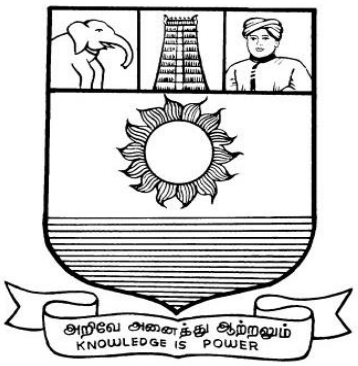
மனோன்மணியம் சுந்தரனார் பல்கலைக்கழகம்

திருநெல்வேலி – 627 012

Manonmaniam Sundaranar University

Thirunelveli – 627 012.



கல்விசார் நிலைக்குழுக் கூட்டம்

MEETING OF THE STANDING COMMITTEE ON

ACADEMIC AFFAIRS HELD ON FRIDAY
THE 27th OCTOBER 2017.

Syllabus for Diploma in Biochemical and Microbial Techniques Course offered through Directorate of Vocational Education (Community Colleges and Extension Learning Programme) from 2017 – 2018

Course Code :5213

DIPLOMA IN BIOCHEMICAL AND MICROBIAL TECHNIQUES
SCHEME OF EXAMINATIONS

Subject Code	Title of the Paper	Credit	Hours	Passing Minimum
Semester I				
C17BM11/E17BM01	Hematology and Blood Grouping	6	90	40/100
C17BM12/E17BM02	Analytical Biochemistry	6	90	40/100
C17BM13/E17BM03	Hospital Management	6	90	40/100
C17CE10/E17CE10	Communicative English	6	90	40/100
C17BM14/E17BM04	Microbial and Stereological Techniques	6	90	40/100
Semester II				
C17BM21/E17BM05	Pathology	6	90	40/100
C17BM22/E17BM06	Microbial Instruments	6	90	40/100
C17LS23/E17LS05	Life Skill	6	90	40/100
C17BMP1/E17BMP1	Hematology Blood grouping and Analytical Biochemistry	4	60	40/100
C17BMP2/E17BMP2	Microbial techniques and pathology	10	150	40/100

Eligibility for admission: Pass in 12th 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 paper is 40%. Classification will be done on the basis of percentage marks of the total marks obtained in all the papers and as given below:

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

Syllabus

First Semester

Paper-I : Haematology and Blood Grouping
Paper-II : Analytical Biochemistry
Paper-III : Hospital Management
Paper-IV : Communicative English
Paper-V : Microbial and Seriological Techniques

Second Semester

Paper-VI : Pathology
Paper-VII : Microbial Instruments
Paper-VIII : Life Skill
Paper-IX : Haematology Blood grouping and Analytical Biochemistry
Paper-X : Microbial techniques and pathology

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

(C17BM11/E17BM01) PAPER - I HAEMATOLOGY AND BLOOD GROUPING

UNIT I BLOOD AND ANTICOAGULANTS: Definition, Functions, Composition, Blood Collection through vein puncture and finger prick, Haemoloysis - agents responsible, precautions to prevent. Anticoagulants**:** Definition, types, use and amount used for each test in haematology. Erythrocyte leucocyte and thrombocyte: Development of RBC Blood Haemoglobin, Methods and procedure for Haemoglobin test, ESR, PCV, Buffy coat, Total RBC Count, RBC indices, Reticulocyte count, Normal values, Increased and decreased conditions. Leucocyte: Development of WBC, Functions, total WBC count, Differential WBC count, Morphology of types of WBC, Total Eosinophil count, Normal values, Increased and decreased conditions. Thrombocyte: Development of Platelet, Functions of platelet, Total Platelet count, Normal values, Increased and decreased conditions.

UNIT II BLEEDING DISORDERS AND LEUKAEMIA : 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,Medical Laboratory Technician Code.

UNIT III BLOOD GROUPING AND BLOOD TRANSFUSION

General: Discovery of Blood Grouping, Rh Typing, Importance Antigen, Antibody, Agglutination, Antigen - Antibody in different Blood Group, Blood Grouping:Principle, Reagents, Methods and Procedure of Red Blood Cell and Serum Grouping with interpretation, Source of error. Sub Group of 'A' and 'AB', Importance, Reagents, Methods and Procedure of Grouping with interpretation. Special Topic: Bombay 'O' Blood Group, Preparation of RBC suspension. Blood transfusion: GENERAL: Types and indications of various blood transfusion, Universal donor / recipient.
DONOR SELECTION: Types of blood donors, Detailed blood donor screening procedure.

UNIT IV BLOOD COLLECTION COMPATIBILITY TEST : Anticoagulants in Blood Bank, Pilot blood containers, Storage of donor blood, Changes take place in stored blood. Compatibility test**:** Cross matching (Major &Minor) Release of Blood for transfusion: Precautions to be followed

UNIT V TRANSFUSION REACTION: Types transfusion reaction investigation.Reaction investigation procedure with interpretation Antiglobulin (Coomb's) Test Haemolytic Disease of Newborn (HDN)

(C17BM12/E17BM02) PAPER – II ANALYTICAL BIO-CHEMISTRY

UNIT 1 INSTRUMENT: Detailed study about Photoelectric colorimeter, Centrifuge, Analytical balance, Flame photometer

UNIT II SOLUTIONS AND SAMPLE: Definitions, types, Solute, Solvent, pH, Buffer, Indicator, Oxidation, Reduction. Anticoagulants in Bio-Chemistry, Separation and Storage of blood / Serum plasma for Biochemical tests, Deprotenisation of blood. cleaning of new and used glassware, Pipettes and test tubes.

UNIT III BIO-CHEMICAL TEST PROFILE: Liver Function tests, Renal Function Tests, Heart Function Tests, , Pancreatic Function Tests. Diabetes, Jaundice, Lipids, Proteins.

UNIT IV 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 Nitrogem Serum Calcium, Serum Amylase.

UNIT V ELECTROLYTE TEST: Electrolytes with test procedure for photoelectric colorimetric method. (Na, K, Cl),Quality control.

(C17BM13/E17BM03) PAPER III HOSPITAL MANAGEMENT

Unit I - **Healthcare - Introduction**

Introduction – Theoretical frame work of healthcare - - Internal and External healthcare – Environmental Scanning of healthcare – International and Technological Environment of healthcare

Unit II- Health Care Systems

A Conceptual Approach to Understanding the Health Care Systems – Institutional Settings - Out Patient services – Medical Services – Surgical Services – Operating department –Hospital Laboratory services –

Unit III - Hospital Management

Understanding the Hospital Management – Role of Medical, Nursing Staff, Paramedical and Supporting Staff - Health Policy - Population Policy - Drug Policy – Medical Education Policy

Unit IV - Health Care in India

Overview of Health Care Sector in India – Primary care – Secondary care – Tertiary care – Rural Medical care – urban medical care – curative care – Preventive care – General & special Hospitals-

Unit V - Health Care Regulation

Health Care Regulation – WHO, International Health regulations, IMA, MCI, State Medical Council Bodies, Health universities and Teaching Hospitals and other Health care Delivery Systems

Reference Books:

1. Paul's, Readings in Economics, Tata McGraw Hill, New Delhi , 1992
2. Dwivedr D.N.Microeconomic Theory, Vikas Publications, New Delhi,1996
3. Seth,M.L.Macroeconomics, Laksminarayana Agrawal, Edu,Pub.Agra.1996
4. Varshey, R.L. & Maheshwari, K.L., Managerial Economics, Sultan Chand, Delhi,1996
5. Peter,Z & Fredrick, B.,Health Economics, Oxford Pub., New York, 1997
6. Shanmugansundaram, Y., Health Economics, Oxford Pub. New York, 1997
7. Mills, A & Lee, K., Economics of Health, OUP, Oxford, 1983

(C17CE10/E17CE10) Paper IV Communicative English

Unit I: Learning context

Concept of learning – Learning style –Grammatical framework – sentence framing – paragraph and texts

Unit II: Reading

Basic concept – Purposes of reading-Decoding-Reading materials – Barriers of reading

Unit III: Writing

Basic concept-Writing style-Terminology-stages-English spelling and punctuation – Written texts

Unit IV: Speaking

Language functions-Conversation- Features of spoken English – Types of English course: functional English, English literature, advance English – Phonetic

Unit V: Developing Communication Skills

Meaning –Classroom presence- Features of developing learning process- Practical skills and Listening- uses of communicative English

References

1. Raman, m.&S. Sharma (2011) communication skills, OUP,New Delhi: India
2. Lata, P.&S. Kumar(2011) communication skills, OUP,New Delhi: India,
3.Leech,G&J.Svartvik(2002) A communicative grammar of English, Pearson,India,
4. Sethi, J. and P.V. Dharmija (2007) A course in Phonetics and spoken English. Second edition, Prentice hall: New Delhi

(C17BM14/E17BM04) PAPER – V MICROBIAL AND SERIOLOGICAL TECHNIQUES

UNIT I INSTRUMENTS: Microscope - Types, Detailed Structure and functions of parts of Compound microscope, Incubator - use and operating procedure, Hot air oven - Use and Operating Procedure, Autoclave - Use and Operating Procedure, culture media and sterilization: Detailed classification, Types, Preparation of common culture media &Special Media. Sterilisation: Definition, Classification, Detailed study about physical and chemical method of sterilization.Test Procedure with Interpretation:Gram's Staining, Acid Fast Staining, Hanging drop preparation.

UNIT II BACTERIA: Structure of Bacteria, Growth requirement of Bacteria, Detailed classification, Staining reactions, Methods of lab diagnosis, Detailed morphology, Culture Media, Pathogenicity and Lab diagnosis of Staphylococci, Streptococci, Pneumococci, Gonococci, Meningococci, Pseudomonas, Mycobacterum species, Treponema Pallidum, Escherichia coli, Proteus, Pseudomonas, Shigella, Leptospirae, Klebsiella.

UNIT III BIO-CHEMICAL TESTS: Indole production test, Methylred, Vogesproskaer, Citrate Utilization test, Sugar Fermentation test.

UNIT IV VIROLOGY AND MYCOLOGY: General properties of virus, Hepatitis virus, Human Immunodeficiency, Virus, Polio Virus, Rabies Virus. Definition and Classification Special Topic: Antibiotic sensitivity test, Microbiological testing of milk and water,Quality Control in Microbiology Lab, Safety measures and waste managememt in the Laboratory.

UNIT V SEROLOGY General:Infection, Immunity, Antigen, Antibody, WIDAL Test, Anti Strptolysion titre, Rapid Plasma Reagin test, Rheumatoid Arthritis factor, C-Reactive Protein, Hepatitis 'B' surface Antigen test, HIV Test.

II SEMESTER

(C17BM21/E17BM05) PAPER - VI PATHOLOGY

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

UNIT II MOTION EXAMINATION: Improtance, Physical, Microscopic examination with interpretation, Concentration method for Ova.special topics:Occult blood in Motion, Difference between Amoebic / Bacillary dysentery.Practical**:**(to be conducted and repeated by every student)Motion - Ova, Cyst, Tropozoite by wet smear preparation using normal saline and lugol's iodine solution, Motion occult blood, microfilaria and Malarial Parasites - Identification in Stained blood smear.

UNIT III PATHOLOGY - URINE ANALYSIS General: Parts of urinary system, importance of urine exam, Normal and abnormal contents of urine sample, Types of urine sample, urine collection and Preservatives.

UNIT IV PHYSICAL AND CHEMICAL EXAM: Colour (Normal, abnormal) Volume (Normal, abnormal), Odour (Normal. abnormal), Appearance (Normal, abnormal), Specific gravity. chemical exam**:** Principle, Reagents, Procedure with interpretation for Proteins (Albumin), Sugar (Glucose), Ketone body (Acetone), Bile Salt, Bile pigment, Urobilinogen, Reaction.

UNIT V MICROSCOPIC EXAM: Importance, Sample collection, Procedure, Organised &Un organized Sediments, Casts, Parasites in Urine, with clean diagram.Special Topic**:**Haematuria, Pregnancy Test.Praticals**:** (to be conducted and repeated by every student)Urine Specific gravity, Urine Albumin (Heat Coagulation Method), Urine Glucose (Benidict's Method), Urine Acetone (Nitroprusside Method), Urine Bile Salt (Hays Method), Urine Bile Pigmetn (Fouchest's Method), Microscopic Examination, Parasites, Pregnancy test (Latex Method), Urine reaction, Occult blood in Urine, Urobilinogen test

(C17BM22/E17BM06) PAPER VII MICROBIAL INSTRUMENTS

Unit I Microscopy & Staining

Microscopy- Principles and applications, dark field, bright field, phase contrast microscopy, Principles of staining, simple staining, negative staining, differential staining, Gram and acid fast staining, flagella staining, capsule and endospore staining.

Unit II Sterilization and disinfectants

Methods of sterilization: - dry heat, moist heat, UV light, ionizing radiation, filtration, Filtrations: Laminar Air Flow Chamber, HEPA filter, different size of Millipore filters. Chemicals: disinfection, antiseptic, anionic and cationic detergents in disinfection.

Unit III Biochemical Instruments

Colorimeter - Instrumentation, Principal, working, Application. PH meter- Hydrogen ion concentration Mechanism of action of buffers in biological system, instrumentation and application.

Unit IV Histopathology Instruments

Selection of tissue and washing specimen, Fixation including cryofixation, clearing & dehydration, Embedding (Vacuum), Processing for section cutting, Microtome operation conditioning of specimen for staining.

Unit V

Important of positive and negative controls, sample collection & labeling. Data analysis, report preparation, and documentation.

.References:

1. Microbiology Pelczar, Chan and Krieg. (Indian edition)
2. Microbiology Vol II Power and Daginawala.
3. Outlines of Biochemistry Cohn and Stumpf.
4. Microbiology by Dubey & Maheswari
5. Microbiology by Purohit.
6. Biophysical and biochemical technique : Nath and Upadhya
7. Fundamental of Biochemistry : A.C. Deb
8. Textbook of Biochemistry : Jain & Jain

(C17LS23/E17LS05) PAPER VIII (LIFE SKILL)

(Common to All Courses)

UNIT- I ATTITUDE : Positive thinking – Goal setting – Problem Solving and Decision making – Leadership and Team Work.

UNIT -II COMMUNICATION SKILLS: Oral communication: Concept of English language – Fluency – Verbal communication in official and public situations.

UNIT-III COMMUNICATION SKILLS: Written Communication: Comprehension – Writing a formal letter like application for Job, enquiry, reply, complaint and such others – preparation of Resume, Curriculum Vitae.

UNIT- IV COMPUTING SKILLS – 1: Introduction to Computers, its various components and their respective functions – Memory storage devices – Microsoft (MS) Office – MS Word.

UNIT- V COMPUTING SKILLS – 2 Internet Basics – Origin of Internet – MODEM – ISP – Upload – Download – e-mail – Origin of worldwide web (www) Browsers – Search engines.

Reference books:
Life skill, Manonmaniam Sundaranar University Publications Division (2011)

(C17BMP1/E17BMP1) PAPER IX PRACTICAL- I

HAEMATOLOGY BLOOD GROUPING AND ANALYTICAL BIOCHEMISTRY

Motion - Ova, Cyst, Tropozoite 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

CLINICAL PATHOLOGY - URINE ANALYSIS

GENERAL: Parts of urinary system, Importance of urine exam, Normal and abnormal contents of urine sample, Types of urine sample, urine collection and Preservatives.

PHYSICAL EXAM: Colour (Normal, abnormal) Volume (Normal, abnormal), Odour (Normal. abnormal), Appearance (Normal, abnormal), Specific gravity.

CHEMICAL EXAM: Principle, Reagents, Procedure with interpretation for Proteins (Albumin), Sugar (Glucose), Ketone body (Acetone), Bile, Salt, Bile pigment, Urobilinogen, Reaction.
MICROSCOPIC EXAM: Importance, Sample collection, Procedure, Organised &Un organized Sediments, Casts, Parasites in Urine, with clean diagram.

SPECIAL TOPIC: Haematuria, Pregnancy Test.

PRACTICAL I 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.

(C17BMP2/E17BMP2) PAPER X PRATICALS- II

MICROBIAL TECHNIQUES AND PATHOLOGY

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

WIDAL test (Slide Method including dilution technique) Rapid Plasma Reagin (Card test), Rheumatoid Athritis factor test, C-Reactive Protein test, Anti streptolysin 'O' test.

CLINICAL PATHOLOGY - BODY FULUIDS

Complete Semen Analysis with interpretations. **(Demo)**
Cerebro Spinal Fluid (CSF) - Formation, Indication for collection, Detailed study about physical, Chemical and microscopic examination of CSF with interpretation. **(Demo)**