



மனோன்மணியம் சுந்தரனார் பல்கலைக்கழகம்

MANONMANIAM SUNDARANAR UNIVERSITY

**SYLLABUS FOR DIPLOMA IN DIAGNOSTIC LAB TECHNOLOGY PROGRAM OFFERED
THROUGH DIRECTORATE OF VOCATIONAL EDUCATION (COMMUNITY COLLEGES AND
VOCATIONAL SKILL DEVELOPMENT CENTRES) FROM 2019 – 2020**



கல்விசார் நிலைக்குழுக் கூட்டம்

**MEETING OF THE STANDING COMMITTEE ON
ACADEMIC AFFAIRS HELD ON FRIDAY
THE 28th JUNE 2019.**

DIPLOMA IN DIAGNOSTIC LAB TECHNOLOGY

நோய் கண்டறி ஆய்வக பட்டயம்

SCHEME OF EXAMINATION

Subject code	Title of the Course	Credit	Hours	Passing Minimum
Semester I				
C19DL11/E19DL01	Anatomy and Physiology	6	90	40/100
C19DL12/E19DL02	Blood Transfusion and Blood Banking	6	90	40/100
C19DL13/E19DL03	Clinical Haematology	6	90	40/100
C19CE10/E19CE10	Communicative English	6	90	40/100
C19DLP1/E19DLP1	Practical I-Lab in Analytical Biochemistry and Haematological Techniques	4	120	40/100
Semester II				
C19DL21/E19DL04	Clinical Microbiology	6	90	40/100
C19DL22/E19DL05	Clinical Biochemistry	6	90	40/100
C19LS23/E19LS05	Life Skill	6	90	40/100
C19DLIP/E19DLIP	Industrial Visit and Internship	10	150	40/100
C19DLP2/E19DLP2	Practical II-Lab in Analytical Biochemistry II	4	120	40/100

Eligibility for admission: Pass in 10th std examination conducted by the Govt. of Tamil Nadu Board of Secondary Education, Government of Tamil Nadu or any other equivalent examination.

Examination: Passing Minimum for each Course is 40%. Classification will be done on the basis of percentage marks of the total marks obtained in all the Courses and as given below:

- 40 % but less than 50 % - Third class
- 50 % but less than 60 % - Second class
- 60 % and above - First class

Theory Paper

Internal Marks-25

External Marks-75

SYLLABUS

Semester I

Course I	:	Anatomy and Physiology
Course II	:	Blood Transfusion and Blood Banking
Course III	:	Clinical Haematology
Course IV	:	Communicative English
Course V	:	Practical I-Lab in Analytical Biochemistry and Haematological Techniques

Semester II

Course VI	:	Clinical Microbiology
Course VII	:	Clinical Biochemistry
Course VIII	:	Life Skill
Course IX	:	Industrial Visit and Internship
Course X	:	Practical II-Lab in Analytical Biochemistry II

***(Semester Pattern for Community College Only)**

**SEMESTER I
COURSE I
(C19DL11/E19DL01)ANATOMY AND PHYSIOLOGY**

UNIT I

18 Hrs

GENERAL ANATOMY: Typical animal cell (Structure & Function) –primary tissues (Classification & function) Skeletal System. Digestive System- Functions of stomach-composition of gastric juice-Pancreatic Juice-Bile and Digestion of food by different Enzymes-Absorption and Defecation.

UNIT II

18 Hrs

RESPIRATORY AND DIGESTIVE SYSTEMS:

Nose-Trachea-Bronchi Lungs and Pleura-Digestive System- Alimentary canal (different parts)-Liver- Gall Bladder- Pancreases.

UNIT III

18 Hrs

UROGENITAL SYSTEM: Different parts of urinary system -Different parts of Male & Female genital -System (Internal & External Genitalia) Special Senses & General Sensibilities- Eye & Vision-Ears-Hearing & Equilibrium-Excretory System-Functions of Kidney-Nephron and Function of Skin.

UNIT IV

18 Hrs

NERVOUS & REPRODUCTIVE SYSTEMS: Brain & Spinal Cord - Autonomic Nervous System-Head & Neck-Thorax- Abd & Pelvis-Surface Anatomy-Reproductive System-Name of primary and accessory organs in male and female-Name of secondary sexual characters in male and female-Function of ovary-formation of ova-menstrual cycle-Functions of Testes-Fertilization Vasectomy and tubectomy.

UNIT V

18 Hrs

CIRCULATORY SYSTEM: Heart-Blood Vessels-Lymphatic –Spleen & Thymus-Blood-Groups-Composition and general function of blood-Description of blood cells - normal counts & function-Anticoagulants-Cerebrospinal Fluid-Formation-Composition & function of lymph-Endocrine-glands- Names of the endocrine gland and the hormone secreted by them-Major actions of such Hormones.

Reference books:

1. Maggie Norris, Donna Rae Siegfried. 2011. Anatomy and Physiology For Dummies John Wiley & Sons
2. Gerard J. Tortora, Bryan H. Derrickson. 2008. Principles of Anatomy and Physiology John Wiley & Sons.
3. Elaine N. Marieb, Lori A. Smith.2016. Laboratory Manual for Anatomy and Physiology. Pearson Education,
4. Elaine Nicpon Marieb.1989.Human Anatomy and Physiology Laboratory Manual,Benjamin/Cummings Publishing Company, 1989

COURSE II
(C19DL12/E19DL02) BLOOD TRANSFUSION AND BLOOD BANKING

Objective:

- To understand the basics of blood transfusion and blood banking

Learning Outcome:

- Will understand the blood grouping tests
- Will understand the blood donor selection criteria
- Will know the blood collection and processing techniques
- Will be able to do compatibility tests, antibody screening and identification
- Will understand the blood components separation storage and transportation procedures.
- Will know the various agencies in blood donor and blood banking.

UNIT I

18 Hrs

Biochemistry and Physiology of Blood

Definition, Functions, Composition: Erythrocyte leucocyte and thrombocyte, Blood Haemoglobin, Methods and procedure for Haemoglobin test, ESR, PCV, Buffy coat, Total RBC Count, total WBC count, Differential WBC count, Total Eosinophil count, Total Platelet count.

UNIT II

18 Hrs

Quantitative and Qualitative Disorders of blood cells:

Detailed study about Blood Coagulation factors, Bleeding Time, Clotting time, Prothrombin time. Anaemia: Definition, Types Of anaemia. Leukaemia Definition, Classification, Detailed Study with Lab finding for Myeloid Leukaemia (Acute & Chronic). Lymphatic Leukaemia (Acute & Chronic) Special topic: Abnormal forms of RBC, Haemophilia

UNIT III

18 Hrs

Blood Grouping and Blood Transfusion

Blood Grouping: Principle, Reagents, Methods and Procedure of Red Blood Cell and Serum Grouping with interpretation, Rh Typing, Importance Antigen, Antibody, Agglutination, Antigen - Antibody in different Blood Group, Sub Group of 'A' and 'AB', Bombay 'O' Blood Group, Preparation of RBC suspension. Blood transfusion: Types and indications of various blood transfusion, Universal donor / recipient.

UNIT IV

18 Hrs

Blood Collection and Compatibility Test

Criteria for selection, screening procedures, risks and management of donor complications, Blood collection procedures: vein puncture and finger prick, Anticoagulants used in Blood Bank, Pilot blood containers, Storage of donor blood, Basic procedures and Techniques for compatibility testing

UNIT V

18 Hrs

Blood transfusion hazards and their management

Nature, Types, and Investigation: Reaction investigation procedure with interpretation. Management of transfusion reactions Antiglobulin (Coomb's) Test, Haemolytic Disease of Newborn (HDN), Transmittable diseases Hepatitis, HIV Syphilis, Malaria - Detection and outline of their management.

Reference Books

- 1) Blood groups in Man R.R. Race & R sanger Black well Scientific Publication, Oxford, 8th Edn.
- 2) Modern Blood Banking & Transfusion Practices D.N. Pottiglio F.A. Davis Company, Philadelphia, 1983
3. Practical Haematology, Shirley Mitchell Lewis, Barbara J. Bain, Imelda Bates Dacie And Lewis 10th Ed, Churchill Livingstone/Elsevier.
4. Hematology: principles and procedures Barbara A. Brown 6th Ed Lea & Febiger.
5. Hematology: Clinical Principles and Applications Bernadette F. Rodak, George A. Fritsma, Kathryn Doig (2007) 3rd Ed, Elsevier Health Sciences.

COURSE III (C19DL13/E19DL03) CLINICAL HAEMATOLOGY

UNIT I

18 Hrs

Collection of Blood Samples ABO Blood Grouping Procedure: Slide or Tile Method-Tube Method-Microplate Method-Micro-Typing System (Diamed/Bioview)-Automated or Semi-Automatic Instrumentation-Obtaining peripheral Blood Smear Staining of Blood Smear Obtaining Cell Counts – RBC-WBC-Platelets both manual and automated Absolute Eosinophils Count

UNIT II

18 Hrs

Estimation of Haemoglobin Packed Cell Volume-Erythrocyte Indices Reticulocyte Count Differential Count Bleeding Time Clotting Time

UNIT III

18 Hrs

Glucose Determination: Oxidase Method Of Glucose Determination -The Colormetric Method-Ortho-Toluidine - The Glucose Tolerance Test (GTT) - Estimation of Serum Creatinine Biuret Method Bromocresol Green Method Modified Reitman & Frankel Method King & King Method

UNIT IV

18 Hrs

Jaundice - Biochemical tests - Unconjugated Hyperbilirubinaemia (Retention Jaundice - Haemolytic (Pre-hepatic Jaundice) - Non haemolytic - Conjugated Hyperbilirubinaemia (Regurgitation Jaundice) Lipid profile - Total lipids - Phospholipids Sackett's Method Estimation of Serum HDL cholesterol Method of Fiske and Subbarow Caraway's Method of Estimation - Hyperuricaemia – Hypouricaemia

UNIT V

18 Hrs

Bile Salts: Hay's Test - For Bile Pigments - Fouchet's Test Collection- Appearance- Analysis of Cerebrospinal fluid- Synovial Fluid- Pleural Fluid- Pericardial Fluid- Peritoneal Fluid- Seminal Fluids- Needle aspiration Cytology- Discharge from any site.

References

1. Medical Laboratory Techniques, Mukharji, Vol - I, II & III, 5th Edn. Tata McGrawHill, Delhi.
2. Laboratory Technology (Methods and interpretation) Ramanic Sood, 4th Ed. J.P. Bros, New Delhi
3. Short text book of Medical Laboratory for technician Satish Gupta J.P. Bros, New Delhi

COURSE IV

(E19CE10/C19CE10)COMMUNICATIVE ENGLISH

1. **Basic Grammar:**
 - a. Review of grammar
 - b. Remedial study of grammar
 - c. Simple sentence
 - d. Word passive voice etc.
2. **Bubbling Vocabulary:**
 - a. Synonyms
 - b. Antonyms
 - c. One – work Institution
3. **Reading and Understanding English**
 - a. Comprehension passage
 - b. Précis – writing
 - c. Developing a story from hints.
4. **Writing English**
 - a. Writing Business letters.
 - b. Paragraph writing
 - c. Essay writing
 - d. Dialogue writing
5. **Speaking English**
 - a. Expressions used under different circumstances
 - b. Phonetics

Reference

1. V.H.Baskaran – “English Made Easy”
2. V.H.Baskaran – “English Composition Made Easy”
(Shakespeare Institute of English Studies, Chennai)
3. N.Krishnaswamy – “Teaching English Grammar”
(T.R.Publication, Chennai)
4. “Life Skill” – P.Ravi, S.Prabakar and T.Tamzil Chelvam,
M.S.University, Tirunelveli.

COURSE V
(C19DLP1/E19DLP1) PRACTICAL I-LAB IN ANALYTICAL BIOCHEMISTRY & HEMATOLOGICAL TECHNIQUES

Motion - Ova, Cyst, Trophozoite by wet smear preparation using normal saline and lugol's iodine solution, Motion occult blood, microfilaria and Malarial Parasites - Identification in Stained blood smear, Special topic: ECG

SPECIAL TOPIC:

Haematuria, Pregnancy Test.

Blood group and Rh(D) Factor test by open slide method and test tube method, compatibility test (both major and minor) by saline technique for all available donors and patients.

Blood Glucose(GOD/POD) Blood/urine urea(Di acetyl Manoxime method), serum/urine creatinine (Alkaline Picrate Method), serum total cholesterol (Enzymatic Method), serum Total proteins (Bicrt Method), serum Albumin (Bromo cresol Greendye Method), serum Acid/Alkaline Phosphatase, serum Bilirubin, Glucose tolerance test.

Urine Specific gravity, Urine Albumin (Heat Coagulation Method), Urine Glucose (Benidict's Method), Urine Acetone (Nitroprusside Method), Urine Bile Salt (Hays Method), Urine Bile Pigments (Fouchest's Method), Microscopic Examination, Parasites, Pregnancy test (Latex Method), Urine reaction, Occult blood in Urine, Urobilinogen test

**SEMESTER II
COURSE VI
(C19DL21/E19DL04) CLINICAL MICROBIOLOGY**

UNIT I

18 Hrs

Microscopy

Parts and principles of simple microscope-compound microscope- phase contrast microscope.

UNIT II

18 Hrs

Systemic Bacteriology

Definition- Classification- Staphylococcus- Streptococcus- Micrococci- Pneumococcus- Neisseria- Corynebacteria- Bacillus- Clostridium-Enterobacteriaceae - Klebsiella- Escherichia coli- Proteus- Salmonella- Shigella- Pseudomonas- Spirochetes.

UNIT III

18 Hrs

Mycology

Classification of Fungus- Laboratory Diagnosis - Collection and transport of Specimen- Direct Microscopy- Classification of pathogenic Fungi:- Superficial Mycoses- Subcutaneous Mycoses- Systemic Mycoses- Opportunistic Mycoses.

UNIT IV

18 Hrs

Virology

General properties of virus- Laboratory diagnosis of viral infections: Hepatitis virus- Human Immunodeficiency Virus- Polio Virus- Rabies Virus.

UNIT V

18 Hrs

Parasitology

General Parasitology- Classification of parasites: Protozoa. Technical terms - parasite- Medical Parasitology- Host- Vector- Pathogen- Commensal- Ova- Cyst- Trophozoite- Cestode- Trematode- Nematode parasites-life cycle Pathogenicity- Lab Diagnosis and Morphology with Diagram of Entamoeba histolytica- Entamoeba coli- Giardia lamblia- Trichomonas vaginalis- Leishmania species- Malarial Parasites (Plasmodium Species)- Tapeworms- Round Worm-Hookworms- Microfilarial worms.

Reference books:

1. Gerad J. Tortora, Berdell R. Funke, Christine L case, Microbiology: An introduction, Eight Edition, Publishers Benjamin Cummings.
2. Prescott, Harley and Klein's Microbiology 7th Ed Authour: Joanne M Wiley, Christopher J Woolverton, Linda M Sherwood.
3. Sherris Medical MicroBiology: An introduction to infectious diseases By Kenneth J Ryan, C George Ray, Publishers Mc Graw-Hill Medical.
4. Pelczar, M.I., and Reid, R.D. (2009) Microbiology, 5th Ed., McGraw Hill Inc., New York

COURSE VII
(C19DL22/E19DL05) CLINICAL BIOCHEMISTRY

UNIT I

18 Hrs

Instrument

Detailed study about Photoelectric colorimeter- pH meter- Centrifuge- Analytical balance- Flame photometer- Analytical Balance—Use and Maintenance. cleaning of new and used glassware- Pipettes and test tubes.

UNIT II

18 Hrs

Analytical Preparation of Solution Reagents

Definitions- types- Solute- Solvent-pH-Buffer-preparation of Phosphate Buffer Saline (PBS)-Use and storage of buffer solution-Concentration of Solutions- Molarity-Normality-ppm-Dilution methods of Solution-Storage of Chemicals and Reagents-Safe Use Flammable Chemicals-Corrosive Chemicals-Toxic-Harmful and Irritating Chemicals-Oxidizing Chemicals-Explosive Chemicals-Carcinogens. Indicator-Oxidation-Reduction.

UNIT III

18 Hrs

BIO-CHEMICAL TEST PROFILE

Liver Function tests- Renal Function Tests- Heart Function Tests- Pancreatic Function Tests-Diabetes- Jaundice- Lipids- Proteins.

UNIT IV

18 Hrs

ROUTINE BIO-CHEMICAL TESTS

Blood Glucose- Blood / Urine Urea- Serum Bilirubin- Serum / Urine Creatinine- Glucose Tolerance Test- Serum total Cholesterol and high Density Lipoproteins- Serum total Proteins / Albumin / Globulin- SGOT- SGPT- Serum Alkaline / Acid Phosphatase- Serum Uric acid- Blood Urea Nitrogen Serum Calcium- Serum Amylase-Proteinuria Glucose- Ketone Bodies- Bile Pigments- Urobilinogen- Urobilin- Porphyrins- Haematuria- Iron- Calcium- Iodine- Flourine in Urine.

UNIT V

18 Hrs

ELECTROLYTE TEST

Electrolytes with test procedure for photoelectric colorimetric method-(Na, K, Cl)- Quality control.

Reference books:

1. Instrumental Methods of Analysis. 6th Edition by H.H. Willard, L.L. Merritt Jr. and others. 1986. CBS Publishers and Distributors.
2. Instrumental Methods of Chemical Analysis. 1989 by Chatwal G and Anand, S. Himalaya Publishing House, Mumbai.
3. A Biologists Guide to Principles and Techniques of Practical Biochemistry. 1975 by Williams, B.L. and Wilson

**COURSE VIII
(C19LS23/E19LS05) LIFE SKILL**

I Life Coping or adjustment

- (a) External and internal influence in one's life
- (b) Process of coping or adjustment
- (c) Coping with physical change and sexuality
- (d) Coping with stress, shyness, fear, anger far live and criticism.

II Attitude

- (a) Attitude
- (b) Self acceptance, self – esteem and self actualization
- (c) Positive thinking

III Problem Solving

- (a) Goal Setting
- (b) Decision Making
- (c) Time Management and stress Management.

IV Computers

- (a) Introduction to Computers
- (b) M.S.Office
- (c) Power Point

V Internet

- (a) Introduction to internet
- (b) E – mail
- (c) Browsing

References:

- 1) Life Skill Programme course I & II by Dr. Xavier Alphona MCRDCE Publications. R.K.Mutt Road, Chennai – 28
- 2) ஆளுமை பண்பு வளர்த்தல் மற்றும் தகவல் தொடர்பு by M.Selvaraj Community College, Palayamkottai
- 3) “Life Skill” –P.Ravi, S.Prabahar & T.Tamil Chelvam, M.S. University, Tirunelveli

**COURSE IX
(C19DLIP/E19DLIP) INDUSTRIAL VISIT**

Students shall be taken for an visit to the an NABL Accreditation Diagnostic Laboratory and observe to various labs /Department wherein they can also undergo practical training. Know the quality policy and procedures practiced in the labs ad method of sample collection, methods of labeling , methods of analysis and reporting procedures. Student's has to submit an report to the teacher on the observation of visit.. The faculty shall submit the assessment records of each student .Marks will be awarded out of 100.

**COURSE X
(C19DLP2/E19DLP2) PRACTICAL II-LAB IN ANALYTICAL BIOCHEMISTRY II**

SPECIAL TOPIC:

Haematuria, Pregnancy Test.

Blood group and Rh(D) Factor test by open slide method and test tube method, compatibility test (both major and minor) by saline technique for all available donors and patients.

Blood Glucose (GOD/POD) Blood/urine urea (Di acetyl Manoxime method), serum/urine creatinine (Alkaline Picrate Method), serum total cholesterol (Enzymatic Method), serum Total proteins (Bicrt Method), serum Albumin(Bromo cresol Greendye Method), serum Acid/Alkaline Phosphatase, serum Bilirubin, Glucose toterance test.

Urine Specific gravity, Urine Albumin (Heat Coagulation Method), Urine Glucose (Benidict's Method), Urine Acetone (Nitroprusside Method), Urine Bile Salt (Hays Method), Urine Bile Pigments (Fouchest's Method), Microscopic Examination, Parasites, Pregnancy test (Latex Method), Urine reaction, Occult blood in Urine, Urobilinogen test