

**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)**

(Affiliated to Bharathidasan University)

(Accredited by NAAC; An ISO 9001:2015 Certified Institution)

SUNDARAKKOTTAI, MANNARGUDI -614016.

TAMIL NADU, INDIA.

DEPARTMENT OF BIOCHEMISTRY



**1.1.3 DETAILS OF COURSES OFFERED THAT FOCUS ON
EMPLOYABILITY/ ENTREPRENEURSHIP / SKILL
DEVELOPMENT**

B.Sc., BIOCHEMISTRY (3USBIC)

ACADEMIC YEAR: 2021-2022

DEPARTMENT OF BIOCHEMISTRY

1.1.3 Details of courses offered by the institution that focus on Employability/ Entrepreneurship / Skill Development During the Year.

B.Sc., Biochemistry (Total No. of Courses:19)

Name of the Course	Course Code	Activities/Content with a direct bearing on Employability/ Entrepreneurship/ Skill development	Description about the need addressed
Fundamentals of Biochemistry	21BC101	Skill Development	Understand the structure, classification, properties and biological Functions of biomolecules
Fundamentals of Biochemistry Practical	21BC102P	Skill Development	Get hands on training in quantitative and qualitative analytical techniques
Analytical Techniques	21BC203	Skill Development & Employability	SD-enable the students to have a deep knowledge on the techniques for measurement of biophysical factors in living organisms EM-enable the students to get an insight on the usage of various techniques and their applications in industry and R&D
Analytical Techniques Practical	21BC204P	Skill Development & Employability	SD- Acquire skill in handling some specified equipments and their application EM- Make the students to learn separation techniques and handling of certain laboratory equipments
Human Anatomy and Physiology	21BC305	Skill Development	Get knowledge on blood group identification, Haemoglobin, techniques in ECG and to find the composition of urine
Human Anatomy and Physiology Practical	21BC306P	Skill Development	Learn the histology of tissues & muscles and able to determine various parameters of blood
Biology	21ABC305	Skill Development	To know about the nomenclature, classification of plants, animals and microorganisms, Inheritance biology and ecosystem
Biology Practical	21ABC306P	Skill Development & Employability	SD-Learn the skill of determining the water parameters using the laboratory equipments and also learn the art of handling the equipments EM- Learn microscope, microcopy, and cytochemical techniques
Enzymes	21BC407	Skill Development & Employability	SD-To get an idea about enzyme kinetics EM-Employability in food industries and clinical laboratory

Enzymes Practical	21BC408P	Skill Development, Employability & Entrepreneurship	SD- Determine the enzyme activity and kinetics EM- Employability in food industries and clinical laboratory EN- Isolation and purification of enzymes
Cell Biology	21ABC407	Skill Development	To understand the basics and fundamentals of cell biology and biogenesis of cell organelles, cell cycle and cell division
Cell Biology Practical	21ABC408P	Skill Development	Study practically the plant and animal cells, the cell organelles and components with the help of microscope and staining techniques
Allied Courses offered by the Department			
General Biochemistry I	21ABC101	Skill Development	To know the organic structure of living systems mainly dealing with biomolecules
General Biochemistry Practical I	21ABC102P	Skill Development	Acquire knowledge on Qualitative analysis of biomolecules
General Biochemistry II	21ABC203	Skill Development	Impart knowledge regarding biochemistry of various physiological processes
General Biochemistry Practical II	21ABC204P	Skill Development	Acquire knowledge on quantitative analysis of biomolecules
Non Major Elective Courses offered by the Department			
Health and Diseases	21NMEBC31	Skill Development & Employability	EM- Know about basic procedures during biological sample collections SD- learn the impaired metabolism of carbohydrate, lipid, protein and disorders leading to various diseases in human beings
Health and Management	21NMEBC42	Skill Development, Employability &, Entrepreneurship	EM- To understand the health facilities and health care services and structures in hospital industry EN- Impart knowledge on various health insurance policies in health care SD- Study the basic principles and practices of hospital management
Skill Based Elective Courses offered by the Department			
Traditional Medicine	21SBEBEC1	Employability, Entrepreneurship & Skill Development	EM- To impart knowledge of Herbal medicine and to make them become employable EN- To make them able to identify medicinal plants and phytotherapy SD- impart knowledge of Herbal medicine as the basic objective of Education



SD- Skill Development



EM- Employability,



EN-Entrepreneurship

Signature of the Head of the Department

HEAD

PG and Research Department of Biochemistry
Sengamala Thayaar Educational Trust
Women's College (Autonomous)
Sundarakkottai, Mannargudi - 614 016

Signature of the Director of CDC

Signature of the Principal

PRINCIPAL
Sengamala Thayaar Educational Trust
Women's College, (Autonomous)
Mannargudi.

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DEPARTMENT OF BIOCHEMISTRY
B.Sc., BIOCHEMISTRY

Semester: I-CC-I: Fundamentals of Biochemistry

Ins. Hrs./Week: 6

Course Credit: 6

Course Code: 21BC101

OBJECTIVES

- To expose the importance of biological macromolecules
- To study the influence and role of structure in reactivity of biomolecules
- To understand the role of biomolecules and their functions

UNIT- I: Carbohydrates (19 Hours)

Carbohydrates- Definition, classification, structure, properties and functions of biologically important carbohydrates viz. monosaccharide (glucose, fructose and galactose), Disaccharides – (sucrose, lactose and maltose) and homo and hetero polysaccharides- starch, glycogen, inulin, cellulose, chitin, hyaluronic acid, chondroitin sulfate and heparin.

Interconversion of sugars.

UNIT –II: Proteins (20 Hours)

Definition, classification, structure, properties and functions of amino acids; Peptides and peptide bond. Proteins- Definition, classification, properties, Biological importance. Structure of proteins- primary structure, secondary, tertiary and quaternary structure; forces stabilizing the structure of proteins. Super secondary structure of proteins.

UNIT –III: Lipids (18 Hours)

Fatty acids - Definition, nomenclature, classification, properties and biological significance. Lipids- Definition, classifications properties and biological functions. Simple lipids: oils and waxes. Compound lipids- Definition, properties, structure and functions- Phospholipids, sphingolipids and glycolipids. Lipoproteins – classification and composition. Derived lipids- Definition, properties, structure and functions of steroids. Prostaglandin- Classification, properties, structure and functions.

UNIT- IV: Nucleicacid (17 Hours)

Definition, components of mono nucleotides- bases (pyrimidines, purines), nucleosides, nucleotides. nucleoside. Properties -**Denaturation and Renaturation**. Polynucleotides- DNA- Definition, properties, composition, structure and biological importance. RNA- Definition, classifications (mRNA, tRNA and rRNA), structure, properties and biological importance.

UNIT –V: Vitamins and Minerals (16 Hours)

Definition and classification, source, structure, properties, daily requirement, deficiency manifestation and biological role of the fat soluble vitamins (A, D, E and K) and water soluble vitamins (C, B1, B2, B3, B5, B6, B9 and B12). Mineral requirements-essential macro minerals- sodium, potassium, calcium, phosphorus and micro minerals- zinc, chromium, iron, selenium- sources and functions.

Total Lecture Hours- 90

COURSE OUTCOME

The students will be able to,

1. Understand the structure, classification, biological functions and properties of carbohydrates
2. Learn the structure of amino acids, and classification, properties and biological functions of proteins.
3. Acquire comprehensive knowledge on structure, classification, nomenclature and functions of lipids.
4. Learn the different types of nucleic acids, their structure and their biological significance.
5. Understand nutrients requirements and the importance of various kinds of vitamin, their sources important biological functions.

TEXT BOOK(S)

1. Deb AC. 2016. Fundamentals of Biochemistry. 7th edition, NCBA Publishers, New Delhi.
2. Jain JL, Sunjay Jain and Nitin Jain. 2018. Fundamentals of Biochemistry. Updated edition. 2020. S.Chand Publishers, New Delhi.
3. Poonam Agarwal. 2020. Review of Biochemistry. 5th edition. CBS Publishers, New Delhi.
4. Robert K. Murray, Daryl K. Granner, Peter A. Mayes, Victor W. Rodwell, 2003. Harper's Illustrated Biochemistry, 26th edition, McGraw-Hill Medical Publishers, New York.
5. Vasudevan DM. 2018. Biochemistry. 9th edition. Aypee Brothers Medical Publishers, New Delhi.

REFERENCE BOOK(S)

1. Anders Liljas. 2019. Textbook of Structural Biology, 2nd edition, World Scientific Publishers, Singapore.
2. Berg JM., Tymoczko JL and Stryer L. 2019. Biochemistry, 9th edition, WH. Freeman Publishers, New York.
3. David L. Nelson and Michael M. Cox. 2017. Lehninger Principles of Biochemistry, 7th edition, WH Freeman Publishers, New York.
4. Lehninger AL, Nelson DL and Cox MM. 2020. Principles of Biochemistry, 8th edition. WH Freeman Publishers, New York.
5. Satyanarayana U and U. Chakrapani. 2020. Biochemistry, 5th Updated edition, Elsevier Publishers, India.

E-RESOURCES

1. <http://www1.biologie.uni-hamburg.de/b-online/library/biology107/bi107vc/fa99/terry/sugars.html>
2. <https://nptel.ac.in/content/storage2/courses/104103071/pdf/mod10.pdf>
3. <https://nptel.ac.in/content/storage2/courses/104103071/pdf/mod11.pdf>
4. <https://nptel.ac.in/content/storage2/courses/104103071/pdf/mod12.pdf>
5. <https://www.pdfdrive.com/biochemistry-books.html>

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DEPARTMENT OF BIOCHEMISTRY
B.Sc., BIOCHEMISTRY

Semester: I-CP-I: Fundamentals of Biochemistry Practical
Ins. Hrs./Week: 3 Course Credit: 2 Course Code: 21BC102P

OBJECTIVES

- To acquire hands on training in quantitative and qualitative analytical techniques

Practicals

1. Safety measures in Laboratories
2. Use of analytical balance and weighting.
3. Preparation & Standardization of laboratory reagents.
4. Calibration of volumetric glass wares (Burette, pipette and measuring cylinder).
5. Handling of Microscope.

QUALITATIVE ANALYSIS

1. Qualitative analysis of carbohydrates (Glucose, Fructose, Galactose, Maltose, Sucrose, Lactose).
2. Qualitative analysis of amino acids (Tryptophan, Tyrosine, Arginine, Proline, Phenyl alanine, Methionine and Histidine)
3. Qualitative analysis of Lipids-Coconut oil, Gingelly oil

QUANTITATIVE ANALYSIS

1. Estimation of reducing sugar by Benedict's quantitative method.
2. Estimation of amino acid by formal titration
3. Estimation of ascorbic acid by titrimetric method using 2,6 - dichlorophenol indophenol.
4. Determination of acid number of edible oil.
5. Determination of saponification number of edible oil.

COURSE OUTCOME

Student are able to

- Familiar with analytical instruments
- Get trained in quantitative and qualitative analytical techniques

TEXT BOOK(S)

1. Anil Kumar, Sarika Garg and Neha Garg, 2012. Biochemical Tests – Principles and Protocols, 1st edition, Vinod Vasishtha Viva Publishers, New Delhi.
2. Jayaraman J. 2011. Manuals in Biochemistry, 1st edition, New Age International Publishers, New Delhi.
3. Pattabiraman TN. 1998. Laboratory Manual in Bio Chemistry – 3rd edition, All India Publishers, Chennai.
4. Sadasivam S and Manickam VA. 2006. Biochemical methods, 3rd edition, New Age international Publishers, New Delhi.
5. Varun Kumar Malhotra, 1996. Practical Biochemistry for students. 4th edition, Jaypee Brothers Medical Publishers, New Delhi.

REFERENCE BOOK(S)

1. Homie DJ and Peck H. 2003. Analytical Biochemistry, 1st edition, Longman group – Rastogic CBS Publishers, New Delhi.
2. Keith Wilson and John Walker, 2015. Principles and Techniques of Practical Biochemistry, 6th edition, Cambridge University press Publishers, USA.
3. Plummer T. 2001. Practical Biochemistry, 3rd edition, McGraw Hill Publishing Company, New York.
4. Sawhney SK, Randhir Singh, 2005. Introductory Practical Biochemistry, 2nd edition, Alpha Science International Limited, United Kingdom.
5. Sergio Caroli and Zyula, 2017. Analytical Techniques for Clinical Chemistry, 1st edition, John Wiley & Sons Inc Publishers, New York.

E-RESOURCES

1. <https://www.pdfdrive.com/principals-and-techniques-of-biochemistry-and-molecular-biology-7th-e18725198.html>
2. <https://www.pdfdrive.com/practical-textbook-of-biochemistry-for-medical-students-e187182647.html>
3. <https://www.pdfdrive.com/introduction-to-practical-biochemistry-e33418060.html>
4. <https://www.pdfdrive.com/practical-biochemistry-e187196416.html>
5. <https://www.pdfdrive.com/introduction-to-practical-biochemistry-e33418060.html>

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DEPARTMENT OF BIOCHEMISTRY
B.Sc., BIOCHEMISTRY

Semester: II-CC-II: Analytical Techniques

Ins. Hrs./Week: 6

Course Credit: 6

Course Code: 21BC203

OBJECTIVES

- To enable the students to have a deep knowledge on the techniques for measurement of biophysical factors in living organisms.
- To enable the students to get an insight on the usage of various techniques and their applications in industry and R&D.
- To develop competence in handling various chromatographic techniques and apply them in isolating and characterizing different biological molecules.

UNIT- I: Colorimetry (16 Hours)

Beer Lambert's Law, Light absorption and its transmittance, Absorption Spectroscopy - Principle, instrumentation and applications of colorimetry and UV-Vis spectrophotometer. Emission Spectroscopy – Spectrofluorimeter - Principle, instrumentation and applications. Flame photometry - principle and applications.

UNIT- II: Chromatographic Techniques (19 Hours)

Chromatography - Principle, method and applications of paper, thin layer, ion exchange, affinity chromatography, gel permeation chromatography and Gas liquid chromatography, Hydrophobic interaction chromatography, liquid chromatography, reverse phase chromatography, liquid chromatography, gel filtration chromatography, flash chromatography. Partition and adsorption chromatography.

UNIT- III: Centrifugation Techniques (19 Hours)

Cell disruption and homogenization-Media for homogenization, methods of cell disruption. Centrifugation - principle- sedimentation coefficient, RCF. Types of centrifuges and rotors. Preparative centrifugation differential, density gradient centrifugation, and Analytical ultracentrifugation – instrumentation and applications - Determination of molecular weight.

UNIT- IV: Electrophoretic techniques (19 Hours)

Electrophoresis - Principles and applications of electrophoresis, Factors affecting electrophoretic mobility. Types of electrophoretic techniques – zonal, capillary, paper and agarose gel. PAGE- Native - PAGE and SDS PAGE. Staining method used in electrophoretic technique, Isoelectric focusing. General scheme for purification of biocomponents.

UNIT- V: Radio isotopic techniques (17 Hours)

Types of radioactive decay, rate of radioactive decay, decay constant, Units of radio activity, measurement of radioactivity based on ionization- GM counter and excitation- Scintillation counter. Autoradiography. Applications of radioisotopes in biology. Hazards of radioactivity, CT scan, MRI scan, Doppler.

Total Lecture Hours- 90

COURSE OUTCOME

The students will be able to,

1. Acquire practical training to handle the instruments like colorimeter, spectrophotometer and to use them for biochemical determinations.
2. Acquire practical skill to separate proteins by gel filtration and PAGE, and are able to separate amino acids and sugar using the techniques of paper/thin layer chromatography, students.
3. Learn about the principle and applications of spectrophotometry, different chromatographic techniques like gel filtration, Ion exchange, thin layer, etc.
4. Students also learn about various electrophoretic techniques such as cellulose acetate, gel, PAGE, etc. and their applications in analyzing proteins and nucleic acids.
5. Learn the basic principles of centrifugation, various types of centrifuges, rotors and methods for subcellular fractionation

TEXT BOOK(S)

1. West, E.S. and Todd, W.R., MacMillan, Textbook of Biochemistry, 1985 Germany.
2. Avinash Upadhyay, Kakoli Upadhyay and Nirmalendu Nath, 2014 Biophysical Chemistry (Principles and Techniques) 4th Edition Himalaya Publishing House, India.
3. Keith Wilson & John Walker, 2005, Principles and Techniques of Practical Biochemistry Cambridge University Press, India.
4. Rajan Katoch. 2011. Analytical Techniques in Biochemistry and Molecular Biology, 1st edition, Springer New York Dordrecht Heidelberg London Publishers, United Kingdom.
5. Sabari and Srivastava A. K., 2009, Fundamentals of Bio Analytical Techniques and Instrumentation Ghosal PHI Learning Pvt. Ltd. India.

REFERENCE BOOK(S)

1. Abhilasha Shourie and Shilpa S Chapadgaonkar, 2015, Bioanalytical Techniques, The Energy and Resources Institute, TERI, India.
2. C.R. Kothari, 2004 Research Methodology, Methods and Techniques, 2nd ed, New Age International Publishers. India.
3. Braun, R.P, 1987, Introduction to Instrumental Analysis, Tata McGraw Hill, India.
4. Pavia et al, 2000, Introduction to Spectroscopy. 3rd Edition, Brooks/Cole Pub Co., New Delhi, India.
5. Machve, K. and Neha, K. 2010, Basic Instrumentation, Publishers & Distributors, India.

E-RESOURCES

1. <https://www.pdfdrive.com/biochemistry-books.html>
2. <https://www.chem.purdue.edu/courses/chm333/Spring%202013/Lectures/Spring%202013%20Lecture%20%20-%204.pdf>
3. <https://nptel.ac.in/content/storage2/courses/102103047/PDF/mod3.pdf>
4. <https://nptel.ac.in/content/storage2/courses/102103044/pdf/mod5.pdf>
5. <https://nptel.ac.in/content/storage2/courses/102103044/pdf/mod2.pdf>

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DEPARTMENT OF BIOCHEMISTRY
B.Sc., BIOCHEMISTRY

Semester: II-CP-II: Analytical Techniques Practical
Ins. Hrs./Week: 3 Course Credit: 2 Course Code: 21BC204P

OBJECTIVES

- To make the students to learn separation techniques and handling of certain laboratory equipments

PRACTICALS

1. Preparation of Buffers and measurement of pH.
2. Titrable acidity of Aminoacids
3. Measurement of Blood pressure
4. Calculate Body Mass Index (BMI)
5. Handling of Colorimeter and Spectrophotometer
6. Estimation of RNA by Orcinol method.
7. Estimation of DNA by Diphenylamine method.

DEMONSTRATION

1. Paper Chromatography for separations and detections of simple Sugars and Aminoacids.
2. Separation of plant pigments by Column Chromatography.
3. Thin Layer Chromatography of Aminoacids.
4. ECG
5. EEG
6. Doppler
7. CT-SCAN
8. MRI-SCAN

COURSE OUTCOME

- Students acquire skill in handling some specified equipments and their application
- Able to separate amino acids and sugars using chromatographic techniques

TEXT BOOK(S)

1. David Plummer. 1988. A Textbook of Practical Biochemistry. Tata McGraw- Hill Education.
2. Peramachi Palanivelu. 2018. Analytical Biochemistry and Separation Techniques - A Laboratory Manual, 4th edition, Twenty first century Publishers, Srilanka.
3. Rajan Katoch. 2011. Analytical Techniques in Biochemistry and Molecular Biology, 1st edition, Springer New York Dordrecht Heidelberg London Publishers, United Kingdom.
4. Avinash Upadhyay, Kakoli Upadhyay and Nirmalendu Nath. 2014. Biophysical Chemistry (Principles and Techniques), 4th edition, Himalaya Publishers, Hyderabad.
5. Machve, K.K. 2015. Basic Instrumentation. 4th edition, Neha Publishers. India.

REFERENCE BOOK(S)

1. Methods in Enzymology Vol. I and II by S.P. Colowick and N.O. Kaplan eds. New York:

- Academia Press, 1955.
2. Jayaraman, J. 1981. Laboratory Manual in Biochemistry. New Age International Publishers. 2nd Edition.1981.
 3. Alan H Gowenlock, 1988. Varley's Practical Clinical Biochemistry, Sixth Edition, CBS Publishers and distributors, India.
 4. Kothari, C.R. 2004. Research Methodology, Methods and Techniques, 2nd edition, New Age International Publishers, India.
 5. Ghosal Sabari and Srivastava A, 2009. Fundamentals of Bio Analytical Techniques and Instrumentation, 2nd edition, PHI Learning Pvt. Ltd. India.

E-RESOURCES

1. <https://www.pdfdrive.com/biochemistry-books.html>
2. https://www.cdc.gov/bloodpressure/materials_for_patients.htm
3. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4890841/>
4. <https://www.healio.com/cardiology/learn-the-heart/ecg-review/ecg-interpretation-tutorial/introduction-to-the-ecg>
5. <https://imotions.com/blog/what-is-ecg/>

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DEPARTMENT OF BIOCHEMISTRY
B.Sc., MICROBIOLOGY

Semester: I-AC-I: General Biochemistry I

Ins. Hrs./Week: 4

Course Credit: 3

Course Code: 21ABC101

OBJECTIVES

- To introduce the organic structure of living systems mainly dealing with biomolecules like carbohydrates, proteins and lipids.
- To describe the basic structural features of nucleic acids
- To describe the roles of vitamins in metabolic processes

UNIT- I: Carbohydrates

(13 Hours)

Carbohydrates: Definition, sources, classification, property, structure and biological significance of Carbohydrates. Structure and functions of Monosaccharides-glucose, fructose, Disaccharides-ucrose, lactose, maltose and Polysaccharides-starch, glycogen. Structure and biological importance of sugar derivatives- **Proteoglycans and Glycoproteins**.

UNIT –II: Proteins

(12 Hours)

Proteins – Definition, sources, classification, properties, structure and biological significance of proteins (Primary, secondary, tertiary), **Denaturation and Renaturation of Proteins**. Amino acids–structure- - essential and nonessential amino acids and properties of amino acids.

UNIT –III: Lipids

(11 Hours)

Lipids - Definition, sources, classification-Triacyl glycerol, phospholipids, glycolipids, sphingolipids, structure, properties and biological significance. Fatty acids- saturated, unsaturated and essential fatty acids-Structure, properties and functions.

UNIT –IV: Nucleic acids

(11 Hours)

Nucleic acids – Definition, purine and pyrimidine bases, structure of nucleosides, nucleotides. **DNA double helical structure**, properties A, B and Z forms of DNA and its functions of DNA. **Types, structure and functions of RNA (mRNA, tRNA, rRNA)**.

UNIT- V: Vitamins

(13 Hours)

Vitamins – Definition, Water soluble vitamins (Chemistry of the vitamin & its coenzyme form, Biochemical role and disorders) –Thiamin, Riboflavin, Niacin, Pyridoxine, Biotin, Lipoic acid:- Chemistry of the Vitamin and its coenzyme form . Fat soluble vitamins A,D,E,K (Chemistry of the vitamin & its coenzyme form, Biochemical role and disorders)

Total Lecture Hours- 60

COURSE OUTCOME

The students will be able to,

1. Through this course the students are exposed to importance of biological importance

2. Analyze the study the chemical and biochemical properties of biomolecules
3. Understand the structure and functions of biomolecules
4. Understand relationship between biological molecules and human health
5. At the end of the course, the students have a thorough understanding on the role of biochemistry and their function

TEXT BOOKS

1. Deb AC. Fundamentals of Biochemistry. NCBA Publishers.
2. Jain JL. Sunjay Jain and Nitin Jain. 2018. Fundamentals of Biochemistry. Updated Edition. 2020. S.Chand Publishers.
3. Poonam Agarwal. 2020. Review of Biochemistry. 5th Edition. CBS Publishers.
4. Ritu Singh and Rajeev Goyal. 2020. Illustrated Reviews Biochemistry (SAE). Wolters kluwer Publishers.
5. Vasudevan DM. 2018. Biochemistry. 9th edition. Aypee Brothers Medical Publishers

REFERENCE BOOK(S)

1. Anders Liljas. 2019. Textbook of Structural Biology. 2nd edition. World Scientific Publishers.
2. Berg JM. Tymoczko JL and Stryer L. 2019. Biochemistry. 9th edition. WH. Freeman Publishers.
3. David L. Nelson and Michael M. Cox. 2017. Lehninger Principles of Biochemistry. 7th edition. WH Freeman Publishers.
4. Lehninger AL, Nelson DL and Cox MM. 2020. Principles of Biochemistry. 8th Edition. WH Freeman Publishers.
5. Satyanarayana U. and Chakrapani U. 2020. Biochemistry. 5th Updated Edition . Elsevier Publishers.

E-RESOURCES

1. <https://www.elsevier.com/journals/clinical-biochemistry/0009-9120/guide-for-authors>
2. <http://rajswashya.nic.in/RHSDP%20Training%20Modules/Lab.%20Tech/Biochemistry/Dr.%20Jagarti%20Jha/Techniques%20In%20Biochemistry%20Lab.pdf>
3. <https://libguides.ug.edu.gh/c.php>
4. <https://www.pdfdrive.com/biochemistry-books.html>
5. <https://drive.google.com/file/d/10C4EYN0Sv2LPI9ZzhoV->

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DEPARTMENT OF BIOCHEMISTRY
B.Sc., MICROBIOLOGY

Semester: I-AP-I: General Biochemistry Practical I

Ins. Hrs./Week: 3

Course Credit: 2

Course Code: 21ABC102P

1. Qualitative analysis of Carbohydrates –Glucose, Fructose, Galactose, Maltose, Lactose, Sucrose.
2. Qualitative analysis of Amino acids-Tyrosine, Tryptophan, Histidine, Arginine, Proline and Phenyl Alanine, Methionine and Cystine
3. Qualitative analysis of Proteins- Egg Albumin, Gelatin and Caesin.
4. Qualitative analysis of Lipids- Gingelly oil and Coconut oil
5. Qualitative analysis of Nucleic acids- DNA and RNA

COURSE OUTCOME

Acquire knowledge on Qualitative analysis of biomolecules

TEXT BOOK(S)

1. Anil Kumar, Sarika Garg and Neha Garg. 2012. Biochemical Tests – Principles and Protocols. 1st Edition. Vinod Vasishtha Viva Publishers.
2. Jayaraman J. 2011. Manuals in Biochemistry. 1st Edition. New Age International Publishers.
3. Sadasivam S and Manickam VA. 2006. Biochemical methods. 3rd Edition. New Age international Publishers.

REFERENCE BOOK(S)

1. Homie DJ. and Peck H. 2003. Analytical Biochemistry. 1st edition, Longman group – Rastogic CBS Publishers.
2. Keith Wilson and John Walker. 2015. Principles and Techniques of Practical Biochemistry. 6th Edition, Cambridge University press Publishers.
3. Sergio Caroli and Zyula. 2017. Analytical Techniques for Clinical Chemistry, 1st edition, John Wiley & Sons Inc Publishers.

E-RESOURCES

1. <https://www.elsevier.com/journals/clinical-biochemistry/0009-9120/guide-for-authors>
2. <http://rajswashya.nic.in/RHSDP%20Training%20Modules/Lab.%20Tech/Biochemistry/Dr.%20Jagarti%20Jha/Techniques%20In%20Biochemistry%20Lab.pdf>
3. https://dspace.cuni.cz/bitstream/handle/20.500.11956/111493/Clinical_biochemistry-pdf.pdf?sequence=1&isAllowed=y
4. https://dspace.cuni.cz/bitstream/handle/20.500.11956/111493/Clinical_biochemistry-pdf.pdf?sequence=1&isAllowed=y
5. <https://www.e-booksdirectory.com>

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DEPARTMENT OF BIOCHEMISTRY
B.Sc., MICROBIOLOGY

Semester: II-AC-II: General Biochemistry II

Ins. Hrs./Week: 4

Course Credit: 3

Course Code: 21ABC203

OBJECTIVES

- To understand the fundamental chemical principles that governs complex biological systems.
- To impart knowledge regarding biochemistry of various physiological processes.
- To impart knowledge in the upcoming areas of Biochemistry.

UNIT- I: Blood

(11 Hours)

Blood–Introduction, origin, composition, characterization, types functions. RBC, WBC:Granulocytes-Eosinophils,Basophils,Neutrophils:AGranulocytes-Monocytes, Lymphocytes and platelets, **Factors and Mechanism of blood coagulation. Anticoagulants. Blood Vessels-Types and Layers of Blood Vessels.**

UNIT- II: Hormones

(13 Hours)

Hormones–Definition, classification and biological functions of hormones, secondary messengers –cAMP, IP3. Human- Endocrine glands – Pituitary, Thyroids, Para thyroid-Histological structure of the glands. **Chemical nature, molecular mechanism of action, functions and regulation of secretion of the hormones.**

UNIT- III: Hypo and Hyper secretions of Hormones

(11 Hours)

Diseases associated with deficiency of endocrine hormones- hypo and hyper secretions. Thyroid disease- thyrotoxicosis, Goiter, Grave's disease, Hashimoto's thyroiditis. Parathyroid hormone-Hyperparathyroidism, hypoparathyroidism, Paget's disease, Ricket's and osteomalacia. Hyper and hypocalcemia.

UNIT- IV: Carbohydrate metabolism

(13 Hours)

Metabolism-Metabolic Process-Catabolism and anabolism.Carbohydrate metabolism-Glycolysis, TCA cycle, Gluconeogenesis, HMP shunt and their regulation. Disorders of carbohydratemetabolism- Hypoglycemia, hyperglycemia, glycosuria. **Diabetes mellitus – classification, metabolic abnormalities, diagnosis and management.**

UNIT –V: Protein metabolism

(12 Hours)

Protein metabolism- Transamination, deamination, decarboxylation, Urea cycle and their regulation. isorders of protein metabolism-Tyrosinemia,Homocystinuria and Phenylketonuria. Glucogenic amino acids with examples, Ketogenic amino acids with examples.

Total Lecture Hours- 60

COURSE OUTCOME

The students will be able to,

1. Identify blood composition and functions

2. The course is designed to provide an understanding to structures and function of endocrine glands.
3. It also provides an understanding of the common endocrine disorders, metabolic regulations, and metabolic abnormalities, and their management.
4. Describe the metabolism of carbohydrates and explain how biochemical energy is generated in the cell.
5. Describe the metabolism of proteins

TEXT BOOKS

1. Deb AC. Fundamentals of Biochemistry. NCBA Publishers.
2. Jain JL, Sunjay Jain and Nitin Jain. 2018. Fundamentals of Biochemistry. Updated Edition. 2020. S.Chand Publishers.
3. Poonam Agarwal. 2020. Review of Biochemistry. 5th Edition. CBS Publishers.
4. Ritu Singh and Rajeev Goyal. 2020. Illustrated Reviews Biochemistry (SAE). Wolters kluwer Publishers.
5. Vasudevan DM. 2018. Biochemistry. 9th edition. Aypee Brothers Medical Publishers

REFERENCE BOOK(S)

1. Anders Liljas. 2019. Textbook of Structural Biology. 2nd edition. World Scientific Publishers.
2. David L. Nelson and Michael M. Cox. 2017. Lehninger Principles of Biochemistry. 7th edition. WH Freeman Publishers.
3. JM. Berg, JL. Tymoczko and L. Stryer. 2019. Biochemistry. 9th edition. WH. Freeman Publishers.
4. Lehninger AL, Nelson DL and Cox MM. 2020. Principles of Biochemistry. 8th Edition. WH Freeman Publishers.
5. Satyanarayana U. and Chakrapani U. 2020. Biochemistry. 5th Updated Edition . Elsevier Publishers.

E-RESOURCES

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3. <https://drive.google.com/file/d/10C4EYN0Sv2LPI9ZzhoV->
4. <https://drive.google.com/file/d/1UyLEp6iXyKrqXuVwh->
5. <https://drive.google.com/file/d/1tghNWPyuqPiqK1Rl11ZzUrFwcoMiuoMa/>

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)



SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2021 – 2022)

DEPARTMENT OF BIOCHEMISTRY
B.Sc., MICROBIOLOGY

Semester: II-AP-II: General Biochemistry Practical II

Ins. Hrs./Week: 3

Course Credit: 2

Course Code: 21ABC204P

1. Quantitative estimation of glucose by Benedict's method
2. Quantitative estimation of Ascorbic acid-2,6-Dichlorophenol Indophenol dye method (from biological sample)
3. Quantitative estimation of Amino acid by formal titration
4. Quantitative estimation of Proteins A/G ratio by Biuret method
5. Quantitative estimation of Lipids

COURSE OUTCOME

The students will be able to acquire knowledge on quantitative analysis of biomolecules

TEXT BOOK(S)

1. J. Jayaraman. 2011. Manuals in Biochemistry. 1st Edition. New Age International Publishers.
2. S. Sadasivam and VA Manickam. 2006. Biochemical methods. 3rd Edition. New Age international Publishers.
3. Anil Kumar, Sarika Garg and Neha Garg. 2012. Biochemical Tests – Principles and Protocols. 1st Edition. Vinod Vasishtha Viva Publishers.

REFERENCE BOOK(S)

1. Keith Wilson and John Walker. 2015. Principles and Techniques of Practical Biochemistry. 6th Edition, Cambridge University press Publishers.
2. Sergio Caroli and Zyula. 2017. Analytical Techniques for Clinical Chemistry, 1st edition, John Wiley & Sons Inc Publishers.
3. DJ. Homie and H. Peck. 2003. Analytical Biochemistry. 1st edition, Longman group – Rastogic CBS Publishers.

E-RESOURCES

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2. <http://rajswashya.nic.in/RHSDP%20Training%20Modules/Lab.%20Tech/Biochemistry/Dr.%20Jagarti%20Jha/Techniques%20In%20Biochemistry%20Lab.pdf>
3. https://dspace.cuni.cz/bitstream/handle/20.500.11956/111493/Clinical_biochemistry-pdf.pdf?sequence=1&isAllowed=y
4. https://dspace.cuni.cz/bitstream/handle/20.500.11956/111493/Clinical_biochemistry-pdf.pdf?sequence=1&isAllowed=y

**SENGAMALA THAYAR EDUCATIONAL TRUST WOMEN'S COLLEGE
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SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2020-2021)

DEPARTMENT OF BIOCHEMISTRY

B.Sc., BIOCHEMISTRY

Semester: III-CC-III: Human Anatomy and Physiology

Ins. Hrs./Week: 6

Course Credit: 6

Course Code: 21BC305

OBJECTIVES

- To explain the basic knowledge of human anatomy and physiology
- To introduce the physiological concepts of homeostasis and central mechanism
- To understand fundamental mechanisms underlying normal function of cells, tissues, organs, and organ systems of the human body

UNIT-I: Body fluids

(19 Hours)

Extracellular fluid-plasma Intracellular fluid: Lymph & Blood-composition and functions. Osmolarity of the body fluids, ionic composition, electrolytes, body buffers. Blood cells-Types, Morphology and functions, **haemoglobin**, haemopoiesis, blood coagulation and **blood groups**.

UNIT-II: Circulation and Respiration

(18 Hours)

Circulation: Structure and functions of Heart and blood vessels. Origin and conduction of heart beat, cardiac cycles, cardiac factors controlling blood pressure, **electrocardiogram**.

Respiration: Anatomy and physiology of respiration, exchange of gases between lung and blood and between blood and tissues. Role of lungs in acid-base balance.

UNIT-III: Digestive system

(19 Hours)

Anatomy of the digestive system, Salivary, Gastric, Biliary, pancreatic and intestinal Secretions- composition and functions. Movements in Gastro intestinal tract, Digestion and absorption in the small intestine. Absorption in the large intestine; Digestion and absorption of carbohydrates, lipids and proteins.

UNIT-IV: Excretory system and Muscle

(17 Hours)

Excretory system: Structure and functions of kidney and Nephron. **Urine- composition and formation**. Renal regulation of acid-base balance. **Muscle:** Kinds of muscle, Ultra structure and chemical composition of skeletal muscle, Sliding filament theory, Physicochemical changes during muscle contraction.

UNIT-V: Central nervous system

(17 Hours)

Brief outline of nervous system-Brain, spinal cord, nerve fibre, synapse. Structure and types of neuron. Resting and action potential-conduction of nerve impulse. Synaptic transmission. neurotransmitters. Brain-chemical composition, metabolism, Biochemical aspects of learning and memory.

Total Lecture Hours- 90

COURSE OUTCOME

The students will be able to,

1. Learn the distribution and composition of body fluids.
2. Understand the basics of anatomy and physiology of Heart and Lungs.

3. Acquire knowledge on the main structures and functions composing Digestive system.
4. Understand the functions of important physiological systems including the excretory system and Muscles.
5. Understand the structure and functions of nervous system.

TEXT BOOK(S)

1. Jain AK. 2019. Textbook of Physiology with Free QA Physiology (2 Volume Set), 8th edition, Arya Medical (APC) Publishers, New Delhi.
2. Martini FH and Nath JL. 2009. Fundamentals of Anatomy & Physiology. 11th edition, Pearson Benjamin Cummings. USA.
3. Nitin Ashok John, 2019. CC Chatterjee's Human Physiology Volume - 1 & II, 13th edition, Kalyani Mukerjee Publications, Kolkata, India.
4. Pal GK. 2019. Comprehensive Textbook of Medical Physiology (2 Volume Set), 2nd edition, Jaypee Medical Publishers, India.
5. Sarda Subramaniam, Madhavan Kutty K and Singh HD. 2006. Text Book of Human Physiology. 6th edition, S.Chand and Company Publishers, New Delhi.

REFERENCE BOOK(S)

1. Guyton AC and Hall JE. 2006. Textbook of Medical Physiology. 11th edition. Saunders, Philadelphia. USA.
2. Shalya Subhash, 2000. Human Physiology: Systemic & Applied, pt edition, - Publishers, New Delhi.
3. Silverthorn DU. 2016. Human Physiology: An Integrated Approach, 6th edition, Pearson Publishers, Austin.
4. Stuart H. Ralston, Ian D. Penman, Mark W. J. Strachan and Richard P. Hobson, 2018. Davidson's Principles and Practice of Medicine. 23rd edition, Elsevier Publishers, USA.
5. West ES, Todd WR, Mason HS and JTV. 2011. Textbook of Biochemistry, 4th edition, Bruggen Oxford IBH Publishers, New Delhi.

E-RESOURCES

1. <https://www.pdfdrive.com/biochemistry-books.html>
2. <https://www.pdfdrive.com/biochemistrystrayer-e25312085.html>
3. <https://www.pdfdrive.com/essentials-human-physiology-e1543905.html>
4. <https://www.pdfdrive.com/human-physiology-from-cells-to-systems-168189400.html>
5. https://www.pdfdrive.com/human-anatomy-physiology-e5_1_1_97.html
6. <https://www.pdfdrive.com/essentials-of-medical-physiology-6th-edition-e32299678.html>

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
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DEPARTMENT OF BIOCHEMISTRY
B.Sc., BIOCHEMISTRY

Semester: III-CP-111: Human Anatomy and Physiology Practical

Ins. Hrs./Week: 3

Course Credit: 2

Course Code: 21BC306P

1. Histology of Tissues - Columnar, cubical, ciliated, squamous, stratified squamous.
2. Microscopic structure of organs - lungs, artery, vein, stomach, ovary, testis, uterus, pancreas.
3. Histology of muscles - cardiac, striated, non- striated
4. Determination of bleeding time
5. Determination of clotting time
6. Estimation of haemoglobin content
7. Determination of heart rate and pulse rate
8. Determination of Blood group
9. Determination of Rh factor
10. Determination of erythrocyte sedimentation rate (ESR)
11. Recording of basal mass index
12. Enumeration of Red blood cells (RBC) - Demonstration
13. Enumeration of White blood cells (WBC) - Demonstration
14. Differential Leucocyte count - Demonstration

COURSE OUTCOME

- Students practically learn the histology of tissues & muscles and able to determine various parameters of blood.

TEXT BOOK(S)

1. Ghai CL. 2013. Textbook of Practical Physiology, 8th edition, Jaypee Brothers Medical Publishers (P) Ltd., New Delhi.
2. Inderbir Singh. 2011. Textbook of Human Histology, 6th edition, Jaypee Brothers Medical Publishers (P) Ltd., New Delhi.
3. Kishore J. 2019. National Health Programs of India National Policies and Legislations Related to Health, 13th edition, Peepee Publishers, New Delhi.
4. Pal GK. 2019. Comprehensive Textbook of Medical Physiology (2 Volume Set), 2nd edition, Jaypee Medical Publishers, Chennai, Tamil Nadu.
5. Praful B Godkar, Bijal Dave & Laveena Muley. 2017. Textbook of Medical Microbiology and Parasitology, 1st edition, Bhalani Publisher, New Delhi.
6. Srinageswari Kand Rajeev Sharma. 2018. Practical workbook of Human Physiology, 2nd edition, Jaypee Brothers Medical Publishers (P) Ltd., New Delhi.

REFERENCE BOOK(S)

1. Arthur C. Guyton. 2011. Guyton & Hall Textbook of Medical Physiology, 12th edition, Elsevier Health Science; 3rd edition Saunders, an imprint of Elsevier Inc., USA.
2. Chatterjees CC. 2020. Human Physiology (vol 1 and 2), 13th edition, CBS Publishing Distribution Pvt. Ltd., India.

3. Nitin Ashok John. 2019. CC Chatterjee's Human Physiology Volume - 1 & II, 13th edition, CBS Publishers, New Delhi.
4. Shalya Subhash. 2000 . Human Physiology: Systemic & Applied, 1st edition, - Publishers, New Delhi.
5. West ES., WR. Todd, HS. Mason and JTV. 2011. Textbook of Biochemistry, 4th edition, Bruggen Oxford IBH Publishers, New Delhi.

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3. <https://ia801901.us.archive.org/26/items/KSembulingamEssentialsOfMedicalPhysiology6thEdition/K%20Sembulingam%20%20Essentials%20of%20Medical%20Physiology%20%206th%20Edition.pdf>
4. <https://ia802205.us.archive.org/1/items/pdfy5vClyqSbVzIGpuT2/DM%20Vasudevan%20%20Textbook%20of%20Biochemistry%20For%20Medical%20Students,%206th%20Edition.pdf>
5. http://yengage.yenepoya.edu.in/idataNenepoyaUniversity/iFile/3/86/file_38672/001/CL%20Ghai%20%20A%20Textbook%20of%20Practical%20Physiology,%208th%20Edition.pdf
6. https://www.academia.edu/21912072/IB_Singh_Textbook_of_Human_Histology_6th_Edition
7. <https://bujhansi.ac.in/econtent/pages/shortcodes/biomedical/Guyton-and-Hall-Textbook-of-Medical-Physiology-12th-Ed.pdf>

**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
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DEPARTMENT OF BIOCHEMISTRY
B.Sc., BIOCHEMISTRY

Semester: III-AC-III: Biology

Ins. Hrs./Week: 4

Course Credit: 3

Course Code:21ABC305

OBJECTIVES

- To define basic biological concepts and processes.
- To describe levels of organization and related functions in plants and animals.
- To identify the characteristics and basic needs of living organisms.

UNIT-I: Inheritance Biology

(11 Hours)

Taxonomy, Types of taxonomy. Plants systematics: Taxonomy Vs Systematics. Principles and methods of taxonomy: concept of species of hierarchical taxa. **Biological nomenclature (International code of Botanical nomenclature). Classical and quantitative methods of taxonomy. Classification of plants, animals and microorganisms.**

UNIT-II: Taxonomy

(13 Hours)

Inheritance biology - Mendelian principle, Chromosome theory of inheritance, allele, multiple allele, poly gene inheritance, pleiotropy, Linkage: Types, arrangement and theory. Crossing over: Mechanism, theory, sex linkage, sex limited and sex influenced characters, Mechanism of sex determination .. Inheritance of mitochondrial and chloroplast genes, maternal inheritance.

UNIT- III: Plant Physiology

(13 Hours)

Plant physiology- Photosynthesis, C₃, C₄ pathway, photo respiration, nitrate and ammonia assimilation, Plant pigment: Chlorophylls, Carotenoids. Plant hormone: Auxins, Gibberelins, Cytokinins, Ethylene, Traumatic acid, phytochemicals, alkaloids, flavonoids, saponins, quinines, terpenes, phenols, Nitrogenous compounds-functions.

UNIT- IV: Environmental Biology

(11 Hours)

Environmental Biology -Physical environment, biotic and abiotic, concept of habitat and niche, Resource partitioning: character displacement Concept, structure and functions of an ecosystem. Ecological succession. **Energy flow and mineral cycling in ecosystem. Terrestrial and aquatic ecosystem.**

Unit -V: Evolutionary Biology

(12 Hours)

Historical review of Evolutionary concept: concept of evolution, origin of life, theories of evolution. Evidences of evolution: Analogy and Homology, Embryological evidences. Paleontological evidences, molecular phylogeny. Variations and mutations. Population genetics: Hardy-Weinberg law, Types of natural selection. Evolutionary synthesis.

Total Lecture Hours- 60

COURSE OUTCOME

The students will be able to,

1. Understand the Mendelian and molecular genetics, cell structure, cell physiology, and molecular processes of cells.

2. Learn organismal form, function, and diversity.
3. Acquire knowledge on the principles and theory of evolution, and concepts of ecology.
4. Explain the processes of growth and development in individuals and populations.
5. Correlate the relationships between organisms and their environment.

TEXT BOOK(S)

1. Iralei and George Odian, 2006, General, organic and Biochemistry, 2nd edition, W.H. Freeman company, New York.
2. Bruce Alberts, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts and Peter Walter, 2002, Molecular biology of the cell-4th ed.; Garland Science; New York.
3. Powar, C.B. 2010, Cell Biology, Himalaya publishing House, Hyderabad.
4. Sobti, R.C., Sharma, V.L. 2009, Essentials of Modern Biology, Ane Books, India.
5. Verma, P.S. and Agarwal, V.K. 2004. Cell Biology, Genetics, Molecular Biology, Evolution and Ecology, S.Chand & Company Ltd, New Delhi,

REFERENCE BOOK(S)

1. Hans -Walter Heldt, 2010, Plant Biochemistry, 4th ed, Academic Press, Elsevier Publications, Netherland.
2. Pandey, S.N, Sinha, B.K. 2009, Plant physiology- 4th ed, Vikas Publishing House, New Delhi.
3. Verma, P.S. and Agarwal, V.K. 2012. Environmental Biology (Principles of Ecology) S.Chand & Company Ltd, New Delhi.
4. Sundara Rajan, S. 2008, Introductory Modern Biology, Anmol publications Pvt Ltd, New Delhi.
5. Verma, V. 2006. Text Book of Plant Physiology, Ane Books Pvt Ltd, New Delhi.

E-RESOURCES

1. <https://www.sciencelearn.org.nz/resources/2000-mendel-s-principles-of-inheritance>
2. <https://library.viu.ca/c.php?g=188912&p=1247781>
3. <https://www.khanacademy.org/science/ap-biology/natural-selection/natural-selection-ap/a/darwin-evolution-natural-selection>
4. <https://www.biologydiscussion.com/ecosystem/ecosystem-its-structure-and-functions-with-diagram/6666>
5. <https://www.intechopen.com/books/herbal-medicine/plants-secondary-metabolites-the-key-drivers-of-the-pharmacological-actions-of-medicinal-plants>

SENGAMALA THAYAR EDUCATIONAL TRUST WOMEN'S COLLEGE
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SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2020 -2021)

DEPARTMENT OF BIOCHEMISTRY
B.Sc., BIOCHEMISTRY

Semester: III-AP-III: Biology Practical

Ins. Hrs./Week: 3

Course Credit: 2

Course Code: 21ABC306P

1. To learn use of microscope, principle of fixation and staining.
2. Study of various plant cell types
3. To carryout gram staining for identifying bacteria.
4. To prepare squash mounts of onion root tips to study mitosis.
5. To study meiosis through permanent slides
6. Separation of chloroplast pigments by Paper Chromatography.
7. To study the cytochemical distribution of nucleic acids and muco polysaccharides within cells / tissues from permanent slides.
8. To raise the culture of E.coli and estimate the culture density by turbidity method. Draw a growth curve from the data.
9. Observation of various stages of chick embryo
10. Measurement of Physico - Chemical parameters in aquatic environment.
 - Dissolved Oxygen
 - Salinity
 - pH (Using pH paper (or) pH meter or Lovid bond Comparator).
 - Free Carbon -di-oxide
 - Carbonates and Bicarbonates

COURSE OUTCOME

The students are able to,

1. Learn microscope, microcopy, and cytochemical techniques
2. Learn the skill of determining the water parameters using the laboratory equipments and also learn the art of handling the equipments

TEXT BOOK(S)

1. Raven and Hetal, P. 2006, Biology 7th edition, Tata McGraw Hill Publications, New Delhi.
2. Powar, C.B. 2010. Cell Biology, Himalaya publishing House, Hyderabad.
3. Sobti, R.C. and Sharma, V.L. 2009. Essentials of Modern Biology, Ane Books, India
4. Sundara Rajan, S. 2008. Introductory Modern Biology, Anmol publications Pvt Ltd, New Delhi.
5. Verma, V. 2006. Text Book of Plant Physiology, Ane Books Pvt Ltd, New Delhi.

REFERENCE BOOK(S)

1. Griffiths, A.J.F, 2008, Introduction to Genetic Analysis, 9th edition, W.H. Freeman & Co. Narway.
2. Ross, F.C.1986. Introductory Microbiology, Bell and Howell Co, London.
3. Taylor, R.G.W. 2005. Practical Cytology, Academic Press, London.
4. Verma, P.S. and Agarwal,V.K. 2004. Cell Biology, Genetics, Molecular Biology, Evolution and Ecology. S.Chand & Company Ltd, New Delhi.

5. Pandey, S.N. and Sinha, B.K. 2009. Plant physiology- 4th ed, Vikas Publishing House, New Delhi.

E-RESOURCES

1. <https://www.pdfdrive.com/biochemistry-books.html>
2. <http://amrita.olabs.edu.in/?sub=79&brch=18&sim=237&cnt=1>
3. <https://www.khanacademy.org/science/ap-biology/heredity/meiosis-and-genetic-diversity/a/phases-of-meiosis>
4. <https://www.ysi.com/parameters/biochemical-oxygen-demand-bod>
5. <https://www.merckmillipore.com/IN/en/water-purification/learning-centers/applications/environment-water-analysis/cod/CLqb.qB.BIMAAAF AZws QWTdi,nav?ReferrerURL=https%3A%2F%2Fwww.google.com%2F&bd=1>

**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
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DEPARTMENT OF BIOCHEMISTRY

B.Sc., BIOCHEMISTRY

Semester: IV-CC-IV: Enzymes

Ins. Hrs./Week: 5

Course Credit: 4

Course Code: 21BC407

OBJECTIVES

- To study the Classification and Nomenclature of enzymes and, specificity of enzyme
- To make them learn the enzyme kinetics, mechanism of enzyme action and factors affecting enzyme activity
- To make them understand the technique of immobilization.

UNIT-I: History & Terminology (14 Hours)

Classification & nomenclature of enzymes, specificity of enzyme action (Lock & Key model and Induced fit model). Enzymes catalysis: proximity and orientation effect, covalent catalysis, metal ion catalysis. Regulatory enzymes-Allo steric (ATCase) & Covalently modulated (Glycogen phosphorylase) enzymes.

UNIT -II: Mechanism of Enzymes (15 Hours)

Mechanism of action of chymotrypsin and Ribonuclease. Role of vitamins as coenzyme precursors (Riboflavin, Niacin, pyridoxine, Biotin and Thiamine). Effect of enzymes concentrations, upward and downward curvatures with examples. Effect of temperature on enzyme activity and temperature quotient.

UNIT-III: Enzyme kinetics (18 Hours)

Importance of measuring initial velocities, Derivation of Michaelis -Menten equation, single and double reciprocal plots Graphical representation of various inhibitors (Competitive, Noncompetitive and Uncompetitive) on Line weaver- Burke plots. Importance of Kcal/Km. Bisubstrate reactions- introduction to sequential and Ping-Pong mechanisms with example.

UNIT-IV: Factors affecting enzyme activity (14 Hours)

General pH profile diagram with exceptions, concept of enzymes assay and its importance, Enzymes activity units (Katal and specific activity), Enzymes isolation and purification - Enzymes solubilization, Brief idea of various fractionation procedures, criteria for enzymes purity and homogeneity.

UNIT-V: Immobilization of Enzymes (14 Hours)

Immobilization of an enzymes. Principles and various methods of immobilization - Ionic bonding, adsorption, covalent bonding (based on R groups of amino acids), microencapsulation and gel entrapment. Applications of immobilized enzymes. Applications of enzymes in Industry. Clinical importance of an enzyme.

Total Lecture Hours- 75

COURSE OUTCOME

The students will be able to,

1. Understand the classification and nomenclature of enzymes, specificity of enzyme Catalysis and regulatory enzymes.
2. Learn the mechanism of enzymes action and the role of vitamins as coenzyme precursors.
3. Acquire knowledge on the Michaelis - Menten equation, single and double reciprocal plots, and graphical representation of various inhibitors
4. Understand the factors affecting enzyme activity and the techniques of enzyme isolation & purification.
5. Learn the principles and methods of enzyme immobilization.

TEXT BOOK(S)

1. Price and Stevens 1989, Fundamentals of Enzymology, Oxford Bioscience publications 2nd edition, New york
2. Palmer, T. and Bonner, P. 2007. Enzymes: Biochemistry, Biotechnology, Clinical Chemistry, 2nd edition, Horwood Publishers, United Kingdom.
3. Weisman, Hand book of Enzyme technology, 3rd edition, Printice Hall Publishers, United Kingdom.
4. Satyanarayana, U. 2019. Fundamentals of Biochemistry, Allied & Books Pvt Ltd, Calcutta.
5. Jain, J.L. 2005. Fundamentals of Biochemistry, 6th edition, S.Chand Publishers, New Delhi.

REFERENCE BOOK(S)

1. Nelson, D.L., Michael M. Cox. 2004. Lehninger Principles of Biochemistry: International Edition, CBS Publishers, 4th edition, London.
2. Stryer, W.H.1995. Biochemistry, Freeman & Co., Scientific Research an Academic Publisher, New York.4th Ed.1995
3. Voet, D. and Voet, J.G. 1990. Biochemistry, 4th edition, John Wiley & Sons Inc., Publishers, New York
4. White, A. 1959. Principles of Biochemistry, 3rd edition, McGraw Hill Book Co., Publishers, New York.
5. Price and Stevens, 1999. Fundamentals of Enzymology, 3rd edition, Oxford University Press, New York.

E-RESOURCES

1. <https://www.pdfdrive.com/biochemistry-books.html>
2. <https://www.chem.purdue.edu/courses/chm333/Spring%202013/Lectures/Spring%202013%20Lecture%2013-14.pdf>
3. <https://www.chem.purdue.edu/courses/chm333/Spring%202013/Lectures/Spring%202013%20Lecture%2015.pdf>
4. <https://www.chem.purdue.edu/courses/chm333/Spring%202013/Lectures/Spring%202013%20Lecture%2016-%2017.pdf>
5. https://www.rgpv.ac.in/campus/PY/enzymes_ppt.pdf

**SENGAMALA THAYAR EDUCATIONAL TRUST WOMEN'S COLLEGE
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SUNDARAKKOTTAI, MANNARGUDI-614016
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DEPARTMENT OF BIOCHEMISTRY
B.Sc., BIOCHEMISTRY

Semester: IV-CP-IV: Enzymes Practical

Ins. Hrs./Week: 3

Course Credit: 2

Course Code: 21BC408P

1. Partial purification of an enzyme using bulk methods or Chromatography.
2. Assay to determine enzyme activity and specific activity.
3. Progress curve plot for an enzyme
4. Effect of pH /temperature on enzyme activity.
5. Determination of K_M and V_{max} using Line weaver-Burk plot.
6. Calculation of inhibitory constant (K_i) for an enzyme
7. Continuous assay of an enzyme.

COURSE OUTCOME

The students will be able to

- They are isolate and purify enzymes
- They are able to determine the enzyme activity and kinetics
- They also learn the enzyme assay technique

TEXT BOOK(S)

1. Price and Stevens 1989, Fundamentals of Enzymology, Oxford Bioscience publications 2nd Ed, New york.
2. Satyanarayana, U. 2019. Fundamentals of Biochemistry, Allied & Books Pvt Ltd, Calcutta.
3. Jain, J.L. 2005. Fundamentals of Biochemistry, 6th Edition, S.Chand Publishers, New Delhi.
4. Voet, D. and Voet, J.G. 1990. Biochemistry, 4th edition, John Wiley & Sons Inc., Publishers, New York
5. White, A. 1959. Principles of Biochemistry, 3rd edition, McGraw Hill Book Co., Publishers, New York.

REFERENCE BOOK(S)

1. Lehninger Principles of Biochemistry: D.L.Nelson, Michael M.Cox, International Edition ,CBS Publishers, 4th Ed , 2004.
2. Stryer, W.H. 1995. Biochemistry Freeman & Co., Scientific Research an academic Publisher, 4th Ed., New York.
3. Marangoni. 2002. Enzyme kinetics. A modern approach, 1st edition, John Wiley Publishers, United Kingdom.
4. Dixon, M. and Webb, J.F. 1979. Enzymes, 2nd edition, Longman Publishers, London.
5. Stryer, I. 1988. Biochemistry, 2nd edition, W.H. Freeman & Co., Publishers, New York.

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2. <http://amrita.olabs.edu.in/?sub=73&brch=8&sim= I 33&cnt=2>
3. <https://courses.lumenlearning.com/biolabsl/chapter/enzymes/>

4. <https://practicalbiology.org/bio-molecules/factors-affecting-enzyme-activity/investigating-the-effect-of-ph-on-amylase-activity>
5. <https://www.easybiologyclass.com/properties-of-enzymes-biochemistry-lecture-notes/>

SENGAMALA THAYAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2020 - 2021)

DEPARTMENT OF BIOCHEMISTRY

B.Sc., BIOCHEMISTRY



Semester: IV-AC-IV: Cell Biology

Ins. Hrs./Week: 3

Course Credit: 3

Course Code: 21ABC407

OBJECTIVES

- To understand the basics and fundamentals of cell biology and biogenesis of cell organelles.
- To study the cellular processes and mechanisms that lead to physiological functions in normal as well as in pathological state.
- To make them understand the organization of cells and cell cycle.

UNIT- I: Basics of Cell Biology

(08 Hours)

Discovery of cell and cell theory, chemical components of a cell. Structure and organization of prokaryotic and eukaryotic cells. Comparison between plant and animal cells. General structure of cytoskeleton - structure, composition and functions of microfilaments, microtubules and intranuclear filaments.

UNIT-II: Biogenesis of cellular organelles

(10 Hours)

Structure and functions of cell organelles: cell wall, nucleus, mitochondria, Golgi bodies, lysosomes, endoplasmic reticulum (rough and smooth), microbodies, glyoxysome, peroxisome, vacuoles, plastids, chloroplast, chromatin, ribosomes, centrioles. Catalysis and use of energy by cells. Chromosomes (structure, types and function).

UNIT -III: Cell membrane

(08 Hours)

Chemical composition, structure, models, functions and specialization of plasma membrane. Lipid bilayer. Membrane pump (sodium - potassium Pump), solute transport by simple diffusion, facilitated diffusion and active transport (mechanism, types of active transport), osmosis. Electrical properties of membrane.

UNIT-IV: Cytoskeleton and extracellular matrix

(10 Hours)

Organization of cells into tissue. Types of tissue. Composition and Organization of microtubules, microfilaments, cadherins, integrins, focal adhesions, tight junctions, selectins, gap junctions, intermediate filaments, desmosome and hemidesmosome - cell adhesion, cell matrix adhesion components and their biological role.

UNIT- V: Cell Cycle

(09 Hours)

Cell division, mitosis, meiosis, cytokinesis and their significant. Cell cycle: phases of cell cycle, Functional importance of each phase, Even during cell cycle. Checkpoints. Methods to study cell cycle - labelled mitotic curve, flow cytometry. Aging (senescence): symptoms, causes and theory. Cell death: Necrosis and apoptosis.

Total Lecture Hours- 45

COURSE OUTCOME

The students will be able to,

1. Understand the structures and purposes of basic components of prokaryotic and eukaryotic cells, especially macromolecules, membranes, and organelles
2. Understand as to how these cellular components are used to generate and utilize energy in cells.
3. Understand the cellular components underlying mitotic cell division.
4. Apply their knowledge of cell biology to selected examples of changes or losses in cell function.
5. Apply their knowledge can include responses to environmental or physiological changes, or alterations of cell function brought about by mutation.

TEXT BOOK(S)

1. Cooper, G.M. and Hausman, R.E. 2009. The Cell. A Molecular Approach. (5th ed) Sunderland
2. Krebs, J. E., Kilpatrick, S.T. and Goldstein, E.S. 2013. Lewin GENES XI, JONES & Bartlett Learning, Burlington, Massachusetts.
3. Lodish, H.A., Berk, C.A., Kaiser, M., Krieger, M.P., Scott, A., Bretscher, H., Matsudaira, P. 2007. Molecular Cell Biology, 6th Edition, WH. Freeman Publishers, New York, USA.
4. Verma, P.S. and Agarwal, V.K. 2004. Cell Biology, Genetics, Molecular Biology Evolution and Ecology, 14 edition, S.Chand and Company Ltd.
5. Watson, J.D., Basker, T.A., and Bell, S. 2008. Molecular Biology of the Gene, 5th Edition. Darling Kindersley Pvt., Ltd., New Delhi.

REFERENCE BOOK(S)

1. Bruce Alberts and Dennis Bray. 2013. Essential Cell Biology. 4th edition, Garland Science, New York.
2. De Robertis and De Robertis, E.M.F. 2010. Cell and Molecular Biology, 8th edition, Lippincott Williams and Wilkins, Philadelphia.
3. Geoffrey M. Cooper and Robert. E. Hausman, 2009 The Cell: A Molecular Approach:, Sinauer Associates, 5thEd, USA.
4. Karp, G. 2010. Cell and Molecular Biology: Concepts and Experiment, 6th edition, John Wiley & Sons, Inc, United Kingdom.
5. Wayne M. Baker. 2008. The World of the Cell. 7th edition, Pearson Benjamin Cummings Publishing, San Francisco.

E-RESOURCES

1. <https://www.pdfdrive.com/biochemistry-books.html>
2. <https://drive.google.com/file/d/1tghNWPYuqPiqKlrlllZzUrFwcoMiuoMa/>
3. [https://www.freebookcentre.net/biology-books-download/BASIS-ON-MOLECULAR-BIOLOGY-\(PDF-52P\).html](https://www.freebookcentre.net/biology-books-download/BASIS-ON-MOLECULAR-BIOLOGY-(PDF-52P).html).
4. [https://www.freebookcentre.net/biology-books-download/Basis-of-molecular-cell-biology-\(PDF-36P\).html](https://www.freebookcentre.net/biology-books-download/Basis-of-molecular-cell-biology-(PDF-36P).html).
5. <https://agrifilif.org/gold/files/2012/09/Lecture-26.pdf>

SENGAMALA THAYAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)



SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2020 -2021)
DEPARTMENT OF BIOCHEMISTRY
B.Sc., BIOCHEMISTRY

Semester: IV-AP-IV: Cell Biology Practical

Ins. Hrs./Week: 3

Course Credit: 2

Course Code:21ABC308P

1. Study a representative Plant and Animal cell by Microscopy
2. Study of the structure of cell organelles through Electron Micrographs
3. Cytochemical staining of DNA Feulgen
4. Study of polyploidy in Onion root tip by colchicine treatment.
5. Identification and study of cancer cells by Photomicrographs.
6. Study of different stages of Mitosis
7. Study of different stages of Meiosis

COURSE OUTCOME

Students are able to,

- Study practically the plant and animal cells, the cell organelles and components with the help of microscope and staining techniques

TEXT BOOK(S)

1. Bruce Alberts and Dennis Bray.2013. Essential Cell Biology. 4 edition, Garland Science.
2. Cooper, G.M. and Hausman, RE. 2009. The Cell .A Molecular Approach. (5" ed) Sunderland.
3. Ganesh M. K. and Shivashankara A. R. 2012, Laboratory Manual for Practical Biochemistry Jaypee publications, 2nd edition.
4. Lodish, H.A., Berk, C.A., Kaiser, M., Krieger, M.P., Scott, A. Bretscher, **H.**, and Matsudaira, P. 2007. Molecular Cell Biology, 6th edition, WH. Freeman Publishers, New York, USA.
5. Watson, J.D., Basker, T.A. and Bell, S.P. 2008. Molecular Biology of the Gene, 5th edition. Dorling Kindersley Pvt., Ltd., New Delhi.

REFERENCE BOOK(S)

1. Bruce Alberts, 2008, Molecular Biology of the cell: Garland Publishing, 5th Ed.
2. Cooper, G.M. and Hausman, RE. 2009. The Cell .A Molecular Approach. (5" ed) Sunderland
3. Geoffrey M. Cooper and Robert. E. Hausman, 2009 The Cell: A Molecular Approach:, Sinauer Associates, 5thEd, USA
4. Lodish.H,.A , Berk.C.A, Kaiser.M, Krieger.MP, Scott.A Bretscher.H, Ploegh and p. Matsudaira, 2007, Molecular Cell Biology, 6th Edition, WH. Freeman Publishers, New York, USA.
5. Watson. JD, TA.Basker and Sp.Bell, 2008 , Molecular Biology of the Gene, 5th Edition. Dorling Kindersley Pvt., Ltd., New Delhi.

E-RESOURCES

1. http://medcell.med.yale.edu/histology/cell_lab.php#:~:text=The%20electron%20microscope%20is%20necessary,and%20small%20granules%20and%20vesicles.
2. <http://amrita.olabs.edu.in/?sub=79&brch=18&sim=237&cnt=1>
3. <https://www.khanacademy.org/science/ap-biology/heredity/meiosis-and-genetic-diversity/a/phases-of-meiosis>
4. <https://www.microscopemaster.com/organelles.html>
5. <https://www.pdfdrive.com/biochemistry-books.html>

**SENGAMALA THAYAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)**



SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2020 - 2021)

DEPARTMENT OF BIOCHEMISTRY
B.Sc., BIOCHEMISTRY

Semester: IV-SBE-1: Traditional Medicine

Ins. Hrs./Week: 2

Course Credit: 2

Course Code: 21SBEB1

OBJECTIVES

- To impart knowledge of Herbal medicine as the basic objective of Education
- To develop a scientific attitude to make students open minded, critical and curious
- To make them able to identify medicinal plants (family/genus-level)

UNIT-I: Introduction

(05 Hours)

Definition of Herbal drug, Importance of Herbal therapies, Herbal verses conventional drugs, Safety in herbal drugs. Toxicity in Herbal drugs and their interactions, **General methods of extraction, isolation and purification of phyto-constituents**

UNIT-II: Phytoconstituents

(07 Hours)

Herbs used as nutraceuticals and healing agents;. Isolation, identification tests and estimation methods for the following phytoconstituents with special emphasis on HPLC, HPTLC and other advanced techniques Aloin from *Aloes Vasicine* from *Adhatoda vasica*, Andrographolides from *Andrographis paniculata* Curcumin from *Curcuma longa* Piperine from *Piper longum*.

UNIT-III: Application of Herbal Medicines

(05 Hours)

Making and using herbal medicines for common ailments like cold, skin infections and Diarrhea; Analytical Profiles of selected herbs - *Brahmi, Anadrographis paniculata Aegle marmelos* and *Gymnema sylvestre*.

UNIT-IV: Quality Control of Herbal Medicines

(07 Hours)

Quality Control and Quality Assurance of Herbal ingredients as per W.H.O.Guidelines, Determination of tannins, Ash value, Extractable matter and Pesticide residues. Herbal product development Lipid orals, tablets, capsules, dermatologic and herbal cosmetics

UNIT-V: Evaluation of Herbal Extracts & Herbal Drug Processing

(06 Hours)

Qualitative and Quantitative estimation of active principles from standardized extracts by HPTLC, Biological standardization -Pharmacological screening of herbal extracts and Microbiological evaluation of herbal extracts Toxicity studies of herbal extracts.

Total Lecture Hours- 30

COURSE OUTCOME

The students will be able to,

1. Develop skill in practical work, experiments, equipment's and laboratory use along with collection and interpretation of herbal products and their utilization.
2. Make aware of natural resources and environment and the importance of conserving the same.
3. Demonstrate understanding of the importance of medicinal plants among different cultures through clear, logical writing.

4. Demonstrate as to how different cultures approach plant use in different ways and how plants and people interact.
5. Apply basic ethnobotanical techniques to the study of a specific cultural use of medicinal plants.

TEXT BOOK(S)

1. Kokate CK and Purohit DP. Textbook of Pharmacognosy, Nirali Prakashan, Pune
2. Staba EJ. Plant Tissue Culture as a source of Bio-Medicinals
3. Trease GE. and Evans WE., Pharmacognosy Baillere Tindall, Eastbourne
4. Tyler VE, Brady LR and Robbers JE. Pharmacognosy Len & Febiger, Philadelphia
5. Wallis TE. Pharmacognosy, CBS Publisher, New Delhi

REFERENCE BOOK(S)

1. William C. Evans, 2009. Pharmacognosy. 16th edition. Saunders Limited, USA.
2. Indian Herbal Pharmacopeia, 2002. Indian Drug Manufacturers Association, India
3. Quality Control methods for medicinal plant material, 1998. WHO, Geneva
4. Pulak Km Mukherjee, 2019. Quality control of herbal drugs. 1st edition, Elsevier, USA.
5. Michael Meguffin, Christopher Hobbs, 1997. Botanical safety handbook. Herbal products association, USA.

E-RESOURCES

1. <https://www.pdfdrive.com/biochemistry-books.html>
2. <https://www.ncbi.nlm.nih.gov/books/NBK92773/>
3. <https://depts.washington.edu/pse406/notes.htm>
4. <https://www.intechopen.com/books/herbal-medicine/introductory-chapter-introduction-to-herbal-medicine>
5. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6806606/>

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE



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DEPARTMENT OF BIOCHEMISTRY

B.Sc., BIOCHEMISTRY

Semester: III-NME-I: Health and Diseases

Ins. Hrs./Week: 2

Course Credit: 2

Course Code: 21NMEBC31

OBJECTIVES

- To make the students learn the impaired metabolism of carbohydrate, lipid, protein and disorders leading to various diseases in human beings.
- To understand the functions and functional disorders of liver, kidney and heart
- To understand oncology with reference to cancer its epidemiology, prevention and therapy

UNIT-I: Specimen collection and processing (05 Hours)

Specimen collection and processing of blood, urine and faeces. Anticoagulants and preservatives for blood and urine. A brief review of units and abbreviations used in expressing concentrations, standard solutions and clinical values. Electrolytes and acid base balance. Maintenance of acid base balance by respiratory and renal mechanism. Acidosis and alkalosis.

UNIT- II: Disorders of Carbohydrate Metabolism (06 Hours)

Overview of regulation of blood glucose, Glucose Tolerance Test (GTT)-normal values and interpretations, causes of abnormal GTT curve, sugar levels in blood, renal glucosuria, hyperglycaemic hormones, Diabetes mellitus- pathological alterations in diabetes mellitus, acute and chronic complications of diabetes mellitus, management of diabetes mellitus, oral hypoglycaemic agents, hypoglycaemia.

UNIT-III: Disorders of Lipids and Proteins (06 Hours)

Plasma lipoproteins, General structure of Lipoproteins, lipoprotein metabolism and transport, lipoprotein disorders, cholesterol, triglycerides and phospholipids in health and diseases. Hyperlipidemia, hyperlipoproteinemia, abetalipoproteinemia. Abnormalities in nitrogen metabolism-phenylketonuria, cystinosis and homocystinuria.

UNIT-IV: Disorders of Liver, Kidney and Heart (06 Hours)

Functions of liver, kidney and heart. Jaundice, fatty liver. Diagnostic enzymes in different diseases-myocardial infarction, liver diseases, muscle diseases, bone diseases, cancers and GI tract diseases. Renal calculi, Cardiac arrest and management, causes, symptoms, pathophysiology and diagnosis of atherosclerosis.

UNIT-V: Oncology (07 Hours)

Cancer – definition, terminology-neoplasia, hyperplasia, hypertrophy, dysplasia, metaplasia, adenoma, sarcoma, epidemiology, etiologic factors, biochemistry of metastasis, prevention-primary, secondary and tertiary prevention, principles of cancer therapy, diagnosis and staging-TNM method, chemotherapeutic agents, tumor markers, treatment.

Total Lecture Hours- 30

COURSE OUTCOME

The students are able to,

1. Know about basic procedures during biological sample collections.
2. Learn various types of diseases associated with impaired carbohydrate metabolism
3. Understand the disorders of protein and lipid metabolism. And the associated diseases
4. Gain knowledge on disorders of liver, kidney and heart
5. Acquire knowledge on oncology, and epidemiology, prevention and treatment of cancer

TEXT BOOK(S)

1. Birn AE., Pillay Y & Holtz T. 2009. Textbook of international health: Global health in a dynamic world, 3rd edition, Oxford University Press Publishers, England.
2. Chakrabarty, Kaveri and Chakrabarty AS. 2019. Textbook of Nutrition in Health and Disease, 1st edition, Springer Publishers, New York, USA.
3. Chatterjea MN and Rana Shinde. 2007. Textbook of Medical Biochemistry, 7th edition, Jaypee Brothers Publishers, Chennai, Tamil Nadu.
4. Krishna Das KV. 2013. Clinical Medicine (A Textbook of Clinical Methods and Laboratory Investigations), 4th edition, Jaypee Brothers Medical publishers, Chennai, Tamil Nadu.
5. Seyed Mohammad Nabavi, Grazia D'Onofrio and Seyed Fazel Nabavi. 2020. Nutrients and Nutraceuticals for Active & Healthy Ageing, 1st edition, Springer Publishers, New York, USA.

REFERENCE BOOK(S)

1. Carl A. Burtis, Edward. Ashwood and David E. Bruns. 2011. Tietz Textbook of Clinical Chemistry and Molecular Diagnostics, 5th edition, Saunders Publishers, United States.
2. Kaplan A, Jack KE, Opheim B, Toivola B and Lyon AW. 1995. Clinical Chemistry Interpretation and techniques, 4th edition, Williams and Wilkins Publishers, United States.
3. Simon Langley-Evans. 2015. Nutrition, health and disease: A lifespan approach, 2nd edition, John Wiley & Sons Publishers, New Jersey, United States.
4. Vibha Rani, Umesh and Yadav. 2018. Functional Food and Human Health, 1st edition, Springer Publishers, New York, USA.
5. William S. Hoffman. 1964. The Biochemistry of Clinical Medicine, 3rd edition, Year Book Medical Publishers, Chennai, Tamil Nadu.

E RESOURCES

1. https://www.cartercenter.org/resources/pdfs/health/ephti/library/lecture_notes/health_science_stude
2. https://www.researchgate.net/publication/327247966_Chapter-06_Carbohydrates-III_Regulation_of_Blood_Glucose_Diabetes_Mellitus
3. <https://www.slideshare.net/amitvermal612147/lipoprotein-disorders>
4. [http://www.student.oulu.fi/~taneliha/Harpers_Illustrated_Biochemistry\(29th_Edition\).pdf](http://www.student.oulu.fi/~taneliha/Harpers_Illustrated_Biochemistry(29th_Edition).pdf)
5. <https://www.slideshare.net/ImranIqbal7/metabolic-disorders-2019>
6. <https://www.slideshare.net/veerundh/veerendhar-nadh-38767743>
7. <http://103.4.234.46/books/Lippincotts%20Illustrated%20Reviews%20Biochemistry%205th%20edition.p>
8. <https://ia801901.us.archive.org/26/items/KSembulingamEssentialsOfMedicalPhysiology6thEdition/K%20Sembulingam%20-20Essentials%20of%20Medical%20Physiology%2C%206th%20Edition.pdf>
9. <https://www.pdfdrive.com/biochemistry-books.html>
10. <https://drive.google.com/file/d/10C4EYN0Sv2LPI9ZzhoV->
11. <https://drive.google.com/file/d/1UyLEp6iXyKrqXuVwh->

12. <https://drive.google.com/file/d/1tghNWPyuqPiqK1R111ZzUrFwcoMiuoMa/>
13. <https://pharmacologyonline.silae.it/files/newsletter/2009/vol3/44.Jagdish.pdf>
14. <https://www.slideshare.net/MiamiDadePA/1-introduction-to-oncology>

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE



(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2020 – 2021)

DEPARTMENT OF BIOCHEMISTRY

B.Sc., BIOCHEMISTRY

Semester: IV-NME-II: Health and Management

Ins. Hrs./Week: 2

Course Credit: 2

Course Code: 21NMEBC42

OBJECTIVES

- To study the basic principles and practices of hospital management.
- To enable the students to understand the health facilities and health care services and structures in hospital industry.
- To impart knowledge on various health insurance policies in health care applicable to patients in hospital industry.

Unit –I: Introduction to Hospital management (05 Hours)

Introduction to Hospital management: Eligibility and personal skills required for Hospital management. Job opportunities in Hospital management. Important hospital management Institutes in India and around the World. Role of Hospital -Levels of care -Health care, delivery system and Hospital -Changing roles of Hospital.

Unit –II: Hospital management system (06 Hours)

Hospital management system: Benefits and Modules of Hospital management systems. Interfacing of analyzer. Pathology lab management. Radiology, Blood Bank, Pharmacology, management softwares. The operating suite: equipment of operating room-housekeeping of operating suite sterilizers-making and sterilizing dressings and linen supplies

Unit-III: Health Care Services (07 Hours)

Health Care Services: Health and Hospitals Services, Classification and Characteristics of Service Organizations, , Healthcare Revolution, Dimensions of Health, Indicators of Health- Composition of Health Sector, Types of Care, Pyramidal Structure of Health Services, Hospitals, Types of Hospitals and Role of Hospital in Healthcare

Unit-IV: Health care Facilities (06 Hours)

Health care Facilities: Functioning of modern hospitals & changing need of patients Hospitality in Hospital Care, Invasive and non-invasive diagnostic facilities in modern hospital Care offered in Specialty and Super specialty Hospitals. Non-Medical Services & Facilities –Stores –Catering -Records Room -Maintenance Services: Laundry, Mortuary

Unit-V: Health and Management (06 Hours)

Health and Management: Current Issues in Healthcare Accreditation-Tele medicine-Health Tourism-Health Insurance and Managed Care-Disaster Management-Hospital Wastes Management. Health Insurance in Private Health Sector Health Insurance in

developing and developed countries. Different Health Insurance Policies-analysis and management.

Total Lecture Hours- 30

COURSE OUTCOME

The students will be able to,

1. The students understand hospital management skills and health care delivery system
2. Learn the key concepts of health insurance, and display analytical skills through understanding rules, regulations and legislations in hospital context.
3. Acquire technical skills through gaining exposure to hospital house-keeping standards and design.
4. Understand the meaning of various terms pertaining to health and hygiene and practice personal hygiene.
5. Know about hospital management system, health care facilities and health care services

TEXT BOOK(S)

1. Aswathappa K., 2012, Organisational Behaviour, Tenth Edition, Himalaya Publishing House, New Delhi.
2. Gupta S And Kant S., Hospital And Health Care Administration: Appraisal And Referral Treatise. Jaypee, New Delhi 1998
3. Luthans, F., 2014 Organisational Behaviour –An Evidence Based Approach, Twelfth Edition, Tata McGraw Hill. New Delhi.
4. Park k, 2005. Text book of preventive and social medicine. Banarsidas Bhanot publishers: Jabalpur. 18th edition.
5. Prasad, L.M., 2014, Organisational Behaviour, Fifth Edition, Sultan & Chand, New Delhi.

REFERENCE BOOK(S)

1. John V. Basmajian and Charles E. Slonecker. 1989. Grant's Method of Anatomy: A Clinical Problem-solving Approach, BI Waverly Pvt. Ltd., New Delhi.
2. Watson and Roger. 2013. Anatomy and Physiology for Nurses.
3. Monica, J.E. Park and K. Park. 2011. Textbook of Preventive and Social Medicine, M/S Banarsidas Bhanot Elaine La Management in Health Care, Macmillan Press Ltd, London.
4. Sakharkar, B.M. 2009. Principles of Hospital Administration and Planning, Jaypee Brothers Medical Publishers Pvt. Ltd., New Delhi.
5. Francis, C.M. 2004. Hospital Administration, Jaypee Brothers Medical Publishers Pvt. Ltd., New Delhi.

E RESOURCES

1. <https://www.kobo.com/us/en/ebook/principles-of-hospital-administration-and-management>
2. <https://www.springer.com/gp/book/9783662496589>
3. https://www.academia.edu/38166165/Healthcare_and_Hospital_Management_Edited_book_Excel
4. <https://www.jaypeedigital.com/book/9789350907337/chapter/ch20>
