# Zagazig University

# Faculty of Pharmacy

# Pharmacology Department

# Program and Course Specifications

## Master and Ph.D.

## Degrees

**2017/2018**

# Master Degree

# Program Specification

# Program Specification

## A- Basic Information

**1- Program title:** Master. Pharm. Sci Degree in **Pharmacology**

**2- Program type:** Single

**3- Faculty/ University:** Faculty of Pharmacy, Zagazig University

**4-Department:** Pharmacology

**5- Coordinator:** Prof. Dr. Ahmed Fahmy

**6- Date of program specification approval: -**

## B- Professional Information

### 1- Program aims:

The Pharmacology Master program aims to provide the postgraduate student with a solid background and wide array of advanced pharmacology-related disciplines including physiology, molecular biology, biostatistics and drug interactions. In addition, the program aims to prepare the postgraduate student to develop an individualized program of research through comprehensive training in laboratories and systematic practicing of different pharmacological techniques.

**Consistency of the program aims with the mission of Faculty of Pharmacy:**

The faculty of Pharmacy, Zagazig University aims to provide the local and regional community with highly qualified, multidisciplinary and professional pharmacists with ethical values and able to participate in the development of drug industry and quality assurance as well as contribute to a distinguished health service to the society. This is achieved through developing and upgrading the academic programs, teaching and learning methods, supporting various student activities,

developing the abilities of the staff members, their assistants and administrative members, enhancing the oriented applied and scientific research and providing the continuous pharmaceutical education.

## 1.1 Graduate attributes:

Modern pharmacology is interdisciplinary and it depends on the strengths of biochemistry, physiology, cell biology and molecular biology to explore and understand the effects of drugs. Therefore, the student should acquire the necessary attributes and skills in various aspects of Pharmacology including the following:

1- Identify a broad scientific background on human physiology and molecular biology.
2- Possess the ability to design a good research experiment, write and evaluate scientific reports.
3- Design experimental protocols through critical thinking and results inspection.
4- Analyze and evaluate the results of research experiments and interpret the results of statistical analysis of the experimental data.
5- Follow the ethics and morals of scientific research regarding handling of experimental animals and intellectual property rights.
6- Develop and improve self-learning abilities.
7- Communicate and work effectively in a team.

## 2-Intended Learning Outcomes (ILOs):

**Upon completing the program, postgraduate students will be able to demonstrate knowledge and understanding** as well as technical and intellectual skills relevant to **Pharmacology** Master of sciences degree as follows:

## 2-1- Knowledge and Understanding:

**On successful completion of the Master degree Program, students will be able to:**

A.1-Detect the principles of human body physiology, progression of diseases, pharmacokinetics, pharmacodynamics and basics of genetics

A.2-Identify the basics of instrumental analyses and techniques applied for different pharmacological experiments.

A.3- Describe the similarities and differences between statistical tests and learn how to apply them appropriately.

A.4- Define the influence of pharmacology and toxicology-related problems on society.

A.5- Update the information in the field of pharmacology and related subjects.

A.6- Recognize the recent methods of targeting drugs in certain diseases.

A.7- Mention the principles of moral and medico-legal aspects applied in the practical life related to different areas of pharmacology.

A.8- List risk factors for drug-induced diseases and related preventative strategies

A.9-Tell (Select) the different methods of study design and statistical analysis

A. 10- Outline the basics of quality assurance to guarantee ideal practice in the field of pharmacology.

A.11-Determine the ethics of handling, care and disposal of experimental animals

## 2-2 - Intellectual Skills:

**On successful completion of the Master degree Program, students will be able to:**

B.1- Analyze experimental data statistically, apply statistical tests appropriately, and interpret statistical significance for results from commonly used statistical tests.

B.2- Propose strategies to minimize drug-induced diseases

B.3- Integrate information regarding drug kinetics, dynamics, toxicity and interaction with other drugs to apply a proper therapeutic regimen in different situations related to the profession.

B.4- Withdraw conclusions and observations from different scientific reports

B.5-Apply the most appropriate instrumental technique for DNA and RNA assays.

B.6- Design and manage different experimental protocols in the field of pharmacology and related disciplines.

B.7- Evaluate the toxicity and hazards of therapeutic regimens and how to apply these regimens properly in different pathological conditions

B.8- Suggest alternative and innovative plans to improve the experimental protocols

B.9- Identify decision errors that can occur when using statistical tests and suggest methods to minimize them

B.10- Take professional decisions based on critical thinking and physiological and pharmacological-based evidences

## 2-3 - Professional and Practical Skills:

**On successful completion of the Master degree Program, students will be able to:**

C.1-Master a wide range of pharmacological techniques either in vivo or in vitro

C.2-Represent and summarize experiment results in a well-organized, written reports.

C.3- Get acquainted with collecting information regarding drugs and research experiments from different resources.

C.4-Demonstrate a solid ability to assess and use different laboratory skills related to pharmacology.

## 2-4 - General and Transferable Skills:

**On successful completion of the Master degree Program, students will be able to:**

D.1- Communicate effectively with other colleagues and staff members using verbal, written and expression language.

D.2- Advise patients and prescribers on the consequences of drug interactions and adverse effects of drugs.

D.3- Share effectively in professional and scientific seminars and discussions related to the field of pharmacology and associated experimental techniques.

D.4- Demonstrate competence in the use of information technology broad enough to meet personal, academic and professional needs

D.5-Recognize learning needs and how to fulfill them.

.D6- Use library, drug information databases, drug interactions identifying websites and other resources to get knowledge related to pharmacology.

D.7-Develop rules and indicators for assessing and criticizing the performance of others.

D.8- Maintain ethics and respect-based relationships with colleagues, professors and other staff members

D.9- Appreciate team working and performing tasks in the group environment.

D.10-Manage time and experimental plan effectively.

D.11- Strive for excellence in life-long learning by planning for the future, participating in continuing education or professional development activities.

## 3- Academic Standards:

Faculty is committed to the Academic References Standards for postgraduate studies (March 2009).

**Matrix :** Comparison between Master degree program ILOs and the Academic Reference Standards (ARS, 2009).

| ARS vs. Program ILOs of Masters in Pharmacology | | |
|---|---|---|
| ARS | | Program ILOs |
| Knowledge and Understanding | 2.1.1- Theories and fundamentals related to the field of learning as well as in related areas. | A.1Identify the principles of human body physiology, progression of diseases, pharmacokinetics, pharmacodynamics and basics of genetics.<br>A.2Detect the basics of instrumental analyses and techniques applied for different pharmacological experiments.<br>A.3- Describe the similarities and differences between statistical tests and learn how to apply them appropriately. |

| | | |
|---|---|---|
| | 2.1.2- Mutual influence between professional practice and its impact on the environment. | A.4- Identify the influence of pharmacology and toxicology-related problems on society. |
| | 2.1.3- Scientific developments in the area of specialization. | A.5- Update the information regarding DNA sequencing and techniques used for analysis of DNA and RNA.<br>A.6Determine the recent methods of targeting drugs in certain diseases. |
| | 2.1.4- Moral and legal principles for professional practice in the area of specialization. | A.7List the principles of moral and medico-legal aspects applied in the practical life related to different areas of pharmacology. |
| | 2.1.5- Principles and the basics of quality in professional practice in the area of specialization. | A.8- List risk factors for drug-induced diseases and related preventative strategies.<br>A.9Detect the different methods of study design and statistical analysis.<br>A.10Identify the basics of quality assurance to guarantee ideal practice in the field of pharmacology. |
| | 2.1.6- The fundamentals and ethics of scientific research. | A.11-Identify the ethics of handling, care and disposal of experimental animals. |
| Intellectual Skills | 2.2.1- Analyze and evaluate information in the field of specialization and analogies to solve problems | B.1- Analyze experimental data statistically, apply statistical tests appropriately, and interpret statistical significance for results from commonly used statistical tests. |
| | 2.2.2- Solve specified problems in the lack or missing of some information. | B.2- Propose strategies to minimize drug-induced diseases. |
| | 2.2.3-Correlate and integrate different pharmaceutical knowledge to solve professional problems. | B.3- Integrate information regarding drug kinetics, dynamics, toxicity and interaction with other drugs to apply a proper therapeutic regimen in different situations related to the profession. |
| | 2.2.4- Conduct research and write scientific report on research specified topics. | B.4- Withdraw conclusions and observations from different scientific reports.<br>B.5- Apply the most appropriate instrumental technique for DNA and RNA assays.<br>B.6- Design and manage different experimental protocols in the field of |

| | | |
|---|---|---|
| | | pharmacology and related disciplines. |
| | 2.2.5- Evaluate and manage risks and potential hazards in professional practices in the area of specialization | B.7- Evaluate the toxicity and hazards of therapeutic regimens and how to apply these regimens properly in different pathological conditions. |
| | 2.2.6- Plan to improve performance in the field of specialization. | B.8- Suggest alternative and innovative plans to improve the experimental protocols<br>B.9- Identify the types of decision errors that can occur when using statistical tests and suggest methods to minimize them. |
| | 2.2.7- Professional decision-making in the contexts of diverse disciplines. | B.10- Take professional decisions based on critical thinking as well as physiological and pharmacological-based evidences. |
| Professional and Practical Skills | 2.3.1- Master basic and modern professional skills in the area of specialization. | C.1- Master a wide range of pharmacological techniques either in vivo or in vitro. |
| | 2.3.2- Write and evaluate professional reports. | C.2-Represent and summarize experiment results in a well-organized, written reports.<br>C.3- Get acquainted with collecting information regarding drugs and research experiments from different resources. |
| | 2.3.3- Assess methods and tools existing in the area of specialization. | C.4- Demonstrate a solid ability to assess and use different laboratory skills related to pharmacology. |
| General and Transferable Skills | 2.4.1- Communicate effectively. | D.1- Communicate effectively with other colleagues and staff members using verbal, written and expression language.<br>D.2- Advise patients and prescribers on the consequences of drug interactions and adverse effects of drugs.<br>D.3- Integrate in professional and scientific seminars and discussions related to the field of pharmacology and associated experimental techniques. |
| | 2.4.2- Effectively use information technology in professional practices | D.4- Demonstrate competence in the use of information technology broad enough to meet personal, academic and professional needs. |

| | | |
|---|---|---|
| | 2.4.3- Self-assessment and define his personal learning needs. | D.5- Recognize learning needs and how to fulfill them. |
| | 2.4.4- Use variable sources to get information and knowledge. | D.6- Use library, drug information databases, drug interactions identifying websites and other resources to get knowledge related to pharmacology. |
| | 2.4.5- Set criteria and parameters to evaluate the performance of others | D.7-Develop rules and indicators for assessing and criticizing the performance of others. |
| | 2.4.6- Work in a team and lead teams carrying out various professional tasks. | D.8- Maintain ethics and respect-based relationships with colleagues, professors and other staff members.<br>D.9- Appreciate team working and performing tasks in the group environment. |
| | 2.4.7- Manage time effectively. | D.10-Manage time and experimental plans effectively. |
| | 2.4.8- Continuous and self-learning. | D.11-Strive for excellence in life-long learning by planning for the future, participating in continuing education or professional development activities. |

# 4-Curriculum Structure and Contents:

**a- Program duration: 2-5** years

**b- Program structure:**

- The Master's program can be completed in 2-5 years.
- The Faculty of pharmacy implements the credit hour system.
- The program is structured as:

**1- Courses: General (1 year) and Special (please see next page)**

**No. of credit hours for program courses:**

Compulsory: 12

Elective: (2x4) 8

Special: (3x4) 12

**2- Thesis:** 30 hours

The candidate must complete a research project on an approved topic in the Pharmaceutical Sciences. To fulfill this requirement the student must present (written and orally) a research proposal and write a thesis.

**3- General University Requirements:** 10 credit hours including:

a- TOEFL (400 units)

b- Computer course

## c-Program Curriculum:

| Course Code | Course Title | Credit hours | Program ILOs Covered |
|---|---|---|---|
| | General Courses: | | |
| M110 | 1- Molecular Biology | 4 | A1, A5, B5, B6, D4, D6,D8 |
| M112 | 2- Physiology | 2 | A1, A4, B4, B10, D1, D3 |
| M111 | 3- Biostatistics | 2 | A3, A9, B1, B9, D1 |
| M102 | 4- Instrumental analysis | 4 | A4 ,B3, D1, D2, D6, D7, D8 |
| ME4 | 5- Elective A Biotechnology | 4 | A1, A5, B5, B6, D4, D6, D8 |
| ME5 | 6- Elective B Applied Pharmacology | 4 | A4, A8, B3, B4, D1 |
| ME7 | Drug induced diseases | 4 | A1, A8, B2, B7, D2, D6 |
| | Special Courses: | | |

| | | | |
|---|---|---|---|
| Lsp1 | Advanced pharmacology techniques | 4 | A7, A10, B6, B7, D7 |
| Lsp2 | Drug targeting | 4 | A1, A6, B3, D4, D9 |
| Lsp3 | Pathophysiology | 4 | A1, A6, B2, D10 |
| | Thesis | 30 | A1, A4, A5, A7, A10, A11, B1, B3, B8, B10, C1, C2, C4, D1, D4, D5, D6, D7, D8, D10 and D11 |

**The marks for each course = 100 Marks**

### d. Learning Outcomes in Domains of Teaching Strategies & Assessment Methods:

| ILOs | teaching method | assessment method |
|---|---|---|
| Knowledge and Understanding<br>Intellectual Skills | Lectures<br>Case study<br>Self-learning | Written and oral Exam |
| Professional and practical Skill | Case study<br>Problem solving<br>Thesis | Practical Exam<br>Case discussion<br>Rubric |
| Intellectual Skills<br>General and Transferable Skills | presentation<br>Thesis | Oral Exam<br>Rubric |

## 5-Program admission requirements:

General Admission Conditions

- The Applicant should finish or being permanently or temporarily exempted from the military service and temporary exemption should be valid for at least one year from the date of beginning of study. (Exceptions apply for demonstrators and assistant lecturers).
- The applicant admission to the M.Sc. program should be no later than ten years from the time of graduation.
- Acquisition of an approval from the Faculty Council following an approval of concerned Departmental Board as well as Graduate Studies and Research Committee recommendation within a maximum of one month for any conditions stated by the concerned Departmental Board.

**Admission Conditions for M.Sc. degree**

In addition to the general admission conditions stated before, applicants are admitted to M.Sc. degree upon fulfillment of the following:

The applicants should be holders of Bachelor in Pharmaceutical Sciences from any Faculty of Pharmacy with a general grade at least good affiliated to the Egyptian Universities or an equivalent degree granted by any institute recognized by the Supreme Council of Universities.

The Faculty council is allowed, on consent of the concerned Departmental Board as well as Graduate Studies and Research Committee, to accept student for registration of M.Sc. degree if he has

got a diploma from one of the Egyptian Universities in one of the pharmaceutical sciences fields, Faculties, or Institutes that are recognized by the Supreme Council of Universities with a general grade of Good regardless his grades in bachelor degree.

Students should fulfill all the admission requirements stated by the concerned Departmental Board (ICDL certificate, local TOEFL certificate with a grade at least 450).

Admission has to be done within the period announced by the university.

Candidate thesis discussion isn't before one calendar year from research point registration.

**Regulations to complete the program:**

Conditions of granting the degree

The Faculty Council, in compliance with the concerned Departmental Board as well as Graduate Studies and Research Committee recommendation awards the M.Sc. degree upon fulfillment of the following requirements:

- Carrying out a deep research in the area of specialization for at least one or two calendar years and at most three years from the time of registration.
- The student has to succeed in all courses examinations.
- Acceptance of the research thesis by the Jury Committee according to statement 104 of universities regulating law.

**Cancellation of Registration**

The Faculty Board is allowed to cancel registration for M. Sc. programs in the following circumstances

- Student's failure to pass the course examinations for two times.
- Student's nonattendance or unsatisfactory progress (at least two annual reports) in research work being reported by the advisors and chief supervisor to the Departmental Board and forwarded to the Graduate Studies and Research Committee recommendation for approval of cancellation.
- Dissertation refusal by the Jury Committee.
- Incapability of the student to graduate by the deadlines indicated.

## 6- Admission Policy:

The faculty complies with the admission regulations and requirements of the Egyptian Supreme Council of Universities (ESCU).

## 7-Student assessment methods:

| Method | ILOS |
|---|---|
| Written exam | Knowledge and Understanding and Intellectual Skills |
| Oral exam | Knowledge and Understanding ,Intellectual Skills and General and Transferable Skills |
| Activity | Intellectual Skills and General and Transferable Skills |
| Seminars | Knowledge and Understanding ,Intellectual Skills & General and Transferable Skills |
| Follow up | Professional and practical Skills & General and Transferable Skills |
| Thesis and oral presentation | Knowledge and Understanding, Intellectual Skills, Professional and practical Skills & General and Transferable Skills |

| Grade Scale | Grade point average value (GPA) | Numerical scale |
|---|---|---|
| A+ | 5 | ≥ 95% |
| A | 4.5 | 90- < 95% |
| B+ | 4 | 85- < 90% |
| B | 3.5 | 80- < 85% |
| C+ | 3 | 75- < 80% |
| C | 2.5 | 70- < 75% |
| D+ | 2 | 65- < 70% |
| D | 1.5 | 60- < 65% |

## 8-Failure in Courses:

Students who fail to get 60% (1 point)

## 9-Methods of program evaluation

| Evaluator | Method | Sample |
|---|---|---|
| **Internal evaluator:** Professor Dr. Rasha Hassan | Program evaluation Courses evaluation | Program report Courses report |
| **External evaluator:** Professor Dr.Alaa El-Sisi | Program evaluation Courses evaluation | Program report Courses report |
| **Others methods** | Matrix with ARS Questionnaires | The Matrix Results of the questionnaires |

**Program coordinator**

**Prof. Dr. Ahmed Fahmy**

المشرف على القسم : عميد الكليه

ا.د/ محمد بركه

# Physiology

# Course specification of Physiology

## A- Course specifications:

- Program on which the course is given: Master of Pharmaceutical Sciences
- Major or Minor element of program: Major
- Department offering the program: Pharmacology Dept.
- Department offering the course: Pharmacology Dept.
- Date of specification approval: 2017/2018

## 1- Basic information:

Title: **Physiology** Code: M112
Lectures: 2 hrs/week Credit hours: 2 hrs/week
Total: 2hrs/week

## 2- Overall aim of the course:

- On completion of the course, the students will be able to build up comprehensive knowledge on the overall human physiological functions of the different body organs.

## 3. Intended learning outcomes (ILOs) of Physiology:

| | |
|---|---|
| **Knowledge and Understanding** | |
| **a1** | Describe the mechanical, physical, and biochemical functions of humans in good health, their organs, and the cells of which they are composed. |
| **a2** | Illustrate the interrelationships between physiology and the society in the field of human health. |
| **Intellectual skills** | |
| **b1** | Withdraw conclusions and observations from previous reports that help the student to conduct his own research and write reports. |
| **b2** | Use literature and scientific evidences to take decisions concerning physiological problems |
| **General and Transferable skills** | |
| **d1** | Communicate effectively and present ideas and findings clearly in oral and written forms. |

| | |
|---|---|
| **d2** | Participate in seminars and discussions related to the field of physiology. |

## 4. Course Content of Physiology:

| Week number | Lecture contents (2hrs/week) |
|---|---|
| **1** | Nerve & Muscle |
| **2** | Autonomic Nervous System 1 (Sympathetic nervous system) |
| **3** | Autonomic Nervous System 2 (Parasympathetic nervous system) |
| **4** | Cardiovascular System 1 (Structure, functions and properties of the heart) |
| **5** | Cardiovascular System 2 (Heart rate, cardiac output and blood pressure) |
| **6** | Central Nervous System 1 (Structure of brain and spinal cord) |
| **7** | Central Nervous System 2 (Reflexes and pain) |
| **8** | Kidney (Structure, function and urine formation) |
| **9** | Respiratory System (Structure and functions of the lung, mechanism of breathing)<br>Activity (Review article- Presentation) |
| **10** | GIT (Functions of gastric secretions and Neurohormonal regulation) |
| **11** | Endocrine System 1 (Hypothalamus, thyroid, parathyroid glands) |
| **12** | Endocrine System 2 (Adrenal gland and endocrine pancreas) |
| **13** | Blood physiology (Functions of blood cells and clotting mechanisms) |
| **14** | Membrane physiology (Structure and functions) |
| **15** | Revision |

## 5- Teaching and Learning Methods:

- Lectures
- Self-learning
- Open discussion

## 6- Student Assessment methods:

- Written exam to assess: a1, a2, b1 and b2.
- Oral exam to assess: a1, a2, b1, b2, d1 and d2.
- Activity to assess: d1, d2

## Assessment schedule:

| | |
|---|---|
| **Assessment (1):** Activity | Week 9 |
| **Assessment (2):** Written exam | Week 16 |
| **Assessment (3):** oral exam | Week 16 |

## Weighting of Assessment:

| Assessment method | Marks | Percentage |
|---|---|---|
| • Activity | 10 | 10 % |
| • Written exam | 75 | 75 % |
| • oral exam | 15 | 15 % |
| **TOTAL** | **100** | **100%** |

## 7- References and books:

**A-Scientific papers**

**B- Essential books:**


- Linda S. Costanzo (2007). Board Review Series: Physiology. Lippincott Williams & Wilkins. 4th ed
- Guyton physiology (2006) Arthur C. Guyton, John E. Hall, 11thedition Elsevier Inc.
- Clinical physiology (2005) An Examination Primer Ahis Banerjee, Cambridge University Press.


**Facilities required for teaching and learning:**

1. **For lectures:** Black (white) boards, computer, data show.

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**Course coordinator**

**Prof. Dr. Ahmed Fahmy**

المشرف على القسم : عميد الكليه

ا.د/ محمد بركه

- **Date: -**

| Matrix I of Physiology course | | | | | | | |
|---|---|---|---|---|---|---|---|
| Week number | Course Contents | Knowledge and understanding | | Intellectual skills | | General & Transferable skills | |
| | | **a1** | **a2** | **b1** | **b2** | **d1** | **d2** |
| **1** | Nerve & Muscle | X | X | X | X | | |
| **2** | Autonomic Nervous System 1 | X | X | X | X | | |
| **3** | Autonomic Nervous System 2 | X | X | X | X | | |
| **4** | Cardiovascular System 1 | X | X | X | X | | |
| **5** | Cardiovascular System 2 | X | X | X | X | | |
| **6** | Central Nervous System 1 | X | X | X | X | | |
| **7** | Central Nervous System 2 | X | X | X | X | | |
| **8** | Kidney | X | X | X | X | | |
| **9** | Respiratory System- Activity | X | X | X | X | | X |
| **10** | GIT | X | X | X | X | | |
| **11** | Endocrine System 1 | X | X | X | X | | |
| **12** | Endocrine System 2 | X | X | X | X | | |
| **13** | Blood physiology | X | X | X | X | | |
| **14** | Membrane physiology | X | X | X | X | | |
| **15** | Revision | X | X | X | X | | X |

# Matrix II of Physiology

| ARS | | Program ILOs | Course ILOs | Course content | Source | Teaching and learning methods | | Method of Assessment | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Lectures | Self-learning | Written exam | Oral exam | Activity |
| Knowledge and Understanding | 2.1.1- Theories and fundamentals related to the field of learning as well as in related areas. | A.1-Detect the principles of human body physiology, progres sion of diseases, pharmacok inetics, pharmacody namics and basics of genetics. . | a1 | All the topics | Scientific papers, text books and Internet | X | X | X | X | |
| | 2.1.2- Mutual influence between professional practice and its impact o the environment. | A.4- Recognize the influence of pharmacology and toxicology-related problems on society. | a2 | All the topics | Scientific papers, text books and Internet | X | X | X | X | |
| Intellectual Skills | 2.2.4- Conduct research and write scientific report on research specified topics. | B.4- Withdraw conclusions and observations from different scientific reports. | b1 | All the topics | Scientific papers, text books and Internet | X | X | X | X | |
| Intellectual Skills | 2.2.7- Professional decision-making in the contexts of diverse disciplines. | B.10- Take professional decisio ns based on critical thinking as well as physiological and pharmacological- | b2 | All the topics | Scientific papers, text books and Internet | X | X | X | X | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | based evidences. | | | | | | | | |
| General & Transferable skills | 2.4.1- Communicate effectively. | D.1- Communicate effectively with other colleagues and staff members using verbal, written and expression language. | d1 | Activity | Scientific papers, text books and Internet | X | X | | X | X |
| General & Transferable skills | 2.4.1- Communicate effectively. | D.3- Integrate in professional and scientific seminars and discussions related to the field of pharmacology and associated experimental techniques. | d2 | Activity | Scientific papers, text books and Internet | X | X | | | X |

# Biostatistics

# Course specification of Biostatistics

## A- Course specifications:

- Program on which the course is given: Master of Pharmaceutical Sciences
- Major or Minor element of program: Major
- Department offering the program: Pharmacology Dept.
- Department offering the course: Pharmacology Dept.

- Date of specification approval: 2017/2018

## 1- Basic information:

Title: **Biostatistics** Code: M111
Lectures: 2 hrs/week Credit hours: 2 hrs/week
Total: 2hrs/week

## 2- Overall aim of the course:

On completion of the course, the students will be able to:

- Design a good research experiment.
- Statistically analyze the results of research experiments.
- Interpret the results of statistical analysis of experimental data.

## 3. Intended learning outcome s (ILOs) of Biostatistics:

| | |
|---|---|
| **Knowledge and Understanding** | |
| **a1** | Identify the fundamentals and principles of Biostatistics. |
| **a2** | List the different methods of statistical analysis. |
| **Intellectual skills** | |
| **b1** | Analyze statistically and interpret data obtained from pharmacological experiments in different forms. |
| **b2** | Assess the types of decision errors that can occur during using statistical tests. |
| **General and Transferable skills** | |
| **d1** | Maintain ethics and respect-based relationships with colleagues. |

## 4. Course Content of Biostatistics:

| Week number | Course Contents |
|---|---|
| **1** | General principle of biostatistics 1 |
| **2** | General principle of biostatistics 2 |
| **3** | Presentation of data |
| **4** | Descriptive statistics |
| **5** | Measures of central tendency |
| **6** | Measures of variability |
| **7** | Normal frequency distribution curve |
| **8** | Probability |
| **9** | Comparing of two means- Activity |
| **10** | Comparing of more than two means |
| **11** | Chi square test |
| **12** | Regression and correlation analysis |
| **13** | Complex analysis |
| **14** | Criteria of good experimental design |
| **15** | Revision |

## 5- Teaching and Learning Methods:

- Lectures
- Self-learning
- Open discussion

## 6- Student Assessment methods:

- Written exam to assess: a1, a2, a3, b1 andb2.
- Oral exam to assess: a1, a2, a3, b1, b2 and d1.
- Activity to assess: d1

### Assessment schedule:

| | |
|---|---|
| **Assessment (1):**Activity | Week 9 |
| **Assessment (2):** Written exam | Week 16 |
| **Assessment (3):** oral exam | Week 16 |

### Weighting of Assessment:

| Assessment method | Marks | Percentage |
|---|---|---|
| • Activity | 10 | 10 % |
| • Written exam | 75 | 75 % |
| • oral exam | 15 | 15 % |
| **TOTAL** | **100** | **100%** |

## 7- References and books:

**A-Scientific papers**

**B- Essential books:**


- Danial W (1995). Biostatistics: A foundation for analysis in health science. (6th ed.) New York: John Wipij& sensing


**C- Electronic resources**


- Dom Spina (2003) Statistics Workshop distance learning material. British Pharmacological Society University of Manchester

**Facilities required for teaching and learning:**

1. **For lectures:** Black (white) boards, computer, data show.

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**Course coordinator**

**Dr/ Samar Rezq**

**المشرف على القسم : عميد الكليه**

**ا.د/ محمد بركه**

- **Date: -**

| Matrix I of Biostatistics course | | | | | | |
|---|---|---|---|---|---|---|
| Week number | Course Contents | Knowledge & understanding | | Intellectual skills | | General & Transferable skills |
| | | **a1** | **a2** | **b1** | **b2** | **d1** |
| **1** | General principle of biostatistics 1 | x | x | | | |
| **2** | General principle of biostatistics 2 | | x | | | |
| **3** | Presentation of data | x | | X | | |
| **4** | Descriptive statistics | x | | X | | |
| **5** | Measures of central tendency | x | | | | |
| **6** | Measures of variability | x | | | | |
| **7** | Normal frequency distribution curve | x | | X | | |
| **8** | Probability | x | | X | | |
| **9** | Comparing of two means- Activity | x | x | X | | X |
| **10** | Comparing of more than two means | x | x | X | | |
| **11** | Chi square test | x | x | X | | |
| **12** | Regression and correlation analysis | x | x | X | | |
| **13** | Complex analysis | | x | X | | |
| **14** | Criteria of good experimental design | | | | x | |
| **15** | Revision | x | x | X | x | X |

## Matrix II of Biostatistics

| ARS | | Program ILOs | Course ILOs | Course content | Source | Teaching and learning methods | | Method of Assessment | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Lectures | Self learning | Written exam | Oral exam | Activity |
| Knowledge and Understanding | 2.1.1- Theories and fundamentals related to the field of learning as well as in related areas. | A.3- Describe the similarities and differences between statistical tests and learn how to apply them appropriately. | a1 | General principle of biostatistics 1- Presentation of data - Descriptive statistics - Measures of central tendency - Measures of variability - Normal frequency distribution curve - Probability - Comparing of two means - Comparing of more than two means - Chi square test - Regression and correlation analysis | Scientific papers, text books and Internet | X | X | x | x | |
| | 2.1.5- Principles and the basics of quality in professional practice in the area of specialization. | A.9- Understand the different methods of study design and statistical analysis. | a2 | General principle of biostatistics 1 - General principle of biostatistics 2 | Scientific papers, text books and Internet | X | x | x | x | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Intellectual Skills | 2.2.1- Analyze and evaluate information in the field of specialization and analogies to solve problems | B.1- Analyze and interpret data obtained from pharmacological study in a specific and suitable form. | b1 | Presentation of data - Descriptive statistics - Normal frequency distribution curve - Probability - Comparing of two means - Comparing of more than two means - Chi square test - Regression and correlation analysis - Complex analysis | Scientific papers, text books and Internet | X | x | x | x | |
| | 2.2.6- Plan to improve performance in the field of specialization. | B.6-Improve the performance in the field of pharmacology through modifying the process or procedure used. | b2 | Criteria of good experimental design | Scientific papers, text books and Internet | X | x | X | x | |
| General & Transferable skills | 2.4.2- Effectively use information technology in professional practices | D.2-Demonstrate competence in the use of information technology broad enough to meet personal, academic and professional needs. | d1 | Activities- Revision | Scientific papers, text books and Internet | X | x | | x | x |

# COURSE SPECIFICATIONS

# Drug Interaction

# ME6

# Course Specification of Drug interaction

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**University: Zagazig** **Faculty: Pharmacy**

## A- Course specifications:

- Program (s) on which the course is given: Master of Pharmaceutical Sciences
- Major or Minor element of program: Major
- Department offering the program: Pharmacology Department
- Department offering the course: Pharmacology Department
- Date of specification approval: 2017/2018

## B- Basic information:

Title: Drug interaction Code: ME6

Credit Hours:

- Lectures : 2 hrs/week
- Practical:---
- Tutorials: ---
- Total: 2hrs/week

## C- Professional information:

### 1-Overall Aims of the Course:

On completion of the course, students will be able to:

- Describe the mechanisms of drug interactions
- Understand the clinical significance of interactions between drugs
- Explain the interactions of specific drug groups
- Demonstrate how to manage different types of drug interactions

## 2-Intended Learning Outcomes of Drug Interaction (ILOs):

| | |
|---|---|
| **Knowledge and Understanding** | |
| a1 | Describe the basic mechanisms of drug interactions |
| a2 | Outline the clinical significance of drug interactions |
| a3 | Enumerate the general methods for the management of drug interactions |
| **Intellectual skills** | |
| c1 | Differentiate between adverse and beneficial interactions of drugs |
| c2 | Suggest novel methods for the management of drug interactions |
| **Transferable and general skills** | |
| d1 | Demonstrate critical thinking and decision making |
| d2 | Work effectively as a member of a team |

## D- Contents:

| Week No. | Lecture (2 hrs/week) |
|---|---|
| 1 | Overview of drug interactions |
| 2 | Mechanisms of drug interactions |
| 3 | Management of drug interactions |
| 4 | -Drug-food and drug-herb interaction |
| 5 | - Drug interaction of antibiotics |
| 6 | - Drug interaction of CVS acting agents |
| 8 | - Drug interaction of respiratory system –acting agents |
| 9 | - Drug interaction of CNS acting agents |
| 10 | - Drug interaction of CVS acting agents |
| 11 | - Drug interaction of GI tract acting agents |
| 12 | - Drug interaction of agents used for kidney disorders |
| 13 | - Drug interaction of endocrine system- acting agents |
| 14 | - Drug interaction of agents used for obesity and anemia |
| 15 | - Case studies |

## E- Teaching and Learning Methods:

- Lectures
- Self-learning
- Open discussion

## F- Student Assessment Methods:

1. Written exam to assess: a1, a2, a3, c1, c2, d1
2. Oral exam to assess: a1, a2, a3, c1, c2, d1
3. Activity a1, a2, a3, d1

## Assessment schedule:

| | |
|---|---|
| Assessment (1): Activity | Week 7 |
| Assessment (2): Written exam | Week 16 |
| Assessment (4): Oral exam | Week 16 |

## Weighting of Assessment

| Assessment method | Marks | Percentage |
|---|---|---|
| Written exam | 75 | 75% |
| Oral exam | 15 | 15% |
| Activity | 10 | 10% |
| TOTAL | 100 | 100% |

## G- Facilities Required for Teaching and Learning:

Black (white) board, overhead projectors, Data show.

## H- List of References:

### 1- Essential books:

i- Richard A. Harvey, Michelle A. Clark, Lippincott's Illustrated Reviews Pharmacology 5th ed. Lippincott Williams & Wilkins, 2012

### 2- Recommended books:

i- H.P.Rang,M.M.Dale,J.M.Ritter& R.J. Flower ed. RANG & DALE Pharmacology 6th 2008 Churchill 2. Livingstone Elsevier London.

ii- Katzung, B.G., ed. Basic and Clinical Pharmacology. 9th ed. New York : McGraw Hill, 2006.

iii- Bennet P.N., and M.J. Brown, eds. Clinical Pharmacology. 10th ed. London : Churchil Livingstone, 2006.

iv- Hardman J.G., L.E. Limbrid, and A.G. Gilman, eds. Goodman & Gilman's the Pharmacological Basis of Therapeutics. 10th ed. New York : McGraw Hill, 2006.

v- Luellmann H., L. Hein, K. Mohr, and D. Bieger. Color Atlas of Pharmacology. 3rd ed. Stuttgart : Thieme, 2005.

vi- Brenner,G.M.andSteven,C.W.., Pharmacology,3rd ed.,2010

**3- Periodicals and websites:**

- British J Pharmacol,
- European J Pharmacol,
- Pharmacology,
- Pharmacology and Toxicology)

Pubmed.com

www.medconsult.com/www.pharmanet.com

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**Course Coordinator: Dr. Eman Salah**

**المشرف على القسم : عميد الكليه**

**ا.د/ محمد بركه**

**Date:**

| Matrix I of Drug interaction course | | | | | | | |
|---|---|---|---|---|---|---|---|
| Course contents | | ILOs for drug interaction course | | | | | |
| | | knowledge & understanding | | | intellectual skills | | Transferable and general skills |
| Lectures | | a1 | a2 | a3 | c1 | c2 | d1 |
| 1 | Overview of drug interactions | | x | | | | |
| 2 | Mechanisms of drug interactions | x | | | | | |
| 3 | Management of drug interactions | | | x | | | |
| 4 | Drug-food interactions | x | x | x | | | x |
| 5 | Drug-smoking interactions | x | x | x | | | x |
| 6 | Drug-environment interactions | x | x | x | | | x |
| 7 | Drug interactions of anti-infective agents | x | x | x | | | x |
| 8 | Drug interactions of cardiovascular acting agents | x | x | x | | | x |
| 9 | Drug interactions of CVS acting agents | x | x | x | | | x |
| 10 | Drug interactions of CNS acting agents | x | x | x | | | x |
| 11 | Drug interactions of endocrine acting agents | x | x | x | | | |
| 12 | Case studies | | | | x | x | x |
| 13 | Case studies | | | | x | x | x |

## Matrix II of Drug interaction course

| Academic Reference Standards (ARS) | | Program ILOs | Course ILOs | Course contents | Source | Teaching & learning methods | Method of assessment | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Lecture | Written exam | Oral exam | Activity |
| 2.13 | Pharmacological properties of drugs including mechanisms of action, therapeutic uses, dosage, contra- indications, ADRs and drug interactions. | A22 | a1 | Describe the basic mechanisms of drug interactions | Scientific papers, text books and Internet | x | x | x | |
| | | | a2 | Outline the clinical significance of drug interactions | Scientific papers, text books and Internet | x | x | x | |
| | | | a3 | Enumerate the general methods for the management of drug interactions | Scientific papers, text books and Internet | x | x | x | |
| 4.9 | Utilize the pharmacological basis of therapeutics in the proper selection and use of drugs in various disease conditions. | C11 | c1 | Differentiate between adverse and beneficial interactions of drugs | Scientific papers, text books and Internet | x | x | x | |
| 4.11 | Assess drug interactions, ADRs and pharmacovigilance | C13 | c2 | Suggest novel methods for the management of drug interactions | Scientific papers, text books and Internet | x | x | x | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **5.10** | Implement writing and thinking, problem- solving and decision-making abilities. | D11 | d1 | Demonstrate critical thinking and decision making | Scientific papers, text books and Internet | x | | x | x |
| | | | d2 | Work effectively as a member of a team | Scientific papers, text books and Internet | x | | x | x |

# Drug-Induced Diseases

# Course specification of Drug-Induced Diseases

## A- Course specifications:

- Program on which the course is given: Master of Pharmaceutical Sciences
- Major or Minor element of program: Major
- Department offering the program: Pharmacology Dept.
- Department offering the course: Pharmacology Dept.
- Date of specification approval: 2017/2018

## 1- Basic information:

Title: **Drug Induced Disease** Code: ME7
Lectures: 4 hrs/week Credit hours: 4 hrs/week
Total: 4hrs/week

## 2- Overall aim of the course:

On completion of the course, the students will be able to define the mechanisms, symptoms and diagnosis of drug-induced diseases and possible preventative methods.

## 3. Intended learning outcome s (ILOs) of Drug Induced Disease:

| | |
|---|---|
| **Knowledge and Understanding** | |
| **a1** | Explain the basics of drug kinetics, dynamics and adverse effects. |
| **a2** | Identify common diseases induced by drugs and the associated risk factors. |
| **Intellectual skills** | |
| **b1** | Suggest possible ways to protect against or minimize some common drug-induced diseases. |
| **b2** | Specify the hazards of therapeutic regimens and how to properly select suitable regimens in different pathological conditions. |
| **General and Transferable skills** | |
| **d1** | Counsel patients and prescribers on drug adverse reactions and possible diseases that may emerge as a result of drugs consumption. |
| **d2** | Get information regarding adverse effects and interactions from a variety of sources. |

## 4. Course Content of Drug Induced Disease:

| Week No | course content |
|---|---|
| **1** | Introduction to drug induced-diseases |
| **2** | Drug-induced hepatotoxicity (Toxic response of the liver and mechanism of toxicity) |
| **3** | Drug-induced hepatotoxicity (Diagnosis and management) |
| **4** | Drug-induced nephrotoxicity (Toxic response of the kidney and mechanism of toxicity) |
| **5** | Drug-induced nephrotoxicity (Diagnosis and management) |
| **6** | Drug-induced CVS diseases (Toxic response of the heart and vascular system) |
| **7** | Drug-induced CVS diseases (Mechanism of toxicity) |
| **8** | Drug-induced CVS diseases (Diagnosis and treatment) |
| **9** | Activity |
| **10** | Drug-induced CNS diseases (Structure and functions of brain blood barrier, toxic response of brain and spinal cord) |
| **11** | Drug-induced CNS diseases (Mechanism of toxicity) |

| | |
|---|---|
| **12** | Drug-induced CNS diseases (Diagnosis and treatment) |
| **13** | Presentations |
| **14** | Open discussion |
| **15** | Revision |

## 5- Teaching and Learning Methods:

- Lectures
- Self-learning
- Open discussion

## 6- Student Assessment methods:

- Written exam to assess: a1, a2, b1 andb2.
- Oral exam to assess: a1, a2, b1, b2, d1and d2.
- Activity to assess: d1 and d2.

### Assessment schedule:

| | |
|---|---|
| **Assessment (1):**Activity | Week 9 |
| **Assessment (2):** Written exam | Week 16 |
| **Assessment (3):** oral exam | Week 16 |

### Weighting of Assessment:

| Assessment method | Marks | Percentage |
|---|---|---|
| • Activity | 10 | 10 % |
| • Written exam | 75 | 75 % |
| • oral exam | 15 | 15 % |
| **TOTAL** | **100** | **100%** |

## 7- References and books:

**A-Scientific papers**

**B- Essential books:**

- Basic and clinical Pharmacology; 10th Edition, Kantzung B.G McGraw Hill Medical Publishing Division 2007.
- Drug-Induced Diseases: Prevention, Detection, and Management, 2nd Edition, Tisdale J. and Miller D. American Society of Health-System Pharmacists 2010.

**Facilities required for teaching and learning:**

1. **For lectures:** Black (white) boards, computer, data show.

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**Course coordinator**

**Prof. Dr. Ahmed Fahmy**

**المشرف على القسم : عميد الكليه**

**ا.د/ محمد بركه**

**Date: -**

| Matrix I of Drug Induced Disease course | | | | | | | |
|---|---|---|---|---|---|---|---|
| Week number | Course Contents | Knowledge and understanding | | Intellectual skills | | General & Transferable skills | |
| | | a1 | a2 | b1 | b2 | d1 | d2 |
| 1 | Introduction to drug induced-diseases | X | | | | | |
| 2 | Drug-induced hepatotoxicity (Toxic response of the liver and mechanism of toxicity) | X | | | | | |
| 3 | Drug-induced hepatotoxicity (Diagnosis and management) | X | | | X | | |
| 4 | Drug-induced nephrotoxicity (Toxic response of the kidney and mechanism of toxicity) | X | | | X | | |
| 5 | Drug-induced nephrotoxicity (Diagnosis and management) | X | | | | | |
| 6 | Drug-induced CVS diseases (Toxic response of the heart and vascular system) | | X | X | | | |
| 7 | Drug-induced CVS diseases (Mechanism of toxicity) | | X | X | | | |
| 8 | Drug-induced CVS diseases (Diagnosis and treatment) | | X | X | | | |
| 9 | Activity | | X | X | | | X |
| 10 | Drug-induced CNS diseases (Structure and functions of brain blood barrier, toxic response of brain and spinal cord) | | X | X | | | |
| 11 | Drug-induced CNS diseases (Mechanism of toxicity) | | X | X | | | |
| 12 | Drug-induced CNS diseases (Diagnosis and treatment) | | X | X | | | |
| 13 | Presentations | X | X | X | X | | |
| 14 | Open discussion | X | X | X | X | | X |
| 15 | Revision | X | X | X | X | | X |

## Matrix II of Drug Induced Disease

| ARS | | Program ILOs | Course ILOs | Course content | Source | Teaching and learning methods | | Method of Assessment | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Lectures | Self-learning | Written exam | Oral exam | Activity |
| Knowledge and Understanding | 2.1.1- Theories and fundamentals related to the field of learning as well as in related areas. | A.1--Detect the principles of human body physiology, progression of diseases, pharmacokinetics, pharmacodynamics and basics of genetics. | a1 | Introduction to drug-induced disease<br>Drug-induced hepatotoxicity 1<br>Drug-induced nephrotoxicity 1<br>Drug-induced 1 CVS toxicity<br>Drug-induced 1 CNS toxicity | Scientific papers, text books and Internet | X | X | X | X | |
| | 2.1.5- Principles and the basics of quality in professional practice in the area of specialization. | A.8- List risk factors for drug-induced diseases and related preventative strategies. | a2 | Drug-induced hepatotoxicity 1<br>Drug-induced nephrotoxicity 1<br>Drug-induced 2 CVS toxicity | Scientific papers, text books and Internet | X | X | X | X | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Drug-induced 2 CNS toxicity | | | | | | |
| Intellectual Skills | 2.2.2- Solve specified problems in the lack or missing of some information. | B.2- Propose strategies to minimize drug-induced diseases. | b1 | Drug-induced hepatotoxicity 2<br>Drug-induced nephrotoxicity 2<br>Drug-induced 3 CVS toxicity<br>Drug-induced 3 CNS toxicity | Scientific papers, text books and Internet | X | X | X | X | |
| | 2.2.5- Evaluate and manage risks and potential hazards in professional practices in the area of specialization | B.7- Evaluate the toxicity and hazards of therapeutic regimens and how to apply these regimens properly in different pathological conditions. | b2 | Drug-induced hepatotoxicity 1<br>Drug-induced nephrotoxicity 1<br>Drug-induced 2 CVS toxicity<br>Drug-induced 2 CNS toxicity | Scientific papers, text books and Internet | X | X | X | X | |
| Transfera | 2.4.1- Communicate effectively. | D.2- Advise patients and prescribers on the consequences of drug interactions and adverse effects of drugs. | d1 | Activity | Scientific papers, text books and Internet | X | X | | X | X |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| General & Transferable skills | 2.4.4- Use variable sources to get information and knowledge. | D.6- Use library, drug information databases, drug interactions identifying websites and other resources to get knowledge related to pharmacology. | d2 | Activity | Scientific papers, text books and Internet | X | X | | X | X |

# General Courses offered by other departments

# Instrumental Analysis and Chromatography II

# Course specification of Instrumental Analysis and Chromatography II

## A- Course specifications:

- Program on which the course is given: Master's of Pharmaceutical Sciences
- Major or Minor element of program: Major
- Department offering the program: Analytical Chemistry.
- Department offering the course: Analytical Chemistry.

- Date of specification approval:

## 1- Basic information:

Title: Instrumental Analysis II Code: M102
Lectures: 4 hrs/week Credit hours: 4 hrs/ week
Total: 4 hrs/ week

## 2- Overall aim of the course:

On completion of the course; the students should be able to outline the basic and applications of different instrumental techniques, describe theories, operation, pharmaceutical and biological applications of instrumental techniques.

## 3. Intended learning outcome s (ILOs):

| | |
|---|---|
| **A- Knowledge and Understanding** | |
| **a1** | Outline the basis, theory and operation of the different instrumental techniques of analysis. |
| **a2** | Describe different pharmaceutical and biological applications of instrumental techniques. |
| **B- Intellectual skills** | |
| **$b_1$** | Select the most appropriate instrumental technique used for pharmaceutical and biological assay. |
| **$b_2$** | Integrate the knowledge gained by studying different instrumental |

| | |
|---|---|
| | techniques in designing analytical system for analytes of complex nature |
| **C- General and Transferable skills** | |
| **$c_1$** | Acquire Computer skills such as preparation of scientific presentations and collecting information through different data-bases. |
| **$c_2$** | Work successfully as a productive member of the team |
| **$c_3$** | Improve scientific brain storming capabilities and cooperate with other team members |

## 4. Course Contents:

| Week No. | Content |
|---|---|
| 1 | **Instrumental Analysis:** *Introduction *Principles |
| 2 | **[Ultraviolet (UV)and Visible spectrophotometry**<br>*Theory<br>*Instrumentations |
| 3 | **[Infrared (IR) spectroscopy].**<br>*Theory<br>*Instrumentations |
| 4 | **Applications of UV and IR** |
| 5 | **Nuclear magnetic resonance (NMR).**<br>*Theory<br>**Instrumentations |
| 6 | **Mass-spectrometry (MS)**<br>*Theory<br>*Pharmaceutical and biological applications. |
| 7 | **Applications of NMR and MS** |
| 8 | **Electrochemistry**<br>**Conductometry, Potentiometry.**<br>*Theory<br>*Pharmaceutical and biological applications. |
| 9 | **Chromatography:**<br>*Introduction<br>*Classification |
| 10 | **Quantitative and Qualitative Chromatographic techniques** |

| | |
|---|---|
| | *Basis<br>*Pharmaceutical and biological applications |
| 11 | **HPLC**<br>*Basis<br>*Types<br>Isocratic flow and gradient elution<br>Particle size, Pore size, Pump pressure, detectors and applications |
| 12 | **Gas Chromatography**<br>*Basis<br>*Pharmaceutical and biological applications<br>*Detectors |
| 13 | Student activities |
| 14 | Student activities |
| 15 | **Revision and Open discussion** |

## 5- Teaching and Learning Methods:

- Lectures
- Self learning
- Student scientific presentation.
- Homework assignments
- Internet based search
- Problem solving

## 6- Student Assessment methods:

Written exams to assess: a1, a2, b1, b2

Oral exam to assess a1, a2, b1 and b2

Activity to assess c1, c2 and c3

| Assessment method | Time | Marks |
|---|---|---|
| Written exam | Week 16 | 75 |
| Oral Exam | Week 16 | 15 |
| Activity | Week 8 | 10 |

## 7- References and books:

**A-Scientific papers**

**B- Essential books:**

- Modern Analytical Chemistry, David Harvey, McGraw-Hill Companies, first edition, 2002.
- Principles of Instrumental Analysis, Douglas A. Skoog, F. James Holler, Crouch Thomson Brooks/Cole, 2007
- Handbook of instrumental techniques of analytical chemistry, Frank A. Settle, Prentice Hall PTR, 1997.

**C- Suggested books:**

- British Pharmacopoeia, HM Stationery Office, London, UK, PA, 2007,
- Martindale: The Complete Drug Reference, Pharmaceutical Press; 35 edition (2007) **.**

**Websites and journals:**

- www.rsc.org
- www.sciencedirect.com
- www.pubmed.com
- www.medline.com
- Guidance for Industry: Q2B of Analytical Procedures; Methodololgy: International Conference of Harmonization (ICH). Nov. 1996 (http:/ www.fda.gov/eder/guidance /1320fnl.pdf).
- Journal of Chromatography A and B, Separation sciences, Analytical and Bioanalytical Chemistry, Bioanalysis, Analytical letters.

## 8-Facilities required for teaching and learning:

**For lectures:** Black (white) boards, data show, computers

**For search and self learning**: Faculty and University libraries

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- **Course Coordinators:**

  **Prof Dr / Hisham Ezzat**

  **Prof Dr/ Magda Elhenawee**

- **Head of Department:**

  **Prof Dr/ Magda Elhenawee**

**Date:**

**تم اعتماد توصيف المقرر في مجلس القسم بتاريخ 10 / 2017**

| Matrix I of Instrumental Analysis and Chromatography II | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Course Contents** | | **ILOs** | | | | | | |
| | | Knowledge and understanding | | Intellectual skills | | General and Transferable skills | | |
| | | **a1** | **a2** | **b1** | **b2** | **$c_1$** | **$c_2$** | **$c_3$** |
| **1** | **Instrumental Analysis:** *Introduction *Principles | **X** | | | | | | |
| **2** | **[Ultraviolet (UV)and Visible spectrophotometry** *Theory *Instrumentations | **X** | **x** | **x** | | | | |
| **3** | **[Infrared (IR) spectroscopy].** *Theory *Instrumentations | **X** | **x** | **x** | | | | |
| **4** | **Applications of UV and IR** | **X** | **x** | **x** | | | | |
| **5** | **Nuclear magnetic resonance (NMR).** *Theory **Instrumentations | **X** | **x** | **x** | | | | |
| **6** | **Mass-spectrometry (MS)** *Theory *Pharmaceutical and biological applications. | **X** | **x** | **x** | | | | |
| **7** | **Applications of NMR and MS** | **X** | **x** | **x** | | | | |
| **8** | **Electrochemistry Conductometry, Potentiometry.** *Theory *Pharmaceutical and biological applications. | **X** | **x** | **x** | | | | |
| **9** | **Chromatography:** *Introduction *Classification | **X** | | | | | | |
| **10** | **Quantitative and Qualitative Chromatographic techniques** *Basis *Pharmaceutical and biological | **X** | **x** | **x** | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | applications | | | | | | | |
| 11 | **HPLC**<br>*Basis<br>*Types<br>Isocratic flow and gradient elution<br>Particle size, Pore size, Pump pressure, detectors and applications | x | | | | | | |
| 12 | **Gas Chromatography**<br>*Basis<br>*Pharmaceutical and biological applications<br>* Detectors | x | | | | | | |
| 13 | Student activities | | | x | x | x | x | x |
| 14 | Student activities | | | x | x | x | x | x |
| 15 | **Revision and Open discussion** | x | x | | | | | |

| Matrix II of Instrumental Analysis and Chromatography II for 2017-2018 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **ARS** | | **Program ILOs** | **Course ILOs** | **Course contents** | **Source** | **Teaching and learning methods** | | **Method of assessment** | | |
| | | | | | | Lecture | Self learning | Written exam | Oral Exam | Activity |
| **Knowledge and Understanding** | 2.1.2- Mutual influence between professional practice and its impact on the environment. | A.4- Identify the influence of pharmacology and toxicology-related problems on society. | a1-a2 | Instrumental Analysis-- UV-visible spectrophotometry, Fluorometry--IR--- NMR-- Conductometry, Potentiometry--MS---chromatography---HPLC, GC, applications | Textbooks, Scientific papers and self learning | x | x | X | x | |
| Intellectual Skills | 2.2.3-Correlate and integrate different pharmaceutical knowledge to solve professional problems. | B.3- Integrate information regarding drug kinetics, dynamics, toxicity and interaction with other drugs to apply a proper therapeutic regimen in different | b1-b2 | Instrumental Analysis-- UV-visible spectrophotometry, Fluorometry--IR--- NMR-- Conductometry, Potentiometry--MS---chromatography---HPLC, GC, | Textbooks, Scientific papers and self learning | x | x | X | x | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | situations related to the profession. | | applications | | | | | | |
| General and Transferable Skills | 2.4.1- Communicate effectively. | D.1- Communicate effectively with other colleagues and staff members using verbal, written and expression language.<br>D.2- Advise patients and prescribers on the consequences of drug interactions and adverse effects of drugs. | $c_1$ | Activity | Textbook ,Scientific papers and self learning | | x | | | x |
| | 2.4.4- Use variable sources to get information and knowledge. | D.6- Use library, drug information databases, drug interactions identifying websites and other resources to get knowledge related to pharmacology. | $c_2$ | Activity | Textbook Scientific papers and self learning | | x | | | x |
| | 2.4.5- Set criteria and parameters to evaluate the performance of others | D.7-Develop rules and indicators for assessing and criticizing the performance of others. | c3 | Activity | Textbook Scientific papers and self learning | | x | | | x |
| | 2.4.6- Work in a team and lead teams carrying out various professional tasks. | D.8- Maintain ethics and respect-based relationships with colleagues, professors and other staff members. | c3 | Activity | Textbooks, Scientific papers and self learning | | x | | | x |

# Biotechnology

# Course Specification of Biotechnology

## A- Course specifications:

- **Program on which the course is given:** Master of Pharmaceutical Sciences
- **Major or minor element of programs:** Major
- **Department offering the program:** Microbiology and Immunology
- **Department offering the course:** Microbiology and Immunology department in conjunction with Biochemistry department
- **Date of specification approval:** September 2017

## 1-Basic Information:

Title: Biotechnology Code: ME4

Credit hours: 4hrs/week Lectures: 4hrs/week

Total: 4hrs/week

## 2- Overall aims of the course:

On completion of the course, the student will be able to describe the components of biotechnology, the exploitation of gene cloning and recombinant DNA technology in production of useful microbial industrial strains and in monoclonal antibody technology, apply conventional genetic approaches and molecular genetics approaches in biotechnology, explain the bases of molecular genetics, and basic gene cloning strategies and tools and explore the basis of stem cell biotechnology and the regenerative medicine.

## 3-Intended learning outcomes (ILOS) of Biotechnology:

| **A- Knowledge and Understanding** | |
|---|---|
| **1a** | Outline the principles of biotechnology techniques |
| **2a** | Explain how to manage and exploit knowledge of DNA cloning, recombinant DNA, and applied technology |

| | |
|---|---|
| **3a** | Summarize recent medical biotechnology applications. |
| **a4** | Identify the principles of stem cell biotechnology and regenerative medicine |
| **B- Intellectual skills** | |
| **b1** | Express the principles biotechnology in medicine, agriculture and pollution control. |
| **b2** | Associate the principles of recombinant DNA technology in gene cloning and assessment of the microbial transformation |
| **b3** | Discuss the principles of PCR technology in the assessment of microbial mutation, gene detection, gene sequencing & forensic medicine |
| **D- General and transferable skills** | |
| **d1** | Use computer skills as internet and power point in the activities. |
| **d2** | Gain information from various sources as text books, scientific journals, internet,…etc. |
| **d3** | Search on various topics and write reports or term papers. |
| **d4** | Work as a member in a team and communicate effectively with the other members of the team |

## 4-Course content of Biotechnology:

| Week No. | Lecture content (2 hrs/week) (Microbiology Department) | Lecture content (2 hrs/week) (Biochemistry Department) |
|---|---|---|
| **1** | Introduction to biotechnology | Pharmacokinetics and pharmacodynamics of peptides and protein drugs<br>a- Elimination of protein therapeutics<br>b- Distribution of protein therapeutics |
| **2** | DNA Recombination:<br>• Naturally occurring genetic recombination<br>• Artificially occurring genetic recombination (in laboratory) | Pharmacokinetics and pharmacodynamics of peptides and protein Drugs<br>c- Protein binding of protein<br>d- Chemical modification of protein therapeutics |
| **3** | Requirements for genetic engineering | Hematopoietic Growth Factor<br>a- Chemical description<br>b- Pharmaceutical concerns<br>c- Clinical and practice aspects<br>d- Toxicities |

| | | |
|---|---|---|
| **4** | Gene Cloning:<br>• General strategy for gene cloning<br>• Obtaining the target genes | INTERLEUKINS<br>a- Interleukins 1-17<br>b- Introduction and chemical Description – Pharmacology |
| **5** | Gene Cloning:<br>• Finding suitable cloning vectors<br>• Joining target gene(s) to vector<br>• Insertion of hybrid (recombinant) DNA into expression host (transformation) and selection of transformant | INTERLEUKINS<br>c- Interferon's alpha , Beta , Gamma<br>d- Pharmaceutical concerns<br>e- Clinical and Practice aspects |
| **6** | Applications of genetic engineering<br>**Activity** | INSULIN<br>a- Introduction<br>b- Pharmacology and Formulations<br>c- Pharmaceutical concerns, chemical and physical stabilities<br>d- Clinical and practice aspects<br>**Activity** |
| **7** | Polymerase chain reaction (PCR)<br>Types of PCR<br>• Traditional PCR<br>• rt PCR<br>• Real time PCR | Growth hormones<br>a- hGH structure , Isolation<br>b- Pharmacology |
| **8** | Applications of PCR:<br>1- gene amplification for:<br>• gene cloning<br>• gene sequencing<br>• gene control drug production<br>2- diagnosis of microbial infections | Growth hormones<br>c- Protein manufacture , formulations<br>d- Clinical use |

| | | |
|---|---|---|
| | 3- in forensic medicine | |
| **9** | Monoclonal antibody (MAb) technology (synthesis of Ab in laboratory):<br>• hybridoma technology<br>• production & selection of Ab<br>• types of genetically engineered MAb (mouse, chemeric, humanized, human)<br>• nomenclature of MAb according to the target and source<br>• Global Marketing pharmaceutically useful MAb | Dispensing Biotechnology products<br>a- Introduction – Storage<br>b- Handling<br>c- Preparations |
| **10** | Stem cells technology:<br>• Types of stem cells<br>• Isolation<br>• Culturing<br>• Applications of stem cells in regenerative medicine | Dispensing Biotechnology products<br>d- Administration<br>e- Outpatient/Homecare use<br>f- Patient assessment |
| **11** | Advances in vaccine preparation | Biotechnology for pharmaceutical products<br>a- Hormones<br>b- Preparation of vaccines and other biological products |
| **12** | Gene sequencing | Biotechnology for pharmaceutical products<br>c- Old , modern Biotechnology<br>d- Applications in Medicine- industry – Agriculture – Ecology |
| **13** | Microarray technology | PCR , LCR ,applications in forensic medicine- Mutations- RFLP…..etc |
| **14, 15** | Presentation of students activities and open discussion | |

## 5-Teaching and Learning Methods:

- Lectures
- Self learning
- Open discussion and presentations
- Critical thinking

## 6-Student Assessment methods:

- Written exams to assess: a1, a2, a3, a4, b1, b2, b3
- Oral exam to assess: a1, a2, a3, a4, b1, b2, b3
- Activity to assess: d1, d2, d3, d4

### Assessment schedule:

| | |
|---|---|
| **Assessment (1):** Activity | Week 6,14,15 |
| **Assessment (2):** Written exam | Week 16 |
| **Assessment (3):** oral exam | Week 16 |

### Weighting of Assessment:

| Assessment method | Marks | Percentage |
|---|---|---|
| • Activity | 10 | 10 % |
| • Written exam | 75 | 75 % |
| • oral exam | 15 | 15 % |
| **TOTAL** | **100** | **100%** |

## 7-References &books:

**A- Scientific papers**

**B- Essential books:**

1. Crommelin, D.A.; and Sindeler, R.D. (1997). Pharmaceutical Biotechnology. Hartwood Academic Publishers. The Netherlands.
2. Glick, B.P.; and Pasterternak, J.J. (1994). Molecular Biotechnology-Principles Applications of recombinant DNA. AS Press, Washington, D.C., USA.

3. Thieman, W.J.; Palladino, M.A. (2008). *Introduction to Biotechnology*. Pearson/Benjamin Cummings. ISBN 0-321-49145-9.
4. Higuchi, R., Dollinger, G., Walsh, P.S. & Griffith, R. (1992) Simultaneous amplification and detection of specific DNA sequences. *Biotechnology*, 10, 413–417. [The first description of real-time PCR].
5. VanGuilder, H.D., Vrana, K.E. & Freeman, W.M. (2008) Twenty-five years of quantitative PCR for gene expression analysis. *Biotechniques*, 44, 619–624.

**C- Suggested books:**

1. Biotechnology in health care: an introduction to biopharmaceuticals
2. Ermak G., (2013), Modern Science & Future Medicine (second edition)

**D- Websites:** pubmed, Science direct, Nejm, Weilyinterscience

**Facilities required for teaching and learning:**

1. **For lectures:** Black (white) boards, computer, data show.

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- **Course Coordinators: Prof. Dr/ Ashraf Ahmed Kadry**
  **Prof. Dr/ Mohammed El-Sewedy**
- **Head of Department: Prof. Dr/ Nehal El-sayed**
- **Date: 2017 تم اعتماد توصيف المقرر بمجلس القسم لشهر سبتمبر**

## Matrix II of Biotechnology (2017-2018)

| ARS | | Program ILOs | Course ILOs | Course contents | Sources | Teaching and learning methods | | Method of assessment | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Lecture | Self learning | Written exam | oral exam | Activity |
| **Knowledge and Understanding** | 2.1.1- Theories and fundamentals related to the field of learning as well as in related areas. | A.1Identify the principles of human body physiology, progression of diseases, pharmacokinetics, pharmacodynamics and basics of genetics. | a1- a2- a3-a4 | Introduction to biotechnology- Bioprocess- Downstream processing- Cell culture- Hybridoma technology-Medical biotechnology- Medicine from cultured cells- DNA Recombination & Application of genetic engineering - Principle of PCR technology and gene amplification.- Applications and advances in PCR- Hybridoma technology& Monoclonal antibody(MAb)- technology & Production Nomenclature of Mabs- Global Marketing Pharmaceutically useful monoclonal antibodies - Applications and advances in PCR -Vaccine preparations- Stem cells technology & Regenerative medicine. | Textbooks, Scientific papers and self learning | x | x | x | x | |
| | 2.1.3- Scientific developments in the area of specialization. | A.5- Update the information regarding DNA sequencing and techniques used for analysis of DNA and RNA. | | | Textbooks, Scientific papers and self learning | x | x | x | x | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2.2.4- Conduct research and write scientific report on research specified topics. | B.5- Apply the most appropriate instrumental technique for DNA and RNA assays.<br><br>B.6- Design and manage different experimental protocols in the field of pharmacology and related disciplines | b1-b2-b3 | Medical biotechnology- Medicine from cultured cells- DNA Recombination & Application of genetic engineering - Applications and advances in PCR- Hybridoma technology& Monoclonal antibody(MAb)-technology & Production Nomenclature of Mabs- Global Marketing Pharmaceutically useful monoclonal antibodies - Applications and advances in PCR -Vaccine preparations- Stem cells technology & Regenerative medicine. | Textbooks, Scientific papers and self learning | x | X | x | x | |
| | 2.4.2- Effectively use information technology in professional practices | D.4- Demonstrate competence in the use of information technology broad enough to meet personal, academic and professional needs. | d1-d2 | Activity - presentation of reports and open discussion | Textbooks, Scientific papers and self learning | x | X | | | x |
| | 2.4.4- Use variable sources to get information and knowledge. | D.6- Use library, drug information databases, drug interactions identifying websites and other resources to get knowledge related to pharmacology. | d3 | Activity - presentation of reports and open discussion | | | | | | |
| | 2.4.6- Work in a team and lead teams carrying out various professional tasks. | D.8- Maintain ethics and respect-based relationships with colleagues, professors and other staff members. | d4 | Activity - presentation of reports and open discussion | | x | X | | x | x |

# Molecular Biology

# Course Specification of Molecular Biology

## A- Course specifications:

- Program on which the course is given: Master degree of pharmaceutical science.
- Major or minor Element of program: Major
- Department offering the program : Microbiology and Immunology
- Department offering the course: Microbiology and Immunology department in conjunction with Biochemistry department
- Date of specification approval: September 2017

## 1-Basic information:

Title: Molecular biology Code: M110

Lectures: 4 hrs/ week Credit hrs: 4 hrs

Total: 4 hrs/week

## 2- Overall aims of the course:

On completion of the course, the students will be able to manifest a comprehensive knowledge on structure and function of DNA, RNA and protein, understand the mechanisms of DNA replication, transcription and protein synthesis, comprehend gene expression and regulation and understand the modern molecular biology techniques.

## 3-Intended learning outcomes (ILOS) of Molecular biology:

| **A-Knowledge and Understanding** | |
|---|---|
| a1 | List the types structure and function of nucleic acids and proteins |
| a2 | Identify basic processes and control mechanisms involved in replication and repair of DNA |
| a3 | Identify expression of genes and regulation of genetic traits and connection of these processes with genetic diseases |

| | |
|---|---|
| a4 | Explain the techniques employed in molecular biology studies |
| **B-Intellectual skills** | |
| b1 | Handle information and solve problems related to molecular biology, using oral, written, symbolic, graphical and numerical forms of presentation |
| b2 | Think critically and make reasonable judgments by acquiring, combining, and evaluating quantitative and non quantitative information. |
| b3 | Integrate knowledge, handle complexity, and formulate judgments with incomplete or limited information |
| b4 | Interpret and explain data and findings of experiments in molecular biology |
| **D-General and Transferable skills** | |
| d1 | Conduct a web-based search on a topic related to molecular biology, write reports and prepare a presentation |
| d2 | Learn independently and to develop professionally, including the ability to pursue further research where appropriate |
| d3 | Communicate effectively, with colleagues and a wider audience |
| d4 | Work effectively as a part of team to collect data and/or to produce reports and presentations |
| d5 | Implement writing and presentation skills by performing an online search, writing a report and presenting the data in a seminar |

## 4- Course Content of Molecular Biology

| Week No. | Lecture content (4 hrs/week) |
|---|---|
| **1** | Introduction and Brief History of Molecular Biology: Transmission genetics, The Molecular Nature of Genes and genome. Introduction to gene function (storing information, replication, mutation) |
| **2** | Structure of biological macromolecules: Protein structure, general properties and functions (Primary Structure, Protein Folding, Secondary Structure, Alpha Helix, Beta Sheets, Tertiary Structure, Protein Domains, Quaternary Structure) |
| **3** | Structure of biological macromolecules: Nucleic Acids properties, structure and types of Nucleic acid. Physical and |

| | |
|---|---|
| | chemical of nucleic acids. Nucleic acid as a genetic material. |
| **4** | Replication and repair of DNA in prokaryotic organisms (Replication origins and regulation Recombination, rearrangement, chromosome structures), |
| **5** | Nucleic acid (genetic material) organization and replication in Eukaryotic cell. Chromatin Structure (histones, nucleosomes) and its Effects on Transcription and gene activity |
| **6** | Synthesis of RNA from DNA: Transcription in prokaryotic cells (RNA polymerases, Prokaryotic transcription) and in eukaryotic cells (RNA polymerases, Mechanisms and control of transcription in eukaryotes), and RNA processing in eukaryotes. |
| **7** | Synthesis of proteins (Translation of m RNA) in prokaryotic cells, and translation and processing in eukaryotic cells<br>**Activity** |
| **8** | Regulation of gene expression in prokaryotes: Operons ( Fine Control of Bacterial Transcription, the lac operon, the ara Major Shifts in operon, the trp operon, riboswitches, Bacterial Transcription: sigma factor switches, the RNA polymerase encoded in phage T7, infection of E coli by phage λ. |
| **9** | DNA-Protein Interactions in Bacteria: the λ family of repressor, the trp repressor, general consideration on protein DNA interaction, DNA binding proteins |
| **10, 11** | Molecular Tools for Studying Genes and Gene Activity: molecular separation, labeled tracers, using nucleic acid hybridization, mapping and quantifying nucleic acid transcripts, measuring transcription rate in vivo, assaying DNA protein interaction, finding RNA sequences that interact with other molecules, knockouts. |
| **12** | Transposition: bacterial transposons, eukaryotic transposons, rearrangement of immunoglobulin genes. Retrotransposons |
| **13** | Bioenergetics and other macromoleucles (lipids, fats, complex carbohydrates and their roles in cell) |
| **14** | Regulation and integration of metabolism in prokaryotics |
| **15** | Genomics, Proteomics, and Bioinformatics<br>Students presentation and open discussion |

## 5- Teaching and learning methods:

- Lectures (overhead project, data show, board)
- Self learning: by assignments
- Open discussion and presentations
- Critical thinking

## 6- Student assessment methods:

- Written exam assess: a1, a2, a3, a4, b1, b2, b3, b4
- Oral exam assess: a1, a2, a3, a4, b1, b2, b3, b4
- Activity assess: d1, d2, d3, d4, d5

### Assessment schedule:

| | |
|---|---|
| **Assessment (1):** Activity | Week 7,15 |
| **Assessment (2):** Written exam | Week 16 |
| **Assessment (3):** oral exam | Week 16 |

### Weighting of Assessment:

| Assessment method | Marks | Percentage |
|---|---|---|
| • Activity | 10 | 10 % |
| • Written exam | 75 | 75 % |
| • Oral exam | 15 | 15 % |
| **TOTAL** | **100** | **100%** |

## 7- References and books:

**A- Scientific papers**

**B -ESSENTIAL BOOKS**

1. Weaver, RF (ed). (2012).”Molecular Biology”, 5th Ed, McGraw Hill Companies.USA

2. Watson, J.D., Hopkins, N.H., Roberts, J.W.. Steitz, J.A- and Weiner, A.M. (1987). Molecular biology of the gene. 4th Edn. The Benjanun/cummmgs Publishing Company Inc. NY.
3. Brown, T.A. (1991). Essential Molecular Biology - A Practical approach. Vol-I, Vol - n , Oxford Univ. Press. Oxford.

**C -SUGGESTED BOOKS**

1. Benjamin, L. (1990). Gene. IV Edn. Oxford Univ. Press, Oxford.

2. David, J., Ulley and Eckstein, F. (1992). Nucleic Acids and Molecular Biology. Vol-6, Springer-verlag Berlin Heidelberg.

3. Desmond, S.T., and Nicholl. (1994). An Introduction to genetic Engineering Cambridge Univ. Press. Cambridge.

4. Freifelder, D. (1990). Microbial genetics. Narosa Pub. Home. India.

5. Gardner, E.J. (1991). Principles of Genetcis. John Wiley and Sons Inc. NY.

.Biology Cell .Thomas D.and ; William C. Earnshaw (2004) ,6. Pollard Philadelphia: Saunders.

7. Lodish, Harvey, Arnold Berk, S. Lawrence Zipursky, Paul Matsudaira, David Baltimore, James Darnell Molecular Cell Biology, 4th ed (2000), New York

8. Watson, JB., Gflnian, M., Witkowshi, J. and Zoller, M. (1992). Recombinant DNA. 2Dd Edn.

**D- Websites:** pubmed, Sciencedirect, Nejm, Weilyinterscience

**Facilities required for teaching and learning:**

1. **For lectures:** Black (white) boards, computer, data show.

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- **Course Coordinators:**

**Prof. Dr. Fathy Mohammed El-Sayed Serry**

**Prof Dr/ Mohamed Mahmoud El-Seweidy**

- **Head of Department: Prof Dr/ Nehal El-sayed**
- **Date: 2017 تم اعتماد توصيف المقرر بمجلس القسم لشهر سبتمبر**

| Matrix I of Molecular Biology (2017-2018) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Course Contents | | ILOs of Molecular Biology course | | | | | | | | | | | | |
| | | Knowledge and Understanding | | | | Intellectual skills | | | | General and transferable skills | | | | |
| | | a1 | a2 | a3 | a4 | b1 | b2 | b3 | b4 | d1 | d2 | d3 | d4 | d5 |
| 1 | • DNA ,RNA structure, function<br>• Difference between DNA & RNA | X | X | | | | | | | | | | | |
| 2 | • DNA replication steps | X | | | | | | | | | | | | |
| 3 | • Types of RNA<br>• Genetic code | | X | | | | | | | | | | | |
| 4 | • Protein synthesis<br>• Alteration of nucleotide sequence | | X | | | | | | | | | | | |
| 5 | • Genetic engineering<br>• DNA cloning<br>• Applications of cloning in treatment of diseases -activity | | | X | X | X | X | | | X | X | X | X | X |
| 6 | • Genomic DNA libraries, c DNA<br>• PCR, LCR and their applications | | | X | | | | X | X | | | | | |
| 7 | • RFLP<br>• Linkage of polymorphism with gene mutation<br>• Prenatal diagnosis, Diagnosis of sickle cell disease | | | X | X | X | X | | | | | | | |
| 8 | • Sequencing of DNA (chemical method) | x | | | | | | | | | | | | |
| 9 | • Sequencing of DNA (enzymatic method) | x | | | | | | | | | | | | |
| 10 | • Electrophoresis | x | | | | | | | | | | | | |
| 11 | • Sothern, western and northern blotting | x | | | | | | | | | | | | |
| 12 | • Sequencing of proteins | | X | | | | | | | | | | | |
| 13 | • Synthesis of genes | x | | | | | | | | | | | | |
| 14 | • Monoclonal antibodies activity (reports) | | | | X | | X | x | x | | | | | |
| 15 | • Revision and open discussion | X | X | X | X | X | X | X | X | X | X | X | X | X |

# Matrix II of Molecular Biology (2017-2018)

| ARS | | Program ILOs | Course ILOs | Course contents | Sources | Teaching and learning methods | | Method of assessment | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Lecture | Self-learning | Written exam | oral exam | Activity |
| **Knowledge and Understanding** | 2.1.1- Theories and fundamentals related to the field of learning as well as in related areas. | A.1Identify the principles of human body physiology, progression of diseases, pharmacokinetics, pharmacodynamics and basics of genetics. | a1- a2- a3- a4 | • DNA structure, function. DNA replication steps - Genomic DNA libraries, c DNA -Sequencing of DNA (chemical method)- Sequencing of DNA (enzymatic method)- Electrophoresis- Sothern, western and northern blotting- Synthesis of genes- RNA structure, function.- Difference between DNA and RNA- Types of RNA- Genetic code- Protein synthesis-Alteration of nucleotide sequence - Sequencing of proteins- Genetic engineering- DNA cloning- PCR, LCR and their applications- RFLP- Linkage of polymorphism with gene mutation- Applications of cloning in treatment of diseases- Prenatal diagnosis, Diagnosis of sickle cell disease- Monoclonal antibodies | Textbooks, Scientific papers and self learning | x | x | x | x | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2.1.3- Scientific developments in the area of specialization. | A.5- Update the information regarding DNA sequencing and techniques used for analysis of DNA and RNA. | a3- a4 | Genetic engineering- DNA cloning- PCR, LCR and their applications- RFLP- Linkage of polymorphism with gene mutation- Applications of cloning in treatment of diseases- Prenatal diagnosis, Diagnosis of sickle cell disease- Monoclonal antibodies | Textbooks, Scientific papers and self learning | x | x | x | x | |
| **Intellectual skills** | 2.2.4- Conduct research and write scientific report on research specified topics. | B.5- Apply the most appropriate instrumental technique for DNA and RNA assays.<br><br>B.6- Design and manage different experimental protocols in the field of pharmacology and related disciplines | b1 | Genetic engineering- DNA cloning- PCR, LCR and their applications- RFLP- Linkage of polymorphism with gene mutation- Applications of cloning in treatment of diseases- Prenatal diagnosis, Diagnosis of sickle cell disease- Monoclonal antibodies | Textbooks, Scientific papers and self learning | x | x | x | x | |
| **General and transferable skills** | 2.4.2- Effectively use information technology in professional practices | D.4- Demonstrate competence in the use of information technology broad enough to meet personal, academic and professional needs. | d1 | Activity (reports)- open discussion | Textbooks, Scientific papers and self learning | x | x | | | X |
| | 2.4.4- Use variable sources to get information and knowledge. | D.6- Use library, drug information databases, drug interactions identifying websites and other resources to get knowledge related to pharmacology. | d2 | Activity (reports)- open discussion | Textbooks, Scientific papers and self learning | x | x | | | X |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2.4.6- Work in a team and lead teams carrying out various professional tasks. | D.8- Maintain ethics and respect-based relationships with colleagues, professors and other staff members. | d3-d4 | Activity (reports)- open discussion | Textbooks, Scientific papers and self learning | x | x | | x | X |

# Special Courses for master degree

# Advanced Pharmacology Techniques

# Course specification of Advanced Pharmacology Techniques

## A- Course specifications:

- Program on which the course is given: Master of Pharmaceutical Sciences
- Major or Minor element of program: Major
- Department offering the program: Pharmacology Dept.
- Department offering the course: Pharmacology Dept.
- Date of specification approval: 2017/2018

## 1- Basic information:

Title: **Advanced Pharmacology Techniques** Code: Lsp1
Lectures: 4 hrs/week Credit hours: 4 hrs/week
Total: 4hrs/week

## 2- Overall aim of the course:

On completion of the course, the students will be able to:

- Summarize the principle of some of the advanced techniques in pharmacology and molecular biology.
- Discuss the precautions that should be noticed while performing certain techniques.

## 3. Intended learning outcome s (ILOs) of Advanced Pharmacology Techniques:

| **Knowledge and Understanding** | |
|---|---|
| **a1** | Discuss scientific developments related to some advanced pharmacological techniques. |
| **a2** | Illustrate principles and basics of quality in professional practice in modern pharmacological laboratory setting. |
| **Intellectual skills** | |
| **b1** | Analyze information and results concerned with some advanced pharmacological techniques. |

| | |
|---|---|
| **b2** | Evaluate and manage risks and potential hazards in a pharmacology lab. |
| **General and Transferable skills** | |
| **d1** | Develop rules and indicators for assessing the performance of others. |

## 4. Course Content of Advanced Pharmacology Techniques:

| Week number | Lecture contents (4hrs/week) |
|---|---|
| **1** | Lab safety measures and handling and disposal of dangerous materials. |
| **2** | Extraction, purification and identification of nucleic acids (DNA and RNA) |
| **3** | Reverse transcription |
| **4** | Polymerase chain reaction (conventional PCR, RT-PCR and real time RT-PCR) |
| **5** | Separation of PCR products and analysis of PCR results |
| **6** | Extraction and quantification of proteins |
| **7** | Western blotting |
| **8** | Analysis of western blot results |
| **9** | Measurement of blood pressure (invasive and non-invasive) - Activity |
| **10** | Measurement of blood glucose level |
| **11** | Assessment of liver function |
| **12** | Assessment of kidney function |
| **13** | Complete blood count |
| **14** | Anatomy and dissection of laboratory animals |
| **15** | Revision |

## 5- Teaching and Learning Methods:

- Lectures
- Self-learning
- Open discussion

## 6- Student Assessment methods:

- Written exam to assess: a1, a2,b1 and b2
- Oral exam to assess: a1, a2, b1, b2 and d1.
- Activity to assess: d1

## Assessment schedule:

| | |
|---|---|
| **Assessment (1):**Activity | Week 7-14 |
| **Assessment (2):** Written exam | Week 16 |
| **Assessment (3):** oral exam | Week 16 |

## Weighting of Assessment:

| Assessment method | Marks | Percentage |
|---|---|---|
| • Activity | 10 | 10 % |
| • Written exam | 75 | 75 % |
| • oral exam | 15 | 15 % |
| **TOTAL** | **100** | **100%** |

## 7- References and books:

**A-Scientific papers**
**B- Essential books:**
Advances in pharmacology, S.J. Enaa, M. Williams, volume 57,2009

**Facilities required for teaching and learning:**

1. **For lectures:** Black (white) boards, computer, data show.

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**Course coordinator**

**Prof. Dr. Mohammed Abd EL-Aal**

**المشرف على القسم : عميد الكليه**

**ا.د/ محمد بركه**

**Date:**

| Matrix I of Advanced Pharmacology Techniques course | | | | | | |
|---|---|---|---|---|---|---|
| Week number | Course Contents | Knowledge and understanding | | Intellectual skills | | General & Transferable skills |
| | | **a1** | **a2** | **b1** | **b2** | **d1** |
| **1** | Lab safety measures and handling and disposal of dangerous materials. | | x | | X | |
| **2** | Extraction, purification and identification of nucleic acids (DNA and RNA) | X | | | | |
| **3** | Reverse transcription | X | | | | |
| **4** | Polymerase chain reaction (conventional PCR, RT-PCR and real time RT-PCR) | X | | | | |
| **5** | Separation of PCR products and analysis of PCR results | | | x | | |
| **6** | Extraction and quantification of proteins | X | | | | |
| **7** | Western blotting | X | | | | |
| **8** | Analysis of western blot results | | x | | | |
| **9** | Measurement of blood pressure (invasive and non-invasive) - Activity | X | x | x | | X |
| **10** | Measurement of blood glucose level | X | x | x | | |
| **11** | Assessment of liver function | X | x | x | | |
| **12** | Assessment of kidney function | X | x | x | | |
| **13** | Complete blood count | X | x | x | | |
| **14** | Anatomy and dissection of laboratory animals | X | | | | |
| **15** | Revision | X | x | x | X | X |

## Matrix II of Advanced Pharmacology Techniques

| ARS | | Program ILOs | Course ILOs | Course content | Source | Teaching and learning methods | | Method of Assessment | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Lectures | Self-learning | Written exam | Oral exam | Activity |
| Knowledge and Understanding | 2.1.4- Moral and legal principles for professional practice in the area of specialization. | A.7- Know the principles of moral and medico-legal aspects applied in the practical life related to different areas of pharmacology. | a1 | Extraction, purification and identification of nucleic acids (DNA and RNA) - Reverse transcription- Polymerase chain reaction (conventional PCR, RT-PCR and real time RT-PCR) - Extraction and quantification of proteins - Western blotting- Measurement of blood pressure (invasive and non-invasive)- Measurement of blood glucose level - Assessment of liver function- Assessment of kidney function - Complete blood count - Anatomy and dissection of laboratory animals | Scientific papers, text books and Internet | X | X | x | x | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2.1.5- Principles and the basics of quality in professional practice in the area of specialization. | A.10- Understand the basics of quality assurance to guarantee ideal practice in the field of pharmacology. | a2 | Lab safety measures and handling and disposal of dangerous materials - Analysis of western blot results - Measurement of blood pressure (invasive and non-invasive)- Measurement of blood glucose level - Assessment of liver function- Assessment of kidney function - Complete blood count | Scientific papers, text books and Internet | X | X | x | x | |
| Intellectual Skills | 2.2.4- Conduct research and write scientific report on research specified topics. | B.6- Design and manage different experimental protocols in the field of pharmacology and related disciplines. | b1 | Separation of PCR products and analysis of PCR results - Measurement of blood pressure (invasive and non-invasive)- Measurement of blood glucose level - Assessment of liver function- Assessment of kidney function - Complete blood count | Scientific papers, text books and Internet | X | x | x | x | |
| | 2.2.5- Evaluate and manage risks and potential hazards in professional practices in the area of specialization | B.7- Evaluate the toxicity and hazards of therapeutic regimens and how to apply these regimens properly in different pathological conditions. | b2 | Lab safety measures and handling and disposal of dangerous materials | Scientific papers, text books and Internet | X | x | x | x | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| General & Transferable Skills | 2.4.5- Set criteria and parameters to evaluate the performance of others | D.7- Develop rules and indicators for assessing and criticizing the performance of others. | d1 | Activity- Revision | Scientific papers, text books and Internet | X | x | | x | X |

# Drug Targeting

# Course specification of Drug Targeting

## A- Course specifications:

- Program on which the course is given: Master of Pharmaceutical Sciences
- Major or Minor element of program: Major
- Department offering the program: Pharmacology Dept.
- Department offering the course: Pharmacology Dept.
- Date of specification approval: 2017/2018

## 1- Basic information:

Title: **Drug Targeting** Code: Lsp2
Lectures: 4 hrs/week Credit hours: 4 hrs/week
Total: 4hrs/week

## 2- Overall aim of the course:

On completion of the course, the students will be able to:

- Understand diseases of different body organs.
- Have special and advanced education in the field of drug targeting.

## 3. Intended learning outcome s (ILOs) of Drug Targeting:

| | |
|---|---|
| **Knowledge and Understanding** | |
| **a1** | Outline various diseases and traditional methods of treatment. |
| **a2** | Update the information regarding the recent use of drug targeting through using different drug delivery systems. |
| **Intellectual skills** | |
| **b1** | Link available information of the disease and the treatment to target the drug and get maximum benefit of it. |
| **General and Transferable skills** | |
| **d1** | Work effectively and carry out integrated tasks within a group. |
| **d2** | Use different sources of information technology to meet academic and professional assignments. |

## 4. Course Content of Drug Targeting:

| Week number | Lecture contents (4hrs/week) |
|---|---|
| **1** | Diseases of the CNS(Alzheimer Disease, Parkinson's Disease, Cerebrovascular Disease, Brain Tumors) |
| **2** | Traditional treatment for the CNS diseases |
| **3** | Drug targeting in CNS<br>Small Molecule Drug Delivery |
| **4** | Drug targeting in CNS<br>Macromolecular Drug Delivery |
| **5** | Diseases and traditional treatment of the Liver<br>Hepatic Inflammation and Fibrosis<br>Liver Cirrhosis: Causes and Therapy |
| **6** | Drug targeting in the Liver<br>Carriers Directed at SECs and KCs |

| | |
|---|---|
| **7** | Drug targeting in the Liver<br>Targeting to other Hepatic Cells |
| **8** | Diseases and traditional treatment of the Kidney<br>Renal Pathology and the Proximal Tubular Cell for Therapeutic Intervention |
| **9** | Drug targeting in the Kidney<br>Activity |
| **10** | Drug targeting in the Kidney<br>Renal Delivery Using Pro-Drugs |
| **11** | Diabetic vascular complications<br>Atherosclerosis |
| **12** | Traditional treatment for Diabetic vascular complications |
| **13** | Drug targeting in Diabetic vascular complications<br>Target Epitopes on Inflammatory Endothelium |
| **14** | Drug targeting in Diabetic vascular complications<br>Targeting Devices |
| **15** | Revision |

## 5- Teaching and Learning Methods:

- Lectures
- Self-learning
- Open discussion

## 6- Student Assessment methods:

- Written exam to assess: a1, a2 andb1.
- Oral exam to assess: a1, a2, b1, d1 and d2.
- Activity to assess: d1 and d2

## Assessment schedule:

| | |
|---|---|
| **Assessment (1):**Activity | Week 9 |
| **Assessment (2):** Written exam | Week 16 |
| **Assessment (3):** oral exam | Week 16 |

## Weighting of Assessment:

| Assessment method | Marks | Percentage |
|---|---|---|
| • Activity | 10 | 10 % |
| • Written exam | 75 | 75 % |
| • oral exam | 15 | 15 % |
| **TOTAL** | **100** | **100%** |

## 7- References and books:

**A-Scientific papers**

**B- Essential books:**

- Drug targeting, strategies, principles and applications, Francis G.E. Delgado C. Human Press 2000.

- Brain Drug Targeting: The Future of Brain Drug Development, Pardridge W.M. Cambridge University Press 2001.

**Facilities required for teaching and learning:**

1. **For lectures:** Black (white) boards, computer, data show.

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**Course coordinator**

**Prof. Dr. Ahmed Fahmy**

**المشرف على القسم : عميد الكليه**

**ا.د/ محمد بركه**

- **Date: -**

| Matrix I of Drug Targeting course | | | | | |
|---|---|---|---|---|---|
| Week number | Course Contents | Knowledge and understanding | | Intellectual skills | General & Transferable skills |
| | | **a1** | **a2** | **b1** | **d1** |
| **1** | Diseases of the CNS | X | | | |
| **2** | Traditional treatment for the CNS diseases | X | | | |
| **3** | Drug targeting in CNS | | X | X | |
| **4** | Drug targeting in CNS | | X | X | |
| **5** | Diseases and traditional treatment of the Liver | X | | | |
| **6** | Drug targeting in the Liver | | X | X | |
| **7** | Drug targeting in the Liver | | X | X | |
| **8** | Diseases and traditional treatment of the Kidney | X | | | |
| **9** | Drug targeting in the Kidney-Activity | | X | X | X |
| **10** | Drug targeting in the Kidney | | X | X | |
| **11** | Diabetic vascular complications | X | | | |
| **12** | Traditional treatment for Diabetic vascular complications | X | | | |
| **13** | Drug targeting in Diabetic vascular complications | | x | X | |
| **14** | Drug targeting in Diabetic vascular complications | | x | X | |
| **15** | Revision | X | x | X | X |

## Matrix II of Drug Targeting

| ARS | | Program ILOs | Course ILOs | Course content | Source | Teaching and learning methods | | Method of Assessment | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Lectures | Self-learning | Written exam | Oral exam | Activity |
| Knowledge and Understanding | 2.1.1- Theories and fundamentals related to the field of learning as well as in related areas. | A.1-Understand the principles of human body physiology, progr ession of diseases, pharmac okinetics, pharma codynamics and basics of genetics | a1 | Diseases and traditional treatment of (CNS- Liver- Kidney- Diabetic vascular complications) | Scientific papers, text books and Internet | x | x | x | x | |
| | 2.1.3- Scientific developments in the area of specialization | A.6-Recognize the recent methods of targeting drugs in certain diseases. | a2 | Drug targeting to (CNS- Liver- Kidney- Diabetic vascular complications) | Scientific papers, text books and Internet | x | x | x | x | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Intellectual Skills | 2.2.3-Correlate and integrate different pharmaceutical knowledge to solve professional problems. | B.3- Integrate information regar ding drug kinetics, dynamic s, toxicity and interaction wih other drugs to apply a proper therapeutic regim en in different situations related to the profession. | b1 | Drug targeting to (CNS- Liver- Kidney- Diabetic vascular complications) | Scientific papers, text books and Internet | x | x | x | x | |
| General & Transferable Skills | 2.4.2- Effectively use information technology in professional practices | D.4- Demonstrate competence in the use of information techn ology broad enough to meet personal, academic and professional needs. | d1 | Activity- Revision | Scientific papers, text books and Internet | X | X | | X | X |
| | 2.4.6- Work in a team and lead teams carrying out various professional tasks. | D.6-Appreciate team working. | d2 | Activity- Revision | Scientific papers, text books and Internet | X | X | | X | X |

# Thesis Specification

# Thesis of Master Degree

## A- Thesis specifications:

- **Program on which the course is given:** Master of Pharmaceutical sciences (Pharmacology)
- **Major or Minor element of program:** Major
- **Department offering the program:** Pharmacology Dept.
- **Department offering the thesis:** Pharmacology Dept.
- **Date of specification approval:** 2017/2018

## 1- Basic information:

Title: Master Thesis in Pharmacology
Credit hours: 30 hrs

## 2- Overall aim of the thesis:

**On completion of the thesis, the students will be able to:**

- Design a scientific study to solve a scientific problem
- Collect all the previously published data to cover the scope of the problem
- Identify and perform different techniques and methods used in the experimental work according to the designed protocol
- Analyze the results of the study and interpret the obtained data
- Draw conclusions about the contribution to knowledge made by the study and evaluate whether these conclusions solve the scientific problem.

## 3- Intended learning outcome's (ILOs):

| **Knowledge and Understanding** | |
|---|---|
| **a1** | Describe all required pharmacological knowledge related to main objectives of the thesis. |
| **a2** | Select the point of the thesis according to the problems present in the community. |
| **a3** | Update the information in the specified area of the work. |
| **a4** | Define any legal aspects related to the thesis work. |
| **a5** | Demonstrate GLP and quality assurance related to practical work of the thesis. |

| | |
|---|---|
| **a6** | Identify and apply scientific experimental ethics. |
| **Intellectual skills** | |
| **b1** | Analyze and interpret the experimental data in a suitable form to solve the suggested problem. |
| **b2** | Integrate all required knowledge to solve problems that may rise during practical work. |
| **b3** | Conduct a research project and write scientific reports. |
| **b4** | Manage risks and hazards related to professional practical area. |
| **b5** | Design a laboratory protocol for the work. |
| **b6** | Make decisions related to recent and future studies. |
| **Professional and practical skills** | |
| **c1** | Perform practical experiments related to the point understudy. |
| **c2** | Report the work in a written report. |
| **c3** | Asses used methods, tools and instruments in pharmacological research. |
| **General and Transferable skills** | |
| **d1** | Communicate effectively with all people related to the work. |
| **d2** | Use information technology in review and thesis preparation. |
| **d3** | Evaluate the work and learning needs. |
| **d4** | Use various sources to get information about the subject understudy. |
| **d5** | Set rules for evaluation and judging others performance. |
| **d6** | Work effectively as a member of a team. |
| **d7** | Acquire time management skills. |
| **d8** | Study independently and plan research studies. |

## 4. Thesis Content:

| Steps | Content |
|---|---|
| 1st | • Suggest the possible points/ problems of research that the candidate can work on in the frame of the aim of work and choose proper point related to the problems of the community and surrounding environment.<br>• Collect all available information about this subject by all possible means.<br>• Use internet, journals, books and others thesis to get previous and recent information about the subject understudy. |

| | |
|---|---|
| | • Design the protocol including the steps of work following the suitable timetable.<br>• Increase the awareness of the recent pharmacological techniques that will be used during practical work and determined by the protocol.<br>• Integrate different knowledge including (basic pharmacology, clinical pharmacology, and pathophysiology of diseases, biochemical basis, major concepts in anatomy and physiology, biostatistics, chemical analysis…….) to solve suggested problem.<br>• Continuous evaluation to the thesis outcome according to the schedule. |
| 2nd | • Master a wide range of pharmacological techniques either in vivo or in vitro.<br>• Record vital data either by invasive or non-invasive techniques e.g. blood pressure, ECG……<br>• Perform basic surgical and anesthetic skills on experimental animals.<br>• Identify pharmacological actions and toxicological profile of active principles.<br>• Induction of some diseases in experimental animals (obesity, diabetes…….)<br>• Separate biological samples and tissues (e.g. blood, plasma, csf, urine, kidney, liver……).<br>• Operate scientific instruments according to instructions.<br>• Evaluate and manage hazards (chemical and biological) throughout the whole practical work.<br>• Organize the experimental work according to the designed protocol (either individual, parallel or sequential experiments)<br>• Apply ethical recommendations during dealing with humans/ experimental animals.<br>• Discuss any legal aspects related to the thesis work. |
| 3rd | • Collect raw data from the designed model.<br>• Interpret raw data to get valuable information.<br>• Perform statistical analysis and biological correlation for the results.<br>• Present and describe the results graphically.<br>• Suggest solution to the problem understudy based on this presented data. |
| 4th | • Communicate with supervisors to discuss results and with patients to collect case history and samples.<br>• Work effectively as a member of a team (e.g. Supervisors, various |

| | |
|---|---|
| | professionals and Technicians).<br>• Present the results periodically in seminars.<br>• Write scientific reports on the obtained results with conclusive significance.<br>• Discuss obtained results in comparison with pervious literatures.<br>• Suggest possible recommendations based on the outcome of the thesis and decide future plans.<br>• Summarize the thesis in an understandable Arabic language for non-professionals.<br>• Write references in the required form (Thesis, Paper…….).<br>• Demonstrate the thesis in a final power point presentation.<br>• Continue self-learning throughout the experimental work and writing scientific papers. |

## 5- Teaching and Learning Methods:

- Self-learning (Activities, Research….)
- Open discussion and case studies
- Lab meetings
- Seminars
- Lab reports

## 6- References:

- **Websites:** Pubmed, Science direct, Weily interscience, high wire press, Ovid, Scopus.

**Facilities required for:**

1. **For practical work:** RT PCR- Fluorescent microscope- Spectroflorometer- Cryostat- Noninvasive blood pressure recorder

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- **المشرف على القسم : عميد الكليه**
- **ا.د/ محمد بركه**
- **Date:**

# Program Matrix of Master degree of Pharmacology and Toxicology

| | | Program ILOS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | A1 | A2 | A3 | A4 | A5 | A6 | A7 | A8 | A9 | A10 | A11 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | B8 | B9 | B10 | C1 | C2 | C3 | C4 | D1 | D2 | D3 | D4 | D5 | D6 | D7 | D8 | D9 | D10 | D11 |
| General courses | Molecular Biology | X | | | | X | | | | | | | | | | | X | X | | | | | | | | | | | | X | | X | | X | | | |
| | Physiology | X | | | X | | | | | | | | | | | X | | | | | | X | | | | | X | | X | | | | | | | |
| | Biostatistics | | | X | | | | | | X | | | X | | | | | | | | X | | | | | | X | | | | | | | | | |
| | Instrumental analysis | | | | X | | | | | | | | | | X | | | | | | | | | | | | X | X | | | X | X | X | | | |
| | Biotechnology | X | | | | X | | | | | | | | | | | X | X | | | | | | | | | | | | X | | X | | X | | | |
| | Applied Pharmacology | | | | X | | | | X | | | | | | X | X | | | | | | | | | | | X | | | | | | | | | |
| | Drug induced diseases | X | | | | | | | X | | | | | X | | | | | X | | | | | | | | | X | | | | X | | | | |
| Special courses | Advanced pharmacology techniques | | | | | | | X | | | X | | | | | | | X | X | | | | | | | | | | | | | | X | | | |
| | Drug targeting | X | | | | | X | | | | | | | | X | | | | | | | | | | | | | | | X | | | | X | | |
| | Pathophysiology | X | | | | | X | | | | | | | X | | | | | | | | | | | | | | | | | | | | | | X |
| Thesis | | X | | | X | X | | X | | | X | X | X | | X | | | | | X | | X | X | X | X | X | X | | | X | X | X | X | X | | X | X |

# PhD Degree

# Program Specification

# Program Specification

## A- Basic Information

**1- Program title:**PhD. Pharm. Sci Degree in **Pharmacology**

**2- Program type:**Single

**3- Faculty/ University:**Faculty of Pharmacy, Zagazig University

**4-Department:**Pharmacology

**5- Coordinator:** Prof. Dr. Ahmed Fahmy

**6- Date of program specification approval:** 2017/2018

## B- Professional Information

### 1- Program aims:

**The Pharmacology PhD's program prepares the postgraduates** to work in a multidisciplinary profession such as research institutes, private and public medical laboratories, universities, National Quality Control Centers (foods & drugs) and Ministry of Health.

**PhD Graduate Attributes**:

They should acquire the necessary attributes & skills in various Pharmacology aspects including the following:

1- Discuss in detail chronic diseases and how to manage it by all possible means
2- Recognize the importance of herbs and natural products and their ability to treat different diseases
3- Mention the application of advanced techniques and trends in pharmacology
4- Evaluate the obtained information from different sources related to pharmacology
5- Have the experience to establish and/ or modify some of the procedures used in pharmacology
6- Respect Moral and ethical principles for professional practice in the area of specialty
7- Analyze , evaluate information and solve professional problem
8- Communicate and work effectively in a team

## 2-Intended Learning Outcomes (ILOs):

The Program aimed to provide excellent opportunities for post graduate students to demonstrate knowledge and understanding qualities and develop skills appropriate for **Pharmacology** PhD of sciences degree.

### 2-1- Knowledge and Understanding:

**On successful completion of the PhD degree Program, students will be able to:**

A.1-Have great depth and systematic understanding of theoretical concepts and recent advances in the field of pharmacology and related subjects

A.2-Outline the principles in detail of chronic disease and related topics

A.3-Discuss relevant methodologies and techniques and their appropriate application within the field of study

A.4-Carry out professional duties in accordance with legal and ethical guidelines

A.5-Discuss quality issues and demonstrates responsible working practices.

A.6-Describe the impact of pharmacology and related sciences on human health and the society

A.7- Illustrate the influence of chronic disease on the health of individuals in society and ways of their management

### 2-2 - Intellectual Skills:

**On successful completion of the PhD degree Program, students will be able to:**

B.1-Interpret and evaluate the suitability, accuracy, and reliability of information from different sources.

B.2- Select the right methods to solve problems according to available information.

B.3-Contribute to the development of the profession through applied study or research.

B.4- Develop writing skills such as clarity and presenting results to formulate scientific papers.

B.5- Work safely in a laboratory environment and avoid risks.

B.6-Improve the performance in the field of pharmacology through modifying the process or procedure used.

B.7-Make balanced decisions and carry responsibility during the research.

B.8-Be creative, innovative and original in one's approach to research.

B.9-Construct coherent arguments and articulate ideas clearly to a range of audiences, formally and informally through a variety of techniques.

## 2-3 - Professional and Practical Skills:

**It is intended that, on successful completion of the PhD degree Program, student**s will be able to:

C.1- Carry out all laboratory procedures and techniques required in the field of study.

C.2-Write and critically evaluate professional reports.

C.3-Evaluate the suitability of methods and instruments used during research.

C.4- Consider developments in technology to enhance learning

C.5- Plan to improve professional practice and to improve the performance of other scholars.

## 2-4 - General and Transferable Skills:

**On successful completion of the PhD degree Program, students will be able to:**

D.1- Adopt verbal and non-verbal communication

D.2-Be competent in the use of computers for data analysis, word-processing, and production of thesis-quality graphics.

D.3- Interact effectively with professional colleagues and assist in their learning and professional development

D.4-Recognize self-limitations and areas for improvement and seek for continuous learning.

D.5-Gather, summarizes, and organizes information from different sources.

D.6-Share experiences with members of the team and encourage participation.

D.7- Direct scientific meetings and to manage time effectively

# 3- Academic Standards:

- ARS (Academic Reference Standards, 2009)

## **Matrix:** Comparison between PhD degree program ILOs and the Academic Reference Standards

| ARS vs. Program ILOs of PhD in Pharmacology | | |
|---|---|---|
| | ARS | Program ILOs |
| Knowledge and Understanding | 2.1.1- Fundamentals and in-depth knowledge and basic theories in the field of specialty and the closely related areas of pharmaceutical sciences. | A.1-Have great depth and systematic understanding of theoretical concepts and recent advances in the field of pharmacology and related subjects.<br><br>A.2-Outline the principles in detail of chronic disease and related topics |
| | 2.1.2- Fundamentals, methods, techniques, tools and ethics of scientific research. | A.3-List relevant methodologies and techniques and their appropriate application within the field of study. |
| | 2.1.3- The ethical and legal principles in pharmacy and academic practices. | A.4-Carry out professional duties in accordance with legal and ethical guidelines. |
| | 2.1.4- The principles and bases of quality assurance in professional practice in the field of specialization. | A.5-Discuss quality issues and demonstrates responsible working practices. |
| | 2.1.5- All relevant knowledge concerning the impact of professional practice on society and environment and the ways of their conservation and development. | A.6-Describe the impact of pharmacology and related sciences on human health and the society.<br>A.7- Illustrate the influence of chronic disease on the health of individuals in society and ways of their management |
| Intellectual Skills | 2.2.1- Analyze and evaluate the data in his\her specified area and utilize them in logical inference processes (induction/deduction). | B.1-Interpret and evaluate the suitability, accuracy, and reliability of information from different sources. |
| | 2.2.2- Propose solutions to specified problems in the light of the available data (information). | B.2-Select the right methods to solve problems according to available information. |
| | 2.2.3- Conduct research studies that add to the current knowledge. | B.3-Contribute to the development of the profession through applied study or research. |
| | 2.2.4- Formulate scientific papers. | B.4-Develop writing skills such as clarity and presenting results to formulate scientific papers. |

| | | |
|---|---|---|
| | 2.2.5- Asses hazards and risks in professional practice in his \ her areas of specialization. | B.5- Work safely in a laboratory environment and avoid risks. |
| | 2.2.6- Plan to improve performance in the pharmaceutical area of interest. | B.6-Improve the performance in the field of pharmacology through modifying the process or procedure used. |
| | 2.2.7- Take Professional decisions and bears responsibility in wide array of pharmaceutical fields. | B.7-Make balanced decisions and carry responsibility during the research. |
| | 2.2.8- Be creative and innovative. | B.8-Be creative, innovative and original in one's approach to research. |
| | 2.2.9- Manage discussions and arguments based on evidence and logic. | B.9-Construct coherent arguments and articulate ideas clearly to a range of audiences, formally and informally through a variety of techniques. |
| Professional and Practical Skills | 2.3.1- Master basic and modern professional skills in the area of specialization. | C.1-Master all laboratory procedures and techniques required in the field of study. |
| | 2.3.2- Write and critically evaluate professional reports. | C.2-Write and critically evaluate professional reports. |
| | 2.3.3- Evaluate and develop methods and tools existing in the area of specialization. | C.3-Evaluate the suitability of methods and instruments used during research. |
| | 2.3.4- Properly use technological means in abetter professional practice. | C.4-Consider developments in technology and how to use to enhance learning. |
| | 2.3.5- Plan to improve professional practice and to improve the performance of other scholars. | C.5-Plan to improve professional practice and to improve the performance of other scholars. |
| General and Transferable Skills | 2.4.1- Effective Communication in its different forms. | D.1-Adopt verbal and non-verbal communication. |
| | 2.4.2- Effective use of information technologies to improve professional practices. | D.2-Be competent in the use of computers for data analysis, word-processing, and production of thesis-quality graphics. |
| | 2.4.3- Help others to learn and evaluate their performance. | D.3-Interact effectively with professional colleagues and assist in their learning and professional development. |
| | 2.4.4- Self-assessment and continuous learning. | D.4-Recognize self-limitations and areas for improvement and seek for continuous learning. |

| | | |
|---|---|---|
| | 2.4.5- Use various sources to get information and knowledge. | D.5-Gather, summarizes, and organizes information from different sources. |
| | 2.4.6- Work as a member and lead a team of workers. | D.6-Share experiences with members of the team and encourage participation. |
| | 2.4.7- Direct scientific meetings and to manage time effectively. | D.7-Direct scientific meetings and to manage time effectively. |

## 4-Curriculum Structure and Contents:

**a- Program duration: 3-5** years

**b- Program structure:**

- The PhD program can be completed in 3-5 years.
- The Faculty of pharmacy implements the credit hour system.
- The program is structured as:

**1- Courses:**

**No. of credit hours for program courses:**

Special: (3x4) 12

**2- Thesis:** 30 hours

The candidate must complete a research project on an approved topic in the Pharmaceutical Sciences. To fulfill this requirement the student must present (written and orally) a research proposal and write a thesis.

**3- General University Requirements:** 10 credit hours including:

a- TOEFL (500 units)

b- Computer course

**C-Program Curriculum:**

| Course Code | Course Title | Credit hours | Program ILOs Covered |
|---|---|---|---|
| | **Special Courses:** | | |
| Lsp4 | Advanced trends in pharmacology | 4 | A.1, A.3, A.5, B.2, B.6, B.8-, D.1, D.6, D.7 |
| Lsp5 | Management of chronic diseases | 4 | A.1, A.5, B.2, D.1, D.5, D.6, |

| | | | |
|---|---|---|---|
| Lsp6 | Pharmacology of natural products | 4 | A.1, A.5, A.7, B.6, D.1, D.6, D.7 |
| | Thesis | 30 | A.1, A.3, A4, A.5, A.6 B.1, B.2, B.3, B.4, B.5, B.6, B.7, B.8, B.9, C.1, C.2, C.3, C.4, C.5, D.1, D.2, D.3, D.4, D.5, D.6, D.7 |

## 5-Program admission requirements:

**Applicants are admitted to PhD degree any time throughout the academic year upon fulfillment of the following:**

1. The applicants should be holders of Bachelor in Pharmaceutical Sciences from any Faculty of Pharmacy and also finish M.Sc. degree affiliated to the Egyptian Universities affiliated to the Egyptian Supreme Council of Universities (ESCU).
2. Students should fulfill all the admission requirements stated by the concerned Departmental Board.

**Regulations to complete the program:**

**Conditions of granting the degree**

The Faculty Council, in compliance with the concerned Departmental Board as well as Graduate Studies and Research Committee recommendation awards the PhD degree upon fulfillment of the following requirements:

1. Carrying out a deep research in the area of specialization for at least two calendar years from the time of registration.
2. The student has to succeed in all courses examinations.
3. Acceptance of the research thesis by the judges Committee according to statement 104 of universities regulating law.

**Cancellation of Registration**

The Faculty Board is allowed to cancel registration for PhD programs in the following circumstances:

1. Student's failure to pass the course examinations for two times.
2. Student's nonattendance or unsatisfactory progress in research work being reported by the advisors to the Departmental Board and forwarded to the Graduate Studies and Research Committee for approval of cancellation.
3. Dissertation refusal by the Jury Committee.

Incapability of the student to graduate by the deadlines indicated

## 6- Admission Policy:

The faculty complies with the admission regulations and requirements of the Egyptian Supreme Council of Universities (ESCU).

## 7-Student assessment methods:

| Method | ILOS |
|---|---|
| Written exam | Knowledge and Understanding and Intellectual Skills |
| Oral exam | Knowledge and Understanding ,Intellectual Skills and General and Transferable Skills |
| Activity | Intellectual Skills and General and Transferable Skills |
| Seminars | Knowledge and Understanding ,Intellectual Skills & General and Transferable Skills |
| Follow up | Professional and practical Skills & General and Transferable Skills |
| Thesis and oral presentation | Knowledge and Understanding, Intellectual Skills, Professional and practical Skills & General and Transferable Skills |

| Grade Scale | Grade point average value (GPA) | Numerical scale |
|---|---|---|
| A+ | 5 | ≥ 95% |

| | | |
|---|---|---|
| A | 4.5 | 90- < 95% |
| B+ | 4 | 85- < 90% |
| B | 3.5 | 80- < 85% |
| C+ | 3 | 75- < 80% |
| C | 2.5 | 70- < 75% |
| D+ | 2 | 65- < 70% |
| D | 1.5 | 60- < 65% |

## 8-Failure in Courses:

Students who fail to get 60% (1 point)

## 9-Methods of program evaluation

| Evaluator | Method | Sample |
|---|---|---|
| **Internal evaluator:** Professor Dr. Rasha Hassan | Program evaluation<br>Courses evaluation | Program report<br>Courses report |
| **External evaluator:** Professor Dr.Alaa El- Sisi | Program evaluation<br>Courses evaluation | Program report<br>Courses report |
| **Others methods** | Matrix with ARS<br>Questionnaires | The Matrix<br>Results of the questionnaires |

**Program coordinator**

**Prof. Dr.** Ahmed Fahmy

**المشرف على القسم : عميد الكليه**

**ا.د / محمد بركه**

# Management of Chronic Diseases

# Course specification of Management of Chronic Diseases

## A- Course specifications:

- Program on which the course is given: PhD in Pharmaceutical Sciences
- Major or Minor element of program: Major
- Department offering the program: Pharmacology Dept.
- Department offering the course: Pharmacology Dept.
- Date of specification approval: 2017/2018

## 1- Basic information:

Title: **Management of Chronic Diseases** Code: Lsp4
Lectures: 4 hrs/week Credit hours: 4 hrs/week
Total: 4hrs/week

## 2- Overall aim of the course:

On completion of the course, the students will be able to:

- Discuss in detail chronic diseases.
- Manage chronic diseases by all possible means.

## 3. Intended learning outcome s (ILOs) of Management of Chronic Diseases:

| | |
|---|---|
| **Knowledge and Understanding** | |
| **a1** | Describe in detail the principles of chronic diseases and related topics. |
| **a2** | Mention the influence of chronic diseases on the health of individuals in society and ways of their management |
| **Intellectual skills** | |
| **b1** | Analyze and evaluate data regarding symptoms and signs of chronic diseases in order to identify different diseases. |
| **b2** | Select proper methods of management of chronic diseases according to available information about the disease. |
| **General and Transferable skills** | |
| **d1** | Develop verbal and non-verbal communication. |

| | |
|---|---|
| **d2** | Gather, summarize, and organize information from different sources. |

## 4. Course Content of Management of Chronic Diseases:

| Week number | Lecture contents (4hrs/week) |
|---|---|
| **1** | Metabolic diseases-1 |
| **2** | Metabolic diseases-2 |
| **3** | Advanced study of management of Cardiovascular system disorders-1 |
| **4** | Advanced study of management of Cardiovascular system disorders-2 |
| **5** | Advanced study of management of Cardiovascular system disorders-3 |
| **6** | Advanced study of management of Cardiovascular system disorders-4 |
| **7** | Advanced study of management of Chronic obstructive pulmonary diseases |
| **8** | Advanced study of management of Immune deficiency disorders |
| **9** | Advanced study of management of Liver diseases-1<br>Activity |
| **10** | Advanced study of management of Liver diseases-2 |
| **11** | Advanced study of management of Neurodegenerative diseases-1 |
| **12** | Advanced study of management of Neurodegenerative diseases-2 |
| **13** | Advanced study of management of Neurodegenerative diseases-3 |
| **14** | Advanced study of management of Psychiatric disorders-1 |
| **15** | Advanced study of management of Psychiatric disorders-1 |

## 5- Teaching and Learning Methods:

- Lectures
- Self-learning
- Open discussion

## 6- Student Assessment methods:

- Written exam to assess: a1, a2,b1 and b2.
- Oral exam to assess: a1, a2, b1, b2, d1 and d2.
- Activity to assess: d1 and d2

### Assessment schedule:

| | |
|---|---|
| **Assessment (1):**Activity | Week 9 |
| **Assessment (2):** Written exam | Week 16 |
| **Assessment (3):** oral exam | Week 16 |

### Weighting of Assessment:

| Assessment method | Marks | Percentage |
|---|---|---|
| • Activity | 10 | 10 % |
| • Written exam | 75 | 75 % |
| • oral exam | 15 | 15 % |
| **TOTAL** | **100** | **100%** |

## 7- References and books:

**A-Scientific papers**
**B- Essential books:**

-Laurence L. Brunton, Bruce A. Chabner, Björn C. Knollmannin Goodman and Gilman's: The pharmacological basics of therapeutics. McGraw-Hill Professional; 12 edition (December 20, 2010)
-Basic & Clinical Pharmacology. Katzung B, Masters S and Trevor A (eds.). 12th Edition McGraw-Hill, Appleton & Lange, San Mateo, CA
-Textbook of therapeutics: Drug and disease management. Helms R, Quan D, Herfindal E and Gourley D (eds.).

**Facilities required for teaching and learning:**

1. **For lectures:** Black (white) boards, computer, data show.

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**Course coordinator**

**Prof. Dr. Mohammed Abd EL-Aal**

**المشرف على القسم : عميد الكليه**

**ا.د/ محمد بركه**

- **Date: -**

## Matrix I of Management of Chronic Diseases course

| Week number | Course Contents | Knowledge and understanding | | Intellectual skills | | General & Transferable skills | |
|---|---|---|---|---|---|---|---|
| | | **a1** | **a2** | **b1** | **b2** | **d1** | **d2** |
| **1** | Metabolic diseases-1 | x | | X | | | |
| **2** | Metabolic diseases-2 | | X | | x | | |
| **3** | Cardiovascular system disorders-1 | x | | X | | | |
| **4** | Cardiovascular system disorders-2 | x | | X | | | |
| **5** | Cardiovascular system disorders-3 | | X | | x | | |
| **6** | Cardiovascular system disorders-4 | | X | | x | | |
| **7** | Chronic obstructive pulmonary diseases | x | | X | x | | |
| **8** | Immune deficiency disorders | x | | X | | | |
| **9** | Liver diseases-1 Activity | x | X | | | X | X |
| **10** | Liver diseases-2 | | | X | x | | |
| **11** | Neurodegenerative diseases-1 | x | x | | | | |
| **12** | Neurodegenerative diseases-2 | x | x | | | | |
| **13** | Neurodegenerative diseases-3 | | | X | x | | |
| **14** | Psychiatric disorders-1 | x | | X | | | |
| **15** | Psychiatric disorders-1 | | x | | x | | |

## Matrix II of Management of Chronic Diseases

| ARS | | Program ILOs | Course ILOs | Course content | Source | Teaching and learning methods | | Method of Assessment | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Lectures | Self-learning | Written exam | Oral exam | Activity |
| Knowledge and Understanding | 2.1.1- Fundamentals and in-depth knowledge and basic theories in the field of specialty and the closely related areas of pharmaceutical sciences. | A.1-Have great depth and systematic understanding of theoretical concepts and recent advances in the field of pharmacology and related subjects. | a1 | Metabolic diseases-1- Cardiovascular system disorders-1- Cardiovascular system disorders-2- Chronic obstructive pulmonary diseases- Immune deficiency disorders- Liver diseases-1- Neurodegenerative diseases-1- Neurodegenerative diseases-2- Psychiatric disorders-1 | Scientific papers, text books and Internet | x | X | x | x | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2.1.5- All relevant knowledge concerning the impact of professional practice on society and environment and the ways of their conservation and development. | A.6-Describe the impact of pharmacology and related sciences on human health and the society. | a2 | Metabolic diseases-2- Cardiovascular system disorders-3- Cardiovascular system disorders-4- Liver diseases-1- Neurodegenerative diseases-1- Neurodegenerative diseases-2- Psychiatric disorders-1 | Scientific papers, text books and Internet | x | x | x | x | |
| Intellectual Skills | 2.2.1- Analyze and evaluate the data in his\her specified area and utilize them in logical inference processes (induction/deduction). | B.1-Interpret and evaluate the suitability, accuracy, and reliability of information from different sources. | b1 | Metabolic diseases-1- Cardiovascular system disorders-1- Cardiovascular system disorders-2- Chronic obstructive pulmonary diseases- Immune deficiency disorders- Liver diseases-2- Neurodegenerative diseases-3- Psychiatric disorders-1 | Scientific papers, text books and Internet | x | x | x | x | |
| | 2.2.2- Propose solutions to specified problems in the light of the available data (information). | B.2-Select the right methods to solve problems according to available information. | b2 | Metabolic diseases-2- Cardiovascular system disorders-3- Cardiovascular system disorders-4- Chronic obstructive pulmonary diseases- Liver diseases-2- Neurodegenerative diseases-3- Psychiatric disorders-1 | Scientific papers, text books and Internet | x | x | x | x | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| General & Transferable Skills | 2.4.1- Effective Communication in its different forms. | D.1-Adopt verbal and non-verbal communication. | d1 | Activity | Scientific papers, text books and Internet | x | x | | x | x |
| | 2.4.5- Use various sources to get information and knowledge. | D.5-Gather, summarize, and organize information from different sources. | d2 | Activity | Scientific papers, text books and Internet | x | x | | x | x |

# Advanced Trends in Pharmacology

# Course specification of Advanced Trends in Pharmacology

## A- Course specifications:

- Program on which the course is given: PhD in Pharmaceutical Sciences
- Major or Minor element of program: Major
- Department offering the program: Pharmacology Dept.
- Department offering the course: Pharmacology Dept.
- Date of specification approval: 2017/2018

## 1- Basic information:

Title: **Advanced Trends in Pharmacology** Code: Lsp6
Lectures: 4 hrs/week Credit hours: 4 hrs/week
Total: 4hrs/week

## 2- Overall aim of the course:

On completion of the course, the students will be able to:

- Mention the application of advanced techniques and trends in pharmacology.
- Obtain and evaluate information from different sources related to pharmacology.
- Demonstrate suitable experience to establish and/or modify some of the procedures used in pharmacology.

## 3. Intended learning outcome s (ILOs) of Advanced Trends in Pharmacology:

| | |
|---|---|
| **Knowledge and Understanding** | |
| **a1** | Describe recent trends in pharmacology. |
| **a2** | Mention the application of advanced techniques and trends in pharmacology. |
| **a3** | Discuss the impact of pharmacology on human health and the society. |
| **Intellectual skills** | |
| **b1** | Obtain and evaluate information from different sources related to pharmacology. |
| **b2** | Acquire suitable experience to establish and/or modify some of the procedures used in pharmacology. |
| **General and Transferable skills** | |
| **d1** | Assist professional colleagues with their learning and professional development. |
| **d2** | Recognize self-limitations and areas for improvement and seek for continuous learning. |

## 4. Course Content of Advanced Trends in Pharmacology:

| Week number | Lecture contents (4hrs/week) |
|---|---|
| **1** | Molecular Pharmacology-1 |
| **2** | Molecular Pharmacology-2 |
| **3** | Molecular Pharmacology-3 |
| **4** | Molecular Pharmacology-4 |
| **5** | Molecular Pharmacology-5 |
| **6** | Genetic Pharmacology-1 |
| **7** | Genetic Pharmacology-2 |
| **8** | Genetic Pharmacology-3 |
| **9** | Genetic Pharmacology-4<br>Activity |
| **10** | Genetic Pharmacology-5 |
| **11** | Stem cells-1 |
| **12** | Stem cells-2 |
| **13** | Stem cells-3 |

| | |
|---|---|
| **14** | Stem cells-4 |
| **15** | Stem cells-5 |

## 5- Teaching and Learning Methods:

- Lectures
- Self-learning
- Open discussion

## 6- Student Assessment methods:

- Written exam to assess: a1, a2, a3, b1 andb2.
- Oral exam to assess: a1, a2, a3, b1, b2, d1and d2.
- Activity to assess: d1 and d2

### Assessment schedule:

| | |
|---|---|
| **Assessment (1):**Activity | Week 9 |
| **Assessment (2):** Written exam | Week 16 |
| **Assessment (3):** oral exam | Week 16 |

### Weighting of Assessment:

| Assessment method | Marks | Percentage |
|---|---|---|
| • Activity | 10 | 10 % |
| • Written exam | 75 | 75 % |
| • oral exam | 15 | 15 % |
| **TOTAL** | **100** | **100%** |

## 7- References and books:

**A-Scientific papers**

**B- Essential books:**

Manual of pharmacology and therapeutics: Goodman & Gilman's, 2008, McGraw-Hill.

**Facilities required for teaching and learning:**

1. **For lectures:** Black (white) boards, computer, data show.

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**Course coordinator**

**Dr/ Shaimaa El Sayed**

**المشرف على القسم : عميد الكليه**

**ا.د/ محمد بركه**

**Date: -**

## Matrix I of Advanced Trends in Pharmacology course

| Week number | Course Contents | Knowledge and understanding | | | Intellectual skills | | General & Transferable skills | |
|---|---|---|---|---|---|---|---|---|
| | | **a1** | **a2** | **a3** | **b1** | **b2** | **d1** | **d2** |
| **1** | Molecular Pharmacology-1 | x | | | | | | |
| **2** | Molecular Pharmacology-2 | | x | | | | | |
| **3** | Molecular Pharmacology-3 | | | x | | | | |
| **4** | Molecular Pharmacology-4 | | | | x | | | |
| **5** | Molecular Pharmacology-5 | | | | | x | | |
| **6** | Genetic Pharmacology-1 | x | | | | | | |
| **7** | Genetic Pharmacology-2 | | x | | | | | |
| **8** | Genetic Pharmacology-3 | | | x | | | | |
| **9** | Genetic Pharmacology-4-Activity | | | | x | | x | X |
| **10** | Genetic Pharmacology-5 | | | | | x | | |
| **11** | Stem cells-1 | x | | | | | | |
| **12** | Stem cells-2 | | x | | | | | |
| **13** | Stem cells-3 | | | X | | | | |
| **14** | Stem cells-4 | | | | x | | | |
| **15** | Stem cells-5 | | | | | x | | |

## Matrix II of Advanced Trends in Pharmacology

| ARS | | Program ILOs | Course ILOs | Course content | Source | Teaching and learning methods | | Method of Assessment | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Lectures | Self-learning | Written exam | Oral exam | Activity |
| Knowledge and Understanding | 2.1.1- Fundamentals and in-depth knowledge and basic theories in the field of specialty and the closely related areas of pharmaceutical sciences. | A.1-Have great depth and systematic understanding of theoretical concepts and recent advances in the field of pharmacology and related subjects. | a1 | Molecular Pharmacology 1- Genetic Pharmacology 1- Stem Cells 1 | Scientific papers, text books and Internet | X | x | x | x | |
| | 2.1.2- Fundamentals, methods, techniques, tools and ethics of scientific research. | A.3-Understand relevant methodologies and techniques and their appropriate application within the field of study. | a2 | Molecular Pharmacology 2- Genetic Pharmacology 2- Stem Cells 2 | Scientific papers, text books and Internet | X | x | x | x | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2.1.5- All relevant knowledge concerning the impact of professional practice on society and environment and the ways of their conservation and development. | A.6-Describe the impact of pharmacology and related sciences on human health and the society. | a3 | Molecular Pharmacology 3- Genetic Pharmacology 3- Stem Cells 3 | Scientific papers, text books and Internet | X | x | x | X | |
| Intellectual Skills | 2.2.1- Analyze and evaluate the data in his\her specified area and utilize them in logical inference processes (induction/deduction). | B.1-Interpret and evaluate the suitability, accuracy, and reliability of information from different sources. | b1 | Molecular Pharmacology 4- Genetic Pharmacology 4- Stem Cells 4 | Scientific papers, text books and Internet | X | x | x | X | |
| | 2.2.6- Plan to improve performance in the pharmaceutical area of interest. | B.6-Improve the performance in the field of pharmacology through modifying the process or procedure used. | b2 | Molecular Pharmacology 5- Genetic Pharmacology 5- Stem Cells 5 | Scientific papers, text books and Internet | X | x | x | X | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| General and Transferable Skills | 2.4.3- Help others to learn and evaluate their performance. | D.3-Interact effectively with professional colleagues and assist in their learning and professional development. | d1 | Activity | Scientific papers, text books and Internet | X | x | | x | x |
| | 2.4.4- Self-assessment and continuous learning. | D.4-Recognize self-limitations and areas for improvement and seek for continuous learning. | d2 | Activity | Scientific papers, text books and Internet | X | x | | x | x |

# Thesis Specification

# Thesis Specification of PhD Degree

## A- Course specifications:

- **Program on which the course is given:** PhD of Pharmaceutical sciences (Pharmacology)
- **Major or Minor element of program:** Major
- **Department offering the program:** Pharmacology Dept.
- **Department offering the thesis:** Pharmacology Dept.
- **Date of specification approval:** 2017/2018

## 1- Basic information:

Title: PhD Thesis in Pharmacology
Credit hours: 30 hrs

## 2- Overall aim of the thesis:

**On completion of the thesis, the students will be able to:**

- Outline the possible protocol for solving harsh problem that the candidate can work after integrating suitable knowledge about this point of research
- Deign a research plan
- Derive and present the results of the study from the data collected
- Analyze the results of the study in the light of prior knowledge
- Draw conclusions about the contribution to knowledge made by the study which may be concerned with the problem under investigation, the methods deployed or the student as researcher
- Determine the scope of the future studies in his/her field

## 3- Intended learning outcome's (ILOs):

| | |
|---|---|
| **Knowledge and Understanding** | |
| **a1** | Illustrate fundamentals and advanced knowledge in the field of pharmacology that help to better Discuss the subject understudy. |
| **a2** | Determine methods, tools and techniques used during work. |
| **a3** | Carry out professional duties in accordance with legal and ethical guidelines. |
| **a4** | Define and apply quality bases during practical work. |
| **a5** | Describe the purpose of the research work and its impact on the community and human health. |
| **Intellectual skills** | |
| **b1** | Interpret and evaluate the suitability, accuracy, and reliability of information obtained from the thesis. |
| **b2** | Propose a solution to the point understudy depending on available data. |
| **b3** | Plan the research to add to the area of study. |
| **b4** | Develop writing skills such as clarity and presenting results to formulate scientific papers. |
| **b5** | Manage risks and hazards related to professional practical area. |
| **b6** | Improve the performance during the practical work. |
| **b7** | Make decisions related to recent and future studies. |
| **b8** | Be creative, innovative and original in one's approach to research. |
| **b9** | Construct coherent arguments and articulate ideas clearly to a range of audiences, formally and informally through a variety of techniques. |
| **Professional and practical skills** | |
| **c1** | Perform practical experiments related to the point understudy. |
| **c2** | Report the work in a written report. |
| **c3** | Asses used methods, tools and instruments in pharmacological |

| | |
|---|---|
| | research. |
| **c4** | Consider developments in technology and how to use to enhance learning. |
| **c5** | Improve the performance during the practical work. |
| **General and Transferable skills** | |
| **d1** | Communicate effectively in different forms. |
| **d2** | Be competent in the use of computers for data analysis, word-processing, and production of thesis-quality graphics. |
| **d3** | Evaluate the performance of others and assist them to develop. |
| **d4** | Recognize self-limitations and areas for improvement and seek for continuous learning. |
| **d5** | Gather, summarize, and organize information from different sources. |
| **d6** | Implement tasks as a member of a team. |
| **d7** | Utilize time effectively to achieve goals. |

## 4. Thesis Content:

| Steps | Content |
|---|---|
| 1st | • Suggest the possible points/ problems of research that the candidate can work on in the frame of the aim of work and choose proper point related to the problems of the community and surrounding environment.<br>• Collect all available information about this subject by all possible means.<br>• Use internet, journals, books and others thesis to get previous and recent information about the subject understudy.<br>• Design the protocol including the steps of work following the suitable timetable.<br>• Increase the awareness of the recent pharmacological techniques that will be used during practical work and determined by the protocol. |

| | |
|---|---|
| | • Integrate different knowledge including (basic pharmacology, clinical pharmacology, and pathophysiology of diseases, biochemical basis, major concepts in anatomy and physiology, biostatistics, chemical analysis…….) to solve suggested problem.<br>• Continuous evaluation to the thesis outcome according to the schedule. |
| 2nd | • Master a wide range of pharmacological techniques either in vivo or in vitro.<br>• Record vital data either by invasive or non-invasive techniques e.g. blood pressure, ECG……<br>• Perform basic surgical and anesthetic skills on experimental animals.<br>• Identify pharmacological actions and toxicological profile of active principles.<br>• Induction of some diseases in experimental animals (obesity, diabetes…….)<br>• Separate biological samples and tissues (e.g. blood, plasma, csf, urine, kidney, liver……).<br>• Operate scientific instruments according to instructions.<br>• Evaluate and manage hazards (chemical and biological) throughout the whole practical work.<br>• Organize the experimental work according to the designed protocol (either individual, parallel or sequential experiments)<br>• Modify methods and experiments used during practical work.<br>• Apply ethical recommendations during dealing with humans/ experimental animals.<br>• Discuss any legal aspects related to the thesis work. |
| 3rd | • Collect raw data from the designed model.<br>• Interpret raw data to get valuable information. |

| | |
|---|---|
| | • Perform statistical analysis and biological correlation for the results.<br>• Present and describe the results graphically.<br>• Suggest solution to the problem understudy based on this presented data. |
| 4th | • Communicate with supervisors to discuss results and with patients to collect case history and samples.<br>• Work effectively as a member of a team (e.g. Supervisors, various professionals and Technicians).<br>• Present the results periodically in seminars.<br>• Write scientific reports on the obtained results with conclusive significance.<br>• Discuss obtained results in comparison with pervious literatures.<br>• Suggest possible recommendations based on the outcome of the thesis and decide future plans.<br>• Summarize the thesis in an understandable Arabic language for non-professionals.<br>• Write references in the required form (Thesis, Paper…….).<br>• Demonstrate the thesis in a final power point presentation.<br>• Continue self-learning throughout the experimental work and writing scientific papers. |

## 5- Teaching and Learning Methods:

- Self-learning (Activities, Research….)
- Open discussion and case studies
- Lab meeting
- Seminar
- Present report

## 6- References:

- **Websites:** Pubmed, Science direct, Weily interscience, High wire press, Scopus, Ovid.

**Facilities required for:**

2. **For practical work:** RT PCR- Fluorescent microscope- Spectroflorometer- Cryostat- Non-invasive blood pressure recorder, Four channel Lab Chart 7, Langendorff apparatus

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**المشرف على القسم : عميد الكليه**

**ا.د / محمد بركه**

- **Date:**

# Program Matrix of PhD degree of Pharmacology and Toxicology

| PhD of Pharmacology (2017/2018) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Courses | | Program intended learning outcomes | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Knowledge and understanding | | | | | | | Intellectual skills | | | | | | | | | Professional and practical skills | | | | | General and transferable skills | | | | | | |
| | | A1 | A2 | A3 | A4 | A5 | A6 | A7 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | B8 | B9 | C1 | C2 | C3 | C4 | C5 | D1 | D2 | D3 | D4 | D5 | D6 | D7 |
| Special courses | Advanced Trends in pharmacology | √ | | √ | | √ | | | | √ | | | | √ | | √ | | | | | | | √ | | | | | √ | √ |
| | Management of chronic diseases | √ | | | | √ | | | | √ | | | | | | | | | | | | | √ | | | | √ | √ | |
| | Pharmacology of natural products | √ | | | | √ | | √ | | | | | | √ | | | | | | | | | √ | | | | | √ | √ |
| **Thesis** | | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |