DEPARTMENT OF BIOCHEMISTRY

Yadava College (Autonomous), Madurai – 625 014.

Choice Based Credit System – Blue Print – for those who joined in June 2018-19

Subject		Semester - I			Semester – II			Semester – III			Semester – IV			Semester – V			Semester - VI			Total Credits
		No	Hr	Cr	No	Hr	Cr	No	Hr	Cr	No	Hr	Cr	No	Hr	Cr	No	Hr	Cr	
Part I		1	5	3	1	5	3	1	5	3	1	5	3	-	-	-	-	-	-	12
Part II		1	5	3	1	5	3	1	5	3	1	5	3	-	-	-	-	-	-	12
Part III	Core	1	6	5	1	6	6	1	6	7	1	6	7	5	28	24	5	28	26	75
	Allied I	1	5	2	1	5	3	1	5	2	1	5	3	-	-	-	-	-	-	10
	Allied II	1	5	2	1	5	3	1	5	2	1	5	3	-	-	-	-	-	-	10
Part IV	Environmental Studies	1	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	02
	Value Based Education	-	-	-	1	2	2	-	-	-	-	-	-	-	-	-	-	-	-	02
	Non Major Elective	-	-	-	-	-	-	1	2	2	1	2	2	-	-	-	-	-	-	04
	Skill Based Elective	1	2	2	1	2	2	1	2	2	1	2	2	1	2	2	1	2	2	12
Part V	PE/NCC/NSS/ EXT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	01
Total papers and hours per semester		6	30	-	7	30	-	7	30	-	7	30	-	6	30	-	6	30	-	140

DEPARTMENT OF BIOCHEMISTRY
YADAVA COLLEGE, MADURAI – 14.
(AUTONOMOUS)

SYLLABUS FOR

B.Sc., BIOCHEMISTRY

CBCS Pattern

For those who joined in June 2018-19

DEPARTMENT OF BIOCHEMISTRY
YADAVA COLLEGE, MADURAI – 14.
(AUTONOMOUS)
SYLLABUS FOR B.Sc., BIOCHEMISTRY CBCS Pattern

For those who joined in June 2018-19

OBJECTIVE OF THE COURSE:

Biochemistry, study of all chemical reactions in living organisms including primitive bacteria to mega blue whale, however this field of growing science is still required to grow, emerging Biochemists have many more work to develop this science. India, country having wide variety of medicinal plants in her, whose proper utilization will glorify mankind. To make students aware of herbal plants and products, Herbal Technology is specialized with Biochemistry. The entire course on B.Sc., Biochemistry based on under mentioned syllabus, enables the learners to acquire basic knowledge in Biochemistry, which is applied in various fields, existing and emerging, from Clinical Biochemistry to Bioinformatics, sandwiching Biotechnology, it also imparts knowledge about medicinal plants and methods, techniques, technology to isolate, analyze active compounds to produce, value added products from herbal plants.

DEPARTMENT OF BIOCHEMISTRY

Yadava College (Autonomous), Madurai – 625014.

Choice Based Credit System course content - for those who joined in June 2018-19

Semester	Part	Subject code	Title of the paper	Teaching Hours / week	Credit	Duration of Exam	Evaluation		Total
							Internal	External	
I	Part I		Tamil	5	3	3	25	75	100
	Part II		English	5	3	3	25	75	100
	Part III Core		Bio molecules	4	5	3	25	75	100
			Major Practical I Qualitative analysis of biomolecules &Colorimetry	2	-	-	-	-	-
	Allied I		General Chemistry	5	2	3	25	75	100
	Allied II		General Biology	5	2	3	25	75	100
	Part IV		Environmental Studies	2	2	3	25	75	100
			Skill Based Elective Communicative English I	2	2	3	25	75	100
	Part V		PE / NCC / NSS / EXT	-	-	-	-	-	-
II	Part I		Tamil	5	3	3	25	75	100
	Part II		English	5	3	3	25	75	100
	Part III Core		Enzyme and Enzyme technology	4	5	3	25	75	100
			Major Practical I Qualitative analysis of biomolecules &Colorimetry	2	1	3	40	60	100
	Allied I		Organic Chemistry	3	2	3	25	75	100
			Chemistry Practical I Volumetric Analysis	2	1	3	40	60	100
	Allied II		Cell Biology	3	2	3	25	75	100
			Biology Practical I General & Cell Biology	2	1	3	40	60	100
	Part IV		Value Based Education	2	2	3	25	75	100
			Skill Based Elective Communicative English II	2	2	3	25	75	100
	Part V		PE / NCC / NSS / EXT	-	-	-	-	-	-

DEPARTMENT OF BIOCHEMISTRY

Yadava College (Autonomous), Madurai – 625014.

Choice based credit system course content for those joined in June 2018-19

Semester	Part	Subject code	Title of the paper	Teaching Hours / week	Credit	Duration of Exam	Evaluation		Total
							Internal	External	
III	Part I		Tamil	5	3	3	25	75	100
	Part II		English	5	3	3	25	75	100
	Part III Core		Metabolism	4	5	3	25	75	100
			Major Practical II Quantitative analysis of Bio molecules	2	2	3	40	60	100
	Allied I		Industrial Chemistry	5	2	3	25	75	100
	Allied II		Genetics	5	2	3	25	75	100
	Part IV		Non-major elective	2	2	3	25	75	100
			Skill Based Elective Communicative English III	2	2	3	25	75	100
	Part V		PE / NCC / NSS / EXT	-	-	-	-	-	-
IV	Part I		Tamil	5	3	3	25	75	100
	Part II		English	5	3	3	25	75	100
	Part III Core		Clinical Biochemistry	4	5	3	25	75	100
			Major Practical III Clinical Biochemistry	2	2	3	40	60	100
	Allied I		Bio-Physical Chemistry	3	2	3	25	75	100
			Chemistry Practical II Analysis of organic compounds	2	1	3	40	60	100
			Bio statistics	3	2	3	25	75	100
	Allied II		*Biology Practical I* Genetics & Bio statistics	2	1	3	40	60	100
	Part IV		Non-Major Elective	2	2	3	25	75	100
			Skill Based Elective Communicative English - IV	2	2	3	25	75	100
	Part V		PE / NCC / NSS / EXT	-	-	-	-	-	-

DEPARTMENT OF BIOCHEMISTRY

Yadava College (Autonomous), Madurai – 625014.

Choice based credit system course content for those joined in June 2018-19

Semester	Part	Subject code	Title of the paper	Teaching Hours / week	Credit	Duration of Exam	Evaluation		Total
							Internal	External	
V	Part III Core		Medicinal Biochemistry	5	5	3	25	75	100
			Microbiology & Immunology	5	5	3	25	75	100
			Bio Techniques	5	5	3	25	75	100
			Molecular Biology	5	5	3	25	75	100
			Major Practical IV Microbiology & Medicinal Plants	4	2	3	40	60	100
			Major Practical V Immunology & Biochemical Techniques	4	2	3	40	60	100
	Part IV		Skill Based Elective Soft Skills - I	2	2	3	25	75	100
	Part V		PE / NCC / NSS / EXT	-	-	-	-	-	-
VI	Part III Core		Nutrition & Dietetics	4	4	3	25	75	100
			Plant Biochemistry	4	4	3	25	75	100
			Herbal Drug Technology	4	4	3	25	75	100
			Genetic Engineering and Industrial Biotechnology	5	5	3	25	75	100
			Bio informatics	5	5	3	25	75	100
			Major Practical VI Biotechnology and Bio informatics	3	2	3	40	60	100
			Major Practical VII Herbal drug Technology	3	2	3	40	60	100
	Part IV		Skill Based Elective Soft Skills - II	2	2	3	25	75	100
	Part V		PE / NCC / NSS / EXT	-	1	-	-	-	-

DEPARTMENT OF BIOCHEMISTRY

Yadava College (Autonomous), Madurai – 625 014.

Choice Based Credit System – Blue Print – for those who joined in June 2018-19

Part	Total No. Of Papers		Hours	Credits
Part I		04	20	12
Part II		04	20	12
Part III	Core	14	80	60
	Allied I	04	20	18
	Allied II	04	20	17
Part IV	Environmental Studies	01	02	02
	Value Education	01	02	02
	Non Major Elective	02	04	04
	Skill Based Education	06	12	12
Part V	PE/NCC/NSS/EXT	01	-	01
Total Hours & Credits			180	140

DEPARTMENT OF BIOCHEMISTRY
YADAVA COLLEGE, MADURAI – 14.
(AUTONOMOUS)
SYLLABUS

S.No	Name of the Subject	Subject Code	Modification /Partially Modification /Replacement
1.	Biomolecules	P3CBC3	Partially Modification
2	Enzymes And Enzyme Technology	Q3CBC4	Partially Modification
3	Qualitative Analysis of Biomolecules And Colorimetry(Major Practical)	R3CBCL2	No Modification
4	Metabolism	R3CBC4	Partially Modification
5	Clinical Biochemistry	S3CBC4	Partially Modification
6	Quantitative Analysis (Major Practical	S3CBCL3	Partially Modification
7	Medicinal Plants	T3CBC9	Modification
8	Microbiology & Immunology	T3CBC12	Partially Modification
9	Biotechniques	T3CBC13	Partially Modification
10	Microbiology & Medicinal Plants(Major Paractical)	T3CBCL6	Partially Modification
11	Immunology & Biotechniques (Major Practical)	T3CBCL8	Partially Modification
12	Molecular Biology	T3CBC14	No Modification
13	Nutrition & Dietetics	U3CBC9	No Modification
14	Plant Biochemistry	U3CBC10	No Modification
15	Herbal Technology	U3CB11	Fully Modification
16	Genetic Engineering And Industrial Biotechnology	U3CBC12	Partially Modification
17	Bioinformatics	U3CBC13	No Modification
18	Biotechnology And Bioinformatics (Major Practical)	U3CBCL6	No Modification
	Herbal Technology (Practical)	U3CBCL7	No Modification

ALLIED – II

Concepts in Biology

Common for B.Sc., Biochemistry & B.Sc., Microbiology (For those who joined in June 2018-19)

ALLIED – II

Concepts in Biology

Common for B.Sc., Biochemistry & B.Sc., Microbiology

(For those who joined in June 2018-19)

Sem	Code	Title of the Paper	Teach. Hours/ Week	Exam Hours	Credits	Evaluaton		Total
						Internal	External	
I		General Biology	5	3	2	25	75	100
II		Cell Biology	3	3	2	25	75	100
II		Practical-I General & Cell Biology	2	3	1	40	60	100
III		Genetics	5	3	2	25	75	100
IV		Biostatistics	3	3	2	25	75	100
IV		Practical-II Genetics &Biostatistics	2	3	1	40	60	100

GENERAL BIOLOGY

Semester: I **Subject Code:**
Paper – 1 **Credits: 2**
Hours per Week: 5 hrs **Total Hours per Semester: 75 hrs**

To enable the learners

to have basic knowledge of classification and general characters of plants and animals
to enrich their knowledge on human physiology

Part A - BOTANY

Unit I

Internal and external morphology of the following

Algae - *Oedogonium*

Fungi - *Aspergillus*

Bryophytes - *Funaria*

Economic importance of Algae and Fungi

Unit II

Internal and external morphology of the following

Pteridophytes - *Selaginella*

Gymnosperms - *Cycas*

Angiosperms - Amaryllidaceae- *Polyanthes tuberosa(Monocot)*
- Asclepiadaceae- *Calotropis gigantea (Dicot)*

Economic importance of Pteridophytes and Gymnosperms.

PART B - HUMAN ANATOMY AND PHYSIOLOGY

Unit III

1. **Digestive system**: Organization of digestive system, function movements and secretions of gastro intestinal tract, digestion and absorption of food
2. **Respiratory system**: Organization of respiratory system, respiratory pigments and mechanism of respiration

Unit IV

3**. Circulatory system**: Organization and function of circulatory system, composition, components and functions of blood.

4. **Excretory system:** Organization and function of excretory system, maintenance of homeostasis.

Unit V

5**. Endocrine system:** Organization and functions of endocrine glands – Hypothalamus, Pituitary, adrenal and Thyroid glands.

6**. Reproductive system:** Organization of male and female reproductive organs, development of primary and secondary sexual characters, menstrual cycle, pregnancy trimesters, birth control measures.

Reference

1. Dutta, A.C., Botany for degree students, Oxford University press.
2. Vashista.B.R., Sniha,A,K., Singh.V.P., Botany for Degree students. S.Chand Company LTD.
3. Pandey. B.P., Text Book of Botany Vol. I and II, S.Chand and Company. New Delhi
4. Roa, K.N., Ancillary Botany, Viswanathan. S., and Company, Chennai.
5. Srivastava. H. N., Plant Physiology, Pradeep Publications, Jalandhar
6. Taylor W.T., and Wehe. R.J. – General biology, East West Press Pvt. LTD.
7. Guyton A.C., and Hall J.E, Textbook of Medical Physiology, W.B.Saunders Company
8. Sujit. K. Chaudri., Concise Medical Physiology, New Central Book Agency, Kolkata, 4th Edition, 2002.

CELL BIOLOGY

Semester: II **Subject Code:**
Paper – II **Credits: 2**
Hours per Week: 3 hrs **Total Hours per Semester: 45 hrs**

To enable the learners

to have knowledge of the cell, it's constituents and life cycle.

to make aware of techniques in cell biology.

Unit I

1. A brief comparative study of prokaryotic and eukaryotic cell structures.
2. Ultra structure and Models – chemistry and functions of plasma membrane.
3. Brief account on chemistry of protoplasm, Structure and functions of microtubules and microfilaments.

Unit II

1. Eukaryotic membrane system: ultra structure, and functions of endoplasmic reticulum (rough and smooth) and Ribosomes.
2. Organelles in Eukaryotic Structure and function of Golgi bodies, Lysosome, and mitochondria.
3. Plastids – types, ultra structure, and functions

Unit III

1. Nuclear organization: Chemistry and structure. Eukaryotic nuclear organization – Nucleolus, nuclear envelope, Chromosomes – Chromatin, Euchromatin and heterochromatin, nucleosomes, Giant, Polytene, Lampbrush chromosome.
2. Cell cycle - various phases of cell cycle, mitosis and meiosis and their significance.
3. Normal and cancerous cell growth, characteristic features of cancer cell.

Unit IV

1. Cytological Techniques – Specimen preparation, Fixatives – Types, Mechanism Staining- Types, Mechanism, Methods, Detection to using stains Biuret Test, sudan black, Schiff's reagent,
2. Microscopy – light and electron microscopes and their working principles.
3. Cell fractionation – gradient and differential centrifugation.

Unit V

Viruses – Classification based on structure, nucleic acid and host. Life cycle of T4 phage, TMV, adenovirus, retrovirus. Virion & Prion.

Reference

1. Albert, B.Bray , Lewis. D., J.Raff, M. Roberts K and Watson JD, Molecular biology of the cell, Newyork, Garland 1983.
2. De Robertis, E.D.P.and De Robertis, Jr. E.M.E, Essentials of cell and molecular biology 1st Edition 1995.
3. Fawcett, D.W., The cell, its organelles and inclusions – Philadelphia W.B. Saunders 1st Edition, 1966.
4. Shukla. R.M. A Textbook of Cell Biology, Dominant Publishers & Distributors 1st Edition, 2005.
5. Carl. P. Swagon and Peter L. Wester. The Cell, Prentice-Hall India Pvt.Ltd, 1st Edition, 1989.
6. Powar. C.B., Cell Biology, Himalaya Publishing house, Mumbai, 3rd Edition, 1996.
7. Krishnasamurthy, K.V., Methods in Plant Histochemistry, Viswanathan printers and publishers, 1st Edition. 1966.
8. Dimmoth.N.J., Easton. A.J., and. Leppard K.N., Introduction to Modern Virology, Blackwell Publishers. 2001.

GENERAL BIOLOGY AND CELL BIOLOGY

Semester: II **Subject Code:**
Practical Paper- I **Credits: 1**
Hours per Week: 2 hrs **Total Hours per Semester: 30 hrs**

To enable the learners

to instill knowledge of morphological and anatomical structures of plants.

to instill knowledge on morphological developments of various Phyla.

to instill knowledge on various systematic organizations of insects and mammals.

to identify various stages in somatic cell division and techniques to

Identify chemical nature of cells.

GENERAL BIOLOGY

1. Vegetative and reproductive structure in *Oedogonium, Aspergillus,Funaria, Selaginella*, and *Cycas*
2. Section cutting of *Oedogonium*- Nannandrous, *Selaginella*-Stem, and *Cycas*-Leaf
3. Structure of Monocot flower – *Polyanthes tuberosa*
4. Structure of Dicot flower – *Calotropis gigantea*
5. Study of Blood Cells of Man.
6. Study of different types of muscles.

CELL BIOLOGY

1. Microscope – Compound microscope working principles.
2. Centrifugation – Centrifuge working principles.
3. Study of cell inclusions, Cystolith and Raphides
4. Study of mitosis by smear technique of *Allium cepa* root tip
5. Preparation of Squamous epithelium from buccal smear
6. Demonstration of Cytological staining techniques Biuret test, Sudan black, Schiff's reagent.

Reference:

1. Dutta,A.C., Botany for degree students, Oxford University press.
2. Taylor, W.T., and Wehe R.J., General biology, East West Press Pvt. LTD.
3. De Robertis, E.D.P.and De Robertis, Jr. E.M.E., Essentials of cell and molecular biology.
4. Fawcett, D.W., The cell, its organelles and inclusions – Philadelphia W.B. Saunders
5. Krishnasamurthy K.V., Methods in plant Histochemistry Viswanathan printers & publishers.

GENETICS

Semester: III **Subject Code:**
Paper – III **Credits: 2**
Hours per Week: 3 hrs **Total Hours per Semester: 45 hrs**

To enable the learners,

to have knowledge on Mendelian and Human genetics.

to make aware of role of genes in life and pre natal diagnosis of genetic disorders.

Unit I

Mendelian genetics – Mendel's works – Mendel's methods, experiments, observations and results. Rediscovery of Mendel – Mendel's laws – Terminology, Back / Test Cross – problems. Mendel's law is not universal – Modifications – complete & incomplete dominance. Co dominance – Lethal factor. Non – allelic gene interactions – Complementary genes – Supplementary genes, Epistasis – Biochemical aspects – Pileo tropism

Unit II

Allelic gene interaction ; Multiple alleles – blood group inheritance – Rh factor. Polygenic / Multiple gene inheritance –Eye colour of Drosophila – quantitative inheritance – height in man. Genes and chromosomes linkage and crossing over – theories of crossing over – cytological basis – mapping of chromosome – single cross over and double cross over maps.

Unit III

Population genetics – gene pool concept, Hardy Weinberg law – gene frequencies – factors affecting Hardy – Weinberg equilibrium.

Unit IV

Human chromosomes: History and nomenclature, Banding technique, genetic map of human chromosomes, Primary and secondary Non – disjunction in man. Autosomal syndromes : Down's, Patau's,. Sex chromosomal syndromes: Klinefelter's, Turner's

Genetic basis of thalassemia, cystic fibrosis. Genetics of cancer – types and characteristics – oncogenes and antioncogenes.

Unit V

Prenatal Diagnosis of genetic diseases: Amniocentesis, Chorionic villi sampling and Ultrasonography - principle, procedure and applications.

Pedigree analysis, eugenics, positive and negative eugenics, euthenics, euphenics, treatment of genetic diseases, Genetic counseling

Reference

1. Edmund. W. Sinnot., Dunn. L. C., Theodusius Dobzansky., Principles of Genetics, Tata Mc. Graw Hill Publishing Company LTD, NewDelhi. 5th Edition, 1973.
2. Alhuwalia., Genetics, Wiley publishers. 1st Edition, 1991
3. Attenburg, Genetics, Oxynol publishers.2000.
4. Sarin .C., Genetics, Tata Mc. Graw Hill Pvt. LTD. 8th Edition, 1999.
5. Strickberger. M, Genetics,. Prentice Hall India Pvt. LTD.3rd Edition.,2003.

BIOSTATISTICS

Semester: IV **Subject Code:**
Paper – 1V **Credits: 2**
Hours per Week: 3 hrs **Total Hours per Semester: 45 hrs**

To enable the learners

to have knowledge of statistics and its application in the field of biology.

to aware about the research methods.

Unit I

Introduction: Basics of statistics – Definition – Statistical Methods – Kinds of biological data. Collection of data - types, organization and representation of data. Sampling and sampling designs. Classification of data types and methods - grouped and ungrouped data.

Frequency distribution: Continuous – Discrete – Cumulative frequency.

Tabulation: parts of a table – advantage. Representation of the data: Diagrammatic-Simple bar, pie diagram. Graphical representation: Histogram, frequency polygon, frequency curve, cumulative frequency curve.

Unit II

Measures of Central Tendency: arithmetic mean – simple and weighed arithmetic mean, median, mode. Measures of dispersion : Range, mean deviation, standard deviation and variance.

Unit III

Measures of symmetry: Skewness and kurtosis, positive and negative skewness. Measures of kurtosis – Correlation and regression: Types of correlation. Methods of studying correlation using Karl Pearson's co-efficient of correlation Regression line, regression equation X on Y and Y on X.

Unit IV

Probability theorem – types of probability – probability measure.

Theoretical distributions – binomial, poisson & normal distribution –characteristics

Unit V

Sampling hypothesis, sampling distribution, Standard error - $\chi 2$ test (goodness of fit), character and applications. ANOVA – one way analysis.

Reference

1. Bhaskararao, T. Methods of Biostatistics, Paras Publication. Hyderabad. 2001.
2. Daniel W.W. Biostatistics : A foundation for analysis in the Health Sciences.. John Willey and sons, New York. 7th Edition 1989.
3. Sancheti. D.C. and Kapoor V.K. Statistics. S. Chand & Sons, New Delhi. 7th Edition 1991
4. Palanichamy. S. and Manoharan. M, Stastical methods for biologist. Palani Paramount Publications, Palani. 2003..

GENETICS AND BIOSTATISTICS

Semester: IV **Subject Code:**
Practical Paper- II **Credits: 1**
Hours per Week: 2 hrs **Total Hours per Semester: 30 hrs**

to know the occurrence of Mendelian laws and genetical syndromes in life.

to know the fundamental ideas of statistics to implement in biology and computer applications for the same.

1. Survey of Mendelian traits in man.
2. Use of models to illustrate Mendel's laws.
3. Determination of blood groups and Rh factor.
4. Down's, Patau's, Klinefelter's, Turner's syndromes - Photographs
5. Finding central tendency using biological data
6. Study of quantitative characters using neem leaves.
7. Laws of probability
8. Study of quantitative characters using coin - tossing test.
9. Computer application in Biostatistics.(demonstration only)

Reference :

1. Alhuwalia, Genetics 1st Edition, Wiley publishers, 1991.
2. Attenburg, Genetics, Oxynol publishers, 2000.
3. Sarin. C., Genetics, Tata Mc. Grand Hill Pvt. LTD., 8th Edition, 1997.
4. Daniel W.W. Biostatistics : A foundation for analysis in the Health Sciences.. John Willey and sons, New York. 7th Edition, 1989.
5. Palanichamy. S. and Manoharan. M, Stastical methods for biologist. Palani Paramount Publications, Palani. 2003.

BIOMOLECULES

Semester: I **Subject Code**

Paper – 1 **Credits: 5**

Hours per Week: 4 hrs **Total Hours per Semester: 60 hrs**

To enable the learners,

to have basic knowledge in the field of Biochemistry.

to know about the structures and functions of carbohydrates, proteins, lipids, nucleic acids and vitamins.

Unit I: Historical background of the origin and development of Biochemistry through the years .Carbohydrates and polysaccharides - occurrence and general importance of carbohydrates – Basic structure of glucose, its isomers and epimers and linkages- Biologically important disaccharides like lactose, maltose and sucrose – Polysaccharides – Energy storage polysaccharides, Starch and Glycogen, Structural polysaccharides, Cellulose, Pectin, and Chitin. Heteropolysaccharides, Bacterial cell wall polysaccharides.

Unit II:

Amino acids and Proteins; Common amino acids of Proteins-physical properties of amino acids-solubility, electrical properties, fundamental role of proteins in life, composition of proteins - essential amino acids. General properties of proteins. Hierarchical structure of proteins,- primary, secondary, tertiary, quaternary structures, forces stabilizing the structure of proteins, classification of proteins on the basis of their biological functions .

Unit III:

Lipids - Fatty Acids - Classification of Fatty acids -Saturated fatty acids, Unsaturated fatty acids, Branched chain fatty acids, Hydroxy and Keto derivatives and Cyclic fatty acids -– Salts, detergents and wetting agents- reactions of unsaturated fatty acids - hydrogenation, halogenation and oxidation.Waxes - Phospholipids sphingomyelins, cerebrosides, gangliosides.

Unit IV:

Nucleic acids-fundamental role of nucleic acids in life processes - Major DNA and RNA - structure of bases, nucleosides and nucleotides - bonds linking the various bases, Chargaff's rule, primary, secondary and three dimensional structure.

Unit V:

Vitamins; Historical development to the discovery of vitamins-fat soluble vitamins – Vitamin A, D, E and K – Water - soluble vitamins; Vitamin B complex, Vitamin C – Brief mention of sources and physiological role.

TEXT BOOK:

J.L.Jain., Sunjay Jain, Nitin Jain,(2004) Fundamental of Biochemistry, S. Chand and Co., New Delhi.

REFERENCE:

1. West E.S., Todd, W.R., Manson H.S. and Van Bruggan J.J. (1967). Textbook of Biochemistry, 4th edition The Macmillan Company, New York.
2. Lehninger, A.L. (1982). Biochemistry. 1st edition, Kalyani Publishers. India.
3. Lubert Stryer, (1988). Biochemistry. 3rd edition, W.H. Freeman and Company, New York.
4. Conn, E.E. and Stump, K. (1989). Outlines of Biochemistry, Fourth edition, Wiley Eastern Limited.

ENZYMES AND ENZYME TECHNOLOGY

Semester: II	**Subject Code:**
Paper – 2	**Credits: 5**
Hours per Week: 4 hrs	**Total Hours per Semester: 60 hrs**

To enable the learners,

to understand the enzymes, it's activity mechanism and regulation.

to know about the enzyme immobilization techniques; it's application in various fields.

Unit I:

Definition – History, nomenclature, classification, general properties, biological role of enzymes. Enzyme unit – IU – Katal, Enzyme turnover-Definitions – coenzymes, holoenzyme, apoenzyme, prosthetic group, metalloenzyme, isoenzyme, multienzyme, zymogen –measurement of enzyme activity, isolation of enzyme, purification, enzyme specificity.

Unit II:

Enzyme - substrate complex. Active site – Fischer's lock and key model, Koshland's induced fit model. Enzyme kinetics: Michaelis Menten equation, Km, Kcat/Vmax and its significance. Lineweaver Burke Plot .Inhibitors - non-competitive, uncompetitive and competitive inhibitor Bi-substrate reactions -ping-pong mechanism.

Unit III:

Factors affecting Enzyme activity – pH, temperature, substrate and product concentration -Regulation of Enzyme activity – feedback control, allosteric enzymes .

Unit IV:

Enzyme Catalysis: Acid-base Catalysis, Covalent catalysis. Proximity and orientation effects, strain and distortion theory – Mechanism of action of chymotrypsin. Isoenzyme – LDH .

Unit V: Immobilization of enzymes – Methods of Immobilization and its effects on enzyme activity. Applications of immobilised enzymes – amylase. Biosensors and its applications.

TEXT BOOK:

Jain. J.L., Sunjay Jain, Nitin Jain. (2004). Fundamental of Biochemistry. S. Chand and Co., New Delhi.

REFERENCE:

1. Alan Fersht. (1995). Enzyme Structure and Mechanism, 2nd Edition, W.H.Freeman and Company New York
2. Eric. Conn. E., Stump, P.K., Roy, G.B. and Doi, H. (2001). Outlines of Biochemistry, 5th Edition, John Wiley and Sons, New york.
3. Stryer, L. (2000). Biochemistry, 4th Edition, W.H.Freeman and Company, New York.
4. Pamela-C.Champe and Richard A. Harwey, (1994). Lippincott's Illustrated Reviews Biochemistry, 2nd Edition, 1994, J.B.Lippincott Company.
5. Voet, D., Judith G.Voet. (1995). Biochemistry, 2nd Edition, 1995, John Wiley and Sons INC, New York.

MAJOR PRACTICALS

QUALITATIVE ANALYSIS OF BIOMOLECULES AND COLORIMETRY

Semester: I &II **Subject Code:**

Practical Paper- I **Credits: 1**

Hours per Week: 2 hrs **Total Hours per Semester: 30 hrs**

To enable the learners,

to analyze carbohydrate, proteins, lipid and enzymes.

to separate biochemical from their natural sources.

to handle instruments like p^H meter and colorimeter with an idea of analysis.

1. **Qualitative analysis of Bio-organic compounds:**
   - i) Analysis of carbohydrates
   - ii) Analysis of amino acids
   - iii) Analysis of proteins
   - iv) Analysis of lipids
2. **Biochemical preparation**
   - i) Starch from potato
   - ii) Casein from milk.
3. **Use of pH meter for the preparation of buffer.**
4. **Verification of Beer Lambert's law using colorimeter.**
   - i) Determining the extinction co-efficient of a given coloured compound
   - ii) Determining the concentration of any given coloured compound using a standard graph.

REFERENCE:

1. Jayaraman, J. (1981). Laboratory Manual in Biochemistry, 1st Edition. New Age International [p] LTD. Publisher Pune.

2. Pattabiraman, T.N. (1998). Laboratory Manual in Biochemistry, 3rd Edition. All India Publishers.
3. Sadasivam,S. and Manickam.A. (1996). Biochemical Methods, 2nd Edition. Wiley Eastern Limited.
4. Sawhney, S.K. and Randhir Singh, (2000). Introductory Practical Biochemistry, 1st Edition. Narosa Publication.
5. David. T. Plummer, (1987). An Introduction to Practical Biochemistry, 3rd Edition. McGraw – Hill Edition
6. Palanivelu, P. (2004). Labaratory Manual for Analytical Biochemistry, Separation Technique. 3rd Edition, Twenty first century publications.

METABOLISM

Semester: III	**Subject Code:**
Paper – 3	**Credits: 5**
Hours per Week: 4 hrs	**Total Hours per Semester: 60 hrs**

To enable the learners,

to have knowledge about metabolism of biomolecules in living organisms.

to understand the importance of integration of metabolism, and metabolism during starvation.

Unit I:

Metabolism – introduction and definition.Carbohydrate Metabolism: Conversion of carbohydrates into Glucose, Glycolysis, TCA cycle, Energetics, HMP shunt, Glycogenolysis, Glycogenesis, Gluconeogenesis, Cori's cycle.

Unit II:

Lipid Metabolism: Oxidation of odd and even chain fatty acids, energetics, ketone body metabolism, phospholipids, cholesterol biosynthesis, conversion of cholesterol into bile acids, 1,25-Dihydroxy cholecalciferol and steroidal hormones.

Unit III:

Amino Acid Metabolism: A brief account of amino acid metabolism. Metabolism of glycine , phenylalanine and tyrosine - urea cycle.Protein metabolism: fate of dietary proteins .

Unit IV:

Bioenergetics: High Energy and low energy compounds. Electron Transport Chain (ETC)—Role of respiratory chain in mitochondria- oxidative phosphorylation, chemiosmotic theory-uncouplers of oxidative phosphorylation, Differentiate between substrate level and oxidative phosphorylation with examples.

Unit V:

Hormones: Definition, classification, secondary signaling, functions of hormones, coordinated regulation of growth.

TEXT BOOK:

Robert Murray Daryl K.Granner, Peter A Mayes, Victor W. Redwell, (2003), Harper's Illustrated Biochemistry 26th Edition M.C. Graw Hill Publications.

REFERENCE:

1. A.L.Lehninger, D.L.Nelson, M.M.Cox, (1993), Principles of Biochemistry, 2nd Edition, CBS Publishers, Delhi
2. Fred.K.Rodrigues, (1997) Carbohydrate metabolism 1st Edition, New Age International Publishers, New Delhi.
3. Donald Voet, Judith G.Voet, (1995) Biochemistry. 2nd Edition, John Wiley and Sons, INC New York.
4. V.L.Davidson, D.B.Sittman, (1994), Biochemistry, 3rd Edition, B.I.Waverly Pvt, LTD New York.
5. Trudy McKee and James R.Mckee, (1996), Biochemistry 1st Edition, W.C.B.Brown Publisher.

QUANITATIVE ANALYSIS

Semester: III	**Subject Code:**
Practical Paper-I I	**Credits: 2**
Hours per Week: 2 hrs	**Total Hours per Semester: 30 hrs**

To enable the learners,

to state the quantity of biomolecules in natural products, which imparts proper knowledge of traditional biochemistry

Analysis of Carbohydrates:

i) Estimation of glucose by Anthrone's method
ii) Estimation of fructose of Selivanoff's method
iii) Estimation of reducing sugar in a fruit by BQR method

Analysis of Proteins

i) Protein determination – Lowry's Method
ii) Protein determination – Biuret Method

Analysis of Lipids:

i) Estimation of cholesterol –Zak's Method

Analysis of Vitamins

i) Determination of ascorbic acid (Titrimetry)
ii) Determination of ascorbic acid (Colorimetry)

REFERENCE:

1. Jayaraman, J. (1981). Laboratory Manual in Biochemistry, 1st Edition. New Age International [p] LTD. Publisher Pune.
2. Sadasivam,S. and Manickam.A. (1996). Biochemical Methods 2nd Wiley Eastern Limited.
3. Palanivelu, P. (2004). Labaratory Manual for Analytical Biochemistry, Separation Technique. 3rd Edition, Twenty first century publications.

CLINICAL BIOCHEMISTRY

Semester: IV **Subject Code:**

Paper – 4 **Credits: 5**

Hours per Week: 4 hrs **Total Hours per Semester: 60 hrs**

To enable the learners.

to have knowledge of metabolic abnormalities and their diagnosis.

to know the inborn errors of metabolism, its reasons and effects.

Unit I:

Introduction; Scope of clinical biochemistry, development of clinical biochemistry, techniques used in clinical assays - evaluation of laboratory tests, normal range, system of International units.

Clinical Hematology: Abnormal hemoglobins, anemias, disturbances in blood clotting mechanism.

Unit II:

Disorders of carbohydrate Metabolism: Normal blood sugar level and its regulation– Hyper and hypoglycemia, renal threshold value, glycosuria, diabetes mellitus, Glucose Tolerance Test (GTT), obesity and hypertension.

Unit III:

Disorders of Lipid metabolism: Hyper and hypo Lipoproteinemias, disorders of phospholipids and cholesterol metabolism. Fatty liver, steatorrhea.

Unit IV:

Disorders of Amino Acid and protein Metabolism: Disorders of plasma proteins, , uremia, uricemia. Crigglar-Najjar disease, Gilbert's disease, Dubin-Johnson disease.– Disorders of nucleic acid metabolism: Gout, Lesch Nyhan Syndrome (LNS).

Unit V:

Endocrine disorders: Diseases associated with thyroid, pituitary, adrenal cortex and medulla– Tissue Function Tests: Biochemical tests of liver, kidney and pancreas, significances of tissue function tests – Diagnostic uses of enzymes

TEXT BOOK:

Carl A.Burtis, Edward R.Ash wood (2001), Tietz, Fundamentals of Clinical chemistry, 5th Edition, Har Court India Pvt LTD, Company New Delhi.

REFERENCE:

1. Thomas M. Devlin. (1997). Text Book of Biochemistry with Clinical Correlation, 4th Edition. Wiley Liss Publication.
2. Chatterjea and Ranashinde. (2005). Text Book of Medical Biochemistry, 6th Edition, 2005, JP Publications, Calcutta.
3. Kanai L. Mukherjee. (1998). Vol. II III Medical Laboratory Technology, 1st Edition. TATA McGraw – Hill Publishing Company LTD New Delhi.
4. Dinesh Puri. (2002). Textbook of Biochemistry, Clinically Oriented Approach. 1st Edition. B.I.Churchill Living Stone Pvt. LTD. New Delhi.
5. Allan Gaw., Robert A., Cowan., Denis St. Stewart, J. and James Shepherd. (1999). Clinical Biochemistry 2nd Edition. Churchill Living stone Company.

CLINICAL BIOCHEMISTRY

Semester: IV **Subject Code:**

Practical Paper-1I I **Credits: 2**

Hours per Week: 2 hrs **Total Hours per Semester: 30 hrs**

To enable the learners,

to instill knowledge of analyzing biomolecules in blood and urine.

to make a biochemist to acquire medical lab tests.

1. Blood Analysis:

i) Sugar - Folin Wu's method

ii) Cholesterol - Ferric chloride method

iii) Creatinine - Picric acid method

iv) Total protein, albumin and globulin Ratio

2. Determination of Blood pressure

3. Urine Analysis:

i) Collection of 24 hours urine

ii) Colour, odour, pH, volume and density

iii) Qualitative analysis of normal and abnormal constituents of urine

iv) Quantitative analysis of Urea and creatinine

REFERENCE:

1. Harold Varley, (1988). Practical Clinical Biochemistry, 4th Edition. CBS Publishers.
2. Pattabiraman, T.N. (1998). Laboratory Manual in Biochemistry, 3rd Edition. All India Publishers

MEDICINAL BIOCHEMISTRY

Semester: V **Subject Code:**

Paper – 5 **Credits: 5**

Hours per Week: 5 hrs **Total Hours per Semester: 75 hrs**

Objectives:

On Successful completion of the course Students should have

1. Understood the development of the traditional and modern methods used for drug discovery, of how molecules interact.

2. Learnt and develop skills in the use of reaction mechanism and knowledge of reaction mechanism can aid in understanding the mode of action of the drug and the method by which it can be synthesized and developed.

UNIT – I

Basic concept of drug: Introduction to drugs, Classification of Drugs, Passage of drugs across biological membrane, distribution of drugs, binding of drugs to plasma Proteins. Drug Receptors: Types of receptors, Receptor theories, drug receptor interaction.

Unit – II

Systems of medicine: Introduction; History of Medicinal plants- drugs diagnosis treatment and uses of Ayurvedic, Siddha, Homeopathy, Allopathy, Unani, Tribal and Naturopathy medicines.

UNIT –III

Pharmacology: Technical terminology and fundamentals of Pharmacology and Pharmacognosy. Routes of drug administration- mechanism of drug metabolism- mechanism of drug absorption, Elimination of drugs.

Unit – IV

Drug action: Drugs acting on nervous system -Opium and Aswagantha- Gastero intestinal regulators-*Zingiber officinale*, *Piper nigrum*, Antidiabetes- *Gymnema sylvestre*- Cardio vascular system- *Digitalis purpurea*-Anti hypertensives- *Rauwolfia serpentina*,

Antimalarials-*Cinchona officinale*, Antitumour-*Vinca rosea*, Laxatives-*Aloe vera*-Organized and unorganized drugs-Resin-*Ferula asafetida* -Latex- *Acacia senegal*

Unit – V

Bioactive substances :A brief account on properties isolation and functions of bioactive substances, Alkaloids, Anthraquinines, Flavonoids, Glycosides, Polyphenol, Steroids, Saponins, Taninns, Volatile oils, and Terpenoids.

TEXT BOOK

Chopra R.N., Nagr. S.L. and Chopra I – C (1956) Glossary of Indian medicinal Plants CSIR, New Delhi.

REFERENCE:

1. Nadkarni, K.M., (1982). Indian Materia Medica, Popular Prakashan (P) LTD. Bombay. Volume I and II

2. Albert F. Hill, (1974) Economic Botany Tata McGraw Hill. Publishing company LTD, New Delhi.

MICROBIOLOGY & IMMUNOLOGY

Semester: V **Subject Code:**

Paper : 6 **Credits: 5**

Hours per Week: 5 hrs **Total hours per semester: 75hrs**

To enable the learners,

to have knowledge of microbes, its basics, role in various walks of life.

to get wide idea about immune system, its functions and abnormalities.

Unit I:

Introduction: Microbiology as a basic and applied science – Development of microbiology through years - natural distribution of microorganism – Bergey's classification of microorganisms and their characteristics – Methods of sterilization, types of Media, Pure culture techniques, Serial dilution. Organization and structure of microorganisms: Prokaryotic organization –. Gram staining techniques.

Unit II

Bacterial nutrition - autotrophic and heterotrophic nutrition - Bacterial reproduction(Sexual and Asexual)- Normal growth curve - Bacterial metabolism- ED pathway – Fermentation –types. Industrial Microbiology – Batch and Fed batch, solid state fermentation, uses of microbes in ethanol production, and antibiotics (Penicillin and Streptomycin) production-cultivation of edible mushroom –storage and its importance. *Volvariella volvaceae* (Paddy straw mushroom).

Unit III:

Food Microbiology – food spoilage, food poisoning, food borne infection – Botulism-Microorganism and Milk: Sources of microbes, fermentation of milk, sweet curdling, butyric acid fermentation. Transmission of disease through milk. Medical

Microbiology – Morphology, pathogenesis and laboratory diagnosis: *Staphylococci*, *Streptococci*, *Bacillus anthrax*, Adeno virus, H.I.V.

Unit IV:

Introduction – origin, scope of Immunology. antigen, antibody, lymphocyte, complement and vaccine – Immunity: Types of Immunity, Immune cells, lymphoid organs, Immunoglobulins: IgA, G, D, E and M. B–cell and T-cell activation .

Unit V:

Antigen and Antibody interaction: precipitation, agglutination, affinity, avidity, cross reactivity, epitope, paratope, idiotope, immuno electrophoresis, rocket electrophoresis, Radio Immuno Assay (RIA), Enzyme Linked Immuno Sorbent Assay (ELISA), immuno fluorescent assay - Transplantation and Graft rejection – Hypersensitivity-Autoimmunity.

TEXT BOOKS:

1. Pelczar M.J., Chan, E.C.S. and Kerig, N.R. (1986). General Microbiology, Grow Hill Company.
2. Kuby, J. (1994). Immunology, 2nd Edition. W.H. Freeman and Company, New York.

REFERENCE:

1. Prescott, L.M., Harley, J.P. and Klein. (2000). Microbiology. W.M.C. Publishers Lowas USA
2. Nester, E.W., Roberts, C.V. and Nester, M.T. (1995). Microbiology-A Human Perspective. IOWA USA
3. Morag and Timbury, M.C. (1994). Medical virology 10th Edition. Churchill living Stone London.
4. Roitt, I.M. (1998). Essentials of Immunology. Blackwell Scientific Publications
5. Roit.J.M., Brostaff.J.J.and Male.J.K. (1996). Immunology 4th Edition. C.V.Moshby Publishers St.Lewis.

6. Mark Peakman and Diego Vergani. (1997). Basic and Clinical Immunology Churchill living stone.
7. Talwar.G.P.and Gupta.S.K. (1992). A Handbook of Practical Immunology (Vol. I and II) Vikas Publishing House Pvt. Ltd., New Delhi.

BIOTECHNIQUES

Semester: V	**Subject Code:**
Paper – 7	**Credits: 5**
Hours per Week: 5 hrs	**Total Hours per Semester: 75 hrs**

To enable the learners,

to know basics of Biochemical techniques.

to apply the biochemical techniques in various field of biosciences.

Unit I: Chromatography: Definition – General principle. Types – Paper, Thin layer, Gas Liquid, Ion – Exchange, Gel filtration Affinity, and High-pressure Liquid Chromatography.

Unit II: Electrophoresis: Definition, factors affecting separation. Paper electrophoresis, cellulose acetate electrophoresis. Gel electrophoresis - Types of gels, modes of gel electrophoresis, column and slab, agarose, PAGE, SDS-PAGE, electrophoresis, pulse field electrophoresis. Iso-electric focusing.

Unit III: Centrifugation: Principles of centrifugation, Relationship between 'rpm' and 'g'. Types of rotors, types of centrifuges, preparative centrifugation – differential centrifugation and density gradient centrifugation. Analytical ultracentrifuge – molecular weight determination – sedimentation equilibrium and sedimentation velocity.

Unit IV: Spectroscopy: Light spectrum, Colorimeter – principle – Instrumentation types and its application, UV/ Visible spectrophotometer – Single beam and Double beam-Spectroscopy- Infrared & NMR. Dialysis, electro dialysis, reverse osmosis .

Unit V: Radioisotopes: Radioactive decay, Rate of radioactive decay, units of radioactivity, measurement of radioactivity – Gas ionization, G.M. counter, scintillation counter. Autoradiography, tracer technique, isotopic dilution method, ^{14}C dating and its application in biological science.

TEXT BOOK:

1. Palanivelu, P. (2004). Labaratory Manual for Analytical Biochemistry, Separation Technique. 3rd Edition, Twenty first century publications

2. Boyer, R.F. (1993). Modern Experimental Biochemistry 2nd Edition. The Benjamin, Cumming Publishing Company, Inc, California.

REFERENCE:

1. Keith Wilson and John Walker. (1994). Practical Biochemistry [Principles and Techniques] 4th Edition. Cambridge University Press.
2. Avinash Upadhya, Kakoli Upadhya and Nirmale Endunath(1998). Biophysical Chemistry 3rd Edition, Himalaya Publishing House Mumbai.
3. S.K.Sawhney and Randhir Singh (2000). Introductory Practical Biochemistry 1st Edition. Narosa Publishing House, New Delhi.
4. David T.Plummer. (1998). An Introduction to Practical Biochemistry, 3rd Edition. Tata Mc Graw – Hill Publishing Company, New Delhi.
5. Phillip Sheller and Donald E.Bianchi. (1987). Cell and Molecular Biology. 3rd Edition WSE Wiley Publications.

MOLECULAR BIOLOGY

Semester: V	**Subject Code:**
PAPER – 8	**Credits: 5**
Hours per Week: 5 hrs	**Total Hours per Semester: 75 hrs**

To enable the learners,

to understand molecular organization of prokaryotes and eukaryotes.

to know the molecular causes and mechanism of cancer.

Unit I:

Prebiotic origin of biomolecules, Urey-Miller's experiments, Endosymbioiant theory, and advantages of compartmentalization of biomolecules – Prokaryotic and Eukaryotic Nuclear organization: Nucleoid, plasmid structure and composition, chromatin structure and composition, euchromatin, heterochromatin .

Unit II:

Nucleic Acid as Genetic Material – Griffith's experiment, Hershey and Chase's experiment, Avery and Macleod's experiment – DNA Replication: Biochemistry of replication, DNA polymerases, types, structure, and mechanism of prokaryotic replication, initiation, elongation and termination. Drugs and inhibitors of replication.

Unit III:

Biochemistry of Transcription, RNA polymerase, structure, mechanism-initiation, elongation and termination. drugs and inhibitors of transcription, concepts of operator and suppressors, *Lac* operon, and *Trp* operon.

Unit IV:

Genetic code, properties of codons, Wobble hypothesis, initiation, elongation and termination processes of translation. prokaryotic translation -drugs and inhibitors of translation.

Unit V:

DNA Mutations: Spontaneous, induced, point, missense, nonsense, frame shift mutation, tautomerisation, transversion, transition, mutagenesis by nitrous acid, hydroxylamine, alkylating agents, intercalators, base analogues, and UV rays.

TEXT BOOK:

David Freifelder. (1987). Molecular Biology 2nd Edition. Narosa Publishing Home, New Delhi.

REFERENCE:

1. Lehninger, A.L., Nelson, D.L. and Cox,M.M. (1993). Principles of Biochemistry 2nd Edition. CBS Publishers, Delhi.
2. Davidson, V.L. and Sittman, D.B. (1994). Biochemistry 3rd Edition. B.I. Waverly Pvt. LTD. New Delhi.
3. Trudy MC Kee and James R. MCKee. (1996). Biochemistry. 1st Edition. W.C.B. Brown Publishers.
4. James D.Watson, Tania A. Baker, Stephen P.Bell Alexander Gan, Michael Levine and Richard Losick. (2004). Molecular Biology of the Gene. 5th Edition, Pearson Education, Singapore.
5. Twyman, R.M. (1998). Advanced Molecular Biology. 1st Edition, Viva Publications, New Delhi.
6. Jermy.W.Dale and Malcolm. Von Schantz. (2003).From Genes to Genomes, Concepts and Application of DNA Technology, John Wiley and Sons Publishers

MICROBIOLOGY AND MEDICINAL BIOCHEMISTRY

Semester: V **Subject Code:**

Practical Paper-1V **Credits: 2**

Hours per Week: 4 hrs **Total Hours per Semester: 60 hrs**

To enable learners,

to know practical and analytical microbial techniques

to identify herbal plants and extract, active compounds from them.

1. Sterilization – knowledge of basic sterilization methods.
2. Media preparation-liquid and solid
3. Serial dilution
4. Pure culture technique – Streak plate, Spread plate, Pour plate..
5. Determination of bacterial mobility by hanging drops technique.
6. Staining Methods-simple, grams staining.
7. Bacterial Growth curve.
8. Isolation of Microbial culture from soft drinks.
9. Microbial quality of milk- Methylene blue dye reduction test
10. Acidity in milk
11. Screening of antibiotic resistance in bacterial culture.
12. Screening of Anti Microbial effect of Raw drug extracts
13. Phytochemical evaluation of crude drugs from various medicinal plants
14. Cultivation of Edible Mushroom – *Volvariella volvaceae* (Paddy straw mushroom).

REFERENCE:

1. Gunasekaran, P. (1995). Laboratory Manual in Microbilogy, 1st Edition. New age international [P] LTD. Publishers New Delhi.
2. Kannan.N, (2000). Laboratory Manual in General Microbiology, Palani Paramount Publications. Palani.
3. Gaud, R.S., Gupta, G.D. (1999) Practical Microbiology, 1st edition Nirali Prakashan Pune.
4. David. T. Plummer, (1987). An introduction to practical Biochemistry 3rd Edition. McGraw – Hill Edition.
5. Nadkarni, K.M. (1982). Indian Materia Medica. Popular Prakashan, [P] LTD. Bombay. Volume I – II.
6. Krishnamurthy, T. (1993). Minor Forest Products of India, Oxford and IBH publishers [P] LTD, New Delhi.

IMMUNOLOGY AND BIOTECHNIQUES

Semester: V	**Subject Code:**
Practical Paper-V	**Credits: 2**
Hours per Week: 4 hrs	**Total Hours per Semester: 60 hrs**

To enable learners,

to know basics of immunological tests and biochemical techniques

1. RBC sedimentation rate
2. RBC and WBC count by haemocytometer.
3. Differential count of WBC
4. Determination of Hemoglobin by hemoglobinometer.
5. Heme agglutination
6. Widal test.
7. Thin layer Chromatography – Separation of lipids /Carbohydrates.
8. Paper chromatography- Separation of amino acid from mixture
9. Centrifugation-Cell organelle separation.

REFERENCE:

1. Palanivelu, P. (2004). Laboratory Manual for Analytical Biochemistry, Separation Technique.3rd Edition, Twenty first century publications.
2. David. T. Plummer, (1987). An introduction to practical Biochemistry 3rd Edition. McGraw – Hill Edition.

NUTRITION AND DIETETICS

Semester: VI	**Subject Code:**
Paper – 9	**Credits: 4**
Hours per Week: 4 hrs	**Total Hours per Semester: 60 hrs**

To enable the learners,

to have knowledge nutritional importance of food and its constituents.

to apply the knowledge to formulate diet for persons under clinical treatment.

Unit I:

Introduction – Definition – Food, Classification of foods, essential nutrients, analysis of food, composition, food habits, food groups, nutritional importance of carbohydrates, proteins, lipids, vitamins and minerals. Nutritive values for different foods – Water: water intake and loss of water balance, exchange of water in the body. Excess of water intake effect and dehydration. Oral rehydration therapy – Dietary fibers: types – source, role of dietary fibers in the absorption of different nutrients, in different diseased conditions.

Unit II:

Energy value of food – Energy unit, Measurement of Energy value – Bomb calorimeter, Benedict's oxy method. Specific dynamic action (SDA) of food, thermo genesis. Basal Metabolic Rate (BMR) – Definition, Measurement of BMR – Direct and indirect methods, factors affecting BMR, Regulation of body temperature. Total energy requirement at different developmental stages.

Unit III:

Determination of nutritive value of proteins. PER, NPR, Net protein utilization, Digestibility coefficient. Biological value, Nitrogen Balance – positive and negative nitrogen balance. Factors affecting protein utilization. Protein malnutrition – Kwashiorkor, Marasmus - Assessment of nutritional status. Balanced diet formulation.

Nutrition at various stages – infant, children, adult, pregnant woman, lactating mother and older person.

Unit IV:

Principles and classification of therapeutic diet. regular, light, soft fluid, parenteral and enteral feeding. Energy modification and nutritional care for obesity, underweight, infections and surgical conditions, peptic ulcer, anemia, hypertension, diabetes mellitus, jaundice, renal failure and atherosclerosis.

Unit V:

Interaction between drugs and nutrients. Nutritional status - Supplementary foods - Food production - Food storage - Food allergy - Food additives - Food fads & fallacies - Applied nutrition programs - Effect of cooking of food - Future protein foods - Future fat foods, Single cell protein (SCP).

TEXT BOOK:

Swaminathan, M., [Vol I and Vol II] Advanced Text Book in Food and Nutrition 2nd Edition 1989, Bappco publications Bangalore.

REFERENCE:

1. Raheena Begum. A Text Book of foods, Nutrition and Dietetics 2nd Edition 1991 Sterling Publishers Pvt LTD. New Delhi.
2. Shubhangini A. Joshi Nutrition and Dietetics 1st Edition 1992, TATA MC Graw Hill Publishing Company New Delhi.
3. Sri Lakshmi B, Food Science, New Age International LTD, New Delhi, 1997.
4. Robinson C.H. Marilyn, R.L. Normal and Therapeutic nutrition Macmillan Publishing Company New York, 1995.
5. Eva. D.W. Katheine, H.F, Fugua, M.F, Principles of Nutrition Wiley Eastern Pvt. LTD New Delhi, 1971.

PLANT BIOCHEMISTRY

Semester: VI **Subject Code:**

Paper – 10 **Credits: 4**

Hours per Week: 4 hrs **Total Hours per Semester: 60 hrs**

To enable the learners,

to get an idea about biochemistry of plants.

to understand the fundamentals of plant tissue culture.

Unit I:

Photosynthesis: Definition, History, light absorption region-Photosynthetic apparatus: Chloroplast. Photosynthetic pigments- chlorophyll, carotenoids and phycobilins. Mechanism of photosynthesis – Light reaction. Dark reaction – C_3, C_4, CAM cycle. Factors affecting photosynthesis. Photorespiration .

Unit II:

Respiration- Introduction- Site of respiration- Respiratory substrate- types of respiration - Mechanism of respiration- Glycolysis- Kreb's cycle- Electron transport system- Terminal oxidation and oxidative phosphorylation- Pentose Phosphate Pathway- RQ- Significance of respiration- Factors affecting respiration.

Unit III:

Plant hormones: Biosynthesis, occurrence and mechanism of actions of Auxin, Gibberellic Acid, Abscisic Acid, Cytokinin, Brassinosteroid, Jasmonic Acid, Salicylic Acid and Ethylene- Functions of synthetic hormones- Growth inhibitors.

Unit IV:

Nitrogen Fixation: N_2 cycle, symbiotic nitrogen fixation, Non- symbiotic nitrogen fixation. Nitrogenase enzyme complex. *Nif* gene – Nitrogen assimilation – Sulfur assimilation – Water movement, Ascent of sap, Mineral absorption and metabolism - translocation of minerals. Micro and macro minerals – sources – function – deficiency.

Unit V:

Physiology of flowering: Phytochrome – Physical and chemical properties of phytochrome –Photoperiodism- Vernalisation- Seed dormancy – Seed germination – Bud dormancy – Senescence – Fruit ripening- Glyoxylate cycle -Geotropism - Circadian rhythm. Plant tissue culture – history, totipotency, organ culture, embryo culture, somoclonal variation.

TEXT BOOK:

1. Salisburry and Ross. (1986). Plant Physiology 1st Edition. CBS Publishers, New Delhi.

REFERENCE:

1. Devlin and Witham (1986). Plant Physiology 1st Edition. CBS Publishers New Delhi.
2. Mukherji. S. and Ghosh. A.K. (1996). Plant Physiology 1st Edition. TATA McGraw-Hill Publishing Company New Delhi.
3. Bidwell, R.G.S. (1974). Plant Physiology. MacMillan Publication.
4. Tarr S.A.J. (1972). Principles of Plant Pathology, 1st Edition. Macmillan Publishers, London.
5. Sharma P.D. (2004). Plant Pathology, 1st Edition. Rastogi Publications, Meerut.

HERBAL DRUG TECHNOLOGY

Semester: VI **Subject Code:**

Paper – 11 **Credits: 4**

Hours per Week: 4 hrs **Total Hours per Semester: 60 hrs**

To enable the learners,

to evaluate the drugs by extracting and analyzing them.

to instill concepts of herbal medicine formulation and preparation.

to get idea about value added products production from plants.

to instill basics of proper utilization of wide flora in a sustainable and value added manner.

Unit – I

Herbs and Nutrition: Collection and preparation of natural drugs for market- Collection- Harvesting- Drying- Garbling- Packing -side effects. Herbal drugs for various diseases, Cough- Adathoda, Thuthuvalai, Thulsi,_Diabetes-Gymnema- Jaundice- Keezhanelli, Cancer- *Catheranthes roseus*.

Unit II

Methods of Drug evaluation: Organoleptic, Microscopic, Physical, Chemical, Biological evaluation, Active constituents tests to identify and assess the quality, purity and uses of following drugs- Lemon grass oil, Sesame oil, Castor oil, Clove oil, Eucalyptus oil and Turpentine oil.

Unit – III

Herbal drug formulations: Types of herbal medicines, Preparation techniques of Legiyam, Thylam, Tablet, Chooranam, Parpam, Chendooram, Distillate, Capsules, Decoction. Ointments, Hair oil and Tonic wine.

Unit – IV

Value added products: Production of value added products from *Azadirachta indica*, *Aloe vera*, *Ocimum sanctum*, *Santalum album*, *Curcuma aromatica.*

Unit – V

Drug toxicity: Safety and efficacy of drugs- Clinical studies with herbal drug- Toxicology of crude extracts- Herbal drug toxicity

TEXT BOOK

1. Farooqui, A.A., Production technology of medicinal and Aromatic plants
2. Krishnamurthy, T., (1993). Minor Forest products of India. Oxford and IBH Publishers (P) LTD, New Delhi.

REFERENCE

1. Sairam, T.V., Herbal Remedies – Part I, II, III, and IV.
2. Thirugnanam, S. (1995). Moolikai Maruthuvam, Selvi Pathippagam, Trichy. (in Tamil)
3. Dhanya Kumar, (2002). Indya Mooligaigal [A Dictionary of Indian Herbal Plants] Narmada pathipagam, Chennai (in Tamil).

GENETIC ENGINEERING AND INDUSTRIAL BIOTECHNOLOGY

Semester: VI **Subject Code:**

PAPER – 12 **Credits: 5**

Hours per Week: 5 hrs **Total Hours per Semester: 75 hrs**

To enable the learners,

to have fundamental knowledge on methods and application of genetic engineering.

to get in depth idea about application of genetic engineering, fermentation technology

in industries.

to make aware of Intellectual property rights law oriented to the genetic engineering.

Unit I:

Gene – organization and expression, cistron – restriction enzymes, types, application. Construction of cloning vectors- various types of cloning vectors, plasmid, cosmid, phage DNA, YAC, pBR322, pUC 18 - Methods of vector introduction – Particle gun bombardment, electroporation, microinjection, liposome mediated gene transfer– construction of recombinant DNA.

Unit II:

cDNA construction, cDNA libraries screening, expression,– transgenesis: transgenic organisms, production of novel proteins: insulin, interferon -features of T_i. Mechanism of T–DNA transfer. Role of virulence gene, use of Ti as vector - Transgenic plant – Bt cotton - Herbicide resistance, insect resistance-Transgenic animal- mice, sheep and poultry.

Unit III:

DNA and RNA probes and their uses in disease diagnosis and in forensics. PCR and RT-PCR, tools of genetic analysis. DNA sequencing chemical, enzymatic, automated. RFLP (Restriction Fragment Length Polymorphism) RAPD (Random Amplified Polymorphic DNA Marker), AFLP (Amplified Fragment Length Polymorphism)

Unit IV:

Bioreactor: Design, parts and their functions, bioprocess control and monitoring variables such as, temperature, agitation pressure, pH and oxygen, computers in bioprocess control.

Unit V:

Safety in recombinant DNA research lab and industrial applications. Intellectual property Rights (IPR), patent protection in developing countries, regional development and IPR, WTO and IPR.

TEXT BOOKS:

1. Old, R.W. Primrose., S.B. 1996 Principles of gene manipulation Blackwell science publication, Germany
2. Duran, P.M. (2005). Bioprocess Engineering Principles, 1st Edition. Elsevier Publications, US.

REFERENCE:

1. Sandthya Mitra. (1996). Genetic Engineering 1st Edition. Mac Millan Indian LTD.
2. Winnacker, E.L. (1987). From Genes to clones - Introduction to Gene Technology, V.C.H. Publication, Federal Republic Company.
3. Brown, T.A. (1995). Gene cloning, 3rd Edition Chapman, Hall Publications USA

4. Balasubramanian, D., Bryce, C.F., Dharmalingam K, Green, J., Kunthala,J., [Eds], (1996). Concepts in Biotechnology. COSTED – IBU, University Press Hyderabad.
5. Shuler, M.L. and Kargi, F. (2002). Bioprocess Engineering Basic Concepts, 2nd Edition. PHI Publications, India.
6. Arkinson B, Mavituna, F. (1991). Biochemical Engineering and Biotechnology handbook 2nd Edition. Mac Millan.
7. Nair, K.R.G., Kumar. A., (1994). Intellectual property rights, Allied Publishers, LTD. New York.
8. Internet Access

BIOINFORMATICS

Semester: VI **Subject Code:**

Paper – 13 **Credits: 5**

Hours per Week: 5 hrs **Total Hours per Semester: 75 hrs**

To enable the learners,

to make aware of basic concepts and tools of Bio informatics.

to utilize *"in silico*" knowledge for elucidating biomolecles.

Unit I:

Introduction, Definition,Scope, importance and applications of bioinformatics. Emerging areas of bioinformatics.An introduction to servers-World Wide Web (www).

Unit II :

Biological databases and its types-Nucleic acid databases (NCBI, DDB and EMBL),Protein databases(primary,composite and secondary). Specialised Genome databases (SGD,TIGR andACeDB),Structural databases(CATH,SCOP and PDBsum)

Unit III:

Sequence alignment-Dot matrix,local alignment(Smith and Watermen algorithm),Global alignment(Needleman and wunsch algorithm),similarity searching using BLAST and FASTA –.Clustal-W- Multiple sequence alignment and methods and application.

Unit IV: Phylogenetic analysis-phylogenetic trees,Distance based and character based methods,automated tools for phylogenetic analysis.

Unit V: Analysis Packages – Features of a stand alone analysis package, selected popular commercial packages – GCG, EGCN, Staden, Special packages on DNA analysis, internet and intranet packages.

TEXT BOOK:

1. Attwood, T.K. and Parry – Smith, D.J. (1999). Introduction to Bio – Informatics, Person Education, Pvt, LTD. Singapore.

2. Gibas, C, Jam beck, P. Developing Bio informatics Computer Skills, Shroff Publisher Calcutta.

REFERENCE:

1. Lesk, A.M. (2002). Introduction to Bio informatics Oxford University Press Oxford.
2. Baxevanis, A.D. and Ouellette, B.F.F. (1998). Bio informatics a practical Guide to the Analysis of Genes, Proteins Wiley – inter science Publication, New York.
3. Smith, D.W. (1994). Bio computing Informatics, Genome Projects. Academic press, Sandiego.
4. David. W. Mount, (2003). Bioinformatics, CBS Publishers and Distributors, New Delhi.
5. Internet Access.

BIOTECHNOLOGY AND BIOINFORMATICS

Semester: VI **Subject Code:**

Practical Paper - VI **Credits: 2**

Hours per Week: 3 hrs **Total Hours per Semester 45 hrs**

To enable the learners,

to capable of handling tools in biotechnology and perform molecular experiments with a hand in "*In silco*" lab,

1. Agarose gel electrophoresis
2. SDS-PAGE
3. Isolation, and quality assessment of bacterial DNA.
4. Isolation and quality assessment of plasmid DNA
5. Retrieving DNA and Protein sequences from biological databases- Demo only
6. Computational analysis of DNA and Protein by bioinformatics tools. - Demo only

REFERENCE:

1. Palanivelu, P. (2004). Labaratory Manual for Analytical Biochemistry, Separation Technique. 3rd Edition, School of Biotechnology, M.K.U
2. Chellam Raja Manikam, Experimental Protocol in Basic Molecular Biology ,1st Edition, OSHO Scientific Pub, Madurai.
3. David. T. Plummer. (1987). An introduction to practical Biochemistry 3rd Edition. McGraw – Hill Edition
4. Sawhney, S.K. and Randhir Singh. (2000). Introductory Practical Biochemistry 1st Edition. Narosa Publication.
5. Internet Access.

HERBAL DRUG TECHNOLOGY

Semester: VI **Subject Code:**

Practical Paper-VII **Credits: 2**

Hours per Week: 3 hrs **Total Hours per Semester: 45 hrs**

To enable the learners,

to isolate, analyze active compounds from herbal plants, formulation and preparation of herbal medicine and value added plant products.

1. Analysis of Alkaloids from various herbs
2. Analysis of Glycosides from various herbs
3. Analysis of Steroids from various herbs
4. Analysis of Saponins from various herbs
5. Analysis of Tannins from various herbs
6. Analysis of Flavonoids from various herbs
7. Preparation of Legiyam
8. Preparation of Thylam.
9. Preparation of Chooranam

REFERENCE:

1. Krishnamurthy, T (1993). Minor Forest Products of India, Oxford and IBH publishers [P] LTD, New Delhi.
2. Nadkarni K.M.. (1982). Indian Materia Medica. Popular Prakashan, Pvt, LTD. Bombay. Volume I – II.
3. Internet Access.

QUESTION PAPER PATTERN

THEORY EXTERNAL

Maximum Marks – 75 Marks **Duration of Examinations: 3 Hrs.**

PART – A

Answer Any TEN questions (10 Questions out of 15) **10X2=20**

PART – B

Answer Any FIVE questions (5 Questions out of 8) **5X5=25**

PART – C **3X10=30**

Answer ANY THREE questions (3 Questions out of 5}

TOTAL **75 Marks**

DEPARTMENT OF BIOCHEMISTRY
YADAVA COLLEGE
(Autonomous)
MADURAI – 625 014.

SELF STUDY PAPER FOR EARNING EXTRA CREDITS BY THE BRILLIANT

STUDENTS

of

B.Sc., BIOCHEMISTRY

UNDER GRADUATE PROGRAMME

For those who joined June – 2018-2019

B.Sc., BIOCHEMISTRY

UNDER GRADUATE PROGRAMME

SELF STUDY PAPER FOR EARNING EXTRA CREDITS BY THE BRILLIANT STUDENTS.

COURSE CONTENT

Semester	Subject Code	Title of the paper	Credits	Teaching hours per week	Duration of Examination	Marks Allotted		Total
						Internal	External	
III		Blood Biochemistry	3	-	3	25	75	100
IV		Medical Lab Technology	3	-	3	25	75	100
V		Mushroom Cultivation	3	-	3	25	75	100
VI		Organic Farming	3	-	3	25	75	100

BLOOD BIOCHEMISTRY

Semester: III **Subject Code:**

Paper – 1 **Credits: 3**

To enable the learners,

to know the techniques in Hematology.

to know the procedures and complications of blood transfusions.

Unit – I

Basic Techniques in Hematology: Methods of blood collection, Anticoagulants, preparing blood smears, staining of blood smears, examination and interpretation of blood smears.

Unit – II

Lab diagnosis of RBC disorders : Lab diagnosis of iron deficiency, megalo blastic, pernicious, folic acid deficiency, hemolytic anemias.

Unit – III

Lab diagnosis of Hemoglobin disorders: Lab diagnosis of sickle cell, aplastic anemias, α, β – thalassemias.

Unit – IV

Bleeding disorders and diagnosis: Bleeding time, Coagulation time, Prothrombin time, and Lab diagnosis of hemophilia – A & B

.**Unit – V**

Blood banking: Antigens & Grouping system, Grouping test, Blood transfusion – Donor screening methods, Coomb's cross matching, transfusion complications.

Reference Books :

1. Ramnik Sood, 2006 Medical Laboratory Technology, Methods and Interpretations, 5th Edition, Jaypee Brothers, New Delhi.

2. Kanai L. Mukherjee, 1996 Medical Laboratory Technology,

A procedure manual for routine diagnostic tests, volume I, II, III, Tata McGraw – Hill Publishing Company Limited, New Delhi.

MEDICAL LAB TECHNOLOGY

Semester: IV **Subject Code:**

Paper – II **Credits: 3**

To enable the learners,

to know the techniques in Hematology.

to know the procedures and complications of blood transfusions.

Unit – I

Histopathology: Fixation, decalcification, preparation of sections, routine and special staining methods.

Unit – II

Stool Examination: Collection, inspection, test for blood, fat, microscopic examination, organisms seen in normal and abnormal conditions.

Unit – III

Sputum Analysis: Collection, physical examination, physical findings along with sputum, microscopic examination, sputum culture, organisms seen in normal and abnormal conditions.

Unit – IV

Semen Analysis: Collection, gross examination, microscopic examination, antibodies of sperm.

Unit – V

Pregnancy test: Specimen collection and procedure, immunological tests for pregnancy – Antisera – Anti HCG dispersed card method, ELISA method.

Reference Books:

1. Ramnik Sood, 2006 Medical Laboratory Technology, Methods and Interpretations, 5th Edition, Jaypee Brothers, New Delhi.

2. Kanai L. Mukherjee, 1996 Medical Laboratory Technology, A procedure manual for routine diagnostic tests, volume I, II, III, Tata McGraw – Hill Publishing Company Limited, New Delhi.

MUSHROOM CULTIVATION

Semester: V **Subject Code**

Paper – III **Credits: 3**

To enable the learners,

to know the basics of mycology.

to know the procedures and methods of cultivation of fungi.

Unit – I

Fungi general characteristics – nutrition, thallus. Cell wall, nuclear status, life cycle - sexuality in fungi (asexual and sexual reproduction)

Unit – II

Taxonomy , nomenclature and classification of fungi up to class levels, natural and artificial classification.

s Ascomycotina Ex. *Saccharomyces cerevisiae,* Basidiomycotina

Ex. *Agaricus campestris*

Unit – III

Cultivation of edible mushrooms –

***Agaricus bisporus* (white button mushroom),**

***Pleurotus ostereatus* (American oyster mushroom),**

***Lentimus edodes* (Japanese mushroom),**

***Volvariella volvaceae* (Paddy straw mushroom).**

Unit – IV

Growing conditions of mushrooms, fungal nutrition – nutritional requirements – carbon and nitrogen sources, minerals and vitamins. Storage of mushrooms and its importance.

Unit – V

Mycotoxins and mycotoxicoses – Mushroom toxins – Amantia, Cyclopeptides, Orellamine Gyromitrin and Muscarine

Reference Books:

1. H.C.Dube, 1990, An Introduction to Fungi, Vikas Publishing house Pvt. Ltd.

2. Geofrey Kibby , 1977, Mushroom and toad stool Chartwel books Inc Octobus book limited

ORGANIC FARMING

Semester: VI **Subject Code**

PAPER – IV **Credits: 3**

To enable the learners,

to know the basics of mycology.

to know the procedures and methods of cultivation of fungi.

Unit – I

Compost preparation – procedure, advantages, disadvantages of organic farming

Unit – II

Biofertilizer – types of biofertilizers, microbial inoculants, advantages of biofertilizer, production of biofertilizer.

Unit – III

Vermiculture – preparation of vermicompost, vermicomposting using paddy straw. Benefits of vermi composting.

Unit – IV

Biopesticides – characteristics of biopesticides, advantages and disadvantages of biopesticides, biopesticides production.

Unit – V

Biofuel - Biodiesel production from *Jatropha curcas, Pongamia glabra*, Gobar gas production and its uses.

Reference Books:

V.Kumaresan 2006, Plant Ecology and Applied Botany, Saras Publication

DEPARTMENT OF BIOCHEMISTRY

YADAVA COLLEGE, MADURAI – 14.

(AUTONOMOUS)

CBCS PATTERN

NON MAJOR ELECTIVE SYLLABUS

FOR THOSE WHO JOINED IN

JUNE – 2018-19

DEPARTMENT OF BIOCHEMISTRY

Yadava College (Autonomous), Madurai – 625 014.

Choice Based Credit System - for those who joined in June 2018-2019

Non- Major Elective offered to Other Major Students

Semester	Subject code	Title of the paper	Teaching Hours / week	Credit	Duration of Exam	*Evaluation*		Total
						Internal	External	
III		Human Diseases & Prevention	2	2	3	25	75	100
IV		Food & Nutrition	2	2	3	25	75	100

HUMAN DISEASES AND PREVENTION

Semester: III	**Subject Code:**
Paper – I	**Credits: 2**
Hours per Week: 2 hrs	**Total Hours per Semester: 30 hrs**

To enable the learners,

to make aware of causes, symptoms, treatment and prevention of human diseases.
to make aware of trauma care.

Unit I:

Definition- Disorder, disease, syndrome, causes, symptoms, and prevention of Hemiplegia, Arthritis, Gout.

Unit II:

Causes, symptoms, and prevention of Sinusitis, Asthmas, Ulcer, Piles.

Unit III:

Causes, symptoms, and prevention of Jaundice, Hepatitis, Myocardial infraction, Cardiomegaly.

Unit IV:

Causes, symptoms, and prevention of Diabetes mellitus, Hyper and Hypo Thyroidism, Obesity.

Unit V:

Causes, symptoms, and prevention of Urinary tract infections, Sexually transmitted diseases, Dysurea, Polycystic ovarian syndrome, Azoospermia.

TEXT BOOK:

Carl A.Burtis, Edward R.Ash wood (2001), Tietz, Fundamentals of Clinical chemistry, 5th Edition, Har Court India Pvt LTD, Company New Delhi.

REFERENCE:

1. Thomas M. Devlin. (1997). Text Book of Biochemistry with Clinical Correlation, 4th Edition. Wiley Liss Publication.

2 .Chatterjea and Ranashinde. (2005). Text Book of Medical Biochemistry, 6th Edition, 2005, JP Publications, Calcutta.

3 .Kanai L. Mukherjee. (1998). Vol. II III Medical Laboratory Technology, 1st Edition. TATA McGraw – Hill Publishing Company LTD New Delhi.

4. Dinesh Puri. (2002). Textbook of Biochemistry, Clinically Oriented Approach. 1st Edition. B.I.Churchill Living Stone Pvt. LTD. New Delhi.

5. Allan Gaw., Robert A., Cowan. Denis St. Stewart, J. and James Shepherd. (1999). Clinical Biochemistry 2nd Edition. Churchill Living stone

FOOD AND NUTRITION

Semester: IV	**Subject Code:**
Paper – II	**Credits: 2**
Hours per Week: 2 hrs	**Total Hours per Semester: 30 hrs**

To enable the learners,

to have knowledge over nutritional importance of food and its constituents.

to apply the knowledge to formulate diet for persons under clinical treatment.

Unit I:

Introduction – Definition – Food, Classification of foods, essential nutrients, composition of food, , nutritional importance of carbohydrates, proteins, lipids, vitamins and minerals. Nutritive values for different foods

Unit II:

Water: water intake and loss of water balance, exchange of water in the body. Excess of water intake effect and dehydration. Oral rehydration therapy – Dietary fibers: types – source, role of dietary fibers in the absorption of different nutrients.

Unit III:

Nitrogen Balance – positive and negative nitrogen balance. Factors affecting protein utilization. Protein malnutrition – Kwashiorkor, Marasmus - Balanced diet formulation. Nutrition at various stages – infant, children, adult, pregnant woman, lactating mother and older person.

Unit IV:

Principles and classification of therapeutic diet. Regular, light, soft fluid, parenteral and enteral feeding. Energy modification and nutritional care for obesity, underweight, anemia, hypertension, diabetes mellitus, jaundice, renal failure and atherosclerosis.

Unit V:

Food fads & fallacies - Food allergy - Food additives - Food production - Food storage - Effect of cooking over food - Supplementary foods - Future protein foods - Future fat foods, Single cell protein (SCP).

TEXT BOOK:

Swaminathan, M., [Vol I and Vol II] Advanced Text Book in Food and Nutrition 2nd Edition 1989, Bappco publications Bangalore.

REFERENCE:

1. Raheena Begum. A Text Book of foods, Nutrition and Dietetics 2nd Edition 1991 Sterling Publishers Pvt LTD. New Delhi.
2. Shubhangini A. Joshi Nutrition and Dietetics 1st Edition 1992, TATA MC Graw Hill Publishing Company New Delhi.
3. Sri Lakshmi B, Food Science, New Age International LTD, New Delhi, 1997.
4. Robinson C.H. Marilyn, R.L. Normal and Therapeutic nutrition Macmillan Publishing Company New York, 1995.
5. Eva. D.W. Katheine, H.F, Fugua, M.F, Principles of Nutrition Wiley Eastern Pvt. LTD New Delhi, 1971.

CERTIFICATE IN THERAPEUTIC NUTRITION

Semester: **Subject Code:**

Paper – I **Credits:**

Hours per Week: **Total Hours:**

To enable the learners,

to make aware of causes, symptoms, therapeutic diet for human diseases.

to make aware of nutritional recovery in diseased conditions,

to make aware of diet management for human diseases.

Unit I: Introduction: Therapeutic Nutrition · Oral Nutrition · Principles and classification of therapeutic diet. Regular, light, soft fluid, parenteral and enteral feeding.

Unit II: Causes, symptoms, therapeutic diet for digestive disorders, Irritable Bowel Syndrome (IBS), Inflammatory Bowel Diseases (IBD), Ulcerative Colitis, Hepatitis, Cirrhosis, Jaundice, Gall Stones and Pancreatitis.

Unit III: Causes, symptoms, therapeutic diet for Anemia, Underweight, Obesity, Diabetes mellitus.

Unit IV: Causes, symptoms, therapeutic diet for Hypertension, Hyperlipidemia, Atherosclerosis, Heart Disease.

Unit V: Causes, symptoms, therapeutic diet for Renal stones, Glomerulonephritis, Acute & Chronic Nephrotic Syndrome, Nephrosclerosis, Renal Failure.

TEXT BOOK:

1. Swaminathan, M., [Vol I and Vol II] Advanced Text Book in Food and Nutrition 2nd Edition 1989, Bappco publications Bangalore.

2. Raheena Begum. A Text Book of foods, Nutrition and Dietetics 2nd Edition 1991 Sterling Publishers Pvt LTD. New Delhi.

3 .Shubhangini A. Joshi Nutrition and Dietetics 1st Edition 1992, TATA MC Graw Hill Publishing Company New Delhi.

4. Sri Lakshmi B, Food Science, New Age International LTD, New Delhi, 1997.

5. Robinson C.H. Marilyn, R.L. Normal and Therapeutic nutrition Macmillan Publishing Company New York, 1995.

6. Eva. D.W. Katheine, H.F, Fugua, M.F, Principles of Nutrition Wiley Eastern Pvt. LTD New Delhi, 1971.

CERTIFICATE IN DIET THERAPY

Semester:	**Subject Code:**
Paper – I	**Credits:**
Hours per Week:	**Total Hours:**

To enable the learners,

to make aware of causes, symptoms, therapeutic diet for human diseases.

to make aware of nutritional recovery in diseased conditions,

to make aware of diet management for human diseases.

Unit I: Introduction: Diet therapy- definition, Diet in Hospital- Liguid, light, soft fluid. Types of Hospital diet: mechanically softened, light diet. Additional modifications in texture consistency.

Unit II: Therapeutic diet for myocardial infarction, high blood pressure and coronary heart diseases.

Unit III: Therapeutic diet for fever, convalescence and yphoid fever

Unit IV: Diet in other health condition: nutrition in pre and post operative condition, nutrition in Arthritis and nutrition in cancer

Unit V: Diet for gall stones, nephritis and renal calculi.

TEXT BOOK:

1. Swaminathan, M., [Vol I and Vol II] Advanced Text Book in Food and Nutrition 2nd Edition 1989, Bappco publications Bangalore.
2. Raheena Begum. A Text Book of foods, Nutrition and Dietetics 2nd Edition 1991 Sterling Publishers Pvt LTD. New Delhi.
3 .Shubhangini A. Joshi Nutrition and Dietetics 1st Edition 1992, TATA MC Graw Hill Publishing Company New Delhi.
4. Sri Lakshmi B, Food Science, New Age International LTD, New Delhi, 1997.
5. Robinson C.H. Marilyn, R.L. Normal and Therapeutic nutrition

Macmillan Publishing Company New York, 1995.

6. Eva. D.W. Katheine, H.F, Fugua, M.F, Principles of Nutrition Wiley Eastern Pvt. LTD New Delhi, 1971.