



SHRI
DHARMASTHALA
MANJUNATHESHWARA
UNIVERSITY

Ordinance Governing
Advanced Certificate in
Medical Microbiology Laboratory Technology
Curriculum 2020-21

SHRI DHARMASTHALA MANJUNATHESHWARA UNIVERSITY

(A State Private University established under the Shri Dharmasthala Manjunatheshwara University
Act No 19 of 2018 of Government of Karnataka and Notification No. ED 261 URC 2018 dated 19th December 2018)

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|| Om Shri Manjunathaya Namaha ||




Shree Kshethra Dharmasthala


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VISION

Shri Dharmasthala Manjunatheshwara University will set the highest standards of teaching and learning by awakening the intelligence of the students and nurturing the creativity hidden in them by creating an environment where the ancient wisdom blends with modern science, to transform them into whole human beings to face the challenges.

MISSION

- ▶ To ensure that the journey of education is inspiring, pleasant and enjoyable.
- ▶ Attract the best of teachers and students.
- ▶ Achieve high principles of trust, love and spirituality in the students.
- ▶ Create a collaborative, diverse and exclusive community.
- ▶ Transform the student of today to be a leader of tomorrow and a better human being.
- ▶ Produce passionate teachers.
- ▶ Evolve innovative teaching techniques.
- ▶ Create a peaceful environment.
- ▶ Prepare the student to face the social challenges.
- ▶ Create a University of which the Nation is proud of.
- ▶ Be an effective partner in Nation Building.
- ▶ Create an Eco-friendly University.
- ▶ Create a University based on the principles of beauty, love and justice.

||Om Shanti! Om Shanti! Om Shanti||



SHRI
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THE LOGO

Poojya Dr D. Veerendra Heggade, Hon'ble Chancellor of the University, while searching for an appropriate Logo for the University, saw a photograph picked from Temple Architecture showing Wings of a Bird, sculpted in Indian style and wanted it to be incorporated in the logo for the University, as the Wings symbolize 'Spreading of Knowledge beyond Boundaries'. Further it was felt that the Central theme of the logo should be 'Rudra' (The Linga) with wings on each side. In this way, the logo of the University was conceptualized.

Hence:

1. The central part represents **Rudra** who Demolishes Darkness.
2. The Three **horizontal lines on The Linga** stand for Samyak Darshan (Right Belief), Samyak Gyan (Right Knowledge) and Samyak Charitra (Right Conduct).
3. The **Wings** symbolize spreading of Knowledge across the boundaries.
4. Base line "**Truth Liberates**" highlights the Purpose of Education: to liberate oneself unconditionally. It shows that it is not discipline, nor knowledge nor the efforts to freedom that liberate but Truth is what liberates you from all your conditioning and ignorance.

The overall significance of Shri Dharmasthala Manjunatheshwara University's Logo is:

Darkness of ignorance is destroyed by the flow of knowledge to bring Liberty to everyone, by realizing the truth. And, it should spread globally without the boundaries as hindrance.



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Ref: SDMU/Notif-139/ 305 /2020

Date: 08/12/2020

NOTIFICATION

Revised Notification on Starting of New Programs from the Academic Year 2019-20

Refer earlier Notification No. SDMU/Notif-14/2019 Dated 24/04/2019. The following amendment may be made in the nomenclature of the Programme under Fellowship Programs in Medical Faculty Sl. No.3. The programme will be henceforth named as Fellowship in Minimally Invasive Surgery (Gynaecology).

Sl. No.	Program	Intake
FELLOWSHIP PROGRAMS IN MEDICAL FACULTY		
1	Fellowship in Neonatal Intensive Care	02
2	Fellowship in Nephrology / Renal Dialysis	02
3	Fellowship in Minimally Invasive Surgery (Gynaecology)	02
4	Fellowship in Reproductive Medicine	02
5	Fellowship in Consultation Liaison Psychiatry	02
6	Fellowship in Rhinology	02
CERTIFICATE COURSES IN MEDICAL FACULTY		
1	Certificate Course in Blood Bank Technician	04
2	Certificate Course in Histo-Technician	04
3	Certificate Course in Renal Dialysis	04
4	Advanced Certificate Course in Medical Microbiology Laboratory Technology	02
GOVERNMENT SPONSORED PROGRAM (BISEP)		
1	PG Diploma in Cellular & Molecular Diagnostics	20
FELLOWSHIP PROGRAMS IN DENTAL FACULTY		
1	Fellowship in Cleft Lip & Palate (Oral Surgery)	02
2	Fellowship in Forensic Odontology	08
3	Fellowship in Oral Implantology	02
Ph.D COURSES UNDER VARIOUS FACULTIES		
1	Ph.D. Course in Medical Faculty	12
2	Ph.D. Course in Dental Faculty	18
3	Ph.D. Course in Physiotherapy	03

The Ordinance shall be effective for the students joining the courses / programs during 2019-20 onwards.

Lt Col U. S. Dinesh (Retd.) MD, MIAC

REGISTRAR,

Shri Dharmasthala Manjunatheshwara

To,
Heads of Constituent Institutes, Shri Dharmasthala Manjunatheshwara University

Copy for information to:

- (1) Hon'ble Vice Chancellor, Shri Dharmasthala Manjunatheshwara University
- (2) Controller of Examinations, Shri Dharmasthala Manjunatheshwara University



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1. INTRODUCTION

This course introduces basic practices and principles of diagnostic microbiology, focusing on pathogens encountered in the various human diseases. Bacteriology and serology are the principle areas that handle the samples coming to Microbiology laboratory for testing. The modern microbiology includes several automated machines for rapid and better quality diagnosis. The course includes application of common algorithms for identification of clinically significant pathogens including aerobic gram-positive cocci, gram-negative bacilli, gram-negative cocci, gram-positive bacilli, and anaerobes. The course introduces principles and procedures of common immunological techniques. Molecular diagnostic techniques especially PCR on both conventional and real time platform are also included for the students to be ready for hi-tech diagnostic facilities in the clinical laboratory.

2. TITLE OF THE COURSE

Advanced Certificate in Medical Microbiology Laboratory Technology

3. GOALS

The purpose of ACMMLT programme is to educate and train the candidates in performing investigations in Medical Microbiology laboratory related to diagnosis, treatment and prevention of infectious and related conditions.

The programme will create opportunity and facility for aspiring candidates to acquire technical acumen in Medical Microbiology laboratory methods. Infectious diseases are gaining a lot of attention and domain of Medical Microbiology has expanded. Automation in the form of newer equipment and machines is coming in Medical Microbiology in a big way. The candidates will be able to handle the newer technology and gain experience to work independently in suitable setups e.g. hospitals,

educational institutes, research institutes and industry. There is a definite need of an advanced training programme in Medical Microbiology Laboratory Technology which endows the candidates with essential skills and will help them to consolidate the basics of traditional and newer laboratory techniques in Medical Microbiology.

Quality control, accreditation to various certifying agencies, preparing antibiotic sensitivity profiles, waste disposal and hospital infection control are taking a front seat in the day to day functioning of healthcare facilities. The course will prepare the candidates for their role as a microbiology technologist in the day to day functioning of the hospitals.

4. OBJECTIVES

- Display honesty, reliability and integrity while performing laboratory procedures.
- Behave professionally and demonstrate medical and moral ethics.
- Adhere to established safety procedures.
- Follow written and verbal instructions, as well as all laboratory policies.
- Organize tasks and work area, and maintain a clean work area.
- Accept constructive feedback for continual improvement.
- Maintain confidentiality of patient information and test results.
- Utilize laboratory equipment and supplies for the purposes intended.

5. INTAKE OF STUDENTS

- Two Candidate per year

6. ELIGIBILITY FOR ADMISSION

The students who have passed B.Sc. MLT or DMLT Course from Institutions affiliated to RGUHS or to other Universities considered equivalent by RGUHS are eligible for this course.

Candidates passing B.Sc. MLT or DMLT through Correspondence course shall not be eligible for this course.

7. SELECTION/ ADMISSION PROCEDURE

Selection shall be based on merit in the qualifying examination and other criteria decided by the Shri Dharmasthala Manjunatheshwara University.

8. DURATION OF THE COURSE

The duration of the Advanced Certificate in Medical Microbiology Laboratory Technology shall be for a period of one year from the commencement of the academic term on full time basis.

9. MONITORING PROGRESS OF STUDIES

Work Diary/Log Book: Every candidate shall maintain a work diary and record his/her participation in the training programmes - field work, clinical work, seminars and case records etc. Special mention may be made of the presentations by the candidate as well as details of field and clinical work conducted by the candidate. The work diary shall be scrutinized and certified by the concerned faculty members.

Periodic Tests: The SDM College of Medical Sciences & Hospital, Dharwad shall conduct two tests for Internal Assessment (IA). The second IA shall be conducted one month prior to the annual university examination so that it also serves the purpose of preparatory examination. These tests will be considered for internal assessment. Any other tests as decided by the department from time to time may be included for formative assessment of the candidates.

Records: Records and marks obtained in tests will be maintained by SDM College of Medical Sciences & Hospital, Dharwad and submitted to Shri Dharmasthala Manjunatheshwara University periodically.

10. TEACHING HOURS, POSTINGS & ATTENDANCE

A. Teaching hours

i) Theory: 70 hours

ii) Practical: 70 hours

B. Attendance

Every candidate should have attended at least 80% of the total number of classes conducted in an academic year from the date of commencement of the term to the last working day as notified by university in each of the subjects prescribed for that year separately in theory and practical.

A candidate lacking in prescribed percentage of attendance in any one or more subjects either in Theory or Practical will not be eligible to appear for the University Examination.

11. SCHEME OF EXAMINATION

A. Internal Assessment

- i) Internal Assessment marks shall be awarded to the candidates in each paper as detailed in the scheme of examination. The marks secured by the candidates in each subject shall be forwarded to the University 15 days before the University Examinations.

- ii) The marks of the internal assessment shall be published on the notice board of SDM College of Medical Sciences & Hospital, Dharwad.
- iii) If a candidate is absent for the test due to genuine and satisfactory reasons, such a candidate may be given a supplementary test within a fortnight.
- iv) There shall be a minimum of two internal assessment examinations conducted by the college at regular intervals both in theory & practical. The average of both the examination marks shall be taken as the internal assessment marks. The internal assessment marks will be calculated separately for theory and practical.

B. University examination:

- i) The University shall conduct examinations at the end of the academic year.
- ii) Written examination: Written examination shall consist of two theory papers of three hours duration. Each paper shall carry 90 marks.
- iii) Practical examination: There shall be one practical examination. The duration of practical examination is of three hours which carries 90 marks.
- iv) Viva- voce: This shall aim at assessing depth of knowledge, logical reasoning, confidence and oral communication skills. Total marks for viva-voce shall be 50. One internal and one external examiner shall conduct the viva-voce.

C. Eligibility for the examination

- i) A candidate shall have minimum 50% of marks in IA to appear for the final examination.

- ii) A candidate must produce the class record book certified by the Head of the Department at the time of practical examination.

D. Pass criteria

- i) The candidate must obtain minimum 50% marks in theory and minimum 50% marks in practical examination for passing the examination.
- ii) Candidates securing less than 50% of marks either in theory or in practical or both shall be declared as fail.
- iii) The IA marks obtained by the candidate obtained in theory and practical will be added to the theory and practical marks of the final examination respectively.
- iv) The marks obtained by the candidate in the viva-voce will be added to the theory marks.
- v) The marks allotted for the practical record book will be added to the practical marks.
- vi) A candidate must pass in theory and practical separately in all the subjects.

E. Pattern of Examinations:

- i) There will be three examinations during the course. Out of the three examinations two examinations will be internal examinations (IA) and the third examination will be the final examination.
- ii) The internal examination will be conducted by Department of Microbiology and the final examination will be conducted by Shri Dharmasthala Manjunatheshwara University.
- iii) The first IA will be conducted at the end of first 6 months of the course. The second IA will be conducted one month prior to the final examination and the final examination will be conducted at the end of the course tenure i.e. one year.

iv) Pattern of the final examination:

- a. Theory paper I: 90 marks
- b. Theory paper II: 90 marks
- c. Practical exam: 90 marks
- d. Viva-voce: 50 marks
- e. Internal assessment marks
 - a. Theory – 20
 - b. Practical – 10

F. Final marks

	Theory paper I	Theory paper II	Theory Internal Assessment	Viva-Voce	Theory Total	Practical	Practical Internal Assessment	Practical Total	Remark
Maximum Marks	90 (A)	90 (B)	20 (C)	50 (D)	250 (A+B+C+D)	90 (E)	10 (F)	100 (E+F)	
Marks Obtained									

12. **CERTIFICATION:** The certificate of passing will be issued to the candidate after declaration of the result as pass. The date and time of issue of the certificate will be decided by Shri Dharmasthala Manjunatheshwara University.

13. **STIPEND:** Rs. 5,000/- per month subject to modifications by the university from time to time.

14. **COURSE CURRICULUM:** Courses will be conducted in five modules

Modules for the course

Modules	Duration	Theory classes	Practical classes	Service Laboratory rotation
Bacteriology – basic techniques, Antibiotic sensitivity and MIC testing and automation e.g. automated blood culture system, Vitek-2 operations etc.	2 months	As per the time table	As per the time table	As per the time table
Serology – basic techniques, ANA and automation like MINI VIDAS, demonstration of ELISA etc.	2 months	As per the time table	As per the time table	As per the time table
Automation techniques in laboratory (BacT-Alert, Vitek-2, ANA, MINI VIDAS etc.)	2 months	As per the time table	As per the time table	As per the time table
Hospital Infection Control Techniques	1 month	As per the time table	As per the time table	As per the time table
Molecular Biology (Basic PCR, RTPCR)	2 months	As per the time table	As per the time table	As per the time table

Syllabus for Advanced Certificate in Medical Microbiology Laboratory Technology

Module 1: Bacteriology

Sr No	Topic
1	Diffusion methods
2	Dilution methods
3	Various classes of antibiotics
4	Antibiotic disc preparation, storage,
5	Preparation of media
6	Antibiotic testing of gram negative organisms and interpretation of results
7	Antibiotic testing of gram positive organisms and interpretation of results
8	Broth dilution methods
9	Agar dilution methods
10	E-test
11	Quality control
12	Maintenance of ATCC strains
13	Doubt clearance

Module 2: Serology

Sr No	Topic
1	Antigen
2	Antibody
3	Antigen antibody reactions: Agglutination, Precipitation, Complement fixation, ELISA, Radio immunoassay, Immunochromatography, Immunofluorescence, Nephelometry
4	Immune response
5	Complement system
6	Methods of dilution
7	Quantitation

Module 3: Automation in Microbiology

Sr No	Topic
1	Uses of automation in Microbiology
2	Instruments overview (Vitek 2, ANA, BacT/Alert 3D)
3	Principle and working of Vitek 2
4	Principle and working of BacT/Alert 3D
5	Demonstration of loading, Barcoding and entry of BacT/Alert bottles
6	Use of Vitek 2 for different bacterial identification
7	Demonstration of GP and GN cards(Preparation, entry and running of card) ID and AST
8	Demonstration of YST cards (Preparation, entry and running of card) ID and AST
9	Different types of identification and AST cards for Vitek 2
10	Interpretation of Vitek 2 results
11	Principle and working of fluorescent microscopy
12	Application of fluorescent microscopy
13	ANA: Principle, procedure and Interpretation
14	Introduction: Quality control Calibration of instruments/pipettes
15	Maintenance of Instruments
16	Processing of samples
17	Results /Reporting
18	Doubt clearance
19	Revision

Module 4: Hospital Infection Control

Sr No	Topic
1	Hand hygiene
2	Biomedical waste management
3	PPE
4	Environmental surveillance for OT and other critical areas
5	Microbiological analysis of water: Analysis techniques
6	Spill management
7	Needle stick injuries
8	Fire and chemical safety

Module 5: Molecular Techniques

Sr. No	Topic
1	Introduction to Molecular biology and its application in diagnostic microbiology
2	Basic principle of PCR and its applications
3	Types of PCR
4	DNA extraction-Principle and types of extraction
5	Amplification
6	Gel electrophoresis
7	Real time PCR
8	Trouble shooting in PCR laboratory
9	Biomedical waste management in PCR laboratory
10	Primer designing
11	Quality control in PCR
12	Revision
13	Rotation

15. TRAINING SKILLS

- A. At the end of the course, the student should have acquired knowledge and skill in the following competencies:
- i. Aseptic practices in laboratory and safety precautions. Selection of Personal Protective Equipment according to task and donning (gloves, mask, eye protection, gown etc.).
 - ii. Quality control of media, reagents etc.
 - iii. Operation of autoclave, hot air oven, filters like Seitz and membrane filters etc. Quality control of sterilization. Maintenance of sterilization record.
 - iv. Sterility control tests
 - v. Handling and care of microscopes.
 - vi. Washing and sterilization of glassware (including plugging and packing).
 - vii. Care, maintenance and use of common laboratory equipment's like autoclave, hot air oven, water bath, centrifuge, refrigerators, incubators etc.
 - viii. Identification of bacteria of medical importance up to species level (except anaerobes which could be up to generic level) by VITEK 2
 - ix. Automated blood culture techniques (BacT/Alert 3D)
 - x. Techniques of anaerobiosis.
 - xi. Preparation of antibiotic discs; performance of antimicrobial susceptibility testing e.g. Kirby-Bauer, Stokes method, Estimation of Minimal Inhibitory/Bactericidal concentrations by tube/plate dilution methods.
 - xii. Automated AST test for Gram positive and Gram negative bacteria
 - xiii. Automated fungal identification using YST card
 - xiv. Tests for β -lactamase production.
 - xv. Screening of gram negative isolates for ESBL and MBL
 - xvi. Screening of Staphylococci for Methicillin Resistance.
 - xvii. Screening of Enterococci for vancomycin resistance.

- xviii. Extraction of nucleic acids for PCR test.
- xix. Nucleic acid amplification techniques and gel electrophoresis.
- xx. Polyacrylamide gel electrophoresis.
- xxi. Understand basic principle of Immunofluorescence (ANA)
- xxii. Testing of disinfectants.
- xxiii. Disposal of infectious waste.
- xxiv. Bacteriological tests for water, air and milk.
- xxv. Maintenance and preservation of bacterial cultures.
- xxvi. Environmental surveillance for operation theatres and other critical care areas.
- xxvii. Biomedical waste management, Hospital infection control and PPE

16. SCHEME OF PRACTICAL LEARNING

Each student will undergo rotation in following disciplines, under the guidance of faculty

- A. Diagnostic bacteriology
- B. Serology & Immunology
- C. Diagnostic Mycology
- D. Automated blood culture and identification system
- E. Molecular biology

17. METHODS OF LEARNING

- A. Theory
- B. Practical
- C. Laboratory Posting

18. LEARNING RESOURCE MATERIAL

- A. Mackie & McCartney's Practical medical Microbiology- 14th edition
- B. Koneman's colour atlas and Textbook of diagnostic microbiology- 6th edition
- C. Bailey and Scott's diagnostic microbiology-12th edition
- D. Ananthanarayan and Paniker's Text Book of Microbiology
- E. Essentials of Medical Microbiology – Apurba S. Sastry, Sandhya Bhat
- F. Parasitology, Protozoology and Helminthology – KD Chatterjee
- G. BacT/Alert and Vitek 2 manual
- H. De Vise H Larone – Medically Important Fungi – A guide to identification.
- I. Molecular biology by Sambrook
- J. PCR manual, Department of Microbiology, SDM College of Medical Sciences & Hospital, Dharwad



SDM College of Medical Sciences & Hospital



SDM College of Dental Sciences & Hospital



SDM College of Physiotherapy &
SDM Institute of Nursing Sciences



Shri Dharmasthala Manjunatheshwara University



SDM Research Institute for Biomedical Sciences



Panoramic View of Campus