SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)
(Accredited with A Grade by NAAC)
(An ISO 9001: 2015 Certified Institution)
SUNDARAKKOTTAI, MANNARGUDI - 614016.

DIPLOMA IN MEDICAL LABORATORY TECHNIQUES

(For the candidates admitted from the academic year 2020-2021 onwards)

ELIGIBILITY: Candidates who have passed 12th and above

Semester	Title of the Paper	Inst. Hrs/ Week	Credit	Exam Hours	Marks		Total
					Internal	External	
I	Paper I- Biochemistry and Human Physiology	8	6	3	40	60	100
	Paper II- Microbiology and Parasitology	8	6	3	40	60	100
	Paper III- Microbiology - Practical	8	6	3	40	60	100
	Total	**24**	**18**	**-**	**-**	**-**	**300**
II	Paper IV- Clinical Biochemistry	8	6	3	40	60	100
	Paper V- Instrumentation and Ethics	8	6	3	40	60	100
	Paper VI- Clinical Biochemistry - Practical	8	6	3	40	60	100
	Total	**24**	**18**	**-**	**-**	**-**	**300**
	Grand Total	**48**	**36**	**-**	**-**	**-**	**600**

CURRICULAM DESIGN

SUBJECT	NUMBER OF PAPER	CREDIT
Papers	4	24
Practicals	2	12
Total	**06**	**36**

1. Scheme of Examination

Course	CIA	External Exam	Hours	Credit
Diploma	40	60	150	36
Total				**36**

2. Duration- 6 Months or 150 Hours

3. Aggregation of CIA Marks

Course	Attendance	Test (Minimum of three Tests including a Model Test)*	Assignment (Minimum of One Assignment)	Total CIA Marks
Diploma	10	20	10	40

*For best two Test- 20 marks

4. Passing

Passing Minimum in CIA – 16 Marks

Passing Minimum in External Exam – 24 Marks

Aggregation of CIA & Exam (Minimum) – 40 Marks

5. Pattern

Semester - consists of a maximum of 6 months in an academic year or combination of two calendar year.

6. Mode- Through On - Campus

7. Course of study

Candidate shell be permitted to the diploma programme concurrently with their UG/ PG Degree programmes if she desires.

8. Award of Certificate

A candidate shell be eligible for the award of certificate if she has passed all the examinations prescribed thereof**.**

9. Revision of Regulations and Curriculum

The College may from time to time revise, amend and change the regulations and curriculum if found necessary.

10. Reappearance

Reappeared candidates in one or more papers may be permitted to re-appear the next Exam. .

PAPER-I : BIOCHEMISTRY AND HUMAN PHYSIOLOGY

Ins. Hrs. /Week : 8 **Course Credit: 6** **Course Code :**

OBJECTIVES:

- To gain knowledge and research practices required for clinical testing laboratories.
- To understand the function efficiently, confidently and safely in clinical laboratory settings including hospital environments.
- To understand the updated knowledge of research trends in health care

UNIT I

Biomolecules – Carbohydrates, Proteins, Lipids, Nucleic Acids and Vitamins – Classification, Structure, Properties and Functions.

UNIT II

Metabolism – An overview of carbohydrate, protein and lipid metabolism. Carbohydrate- Glycolysis, TCA Cycle, Glycogen metabolism Protein – Deamination and Transamination reactions, Urea Cycle. Lipid – β oxidation, Biosynthesis of fatty acids.

UNIT III

Cell – structure and organelles, functions and cell division.Blood – Composition and functions, Haemotopoiesis, Haemostasis, Blood Groups, Blood Transfusion.Cardiovascular System – Structure of heart and ECG, lymphatic system.Nervous system – Outline of the nervous system.

UNIT IV

Renal System –Anatomy and Physiology of the kidney, Formation of Urine.Digestive System – Anatomy and the process of Digestion,Reproduction system – Anatomy of Male and Female Reproduction system.

UNIT V

Immunology – Overview of the immune system, structure of antibodies, Nature of antibodies, antigen antibody reactions.Immune techniques, Immune response, vaccines, transplantation, hypersensitivity.HLA Typing and Tissue matching.

COURSE OUTCOME:

The students will be able to,

1. Apply knowledge and technical skills associated with medical lab technology.
2. Perform routine clinical laboratory procedures within acceptable quality control parameters in haematology, chemistry, immunohematology, and microbiology.
3. Demonstrate ability to plan and implement professional activities.
4. Understand the impact of laboratory tests in a global and environmental context.
5. Work as a leader in the diverse professional and industrial research areas.

TEXT BOOK(S):

1. Harper's Biochemistry - Robert K. Murray, Daryl K.Garner, Peter A. Mayes, Victor W. Rodwell.
2. Fundamentals of Biochemistry - J.L. Jain
3. Human Physiology - Chatterjee H.H. Vol I & Vol II

REFERENCE BOOK(S):

1. Biochemistry - Voet and Voet
2. Biochemistry - L. Stryer
3. Principles of Biochemistry - Cox and Lehninger
4. Immunology – Introduction Text Book - Nandhini Shetty

E-RESOURCES:

https://www.pdfdrive.com/biochemistry-books.html

PAPER-II- MICROBIOLOGY AND PARASITOLOGY

Ins. Hrs. /Week : 8 **Course Credit: 6** **Course Code :**

OBJECTIVES:

- To impart knowledge of the basic principles of bacteriology and parasitology.
- To provide all the necessary information for the prevention, diagnosis, treatment and monitoring of infectious diseases, using the latest scientific advances in the fields of bacteriology and parasitology
- To uses the latest generation of classic culture, serology advances in the fields of bacteriology and parasitology

UNIT I

General introduction to microbiology- Microscope – Light and Compound Microscopes Staining techniques, Nutritional Requirements for the growth of microbes.Study of morphology of bacteria, staining of bacteria – gram's stain, albert stain, ziehl-neelsen stain, spore stain, Growth requirements – Nutritional, gas, moisture, accessory nutritional requirement, Growth curve, factors influencing growth, Bacterial reproduction, Different Culture Media for bacterial growth, culture techniques, Classification and identification of bacteria.

UNIT II

Gram positive organisms- *Staphylococcus, Streptococcus, Bacillus, Clostridium, Mycobacterium.* Sterilization and disinfection: Introduction to sterilization, disinfection, antiseptic, bacteriocidal agents, bacteriostatic agents; Different methods of sterilization-Physical, Chemical, dry heat, moist heat, Filtration, Radiation, Autoclave, types of autoclave, Uses of disinfectant; Infection, classification of infection, source of infection in man, Method of transmission of infection, Pathogenecity and Virulence

UNIT III

Bacteria- Classification- systematic bacteriology, Morphology- Membrane- Composition, chemical nature- Physiology of bacteria. Disease caused by Gram negative bacteria- Enterobacteriaceae- *Shigella, E.coli, Klebsiella, Salmonella, Proteus and Yersinia. Pseudomonas, Vibrio and Compylobacter, Spirocheates.*

UNIT IV

General Virology: Morphology of virus – size, shape, structure, Reaction to physical and chemical agents, Viral Multiplication, classification of viruses, Overview of oncogenic viruses, DNA viruses , RNA Viruses Viruses- Classification, Isolation and growth of viruses structure, Mode of infection oncogenic viruses, retroviruses, Pox virus, Rabdo, Hepadnoviridae, Adeno viridae. Ifluenza virus, special mantion about Avian flu.

UNIT V

Fungi and Algae- Classification, Morphology- Membrane- Composition, Correlations with clinical diseases- superficial, subcutaneous, systematic fungal infections. Parasitology- Entamoeba, Plasmodium, Giardia, Trypanosoma, Ascaris, Liverfluke.Mycology: Fungi and
yeasts, classification of Fungi, Superficial Mycosis, Microsporum, Trichophyton, Epidermophytom, Subcutaneous Mycosis. Parasitology: Introduction, Classification of parasite, host, Mechanism of disease production by parasites, classification of the pathogenic Protozoa, overview of Entamoeba histolytica, Giardia lamblia, Leishmania donovani Malaria parasite, Balantidium coli,

COURSE OUTCOME:

The students will be able to,

1. Identify and recognize the various forms of bacteria and fungi morphologically – hence a selection of illustration with different microbes as regards staining, growth requirements, isolation and cultivation.
2. Apply basic knowledge on microbes to develop fully of information available so as to understand infections and contamination of tissue/system and materials respectively.
3. Select microorganisms which show antibiotic activity and fully characterize for further studies and development.
4. Recognize immune response, immunological products and various levels of body responses to infection.
5. Identify basic information on fungi, protozoa and helminthes, and virology. Recognize probiotics.

TEXT BOOK(S):

1. Medical Microbiology, N C Dey, H L E Grueber, T K Dey
2. Medical Parasitology & Clinical Pathology, S K Sarkar Michael

REFERENCE BOOK(S):

3. Medical Laboratory technology (Vol. - II), K L Mukherjee, Mc Graw Hill
4. Practical Microbiology Protozoology and Parasitological, N C Dey , T K Dey , New Central Book Agency
5. Microbiology, J Pelezar

E-RESOURCES:

https://www.pdfdrive.com/biochemistry-books.html

PAPER-III- MICROBIOLOGY PRACTICAL

Ins. Hrs. /Week : 8 **Course Credit: 6** **Course Code :**

1. Sterilisation techniques.
2. Preparation of culture media.
3. Pour Plate and spread plate methods.
4. Hanging drop technique.
5. Staining Techniques - Simple staining, Gram staining, Acid fast staining, Capsule staining, Spore staining.
6. Isolation of microbes in clinical samples using differential media (pus, blood, urine, faeces, CSF).
7. WIDAL, ASO, CRP,VDRL.
8. ELISA.
9. Iodine Wet Mount for Cysts
10. Slide culture techniques, LCB mount.
11. KOH Mount
12. Using of autoclave hot air oven, other common laboratory equipment etc.
13. Biochemical testing – Catalase, oxidase, citrate, urease, TSI, Carbohydrate fermentation, MR VP, Indole
14. Haemagglutionation test.
15. Haemagglutination inhibition test.

TEXT BOOK(S):

1. Text Book on Principles of Bacteriology, Virology and Immunology, Topley and Wilsons 1995.

REFERENCE BOOK(S):

2. Clinical virology Manual by Steven, S., Adinka, R.L., Young, S.A. 10.
3. Principles of Virology. 2000 by Edward Arnold.
4. Medical Virology 10 Th Edition by Morag C and Tim bury M C 1994. Churchil Livingstone, London.

E-RESOURCES:

https://www.pdfdrive.com/biochemistry-books.html

PAPER-IV- CLINICAL BIOCHEMISTRY

Ins. Hrs. /Week : 8 **Course Credit: 6** **Course Code :**

OBJECTIVES:

- To understand the applied knowledge of the theory and practice of clinical biochemistry
- To understand to how biochemical investigations are employed to develop a clinical diagnosis
- To understand the necessary professional and research skills to promote lifelong learning and career development.

UNIT I

Basic concepts of clinical Biochemistry A brief review of Units and abbreviations used in expressing concentrations and standard solutions. Specimen collection and processing (blood, urine and faeces, Sputum, Intestinal fluid, Semen), anti-coagulants and preservatives for blood and urine. Transport of specimens – Use of biochemical tests – the application of biochemistry in hospital setting

UNIT II

Disorders of carbohydrate metabolism – Diabetes mellitus – classification, metabolic changes, complication and diagnosis (GTT) – hypoglycemia, hyperglycaemia, glycosuria. Disorders of lipid metabolism – Atherosclerosis, hyper and hypo cholesterolemia, lipoprotenemias. Disorders of Protein metabolism – plasma proteins, nature, biological role, and disorders of urea cycle.

UNIT III

Definition and different classes of hormones; Thyroid hormone and their mechanism of action; Pituitary hormones and their role in biological systems; Hormone regulation, Role of insulin in modulating blood glucose level

UNIT IV

Diagnosis of liver Function (LFT), Jaundice, Hepatitis; Plasma Proteins – Acid Base Balance and pH -Renal function test. - Normal and Abnormal Constituents of Urine Gastric Function test.

UNIT V

Introduction, tissue processing and embedding, section cutting and problem encountered, staining, Decalcification, frozen section, cytology, Fine needle aspiration cytology. – Labelling of tissues– staining techniques

COURSE OUTCOME

The students will be able to,

1. Knowledge of the historical background for Clinical Biochemistry.
2. Explain the basic elements of core Biochemistry and specialized tests of biochemistry.
3. Compare and contrast the basic differences between carbohydrate, lipid and protein metabolism abnormalities.

4. Describe and identify the main characteristics of diagnosis, screening, and prognosis of disease.
5. Apply the processes of scientific research to use in emergency services in clinical biochemistry. Distinguish scientific explanations that show the hormonal disorders during disease.

TEXT BOOK(S):

1. Medical Biochemistry M. N. Chaterjee

REFERENCE BOOK(S):

1. Biochemistry, U.Satyanarayana, Books and Allied (P),Ltd. Kolkata- India
2. Practical Biochemistry Varley

E-RESOURCES:

https://www.pdfdrive.com/biochemistry-books.html

PAPER-V- INSTRUMENTATION AND ETHICS

Ins. Hrs. /Week : 8 **Course Credit: 6** **Course Code :**

OBJECTIVES:

- To understand the different methods of sterilization
- To understand the knowledge about incubator, preparation and use of glasswares
- To understand the different biomedical instruments used in hospital

UNIT I

Different methods of sterilization- Physical, Chemical, dry heat, moist heat, Filtration, Radiation, Autoclave, types of autoclave, Balances. Centrifuge- Bench top, refrigerated.

UNIT II

Incubator, Preparation and use of glasswares – selection and cleaning of glassware, syringes and needles. Colorimeter- principle, Beer-Lambert's Law, Different functional parts, application, Specification, UV Spectrophotometer – Principle of measurement, application, Specification, pH meter – pH electrodes, Bio-chemical analyzer- Semi-analyzer, Auto analyzer, Electrolytes analyzer.

UNIT III

Sphygmomanometer, Stethoscope, BP measuring principle based on Korotkoff sound, Semi automated BP Instrument, Automated BP Instrument.

UNIT IV

ELISA Reader, ECG machine-ECG machine, EEG machine – electrodes , Basic functional block diagram of EEG, Application, EMG machine, Spirometer, Blood cell Counter, Blood gas analyzer - pH, p CO2, pO2 measurement, Overview of blood flow meter.

UNIT V

Laboratory – Medical Laboratory technician code of ethics, student's code, personal core accidents medico legal aspects – preservation of specimen and records.

COURSE OUTCOME:

The students will be able to,

1. Operate biomedical instruments used in hospital
2. Calibrate biomedical instruments used in hospital
3. Test different biomedical instruments used in hospital

TEXT BOOK(S):

1. R. S. Khandpur, Biomedical Instrumentation Technology and Applications, McGraw-Hill Professional,2004
2. Leslie Cromwell, Fred. J. Weibell and Erich. A. Pfeiffer, Biomedical Instrumentation and Measurements, 2nd Edition, PHI, 2003.
3. John G. Webster, Medical Instrumentation: Application and Design, 3rd edition, John Wiley & Sons, New York, 1998.
4. Raja Rao, C, Guha, S.K, Principles of Medical Electronics and Biomedical Instrumentation, Orient Longman Publishers (2000)

REFERENCE BOOK(S):

1. R. Anandanatarajan, Biomedical Instrumentation, PHI Learning, 2009.
2. M. Arumugam, Biomedical Instrumentation, Anuradha Agencies Publishers, Vidayal Karuppar, 612 606, Kumbakonam, R.M.S: 1992

E-RESOURCES:

https://www.pdfdrive.com/biochemistry-books.html

PAPER- VI – CLINICAL BIOCHEMISTRY – PRACTICAL

Ins. Hrs. /Week : 8 **Course Credit: 6** **Course Code :**

1. Collection of biological samples – Blood, Urine, Faeces
2. Basic units and conventional units in hospital laboratories.
3. Estimation of Blood Glucose.
4. Estimation of Blood Cholesterol.
5. Estimation of Blood Urea.
6. Estimation of Blood Uric acid.
7. Estimation of Total and free creatinine in blood.
8. Estimation of Bilirubin.
9. Estimation of Protein – A:G ratio.
10. Estimation of Calcium.
11. Estimation of AST and ALT
12. Blood Grouping,
13. Estimation of Haemoglobin. –Determination of Haematological parameters - Haemoglobin, RBC, WBC, Platlet, PCV, Bleeding time and Clotting time)
14. ESR, PCV & Blood Pressure
15. Qualitative analysis of urine (Normal and Abnormal).
16. Microscopic analysis of urine.
17. Pregnancy tests.

TEXT BOOK(S):

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

REFERENCE BOOK(S):

1. Biochemistry, U.Satyanarayana, Books and Allied (P),Ltd. Kolkata- India
2. Practical Biochemistry Varley

E-RESOURCES:

https://www.pdfdrive.com/biochemistry-books.html

PAPER-I : BIOCHEMISTRY AND HUMAN PHYSIOLOGY

Ins. Hrs. /Week : 8 **Course Credit: 6** **Course Code :**

OBJECTIVES:

- To gain knowledge and research practices required for clinical testing laboratories.
- To understand the function efficiently, confidently and safely in clinical laboratory settings including hospital environments.
- To understand the updated knowledge of research trends in health care

UNIT I

Biomolecules – Carbohydrates, Proteins, Lipids, Nucleic Acids and Vitamins – Classification, Structure, Properties and Functions.

UNIT II

Metabolism – An overview of carbohydrate, protein and lipid metabolism. Carbohydrate- Glycolysis, TCA Cycle, Glycogen metabolism Protein – Deamination and Transamination reactions, Urea Cycle. Lipid – β oxidation, Biosynthesis of fatty acids.

UNIT III

Cell – structure and organelles, functions and cell division.Blood – Composition and functions, Haemotopoiesis, Haemostasis, Blood Groups, Blood Transfusion.Cardiovascular System – Structure of heart and ECG, lymphatic system.Nervous system – Outline of the nervous system.

UNIT IV

Renal System –Anatomy and Physiology of the kidney, Formation of Urine.Digestive System – Anatomy and the process of Digestion,Reproduction system – Anatomy of Male and Female Reproduction system.

UNIT V

Immunology – Overview of the immune system, structure of antibodies, Nature of antibodies, antigen antibody reactions.Immune techniques, Immune response, vaccines, transplantation, hypersensitivity.HLA Typing and Tissue matching.

COURSE OUTCOME:

The students will be able to,

1. Apply knowledge and technical skills associated with medical lab technology.
2. Perform routine clinical laboratory procedures within acceptable quality control parameters in haematology, chemistry, immunohematology, and microbiology.
3. Demonstrate ability to plan and implement professional activities.
4. Understand the impact of laboratory tests in a global and environmental context.
5. Work as a leader in the diverse professional and industrial research areas.

TEXT BOOK(S):

1. Harper's Biochemistry - Robert K. Murray, Daryl K.Garner, Peter A. Mayes, Victor W. Rodwell.
2. Fundamentals of Biochemistry - J.L. Jain
3. Human Physiology - Chatterjee H.H. Vol I & Vol II

REFERENCE BOOK(S):

1. Biochemistry - Voet and Voet
2. Biochemistry - L. Stryer
3. Principles of Biochemistry - Cox and Lehninger
4. Immunology – Introduction Text Book - Nandhini Shetty

E-RESOURCES:

https://www.pdfdrive.com/biochemistry-books.html

PAPER-II- MICROBIOLOGY AND PARASITOLOGY

Ins. Hrs. /Week : 8 **Course Credit: 6** **Course Code :**

OBJECTIVES:

- To impart knowledge of the basic principles of bacteriology and parasitology.
- To provide all the necessary information for the prevention, diagnosis, treatment and monitoring of infectious diseases, using the latest scientific advances in the fields of bacteriology and parasitology
- To uses the latest generation of classic culture, serology advances in the fields of bacteriology and parasitology

UNIT I

General introduction to microbiology- Microscope – Light and Compound Microscopes Staining techniques, Nutritional Requirements for the growth of microbes.Study of morphology of bacteria, staining of bacteria – gram's stain, albert stain, ziehl-neelsen stain, spore stain, Growth requirements – Nutritional, gas, moisture, accessory nutritional requirement, Growth curve, factors influencing growth, Bacterial reproduction, Different Culture Media for bacterial growth, culture techniques, Classification and identification of bacteria.

UNIT II

Gram positive organisms- *Staphylococcus, Streptococcus, Bacillus, Clostridium, Mycobacterium.* Sterilization and disinfection: Introduction to sterilization, disinfection, antiseptic, bacteriocidal agents, bacteriostatic agents; Different methods of sterilization-Physical, Chemical, dry heat, moist heat, Filtration, Radiation, Autoclave, types of autoclave, Uses of disinfectant; Infection, classification of infection, source of infection in man, Method of transmission of infection, Pathogenecity and Virulence

UNIT III

Bacteria- Classification- systematic bacteriology, Morphology- Membrane- Composition, chemical nature- Physiology of bacteria. Disease caused by Gram negative bacteria- Enterobacteriaceae- *Shigella, E.coli, Klebsiella, Salmonella, Proteus and Yersinia. Pseudomonas, Vibrio and Compylobacter, Spirocheates.*

UNIT IV

General Virology: Morphology of virus – size, shape, structure, Reaction to physical and chemical agents, Viral Multiplication, classification of viruses, Overview of oncogenic viruses, DNA viruses , RNA Viruses Viruses- Classification, Isolation and growth of viruses structure, Mode of infection oncogenic viruses, retroviruses, Pox virus, Rabdo, Hepadnoviridae, Adeno viridae. Ifluenza virus, special mantion about Avian flu.

UNIT V

Fungi and Algae- Classification, Morphology- Membrane- Composition, Correlations with clinical diseases- superficial, subcutaneous, systematic fungal infections. Parasitology- Entamoeba, Plasmodium, Giardia, Trypanosoma, Ascaris, Liverfluke.Mycology: Fungi and
yeasts, classification of Fungi, Superficial Mycosis, Microsporum, Trichophyton, Epidermophytom, Subcutaneous Mycosis. Parasitology: Introduction, Classification of parasite, host, Mechanism of disease production by parasites, classification of the pathogenic Protozoa, overview of Entamoeba histolytica, Giardia lamblia, Leishmania donovani Malaria parasite, Balantidium coli,

COURSE OUTCOME:

The students will be able to,

1. Identify and recognize the various forms of bacteria and fungi morphologically – hence a selection of illustration with different microbes as regards staining, growth requirements, isolation and cultivation.
2. Apply basic knowledge on microbes to develop fully of information available so as to understand infections and contamination of tissue/system and materials respectively.
3. Select microorganisms which show antibiotic activity and fully characterize for further studies and development.
4. Recognize immune response, immunological products and various levels of body responses to infection.
5. Identify basic information on fungi, protozoa and helminthes, and virology. Recognize probiotics.

TEXT BOOK(S):

1. Medical Microbiology, N C Dey, H L E Grueber, T K Dey
2. Medical Parasitology & Clinical Pathology, S K Sarkar Michael

REFERENCE BOOK(S):

3. Medical Laboratory technology (Vol. - II), K L Mukherjee, Mc Graw Hill
4. Practical Microbiology Protozoology and Parasitological, N C Dey , T K Dey , New Central Book Agency
5. Microbiology, J Pelezar

E-RESOURCES:

https://www.pdfdrive.com/biochemistry-books.html

PAPER-III- MICROBIOLOGY PRACTICAL

Ins. Hrs. /Week : 8 **Course Credit: 6** **Course Code :**

1. Sterilisation techniques.
2. Preparation of culture media.
3. Pour Plate and spread plate methods.
4. Hanging drop technique.
5. Staining Techniques - Simple staining, Gram staining, Acid fast staining, Capsule staining, Spore staining.
6. Isolation of microbes in clinical samples using differential media (pus, blood, urine, faeces, CSF).
7. WIDAL, ASO, CRP,VDRL.
8. ELISA.
9. Iodine Wet Mount for Cysts
10. Slide culture techniques, LCB mount.
11. KOH Mount
12. Using of autoclave hot air oven, other common laboratory equipment etc.
13. Biochemical testing – Catalase, oxidase, citrate, urease, TSI, Carbohydrate fermentation, MR VP, Indole
14. Haemagglutionation test.
15. Haemagglutination inhibition test.

TEXT BOOK(S):

1. Text Book on Principles of Bacteriology, Virology and Immunology, Topley and Wilsons 1995.

REFERENCE BOOK(S):

2. Clinical virology Manual by Steven, S., Adinka, R.L., Young, S.A. 10.
3. Principles of Virology. 2000 by Edward Arnold.
4. Medical Virology 10 Th Edition by Morag C and Tim bury M C 1994. Churchil Livingstone, London.

E-RESOURCES:

https://www.pdfdrive.com/biochemistry-books.html

PAPER-IV- CLINICAL BIOCHEMISTRY

Ins. Hrs. /Week : 8 **Course Credit: 6** **Course Code :**

OBJECTIVES:

- To understand the applied knowledge of the theory and practice of clinical biochemistry
- To understand to how biochemical investigations are employed to develop a clinical diagnosis
- To understand the necessary professional and research skills to promote lifelong learning and career development.

UNIT I

Basic concepts of clinical Biochemistry A brief review of Units and abbreviations used in expressing concentrations and standard solutions. Specimen collection and processing (blood, urine and faeces, Sputum, Intestinal fluid, Semen), anti-coagulants and preservatives for blood and urine. Transport of specimens – Use of biochemical tests – the application of biochemistry in hospital setting

UNIT II

Disorders of carbohydrate metabolism – Diabetes mellitus – classification, metabolic changes, complication and diagnosis (GTT) – hypoglycemia, hyperglycaemia, glycosuria. Disorders of lipid metabolism – Atherosclerosis, hyper and hypo cholesterolemia, lipoprotenemias. Disorders of Protein metabolism – plasma proteins, nature, biological role, and disorders of urea cycle.

UNIT III

Definition and different classes of hormones; Thyroid hormone and their mechanism of action; Pituitary hormones and their role in biological systems; Hormone regulation, Role of insulin in modulating blood glucose level

UNIT IV

Diagnosis of liver Function (LFT), Jaundice, Hepatitis; Plasma Proteins – Acid Base Balance and pH -Renal function test. - Normal and Abnormal Constituents of Urine Gastric Function test.

UNIT V

Introduction, tissue processing and embedding, section cutting and problem encountered, staining, Decalcification, frozen section, cytology, Fine needle aspiration cytology. – Labelling of tissues– staining techniques

COURSE OUTCOME

The students will be able to,

1. Knowledge of the historical background for Clinical Biochemistry.
2. Explain the basic elements of core Biochemistry and specialized tests of biochemistry.
3. Compare and contrast the basic differences between carbohydrate, lipid and protein metabolism abnormalities.

4. Describe and identify the main characteristics of diagnosis, screening, and prognosis of disease.
5. Apply the processes of scientific research to use in emergency services in clinical biochemistry. Distinguish scientific explanations that show the hormonal disorders during disease.

TEXT BOOK(S):

1. Medical Biochemistry M. N. Chaterjee

REFERENCE BOOK(S):

1. Biochemistry, U.Satyanarayana, Books and Allied (P),Ltd. Kolkata- India
2. Practical Biochemistry Varley

E-RESOURCES:

https://www.pdfdrive.com/biochemistry-books.html

PAPER-V- INSTRUMENTATION AND ETHICS

Ins. Hrs. /Week : 8 **Course Credit: 6** **Course Code :**

OBJECTIVES:

- To understand the different methods of sterilization
- To understand the knowledge about incubator, preparation and use of glasswares
- To understand the different biomedical instruments used in hospital

UNIT I

Different methods of sterilization- Physical, Chemical, dry heat, moist heat, Filtration, Radiation, Autoclave, types of autoclave, Balances. Centrifuge- Bench top, refrigerated.

UNIT II

Incubator, Preparation and use of glasswares – selection and cleaning of glassware, syringes and needles. Colorimeter- principle, Beer-Lambert's Law, Different functional parts, application, Specification, UV Spectrophotometer – Principle of measurement, application, Specification, pH meter – pH electrodes, Bio-chemical analyzer- Semi-analyzer, Auto analyzer, Electrolytes analyzer.

UNIT III

Sphygmomanometer, Stethoscope, BP measuring principle based on Korotkoff sound, Semi automated BP Instrument, Automated BP Instrument.

UNIT IV

ELISA Reader, ECG machine-ECG machine, EEG machine – electrodes , Basic functional block diagram of EEG, Application, EMG machine, Spirometer, Blood cell Counter, Blood gas analyzer - pH, p CO2, pO2 measurement, Overview of blood flow meter.

UNIT V

Laboratory – Medical Laboratory technician code of ethics, student's code, personal core accidents medico legal aspects – preservation of specimen and records.

COURSE OUTCOME:

The students will be able to,

1. Operate biomedical instruments used in hospital
2. Calibrate biomedical instruments used in hospital
3. Test different biomedical instruments used in hospital

TEXT BOOK(S):

1. R. S. Khandpur, Biomedical Instrumentation Technology and Applications, McGraw-Hill Professional,2004
2. Leslie Cromwell, Fred. J. Weibell and Erich. A. Pfeiffer, Biomedical Instrumentation and Measurements, 2nd Edition, PHI, 2003.
3. John G. Webster, Medical Instrumentation: Application and Design, 3rd edition, John Wiley & Sons, New York, 1998.
4. Raja Rao, C, Guha, S.K, Principles of Medical Electronics and Biomedical Instrumentation, Orient Longman Publishers (2000)

REFERENCE BOOK(S):

1. R. Anandanatarajan, Biomedical Instrumentation, PHI Learning, 2009.
2. M. Arumugam, Biomedical Instrumentation, Anuradha Agencies Publishers, Vidayal Karuppar, 612 606, Kumbakonam, R.M.S: 1992

E-RESOURCES:

https://www.pdfdrive.com/biochemistry-books.html

PAPER- VI – CLINICAL BIOCHEMISTRY – PRACTICAL

Ins. Hrs. /Week : 8 **Course Credit: 6** **Course Code :**

1. Collection of biological samples – Blood, Urine, Faeces
2. Basic units and conventional units in hospital laboratories.
3. Estimation of Blood Glucose.
4. Estimation of Blood Cholesterol.
5. Estimation of Blood Urea.
6. Estimation of Blood Uric acid.
7. Estimation of Total and free creatinine in blood.
8. Estimation of Bilirubin.
9. Estimation of Protein – A:G ratio.
10. Estimation of Calcium.
11. Estimation of AST and ALT
12. Blood Grouping,
13. Estimation of Haemoglobin. –Determination of Haematological parameters - Haemoglobin, RBC, WBC, Platlet, PCV, Bleeding time and Clotting time)
14. ESR, PCV & Blood Pressure
15. Qualitative analysis of urine (Normal and Abnormal).
16. Microscopic analysis of urine.
17. Pregnancy tests.

TEXT BOOK(S):

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

REFERENCE BOOK(S):

1. Biochemistry, U.Satyanarayana, Books and Allied (P),Ltd. Kolkata- India
2. Practical Biochemistry Varley

E-RESOURCES:

https://www.pdfdrive.com/biochemistry-books.html