



**HEMWATI NANDAN BAHUGUNA UTTARAKHAND
MEDICAL EDUCATION UNIVERSITY**



**REGULATIONS & SYLLABUS FOR
B.Sc Medical Microbiology
(W.e.f. Academic Session 2016-17)**

Admission, Selection, Migration & Training

Admission to the B.Sc (Medical Microbiology) & B.Sc optometry Course

Eligibility Criteria

No Candidate shall be allowed to be admitted to the B.Sc (Medical Microbiology) until:-

- i) He/She has completed the age of 17 years on or before first day of July of the year commencing the prescribed academic session of the said course.
- ii) He /She has passed qualifying examination as under
 - (a) The Indian school certificate Examination which is equivalent to 10+2 higher secondary examination after a period of 12 years study, the last two years of study comprising of Physics, Chemistry, Biology and Mathematics or any other elective subjects with English at a level not less than the core course for English as prescribed by the National Council of Educational Research and Training after the introduction of the 10+2+3 years Educational Structure as recommended by the National Committee on Education.

OR
 - (b) The intermediate examination in Science of an Indian University/Board or other recognized examining body with Physics, Chemistry & Biology which shall include a practical test in these subjects and also English as a Compulsory Subject.

OR
 - (c) The pre-professional or medical examination with Physics, Chemistry and Biology, after passing their higher secondary School Examination, or the pre-university or an equivalent examination. The Pre-Professional/Pre-Medical examination shall include a practical test in Physics Chemistry and Biology and also English as compulsory Subject.

OR
 - (d) The first year of the three years degree course of a recognized University with Physics, Chemistry and Biology including a practical test in these subjects provide the examination is a "University Examination" and candidate has passed 10+2 with English at a level not less than a core course.

OR
 - (e) B.Sc examination of an Indian University, provided that he/she has passed the B.Sc examination with not less than two of the following subjects- Physics, Chemistry, Biology (Botany, Zoology) and further that he/she has passed the earlier qualifying examination with the following subjects- Physics, Chemistry, Biology and English (10+2 level).

OR

Any other examination which in scope and standard is found to be equivalent to the intermediate science examination of an Indian University/Board, taking Physics, Chemistry and Biology including a practical test in each of these subjects and English.

Note: 10+2 with vocational training in Nursing/Medical Lab Technology/Medical Microbiology are also eligible and 10+2 with diploma in Medical Microbiology is also eligible for the respective course.

Marks obtained in Mathematics are not to be considered for admission to the B.SC MLT course. After the 10+2 course is introduced the integrated courses should be abolished.

MIGRATION/TRANSFER OF CANDIDATES

- a) Migration/Transfer of candidates from one recognized Institution to another Institution of this university or from another University will not generally be considered.
- b) However, under extraordinary circumstances, the vice chancellor shall have the power to place any Migration/transfer he deems fit in the Governing Council and get its approval for grant of permission for Migration/transfer to candidates undergoing course of study in affiliated Institution of this University.

TRAINING PERIOD AND TIME DISTRIBUTION

- 1) Every student shall undergo a period of certified study extending over. Three and a half academic years OR Six semesters, plus 6 months internship, from the date of commencement of his study for the subject comprising the B.Sc Medical Microbiology curriculum to the date of completion of examination and followed by compulsory rotating internship. Each Academic year shall consist of 180 days each semester of 90 days teaching of 8 hours each day college working time, including one hour of lunch.

Attendance: 75% attendance (theory and Practicals individually) is mandatory appear in the Sessional examinations and the university examinations.

Medium of Instructions: English, throughout the course studies

University Examination Period

Theory Examination- The Theory paper will be of 3 hours duration, containing 8 questions total of 5 questions should be attempted

Practical Examination- The practical examination will be of 3 hours duration. The practical Examination marks will be disturbed as follows: Practical exercise-30, spotting -10, practical note book-10 and Viva voce-20. There will be one external examiner for the practical examination and the concerned teacher will act as internal examiner.

Examination Rules:

- 1. The minimum passing marks in each theory paper (University exam) should be 40% (University +Internal Exam)
- 2. The minimum passing marks in individual each theory paper Internal+University exam should be 40% (University +Internal Exam)
- 3. The minimum passing marks in university practical examination should be 50% & should be 50% in internal also.
- 4. A candidate in order to pass must secure 50% marks in the aggregate in a particular academic year.
- 5. **Grace Marks-** 10 marks by the university in one or two Subject & also Student will get 10 marks grace if fail in one subject but if student is fail in two subjects with less than 10 marks than student will get grace in two subjects i.e. Less than 10 as 1, 2, 3,4,5,6,7,8,9 marks.
- 6. The division will be determined on the basis of the aggregate of the marks of all the papers.
 - i) Passed with honors will be rewarded on 75% and above only in first attempt.
 - ii) First division will be marked on 60% and above.
 - iii) Second division will be marked on 50% and above but less than 60%.

Compartments/Supplementary/Back Paper

- (i) A student who obtains 40% of marks individually but has failed in two Papers shall be permitted to appear in those papers only at the two consecutive examinations and if he/she passes at either of those examinations he/She will be

deemed to have passed the examination and will be promoted to higher class (aggregate marks should be 50%).

- (ii) A student (s) appearing in back paper/supplementary shall be eligible to join the next higher class provisionally however any student who fails to pass 1st year would not be admitted in 3rd year course.

2) The period of three & half year is divided into phased as follows:-

- a) Phase-I- First year b.sc Medical Microbiology (One year duration-two semesters)**
- (i) Human Anatomy and Physiology
 - (ii) Basic Pathology
 - (iii) Clinical Biochemistry
 - (iv) Preventive Medicine & Health care
 - (v) Fundamentals of Medical Microbiology
 - (vi) Instrumentation Techniques in Medical Microbiology
- b) Phase-II- Second year B.Sc Medical Microbiology (One year duration two Semester)**
- (i) Bacterial Pathogens & Associated Diseases
 - (ii) Systematic Bacteriology
 - (iii) Misc. Microbes, Fungal Pathogens & Assoc. Diseases
 - (iv) Lab Diagnosis of Microbial Diseases
 - (v) Human Parasitology
 - (vi) Applied Medical Microbiology
- c) Phase-III- Third year B.Sc Medical Microbiology (One year duration two Semesters)**
- (i) Pathogenic Viruses and Associated Diseases
 - (ii) Applied Immunology & Serodiagnosis
 - (iii) Advanced Diagnostic Technology
 - (iv) Automation & Computerization in Medical Micro
 - (v) Molecular Biology & Clinical Lab Technology
- d) Phase-IV- Fourth year B.Sc Medical Microbiology (six months duration) Internship.**

DISTRIBUTION OF MARKS TO VARIOUS DISCIPLINES

Ist Year

Paper Theory/Papers No.	Paper Code	Duration	Theory (Max Marks)		Total	Practical (Max Marks)		Total
			Sessional	Annual		Sessional	Annual	
I. Human Anatomy & Physiology		3hrs	30	70	100	30	70	100
II. Basic Pathology		3hrs	30	70	100			
III. Clinical Biochemistry		3hrs	30	70	100	30	70	100
IV. Preventive Medicine & Health Care		3hrs	30	70	100			
V. Fundamentals of Medical Microbiology		3hrs	30	70	100	30	70	100
VI. Instrumentation Technique in Medical Microbiology		3hrs	30	70	100			
TOTAL MARKS			180	420	600	90	210	300

IInd Year

Paper Theory/Papers No.	Paper Code	Duration	Theory (Max Marks)		Total	Practical (Max Marks)		Total
			Sessional	Annual		Sessional	Annual	
I. Bacterial Pathogens & Associated Diseases		3hrs	30	70	100	30	70	100
II. Systematic Bacteriology		3hrs	30	70	100			
III. Misc. Microbes, Fungal Pathogens & Asso. Diseases		3hrs	30	70	100	30	70	100
IV. Lab Diagnosis of Microbial Diseases		3hrs	30	70	100			
V. Human Parasitology		3hrs	30	70	100	30	70	100
VI. Applied Medical Microbiology		3hrs	30	70	100			
TOTAL MARKS			180	420	600	90	210	300

IIIrd Year

Paper Theory/Papers No.	Paper Code	Duration	Theory (Max Marks)		Total	Practical (Max Marks)		Total
			Sessional	Annual		Sessional	Annual	
I. Pathogenic Viruses & Associated Diseases		3hrs	30	70	100	30	70	100
II. Applied Immunology & Serodiagnosis		3hrs	30	70	100			
III. Advanced Diagnostic Technology		3hrs	30	70	100	30	70	100
IV. Automation Computerization in Medical Micro		3hrs	30	70	100			
V. Molecular Biology & Clinical Lab Technology		3hrs	30	70	100	30	70	100
TOTAL MARKS			150	350	500	90	210	300

Note: Result of all University examination shall be declared before the start of teaching for next Semester.

**BACHELOR OF MEDICAL RADIO IMAGING TECHNOLOGY
(B.M.R.I.T) 3RD Year
PAPER 2ND**

Code No: MRT-302
Max. Marks- 70

**RADIOTHERAPY PLANNING AND QUALITY CONTROL &
RADIATION THERAPY**

Definition of treatment planning. Planning procedure in general with special emphasis on tumour localization and target volume measurement by conventional radiographic method and simulator imaging. Role of special contrast medium base radiotherapy. CT/MR/Ultrasound/radionuclide imaging methods. Physical and clinical requirements of field secretion of treatment in Teletherapy Role of portal films in treatment planning. Chose of central axis percentage depth dose data and isodose curve from a spectrum of radiotherapy beams used for treatment. Requirement and practice of organ shielding single, multiple fields, pendulum and rotational field therapy, planning procedures. Computerized treatment planning system choice of dose, time and fraction. Safety of critical organs in planning methods. Role of treatment shell immobilization devices and later in patients set up and positioning.

Acceptance test on therapy simulator teleisope megavoltage-X-ray and electron beam machines. Contribution of technologist in radiation calibration quality control assurances execution of radiation treatment.

PRACTICAL BASED ON THEORY

Note: Course Structure (Teaching duration) will be of 2 hrs. /week for theory & 3 hrs. /week for practicals for each paper.

1. The minimum pass marks will be 40% in individual subjects in theory & practical and 50% in aggregate.
2. The theory and practical papers will be of equal weightage with 30% in sessional & 70% in final University Examination.
3. The division will be determined on the basis of the aggregate of the marks of all the course/subjects prescribed for the degree as under:
 - (i) Passed with honours will be rewarded 75% and above only in first attempt
 - (ii) First division will be marked on 60% and above.
 - (iii) Second Division will be marked on 50% and above but less than 60%

Compartments/Supplementary/Back Paper

- (i) A student who obtain 40% of the marks individually but has failed in two papers shall be permitted to appear in those papers only at the two consecutive examinations and if he/she passes at either of those examination he/she will be deemed to have passed the examination and will be promoted to higher class (aggregate marks should be 50%).
- (ii) A student (s) appearing in back paper/supplementary shall be eligible to join the next higher class provisionally however any student who fails to pass Ist year would not be admitted in 3rd year course.

Theory Examination : All the paper in each year carrying 100 marks out of which 30 marks will be internal assessment and 70 marks for external assessment based on the question paper sent by the university the paper will be 3 hrs. Each Paper will have 8 questions out of which the candidate will have to attempt 5 questions.

The practical examination will be held with the final Examination. The Practical and Viva Voice in each subject will carry 30% marks as internal & 70% marks as external assessment (according to examination scheme) prescribed for the year.

PHASE DISTRIBUTION AND TIMINGS OF EXAMINATIONS:

- Ist Annual Examination (or at the end of second semester)
- IInd Annual Examination (or at the end of forth Semester)
- IIIrd Annual Examination (or at the end of Sixth semester)
- Six Months Internship after third Annual Examination.

EXAMINATION REGULATIONS:

Essential for qualifying to appear in professional examinations. The performance in essential components of training is to be assessed based on.

ATTENDANCE: 75% of attendance in a subject for appearing in the examination is compulsory provide he/she has 80% attendance in non lecture teaching i.e. seminars, group discussions tutorial's, demonstrations, Practical's, Hospital (Tertiary, Secondary, Primary) postings and bed side clinics, etc.

INTERNAL ASSESSMENT:

- (i) It shall be based on day today assessment (see note). Evaluation of student assignment, preparation for seminar, clinical case presentation etc.
- (ii) Sessional examinations shall be conducted throughout the course. The question of number of examinations is left to the institution.
- (iii) Day to day records should be given importance during internal assessment.

- (iv) Weightage for the internal assessment shall be 30% of the total marks in each subject.
- (v) Students must secure at least 50% marks of the total marks fixed for internal assessment in particular subject in order to be eligible to appear in final university examination of that subject.

Note: - Internal assessment shall relate to different ways in which student's participation in learning process during semesters is evaluated. Some examples are as follows:

- (i) Preparation of subject for student's seminar.
- (ii) Preparation of a clinical case for discussion.
- (iii) Clinical Case study problem solving exercise.
- (iv) Participation in project for health care in the community (planning stage to evaluation).
- (v) Proficiency in carrying out a practical or a skill in small research project.
- (vi) Multiple choice question (MCQ) tests after completion of a system/teaching.

Each item tested shall be objectively assessed and recorded. Some of the items can be assigned as Home work/Vocational work.

UNIVERSITY EXAMINATIONS:

Theory papers will be prepared by the examiners as prescribed Nature of question will be short answer type/objective type and marks for each part indicated separately.

Practical/clinical will be conducted in the laboratories or hospital wards objective will be to assess proficiency in skills. Conducts of experiment, interpretation of data and logical conclusion clinical cases should preferably include common diseases not esoteric syndromes or rare disorders. Emphasis should be on candidate's capability in eliciting physical signs and their interpretation.

Viva/Oral includes evaluation of Management approach and handling of emergencies Candidate's skill in interpretation of common investigation data also is to be evaluated.

The examination are to be designed with a view to ascertain whether the candidate has acquired necessary for knowledge, minimum skills along with clear concepts of the fundamentals which are necessary for him to carry out his professional day to day work competently. Evaluation will be carried out on a n objective basis.

Question paper should preferable be of short structure/objective type.

Clinical cases/practical shall take into account common diseases which the student is likely to come in contact in practice.

During evaluation (both external and internal) it shall be ascertained if the candidate has acquired the skills.

There shall be one main examination in a year and a supplementary to be held not later than 6 months after the publication of its result.

Note: Result of all University examination shall be declared before the start of teaching for next semesters.

DURATION OF EXAMINATION & QUESTIONS

- (i) Each written will be of three hours duration having eight questions, only five questions to be attempted. No choice will be given in any questions.
- (ii) A clinical/practical examination in any subject for students shall not be for more than a day. In no case more than 20 students are examined for clinical/practical & oral in a day.

General

If candidate obtains an aggregate of 75 percent in all the subject of any professional examinations will be declared to have passed the examination with honors, provided he/she passes in all subjects in the first attempt.