

Study & Evaluation Scheme

of

M.Sc. (Medical Microbiology)
[Applicable for the Batch 2013-14 till revised]



TEERTHANKER MAHAVEER UNIVERSITY

Delhi Road, Moradabad, Uttar Pradesh-244001

Website: www.tmu.ac.in



TEERTHANKER MAHA VEER UNIVERSITY

(Established under Govt. of U. P. Act No. 30, 2008)

Delhi Road, Moradabad (U.P)

Study & Evaluation Scheme of M. Sc. (Medical Microbiology)

SUMMARY

Programme	: M. Sc. (Medical Microbiology)
Duration	: Three year full time (Annual System)
Medium	: English
Minimum Required Attendance	: 75 percent
Maximum Credits	: 90
Minimum credits required for the degree	: 90

Assessment	Internal		External		Total
	25		75		100
Internal Evaluation (Theory Papers)	Class Test-I	Class Test-II	Assignment(s)	Other Activity (including attendance)	Total
	7.5 Marks	7.5 Marks	5 Marks	5 Marks	25 Marks
Evaluation of Practical/Dissertations & Project Reports	Internal		External		Total
	50		50		100
Duration of Examination	External			Internal	
	3 hrs.			1 ½ hr.	

To qualify the course a student is required to secure a minimum of 50% marks in aggregate including the year-end examination and teachers continuous evaluation.(i.e. both internal and external).A candidate who secures less than 50% of marks in a course shall be deemed to have failed in that course.

A Candidate who has been placed under re-appear category in any of the subject shall be allowed to continue his/her studies in the next year but will have to appear in the supplementary examination to be conducted within three months after declaration of the result.

Students clearing all papers or having failure in not more than two subjects will be allowed to move to the next higher class. Students with failure in more than two subjects will have to re-appear in the said papers in the year end examination of the program in the subsequent year(s).

Note: For internal assessment purpose, there will be three Class Tests in a year and best two tests will be computed for the final result.

STUDY & EVALUATION SCHEME
Programme: M. Sc. (Medical Microbiology)

Year-I

S. No.	Course Code	Subject	Periods				Credit	Evaluation Scheme		
			L	T	S	P		Internal	External	Total
1	MSC101	Basics of Anatomy	6	-	1	-	7	25	75	100
2	MSC102	Basics of Physiology	5	-	1	-	6	25	75	100
3	MSC103	Basics of Biochemistry	4	-	1	-	5	25	75	100
4	MSC104	Research Methodology	1	-	-	-	1	25	75	100
5	MSC151	Basics of Anatomy (Lab)				6	3	50	50	100
6	MSC152	Basics of Physiology (Lab)				6	3	50	50	100
7	MSC153	Basics of Biochemistry (Lab)				4	2	50	50	100
Total			16		3	16	27	250	450	700

Year-II

S. No.	Course Code	Subject	Periods				Credit	Evaluation Scheme		
			L	T	S	P		Internal	External	Total
1	MSM201	General Bacteriology	3	2	1	-	5	25	75	100
2	MSM202	Systemic Bacteriology	3	2	1	-	5	25	75	100
3	MSC201	Teaching Methodology	2	1	1	-	3	25	75	100
4	MSM251	Microbiology Practical I	-	-		24	12	50	50	100
5	MSC251	Fundamental of Computer (Lab)				2	1	50	50	100
Total			8	5	3	26	26	175	325	500

Year-III

S. No.	Course Code	Subject	Periods			Credits		Evaluation Scheme		
			L	T	S	P		Internal	External	Total
1	MSM301	Virology, Mycology & Parasitology	3	2	1	-	5	25	75	100
2	MSM302	Clinical Microbiology, Molecular Biology and Recent Advances	3	2	1	-	5	25	75	100
3	MSC351	Teaching Practice	-	-	-	6	3	50	50	100
4	MSM351	Microbiology Practical II	-	-	-	24	12	50	50	100
5	MSM352	Thesis	-	-	-	-	12	50	50	100
Total			6	4	2	30	37	200	300	500

L – Lecture **T- Tutorial** **P- Practical** **S= Seminar** **C-Credits**
1L = 1Hr **1T= 1 Hr** **1P= 1 Hr** **1S=1Hr** **1C =1Hr of Lecture/Seminar**
2 Hrs of Practical/Tutorial

Note: Presenting paper/poster at conferences/ preparing manuscripts for documentation and presenting seminar shall be given weight age in the internal assessment.

Question Paper Structure

1. The question paper shall consist of **EIGHT** questions, out of which first question shall be of short answer type (not exceeding 50 words) and will be compulsory. Question No. 1 shall contain 8 parts representing the entire syllabus and students shall have to answer any five (weightage 3 marks each)
2. Out of the rest **SEVEN** questions, students shall be required to attempt any five questions. The weight age of questions no. 2 to 8 shall be 12 marks each.

M.Sc. (Medical Microbiology) Year-I BASICS OF ANATOMY

Course Code: MSC101

L-6, T-0, P-0, S-1 C-7

Course Contents

General Anatomy

1. Anatomical terminology, Anatomical plane, Anatomical positions, Clinical positions, Terms related to movements
2. Basics of cytology: Structure of cell wall, Cell organelles,
3. Musculoskeletal system:
 - (a) Bones & classification, Morphology, ossification functions, blood supply
 - (b) Muscles, Morphology, classification blood supply, innervations, functions
4. Integumentary system: Thick Skin, Thin skin layers of dermis epidermis, Skin appendages, blood supply, innervations, functions
5. Cardiovascular system: Morphology of blood vessel, classification of blood vessels, blood capillaries, blood circulation, functions
6. Nervous system: Central Nervous system & Peripheral Nervous system, Gross basic Anatomy, Cranial nerves, Spinal nerves, Functions of nerves, Autonomic nervous system
7. Endocrine system: Classification, Hormone produces, Control of hormone secretion, basic functions
8. Lymphatic system: Formation of lymph, Lymphatic ducts, Thoracic duct, Lymph circulation, functions
9. Digestive system: Parts of digestive system, gross anatomy and functions
10. Excretory system: Parts of excretory system, gross anatomy of kidney, ureter, urinary bladder penis and their functions
11. Reproductive system: Male reproduction system- gross anatomy of testis, epididymis, vas-deferens, seminal vesicles and prostate. Female reproductive system- gross anatomy of ovaries, uterine tube, uterus, vagina, menstruation cycle
12. Basics of genetics: Cell division ,mitosis, meiosis, Cell cycle, Chromosomes

Gross Anatomy (Elementary Anatomy)

1. Superior Extremities
2. Inferiors Extremities
3. Thorax
4. Abdomen
5. Pelvis
6. Head, Neck & Fact Region

Anatomy of each part including functional, sectional and radiological anatomy

Recommended Books

1. Williams et al, *Gray's Anatomy*, Livingstone Churchill.
2. B. Young and J. Heath, *Wheaters' Functional Histology*, Livingstone Churchill
3. Ross M.H., *Histology: A Text & Atlas*, Williams & Wilkins.
4. Langman Jan, *Medical Embryology*, William and Wilkins.
5. Thompson J.S. & Thompson M.W., *Genetic in Medicine*, W.B. Saunders & Co. Philadelphia,
6. Stuin J & Carpenter MB, *Human Neuroanatomy*,
7. Richard S. Snell, *Clinical Neuroanatomy for Medical Students*, Willian and Wilkins

M.Sc. (Medical Microbiology) Year-I
BASICS OF PHYSIOLOGY

Course Code: MSC102

L-5, T-0, P-0, S-1 C-6

Course Contents

1. Cell Physiology

Cell Structure and membrane transport, Resting Membrane Potential, Composition of ECF and ICF, Nernst Equation, Equilibrium Potential, Goldman Equation

2. Nerve-Muscle and Biopotential

Neuron (structure, function and classification), Neuroglia, Action Potential, Neuromuscular junction, Skeletal Muscle (structure, mechanism of contraction and relaxation), Smooth Muscle (structure, mechanism of contraction and relaxation)

3. Blood

Function and Composition, Erythrocytes, Haemoglobin, Blood groups, Leucocytes, Thrombocytes, Immunity

4. Cardiovascular System

Cardiac Muscle, Physiological anatomy of heart and conduction system, Cardiac Action Potential, Normal ECG, Cardiac cycle, Heart sounds, Cardiac output and blood pressure, Coronary circulation

5. Respiration

Functional anatomy of the respiratory system, Mechanism of breathing, Dead space, Surfactants

Dynamic and static lung volumes and capacities, Transport of oxygen and carbon dioxide, Regulation of Respiration, Cyanosis, Hypoxia, Oxygen toxicity

6. Gastrointestinal Tract

Functional anatomy, Salivary glands (secretion and function of saliva, deglutition), Stomach (composition, regulation of secretion and function of the gastric juice), Liver (secretion and function of bile), Pancreas (secretion and function), Intestines, Intestinal secretion (composition and function), Movements of Intestines, Hormones of GIT

7. Excretory System

Function of kidney, Structure of nephron, Juxta glomerular apparatus, Formation of urine

Counter current mechanism, Acidification of urine & role of kidney in maintenance of acid base balance, Renal function tests, Micturition

8. Autonomic Nervous System

Organization of the ANS, Chemo-transmitters, Effect of sympathetic and parasympathetic stimuli on different organ systems

9. Central Nervous System

General organization of CNS & PNS, Sensory system :(General sensations, receptors, sensory pathways, sensory areas of brain)

Motor system: (muscle spindle, Golgi tendon organ, reflex arc, corticospinal and extra-pyramidal tracts)

Brain: Functions of: Cerebellum, thalamus, hypothalamus, basal ganglia, limbic system, reticular activating system; Higher Function: Sleep

10. Special Senses

Eye (functional anatomy, refractory indices of media, rods and cones, role of vitamin A, visual pathway), Ear (structure of internal ear, mechanism of hearing), Taste (distribution and structure of taste buds and taste papillae, primary taste modalities, taste pathway), Smell (olfactory epithelium and pathway)

11. Endocrine System

Mechanism of action of hormones, Functions of the following glands: Pituitary, thyroid, parathyroid, adrenal (cortex and medulla), pancreas

12. Reproductive System

General organization of male and female reproductive systems, Male: Spermatogenesis and actions of male sex hormones, Female: Sexual cycles and actions of female sex hormones, pregnancy, parturition and lactation, Family planning

Reference Books (Latest Edition)

1. Guyton, A., *Text Book of Medical Physiology*, Elsevier Publication,
2. Ganong, W.F., *Reviews of Medical Physiology*, Lange Publication
3. Khurana, I., *Text Book of Physiology*, Elsevier Publication
4. Berne V, *Principles of Physiology*, Elsevier Mosby Publication.
5. Lippincott W &Wilkins, *Medical Physiology (Clinical Medicine)*, Rhodes &Bell.

M.Sc. (Medical Microbiology) Year-I
BASICS OF BIOCHEMISTRY

Course Code: MSC103

L-4, T-0, P-0, S-1, C-5

Course Contents

Basic concepts of Biochemistry to be studied under the following headings:

1. Cell structure and function and transport through the biological membrane.
2. Chemistry of Bio molecules – carbohydrate, lipids, amino acids, proteins and nucleic acids.
3. Chemistry of Blood & haemoglobin.
4. Enzymes.
5. Bioenergetics and Biologic oxidation.
6. Metabolism of carbohydrates, Proteins, lipids and nucleotides.
7. Integration of metabolism.
8. Nutrition, Vitamins & minerals.
9. Molecular Biology.
10. Detoxification & Xenobiotics.
11. Oxygen derived free radicals.
12. Immunology.
13. Organ function tests.

Reference Books

1. Lubert Stryer (Ed.), *Biochemistry*, W.H. Freeman & Company, New York.
2. Lehninger , Nelson & Cox (Ed.), *Principles of Biochemistry*, CBS Publishers & Distributers.
3. Murray R.K. & P.A. Mayes (Ed.), *Harpers Biochemistry*, D.K. Granner,
4. Thomas M. Devlin (Ed.), *Textbook of Biochemistry with Clinical Correlations*, Wiley Liss Publishers.
5. Benjamin Lewin (Ed), *Genes VI*, Oxford University Press

M.Sc. (Medical Microbiology) Year-I RESEARCH METHODOLOGY

Course Code: MSC104

L-1, T-0, P-0, S-0, C-1

Course Contents

Unit – 1

Methods of collection of data, classifications and graphical representation of data. Binomial and normal probability distribution. Polygon, histogram, measure of central tendency. Significance of statistical methods, probability, degree of freedom, measures of variation - Standard deviation, Standard error.

Unit – 2

Sampling, sample size and power. Statistical inference and hypothesis. Tests for statistical significance: t-test, Chi-square test, confidence level, Null hypothesis.

Unit – 3

Analysis of Variance (one way and two way ANOVA). Factorial designs (including fraction factorial design). Theory of probability, Permutation and Combination, Ratios, Percentage and Proportion and Multiple comparison procedures.

Unit – 4

Non-parametric tests, Experimental design in clinical trials, Statistical quality control, Validation, Optimization techniques and Screening design. Linear regression and Correlation, least square method, significance of coefficient of correlation, nonlinear regression.

Unit – 5

Report Preparation: Types and Layout of Research Report, Precautions in Preparing the Research Report. Bibliography and Annexure in the Report: Their Significance, Drawing Conclusions, Suggestions and Recommendations to the Concerned Persons. Use of SPSS in Data Analysis.

Recommended Books

1. Cooper & Schindler, *Business Research Methods*, Tata McGraw Hill.
2. *Saunders Research Methods for Business Students*, Pearson Education, 2007.
3. Malhotra Naresh K., *Marketing Research*, Pearson Education.
4. Fisher, R.A., *Statistical Methods for Research Works*, Oliver & Boyd, Edinburgh.
5. Chow, *Statistical Design and Analysis of Stability Studies*, Marcel Dekker, New York.
6. Finney, D.J., *Statistical Methods in Biological Assays*, Hafner, New York.
7. Montgomery, D.C., *Introduction to Statistical Quality Control*, Willy.
8. Lipschutz, *Introduction to Probability and Statistics*, McGraw-Hill.

Note:

* Latest editions of all the suggested books are recommended.

**M.Sc. (Medical Microbiology) Year-I
BASICS OF ANATOMY (LAB)**

Course Code: MSC151

L-0, T-0, P-6, S-0, C-3

Course Contents

Practical: Demonstration of the following on dissected parts

1. Anatomical terminology (anatomical plane, anatomical positions, other positions required in clinical practice, terms related to movements and sections etc.)
2. Basics of cytology
3. Musculoskeletal system
4. Integumentary system
5. Cardiovascular system
6. Nervous system
7. Endocrine system
8. Lymphatic system
9. Digestive system
10. Excretory system
11. Reproductive system
12. Basics of genetics (cell division, cell cycle)

Gross Anatomy Dissections

1. Superior Extremities
2. Inferiors Extremities
3. Thorax
4. Abdomen
5. Pelvis
6. Head, Neck and Face

**M.Sc. (Medical Microbiology) Year-I
BASICS OF PHYSIOLOGY (LAB)**

Course Code: MSC152

L-0, T-0, P-6, S-0, C-3

Course Contents

- Study of microscope
- Preparation and staining of blood film and identification of different blood cells
- Differential leukocyte count
- Determination of blood group
- Estimation of haemoglobin
- Haemin crystal
- Determination of bleeding and clotting time
- Total leukocyte count

Recommended Books

1. Ghai, C.L., *Textbook of Practical Physiology*, Jaypee Bros.
2. Jain, A.K., *Manual of Practical Physiology*, Arya Publications

M.Sc. (Medical Microbiology) Year-I
BASICS OF BIOCHEMISTRY (LAB)

Course Code: MSC153

L-0, T-0, P-4, S-0, C-2

Course
Contents

Basic awareness of laboratory with respect to equipments and glassware, units of measurement and calibration of volumetric apparatus, preparation and storage of reagents, standard solutions, buffer solutions and pH determination.

S. No.	Topic
1.	Introduction : Handling of chemicals, preparation of reagents Pipetting etc.
2	Colour reactions of carbohydrates
3	Colour reactions of Lipids
3.	Colour reactions of proteins
4.	Precipitation reactions of protein.
5.	Individual proteins -Albumin, Globulin , Casein & Gelatin.
6.	Unknown protein identification
7.	Milk Analysis
8.	Starch digestion by salivary amylase and products.
9.	Normal constituents of urine.
10.	Abnormal constituents of urine and Reporting of abnormal urine.
11.	pH determination and buffer preparation
12.	Demonstration : Spectroscopic examination of Blood
13.	Verification of Beer's Lambert Law: Colorimetry, Spectro photometry.
14	Estimation of serum glucose level and glucose tolerance test.
15	Estimation of total protein and albumin level and calculation of A/G Ratio.
16	Estimation of Serum Urea level and calculation of Urea clearance.
17	Estimation of Serum Uric Acid level.
18	Estimation of Serum Creatinine level and Calculation of Creatinine clearance.
19	Diagnostic Enzymology :- * Liver Enzymes * Cardiac Enzymes * Misc.
20	Estimation of Serum ALP Activity
21	Clinical problems involving organ function tests.
22	Demonstration : Electrophoresis.(Paper, agarose & PAGE)
23	Demonstration : Chromatography (Paper & HPLC)
24	Demonstration: Flame photometry.
25	Special Technique: - Bioluminescence, fluorometry, Chemiluminescence.
26	Quality Control.
27	Molecular Biology Practicals.

Reference Books

1. Burtis & Ashwood W.B (Ed), *Tietz Textbook of Clinical Chemistry*, Saunders Company.
2. Keith Wilson & John Walker (Ed), *Principles & Techniques of Practical Biochemistry*, Cambridge University Press.

M.Sc. (Medical Microbiology) Year-II
GENERAL BACTERIOLOGY

Course Code: MSM201

L- 3, T-2, P-0, S-1 C-5

Course Contents

Bacteriology

- History of Microbiology
- Principles, mechanisms of different types of microscopes and their uses
- Morphology of bacteria, Bacterial metabolism, Bacterial taxonomy and classification;
- Sterilization and disinfection
- Growth and nutrition of bacteria and methods of cultivation
- Isolation and identification of bacteria
- Bacterial genetics and variation
- Normal bacterial flora, zoonosis, epidemiology and transmission
- Bacteriological examination of water, food, air and milk
- Care, management, method of inoculation and uses of experimental laboratory animals
- Antimicrobial chemotherapy.

Immunology

- Anatomy, development and functions of immune system
- Host and parasite relationship
- Biology of immune response
- Microbial pathogenicity and host immune response
- Infection and immunity
- Antigen and antibodies
- Toxins, antitoxins
- Complement
- Antigen antibody reactions
- Hypersensitivity
- Vaccine and immunization
- Immunodeficiency diseases
- Autoimmunity, Immunological tolerance
- Immunology of transplantation and malignancy
- Immunohematology,
- Laboratory immunological procedures.

M.Sc. (Medical Microbiology) Year-II
SYSTEMIC BACTERIOLOGY

Course Code: MSM202

L- 3, T-2, P-0, S-1 C-5

Course Contents

Properties, epidemiology, transmission, methods of isolation, identification, pathogenesis, toxins and enzymes production, antigen structures, clinical importance and laboratory diagnosis of the infection with the following bacteria:

- Gram Positive Cocci: Staphylococcus, Streptococcus, Pneumococcus
- Gram Negative Cocci: Neisseria
- Gram Positive Bacilli: Corynebacterium, Bacillus, Clostridium
- Non-sporing Anaerobes
- Gram Negative Bacilli: Enterobacteriaceae, Vibrio, Pseudomonas, Acinetobacter, Yersinia, Pasteurella, Francisella, Haemophilus, Bordetella, Brucella
- Mycobacterium: Mycobacterium tuberculosis, atypical Mycobacterium, Mycobacterium leprae,
- Spirochaetes
- Mycoplasma,
- Actinomycetes,
- Helicobacter, Campylobacter and other miscellaneous bacteria,
- Rickettsia
- Chlamydia

Immunology of bacterial infections.

M.Sc. (Medical Microbiology) Year-II
TEACHING METHODOLOGY

Course Code: MSC201

L- 2, T-1, P-0, S-1 C-3

Course Contents

- Challenges for teachers in Medical Education
- Teaching strategies
 - Lecture method
 - Small group teaching
 - Inquiry and problem solving methods
 - Case study
 - Team projects
 - Presentation
 - Seminar
 - Field visit
 - Simulation
 - Computer based instructions
 - Bed side learning
 - One to one teaching
 - Self directed teaching
- Preparation of lesson
- Selection of teaching methods
- Identification and review of literature
- Identification of teaching resources
- Developing teaching aids for instructional activities that link research and theory to practice
- Contact development; key element of curriculum design and evaluation
- Implementation and monitoring of curriculum transaction and student's evaluation
- Student feedback : designing and implementation
- Research paper writing

M.Sc. (Medical Microbiology) Year-II MICROBIOLOGY PRACTICAL I

Course Code: MSM251

L- 0, T-0, P-24, S-0 C-12

Course Contents

Bacteriology

- Microscopy – Handling and general maintenance
- Staining procedures – Preparation of stains and staining methodology
- Growth and survival of micro organisms and estimation of microbial colonies by various procedures
- Cultivation – Media preparation – details of ingredients, pH measurement, preparation of reagents, buffers, glass wares etc and quality control
- Antimicrobial agents – Preparation, susceptibility testing, quality control, MIC, MBC
- Sterilisation and disinfection – Handling of main types of filters, preparation procedures for autoclaving , hot air oven, testing of disinfectants
- Care and maintenance of common laboratory instruments
- Handling, maintenance and inoculation techniques of small laboratory animals.
- Collection of specimens for Microbiological investigations such as Blood, Urine, Throat swab, Rectal swab, Stool, Pus (swabs), OT specimens
- Complete characterization of bacteria of medical importance including morphology, cultural, biochemical, serological, antimicrobial susceptibility pattern and any other biological properties as well as molecular methods (if any)

Immunology

- Blood collection and preservation for serological testing
- Precipitation tests (including immunodiffusion tests)
- Agglutination tests
- ELISA
- Immunofluorescence
- Antigen preparation

M.Sc. (Medical Microbiology) Year-II
FUNDAMENTALS OF COMPUTER (LAB)

Course Code: MSC251

L-0, T-0, P-2, S-0 C-1

Course Contents

Unit – I

Basic computer organization functionality computer codes computer classification Boolean algebra, primary storage, secondary storage devices, input-output devices, computer software, computer languages, operating system, business data processing concepts, data communication and networks and advances.

Unit – II

Planning the computer program, algorithm, flowcharts, and decision tables.

Unit – III

Writing simple programs in 'C', Numeric constants and variables. Arithmetic Expressions, Input & Output in 'C' Programs, conditional statements, implementing loops in programs, arrays, logical expressions, and control statements such as switch, break and continue functions, processing character strings, files in 'C'.

Unit – IV

MS Office (Word, Excel, PowerPoint), Basic Database concept and classification, operations performed on database, using MS-Access. Internet Features.

Unit – V

Computer applications in Microbiology and clinical studies.

Recommended Books

1. Sinha, R.K., *Computer Fundamentals*, BPB Publications.
2. Raja Raman, V, *Computer Programming in 'C'*, PHI Publication.
3. Hunt N & Shelley J., *Computers and Common Sense*, PHI Publication.

* Latest editions of all the suggested books are recommended.

M.Sc. (Medical Microbiology) Year-III
VIROLOGY, MYCOLOGY & PARASITOLOGY

Course Code: MSC251

L- 3, T-2, P-0, S-1 C-5

Course Contents

Virology

- General properties, cultivation, interferon and interference of virus.
- Clinical importance and laboratory diagnosis of infections with the following viruses: Pox, Herpes, Adeno, Picorna, Myxo, Arbo, Rhabdo, Hepatitis, Miscellaneous viruses.
- Bacteriophages,
- Oncogenic viruses,
- Slow viruses and Prion diseases
- Human Immunodeficiency Virus (HIV)
- Immunology of viral infections
- Diagnosis of viral infections (Cell culture, serology and molecular methods of diagnosis).

Mycology

- Morphology, cultivation, epidemiology, transmission, clinical importance and lab diagnosis of
 - Yeasts
 - Yeast-like
 - Moulds
 - Dimorphic fungus
- Superficial, subcutaneous and deep fungal infections,
- Opportunistic fungal infection,
- laboratory contaminating fungus and mycotoxins.
- Immunology of mycotic infections.

Parasitology

- Taxonomy and classification,
- Transmission, clinical features and prophylaxis of medically important
 - Protozoa,
 - Cestodes,
 - Trematodes
 - Nematodes.
- Immunology of parasitic diseases
- Laboratory diagnosis of parasitic infections.

M.Sc. (Medical Microbiology) Year-III
CLINICAL MICROBIOLOGY, MOLECULAR BIOLOGY AND RECENT
ADVANCES IN MICROBIOLOGY

Course Code: MSM302

L- 3, T-2, P-0, S-1 C-5

Course Contents

- Hospital infections
- Quality control in microbiology
- Laboratory control of antimicrobial therapy
- Collection of specimens for bacteriological investigations
- Methods of culture, techniques and organisms encountered in: CSF, blood culture, sputum, pus, urine, stool, UTI, endocarditis, Bone and joint infections
- Bacteriological investigations in:
 - PUO
 - Tuberculosis
 - Leprosy
 - Meningitis
 - Eye infections
- Causative agents and investigations in cases of:
 - Food poisoning, gastroenteritis, diarrhoea
 - Respiratory tract infections
 - Sexually transmitted diseases
 - Dental infections
- Blood transfusion and associated infections
- Immunoprophylaxis against diseases
- Rapid diagnostic methods in microbiology
- Basic knowledge of the following:
 - Bacteriophage typing
 - Recombinant DNA technology
 - Southern, Northern and Western blotting
- DNA amplification techniques, diagnostic PCR, different methods of PCR product detection
- Genotyping of microbes and viruses
- Emerging infectious diseases
- Bioterrorism
- Quality control in Microbiology laboratory.

**M.Sc. (Medical Microbiology) Year-III
TEACHING PRACTICE**

Course Code: MSC351

L-0, T-0, P-6, S-0 C-3

Objectives:

- Acquire competence to plan for instructions and delivery of curriculum
- Obtain feedback both about teaching as well as student learning
- To develop broad understanding of modern principles and procedures used in medical science education
- Development of essential skills for practicing modern medical science teaching

For teaching practice student shall take classes as decided and allocated by the Department. For evaluation purpose, a board of three examiners comprising of one internal and two external examiners will be appointed by the Vice Chancellor from the panel of examiners recommended by the Principal of the College. All the three examiners will assess the student separately and average of these marks shall be awarded as final marks to the student concerned.

**M.Sc. (Medical Microbiology) Year-III
MICROBIOLOGY PRACTICAL II**

Course Code: MSM351

L-0, T-0, P-24, S-0 C-12

Course Contents

Virology

- Serodiagnosis of viral infections
- Polymerase chain reaction(PCR) for viral nucleic acid detection – (Observation)
- Haemagglutination (HA) and Haemagglutination inhibition tests (HAI)
- ELISA
- Egg inoculation techniques

Mycology

- KOH and LPCB preparations
- Staining techniques
- Culture of fungi
- Slide culture
- Basic identification techniques

Parasitology

- Examination of stool for parasites, including concentration techniques
- Examination of blood for parasites and microfilaria
- Examination of bone marrow for LD bodies
- Examination of sputum/ aspirate/ tissue for parasites – trophozoites, larvae etc

Clinical Microbiology

- Surveillance sampling
- O.T. Sterility testing
- Bacteriological examination of water, milk, food and air
- Processing of clinical samples for pathogens

M.Sc. (Medical Microbiology) Year-III THESIS

Course Code: MSM352

L-0, T-0, P-0, S-0 C-12

Guidelines

Each M.Sc. Medical student will carry out research work under the supervision of a faculty member (Guide) with post-M.D./ Ph.D. teaching experience of three years or more in the subject. However, a teacher with M.D./ Ph.D. degree in the subject or related subjects shall be qualified for being taken in as Co-guide.

The Guide will be allotted to each student at the commencement of second year. The student will prepare a Plan of Thesis under the supervision of the Guide, and submit it to the university within two months of commencement of second year. The university will convey approval/disapproval of the Plan within one month.

In case the Plan is disapproved, a fresh Plan must be submitted within one month. After approval of the Plan, the student will begin work on the thesis.

The progress of work will be monitored regularly by the Guide. The thesis not exceeding 100 pages typed on A4 paper on one side only in double spacing is to be submitted to the university through the Guide six months before the date of III year University examination.

It will be evaluated by a panel of examiners (2 external & 1 internal at least) approved by the Vice Chancellor. The approval of the thesis by the panel will be a pre-requisite for the candidate to appear in the written/practical examination of III year. If the thesis is returned for revision, the suggested revision must be done and the revised thesis submitted for evaluation to the examiner(s) who has/have suggested for the revision.

After approval of revised thesis, the candidate can appear in the next 3rd year examination provided the approval is received one month before the examination. If the thesis is disapproved, the entire process from submission of a new Plan to submission of Thesis is to be repeated. On approval of new thesis, the candidate can appear in the next 3rd year examination provided there is a one month gap between the receipt of approval and commencement of examination.

Note: A student is required to submit four hard copies of the thesis alongwith the soft copy in the prescribed format given by the college.

Recommended Textbooks

1. *Ananthanarayan & Paniker's Textbook of Microbiology, 8th edition. Orient Longman, India; 2009.*
2. *Anaissie Elias J. Clinical Mycology, Churchill Livingstone 2003.*
3. *Bailey and Scott's Diagnostic Microbiology. 9th ed. CV Mosby, St. Louis, 2003.*
4. *Brooks, Geo F Jawetz Medical Microbiology 22nd ed McGraw Hill 2001.*
5. *Coller, Leslie Topley and Wilson's Microbiology and microbial infections Vol 1, 2, 3, 4, 5, 6, 7: 9th edition*
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