

**Islamic Republic of Iran**  
**Ministry of Health and Medical Education**  
**High Council for Medical Science Planning**  
**Discontinuous Master's Degree Program in Medical Virology**

(General information, program, course titles and evaluation)

Date 2016.05.29

Ministry of Health and Medical Education of the Islamic Republic of Iran  
High Council for Medical Science Planning

**In the Name of God**  
**Curriculum of the Discontinuous Master's Degree Program**  
**Medical Virology Field**

**Field: Medical Virology**

**Course:** Discontinuous master's degree

**Specialized Secretaries:** Secretariat of the Council for Education of Basic Medical, Health and Specialized Sciences

The High Council of Medical Sciences Planning in the sixty-third session dated 2016.05.29, based on the plan of the discontinuous master's degree program in medical virology, which has been approved by the Secretariat of the Council for Basic Medical, Health and Specialized Sciences, approved the education program of this course in five chapters (general specifications, curriculum, course titles, standards, and curriculum evaluation) as described in the appendix and stipulates:

1- The curriculum of the **discontinuous master's degree course in medical virology** from the date of notification is irrevocable for all universities and higher education institutions in the country that have the following specifications:

a. Universities and higher education institutions administered under the Ministry of Health and Medical Education.

b. Institutions established with the official permission of the Ministry of Health and Medical Education and therefore, they are subject to the approvals of the High Council for Medical Science Planning.

c. Other higher education institutions that are established in accordance with special laws and must be subject to the academic standards of the Islamic Republic of Iran.

2- From the date of notification of this program, all education courses and similar programs of institutions in the field of **discontinuous master's degree in medical virology** in all universities and higher education institutions mentioned in Article 1 will be obsolete and the mentioned universities and institutions of higher education can run such courses and administer the new program in accordance with regulations.

3- General specifications, curriculum, course titles, standards and evaluation of the discontinuous master's degree program in medical virology will be announced in five chapters.

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The vote issued in the sixty-third session of the High Council for Medical Sciences Planning dated 2016.05.29 regarding:

**Curriculum of the Discontinuous Master's Degree Program**

**Medical Virology Field**

1- The curriculum of the **discontinuous master's degree course in medical virology** was approved by a majority of votes.

2- The curriculum of the **discontinuous master's degree course in medical virology** is applicable from the date of notification.

It is approved and signed by:

**Dr. Jamshid Hajati**

**The Secretary of the Basic Medical, Health and Specialized Education Council**

It is approved and signed by:

**Dr. Seyed Mansour Razavi**

**The Secretary of the Medical Sciences Planning High Council**

It is approved and signed by:

**Dr. Bagher Larijani**

**Deputy Minister of Education**

The vote issued in the sixty-third session of the High Council for Medical Sciences Planning dated 2016.05.29 regarding the curriculum of the discontinuous master's degree program in medical virology, is correct and should be implemented.

signed by:

**Dr. Seyed Hassan Hashemi**

**Minister of Health and Medical Education and**

**Chairman of the Supreme Council for Medical Science Planning**

Ministry of Health and Medical Education of the Islamic Republic of Iran

High Council for Medical Science Planning

## **Names of members of the Medical Virology Curriculum Review Committee for the Discontinuous Master's Degree**

<b>First name and last name</b>	<b>University</b>
Dr. Mahmoud Shamsi Shahrabadi	Iran Medical Sciences and Health Services
Dr. Rakhshandeh Nategh	Tehran Medical Sciences and Health Services
Dr. Talat Mokhtari Azad	Tehran Medical Sciences and Health Services
Dr. Ahmad Fayyaz	Pastor Institute of Iran
Dr. Seyed Ali Mohammad Arabzadeh	Kerman Medical Sciences and Health Services
Dr. Seyed Mohammad Jazayeri	Tehran Medical Sciences and Health Services
Dr. Houria Saderi	Shahed
Dr. Houria Soleiman Jahi	Tarbiat Modares
Dr. Hamidreza Monavari	Iran Medical Sciences and Health Services
Dr. Angila Atai	Iran Medical Sciences and Health Services
Dr. Taravat Bamdad	Tarbiat Modares

## **Collaborators of the Secretariat of the Supreme Council for Medical Science Planning**

Dr. Seyed Abdolreza Mortazavi Tabatabai: Council for Medical Science Planning	Deputy of the Secretariat of the Supreme
Ms. Raheleh Daneshnia: High Council for Medical Science Planning	Expert in charge of the Secretariat of the
Ms. Zohreh Ghorbaniyan: Council for Medical Science Planning	Expert in the Secretariat of the High

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**List of members and guests present at the one hundred and sixty-second session  
High Council of Medical Sciences Planning, dated 2016/01/31**

**Attendees:**

Dr. Tahereh Changiz  
Dr. Hasti Sanaei Shaar (Representative of the Deputy Minister of Health)  
Dr. Shahram Ejtemaei Mehr  
Dr. Davood Omy  
Dr. Mohammad Hosseinpour Kazemi  
Dr. Mohammad Taghi Joghtaei  
Dr. Jamshid Hajati  
Dr. Seyed Ali Hosseini  
Dr. Ahmad Khaleghnejad Tabari  
Dr. Javad Rafinejad (Representative of the Deputy Minister of Research and Technology)  
Dr. Abdul Hamid Zafarmand  
Dr. Jamshid Kermanchi (Representative of the Deputy of Treatment)  
Dr. Abbas Monzavi  
Dr. Mohammad Reza Mansouri  
Dr. Seyed Mansour Razavi.

**Guests:**

Dr. Mahmoud Shamsi Shahr abadi  
Dr. Talat Mokhtari Azad  
Dr. Rakhshandeh Nategh  
Dr. Seyed Ali Mohammad Arabzadeh  
Dr. Seyed Mohammad Jazayeri  
Dr. Houria Soleiman Jahi  
Dr. Hamidreza Monavari  
Dr. Masoud Mardani  
Dr. Shirin Afhami  
Dr. Parviz Olia  
Dr. Manouchehr Makoundi  
Dr. Seyed Abdolreza Mortazavi Tabatabai

**List of attendees of the High Council for Medical Science Planning at the time of approval of Medical Virology Curriculum for the Discontinuous Master's Degree**

**Attendees:**

Dr. Seyed Hassan Hashemi  
Dr. Bagher Larijani  
Dr. Reza Malekzadeh  
Dr. Rasoul Dinarvand  
Dr. Mohammad Mirzabeigi  
Dr. Seyed Hassan Emami Razavi  
Dr. Hamid Akbari  
Dr. Mohammad Hossein Pourkazemi  
Dr. Mehdi Tehrani soost  
Dr. Mohammad Taghi Joghtaei  
Dr. Jamshid Hajati  
Dr. Ali Akbar Haghdoost  
Dr. Alireza Zali  
Dr. Mohammad Reza Sabri  
Dr. Seyed Amir Mohsen Ziaei  
Dr. Mohammad Abdollahi  
Dr. Hossein Keshavarz  
Dr. Abbas Monzavi  
Dr. Fereydoon Nouhi  
Dr. Seyed Mansour Razavi  
Dr. Tahereh Changiz  
Dr. Seyed Abdolreza Mortazavi Tabatabai  
Ms. Raheleh Daneshnia

Ministry of Health and Medical Education of the Islamic Republic of Iran  
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**Chapter One**  
**Curriculum of Medical Virology Field**  
**Discontinuous Master's Degree Program**

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**Introduction:**

Due to the importance and role of viruses in human and animal diseases and the increasing development of diagnostic techniques and the emergence of emerging and re-emerging viral diseases as a threat to human health, it is necessary to periodically review the field of virology. Accordingly, the program review team will review its content and welcome the opinions of experts in future reviews.

**Field and Title in Persian and English:**

Discontinuous Master of Medical Virology Field (M.Sc.)

**Definition**

Medical Virology is a branch of basic medical sciences in which students learn characteristics of viruses, laboratory diagnosis of viruses and viral diseases, methods to control and prevent them during the course to gain the ability to perform research and diagnostic activities and related services.

**Conditions and method of admission to the field:**

- Passing the entrance exam in accordance with the rules and regulations of the Ministry of Health and Medical Education
- Having a bachelor's degree in microbiology, medical parasitology, biochemistry, immunology, laboratory sciences, medical entomology, veterinary laboratory sciences, Microbiology, Biology (all majors) and General Doctor (Medicine, Dentistry, Pharmacy), Professional Veterinary Doctor and Professional Doctor of Laboratory Sciences

**Exam Materials and Coefficients:**

Entrance Exam Materials and Coefficients:

<b>Exam Materials</b>	<b>Coefficients</b>
Bacteriology	1
Virology	3
Immunology	2
Parasitology	1
Cellular and Molecular Biology	1.5
General English Language	2

In order to get the latest changes in the accepted education documents and the exam materials and coefficients for each academic year, refer to the booklet of the discontinuous master's degree exam in the medical sciences related to that academic year.

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## **History and Evolution of the Field in the World and Iran:**

### **A brief history of the field in the world:**

Although the identification of diseases caused by viruses has been reported for several centuries, the science of virology and applied methods for studying viruses began in the late nineteenth century. With many advances in identifying more viruses as causative agents of various diseases and also their application in genetic studies and molecular biology, a field called **virology** was introduced so that now several scientific centers have been established in different countries of the world which are constantly working in this field. Therefore, with the rapid development of this science and the emergence of new unknown pathogenic viruses, more and more information is reported in this field, which requires a review of the educational program in this field after every few years.

### **A brief history of the field in Iran:**

The master's degree course in virology began in 1985 in the medical school of Tarbiat Modares University and in 1990 in Tehran University of Medical Sciences. In 1994, the mentioned field was established in Iran University of Medical Sciences and now several other centers such as Jundishapur University of Medical Sciences (Ahvaz Jundishapur - Shiraz - Gorgan and Kerman) and the Razi Institute also have a master's degree in virology. The program of this field was last revised in 2006.

### **Career status of graduates:**

- Medical sciences Universities
- Medical diagnostic laboratories
- Research centers and growth centers
- Knowledge-based companies
- Standard organizations

### **Philosophy (Values and Beliefs):**

- The philosophy of creating the discipline is to help diagnose, treat and fight viral diseases.
- The program emphasizes the following values:
  - Emphasis on the health of patients, professionals, clients, staff and students
  - Emphasis on compliance with Biosafety regulations in the workplace
  - Commitment to the maintenance of material and spiritual capital in the workplace
  - Commitment to strict observance of professional matters
  - Commitment to observe the legal charter of patients
  - Commitment to observe research ethics in conducting research work, especially in clinical research and work on laboratory animals.

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**Perspective (Vision):**

In the next ten years, the country will move forward in the field of virology in line with the world's leading countries, and in the field of research, will expand the frontiers of knowledge and provide diagnostic services to specialists, especially clinical specialists.

**Mission:**

The mission of this course is to train individuals aware of current scientific issues, capable, responsible and sensitive to the health of individuals and society in the field of virology to provide their expertise in various fields of virology to the society.

**Expected Outcomes for Graduates:**

Graduates of this course should be able to:

Cooperate students in practical educational matters.

Participate in conducting research projects in the field of virology under the supervision of professors.

Perform tests to diagnose viral diseases in health and treatment centers.

Play a role in guiding the community in applying the principles of prevention and control of viral diseases.

**The role of graduates in the society:****The professional duties of graduates in their job position are as follows:**

-Cooperation in educating students (if employed at the university) in technical parts and practical laboratory credits in theory and practice

-Training students and staff on the correct use and maintenance of devices, equipment and tools used in the virology department.

-Training on the principles of biosafety and safety standards and personal protection standards for students (if employed at the university) and medical staff -Assisting in projects and research projects under the supervision of relevant professors

-Providing consulting services to the community in the field of control of viral diseases

-Assistance in setting up diagnostic methods

-Performing virological tests

-Monitoring the quality of conducting virological tests

-Correct use and maintenance of laboratory devices and equipment

-Assistance in launching new diagnostic methods and monitoring the quality of viral tests

-Assistance in sending test results to the relevant physician as soon as possible so that it can be effective for rapid treatment.

-Providing expert opinions to officials regarding virology kits, materials, products and equipment.

-Participating in management and supervision in the virology laboratory under the supervision of technical manager

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## Main Expected Competencies and Skills

The general competencies expected for graduates are:

- Communication skills
- Interaction between departments
- Teaching
- Research
- Critical thinking
- Writing scientific articles
- Problem-solving skills
- Management skills in performing processes
- Skills in working with laboratory animals
- Physical and mental health of the work environment
- Proper use of laboratory equipment and equipment
- Observance of safety principles
- Common measurements and calibration of equipment
- Professionalism
- Lifelong self-improvement

## Procedural Skills

In this section, practical skills (Procedural Skills) are presented.

Skill	Minimum required number of doing the skill for learning			
	Observation	Assist in working	Independent work	Total number
Cell culture Skills	5-10	5-10	5	15-20
Serological tests	5	5	5	15
Molecular tests	5-10	5-10	5	15-20
Work with laboratory animals	10	10	10	30
Virus seed production and viral titration	5-10	5-10	5-10	15-20
Virus concentration and purification	10	10	10	30

## Educational strategies:

In compiling this program, the following strategies have been considered:

- Task based education
  - Combination of student and professor orientation
  - Problem based education
  - Community oriented education
  - Subject directed education
  - Hospital education
  - Evidence based education
  - Systematic education
  - Disciplinary education with thematic integration if required
  - Compulsory training and in a small part of the training course, elective
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### **Teaching methods and techniques:**

In this course, the following teaching methods and techniques will be mainly used:

- Demonstration
- Practical work in the laboratory
- Various intra-departmental, inter-sectoral, hospital, interdisciplinary and inter-university conferences and seminars
- Small group discussion - Educational workshops - Club Journal and Reading - Case Presentation
- Laboratory Morning Report
- Using distance learning and simulation techniques according to the facilities
- Participating in lower-level education
- Self education, self-study
- Other teaching methods and techniques according to educational needs and objectives

### **Ethical expectations of learners:**

Learners are expected to strictly observe the legal charter (1) of patients.

- Strictly observe the rules related to security and safety of patients, staff, and the work environment. (These rules are designed by the department and provided to the students).
- Follow the rules related to Dress Code (2).
- When working with animals, strictly observe the relevant ethical rules (3).
- Protect the resources and equipment they work with under any circumstances.
- Respect faculty, staff, classmates, and other learners, and contribute to creating a friendly and respectful atmosphere in the workplace.
- Observe social and professional ethics considerations in critique of programs.
- In conducting researches related to the field, observe research ethics.

\* Items 1, 2, 3 are presented in the appendices of this program.

### **Student Overall Assessment:**

**A - Assessment Method:** Students (learners) will be assessed by the following methods:

Oral                      Written                      Practical

**Portfolio assessment including:** assessment of log book, test results, articles, encouragement and hints, certificates of working and the like

**B - Frequency of assessment:** Periodical

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**Chapter Two**  
**Minimum Requirements for Curriculum in**  
**Medical Virology Field**  
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**Minimum required faculty (number – specific field - rank):**

Existence of a virology department, with at least 5 virologists with (Ph.D.) degree, at least one of whom is an associate professor and above.

**Staff required to run the program:**

- Masters of Virology at least one person
- Bachelor and associate of related fields at least 2 people

**General public spaces and facilities required:**

Classrooms - Student Room – Access to internet with sufficient speed –  
Computer room - Conference Hall – Education department archive room – Professors' room

**Specific spaces required:**

- Specific Laboratories including:
- Cell and virus culture laboratory
  - Molecular laboratory
  - Serology laboratory
  - Washing and sterilization spaces
  - Animal room
  - Space for first aid and emergency

**Population required:**

- Laboratory samples of patients
- Laboratory animals

**Fields and expertise required**

Getting cooperation from Infectious diseases specialists - Statistics and Epidemiology - Molecular Biology, Genetics and Immunology

**Educational areas required:**

- Medical diagnostic sample laboratories with standard virology departments or units.
- Health-treatment fields in case of epidemics

**Educational equipment required:**

Seminar hall, Computer, Blackboard, Video projector, PowerPoint, Textbooks, Library and Study hall

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**Chapter Three**  
**Curriculum Details and Courses**  
**Medical Virology Field**  
**Discontinuous Master's Degree**

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**Course Details:****Course Name: Discontinuous Masters of Medical Virology****Course Length and Structure:**

Course Length is in accordance with the educational regulations of the discontinuous masters program, approved by the High Council for Medical Sciences Planning.

**Total number of Credits:**

The number of credits in this course are 32 which are as follows:

Credits	Number of credits
Mandatory specialized credits (core)	18 credits
Optional specialized credits (non- core)	6 credits
Thesis	8 credits
<b>Total</b>	<b>32 credits</b>

**Table A – Deficiency or Compensation Courses of the Discontinuous Masters of Medical Virology Field**

Lesson code	Name of Course	Number of credits			Course hours			Prerequisite or concurrent
		Total	Theoretical	Practical	Theoretical	Practical	Total	
1	Medical Information Systems*	1	0.5	0.5	9	17	26	-
2	Vital Statistics	2	2	-	34	-	34	-
3	Laboratory Animals	1	0.5	0.5	9	17	26	-
4	Cell Biology	2	2	-	34	-	34	-
5	Research Methods	2	1	1	17	34	51	-
6	Immunology (1)	2	2	-	34	-	34	-
7	Chemistry Analysis	2	1	1	17	34	51	-
<b>Total</b>		<b>12</b>						

\*Passing this course is mandatory for all students who have not passed it before as a deficiency or compensation course.

-The student is required to take all or some of the compensatory deficit courses (Table A) at the discretion of the department and with the approval of the Graduate Council of the University.

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**Table B – Compulsory (Core) Specialized Courses of the Discontinuous Masters of Medical Virology Field**

Lesson code	Name of Course	Number of credits			Course hours			Prerequisite or concurrent
		Total	Theoretical	Practical	Theoretical	Practical	Total	
8	General Virology	3	3	-	51	-	51	-
9	Cellular Molecular Biology	2	2	-	34	-	34	-
10	Systematic Virology 1	3	3	-	51	-	51	General Virology Code 08
11	Systematic Virology 2	3	3	-	51	-	51	General Virology Code 08
12	Practical Virology1	3	-	3	-	102	102	-
13	Practical Virology2	2	-	2	-	68	68	Practical Virology1 Code 12
14	Seminar	2	2	-	34	-	34	-
15	Thesis	18	-	-				-
<b>Total</b>		<b>26</b>						-

**Educational Workshops:**

\*Biosafety Workshop

\*Passive Defence Workshop

**Note:**

These workshops are designed, implemented and evaluated by the professors and Ph.D. students (if any) of the medical virology field.

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**Table C - Optional (non- core) Specialized Courses of the Discontinuous Masters of Medical Virology Field**

Lesson code	Name of Course	Number of credits			Course hours			Prerequisite or concurrent
		Total	Theoretical	Practical	Theoretical	Practical	Total	
16	Bioinformatics	2	1	1	17	34	51	
17	Special Topics in Virology	2	2	-	34	-	34	General Virology Code 08
18	Principles of Epidemiology	2	2	-	34	-	34	
19	Clinical Virology	2	-	-	-	-	102 hours Internship	
20	Biosafety	2	2	-	34	-	34	
21	Medical Entomology	2	2	-	34	-	34	
22	Immunology 2	2	1	1	17	34	51	
23	Medical Bacteriology	2	1	1	17	34	51	
<b>Total</b>		<b>16</b>			5			

\*Students must complete 6 credits of the above courses (Table C) in accordance with the preferred thesis topic, approval of the supervisor and confirmation of the Graduate Council of the University.

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**Course Name: Medical Information Systems**

**Course code: 01**

**Prerequisite or Concurrent:** None

**Number of Credits:** 1 credit (0.5 Theoretical credit – 0.5 Practical credit)

**Credit Type:** (Theoretical – Practical)

**Overall Course Objectives:** Familiarity of the students with various computer hardware parts, Windows operating system, internet, and important medical and health databases.

**Course description:** The rapid advancement of technology, especially information technology, offers clearer perspectives and horizons for conquering the scientific, technical and industrial peaks and solving human problems and desires, and requires every individual in the society to redouble their efforts to acquire computer skills and their application in the science side. Consequently, today the individuals and societies who are incapable of using new computer technologies are considered illiterate.

The spread of e-libraries to all people, especially students, has necessitated learning about the latest advances in computers and information. In most developed and technology-owning countries, and in some developing countries, computer science education and information technology learning are among the main programs of schools and universities. Fortunately, in recent years, our country's universities have taken appropriate steps to familiarize students with information technology and improve their abilities.

At the end of the course, the student should know the different components of a personal computer and know the function of each and get acquainted with the Windows operating system. The student should also have the ability to use library templates and various search methods in important databases in their field of study and the ability to use e-mail to send and receive letters and files.

**Outline (9 theoretical hours - 17 practical hours):**

- Familiarity with computers
- Types of computers
- Hardware
- Function and importance of each of the hardware components and accessories
- Software familiarization and operation of the Windows operating system
- Capabilities and features of the Windows operating system
- How to install and setting up the Windows operating system
- Internet familiarity
- Necessary settings for connecting to the network
- Familiarity with the types of networks
- Internet search methods
- Search engines and methods of using them
- Methods for sending and receiving E-mail

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- Familiarity with important medical and health databases
- Familiarity with databases such as Medline, Elsevier, ProQuest, etc.
- Familiarity with Full - Text electronic journals on CD and search methods
- Familiarity with important sites in the field of medicine and health

### **References:**

- Windows XP and internet. Compiled by: Engineer Keyvan Fallah Moshfeghi. Latest Edition
- Internet Step-by-Step Tutorial. Third edition Compiled by: Engineer EynAllah Jafarnejad. Last Edition
- Internet for Physicians, Author: Dr. Mohammad Reza Jahani et al., Last Edition
- Articles and other books (up-to-date sources)

### **Student's evaluation:**

Midterm Exam	25%
Final Exam	50%
Homework	15%
Presence and active participation in class	10%

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**Course Name: Vital Statistics**

**Course code: 02**

**Prerequisite:** None

**Number of Credits:** 2 credits

**Credit Type:** Theoretical

**Overall Course Objectives:**

To acquaint students with vital statistics and its application in scientific research

**Course description:** Analysis, evaluation and interpretation of the results obtained in research, laboratory tests and epidemiological studies

**Outline (34 theoretical hours):**

1. One-way analysis of variance (grouping relative to one trait)  
Independent samples and completely randomized experiments  
Equal test for the Mean of population  
Sample and Multiple comparison
2. Two-way analysis of variance (grouping with respect to two traits)  
Grouping with respect to two non-repeating traits (completely randomized blocks) Grouping with respect to two traits with repetition (factorial experiments)
3. Correlation analysis and Regression  
The concept of correlation between two traits  
Linear correlation  
Linear regression
4. Common application of chi-square test  
Sample matching test with theoretical distribution  
First degree homogeneity test  
Fisher exact test  
McNemar test
5. Simple non-parametric tests
6. Standardization of indicators and their test.

**References:**

1. Statistical methods and health indicators, Volume I, Compiled by Dr. Kazem Mohammad, Dr. Hossein Malek Afzali, Articles and other books with (up to date).
2. Statistical methods in medical research, P. Armitage, Blackwell scientific publication, London.
3. Other articles and books with (updated sources).

**Student's evaluation:**

Oral exam and problem solving are done under the supervision of the relevant professor.

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**Course Name: Laboratory Animals**

**Course code: 03**

**Prerequisite:** None

**Number of Credits:** 1 credit (0.5 Theoretical credit – 0.5 Practical credit)

**Credit Type:** (Theoretical – Practical)

**Overall Course Objectives:** Familiarity with the use of laboratory animals in research

**Course description:** In this course, students learn maintenance method, protection, and use of laboratory animals and become exclusively familiar with animal diseases and their physiology.

**Outline (9 theoretical hours - 17 practical hours):**

1. History and definition of terms
2. Anatomy and physiology of laboratory animals
3. Introduction of common breeds of laboratory animals and their application in research
4. Grading of laboratory animals including: Conventional, Free of special diseases (SPF), Transgenic, etc.
5. Familiarity with the methods of reproduction and maintenance of laboratory animals
6. Hygiene rules for working with laboratory animals
7. Major diseases of laboratory animals
8. Principles of working with laboratory animals including: controlling and carrying laboratory animals, injections (im, iv and ip), blood sampling and sampling, sex determination, pregnancy determination, biochemistry, recording of observations, marking and extermination of animals
9. Familiarity with the rules and ethical considerations of working with laboratory animals
10. Holding injection steps to laboratory animals, teaching animal handling, how to behave and restraining laboratory animals for relevant experiments under the opinion of the relevant professor.

**References:**

Determined under the opinion of the relevant professor

Articles and books with (up-to-date resources)

**Student's evaluation:**

Students are assessed by a written exam after the end of the semester.

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**Course Name: Cell Biology**

**Course code: 04**

**Prerequisite:** None

**Number of Credits:** 2 credits

**Credit Type:** Theoretical

**Overall Course Objectives: Introducing students to the genetic structure of viruses and their genome composition and specifications**

**Lesson Description:** In this course, the students will learn the genetic structure of viruses, the proliferation method of DNA and RNA, and the chemical structure, and the translation and transcription steps of nucleic acid.

**Outline (34 theoretical hours):**

- History of cell formation
- Techniques for studying cell structure
- Structure of cell membranes
- Membrane exchange of ions, small molecules and electrical properties of membranes
- Replication mechanisms (types of replications), transcription and translation
- Protein transfer to membranes and cellular organs
- Vesicular transfer of materials and endocytosis
- Cellular messaging: Transduction pathways and control signals of gene expression
- Cellular skeleton: Microfilaments, microtubules and average filaments
- Between cell junctions and cell correlation in tissue
- Cellular cycle: Mitosis and cell cycle regulation
- Programmed cell death
- Stem cell carcinogenesis mechanisms
- Stem cells of cell renewal

**References:**

1. GENES book from Mr. LEWIN
  2. JANEWAY'S IMMUNOBIOLOGY
- And books and articles with (up-to-date sources).

**Student's evaluation:**

Formative assessment under the supervision of the relevant professor.

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**Course Name: Research Methods**

**Course code: 05**

**Prerequisite:** None

**Number of Credits:** 2 credits (1 Theoretical credit – 1 Practical credit)

**Credit Type:** Theoretical - Practical

**Outline (17 theoretical hours - 34 practical hours):**

- Definition of key concepts in research
- Introduction and familiarity with various types of research by purpose and data collection or research plan
- Familiarity with the division of various types of research (including correlation study, regression and correlation matrix)
- Introduction of research process and familiarity with its types
- Familiarity with methods of beginning research and topic selection
- Familiarity with Brain Storming methods
- Familiarity with methods of conducting research and preparing a preliminary plan
- Familiarity with research questions and hypotheses
- General strategies of quantitative and qualitative research
- Research approaches and familiarity with its types
- Familiarity with research techniques and data collection procedure
- Familiarity with data analysis methods and software used
- Familiarity with writing methods and research report and essay writing
- Practical application of methods taught in the classroom by presenting a project.

**References:**

1. Methodology of applied research in medical sciences; Author: Dr. Malek Afzali
2. and articles and books with (up-to-date sources)

**Student's evaluation:**

Formative assessment under the supervision of the relevant professor

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**Course Name: Immunology (1)**

**Course code: 06**

**Prerequisite:** None

**Number of Credits:** 2 credits

**Credit Type:** Theoretical

**Overall Course Objectives: To acquaint students with the general principles of immunology**

**Lesson Description:** In this course, students are introduced to the structure of the immune system and learn the mechanisms in the body's defence system and learn how to use these systems to fight viral diseases.

**Outline (33 theoretical hours):**

1. Introduction and general definition of Ag, Ab, structure and definition of cellular safety and humoral
2. Definition of HLA and description of its types based on MHCI and MHCII
3. Humoral immunity and neutralization of viruses by antibodies
4. Innate immune and cellular immune responses against viruses
5. The role of inflammatory responses in the pathogenesis of viruses
6. The role of Treg and  $\gamma$  A T cell response in viral infections.
7. Mechanisms of escape of viruses from the immune system
8. Viral autoimmune diseases
9. Vaccines and adjuvants based on viral diseases.
10. Principles of Cell Therapy in viral infections
11. Common immunology techniques in the study of pathogenesis and viral diagnosis (CTL assay, proliferation, Elispot, Facs, etc.)

**References:**

1. Cellular and Molecular Immunology (last edition)
2. Immunology, by Dr. Farid Hosseini, Astan Quds Publishing, (Latest edition)
3. And articles and books with (up-to-date sources)

**Student's evaluation:**

Students are evaluated by a written exam after the end of the semester.

Ministry of Health and Medical Education of the Islamic Republic of Iran High Council for Medical Science Planning

**Course Name: Chemistry Analysis**

**Course code: 07**

**Prerequisite:** None

**Number of Credits:** 2 credits

**Credit Type:** (1 Theoretical credit – 1 practical credit)

**Overall Course Objectives:** To acquaint students with the analysis and calculation of chemical standards

**Course Description:** In this course, the students learn the standard solutions for converting weight units to international units and optimizing solutions.

**Outline (17 theoretical hours - 34 practical hours):**

It is adjusted with the opinion of the relevant professor.

**References:**

Based on the opinion of the relevant professor, the students will use the introduced sources.

**Student's evaluation:**

Students are evaluated by written and oral exam after the end of the semester.

Ministry of Health and Medical Education of the Islamic Republic of Iran High  
Council for Medical Science Planning

**Course Name: General Virology**

**Course code: 08**

**Prerequisite:** None

**Number of Credits:** 3 credits

**Credit Type:** Theoretical

**Overall Course Objectives:** To acquaint students with the generalities of virology

**Course Description:** Familiarity with the structure, classification, reproduction, connection method, pathogenicity and generalities of prevention and treatment

**Outline (51 theoretical hours):**

1. Define the traits and characteristics of viruses and compare them with other microorganisms
2. Physical, chemical and morphological structure
3. Classification
4. Bacteriophages
5. Methods of diagnosis of infections and viral diseases
6. The effect of physical and chemical factors on viruses
7. Reproduction cycle of various viruses
8. Interferon and antiviral drugs
9. The interaction between the virus and the host cell
10. Pathogenesis of viruses
11. Genetics of viruses
12. Relationship between viruses and cancers
13. Immunity and immunopathogenesis of viruses
14. Concentration and purification of viruses
15. Prions

**References:**

1. Fields Virology (up-to-date version)
2. Medical microbiology Jawets et al. (up-to-date version)
3. Zinsser microbiology (up-to-date version)

**Students' evaluation:**

Students are assessed by a written exam at the end of the semester.

Ministry of Health and Medical Education of the Islamic Republic of Iran High Council for Medical Science Planning

**Course Name: Molecular Cellular Biology**

**Course code: 09**

**Prerequisite:** None

**Number of Credits:** 2 credits

**Credit Type:** Theoretical

**Overall Course Objectives:** Introducing students to the genetic structure of microorganisms and the mechanism of genetic change

**Course Description:** Students learn the mechanism of genetic change in microorganisms and how to reproduce, and also learn the structure of the plasmid and its application to cloning and expression of genes and their study.

**Outline (34 theoretical hours):**

- Bacterial genome, chromosome and plasmid
- DNA replication in bacteria
- Restricted enzymes
- Selection of mutations in bacteria
- Carcinogenesis
- Transduction
- Conjugation
- Transmissible genetic elements
- Transcription in prokaryotes
- Regulation of gene expression
- Cloning gene in bacteria
- Gene cloning
- Gene regulation
- Expression
- Transferable elements
- Transduction

**References:**

Zinsser Microbiology (up-to-date version)

Medical Microbiology Joklik (up-to-date version)

**Student's evaluation:**

Students are assessed by a written exam at the end of the semester.

Ministry of Health and Medical Education of the Islamic Republic of Iran High Council for Medical Science Planning

**Course Name: Systematic Virology 1**

**Course code: 10**

**Prerequisite or Concurrent:** General Virology Code 08

**Number of Credits:** 3 credits

**Credit Type:** Theoretical

**Overall Course Objectives:** Teaching students the generalities of members of viruses with DNA

**Course Description:** In this course, students learn the structure, reproduction, physical, chemical, and pathogenic properties that permeate in all viruses with DNA genomes.

**Outline (51 theoretical hours):**

- 1.Parvoviridae family
- 2.Circoviridae family
- 3.Family of papillomaviridae
- 4.Poliomyeloid family
5. Adenoviridae family
6. Paxviridae family
- 7.Herpesviridae family
- 8.Hepadnaviridae and Deltaviridae family

**References:**

1. Fields Virology. Vol 1, last edition (up-to-date version)
2. Medical virology Murray, last edition (up-to-date version)

**Students' evaluation:**

Students are assessed by a written exam at the end of the semester.

Ministry of Health and Medical Education of the Islamic Republic of Iran High Council for Medical Science Planning

**Course Name: Systematic Virology 2**

**Course code: 11**

**Prerequisite or Concurrent:** General Virology Code 08

**Number of Credits:** 3 credits

**Credit Type:** Theoretical

**Overall Course Objectives:** Teaching students the generalities of members of viruses with DNA

**Course Description:** In this course, students learn the structure, reproduction, physical, chemical, and pathogenic properties that permeate in all viruses with RNA genomes.

**Outline (51 theoretical hours):**

1. Picornaviridae family
2. Calici viridae and asteroviridae family
3. Reyviridae family
4. Tugronic family
5. Flaviridae family
6. Rhabdoviridae family
7. Coronaviridae family
8. Artomyxoviridae family
9. Paramixoviridae family
10. Bonyaviridae family
11. Arnaviridae family
12. Retroviridae family
13. Filoviridae family
14. Hepasiviridae family
15. Birnavoa Bernaviridae family

**References:**

1. Fields Virology. Vol 1, last edition (up-to-date version)
2. Medical virology Murray, last edition (up-to-date version)

**Students' evaluation:**

Students are assessed by a written exam at the end of the semester.

Ministry of Health and Medical Education of the Islamic Republic of Iran High Council for Medical Science Planning

**Course Name: Practical Virology 1**

**Course code: 12**

**Prerequisite:** None

**Number of Credits:** 3 credits

**Credit Type:** Practical

**Overall Course Objectives:** Familiarity of students with the basic techniques of virology experiments

**Course Description:** Familiarization of students with sterilization, preparation of culture media, method of cell culture, and viral growth in embryonated eggs and cell culture

**Outline (102 practical hours):**

- Sterilization and washing methods
- Preparation of cell culture media, buffers and related solutions
- Preparation of primary cell culture
- How to cultivate stable cells and their passage
- Various methods of cell maintenance, cell storage, and return of frozen cells
- Familiarity with virus inoculation into cell culture and observation of changes resulting from it
- Virus storage methods
- Egg embryo detection and inoculation methods
- Biosafety
- Disinfectants and how to use them
- Titration of viruses by ID501TC
- Virus storage
- Hemagglutination and Hemadsorption
- Neutralization

**References:**

1. Diagnostic procedure for viral infection. Lennet. Last edition.

**Students' evaluation:**

Students are assessed by taking a practical test in viral diagnostic and taking a written exam at the end of the semester.

Ministry of Health and Medical Education of the Islamic Republic of Iran High Council for Medical Science Planning

**Course Name: Practical Virology 2**

**Course code: 13**

**Prerequisite or Concurrent:** Practical Virology 1

**Number of Credits:** 2 credits

**Credit Type:** Practical

**Overall Course Objectives:** Familiarity of students with new methods of virology and diagnosis of viral infections

**Course Description:** Due to the many advances in the new methods of diagnosing viral infections and identifying new viruses, it is necessary for students of this course to become fully acquainted with these methods.

**Outline (68 practical hours):**

1. Determining the degree of viruses by the method of producing plaque
2. Immunofluorescence
3. ELAISA
4. Agglutination prevention
5. Observation of intracellular inclusions
6. Evaluation of viral proteins by electrophoresis and blotting
7. Different PCR methods

**References:**

1. Diagnostic procedure for viral infection (up-to-date version)

**Students' evaluation:**

Students are assessed by taking a practical test in viral diagnostic and taking a written exam at the end of the semester.

Ministry of Health and Medical Education of the Islamic Republic of Iran High Council for Medical Science Planning



**Course Name: Seminar**

**Course code: 14**

**Prerequisite:** None

**Number of Credits:** 2 credits

**Credit Type:** Theoretical

**Overall Course Objectives:** To acquaint the students with the method of collecting the latest data related to virology and how to present articles and their ability to analyse articles

**Course description:** In this course, the method of presenting scientific content of a research, the results, and analysis are taught to the students, and accuracy of the materials and content is also discussed.

**Outline (34 theoretical hours):**

It is determined based on the written program of the department of virology for the master's degree and in consultation with the professor.

**References:**

Recent papers in Virology

**Students' evaluation:**

Student evaluation is done through oral presentation and written report.

Ministry of Health and Medical Education of the Islamic Republic of Iran High  
Council for Medical Science Planning

**Course Name: Thesis**

**Course code: 15**

**Prerequisite:** None

**Number of Credits:** 8 credits

**Outline:**

The thesis is completed in accordance with the educational regulations and provisions of the discontinuous masters of the high council of medical sciences planning.

Ministry of Health and Medical Education of the Islamic Republic of Iran High  
Council for Medical Science Planning

**Course Name: Bioinformatics**

**Course code: 16**

**Prerequisite:** None

**Number of Credits:** 2 credits (1 Theoretical credit – 1 practical credit)

**Credit Type:** Theoretical - Practical

**Overall Course Objectives:**

Introducing students to the bioinformatics system and scientific communication with research centers.

**Course description:** In this course, students become acquainted with the international intelligence agencies regarding the latest researches in the field of molecular biology and gain access to the latest findings through scientific communication and establish scientific and research exchanges.

**Outline (17 theoretical hours - 33 practical hours):**

- Introduction and familiarity with the basic concepts of bioinformatics
- Familiarity with the basic DNA databases; Introduction of databases: a) NCBI, b) EMBL, and c) DDBJ
- Familiarity with basic protein databases; Introduction of databases: a) PDB, b) Introduction of database uniprot/swiss-prot, and c) TrEMBL
- Familiarity with sequence search and types of Blast
- Familiarity with mechanisms and algorithms used in DNA and protein sequence alignment
- Familiarity with software used in alignment (such as haseegene, Mega)
- Principles of different methods Real-Time PCR, PCR and its application in virology
- Principles of designing different primers and their application
- Familiarity with primer design software and practical work

**References:**

Current protocol in Bioinformatics, Weilly Press (up-to-date version)

**Students' evaluation:**

Student evaluation is done through oral presentation and written exam.

Ministry of Health and Medical Education of the Islamic Republic of Iran High Council for Medical Science Planning

**Course Name: Specific Topics in Virology**

**Course code: 17**

**Prerequisite:** General Virology

**Number of Credits:** 2 credits

**Credit Type:** Theoretical

**Overall Course Objectives:**

Familiarity of students with the method of collecting new data in virology and compiling daily topics in the relevant field

**Course description:** Application of virology knowledge in order to analyse the latest information about virology and viral diseases common in the country.

**Outline (34 theoretical hours):**

It will be determined by specifying the topics by the relevant professor taking into account the topic of student thesis and related issues about the advances in virology.

**References:**

1. Recent papers in basic and medical virology
2. Fields virology. Last edition

**Students' evaluation:**

Student evaluation is done through oral presentation and written exam.

Ministry of Health and Medical Education of the Islamic Republic of Iran High Council for Medical Science Planning

**Course Name: Principles of Epidemiology**

**Course code: 18**

**Prerequisite:** None

**Number of Credits:** 2 credits

**Credit Type:** Theoretical

**Overall Course Objectives:**

To introduce students to epidemiology and the spread of diseases caused by viruses

**Course Description:**

In this course, students learn about epidemiology and the spread of human diseases and common diseases between humans and livestock and how to prevent and control them, and also get familiarized with the methods of studying, prevalence degree, and statistics of infectious diseases.

**Outline (34 theoretical hours):**

1. Introduction
2. Epidemiological terms
3. Pathogens (physical and biological)
4. Environmental factors and their role in causing diseases
5. Epidemiological study methods
6. Epidemiology of diseases transmitted through respiration
7. Epidemiology of diseases transmitted through the gastrointestinal tract
8. Epidemiology of diseases transmitted by contact
9. Epidemiology of diseases transmitted by arthropods
10. Epidemiology of common diseases of humans and animals
11. Principles of control and prevention of infectious diseases

**References:**

Determined by the professor's opinion

**Students' evaluation:**

Students are assessed by a written exam at the end of the semester.

Ministry of Health and Medical Education of the Islamic Republic of Iran High Council for Medical Science Planning

**Course Name: Clinical Virology**

**Course code: 19**

**Number of Credits:** 2 credits

**Credit Type:** Internship

**Overall Course Objectives:**

Familiarizing students with common viral diseases in the form of clinical observations by relevant infectious and clinical specialists, will have internships in the following sections.

- Pediatric ward
- Gastrointestinal ward
- Dermatology ward
- Ophthalmology ward

**Course description:** In this course, students will get familiar with common viral diseases in different wards of the hospital by observing outpatients in clinics and learning how to get samples from outpatients and patients hospitalized in dermatology, infectious and pediatric wards under the supervision of the relevant professors.

**Outline (102 hours of internship):**

**Observing patients under the supervision of pediatricians including:**

1. Sensia respiratory infections
2. Infections suspected of adeno
3. Breathing infections suspected to influenza
4. Breathing infections suspected to parainfluenza

**Observing patients under the supervision of pediatricians and gastroenterologists including:**

5. Gastrointestinal infections suspected to adeno
6. Gastrointestinal infections suspected to rotavirus
7. Gastrointestinal infections suspected to astro and caliciviruses
8. Gastrointestinal infections suspected to adeno

**Observing and evaluation of skin diseases under the supervision of relevant specialists including:**

9. Skin infections suspected to varicella zoster
10. Skin infections suspected to herpes simplex 1 and 2
11. Skin infections suspected to parvoviruses
12. Skin infections suspected to molluscum contagia zoom

**Observing patients under the supervision of ophthalmologists including:**

13. Conjunctival infections due to infection with Coxsackie viruses
14. Conjunctival infections due to infection with adenoviruses
15. Conjunctival infections due to infection with herpes family viruses

**References:**

**Recent papers in clinical and medical virology** (up-to-date version)

**Students' evaluation:**

Student evaluation is done through oral presentation and written exam.

Ministry of Health and Medical Education of the Islamic Republic of Iran High Council for Medical Science Planning

**Course Name: Biosafety**

**Course code: 20**

**Prerequisite:** None

**Number of Credits:** 2 credits

**Credit Type:** Theoretical

**Overall Course Objectives:**

To acquaint students with the dangers of laboratory materials and equipment, application and preventive measures, and to take complete precautions.

**Course Description:** In this course, students will be introduced with the use of biological substances and how to avoid the dangers of infectious devices and materials in the laboratory.

**Outline (34 theoretical hours):**

1. Familiarity with the transfer of materials and infectious samples
2. International rules and regulations for the transfer of infectious specimens
3. Principles of packaging system for transportation
4. Necessary measures to clean the leakage of infectious samples during transmission and to prevent the spread of contamination
5. Investigation of the risks of genetic changes in microorganisms
6. Disinfection of laboratory environment and equipment, bacterial and viral
7. Necessary measures for packing and dumping waste from infectious materials,
8. Storage of flammable materials and caustic substances (acids and bases)
9. Care in the use of materials, gas and liquefied petroleum gas
10. How to work with laboratory devices and equipment and assess their hazards and apply the necessary precautions
11. Investigating the risks of genetic changes in microorganisms and creating genetic clones and gene therapy and taking the necessary precautions
12. Familiarity with the use and consumption of radioactive materials and the necessary measures in their storage, maintenance, consumption and waste
13. Risks in the use and application of UV, X-rays, and gamma rays

**References:**

Laboratory biosafety manual (up-to-date version)

**Students' evaluation:**

Student evaluation is done through oral presentation and written exam.

Ministry of Health and Medical Education of the Islamic Republic of Iran High Council for Medical Science Planning

**Course Name: Medical Entomology**

**Course code: 21**

**Prerequisite:** None

**Number of Credits:** 2 credits

**Credit Type:** Theoretical

**Overall Course Objectives:**

Familiarity of students with arboviruses, diagnosis and methods of their transmission, various arbovirus diseases transmitted by important medical arthropods, common arbovirus diseases in Iran and methods of controlling them.

**Outline (34 theoretical hours):**

1. Insect body structure
2. Methods of disease transmission by insects
3. Transmission mechanisms
4. Definition - general characteristics of arboviruses.
5. Naming - classification and different families of arboviruses
6. Laboratory diagnosis of arboviruses
7. Keeping arboviruses in nature
8. Introducing the most important arboviruses and their evolution
9. Methods of arbovirus transmission and by arthropods
10. arboviruses pathogenesis
11. Arboviruses diseases transferred from aedes, colecs, colists, anopheles, soil mosquitoes, koleokooids, etc. and ticks
12. Introduction of common arbovirus diseases in Iran
13. Ways to prevent and control arboviruses
14. Articles published in this field in reputable journals

**References:**

1. Mullen G and Durden L. (last edition). Medical and Veterinary Entomology. Academic Press.
2. Yunker (last edition). Arboviruses in Arthropod Cell in vitro, Vol I, II. CRC Press.
3. Arbovirus related papers (up-to-date version)

**Students' evaluation:**

In this course students will be evaluated by summative (final exam) and formative (during the semester, midterm, project, and etc.) evaluation.

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**Course Name: Immunology (2)**

**Course code: 22**

**Prerequisite:** None

**Number of Credits:** 2 credits (1 theoretical + 1 practical)

**Credit Type:** Theoretical - Practical

**Overall Course Objectives:** Familiarization of students with the immune system

**Course description:** Students learn various topics in immunology and can use this to understand the body's defence mechanism against viruses and its use to prepare and manufacture viral vaccines to prevent diseases.

**Outline (17 theoretical hours - 34 practical hours):**

1. Cells, tissues and organs of the immune system
2. Innate immune and the cells associated with them
3. Acquired immune system cells
4. Lymphatic tissue
5. Immunogens and antigens
6. Antibodies with B cell formation and humoral immune response
7. immunoglobulins and interaction of antibodies with antigens, action of antibodies, antibody diversity and production of genes related to their production
8. Lymphocytes and natural killer cytokines
9. Cytokines
10. Chemokines
11. Complement and chitin and swelling
12. Regulation and immune response
13. Immunological tolerance
14. Immunity against viruses
15. Vaccination
16. Types of hypersensitivity
17. Autoimmune and autoimmune diseases
18. Immunological methods

**References:**

1. Medical Immunology, D. Stites (up-to-date version)
2. Immunology, Dr. Farid Hosseini

**Students' evaluation:**

Students will be assessed by a written exam at the end of the semester.

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**Course Name: Medical Bacteriology**

**Course code: 23**

**Prerequisite:** None

**Number of Credits:** 2 credits (1 theoretical + 1 practical)

**Credit Type:** Theoretical - Practical

**Overall Course Objectives:**

Familiarization of students with pathogenic bacteria and common diseases in Iran

**Course Description:** Familiarity of students with bacterial diseases, method of transmission, pathogenesis, diagnosis, prevention and treatment.

**Outline (17 theoretical hours - 34 practical hours):**

1. Generalities of pathology
2. Genetics of bacteria and their application
3. Gram-positive Cocos and their culture
4. Gram-negative Cocos
5. Gram-negative coco bacilli
6. Gram-negative intestinal bacilli (Enterobacteriaceae)
7. Aerobic and anaerobic gram-positive bacilli
8. Sporulated gram-positive bacilli
9. Mycobacteria
10. Spirochetes
11. Mycoplasma, chlamydia
12. Aerobic actinomycetes
13. Anaerobic actinomycetes

It is noteworthy to state that the students will get familiarized with culture and isolation and extraction of plasmid bacteria about various bacteria practically in the laboratory.

**References:**

1. Medical microbiology Jawetz (up-to-date version)
2. Medical Microbiology Murray (up-to-date version)

**Students' evaluation:**

Students will be assessed by a written exam at the end of the semester.

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**Standards of the Curriculum**  
**Medical Virology Field**  
**Discontinuous Master's Degree**

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Council for Medical Science Planning

## Standards of the Curriculum

The following are the minimum issues that should be considered by evaluators in the curriculum evaluation process:

\*It is necessary that the courses, is equipped with the **spaces and general educational facilities** such as: specialized classroom, conference hall, specialized book group in the department, public library, computer center equipped with high-speed internet, and specialized software, dedicated department website, and educational archiving system

\*It is necessary that the educational group provide the required **specialized spaces** including: specialized laboratories, hospital and social areas, based on the provisions of the educational program.

\*It is necessary that the educational department provide the required **welfare and cultural spaces**, including: professors' room, students' room, self-service, prayer hall, dormitory, and cultural and sports facilities.

\*It is necessary that the educational areas outside the department of **rotation courses** be definitively approved by the assessment team.

\*It is necessary that required **populations and specific materials** for education, including: patient, active hospital bed, laboratory samples, food samples, medicine with cosmetics according to the needs of the training program be in sufficient numbers and acceptable diversity to be available to learners.

\*It is necessary that the required **capital and consumer equipment** in the program be provided to the executors of the program and their quality is approved by the assessment team.

\*It is essential that the **necessary facilities for training exercises and related research**, be in accordance with the field of evaluation and available to the faculty and students, and this should be approved by the evaluators.

\*It is essential that the evaluated education department has the required **faculty** based on the items in the educational program and the approvals of the Development Council and its documents are provided to the evaluation team.

\*It is essential that the educational department has the required **trained staff** to train the course learners according to what is stated in the training program.

\*It is necessary that the **educational program** (Curriculum) is available to all the audience.

\*It is essential that regulations, instructions, guidelines, rules and bylaws be available to all audiences and learners should be informed about them at the beginning of the course and the documentation should be provided to the assessors.

\*It is essential that **course materials** including books and journals required by learners and faculty members are available on the department shelf.

\*It is essential that learners are actively present at their workplace during the week, according to the number of days required by current rules, perform their duties under the supervision of faculty with senior learners, and have a weekly or monthly group schedule available.

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\*It is necessary that the **content of the theoretical class curriculum** is at least 80% consistent with the syllabus contained in the curriculum.

\*It is necessary that learners actively participate in all of the **department educational and research programs**, such as in-group conferences, seminars, hands-on work, research, and lower-level training, according to the department regulatory program, and provide documentation to evaluators.

\*It is necessary that the training process in the course be relatively satisfactory to the learners and approved by the evaluators.

\*It is necessary that **Dress code** be informed to the learners at the beginning of the program, and to monitor it, there are appropriate executive mechanisms approved by the evaluators in the department.

\*It is necessary that learners are aware of and act on the **ethical codes** contained in the curriculum and that their actions are approved by the evaluators.

\*It is necessary to form an **educational portfolio** for all learners in the educational department and to keep the results of evaluations, certificates of educational activities, inside and outside the educational department, incentives, reminders and other necessary documents.

\*It is necessary that learners have an acceptable **log book** in accordance with the general and specific competencies contained in the program being evaluated.

\*It is necessary that the learners, based on the semester, have performed the **necessary specific intervention skills** based on the items in the program and have recorded them in their workbook and signed them by the supervising professors.

\*It is necessary that the **worksheet** is continuously completed by the learners and monitored by the relevant professors and the necessary written feedback is provided to them.

\*It is necessary for learners to participate in the **research programs of the scientific department** during their program and its documents are available.

\*It is necessary for the learners, according to the academic year, to pass the **credits outside the educational department** (if any) and to have received a **certificate** from the person in charge of the relevant field, and its documents should be presented to the evaluation group.

\*It is necessary that there is pre-planned and planned **interdisciplinary scientific cooperation** between the main educational department and other educational departments, and the documents indicating this cooperation be available.

\*It is necessary to use at least 70% of the **educational methods and techniques** in the program.

\*It is necessary that learners be **evaluated** during the program according to the methods mentioned in the program and the documentation be provided to the assessment team.

\*It is essential that the evaluated university or educational center meets the criteria set forth in the curriculum.

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**Chapter Five**  
**Curriculum Evaluation**  
**Medical Virology Field**  
**Discontinuous Master's Degree**

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## Program Evaluation

### Formative Evaluation of the Program:

-Evaluation is based on achieving the educational goals of the program, determining and identifying the strengths and weaknesses of the program and modifying the program if necessary.

### Summative Evaluation of the Program:

The program is evaluated under the following conditions:

- 1- Passing ..... years after the implementation of the program
- 2- Major technological changes that indicate the need to review the program
- 3- Decisions made by the key policy-makers related to the program

### Program Evaluation Indicators:

Index	Criteria
* Graduates' satisfaction with the program:	60%
* Faculty members' satisfaction with the program:	60%
* Health system managers' satisfaction with the program results:	60%
* Estimation of needs and health problems by graduates:	60%
* Quantity and quality of intellectual products:	Based on evaluators' opinion

### Program Evaluation Method

- Survey of the faculty involved in the program, assistants and graduates with pre-compiled questionnaires
- Using the questionnaires in the evaluation and accreditation unit of the secretariat.

### Trustees of Program Evaluation

The trustees of program evaluation are the council for the development of medical universities in collaboration with the program development or review group and other educational secretariats and other faculty members.

### Program Review Method

The steps of reviewing this program are as follows:

- Gathering information from surveys, comparative and field research, suggestions and opinions of experts
- Requesting the secretariat to form the program review committee
- Suggesting the collected data in the program review committee
- Review the required parts of the program and submit a draft of the revised educational program to the secretariat of the high council for medical sciences planning

Ministry of Health and Medical Education of the Islamic Republic of Iran High Council for Medical Science Planning

## **Appendices**



## **Appendix No. 1**

## **Charter of Patients' Rights in Iran**

1- Optimal receipt of health services is the patient's right.

- Presenting health services should be:

1-1) Worthy of human dignity and respect values, cultural and religious beliefs;

1-2) Based on honesty, fairness, politeness and kindness;

1-3) Free from any discrimination, including ethnic, cultural, religious, type of disease and gender;

1-4) Based on updated knowledge;

1-5) Based on the superiority of the patient's interests;

1-6) Fair and based on patients' treatment priorities as regards the distribution of health resources;

1-7) Based on the coordination of care elements including prevention, diagnosis, treatment and rehabilitation;

1-8) With the provision of all basic and essential welfare facilities and away from imposing suffer and unnecessary restrictions;

1-9) Pay special attention to the rights of vulnerable groups in society, including children, pregnant women, the elderly, the mentally ill patients, prisoners, mentally and physically disabled, and unaccompanied persons;

1-10) In the fastest possible time and with respect to the patient's time;

1-11) Considering variables such as language, age and gender of service recipients;

1-12) In necessary and urgent cases (emergency), services should be provided regardless of the cost. In case of non-urgent cases, it should be defined according to the standard terms;

1-13) In necessary and urgent cases (emergency), if it is not possible to provide appropriate services, it is necessary to provide the necessary services and necessary explanations in order to transfer the patient to an equipped unit;

1-14) In the final stages of life, when the patient's condition is irreversible and death is imminent, the goal is to maintain the patient's comfort. Comfort means reducing the patient's pain and suffering, paying attention to the psychological, social, spiritual and emotional needs of him and his family at the time of death. The dying patient has the right to be with the person he wants in the last moments of his life.

2- The information should be provided to the patient in a satisfactory and sufficient manner.

2-1) The information needs to cover the following content:

2-2-1) The content of the charter of patients' rights at the time of admission;

2-1-2) Standards and predictable costs of the hospital such as treatment and non-treatment costs, insurance rules and introducing supportive oppression at the time of admission;

2-1-3) Name, responsibility and professional rank of members of the medical team responsible for providing care, including doctors, nurses and students and their professional relationship with each other;

2-1-4) Diagnostic and therapeutic methods and the strengths and weaknesses of each method and its possible side effects, diagnosis of the disease, prognosis and its side effects, as well as all the information influencing the patient's decision-making process;

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2-1-5) How to access the treating physician and key members of the medical team during treatment;

2-1-6) All actions with a research nature.

2-1-7) Provide necessary training to continue treatment

2-2) Presenting information should be provided as follows:

2-2-1) Information should be timely and appropriate to the patient's condition, including anxiety, pain and his characteristics including language, education, and comprehension, unless:

-Delay in initiating treatment by providing the above information is considered harmful to the patient; (In this case, the transfer of information after the necessary action, should be done at the first appropriate time.)

-Despite being informed of the right to receive information, the patient refuses to do so, in which case the patient's request should be respected; unless not being informed put the patient at serious risk with others;

2-2-2) The patient can access all the information recorded in his clinical file and receive its image and request the correction of errors contained in it.

3- The patient's right to choose and decide freely in receiving health services must be respected.

3-1) The scope of selection and decision-making needs to be about the following:

3-1-1) Selection of the treating physician and the center providing health services within the framework of the criteria;

3-1-2) Selection and conference with the second physician as the consultant;

3-1-3) Participation or non-participation in any research, with the assurance that his decision will not affect the continuity of how to receive health services.

3-1-4) Accepting or rejecting the proposed treatments after being aware of the possible side effects of accepting or rejecting it, except in cases of suicide or in cases where refusing to treat would put another person in serious danger;

3-1-5) Announcing the patient's previous opinion about future treatment measures when the patient has the capacity to make decisions and as a guide to medical procedures in the absence of his decision-making authority in accordance with legal standards considered by health care providers and the decision maker replaces the patient.

3-2) The conditions for selection and decision-making include the following:

3-2-1) The patient's choice and decision-making should be free and informed, based on receiving sufficient and comprehensive information (mentioned in paragraph 2);

3-2-2) After providing information, the patient should be given the necessary and sufficient time to make a decision and select.

4- The provision of health services should be based on respect for the patient's privacy (right to privacy) and the principle of confidentiality.

4-1) Observance of the principle of confidentiality regarding all information about the patient is mandatory, except in cases where the law has excluded it;

4-2) In all stages of care, both diagnostic and therapeutic, the patient's privacy must be respected. It is necessary for this purpose to provide all the necessary facilities to ensure the privacy of the patient;

4-3) Only the patient and group therapy and authorized persons on behalf of the patient and persons who are considered authorized by law can access the information;

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4-4) The patient has the right to be accompanied by a trusted person in the diagnostic process, including examinations. Accompanying one of the child's parents in all stages of treatment is the child's right, unless it is contrary to medical necessities.

5. Access to an efficient complaints system is the patient's rights.

5-1) Every patient has the right to file a complaint to the competent authorities in the event of a violation of his or her rights, which is the subject of this charter, without interfering the quality of health services;

5-2) Patients have the right to be informed of the procedure and the results of their complaint;

5-3) Damage resulting from the error of health care service providers must be compensated as soon as possible after review and proof in accordance with regulations.

In the implementation of the provisions of this charter, if the patient for any reason does not have the capacity to make decisions, the exercise of all the rights of the patient - mentioned in this charter - will be the responsibility of the alternative legal decision maker. Of course, if a substitute decision-maker obstructs the patient's treatment, contrary to the physician's opinion, the physician can appeal to review the decision through the relevant authorities.

-If a patient is without required qualities to make decisions, but can make a reasonable decision in a part of the treatment, his decision must be respected.

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## **Appendix No. 2**

### **Executive Regulations for Dress Code and Students' Professional Ethics In Laboratory-Clinical Environments**

The dress code and behavior of all the staff in the professions related to medical sciences department needs to be in a way that besides maintaining the professions' dignity, provides effective professional communication with patients, patients' companions, colleagues and others in educational settings.

Therefore, it is morally necessary for all ones who are studying or providing services in clinical and laboratory educational settings to observe the following rules.

#### **Chapter 1: Dressing and Dress Code**

The students' clothes to enter educational environments, especially clinical and laboratory environments, should be uniform and include the following set of features:

- 1-White knee-high non-stick cape with long sleeves
- 2- The cape must be sealed with the logo of Medical Sciences University and the relevant medical health services.
- 3- All buttons on the cape must be completely closed during the entire period of attendance in educational environments.
- 4-Using a valid identification card (ID) with a photo attached (containing first name, last name, faculty name, field of study) on the cover, in the left chest area during the entire period of attendance in educational environments is mandatory.
- 5-Female students should cover the entire head, neck, under the neck and hair with a suitable cover.
- 6-Pants should be long, conventional, plain, and non-stick; use of ripped jeans and the like is not appropriate for the medical dignity.
- 7-It is essential to wear simple socks that cover the entire foot and leg.
- 8-It is forbidden to wear lace socks with embellishments.
- 9- Shoes should be comfortable and appropriate, there should be no noise when walking.
- 10-The cape, dress, and shoes must be comfortable, clean, neat, and conventional, and they should not have sharp and inappropriate colors.
- 11- It is forbidden to use inappropriate badges for the medical field and hang them on the cape, pants, and shoes.
- 12- It is forbidden to use and expose any ring, bracelet, necklace, and earrings (except wedding ring) in educational environments.
- 13- The use of slippers and sandals in educational environments except in operating room and delivery room is prohibited.

#### **Chapter 2: Personal hygiene and make-up standards in educational environments of the country**

1. Those related to the medial professions are models for personal cleanness and hygiene. Thus, cleanness in appearance and hygiene are essential in medical science educational environments.

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2- Nails should be short and clean. Using nail polish and nail stickers in any form is prohibited. The use of artificial nails and long nails increases the chances of transmitting the infection and the possibility of damage to others and medical equipment.

3- Unconventional make-up of the head and face is far from the practice of the medical profession. 4- It is forbidden to show any make-up in the form of a tattoo and using a ring with a jewel in the nose or any part of the hands and face.

### **Chapter 3: Criteria for students' behavior in medical education environments**

1- Observance of the principles of professional ethics, humility and modesty in dealing with patients, patients' companions, professors, students and staff is mandatory.

2- Speaking in educational settings should be accompanied by calm and courtesy, and making any loud noise or uttering words that are not appropriate in the medical profession is prohibited.

3- Smoking at all times when a person is present at educational environments is prohibited.

4- Chewing gum and the like is prohibited in laboratories, conference halls, patient rounds and in the presence of professors, staff and patients.

5- When attending classes, laboratories and rounds of patients, the mobile phone should be turned off and at other times, its use should be reduced as necessary.

6. Any discussion or joke in related public places such as elevators, coffee shops and restaurants is prohibited.

### **Chapter 4: Supervising the administration and follow-up cases of violations of regulations**

1- Supervising the principles of this regulations in educational hospitals and other clinical education medical environments is the responsibility of the deputy of the hospital, director of the department, chairman of the department, and educational and student experts.

2- People who do not observe the professional ethics and principles of this regulation will be warned first and if they insist on committing a violation, they will be referred to the Student Disciplinary Council.

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## Appendix No. 3

### Rules of Working with Laboratory Animals

Animals have a very important role in promoting and expanding medical research, and the ethical principles and instructions of the divine religions dictate that we adhere to their rights. Therefore, researchers are required to observe the relevant ethical principles in the researches they conduct on animals. Consequently, according to the approvals of the Publications Commission, it is mandatory to mention the code of the Ethics Committee in research articles submitted to scientific journals. The following are the principles and rules of working with laboratory animals:

- \*The storage space and building have the necessary facilities for animal health.
- \*Before the arrival of the animals, depending on the type and species, the necessary conditions should be provided for keeping them.
- \*Cages, walls, floors and other building parts should be washable and disinfectable.
- \*In Indoor conditions, the required conditions such as light, oxygen, humidity, and temperature should be provided.
- \*If kept outdoors, the animal should have a shelter.
- \*The space and cage should fit the animal species.
- \*Cages allow the animal to rest.
- \*In animal transportation, the heating and cooling conditions, light and breathing air from the place of purchase to the permanent place of the animal need to be observed.
- \*The animal transport vehicle has appropriate conditions and has the necessary license.
- \*The health of the animal should be monitored by the recipient.
- \*The quarantine of the newly arrived animal should be observed.
- \*Animals should not be placed near their predators.
- \*Cages should be kept at the sight of the observer.
- \*\*There should be no possibility of animal escape from the cage.
- \*Remove extra noises from the environment that annoy the animal.
- \*There should be no possibility of injury to the animal as a result of movement.
- \*The bed and resting place of the animal should be cleaned regularly.
- \*Storage space should be regularly washed and disinfected.
- \*Use standard disinfectants to clean the environment and sanitize work equipment.
- \*The animal's food and water should be appropriate and hygienic.
- \*Ventilation and evacuation of excretion should be done continuously so that there is no annoying odor and no possibility of allergens and disease transmission to staff, as well as laboratory animals.
- \*There should be a suitable space for disposal of corpses and carcasses of animals.
- \*There should be adequate, comfortable and hygienic space for office staff, technicians, and caregivers.
- \*Do not use sick animals or animals with special conditions such as pregnancy and lactation in research.

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\*Before conducting any research, the necessary opportunity should be provided for the animal to adapt to the environment and the people.

\*Employees must have received training in working with animals.

### **Conditions for Conducting Animal Research**

- ✓ The specific animal species selected needs to be appropriate for testing and research.
- ✓ The minimum animal required be used for statistical and true research accuracy.
- ✓ It should not be possible to use optimal replacement programs instead of using the animal.
- ✓ Minimal harassment should be used in different stages of research and in the method of animal death after research.
- ✓ Observe animal labor codes throughout the study.
- ✓ The results should lead to improving the health of the community.

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