ion channels, recording neuronal signals, ionic basis of resting potential and action potential, propagation of action potential.

Unit 3 Synapse (12)

Synaptic transmission - Synapse, Electrical synapse transmission, chemical synaptic transmission, Synaptic transmitter release, synaptic potentials, synaptic delay, synaptic plasticity, molecular mechanism of synaptic transmission, myoneural junction

Unit 4 Neurotransmitters (12)

Neurotransmitters - Chemistry, synthesis, storage, release, receptors and function- acetyl choline, catecholamines, serotonin, histamine, glutamate, aspartate, GABA, glycine, neuropeptides, nitric oxide

Unit 5 Disorders (12)

Neural processing and neurodegenerative disorders- Learning and memory, neurochemical basis of drug abuse, neurodegenerative disorders, Parkinson's disorder, Alzheimer's disorder, Amyotrophic Lateral Sclerosis, Senile Dementia

Total : 60 hours

Text Books

1. Arthur C. Guyton and John E Hall, Text book of medical physiology 11th Edition; 2006
2. Bruce Alberts, Alexander Johnson, Juliana Lewis, Martin Raff, Keith Roberts and Peter Walter, Molecular biology of the cell, 4th Edition; 2004
3. David Nelson and Michael Cox, Lehninger Principles of Biochemistry, 4th edition; 2005

Reference Books

1. Gordon Shepherd, Neurobiology, 3rd Edition; 1994
2. Mark F Bear, Barry W Connors and Michael A Paradiso, Neuroscience: Exploring the brain, 4th Edition; 2015

PLANT BIOCHEMISTRY

6 0 0 5

Course objectives

This paper provides insights into the primary metabolic pathways occurring in plants, the types of plant metabolites and the industrial potential of those metabolites and the role of hormones in plant growth.

Unit 1 Photosynthesis

(12)

Ultra Structure and organization of chloroplast membranes, lipid composition of chloroplast membranes, electron transport chain. Thylakoid membrane protein complexes Calvin cycle: Biochemistry of RuBp Carboxylase or oxygenase, Hatch and Slack pathway, CAM plants; productivity of C₄ plants.

Unit 2 Nitrogen Metabolism

(12)

Nitrogen fixation, nitrogenase complex, electron transport chain and mechanism of action of nitrogenase. Structure of 'NIF' genes and its regulation, Hydrogen uptake and bacterial hydrogenases, Nitrate Metabolism: Enzymes of nitrate metabolism, Ammonium assimilation enzymes: glutamine synthetase, glutamate synthase and GDH.

Unit 3 Plant Hormones

(12)

Plant growth regulators: Auxins; gibberellins, cytokines, abscisic acid and ethylene - biosynthesis and their metabolic functions, synthetic growth hormones, inhibitors. Stress response in Plants.

Unit 4 Secondary metabolites

(12)

Major chemical classes of secondary metabolites: A brief account of the following classes: Alkaloids, terpenoids, flavonoids, Phenolics and phenolic acids, steroids, coumarins, quinines, acetylenes, cyanogenic glycosides, amines and nonprotein amino acids, gums, mucilages, resins etc. (Structures not necessary. Give examples of the compounds and the plants in which present and their importance).

Unit 5 Uses of secondary metabolites

(12)

Importance of secondary metabolites: Uses of secondary metabolites to man: as drugs, precursors of drugs in pharmaceutical industry, as natural pesticides/insecticides; other uses of secondary metabolites.

Total : 60 hours

Text Books

1. Plant Metabolism by H.D Kumar and H.N Singh. Publisher. Macmillan, ISBN-10: 0333256387; ISBN-13:978-0333256381. 1st Ed, 1980.
2. Biotechnology: Secondary Metabolites by K.G Ramawat, (2000) Publisher: Science Publishers, U.S. ISBN-10: 1578080576 ISBN-13: 978-1578080571, 1st Ed., 2000.

Reference Books

1. Plant Biochemistry by P.M Dey and J.B. Harborne (Editors) (1997) Publisher: Academic Press ISBN-10:0122146743, ISBN-13:978-0122146749, 1st Ed, 1997.
2. Plant Metabolism by Prof David T. Dennis, Prof David H. Turpin, Dr Daniel D. Lefebvre and Dr David B. Layzell (Editors) publisher: Longman; ISBN-10: 0582259061, ISBN-13:978-582259065, 1st Ed, 1997

HUMAN PHYSIOLOGY

6 0 0 5

Course objectives

The objective is to impart knowledge and understanding of the human body. To understand the inter relationships within and between anatomical and physiological systems of the human body.

Unit I Blood and Circulatory System (12)

Blood: composition and function, types and function of blood cells, erythropoiesis, Blood groups- ABO and Rhesus system. Blood coagulation, Spleen – Structure and function. Structure and function of lymphatic System

Circulatory system and Heart - Structure and functions of heart and associated blood vessels, Cardiac cycle.

Unit II Digestive System (12)

General structure of digestive system – Digestion and absorption of food in the mouth, stomach and intestines. Movements of small intestine. Role of pancreas, Liver – Structure and function, defaecation.

Unit III Respiratory system (12)

Outline of various components of respiratory system. Mechanism and chemistry of respiration.

Muscles-Types of muscles and their functions.Mechanism of muscle contraction.

Unit IV Excretory system (12)

Structure and role of kidney, nephrons. Mechanism of urine formation- Glomerular filtration, tubular secretion and reabsorption.

Unit V Nervous System (12)

Brief outline of nervous system-brain, spinal cord, nerve fibres. Transmission of nerve impulse and neurotransmitters.

Total : 60 hours

Text Books

1. Guyton AC. Text book of Medical Physiology, 8th Edition. Prism books (pvt), Bangalore, India. TATA McGraw-hill publishing Company,1991.
2. C.C. Chatterjee, Human Physiology (Vol. I & Vol. II), Medical Allied Agency, Calcutta, 11thedition, 1985.

Reference Books

1. Ganong (Williams) Review of medical physiology 25th edition. 2015.McGraw-Hill.
2. Ross and Wilson. Anatomy and physiology In health and illness. 12th ed, 2014. Elsevier.

LIST OF GENERIC ELECTIVES

Course objectives

The course aims to provide students with a practical and hands-on experience with common bioinformatics tools and databases.

Unit 1 Introduction to bioinformatics and data generation (12)

What is bioinformatics and its relation with molecular biology, important contributions - sequencing development - aims and tasks of Bioinformatics - applications of Bioinformatics - challenges and opportunities - Computers and programs – internet - World Wide Web – browsers.

Unit 2 Biological Database I (12)

General Introduction of Biological Databases and its Importance: Nucleic acid databases (NCBI, DDBJ, and EMBL). Protein databases (Primary, Composite, and Secondary). Specialized Genome databases: (SGD, TIGR, and ACeDB).

Unit 3 Biological Database II (12)

Derived databases (Prosite, Pfam, PRODOM, PRINTS). Structure databases (CATH, SCOP, and PDBsum) and bibliographic databases.

Unit 4 Sequence Alignment (12)

Introduction to Sequences, alignments and Dynamic Programming; Local alignment and Global alignment (algorithm and example), Pairwise alignment (BLAST and FASTA Algorithm) and multiple sequence alignment (Clustal W algorithm).

Unit 5 Anatomy of proteins and Visualization (12)

Primary, Secondary and tertiary structure of proteins and 3D structure viewers (Rasmol, SPDBv, Chime, Cn3D, PyMol).

Total : 60 hours

Text Books

1. Mount David. Bioinformatics: sequence and genome analysis, 2nd edn. 2000, Cold Spring Harbor Laboratory.

Reference Books

1. Stephen Misener, Stephen A. Krawetz. Methods and Protocols (Methods in Molecular Biology) 1999, Humana Press.
2. Jonathan Pevsner. Bioinformatics and Functional Genomics 2nd Edition 2009, Wiley Blackwell.
3. Stephen Misener, Stephen A. Krawetz. Methods and Protocols (Methods in Molecular Biology) 1999, Humana Press.
4. Jonathan Pevsner. Bioinformatics and Functional Genomics 2nd Edition 2009, Wiley Blackwell.

PRINCIPLES OF GENETICS

4 0 0 3

Course objectives

Genetics having its roots in mathematics thanks to Mendel, appeals to students as one of the analytical branches of biology even in senior school. Basic concepts that are essential to understand inheritance will be taught, starting from the abstract factors to physical basis of inheritance. The course aims to communicate the pivotal role of Mendelian concepts in the development of the science of genetics and also the fact that nature is full of examples that deviate from Mendelian laws starting from linkage groups.

Unit 1 Concept of genetic inheritance (5)

Concept of alleles, haploid and diploid status, phenotype and genotype: Mendel's laws of inheritance, dominant and recessive inheritance, test, back and reciprocal crosses with two examples each.

Unit 2 Physical basis of inheritance (5)

Chromosomal theory of inheritance, concept of linkage and crossing over, cytological proof of crossing over, genetic mapping: two and three point cross over. Allelic interactions- dominance relationships- complete, incomplete and co-dominance, gene-gene interaction.

Unit 3 Extra nuclear inheritance (4)

Criteria for extra nuclear inheritance, plastid inheritance in *Mirabilis jalapa*, maternal effect snail shell coiling, cytoplasmic inheritance (mitochondria and chloroplast).

Unit 4 Analysis of genetic inheritance in human (5)

Gathering family history, pedigree symbols and construction of pedigrees. Patterns of inheritance for monogenic traits and risk assessment with examples for autosomal inheritance-dominant, recessive, sex-linked inheritance, sex-limited and sex-influenced traits, mitochondrial inheritance.

Unit 5 Karyotyping (5)

Karyotyping- banding pattern and nomenclature (G and Q banding), common syndromes due to numerical chromosome changes, common syndromes due to structural alterations (translocations, duplications, deletions)

Total : 24 hours

Text Books

1. Principles of Genetics, 6th edition (2011), Snustad DP and Simmons MJ, John Wiley and Sons, Inc; ISBN-13: 978-0470903599
2. Human Molecular Genetics, 3rd edition (2003) by Tom Strachan and Andrew Read; Garland Science Publishers, ISBN -13: 978-0815341826.

Reference Books

1. William S. Klug, Michael R. Cummings, Charlotte A. Spencer, Michael A. Palladino; Pearson Education, ISBN-13: 978-0321724120. Concepts of Genetics, 10th edition, (2011).
2. Gardner EJ, Simmons MJ, Snustad DP. Principles of Genetics, 8th edition (2005), John Wiley and Sons, Inc. ; ISBN-13: 978-9971513467.
3. Griffith AJF, Miller JH, Suzuki DT, Lewontin RC, Gelbert WM., An introduction to Genetic Analysis, W. H. Freeman and Co. New York. ISBN-13: 978-429229432. 10th edition (2010),
4. Principles of Genetics, 6th edition (1998), Robert H. Tamarin Publisher: William C Brown Pub; ISBN-13: 978-0697354624.

STATISTICS

4 0 0 3

Course objectives

The course was designed in such a way to get hands on training in the Biochemical methods in the aspect of doing research and to impart the knowledge of Statistics to the students.

Unit I Computer Components and Programming (12)

Components of Computers: Hardware – software – Types of S/W – Input and output Devices – CPU – ALU – Memory – Types of Memory – Files – Types of files.

Programming: Introduction to Programming languages – types of Programming languages – Uses – DBMS – Advantages – RDBMS – Multimedia – Uses.

Unit II Internet (12)

Introduction to Internet – uses of Internet – types of Internet – Intranet – Extranet – ISP – Types of Email, Chatting, Browsing. WWW – Webpage, Web browser, Web server – uses – advantages – Search engines.

Unit III Introduction to statistics (12)

Introduction to statistics – diagrammatic and graphical representation – measures of central tendency : mean, median , mode – measures of dispersion : quartile deviation , mean deviation , standard deviation.

Unit IV Correlation Analysis (12)

Correlation analysis : Scatter diagram method, karl pearson's method, spearman's rank correlation method- regression analysis : regression equation of Y on X and Y on X - simple problems.

Unit V Test of Hypothesis (12)

Test of Hypothesis-, T test, F test , χ^2 test- ANOVA: one way, two way anova.

Total : 60 hours

TextBooks

1. Levin and Rubin, Statistics for Management, Prentice hall of India. 7th Edition, 1998.
2. N. Gurumani, Research Methodology for Biological Science, MJP Publisher, 2006.

Reference Books

1. Anderson. J., et al, Thesis and assignment writing, Wiley eastern Pvt. Ltd. Delhi, 1970.
2. Alexis Lcon and Mathew's icon, Fundamentals of Information Technology, Wikas Publisher, 1999.
3. C. R. Kothari, Research Methodology: Methods and Techniques, New Age International(P) Limited, India, 2005. 2nd Edition.

PATHOLOGICAL BASIS OF DISEASES

4 0 0 3

Course objectives

The syllabi of Pathology compliments and supplements the necessary knowledge students have gained in Physiology. Consequently it incorporates topics like cellular adaptations, inflammation, neoplasia, cellular ageing and other infectious diseases. Pathology also provides the necessary inputs for the other disciplines like Pharmacology, social and preventive medicine, medicinal biochemistry etc.

Unit 1 Introduction (5)

History of pathology, Basic definitions and common terms used in pathology, Survival mechanism and disease, microscopic and cellular pathology, scope and techniques used.

Unit 2 Cell Injury and responses of cells: Cellular Adaptations, and Cell Death (5)

An overview of cellular adaptation: Hyperplasia, Hypertrophy, Atrophy, Metaplasia; Causes and mechanisms of cell injury, reversible and irreversible injury, Necrosis, Apoptosis, Types of apoptosis, Intracellular accumulations, Cellular ageing

Unit 3 Role of Inflammation in disease (5)

Basic concepts with suitable examples of general features of acute and chronic inflammation: Vascular Changes, cellular events, important chemical mediators of inflammation, Morphological effects inflammation response, Granulomatus Inflammation.

Unit 4 Role of Tissue repair Healing and Fibrosis (4)

Basic mechanism of tissue regeneration, and repair by healing, scar formation and fibrosis

Unit 5 Common Hemodynamic Disorders in diseases (5)

An overview of Edema, hyperemia, congestion, hemorrhage, hemostasis and thrombosis, Embolism, Infarction and shock with suitable examples

Total : 24 hours

Text Books

1. Robbins and Cotran. Pathologic Basis of Disease, 8th edition (2009), Vinay Kumar, Abul. K. Abbas, Jon C. Aster, Nelson Fausto; Saunders Publishers, ISBN-13: 978-1416031215
2. Robbins, Basic Pathology, 9th edition (2012), Kumar, Abbas, Fausto and Mitchell; Saunders Publication, ISBN-13: 978-1437717815

Reference Books

1. J.,Ed. Underwood and J. C. E. Underwood General And Systematic Pathology, 2nd edition (1996); Churchill Livingstone, ISBN-13: 978-0443052828
2. Ramnik. Sood Medical Laboratory Technology Methods and Interpretations, 6th edition (2009); Jaypee Brothers Medical Publishers, ISBN-13: 978-8184484496.

Course objectives

The paper details the types of natural resources and also tries to create an awareness on the exploitation of natural resources and the practices for the goal of sustainability.

Unit 1 Natural resources (5)

Definition and types. Sustainable utilization - Concept, approaches (economic, ecological and socio-cultural). Renewable and non-renewable sources of energy

Unit 2 Land and Water (5)

Utilization (agricultural, pastoral, horticultural, silvicultural); Soil degradation and Management. Fresh water (rivers, lakes, groundwater, aquifers, watershed); Marine; Estuarine; Wetlands; Threats and management strategies.

Unit 3 Biological Resources (5)

Biodiversity-definition and types; Significance; Threats; Management strategies; Bioprospecting; IPR; CBD; National Biodiversity Action Plan).

Unit 4 Forests (5)

Definition, Cover and its significance (with special reference to India); Major and minor Forest products; Depletion; Management.

Unit 5 Contemporary practices in resource management (4)

EIA, GIS, Participatory Resource Appraisal, Ecological Footprint with emphasis on carbon footprint, Resource Accounting; Waste management.

Total : 24 hours**Text Books**

1. Vasudevan, N Essentials of Environmental Science (2006). Narosa Publishing House, (New Delhi).

Reference Books

1. Singh, J. S., Singh, S.P. and Gupta, S. Ecology, Environment and Resource Conservation (2006) Anamaya Publications, (New Delhi).
2. Rogers, P.P., Jalal, K.F. and Boyd, J.A. An Introduction to Sustainable Development (2008). Prentice Hall of India Private Limited, (New Delhi).

INTELLECTUAL PROPERTY RIGHTS

4 0 0 3

Course objectives

The course aims at introducing the students to the much needed awareness on intellectual property rights and its types.

Unit 1: Introduction to intellectual property right (IPR) (5)

Concept and kinds. Economic importance. IPR in India and world: Genesis and scope, some important examples. IPR and WTO (TRIPS, WIPO).

Unit 2: Patents and Copyrights (5)

Objectives, Rights, Patent Act 1970 and its amendments. Procedure of obtaining patents, Working of patents. Infringement.

Introduction, Works protected under copyright law, Rights, Transfer of Copyright, Infringement.

Unit 3: Trademarks and Geographical Indications (5)

Trademarks Objectives, Types, Rights, Protection of goodwill, Infringement, Passing off, Defences, Domain name.

Geographical Indications: Objectives, Justification, International Position, Multilateral Treaties, National Level, Indian Position.

Industrial Designs: Objectives, Rights, Assignments, Infringements, Defences of Design Infringement

Unit 4: Protection of Traditional Knowledge (5)

Objective, Concept of Traditional Knowledge, Holders, Issues concerning, Bio-Prospecting and Bio-Piracy, Alternative ways, Protectability, need for a Sui-Generis regime, Traditional Knowledge on the International Arena, at WTO, at National level, Traditional Knowledge Digital Library.

Unit 5: Protection of Plant Varieties (4)

Plant Varieties Protection-Objectives, Justification, International Position, Plant varieties protection in India. Rights of farmers, Breeders and Researchers. National gene bank, Benefit sharing. Protection of Plant Varieties and Farmers' Rights Act, 2001.

Total : 24 hour

Text Books

1. N.S. Gopalakrishnan & T.G. Agitha, (2009) Principles of Intellectual Property Eastern Book Company, Lucknow.
2. Kerly's Law of Trade Marks and Trade Names (14th Ed) Thomson, Sweet & Maxweel.

Reference Books

1. Ajit Parulekar and Sarita D' Souza, (2006) Indian Patents Law – Legal & Business Implications; Macmillan India Ltd.
2. B.L. Wadehra (2000) Law Relating to Patents, Trade Marks, Copyright, Designs & Geographical Indications; Universal law Publishing Pvt. Ltd., India.
3. P. Narayanan (2010) Law of Copyright and Industrial Designs; Eastern law House, Delhi.

HERBAL TECHNOLOGY

2002

Course objectives

Herbal technology gives a brief discussion on the alternative medicines practiced in India. The importance of medicinal plants can be well understood.

Unit 1 Introduction (5)

Herbal medicines: history and scope - definition of medical terms - role of medicinal plants in Siddha systems of medicine; cultivation - harvesting - processing - storage - marketing and utilization of medicinal plants.

Unit 2 Pharmacognosy (5)

Pharmacognosy - systematic position medicinal uses of the following herbs in curing various ailments; Tulsi, Ginger, Fenugreek, Indian Goose berry and Ashoka.

Unit 3 Phytochemistry (5)

Phytochemistry - active principles and methods of their testing - identification and utilization of the medicinal herbs; *Catharanthus roseus* (cardiotonic), *Withania somnifera* (drugs acting on nervous system), *Clerodendron phlomoides* (anti-rheumatic) and *Centella asiatica* (memory booster).

Unit 4 Analytical pharmacognosy (5)

Analytical pharmacognosy: Drug adulteration - types, methods of drug evaluation - Biological testing of herbal drugs - Phytochemical screening tests for secondary metabolites (alkaloids, flavonoids, steroids, triterpenoids, phenolic compounds).

Unit 5 Conservation of herbs (4)

Medicinal plant banks micro propagation of important species (*Withania somnifera*, neem and tulsi)- Herbal foods-future of pharmacognosy.

Total : 24 hours

Text Books

1. Glossary of Indian medicinal plants, R.N.Chopra, S.L.Nayar and I.C.Chopra, 1956. C.S.I.R, New Delhi.
2. The indigenous drugs of India, Kanny, Lall, Dey and Raj Bahadur, 1984. International Book Distributors.

Reference Books

1. Herbal plants and Drugs Agnes Arber, 1999. Mangal Deep Publications.
2. Ayurvedic drugs and their plant source. V.V. Sivarajan and Balachandran Indra 1994. Oxford IBH publishing Co.
3. Ayurveda and Aromatherapy. Miller, Light and Miller, Bryan, 1998. Banarsidass, Delhi.
4. Principles of Ayurveda, Anne Green, 2000. Thomsons, London.

Course objectives

Pharmacology is the science concerned with the study of drugs and how they can best be used in the treatment of disease in both humans and animals. The course starts with the general considerations and lead to understanding of various drugs acting on different body systems. It is a very important biomedical discipline, with roots both in basic biology and chemistry, and plays a vital role in helping to safeguard our health and welfare.

Unit 1 General Pharmacology (5)

Nature and Source of drugs, Routes of drug administration and their advantages, receptor and receptor subtypes.

Unit 2 Pharmacokinetics (5)

Drug absorption, distribution, metabolism, and excretion, bioavailability, First Pass metabolism, excretion and kinetics of elimination, Bioavailability, Biological half life of drug and its significance, Drug-drug interactions.

Unit 3 Pharmacodynamics (5)

Principles and mechanism of drug action, Factors affecting drug action. General considerations, pharmacological classification, mechanism of action and uses of following classes of drugs acting on various systems.

Unit 4: Drugs acting on CNS (5)

(a) Mechanism of General anaesthesia, Stages of anaesthesia, General anaesthetics (Nitric oxide, halothane), (b) Principles of hypnosis and sedatives: sedative and hypnotics drugs (Phenobarbitone, diazepam), (c) Opioid analgesics (Morphine) (d) CNS stimulants (strychnine, amphetamine).

Unit 5: Anti-inflammatory, Hormones and hormone antagonists (4)

Drug therapy of inflammation, NSAID and other drugs (aspirin, celecoxib). Insulin and oral hypoglycaemic agent (tolbutamide, rosiglitazone), thyroid and anti-thyroid drugs (eltroxin, carbimazole), estrogen and progestins (progesterone, hydroxyprogesteronecaproate).

Total : 24 hours

Text Book

1. Essentials of Medical Pharmacology, 7th edition (2010), K.D. Tripathi, Jaypee Brothers.

Reference Books

1. H.P. Rang, M.M. Dale, J.M. Ritter and P.K. Moore Pharmacology, 7th edn (2011), , Churchill Livingstone.
2. S.K. Kulkarni, Vallabh Prakashan Hand book of Experimental Pharmacology, 4th ed (2012)

ABILITY ENHANCEMENT COMPULSORY COURSES

SEMESTER I

தமிழ் மொழி, இலக்கிய வரலாறு – அறிமுகம்

5 0 0 5

நோக்கம்: தமிழ்மொழி மற்றும் இலக்கியத்தின் வரலாற்றை அறிமுகம் செய்யும் நோக்கில் இப்பாடம் வடிவமைக்கப்பட்டுள்ளது. தமிழ்மொழியின் வரலாற்றை அறிவியல் கண்ணோட்டத்துடனும் மொழிக்குடும்பங்களின் அடிப்படையிலும் விளக்குகிறது. சங்க இலக்கியம் தொடங்கி, இக்கால இலக்கியம் வரையிலான தமிழிலக்கிய வரலாற்றை இலக்கிய வரலாறு அறிமுகப்படுத்துகின்றது. அரசு வேலை வாய்ப்பிற்கான போட்டித் தேர்வுகளுக்குப் பயன்படும் வகையிலும் இப்பாடம் அமைந்துள்ளது.

அலகு 1 தமிழ் மொழி வரலாறு

13 மணி நேரம்

மொழிக்குடும்பம் - இந்திய மொழிக்குடும்பங்கள் - இந்திய ஆட்சி மொழிகள் - திராவிட மொழிக்குடும்பங்கள் - திராவிட மொழிகளின் வகைகள் - திராவிட மொழிகளின் சிறப்புகள் - திராவிட மொழிகளின் வழங்கிடங்கள் - திராவிட மொழிகளுள் தமிழின் இடம் - தமிழ்மொழியின் சிறப்புகள் - தமிழ் பிறமொழித் தொடர்புகள்.

அலகு 2 சங்க இலக்கியம்

12 மணி நேரம்

சங்க இலக்கியம் - எட்டுத்தொகை - நற்றிணை - குறுந்தொகை - ஐங்குறுநூறு - பதிற்றுப்பத்து - பரிபாடல் - கலித்தொகை - அகநானூறு - புறநானூறு - பத்துப்பாட்டு - திருமுருகாற்றுப்படை - சிறுபாணாற்றுப்படை - பெரும்பாணாற்றுப்படை - பொருநராற்றுப்படை - மலைபடுகடாம் - குறிஞ்சிப்பாட்டு, முல்லைப்பாட்டு, பட்டினப்பாலை - நெடுநல்வாடை - மதுரைக்காஞ்சி.

அலகு 3 அற இலக்கியங்களும் காப்பியங்களும்

11 மணி நேரம்

களப்பிரர் காலம் விளக்கம் - நீதி இலக்கியத்தின் சமூகத்தேவை - பதினெண்கீழ்க்கணக்கு நூல்கள் அறிமுகம் - திருக்குறள், நாலடியார்.

காப்பியங்கள் - ஐம்பெருங்காப்பியங்கள் மற்றும் ஐஞ்சிறுங்காப்பியங்கள் அறிமுகம் - காப்பிய இலக்கணம் - சிலப்பதிகாரம் - மணிமேகலை - சீவகசிந்தாமணி - வளையாபதி - குண்டலகேசி.

அலகு 4 பக்தி இலக்கியங்களும் சிற்றிலக்கியங்களும்

11 மணி நேரம்

தமிழகப் பக்தி இயக்கங்கள் - பக்தி இலக்கியங்கள் - சைவ இலக்கியம் - நாயன்மார்கள்

அறுபத்து மூவர் - சமயக்குரவர் நால்வர் - வைணவ இலக்கியம் - பன்னிரு ஆழ்வார்கள் - முதல் மூன்று ஆழ்வார்கள்.

சிற்றிலக்கியக் காலம் - சிற்றிலக்கியங்கள் - வகைகள் - பரணி - கலிங்கத்துப்பரணி - குறவஞ்சி - குற்றாலக் குறவஞ்சி - பிள்ளைத்தமிழ் - மீனாட்சியம்மைப் பிள்ளைத்தமிழ் - தூது - தமிழ்விடு தூது - கலம்பகம் - நந்திக்கலம்பகம் - பள்ளு - முக்கூடற்பள்ளு.

அலகு 5 இக்கால இலக்கியங்கள்

13 மணி நேரம்

நவீன காலம் - நவீன இலக்கியம் - உள்ளடக்கம் - புதுக்கவிதை - தோற்றமும் வளர்ச்சியும்- நாவல் - முதல் மூன்று நாவல்கள் - நாவலின் வகைகள் - பொழுது போக்கு நாவல்கள் - வரலாற்று நாவல்கள் - சமூக நாவல்கள் - இக்கால நாவல்கள் - மொழிபெயர்ப்பு நாவல்கள் - சிறுகதை -வகைகளும் வளர்ச்சியும் - நாடகம் - காலந்தோறும் நாடகங்கள் - புராண இதிகாச நாடகங்கள் - சமூக நாடகங்கள் - வரலாற்று நாடகங்கள் - மொழிபெயர்ப்பு நாடகங்கள் - நகைச்சுவை நாடகங்கள்.

பாட நூல்கள்

1. அகத்தியலிங்கம். ச., “திராவிடமொழிகள் தொகுதி 1”, மணிவாசகர் பதிப்பகம், முதற்பதிப்பு, 1978.
2. சக்திவேல். ச., “தமிழ்மொழி வரலாறு”, மணிவாசகர் பதிப்பகம், முதற்பதிப்பு 1998.
3. பூவண்ணன், “ தமிழ் இலக்கிய வரலாறு”, சைவசித்தாந்த நூற்பதிப்புக் கழகம், முதற்பதிப்பு, 1998.
4. வரதராசன். மு., “இலக்கிய வரலாறு”, சாகித்ய அகாதெமி, ஒன்பதாம் பதிப்பு, 1994.
5. விமலானந்தம். மது.ச., “இலக்கிய வரலாறு”, பாரி நிலையம், மறுபதிப்பு, 2008.

Total : 60 hours

HINDI I

5 0 0 5

Objective

To train the students in the use of Karyalayin Basha. To enable the students to develop the communication skill in Hindi language .

Unit 1 Gadya aur Karyalayin Basha (12)

Mamata, -Yogyatha evam vyavasay kaa Chunaav Paribashik shabdavalil prashasanik vakyansh, padanam,

Unit 2 Gadya aur Sarkari Patra (12)

Rajneethi kaa Bhantwara, , Samanya sarkari patra, gyapan, karyalay gyapan

Unit 3 Gadya aur Sarkari Patra (12)

Computer nayi krantee kee dastak, , Karyalay aadesh, Ardha sarkari patra paripatra, Adhisoochana

Unit 4 Gadya aur Samanya Patra (12)

Raspriya, Samanya patra- chutti patra, sampadak ke naam patra, shikayati patra, pustak vikretha ke naam patra

Unit 5 Vyavasaayik patra (12)

Bankon mein bach khaata kholne ke liye – chek buk ke liye, run lene hetu, chek buk gum ho jane hetu, kitaabon kaa krayadesh

Total : 60 hours

Text Book

1. N.Lavanya . Gadya Aur Prayojanmulak Hindi , Mayura Publishers, edition 2008

Objective

To introduce French Language , To enable the students to understand and to acquire the basic knowledge of French Language with the elementary grammar.

Unit 1 Introduction (12)

Introduction - Alphabet – Comment prononcer, écrire et lire les mots- Base : Les prénoms personnel de 1^{er}, 2^{ème} et 3^{ème} personnes – Conjugaisons les verbes être et avoir en forme affirmative, négative et interrogative

Unit 2 Leçons 1- 3 (12)

Leçons 1.Premiers mots en français,- 2. Les hommes sont difficiles,- 3 Vive la liberté- Réponses aux questions tirés de la leçon - Grammaire : Les adjectives masculines ou féminines – Les articles définis et indéfinis - Singuliers et pluriels

Unit 3 Leçons 4- 6 (12)

Leçons 4. L'heure, C'est l ;heure,- 5. Elle va revoir sa Normandie,- 6 .Mettez –vous d'accord groupe de nom - Réponses aux questions tirés de la leçon - Grammaire : A placer et accorder l'adjectif en groupe de nom- Préposition de lieu –A écrire les nombres et l'heure en français

Unit 4 Leçons 7- 9 (12)

Leçons7. Trois visage de l'aventure,- 8. A moi, Auvergne,- 9. Recit de voyage - Réponses aux questions tirés de la leçon - Grammaire : Adjectif possessif – Les Phrases au Présent de l'indicatif - Les phrases avec les verbes pronominaux au présent

Unit 5 Composition (12)

A écrire une lettre à un ami l'invitant à une célébration différente ex : mariage – A faire le dialogue - A lire le passage et répondre aux questions

Total : 60 hours**Text Book**

Jacky Girarder & Jean Marie Gridlig, « Méthode de Français Panorama », Clé Internationale , Goyal Publication, New Delhi., Edition 2004

Reference Books

1. Dondo Mathurin, “Modern French Course”, Oxford University Press, New Delhi, Edn 1997
2. Nitya Vijayakumar, “Get Ready French Grammar – Elementary”, Goyal Publications, New Delhi. Edn 2010

Course objectives

To enable the students to develop their communication skills effectively, to make students familiar with the English Language, to enrich vocabulary in English and to develop communicative competent

Unit 1	Detailed Poems I	12
	1. On His Blindness - John Milton	
	2. The Village Schoolmaster - Oliver Goldsmith	
	3. The Daffodils - William Wordsworth	
Unit 2	Detailed Poems II	12
	4. Night and Death - Joseph Blanco White	
	5. The Ballad of Father Gilligan - W.B. Yeats	
Unit 3	Prose	12
	1. Martin Luther King Jr. - Coretta s King	
	2. Albert Schweitzer - Norman Wymar	
	3. Stanley Finds Livingstone - Lawrence Wilson	
	4. Srinivasa Ramanujan - C.P. Snow	
	5. My Days - R.K. Narayan	
Unit 4	Grammar	12
	1. Articles	
	2. Prepositions	
	3. Tenses	
	4. Wh - Questions	
	5. Synonyms and Antonyms	
	6. One Word Substitution	
Unit 5	Composition	12
	7. Reading Comprehension	
	8. Filling up Forms	
	9. Railway Reservation/ Cancellation Forms	
	10. Bank-Chalan	
	11. Convocation Form	
	12. Money Order Form	

Total : 60 hours

Text Book

1. Mahadevan, Usha. *Empower with English, Sun Beams - I*. Emerald Pub: Chennai. 2012. Print.

SEMESTER II

தமிழிலக்கியம்

5005

நோக்கம்

சங்க காலம் தொடங்கி தற்காலம் வரையிலும் தமிழில் உள்ள படைப்பிலக்கியங்களை இப்பாடம் அறிமுகம் செய்கின்றது. தமிழ் இலக்கியத்தில் தேர்ந்தெடுக்கப்பட்ட மிக முக்கியமான செய்யுட்கள், கவிதைகள், கதைகள், உரைநடை ஆகியவற்றைக்கொண்டு இப்பாடம் கட்டமைக்கப்பட்டுள்ளது. மாணாக்கரிடம் இலக்கியத் தேடலை உருவாக்குவதும், தற்சார்புடைய அறிவை மேம்படுத்துவதும் இப்பாடத்தின் நோக்கமாகும்.

அலகு 1 செவ்வியல் இலக்கியங்கள்

12 மணி நேரம்

திருக்குறள்- அன்புடைமை, ஒழுக்கமுடைமை, பெரியாரைத்துணைக்கோடல் - மூன்று அதிகாரங்கள் முழுமையும்.

புறநானூறு- பாடல் எண்: 18, 55, 182, 183, 192 -ஐந்து பாடல்கள்.

குறுந்தொகை- பாடல் எண்: 2, 167, 27, 202, 184 - ஐந்து பாடல்கள்.

அலகு 2 காப்பியங்கள்

12 மணி நேரம்

சிலப்பதிகாரம்- கனாத்திறம் உரைத்தக் காதை முழுவதும்.

மணிமேகலை- பவத்திறம் அறுக எனப் பாவை நோற்ற காதை முழுவதும்.

கம்பராமாயணம் - மந்தரைச் சூழ்ச்சிப்படலம் (தேர்ந்தெடுக்கப்பட்ட ஒன்பது பாடல்கள்).

அலகு 3 கவிதையும் புதுக்கவிதையும்

11 மணிநேரம்

பாரதிதாசனின் 'தமிழியக்கம்' -(i) நெஞ்சு பதைக்கும் நிலை - (ii) இருப்பதைவிட இறப்பது நன்று - இரண்டு கவிதைகள்.

ஈரோடு தமிழன்பனின், "அந்த நந்தனை எரித்த நெருப்பின் மிச்சம்" என்னும் தொகுதியில் இடம்பெற்றுள்ள 'விடிகிறது' என்னும் புதுக்கவிதை.

அலகு 4 சிறுகதைகள்

12 மணி நேரம்

தி. ஜானகிராமனின் 'சக்தி வைத்தியம்'

கி. ராஜநாராயணனின் 'கதவு' - இரண்டு கதைகள்

அலகு 5 உரைநடை

13 மணி நேரம்

வைரமுத்து எழுதிய 'சிற்பியே உன்னைச் செதுக்குகிறேன்' முழுவதும்

மொத்தம்: 60 மணி நேரம்

பாட நூல்கள்

1. இரவிச்சந்திரன். சு. (ப.ஆ), "செய்யுள் திரட்டு", வேல்ஸ் பல்கலைக்கழகம், முதற்பதிப்பு, 2008.

2. வைரமுத்து. இரா., "சிற்பியே உன்னைச் செதுக்குகிறேன்", திருமகள் நிலையம், பதினேழாம் பதிப்பு, 2007.

பார்வை நூல்கள்

1. பாலச்சந்திரன்.சு., "இலக்கியத் திறனாய்வு", நியூ செஞ்சரி புக் ஹவுஸ், பத்தாம் பதிப்பு, 2007.

2. மாதையன்.பெ., "தமிழ்ச் செவ்வியல் படைப்புகள்", நியூ செஞ்சரி புக் ஹவுஸ், முதல் பதிப்பு, 2009.

3. வரதராசன்.மு., "குறள் காட்டும் காதலர்", பாரி நிலையம், மறுபதிப்பு, 2005.

Objective

To enable the students to have the knowledge in contemporary literature of the modern era. It also provides an idea how translation to be effected.

Unit 1 Kahani Aur Ekanki (12)

Poos Kee Raat., - **Duzhazar**

Unit 2 Ekanki aur Kahani (12)

Vaapasi, Akeli, . Akbhari vigyapan

Unit 3 Kahani Aur Anuvad (12)

Sharandatha - Anuvad anuched angreji se hindi me karne ke liye.

Unit 4 Ekanki aur Anuvad (12)

Raat ke Raahi Main Bhi Maanav hoon Anuvad anuched angreji se hindi me karne ke liye.

Unit 5 Kahani , Ekanki Aur Anuvad (12)

Parda - Yeh Meri Janma Bhoomi Hai -anuvad anuched angreji se hindi me karne ke liye.

Total : 60 hours

Text Book

1. N.Lavanya, Sankalan Kahani evam Ekankied Mayura Publishers, edition 2010

Objective

To fortify the grammar and vocabulary skills of the students and Enable the students have an idea of the French Culture and Civilization.

Unit 1 Leçons 10 – 11 (12)

Leçons : 10. Les affaires marchent,- 11. Un après midi à problèmes- Réponse aux questions tirés de la leçon - Grammaire : Présent progressif, passé récent ou future proche - Complément d'objet directe - Complément d'objet indirecte .

Unit 2 Leçons 12 – 13 (12)

Leçons : 12. Tout est bien qui fini bien,- 13. Aux armes citoyens – Réponses aux questions tirés de la leçon - Grammaire : Les pronoms « en ou y » rapporter des paroles - Les pronoms relatifs que, qui, ou où .

Unit 3 Leçons 14 – 15 (12)

Leçons 14. Qui ne risqué rien n'a rien,- 15. La fortune sourit aux audacieux – Réponses aux questions tirés de la leçon - Grammaire : Comparaison – Les phrases au passé composé

Unit 4 Leçons 16 – 18 (12)

Leçons 16 La publicite et nos rêves 17 La France le monde 18 Campagne publicitaire Réponses aux questions tirés de la leçon - Grammaire :- Les hrases à l' Imparfait - Les phrases au Future

Unit 5 Composition : (12)

A écrire une lettre de regret// refus à un ami concernant l'invitation d'une célébration reçue- A écrire un essaie sur un sujet générale - A lire le passage et répondre aux questions

Total : 60 hours

Text Book

Jacky Girardier & Jean Marie Gridlig, « Méthode de Français Panorama », Clé Internationale , Goyal Publication, New Delhi., Edition 2004

Reference Books

1. Dondo Mathurin, “ Modern French Course”, Oxford University Press, New Delhi., Edition 1997
2. Paul Chinnappane “ Grammaire Française Facile” , Saraswathi House Pvt Ltd, New Delhi, Edition 2010

FOUNDATION ENGLISH II**6 0 0 4****Course Objective: -**

To enable the students to develop their communication skills effectively. To make students familiar with the English Language. To enrich vocabulary in English. To develop communicative competency.

Unit 1 Prose-I**12**

1. On Saying 'Please' - A.G. Gardiner
2. Women, Not the Weaker Sex - M.K. Gandhi
3. The Sky is the Limit - Kalpana Chawla

Unit 2 Prose-II**12**

4. Polluting the World - Edgar I. Baker
5. Dimensions of Creativity - Dr. A. P. J. Abdul Kalam
6. The Message of Visva - Bharati

Unit 3 Short Stories**12**

1. Open Window - H. H. Munro (Saki)
2. The Lion's Share - Arnold Bennett
3. The Sparrows - K.A. Abbas
4. The Cop and The Anthem - O- Henry
5. The Necklace - Guyde Maupassant

Unit 4 Fundamental Grammar Skills**12**

1. Question Tags
2. Concord
3. Reported Speech
4. Idiom and Phrases

Unit 5 Advanced Grammar Skills**12**

5. Conditional Clauses
6. Cause and Effect
7. Simple, Complex, Compound
8. Framing Questions

Total : 60 hours**Text Book**

1. Rao, Shoba B. Empower with English, Sun Beams - II. Emerald Pub: Chennai. 2012. Print.

SEMESTER III

பயன்பாட்டுத் தமிழ்

5004

நோக்கம்

தற்கால அன்றாடத்தேவைக்குரிய வகையில் தமிழ்மொழியைச் செம்மையாகப் பயன்படுத்த வேண்டும் என்னும் நோக்கில் இப்பாடம் உருவாக்கப்பட்டுள்ளது. மாணாக்கரின் வேலைவாய்ப்பு நேர்காணல்கள் மற்றும் குழு உரையாடல்களை எதிர்கொள்வதற்கேற்ற பேச்சுத்திறன் மேம்பாடு, செய்தித்தாள்களை நுட்பமாக அணுகும்விதம், சிறந்த கடிதங்களை எழுதுவதற்கான பயிற்சி போன்ற பயன்பாடு சார்ந்த மொழிப்பயிற்சியை இப்பாடம் அளிக்கின்றது.

அலகு 1 மொழி

11 மணி நேரம்

பிழை நீக்கி எழுதுதல் - ஒற்றுப்பிழை நீக்கி எழுதுதல் - தொடர்பிழை நீக்கி எழுதுதல் - ஒற்று மிகும் இடங்கள் - ஒற்று மிகா இடங்கள் - பிற மொழிச் சொற்களை நீக்கி எழுதுதல் - பயிற்சிகள்.

அலகு 2 பேச்சு

13 மணி நேரம்

பேச்சுத்திறன் - விளக்கம் - பேச்சுத்திறனின் அடிப்படைகள் - வகைகள் - மேடைப்பேச்சு - உரையாடல் - குழுவாக உரையாடல் - பயிற்சிகள்.

தலைவர்களின் மேடைப் பேச்சுகள் - பெரியார் - அண்ணா - கலைஞர்.

அலகு 3 எழுதுதிறன்

12 மணி நேரம்

கலைச்சொல்லாக்கம் - தேவைகள் - கலைச்சொற்களின் பண்புகள் - கலைச்சொல்லாக்கத்தில் தவிர்க்க வேண்டியவை - அறிவியல் கலைச்சொற்கள்.

கடிதம் - வகைகள் - அலுவலகக் கடிதங்கள் - பயிற்சி - அறிஞர்களின் கடிதங்கள் - கடிதங்களின் வழி கற்பித்தல் - சில அறிஞர்களின் கடிதங்கள் - நேரு...,

அலகு 4 மொழிபெயர்ப்பு

13 மணி நேரம்

மொழிபெயர்ப்பு அடிப்படைக் கோட்பாடுகள் - மொழிபெயர்ப்பு முறைகள் - மொழிபெயர்ப்பாளரின் தகுதிகள்.

மொழிபெயர்ப்பு வகைகள் - சொல்லுக்குச் சொல் மொழிபெயர்த்தல் - தழுவல் - கட்டற்ற மொழிபெயர்ப்பு - மொழியாக்கப்படைப்பு - இயந்திர மொழிபெயர்ப்பு - கருத்துப்பெயர்ப்பு - மொழிபெயர்ப்பு நடை - மொழிபெயர்ப்பு சிக்கல்களும் தீர்வுகளும்.

பயிற்சி: அலுவலகக் கடிதங்களை மொழிபெயர்த்தல் (ஆங்கிலத்திலிருந்து தமிழுக்கு).

அலகு 5 இதழியல் பயிற்சி

11 மணி நேரம்

இதழ்களுக்குத் தலையங்கம் எழுதுதல் - நூல் மதிப்புரை எழுதுதல் - சாதனையாளரை நேர்காணல் - நிகழ்ச்சியைச் செய்தியாக மாற்றுதல்.

பாட நூல்கள்

1. ஈஸ்வரன்.ச., சபாபதி.இரா., “இதழியல்”, பாவை பப்ளிகேஷன்ஸ், முதற்பதிப்பு, 2004.
2. ஈஸ்வரன்.ச., “மொழிபெயர்ப்பியல்”, பாவை பப்ளிகேஷன்ஸ், முதற்பதிப்பு, 2005.
3. எட்கர் தார்ப், ஷோவிக் தார்ப், “நேர்முகத் தேர்வில் வெற்றிபெற”, கிழக்குப் பதிப்பகம், இரண்டாம் பதிப்பு, 2009.
4. சுப்பிரமணியன்.பா.ரா., ஞானசுந்தரம்.வ., (ப.ஆ)“தமிழ்நடைக் கையேடு”, இந்தியமொழிகளின் நடுவண் நிறுவனம், மைசூர் மொழி அறக்கட்டளை மற்றும் தஞ்சைத்தமிழ்ப் பல்கலைக்கழகம் - வெளியீடு, நான்காம் மீள்பதிப்பு, 2010.
5. சுப்புரெட்டியார்.ந., “தமிழ் பயிற்றும் முறை”, மெய்யப்பன் பதிப்பகம், ஐந்தாம் பதிப்பு, 2006.

Objective

To help the students to have in depth knowledge of Literature. It makes the students to acquire more about the medieval period through the literary works.

Unit 1 Prachin Kavya Hindi Sahitya ka Itihas (12)

Kabir- Hindi bash aka vikas – Hindi sahitya kaa aavirbahv

Unit 2 Prachin Kavya Hindi Sahitya ka Itihas (12)

Surdaas, Tulsidass. Hindi sahitya kaa kaal vibhajan, aadikal, kaa Parichay

Unit3 Prachin Kavya Hindi Sahitya ka Itihas (12)

Rahim, aadikaal kaa namkran, paristhitiyan, racha evam rachnaakar

Unit 4 Bhakti Kaal, Reethi kaa (12)

Bhakti kal kaa vibhajan paristhitiyan- racha evam rachnaakar - Reethikal ke prakaar, rachna evam rachnakar

Unit 5 Prachin Kavya evam rachnakaron kaa parichay (12)

Bihari - Chandbardayee, Ameerkhusaro, Kabir, Surdas, Tulsidas Jaayasi, Kesahv das Bhushan

Total : 60 hours**Text Book**

1. N. Lavanya, Prachin evam Aadhunik Kavya Sankalan ed , Mayura Publishers, edition 2011

Reference Book

1. Nagendra, Hindi Sahitya kaa Itihas, Raj kamal Prakashan, 1997

Objective

To strengthen the Grammar and Composition in French language and To train the students to enhance his skill in French language for communication

Unit 1 Leçon 16 & 29 (12)

Leçon 16 - La famille Vincent (Page 44) - Grammaire : Passé composé'

Leçon 29 - Vers l'hôtel (page 80) Grammaire : Impératif, A mettre les phrases du singulier au pluriel

Unit 2 Leçon 40 & 44 (12)

Leçon 40 - L'épicerie, les légumes et les fruits (page 112) – Grammaire : Présent de l'indicatif

Leçon 44 - La poste (page 124) – l Grammaire : A mettre les phrases à l'imparfait

Unit 3 Leçon 51 & 58 (12)

Leçon 51 - Le café et tabac (page 142) - Grammaire : A changer les phrases en Interrogatif

Leçon 58 - La Chasse et la pêche (160) - Grammaire : Le plus que parfait

Unit 4 Leçon 61 (12)

Leçon 61 Un mariage à la campagne(page 170) - Grammaire –A changer au participe présent

Unit 5 Composition (12)

Composition : A écrire une lettre à un ami l'invitant à une celebration differente ex : mariage –
A faire un essaie sur un sujet générale - A lire le passage et répondre aux questions

Total : 60 hours

Text Book

Les leçons ont été choisi et tiré de I & II degré de G .MAUGER « Cours de Langue et de Civilisation Française » The Millenium, Publication Hachette, Edition 2002

Reference Books

1.Dondo Mathurin, “ Modern French Course”, Oxford University Press, New Delhi., Edition 1997

2. Paul Chinnapan, « Saraswati Grammaire Française facile », Saraswathi House Pvt. Ltd., New Delhi., Edition 2010

3. Larouse, “Larouse French Grammar”, Goyal Publication, New Delhi, Edition 1995

Objective

To Train The Students In The Use Of The English Language In Varied Literary And Non Literary Context, To Teach Them Soft Skills And Strength Their Foundation In Grammar And Composition, To Elevate Their Comprehension Skills.

Unit 1 Prose I **12**

1. Spoon Feeding - W. R. Inge
2. Reading For Pleasure - L. A. G. Strong
3. The Challenge Of Our Time - E. M. Forster

Unit 2 Prose II **12**

4. Human Values In Education - V. K. Gokak
5. Human Rights - Sivagami Paramasivam

Unit 3 Short Stories **12**

1. Comrades - Nanine Gordimer
2. Games At Twilight - Anita Desai
3. The Gateman's Gift - R.K. Narayan

Unit 4 Primary Composition Exercises **12**

1. Letter Writing
2. Comprehension

Unit 5 Advancedcomposition Exercises **12**

3. Precis-Writing
4. Resume Writing
5. Report Writing

Total : 60 hours

Text Books

1. Subramanian, S. Dr. Words of Wisdom. An Anthology of Modern Prose. Anu Chitra Pub., Chennai. 2003. P.
2. Subramanian, A, E. Gifts to Posterity. An Anthology of Modern Short Stories. Anu Chitra Pub., Chennai. 2003.

SEMESTER IV

தமிழர் நாகரிகமும் பண்பாடும்

5 0 0 5

நோக்கம்

பண்டைத் தமிழரின் வாழ்வியல் நெறிகள் இயல்பானதும் இயற்கையோடு இணங்கிச் செல்வதுமாகும்; மிகவும் பழமையானதும் பண்பட்டதுமாகும். அன்பான அக வாழ்க்கையைக்கூட செம்மையாகத் திட்டமிட்டுள்ளனர். பொழுதுபோக்கு, போர்முறைகள், கலை, சமயம், அரசியல், அறிவியல் என அனைத்திலும் தமிழர் சிறந்து விளங்குவதை விளக்கும் பாடமாக இது அமைந்துள்ளது. அரசு வேலை வாய்ப்பிற்கான போட்டித் தேர்வுகளுக்குப் பயன்படும் வகையிலும் இப்பாடம் அமைந்துள்ளது.

அலகு 1 நாகரிகம், பண்பாடு

12 மணி நேரம்

சொற்பொருள் விளக்கம் - பண்டைத் தமிழர் வாழ்வியல் - அகம் - களவு - கற்பு - குடும்பம் - விருந்தோம்பல் - உறவு முறைகள் - சடங்குகள் - நம்பிக்கைகள் - பொழுதுபோக்கு - புறம் - போர் முறைகள் - நடுகல் வழிபாடு - கொடைப்பண்பு.

அலகு 2 கலைகள்

12 மணி நேரம்

சிற்பம் - ஓவியம் - இசை - கூத்து - ஒப்பனை - ஆடை அணிகலன்கள்.

அலகு 3 சமயம்

12 மணி நேரம்

சைவம் - வைணவம் - சமணம், பௌத்தம் வெளிப்படுத்தும் பண்பாடு.

அலகு 4 அரசியல்

12 மணி நேரம்

அரசு அமைப்பு - ஆட்சி முறை - உள்நாட்டு வணிகம் - வெளிநாட்டு வணிகம் - வரி வகைகள் - நாணயங்கள் - நீதி முறை.

அலகு 5 அறிவியல்

12 மணி நேரம்

கல்வி - வேளாண்மை - வானியல் அறிவு - மருத்துவம் - கட்டிடக்கலை.

பாட நூல்கள்

1. கே.கே. பிள்ளை, “தமிழக வரலாறு: மக்களும் பண்பாடும்”, உலகத் தமிழாராய்ச்சி நிறுவனம், மீள்பதிப்பு, 2009.
2. பக்தவச்சல பாரதி, “தமிழர் மானிடவியல்”, அடையாளம், இரண்டாம் பதிப்பு, 2008.
3. தட்சிணாமூர்த்தி. அ., “தமிழர் நாகரிகமும் பண்பாடும்”, யாழ் வெளியீடு, மறுபதிப்பு, 2011.
4. தேவநேயப்பாவாணர். ஞா., “பழந்தமிழர் நாகரிகமும் பண்பாடும்”, தமிழ்மண் பதிப்பகம், சென்னை.
5. வானமாமலை.நா., “தமிழர் வரலாறும் பண்பாடும்”, நியூ செஞ்சுரி புக் ஹவுஸ், ஆறாம் பதிப்பு, 2007.

Objective

To enable the students to acquire knowledge in journalism so as to enhance his skill in effective communication pertaining to Hindi language .

Unit 1 Aadhunik kavitha Aur Rachnaakar (12)

Mythili Sharan Gupt - Apna Sansar, Aadhunik Rachnakar Hazaari prasad Diwedi,
Mahaveer Prasad Diwedi,

Unit 2 Aadhunik kavitha Aur Rachnaakar (12)

Jayashankar Prasad Kamayani - Chinta, Aadhunik Hindi Rachanakar Premchand, Jainendra

Unit 3 Aadhunik kavitha Aur Patrakaritha (12)

Mahadeviverma, Murjaya PhoolBhavani Prasad Mishra Patrakarita – paribhasha,, arth, prakar,
swaroop

Unit 4 Aadhunik kavitha, Patrakaritha aur Rachnakar (12)

Mukthibodh Tum Logoan se door, Shamsheer Bhadur Singh – Bharat kee aarathi,
Vigyapan- sampadan kala,-Nirala, -Pant- Mohan Rakesh

Unit 5 Aadhunik kavitha , Patrakaritha aur Rachnakar (12)

Prabhakar Machve Nimna Mdhya varg, **Patrakaritha-** samachar sankalan - Peeth patrakarita,
Rachnakaar - Fanishwaranath renu -Mannu bhandari,Bhagawaticharan Verma, Yashpal

Total : 60 hours**Text Book**

1. N. Lavanya, Prachin evam Aadhunik Kavya Sankalan ed Mayura Publishers, edition 2011

Reference Book

1. Patrakaritha Ek Paricahy by Dr.Madhu Dhawan, Bodh Prakashan, edition 1997

FRENCH IV

5 0 0 5

Objective

To enable the students to strengthen their knowledge of grammar/ composition, to make the students to develop their skills of communication in French language

Unit 1 Leçon 20 & 46 (12)

Leçon 20 - Une grande Nouvelle (page 56) – Grammaire : A mettre les phrases au Future

Leçon 46. - Le métro ; l'autobus (page 130) - Grammaire : A former ou à changer l'adjectif masculin ou féminin à l'adverbe - A trouver les noms qui correspondent aux verbes

Unit 2 Leçon 48 & 63 (12)

Leçon 48. - A la Préfecture de police (page 132) - Grammaire : Les Pronoms relatifs

Leçon 63 - Les sports (page 174) Grammaire : Le conditionnel présent

Unit 3 Leçon 56 & 57 (12)

Leçon 56 - A Biarritz, la plage (page 156) - Grammaire : Le future antérieure

Leçon 57 - Dans les Pyrénées (page 158) - Grammaire : Le future antérieure suite)

Unit 4 Leçon 65 (12)

Leçons 65 - A fin des vacances (page 178) Grammaire : A changer les phrases du pluriel- au singulier - Le présent du subjonctif

Unit 5 (12)

Composition : A écrire une lettre de regret / refus à un ami concernant l'invitation d'une célébration reçue- A écrire un essai sur un sujet générale - A lire le passage et répondre aux questions

Total : 60 hours

Text Book

Les leçons ont été choisi et tiré de I &II degré de G .Mauger « Cours de Langue et de Civilisation Française » The Millenium, Publication Hachette, Edition 2002

Reference Books

1. Dondo Mathurin, “ Modern French Course”, Oxford University Press, New Delhi, Edition 1997

2. Paul Chinnapan, « Saraswati Grammaire Française facile », Saraswathi House Pvt. Ltd., New Delhi., Edition 2010
3. Larouse, “Larouse French Grammar”, Goyal Publication, New Delhi, Edition 1995

Course objectives

To train the students in the use of the english language in varied literary and non literary context, To teach them soft skills and strength their foundation in grammar and composition, To elevate their comprehension skills

Unit 1 Prose I **12**

1. The Complete Man - Prince Philip
2. Try Prayer Power - Norman Vincent Peale
3. On Not Answering The Telephone - W. Plomer

Unit 2 Prose II **12**

4. Science, humanities and religion - S. Radhakrishnan
5. The Reason - E. V. Lucas

Unit 3 Short Stories **12**

1. The Ant and the Grasshopper - W. Somerset Maugham
2. How much land does a man need - Leo Tolstoy
3. The Dying Detective - Sir Arthur Conan Doyle

Unit 4 Primary Composition Exercises **12**

1. Business Letters
2. Hints Development

Unit 5 Advanced Composition Exercises **12**

3. Paraphrasing
4. Writing Abstract
5. Dialogue Writin

Total : 60 hours

Text Books

1. Subramanian, S. Dr. Words of Wisdom. An Anthology of Modern Prose. Anu Chitra Pub., Chennai. 2003.
2. Subramanian, A, E. Gifts to Posterity. An Anthology of Modern Short Stories. Anu Chitra Pub., Chennai. 2003.

SKILL ENHANCEMENT COURSES

NATIONAL SERVICE SCHEME

2 0 0 2

Course objectives

To inculcate interest in building up a better society.

Unit 1 Environment Issues (5)

Environment conservation, enrichment and Sustainability - Climate change - Waste management - Natural resource management - (Rain water harvesting, energy conservation, waste land development, soil conservations and afforestation)

Unit 2 Disaster Management (4)

Introduction to Disaster Management, classification of disasters - Role of youth in Disaster Management

Unit 3 Project Cycle Management (5)

Project planning - Project implementation - Project monitoring - Project evaluation: impact assessment

Unit 4 Documentation and Reporting (5)

Collection and analysis of data - Preparation of documentation/reports - Dissemination of documents/reports

Unit 5 Project work/ Practical (5)

Workshops/ seminars on personality development and improvement of communication skills.

ENTREPRENEURSHIP DEVELOPMENT

2 0 0 2

Course objectives

The course intends to introduce to the students the field of entrepreneurship and to inculcate the interest in entrepreneurship.

Unit 1 Introduction (5)

Meaning, Needs and Importance of Entrepreneurship, Promotion of entrepreneurship, Factors influencing entrepreneurship, Features of a successful Entrepreneurship.

Unit 2 Establishing An Enterprise (5)

Forms of Business Organization, Project Identification, Selection of the product, Project formulation, Assessment of project feasibility.

Unit 3 Financing The Enterprise (5)

Importance of finance / loans and repayments, Characteristics of Business finance, Fixed capital management: Sources of fixed capital, working capital its sources and how to move for loans, Inventory direct and indirect raw materials and its management.

Unit 4 Marketing Management (5)

Meaning and Importance, Marketing-mix, product management – Product line, Product mix, stages of product life cycle, marketing Research and Importance of survey, Physical Distribution and Stock Management.

Unit 5 Entrepreneurship And International Business (4)

Meaning of International business, Selection of a product, Selection of a market for international business, Export financing, Institutional support for exports.

Total : 24 hours

Text Book

1. Holt DH. Entrepreneurship: New Venture Creation. 2005

Reference Books

1. Kaplan JM Patterns of Entrepreneurship. 2004
2. Gupta CB, Khanka SS. Entrepreneurship and Small Business Management, Sultan Chand & Sons. 2014.

MEDICAL LAB DIAGNOSTICS

2002

Course objectives

Medical Lab Diagnostics would help students enhance their practical skills and would enable them work in a Hospital setup. The students would orient themselves to work in a proper diagnostic setting, would be introduced to detection of diseases using microbiological and molecular methods.

Unit 1: Fundamentals of Clinical Diagnostics (5)

Sterilization Techniques: Physical methods and Chemical methods.

General overview of blood banking, blood typing, blood screening in transfusion medical lab.

Unit 2: Approaches to diagnosis of infectious diseases I (5)

Isolation of bacteria from mixed culture. Study of morphological, cultural, biochemical characteristics of common bacterial pathogen. Composition and use of important differential media for identification of pathogenic bacteria EMB agar, McConkey agar, TCBS agar and Salmonella-Shigella agar and blood culture media (any two)

Unit 3: Approaches to diagnosis of infectious diseases II (5)

Enumerate the microbial load on the selected fresh produce from major outlets. Isolate and identify the common microorganisms present on their surface using microbiological, biochemical and PCR techniques.

Unit 4: Immunoserology: Principles and Application I (5)

Antigen-antibody interaction and its use in diagnosis: Detection and diagnosis of common infectious diseases: Widal and typhi dot for typhoid, Malaria antigen in Malaria, NS1 antigen in Dengue

Unit 5: Immunoserology: Principles and Application II (4)

Antigen-antibody interaction and its use in diagnosis: Detection and diagnosis of common non infectious diseases: Acylatedhaemoglobin in Diabetes, TSH levels in Thyroid condition.

Total : 24 hours

Text Book

Bailey and Scott's Diagnostic Microbiology, 12th edition (2007), Betty A. Forbes, Daniel F. Sahn and Alice S. Weissfeld; Mosby Elsevier Publishers, ISBN-13: 978-0808923640.

Reference Books

1. Ramnik Sood Medical Laboratory Technology Methods and Interpretations Volume 1 & 2, 6th edition (2009); Jaypee Brothers Medical Publishers, ISBN-13: 978-8184484496.
2. James Cappuccino and Natalie Sherman, Benjamin Cummings Microbiology: A Laboratory Manual, 10th edition (2013), ISBN-13: 978-0321840226

Course objectives

Forensic science is the application of scientific knowledge to questions of civil and criminal law. Interest in forensic science has grown considerably in recent years. Keeping this in view, the present forensic science course is designed for students to explore how forensic scientist's work, the tools and techniques they use and how they reach the conclusions they present in court.

Unit 1: Crime Scene Investigation (5)

Documentation of crime scene by photography, sketching and field notes. Simulation of a crime scene for training. To lift footprints from crime scene. Introduction and principles of forensic science, Forensic science laboratory and its organization and service, tools and techniques in forensic science, branches of forensic science, causes of crime, role of modus operandi in criminal investigation

Unit 2: Types of injuries and death (5)

Case studies to depict different types of injuries and death. Classification of injuries and their medico-legal aspects, method of assessing various types of deaths.

Unit 3: Forensic Toxicology (5)

Identification techniques of common toxins, drugs, pesticides, Volatile poisons, vegetable poisons etc. in given biological samples and crime scene. Role of the toxicologist, significance of toxicological findings

Unit 4: Fingerprint analysis (5)

Investigation method for developing fingerprints by Iodine crystals. To observe the effects of surface temperature on fingerprints. Fundamental principles of fingerprinting, classification of fingerprints, development of finger print as science for personal identification.

Unit 5: DNA Fingerprinting (4)

DNA isolation in minimal available biological samples. PCR amplification on target DNA and DNA profiling. Principle of DNA fingerprinting, application of DNA profiling in forensic medicine

Total : 24 hours

Text Books

1. James SH, Nordby JJ and Bell S Forensic Science – An introduction to Scientific and Investigative Techniques, 3rd edition (2009), CRC Press, ISBN-13: 978-1420064933.
2. Barbara Wheeler and Lori J Wilson; Practical Forensic Microscopy: A laboratory manual, 1st edition (2008), Bios Scientific Publisher, ISBN-13: 978-0470031766.

Reference Books

1. Rajesh Bardale, Principles of Forensic Medicine and Toxicology, 1st edition (2011); Jaypee Brothers Medical Pub, ISBN-13: 978-9350254936.
2. Ross M Gardner, Practical Crime Scene Processing and Investigation, 2nd edition (2011), CRC press ISBN-13: 978-1439853023.
3. Karmakar, Forensic Medicine and Toxicology: Oral, Practical And Mcq, 3rd edition (2006), Jaypee Brothers, ISBN-13: 978-8171797350.
4. Houck, M.M. and Siegel, JA; Fundamentals of Forensic Science, 2nd edition (2010), Academic Press, ISBN-13: 978-0123749895.