



Program Specifications for Master Degree In Medical Microbiology and Immunology

Program type: Single

Department offering the program: Department of Medical Microbiology and Immunology

Program code: MI 806

Total credit points: 172

Academic year: 2016/2017

Program Coordinator: Prof. Tarek El-Etreby - Prof. Abdel Fattah Mohamed Attia - Ass. Prof. Marwa Salah Mostafa

External evaluators: Prof. Amal Matta Micobiology & Immunology Department, Banha University

I. Aim of Program

1. Prepare M.Sc. graduates for research, technical and supervisory positions in scientific laboratories in academic, government and the healthcare field.
2. Provide graduates with fundamentals of bacteriology, virology, mycology and immunology, including pathogenicity processes at the cellular and molecular level.
3. Enable graduates to supervise and practice prevention and control of infection in the healthcare settings.
4. Provide a solid foundation for those who intend to go on to study for an MD.

II. Intended learning outcomes of program (ILOs)

A. **Knowledge and Understanding:** By the end of the program the candidate should be able to:

- 1) Achieve sufficient understanding of medical bacteriology, virology, mycology and immunology to offer basic advice on relevant investigations, interpretation of results and infection control procedures
- 2) Achieve sufficient understanding of basic genetics, which includes the chromosomal structure, gene expression and regulation, as well as the principles and application of molecular biology techniques in research and medicine
- 3) Express a basic understanding of quality assurance in the diagnostic laboratory and the range of diagnostic tests available and the circumstances in which they are used
- 4) Understand the evidence base behind standard operating procedures (SOPs)/ examination procedures (EPs) and the importance of audit and quality control to establish validity
- 5) Outline the principles of diagnosis and management of clinical syndromes such as respiratory tract infections..etc

- 6) Describe the important mechanisms of microbial pathogenesis and outcomes of infections with emphasis on molecular immunology and immunity to infections
- 7) Achieve sufficient understanding of the important microbial infections with an emphasis on the common infections in practice, including endemic infections and infections associated with severely immunocompromised patients
- 8) Explain the modes of transmission of pathogenic microorganisms (chain of infection) and how the pathogen is maintained in nature
- 9) Describe how the pathogen could be eliminated; in the environment, from medical equipment and devices and in order to provide safe healthcare
- 10) Express the ability to utilize evidence-based guidelines for prevention and control of infection/disease
- 11) Clarify treatment of infection caused by the pathogen
- 12) List the key considerations and principles in the planning and design of a study on the basis of statistical methods
- 13) Achieve advanced understanding of qualitative and quantitative research methods and how to conduct original research, including relevant legal and ethical issues

B. Intellectual Skills: By the end of the program the candidate should be able to:

- 1) Analyze clinical and laboratory problems effectively, and correctly interpret and explain results simply and effectively to clinicians and patients
- 2) Demonstrate basic criteria used in the taxonomy of bacteria, viruses and fungi
- 3) Plan an appropriate investigation scheme for individuals at risk of infection
- 4) Demonstrate important mechanisms of microbial pathogenesis, basic concepts of molecular immunology, immunity to infection and outcomes of infections
- 5) Utilize guidelines for prevention and control of infection/disease
- 6) Compare and contrast the common symptoms of infectious diseases
- 7) Produce accurate letters/reports with clear conclusions
- 8) Analyze the applications of DNA preparations, such as DNA extraction, cloning, transformation and PCR
- 9) Plan an independent research proposal to a high professional and ethical standard
- 10) Plan, undertake and report an independent research project
- 11) Write well-structured and clear essays

C. Professional and Practical Skills: By the end of the program the candidate should be able to:

- 1) Perform diagnostic laboratory tests in medical bacteriology, virology, mycology and immunology to offer basic advice on relevant investigations, interpretation of results and infection control procedures
- 2) Plan and execute laboratory experiments with an awareness of good laboratory practice assessment
- 3) Prepare standard operating procedures
- 4) Prepare laboratory reports

- 5) Analyze and interpret laboratory data relevant to the cases of medical microbiology and immunology
- 6) Perform the isolation and characterization of specific microbes in clinical specimens
- 7) Identify the pathogen by its specific growth characteristics if any, distinguishing biochemical tests, its morphological and/or staining characteristics, immunological or nucleic acid-based tests
- 8) Perform basic laboratory techniques in extraction and analysis of genomic DNA including protein and PCR technology
- 9) Demonstrate bioinformatics software applications
- 10) Identify the manual diagnostic procedures and the application of laboratory automation for diagnosis, quality control program and laboratory administration
- 11) Adhere to relevant precautions and safety procedures in a medical microbiology lab
- 12) Use computational tools and packages
- 13) Develop an understanding of the biological characteristics of pathogenic microorganisms, the course of their infections, the functions of the immune system and the actions of antibiotics against these pathogens
- 14) Produce a research proposal to a professional standard, and submit an application to the ethics committee
- 15) Apply knowledge of sampling variation to construct 95% confidence intervals and test hypotheses about population means and proportions
- 16) Choose and perform the appropriate statistical technique for the analysis of means and proportions giving the research question and distribution of the data
- 17) Interpret the results of simple statistical analysis and communicate them in a clear, concise and appropriate manner

D. General and Transferable Skills: By the end of the program the candidate should be able to:

- 1) Communicate effectively through oral presentations, computer processing and presentations, and written reports
- 2) Integrate and evaluate information from a variety of sources
- 3) Transfer techniques and solutions from one discipline to another
- 4) Manage resources and time
- 5) Learn independently and effectively with critical inquiry for the purpose of continuing professional development.
- 6) Understand different scientific methodologies and have critical reading abilities
- 7) Write scientific article according to the basics of scientific research.

III. Academic standards

1. Academic reference standers: The academic standers of medical microbiology and immunology program is adopted and accredited by the departmental council

2.External References for Standards:

- a- Department of Microbiology and Immunology, New York Medical College, Valhalla, NY 10595, Telephone: 914 594-4175, Fax: 914 594-4176
- b- London School of Hygiene & Tropical Medicine, University of London, <http://www.lshtm.ac.uk/courses/>
- c- UNIV OF WISCONSIN MADISON, Medical School.

IV. Program Structure and Contents

Program Admission Requirements

According to the bylaws of the Faculty of Medicine - Cairo University for Post Graduate Programs (July 2009), applicants should have MBBch or equivalent degree. According to Cairo University requirements, all applicants for postgraduate studies should fulfill preliminary courses on the following subjects; Medical statistics I – English language (TOEFL or equivalent degree) – Computer skills (ICDL). Admission to the program is open during July. Selection criteria will be established by the Council of the Medical Microbiology and Immunology Department including the minimum score of the Bachelor Degree.

Program duration: Three academic years.

Program structure: Total Credit points 172

- **First part: 1.5 years - Total credit points 52 - (Table 1)**

Table 1: First part

| Courses | | Credit Points | | ILOs |
|--|---|---------------|-------|---|
| Code | Title | CPs | Total | |
| COMPULSORY COURSES | | | | |
| <i>MI 804</i> | Medical Biochemistry – Basic Biochemistry and metabolism – Basic genetics and Molecular Biology | 8 | 9 | A ₁ , A ₂ , A ₃ , A ₄ , A ₆ , B ₄ , B ₈ , D ₂ , D ₃ |
| <i>MI 809 MB</i> | Medical Biostatistics | 1 | | A ₁₂ , C ₁₅ , C ₁₆ , C ₁₇ |
| ELECTIVE COURSES (MEDC) choose ONE course | | | | |
| <i>MI 805</i> | Medical Parasitology | 1 | 1 | A ₅ , A ₈ , A ₉ , A ₁₁ , B ₃ , B ₆ |
| <i>MI 809 IOD</i> | Infectious and Occupational Diseases | 1 | | A ₇ |
| SCIENTIFIC ACTIVITIES | | | | |
| <i>1st Part</i> | Scientific activities | 2 | 2 | D ₆ , D ₇ |
| PRACTICAL TRAINING PROGRAM (Basic training) | | | | |
| <i>MI 806 P1</i> | Practical training program part 1 | 40 | 40 | C ₂ , C ₅ , C ₈ , C ₉ , |

| | | | |
|--|--|--|-----------------------------------|
| | | | C ₁₀ , C ₁₃ |
|--|--|--|-----------------------------------|

- **Second part: 1.5 years - Total credit points 120 - (Table 2)**

Table 2: Second part

| Courses | | Credit Points | | ILOs |
|-----------------------------------|-------------------------------------|---------------|-------|---|
| Code | Title | CPs | Total | |
| COMPULSORY COURSES | | | | |
| MI 806 | Medical Microbiology and Immunology | 17 | 17 | A ₁ –A ₁₁ , B ₁ –B ₈ , D ₁ –D ₅ |
| SCIENTIFIC ACTIVITIES | | | | |
| ^{2nd} Part | Scientific activities | 3 | 3 | D ₆ , D ₇ |
| PRACTICAL TRAINING PROGRAM | | | | |
| MI 806 P2 | Practical training program Part 2 | 60 | 60 | A ₃ –A ₅ , A ₉ C ₁ –C ₁₃ |
| MASTER THESIS | | | | |
| | Master Thesis | 40 | 40 | A ₁₂ , A ₁₃ , B ₇ –B ₁₁ , C ₁₄ , D ₆ , D ₇ |

- **Master Thesis:** completed during second part 40 credit points.

All master degree students should prepare a thesis in Medical Microbiology and Immunology. The department scientific ethical committees must approve the protocol of the research. The thesis (should / may) include a review part and a research part. The thesis is supervised by one or more senior staff members and may include other specialties according to the nature of the research. The thesis should be evaluated and approved by a committee of three professors including one of the supervisors, an internal professor and an external professor.

Practical Training Program

According to the Faculty of Medicine, Cairo University Bylaws for Post Graduate Programs (July 2009), all the students should have a basic training for 18 months. They should spend 10 months in Biochemistry Department, 2 months in Parasitology Department and 6 months in the department of Microbiology and Immunology. The whole of the second part of the practical training program will be conducted in the department of Microbiology and Immunology. The details of the training program are found in a separate document.

Scientific Activities:

The students should participate in the scientific activities of the departments such as:

- *Journal club (presenting scientific articles) once every 2 weeks.*
- *Seminars (including recent topics and controversial issues). Students are expected to participate in the discussions.*
- *Scientific meetings arranged by the department.*
- *Others e.g., conferences, etc*

Each activity is monitored and given credit points registered in the candidate logbook. The student should collect the required points before allowed to sit for final exam.

V. Regulations for Progression and Program Completion

After finishing the first part, attending the specified courses and collecting the required credit points, the student should pass the first part examination before proceeding to the second part. In case the student fails to pass the examination, he may proceed in the practical training and can resubmit for the next first part examination. After passing the first part, the student submits a protocol for master thesis at the beginning of second part. Before submitting to the final exam, he should finish the thesis and get approval, complete phase 2 of practical training program, and collect the required credit points. The candidate will receive his degree after passing this final examination. Master degree should be obtained within a maximum of 6 years after registration date.

VI. Assessment

A: Assessment Tools

- **Supervision and Monitoring of Training Program**

According to the Faculty of Medicine, Cairo University Bylaws for Residency Training Programs, coordinators carry continuous assessment during the program. A residency training logbook including scientific activities will be kept for each student to document all his/her clinical, laboratory and/or operative activities as well as his/her participation in different scientific activities. The head of the department should allow the students to undergo the final examination when they complete their training program and collect the credit points needed.

- **Formal Assessment**

According to the Faculty of Medicine, Cairo University Bylaws for Post Graduate Programs (July 2009). Students should be assessed at the end of first part and of the second part.

1. First Part Final Exam:

- **Medical Biochemistry:** Three-hour written exam (including short essay and multiple choice questions) + oral exam + practical exam.
- **Medical Biostatistics:** One and half-hour written exam (including short essay and multiple choice questions) + oral exam + practical exam
- **Elective course** One hour written exam + oral exam + practical exam

2. Second Part Final Exam Part 2:

- **Medical Microbiology and Immunology:** Two 3-hour written exams; each is 3-hour duration, on two separate days, paper (I) on first day and paper (II) on second day (including short essay and multiple choice questions); Two-hour cases exam; Oral exam; and Practical exam.

B: Assessment Schedule:

1. First Part Final Exam:

The written exam will be held in April/October (two days):

Day one: Medical Biochemistry (3 hours)

Day two: Medical biostatistics (1.5 hours) + Elective course (1 hour)

This will be followed by the practical and oral exams on separate days

2. Second Part Final Exam:

The written exam will be held in May/ November (two days):

Day one: Medical Microbiology and Immunology paper 1 (General)
 Day two: Medical Microbiology and Immunology paper 2 (Systematic)
 This will be followed by practical exam, case scenarios, and oral exams on separate days.

C: Weighing Of Assessment (Marks allocated to courses):
 (50 marks for each credit point)

| Courses | | Marks | | | |
|--------------------------|------------------------------|--------------------------------|------|-----------|------------|
| Code | Title | Written | Oral | Practical | Total |
| FIRST PART | | | | | |
| MI 804 | Medical Biochemistry | 160 | 80 | 160 | 400 |
| MI 809 MB | Medical Biostatistics | 25 | | 25 | 50 |
| MI 805 | Medical Parasitology | 30 | | 20 | 50 |
| MI 809 IOD | Infectious/Occupational Dis. | 30 | | 20 | |
| Total First Part | | | | | 500 |
| SECOND PART | | | | | |
| MI 806 | Medical Microbio./Immun. | *WI-150 *WII-150 **C-100 | 150 | 250 | 800 |
| Total Second Part | | | | | 800 |

**To pass the written exam the student should attain sixty percent of the total written marks (paper I + paper II) as a minimum; **C: Case*

Remarks

- It is mandatory to pass all the papers of written exams separately.
- The passing mark in any written exam is $\geq 60\%$.

VII. Evaluation of Program Intended Learning Outcomes

| Evaluator | Tool | Sample |
|--|--|---|
| 1. Senior Students | Questionnaire at the end of the program | All the PG students |
| 2. Alumni | The faculty is currently developing an Alumni office for postgraduates | Not yet determined |
| 3. Stakeholders | A meeting will be arranged during annual conference of the department | Available representatives from: <ul style="list-style-type: none"> - Army hospitals - National medical insurance - Medical syndicate - Ministry of health |
| 4. External Evaluators | Review program and courses Attending the final exam | Once before implementation Bi-annual report |
| 5. College Quality Assurance committee | Annual program reviewer | |

Date of Approval by Department: Jan 2017

Program Coordinator: Prof. Tarek El-Etreby - Prof. Abdel Fattah Mohamed Attia - Ass. Prof. Marwa Salah Mostafa

Head of Department: Prof. Nadia Hafez