Mansoura University
Faculty of Pharmacy
Quality Assurance Unit
Academic Reference Standards (ARS)
PhD Program
2021/2022
Postgraduate Studies

Academic Reference Standards (ARS)
for
PhD in Pharmaceutical Sciences
(*Pharmacognosy*)

ARS

Academic Year: *2021/2022*

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signature

PhD in Pharmaceutical Sciences (Pharmacognosy)

Academic Reference Standards (ARS)

(Department Council Approval on May 11th2022 and Faculty Council Approval on……..)

1. Graduate Attributes

The graduates of Ph.D. degree of Pharmaceutical sciences (Pharmacognosy) should be able to:

1.1. Mastering the basics and methodologies of scientific research in the field of pharmacognosy.

1.2. Adding to knowledge in Pharmacognosy and chemistry of natural products.

1.3. Applying of the analytical method and the critic of knowledge in the field of Pharmacognosy and related fields.

1.4. Integrating the knowledge of natural products with the related knowledge and developing the environmental relations between them.

1.5. Showing deep awareness of current problems and modern theories in the area of Pharmacognosy, biotechnology and drug discovery.

1.6. Identify professional problems and find innovative solutions to solve them.

1.7. Mastering a wide range of specialized professional skills in the field of Pharmacognosy and natural drug discovery.

1.8. Developing methods and new tools for practicing the profession.

1.9. The use of appropriate technological means to serve the professional practice of pharmacognosy.

1.10. Communicating effectively and lead a team in different professional contexts.

1.11. Taking decision in light of the available information.

1.12. Employing the available resources efficiently and develop and work on finding new resources.

1.13. Realizing of their role in the development of society and the preservation of the environment.

1.14. Committing to integrity and credibility and the rules of the profession.

1.15. Committing to continuous self-development and transfer their experience to others.

2. General Standards

2.1. Knowledge and Understanding

Upon successful completionof the Ph.D. program, the graduate should be able to understand and be familiar with:

2.1.1. Identify the theories and fundamentals and modern knowledge in the field of Pharmacognosy and related fields.

2.1.2. Recognize fundamentals and methodologies and ethics of the scientific research in the field of pharmacognosy and its different tools.

2.1.3. Distinguish principles of moral and legal professional practice in the area of pharmacognosy, biotechnology and drug discovery.

2.1.4. Identify principles and fundamentals of the quality of professional practice in the field of pharmacognosy.

2.1.5. Recognize knowledge about the effects of the professional practice of pharmacognosy on the surrounding environment and methods of environmental development and maintenance.

2.2. Intellectual Skills

Upon Completion of this program the graduate should be able to:

2.2.1. Analyze and evaluate the information in the field of pharmacognosy, measuring them and elicitation of them.

2.2.2. Solve problems in the field of natural product research even with unavailability of some data.

2.2.3. Carry out research studies add to the knowledge.

2.2.4. Write a scientific papers.

2.2.5. Assess risk in professional practices in the area of natural product research.

2.2.6. Plan for the development of performance in the field of pharmacognosy.

2.2.7. Generate professional decisions in a variety of professional contexts.

2.2.8. Innovation and creativity.

2.2.9. Dialogue and the debate based on the evidence.

2.3. Professional and practical skills

Upon successful completion of the Ph.D. program, the graduate should be able to

2.3.1. Master basic and modern professional skills in the area of natural product research.

2.3.2. Write and evaluate the professional reports in pharmacognosy.

2.3.3. Evaluate and develop ways and existing tools in the area of natural product research.

2.3.4. Use of technological means to serve the professional practice in the field of pharmacognosy.

2.3.5. Plan for the development of professional practice and other performance.

2.4. General and transferrable Skills

Upon Completion of this program the graduate should be able to:

2.4.1. Communicate effectively by various ways.

2.4.2. Use of information technology to serve the development of professional practice in the field of pharmacognosy.

2.4.3. Teach others and assess their performance.

2.4.4. Perform Self-assessment and continuous learning.

2.4.5. Use different sources for information and knowledge.

2.4.6. Manage scientific meetings and the ability to manage time.

2.4.7. Develop rules and evaluate other performance indicators.

2.4.8. Work in a team and the leadership of professional teams in different contexts.

Department Council Approval on May2022 and
Faculty Council Approval on ……..)

Head of Department: Prof. Dr. Mona G. Zaghloul

Signature:

Program: PhD in Pharmaceutical Sciences (Pharmacognosy)

Program Specification for Philosophy Doctorate of Pharmacognosy

Academic Year: *2021/2022*

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Mona.G. Zaghloul

A-Basic Information

1	**Faculty**	**Pharmacy**
2	**Program Title:**	**PhD in Pharmaceutical Sciences (*Pharmacognosy*)**
3	**Program Type:**	**Single**
4	**Department (s):**	**Department of Pharmacognosy**
5	**Final award:**	**PhD degree in Pharmacognosy**
6	**Coordinator:**	Prof. Dr. Mona Zaghloul
7	**External Evaluator(s):**	Prof. Dr. Maged Abo Hashem
8	**Date of Program Specification Approval:**	***Department council: 11/5/2022,*** ***Faculty council: ……..***

B-Professional Information

1-Program Aims

Upon successful completion of the program, graduates should demonstrate comprehensive knowledge, clear understanding and outstanding skills in pharmaceutical sciences and ***Pharmacognosy***.

1.1 Mastering of advanced knowledge, professional research skills, attitudes, and values in the field of pharmacognosy and integrating with the relevant subjects in his/her professional practice.

1.2 Applying the basics and methodologies of scientific research in the field of pharmacognosy.

1.3 Using of appropriate technological means to serve the professional practice of spectroscopy and natural products biotechnology.

1.4 Adding to knowledge in pharmacognosy and chemistry of natural products.

1.5 Adopting the critical and analytical thinking approaches in subjects relevant to the isolation of active natural products and their structural elucidation using modern spectroscopic techniques.

1.6 Integrating the knowledge in the field of natural product based drug design and discovery and natural toxins.

1.7 Showing deep awareness regarding the current problems and recent theories & trends in the field of spectroscopy, biotechnology and drug discovery.

1.8 Defining the challenging professional problems in the field of drug discovery and structural elucidation.

1.9 Applying the recent technological tools in developing the professional practices in biotechnology of natural products, drug design and discovery.
1.10 Team management as well as effective communication with professional colleagues in other departments.
1.11 Making the appropriate professional and scientific decisions in solving research problems based on self-directed and original research investigations from the problem-recognition stage through to the evaluation and appraisal of results and findings, this to include the ability to select appropriate techniques and procedures.
1.12 Employing the available resources efficiently and develop and work on finding new resources.
1.13 Realizing of his/her role in the development of society and the preservation of the environment.
1.14 Writing a thesis that involves extensive writing literature surveys and laboratory based practical work in the field of natural products.
1.15 Designing and conducting research projects.
1.16 Committing to continuous self-development and transfer his/her experience to others.
1.17 Attaining communication skills, research ethics, time management, decision-making, and team-working.
1.18 Manipulate computer program, online database, software and other IT skills to get information and analyze the obtained research data.

2-Intended Learning Outcomes (ILOs)

a- Knowledge and Understanding:

By the end of this program the graduate should be able to:

A1	Identify the modern knowledge in the field of spectroscopy, biotechnology, natural toxins and natural drug discovery.
A2	Recognize fundamentals, methodologies and ethics of the scientific research in the field of spectroscopy, biotechnology and natural toxins.
A3	Distinguish principles of moral and legal professional practice in the area of natural drug design, modeling and discovery.
A4	Identify principles and fundamentals of the professional practice in the field spectroscopy and natural products.
A5	Recognize knowledge about the effects of the professional practice of pharmacognosy on the surrounding environment and methods of environmental development and maintenance.
A6	Identify appropriate types of data needed to tackle a certain research problems.

b- Intellectual Skills

By the end of this program the graduate should be able to:

B1	Analyze and evaluate the gained information in the area of biotechnology, natural toxins and natural drug discovery, measuring them and elicitation of them.
B2	Solve problems about the structural elucidation of natural products and natural drug discovery even with unavailability of some data.
B3	Carry out research studies in the field of natural products add to the knowledge.
B4	Apply critical thinking and hypothesis-driven methods of scientific inquiry.
B5	Write a scientific papers and thesis in the field of pharmacognosy and phytochemistry.
B6	Assess risk in professional practice in the area of natural product research and biotechnology.
B7	Plan for the development of performance in the field of natural drug discovery.
B8	Generate professional decisions in a variety of professional contexts.
B9	Innovation and creativity.
B10	Dialogue and debate based on the evidence.

c- Professional and Practical Skills

By the end of this program the graduate should be able to:

C1	Master basic and modern professional skills in the area of natural product discovery, biotechnology, spectroscopy and natural toxins.
C2	Develop different research methodologies and good experimental and reporting skills in the separation and structural elucidation of the naturally occurring compounds.
C3	Evaluate and develop ways and existing tools in the area of biotechnology and natural drug design.
C4	Plan for the development of professional practice through applied study or research.
C5	Write accurately, evaluate professional reports and publish scientific research papers in scientific journals and conferences.
C6	Write thesis in a scientific and precise way.

d. General and Transferable Skills

By the end of this program the graduate should be able to:

D1	Communicate effectively by verbal and written means.
D2	Manipulate computer program, online database, software and other IT to get information and analyze the obtained research data.
D3	Take responsibility for continuing learning and the ability to work with and motivate others.

D4	Manage scientific meetings and ability to manage time.
D5	Develop rules and evaluate other performance indicators.
D6	Evaluate and criticize scientific work, literature and research data.
D7	Work in a team and the leadership of professional teams.
D8	Develop presentation skills, give seminars and defend thesis in public.

3-Academic Reference Standards (ARS):

Approved by both the Department and Faculty Councils
Department council Approval Date: -11/5/2022,
Faculty council Approval Date: ……..

3a- Academic References Standards: (**Attached**)

3b-Comparison of provision to External References

Achievement of academic reference standards via program Intended Learning Outcomes.

ILOs	ARS	Program
1. **Knowledge and Understanding**	**1.1**	A1, A2, A3, A4
	1.2	A3, A4
	1.3	A3, A4
	1.4	A3, A4
	1.5	A5
2. **Intellectual Skills**	**2.1**	B1
	2.2	B2, B4
	2.3	B3
	2.4	B5
	2.5	B6
	2.6	B7
	2.7	B8
	2.8	B9
	2.9	B10
3. **Professional and Practical Skills**	**3.1**	C1,C2, C3
	3.2	C5, C6
	3.3	C3
	3.4	C2, C3, C4
	3.5	C4
4. **General and Transferable Skills**	**4.1**	D1
	4.2	D2
	4.3	D3, D5, D6
	4.4	D3, D8
	4.5	D2
	4.6	D4
	4.7	D5

	4.8	D7

4-Curriculum Structure and Contents

4A. Program duration: 2-5 years.

4B. Program structure:

a- The program consists of 50 credit hours of study (8 credit hours of courses and 42 credit hours for thesis).

b- Courses include 6 credit hours of obligatory courses, in addition to 2 credit hours for an elective course., All courses possess the code number [300], According to Faculty By-Law..

c- A scientific research thesis of 42 credit hours represents a main component of the program. It is achieved in a subject assigned by the supervision committee, endorsed by the Department Council, the committee of graduate studies & research and the Faculty Council.

d- The student should publish at least one scientific research paper in scientific journals before the public defense of the Thesis..

4C. Program Components

1- Courses according to the By-law

Code number	Name of the course	Type	Credit Hours	Semester
PGP-301	***Biotechnology and Genetic Engineering (I)***	Compulsory	2	Fall
PGP-302	***Applications on structural elucidation of natural products***	Compulsory	2	Fall
PGP-303	***Biotechnology and Genetic Engineering (II)***	Compulsory	2	Spring
PGP-304	***Natural toxins*** **(E)**	elective	2	Spring
PGP-305	***Natural product-based drug design and discovery*** **(E)**	elective	2	Spring
Total (Courses)			8	
	Thesis		42	
Total			50	

2- Achievement of Program Intended Learning Outcomes by its components

Course Name	C.H	Program ILOs (by No.)			
		K.U*	IS**	P.P.S***	G.T.S****
First Semester					
Biotechnology and Genetic Engineering (I) ***(PGP-301)***	**2**	A1, A2, A4	B1, B6	C1, C3	D1, D2, D6
Applications on structural elucidation of natural products ***(PGP-302)***	**2**	A1, A2, A4	B2, B4, B8	C1, C2	D2, D3, D5
Second Semester					
Biotechnology and Genetic Engineering (II) ***(PGP-303)***	**2**	A1, A2, A4	B1, B6	C1, C3	D1, D2, D6
Natural toxins ***(PGP-304) (elective)***	**2(E)**	A1, A2, A5	B1, B3	C1	D1, D3, D4
Natural product based drug design and discovery ***(PGP-305) (elective)***	**2(E)**	A1, A3, A6	B1, B2, B7	C1, C3, C4	D2, D3, D8
Total	**8**				
Thesis	**42**	A4, A5, A6	B3,B4, B5, B6, B7, B8, B9, B10	C3, C4, C5, C6	D1, D2, D3, D4, D5, D6, D7, D8
Total	**50**				

* ***K**nowledge and **U**nderstanding*
** ***I**ntellectual **S**kills*
*** ***P**rofessional and **P**ractical **S**kills*
**** ***G**eneral and **T**ransferable **S**kills*

Code	Course title	K.U*						IS**							P.P.S***				G.T.S****						
		A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B6	B7	B8	C1	C2	C3	C4	D1	D2	D3	D4	D5	D6	D8
PGP -301	*Biotechnology and Genetic Engineering (I)*	√	√		√			√				√			√		√		√	√				√	
PGP -302	*Applications on structural elucidation of natural products*	√	√		√				√		√			√	√	√				√	√		√		
PGP -303	*Biotechnology and Genetic Engineering (II)*	√	√		√			√				√			√		√		√	√				√	
PGP -304	*Natural toxins* (E)	√	√			√		√		√					√				√		√	√			
PGP -305	*Natural product-based drug design and discovery* (E)	√		√			√	√	√				√		√		√	√		√	√				√

* ***K**nowledge and **U**nderstanding*
** ***I**ntellectual **S**kills*
*** ***P**rofessional and **P**ractical **S**kills*
**** ***G**eneral and **T**ransferable **S**kills*
E ***E**lective course*

5- Student Assessment Methods

6.1- Written exam (special courses).	To assess Knowledge and Understanding and Intellectual Skills
6.2- Oral exam (special courses).	To assess Knowledge and Understanding, Intellectual Skills and General and transferable Skills
6.3- Scientific seminar for thesis registration	To assess Knowledge and Understanding, Intellectual Skills and General and transferable Skills
6.4- Published scientific research paper.	Knowledge and Understanding, Intellectual Skills, Professional and practical Skills
6.5- Thesis writing	Knowledge and Understanding, Intellectual Skills, Professional and practical Skills & General and Transferable Skills
6.5- Public presentation and discussion of the thesis.	Knowledge and Understanding, Intellectual Skills, Professional and practical Skills & General and Transferable Skills

6- Program Admission Requirements

7.1- The candidate should hold a Master degree in pharmaceutical sciences in the same specialization from any faculty of pharmacy from Egypt or Arabian countries or foreign universities recognized by the Supreme Council of Universities.

7.2- The candidate should be available for study at least two days per week throughout the duration of study.

7.3- The candidate should follow postgraduate rules of by-law (**2014**) and its modified by-law **(2017)** of Faculty of Pharmacy-Mansoura University.

7- Regulations for progression and program completion

8.1- The minimum duration of time to gain the PhD degree is two years from the approval date of university council of graduate studies ad research on the registration of the PhD thesis.

8.2- The maximum duration of time to gain the PhD degree is 5 years from the date of registration, putting in consideration the periods of enrollment suspension. It is possible to extend this period up to two years (one year at a time) based on a request from the candidate's major supervisor, a suggestion from the department council and the committee of graduate studies & research and the approval of the faculty council. The final decision should be endorsed by the university council of graduate studies & research.

8.3- The student has to pass the assigned courses, and to practically do a scientifc research thesis for complete fulfilment of the PhD degree.

8.4- An annual progress report is presented by the supervisors of Thesis to the Dept Council by December.

8.5- The candidate should follow postgraduate rules of by-law (**2014**) and its modified by-law **(2017)** of Faculty of Pharmacy-Mansoura University.

8- Facilities Required for Search:

8.1- Computers.

8.2- Library and digital library supplied by recent scientific books and journals.

8.3- Laboratories with enough chemicals, apparatus and advanced instruments.

8.4- Access to research engines for scientific periodicals in the field of natural products.

9-Thesis

A thesis should be prepared by the student for complete fulfilment of the PhD degree.

10- Evaluation of program

Evaluator	Method	Sample
Internal evaluator	Program evaluation Courses evaluation	Program report Courses report
External evaluator	Program evaluation Courses evaluation	Program report Courses report
Stakeholders	Questionnaires	To be Attached
Postgraduates	Questionnaires	To be Attached
Self-evaluation	Matrices	To be Attached
Supervisors of Thesis	Reports	Reports of staff members of committee to evaluate the thesis

Program Coordinator: ……
Head of Department: Prof. Dr. Mona G. Zaghloul
Signature:
Date:

Annex 1

Attach courses specifications.

Program: PhD in Pharmaceutical Sciences (*Pharmacognosy*)

Pharmacognosy Department

PhD Thesis Specification

Academic Year: 2021/2022

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signature

A-Basic Information

1	**Faculty**	**Pharmacy**
2	**Program Title:**	**Ph.D. thesis in pharmacognosy**
3	**Program Type:**	**Single**
4	**Department (s):**	**Pharmacognosy Department**
	Total credits of the Thesis	**42 C. H.**
	Total credits of the Program	**50 C.H.**
5	**Final award of the Program:**	**PhD degree of Pharmaceutical Sciences (Pharmacognosy)**
6	**Coordinator:**	Prof. Dr. Mona Zaghloul
7	**External Evaluator(s):**	Prof. Dr. Maged Abo Hashem
8	**Date of Program Specification Approval:**	***Department council: 11/5/2022*** ***Faculty council: ……..***

B-Professional Information

1-Aims

The overall aims of the thesis:

Upon successful completion of this course, the students should be able to:

1.1 Design with his Supervisors a scientific protocol designed to solve problem using suitable knowledge in pharmacognosy.

1.2 Demonstrate recent techniques and methods used in the experimental work according to the designed protocol

1.3 present the results of the study from the data collected

1.4 Analyze the results of the study according to other studies in the same point.

1.5 Drive conclusions of research finding and make prospective in the points of research.

2-Intended Learning Outcomes (ILOs)

a- Knowledge and Understanding:

Upon successful completion of the thesis, the graduate should be able to efficiently demonstrate the essential knowledge and understanding of:

a1	Demonstrate advanced and in depth pharmacognosy knowledge within the specified point of research.
a2	Illustrate the suitable methods, tools and relevant techniques needed to perform the research.
a3	identify clearly legal and ethical guidelines that govern the professional work of pharmacognosy researches.
a4	Define and apply quality assurance standard during practical work.
a5	Describe the impact of the research point on community and human health

b- Intellectual Skills

By the end of this thesis, the graduate should be able to:

b1	Interpret and evaluate the suitability, accuracy, and reliability of information obtained from the thesis.
b2	Propose creative solutions to the point understudy depending on available data.
b3	Carry out the researches that improve the knowledge of natural product.
b4	Writing scientific thesis and formulate scientific papers.
b5	Asses risks and hazards related to professional and practical work in pharmacognosy and biotechnology
b6	Suggest creative and innovative ideas in researches of pharmacognosy and natural product.

c- Professional and Practical Skills

By the end of this thesis, the graduate should be able to:

c1	Perform practical experiments related to natural product discovery, separation and biotechnology.
c2	Report the work in a written thesis and formulate scientific papers.
c3	Asses used methods, tools and instruments in natural product research.
c4	Consider developments in technology and how to use to enhance learning.

c5	Plan for the development of professional practice through applied study or research.

d. General and Transferable Skills

By the end of this thesis, the graduate should be able to:

d1	Communicate effectively by verbal and written means.
d2	Manipulate computer program, online database, software and other IT to get information and analyze the obtained research data
d3	Develop rules and evaluate other performance indicators.
d4	Recognize self-limitations and areas for improvement and seek for continuous learning.
d5	Gather, summarize, and organize information from different sources.
d6	Work in a team and lead professional teams.
d7	Utilize time effectively to achieve goals.

3- Thesis Contents:

Part	Topics
1	Abstract (Arabic and English)
2	Introduction
3	Aims, Objectives and Rational of the work
4	Results and Discussion, covering all fields
5	Methodology and Experimental Work of all fields
6	Conclusion
7	References

4- Matrix of knowledge and skills of the Thesis:

Part	Topics	Course ILOs			
		K.U*	IS**	P.P.S***	G.T.S****
2	Introduction	a1, a5	b3	c2, c3	d1, d2, d3,d4
3	Objectives/Rational	a3	b1, b2, b3, b4	c1, c4	d1, d2, d3,d4
4	Results and Discussion	a1, a2, a3	b1, b2, b3,b5, b6	c2, c5	d1, d2, d3,d4, d5
5	Experimental Work	a2, a4	b1	c1, c2, c3	d1, d2, d3,d4, d6, d7

6	Conclusion	a1, a2, a3	b3	c3	d1, d2, d3,d4

* ***K**nowledge and **U**nderstanding* *****I**ntellectual **S**kills* ******P**rofessional and **P**ractical **S**kills* *******G**eneral and **T**ransferable **S**kills*

5. Student Assessment:

A written Thesis	
Published Research Paper(s)	
Public Defense	
Committee-in-Charge Report	
Dept Council Approval	

Guidelines of the Thesis (according to By-Law).

1- The minimum period for obtaining a PhD is two years from the date of approval of the University's Graduate Studies Council for registration.

2- The maximum limit for obtaining a doctoral degree is five years from the date of registration, taking into account cases of suspension of registration, and registration may be extended upon the request of supervisors and the approval of the relevant department council, the Graduate Studies and Research Committee, and the College Board for an academic year with a maximum of two years.

3- The student must pass the English Language Examination with the minimum score specified by the University Studies Board to approve the PhD defense date.

4- The total number of credit hours for obtaining a doctoral degree is 50 credit hours (8 course hours, 42 credit hours per thesis).

5- The student conducts a research on a topic determined by the supervisory committee and approved by the relevant department council and the college, graduate studies and research councils.

6- The researcher submits, before registering for the academic degree, the research plan in a public discussion in the department to discuss the topic of the thesis, determine the objectives of the research, the extent of its application, potential problems and how to overcome them.

7- After the approval of the Graduate Studies and Research Committee and the College Board, the scientific departments develop specialized courses from code (300) whose number of credit hours does not exceed 8 hours, and their average points are not less than 2.00, and these hours are calculated within the hours prescribed for the program.

8- The scientific thesis is the responsibility of the relevant department council and is accomplished scientifically and technically under the responsibility of the supervisory committee. Scientific, technical and administrative support must be provided to the researcher for its completion, and the supervision committee is formed as follows:

9- The College Council, upon the proposal of the relevant Department Council, appoints a professor who supervises the thesis (principal supervisor). The council may entrust the supervision of the thesis to one of the assistant professors.

10- It is permissible for the supervisors to be many professors or assistant professors, and teachers may participate with a maximum of one in the same specialty.

11- A member from abroad who has experience in the specialty to which the dissertation belongs may be joined to the supervision committee.

12- The student should meet his main supervisor at least once monthly and a semi-annual report must be provided by the supervisor(s) on the progress of student to the department council and the Graduate Studies Committee and the graduate should be given a copy of the report. The annual report must be submitted to the college council in October each year.

13- A postgraduate student registered to obtain a master's degree or a doctorate degree, after completing the thesis preparation, holds a public discussion session on the thesis summary and the results he reached, during which the supervisors determine the extent to which the student fulfills the research point before submitting the thesis to the department council.

14- The principal supervisor submits an application that includes a proposal to form a discussion committee and judge the thesis after preparing it and preparing it for discussion in preparation for presentation to the Postgraduate Studies and Research Committee and then the College Board for approval and is supported by the following:

15- The report on the validity of the dissertation for discussion, signed by the majority of the members of the supervisory committee, one of whom is the main supervisor.

16- A copy of the thesis prepared according to the instructions for writing scientific theses in the faculty.

17- At least one research published in a scientific refereed journal.

18- The committee for discussion and judgment on the dissertation is formed of three members based on the proposal of the relevant department council, the graduate studies and research committee, and the approval of the college council, one of whom is the main supervisor or two members with one vote. And two other members from among the professors or assistant professors, at least one of them is from outside the college for master's theses, and at least one of them is from outside the University for Doctoral Theses (the two are from outside the college) according to the text of Article 153 of the Universities Organization Law.

19- The department council approves the individual reports, the group report, and what indicates that the student has made the proposed amendments from the discussion and judgment committee and submitted them to the Graduate Studies and Research Committee and the College Board in preparation for presentation to the University Council.

20- The date of awarding the academic degree is the date on which the University Council approved the College Board's recommendation for grants.

21- The college council, based on the proposal of the discussion and judgment committee, may return the message to the student to correct the errors and complete what the committee deems short of or submit another message in case the thesis is rejected.

6 – Facilities Required:

Laboratory	**Chemicals, apparatus and advanced instruments**
Library	**Scientific books and journals**
Others	

Thesis Coordinator	Head of Department	Date
Prof. Dr.	Prof Dr. Mona Zaghloul	…….

* Date of Dept. Council Approval

Dept. of Pharmacognosy	Course Specification	PhD

Pharmacognosy PhD

Course Specification

Academic year: 2021/2022

البرنامج دكتوراة	توصيف مقرر التقنية الحيوية و الهندسة الوراثية في العقاقير ـ ١ Biotechnology & Genetic engineering in pharmacognosy-I

رئيس القسم أ د. منى جودة زغلول	منسق المقرر ا. د. أحمد أبو الغيط جوهر

Mansoura University
Faculty of Pharmacy
Postgraduate Studies
PhD Program
Biotechnology & Genetic engineering in pharmacognosy-I
Course Specification
2021/2022

General

University	Mansoura
Faculty	Pharmacy
Department offering the course	Pharmacognosy
Department supervising the course	Pharmacognosy
Program on which the course is given	PhD degree of Pharmacognosy PGP- 300
Academic Level	Postgraduate
Academic year	2021/2022 - first semester
Date of course specification approval	11/5/2022

A.Basic Information : Course data :

Course Title	Biotechnology & Genetic engineering in pharmacognosy-I
Course Code	PGP-301
Prerequisite	------
Teaching Hours: Lecture	2
Practical:	------
Total Credit Hours	2

B. Professional Information

1- Overall Aims of Course:

On completion of course, the students will be able to understand the basics of biotechnology and biocatalysis in natural products, specify the suitable technique for production of valuable metabolite and differentiate between different types of biocatalysis, biocatalysis systems and microbial models of mammalian metabolism. Also the student should be aware of biotechnology in drugs and therapeutics, genetics and biotechnology e.g. monoclonal antibodies, gene therapy, mammalian culture for production of pharmaceuticals.

2- Intended Learning Outcomes (ILOs)

2.1. *Knowledge and Understanding*

After completion of the course, graduates will be able to

(A1)	a1	Identify the modern knowledge in the field of biotechnology, natural toxins and natural drug discovery.

(A2)	a2	Recognize fundamentals, methodologies and ethics of the scientific research in the field of biotechnology and natural toxins.
(A4)	a3	Identify principles and fundamentals of the professional practice in the field of natural products.

2.2. Intellectual Skills

After completion of the course, graduates will be able to

(B1)	b1	Analyze and evaluate the gained information in the area of biotechnology, natural toxins and natural drug discovery, measuring and elicitation of them
(B6)	b2	Assess risk in professional practice in the area of natural product research and biotechnology.

2.3. Professional and Practical Skills

After completion of the course, graduates will be able to

(C1)	c1	Master basic and modern professional skills in the area of natural product discovery, biotechnology and natural toxins
(C3)	c2	Evaluate and develop ways and existing tools in the area of biotechnology

2.4. General and Transferable Skills

After completion of the course, graduates will be able to

(D1)	d1	Communicate effectively by verbal and written means.
(D2)	d2	Manipulate computer program, online database, software and other IT to get information and analyze the obtained research data.
(D6)	d3	Evaluate and criticize scientific work, literature and research data.

3. Course Contents

Week No.	Topics	Lecture Hours	Practical / Tutorial hr.
1	Introduction to biotechnology, biocatalysis in natural products chemistry	8	0
2	Biotechnology in drugs and therapeutics, genetics and biotechnology e.g. monoclonal antibodies, gene	16	0
Total:		**24**	**0**

4- Matrix of knowledge and skills of the course (contents versus ILOs of the course)

Week	Topics	Course ILOs			
		K.U*	IS**	P.P.S***	G.T.S****
1	Introduction to biotechnology, biocatalysis in natural products chemistry	A1, A4	B1, B6	C1, C3	D1, D2
2	Biotechnology in drugs and therapeutics, genetics and biotechnology e.g. monoclonal antibodies, gene	A1, A2, A4	B1, B6	C1	D6

** Knowledge and Understanding* ***Intellectual Skills* ****Professional and Practical Skills*
*****General and Transferable Skills*

5- Teaching and Learning Methods:

5.1	**Lectures using Power Point** (PPT) presentations
5.2	**Lectures using whiteboard**
5.3	**Video-recorded lectures**, uploaded to the University Portal for Online learning
5.4	Activities and **tasks required to develop students' self-learning skills**.
5.5	**Tutorial**, **Class Activity** and **Group Discussion** to explain what has not been understood
5.6	**Interactive Sessions** using Microsoft Teams
5.7	Internet search and Research Assignments to design **Formative Assignments**

6- Student Assessment:

	Assessment Methods		**Assessment Schedule**	**Weighing of Assessments**
Assessment 1	**Written Exam (Final)**	Paper exams that are corrected electronically and/or manually. To assess understanding, intellectual, professional skills	week 15	90
Assessment 2	**Oral Exam**	To assess understanding, intellectual skills, General and Transferable skills	week 15	10
				100 %

7- List of References

	Reference	Type
1	Glossary of biotechnology and genetic engineering	Course notes
2	-Biotechnology and Genetic Engineering, By Kathy Wilson Peacock, 2001	Essential Book **(Text Books)**
3	-Biotechnology: Genetic fundamentals and genetic engineering, By Hans-Jürgen Rehm, Alfred Pühler, Gerald Reed, 2003	Recommended Book (electronic Books)
4	http://www.fao.org/docrep/003/X3910E/X3910E04.html	Websites

8- Facilities required for teaching and learning

-Class room	**Data show- Computers, Internet.**
- Library	**supplied by recent scientific books and journals.**

9. Signature

Course Coordinator	Head of Department	Date*
Prof. Dr. Ahmed A. Gohar	Prof Dr. Mona G.Zaghloul	……

* Date of faculty Council Approval

Dept. of Pharmacognosy	Course Specification	PhD

Pharmacognosy PhD

Course Specification

Academic year: 2021/2022

البرنامج دكتوراة	توصيف مقرر تطبيقات على استنباط التركيب البنائي للنواتج الطبيعية Applications on structural elucidation of natural products
رئيس القسم أ د. منى جودة زغلول	منسق المقرر د. زين العابدين متولي نعيم

Mansoura University
Faculty of Pharmacy
Postgraduate Studies
PhD Program
Applications on structural elucidation of natural products
Course Specification
2021/2022

General

University	Mansoura
Faculty	Pharmacy
Department offering the course	Pharmacognosy
Department supervising the course	Pharmacognosy
Program on which the course is given	PhD degree of Pharmacognosy PGP- 300
Academic Level	Postgraduate
Academic year	2021/2022 - first semester
Date of course specification approval	11/5/2022

A.Basic Information: Course data:

Course Title	Applications on structural elucidation of natural products
Course Code	PGP-302
Prerequisite	------
Teaching Hours: Lecture	2
Practical:	------
Total Credit Hours	2

B. Professional Information

1- Overall Aims of Course:

The course helps the student gain and understanding of the principle of the different spectroscopic methods of analysis such as: Visible, Ultraviolet, Infrared, Nuclear Magnetic Resonance and Mass Spectroscopy. The course also provides the students with a detailed exposure to the applied aspects of these spectroscopic techniques in structure-elucidation of the natural products. Moreover, the course enables the students to interpret 1- and 2-D NMR spectra of organic molecules and to identify natural products structures from their NMR spectra. By the end of the course the students will be able to solve and work-out the structure of unknown natural products using a combination of UV, IR, 1H-NMR, 13C-NMR, 2D-NMR and Mass spectroscopy.

2- Intended Learning Outcomes (ILOs)

2.1. *Knowledge and Understanding*

After completion of the course, graduates will be able to

(A1)	a1	Identify the modern knowledge in the field of spectroscopy, biotechnology, natural toxins and natural drug discovery.
(A3)	a2	Recognize fundamentals, methodologies and ethics of the scientific research in the field of spectroscopy, biotechnology and natural toxins.
(A6)	a3	Identify principles and fundamentals of the professional practice in the field spectroscopy and natural products.

2.2. Intellectual Skills

After completion of the course, graduates will be able to

(B1)	b1	Solve problems about the structural elucidation of natural products and natural drug discovery even with unavailability of some data.
(B2)	b2	Apply critical thinking and hypothesis-driven methods of scientific inquiry.
(B7)	b3	Generate professional decisions in a variety of professional contexts.

2.3. Professional and Practical Skills

After completion of the course, graduates will be able to

(C1)	c1	Develop different research methodologies and good experimental and reporting skills in the structural elucidation of natural products.
(C3)	c2	Master basic and modern professional skills in the area of natural product discovery, biotechnology, spectroscopy and natural toxins.
(C4)	c3	Develop professional practice through applied research.

2.4. General and Transferable Skills

After completion of the course, graduates will be able to

(D2)	d1	Manipulate computer program, online database, software and other IT to get information and analyze the obtained research data.
(D3)	d2	Take responsibility for continuing learning and the ability to work with and motivate others.
(D8)	d3	Develop rules and evaluate other performance indicators.

3. Course Contents

Week No.	Topics	Lecture Hours	Practical / Tutorial hr.
1	Introduction to UV spectrosopic technique and its applictions on conjugated dienes	4	0
2	UV applications on conjugated enones and aromatics	2	0
3	Introduction to IR spectrosopic technique and its applictions on aliphatic & aromatic compounds	2	0
4	IR functional groups in different classes	2	0
5	Introduction to H-MMR spectrosopic technique, definition & basic priciple	4	0
6	H-NMR chemical shifts in olefins and aromatics, complex spin system and coupling constant values	2	0
7	Introduction to C13-MMR spectrosopic technique, definition & basic priciple	2	0
8	APT & DEPT and 2D NMR techniques	2	0
9	Introduction to MS spectrosopic technique, definition, C1-MS, FD-MS & FAB-MS	2	0
10	McLafferty rearrangment and retro Diels-Alder in mass spectroscopy	2	0
Total:		**24**	**0**

4- Matrix of knowledge and skills of the course (contents versus ILOs of the course)

Week	Topics	Course ILOs			
		K.U*	IS**	P.P.S***	G.T.S****
1	Introduction to UV spectrosopic technique and its applictions on conjugated dienes	A1	B7	C1, C4	D2, D3, D8
2	UV applications on conjugated enones and aromatics	A1, A3	B7	C3, C4	D8
3	Introduction to IR spectrosopic technique and its applictions on aliphatic & aromatic compounds	A1, A3	B1, B2	C1, C3, C4	D3, D8
4	IR functional groups in different classes	A1, A3, A6	B1	C1, C3, C4	D2

5	Introduction to H-MMR spectrosopic technique, definition & basic priciple	A1, A3, A6	B1, B2	C1, C3, C4	D2, D3, D8
6	H-NMR chemical shifts in olefins and aromatics, complex spin system and coupling constant values	A1, A3, A6	-	C4	D3, D8
7	Introduction to C13-MMR spectrosopic technique, definition & basic priciple	A3, A6	B1, B2, B7	C4	D2, D8
8	APT & DEPT and 2D NMR techniques	A6	B7	C4	D8
9	Introduction to MS spectrosopic technique, definition, C1-MS, FD-MS & FAB-MS	A1	B2	-	D2
10	McLafferty rearrangment and retro Diels-Alder in mass spectroscopy	A1, A3	B1, B7	C3, C4	D2, D8

** Knowledge and Understanding* ***Intellectual Skills* ****Professional and Practical Skills*
*****General and Transferable Skills*

5- Teaching and Learning Methods:

5.1	**Lectures using Power Point** (PPT) presentations
5.2	**Lectures using whiteboard**
5.3	**Video-recorded lectures**, uploaded to the University Portal for Online learning
5.4	Activities and **tasks required to develop students' self-learning skills**.
5.5	**Tutorial**, **Class Activity** and **Group Discussion** to explain what has not been understood
5.6	**Interactive Sessions** using Microsoft Teams
5.7	Internet search and Research Assignments to design **Formative Assignments**

6- Student Assessment:

	Assessment Methods		**Assessment Schedule**	**Weighing of Assessments**
Assessment 1	**Written Exam (Final)**	Paper exams that are corrected electronically and/or manually. To assess understanding, intellectual, professional skills	week 15	90
Assessment 2	**Oral Exam**	To assess understanding, intellectual skills, General and Transferable skills	week 15	10
				100 %

7- List of References

	Reference	Type
1	- Spectroscopic identification of organic compounds, Robert M. Silverstein, Francis X. Webster and David J. Kiemle 7th. (2009) - Spectroscopic methods in organic chemistry, DH Williams and I Fleming, McGraw-Hill, 2005.	Essential Book **(Text Books)**
2	Modern NMR spectroscopy, Sanders, J.K.M., Hunter, B.K.; Oxford: New York, 2005	Recommended Book (electronic Books)
3	http://www.chemistry.cccsu.edu/glagovich/teaching/472/uvvis/uvvis.html http://www.chem.csustan.edu/Tutorials/INFRARRED.HTM http://www.science.widener.edu/svb/nmr/nmr.html http://www.chipo.chem.uic.edu/web1/ocol/spec/MS.html	Websites

8- Facilities required for teaching and learning

-Class room	**Data show- Computers, Internet.**
- Library	**supplied by recent scientific books and journals.**

9. Signature

Course Coordinator	Head of Department	Date*
Dr. Zen Alabdeen Metwally Naeem	Prof Dr. Mona G.Zaghloul	.....

* Date of faculty Council Approval

Dept. of Pharmacognosy	Course Specification	PhD

Pharmacognosy PhD

Course Specification

Academic year: 2021/2022

البرنامج دكتوراة	توصيف مقرر التقنية الحيوية و الهندسة الوراثية في العقاقير ـ ٢ Biotechnology & Genetic engineering in pharmacognosy-II
رئيس القسم أ د. منى جودة زغلول	منسق المقرر ا. د. أحمد أبو الغيط جوهر

Mansoura University
Faculty of Pharmacy
Postgraduate Studies
PhD Program
Biotechnology & Genetic engineering in pharmacognosy-II
Course Specification
2021/2022

General

University	Mansoura
Faculty	Pharmacy
Department offering the course	Pharmacognosy
Department supervising the course	Pharmacognosy
Program on which the course is given	PhD degree of Pharmacognosy PGP- 300
Academic Level	Postgraduate
Academic year	2021/2022 - second semester
Date of course specification approval	11/5/2022

A.Basic Information : Course data :

Course Title	Biotechnology & Genetic engineering in pharmacognosy-I
Course Code	PGP-303
Prerequisite	------
Teaching Hours: Lecture	2
Practical:	------
Total Credit Hours	2

B. Professional Information

1- Overall Aims of Course:

Knowledge of basic plant tissue culture techniques as well as uses and applications including (production of secondary metabolites, biotransformation using plant cell and organ cultures, large scale cultivation and techniques for crop improvement).

Also the student should understand basics of mammalian cell culture as well as uses and applications including (cell culture for tissue engineering (scaffolding) , stem cell assays and cloning)

2- Intended Learning Outcomes (ILOs)

2.1. *Knowledge and Understanding*

After completion of the course, graduates will be able to

(A1)	a1	Recognize fundamentals, methodologies and ethics of the scientific research in the field of biotechnology .

(A2)	a2	Identify principles and fundamentals of the professional practice in the field of natural products.
(A4)	a3	Understand computer program, online database, software and other IT to get information and analyze the obtained research data.

2.2. Intellectual Skills

After completion of the course, graduates will be able to

(B1)	b1	Design experiment model for PTC exp. or natural product biotransformation
(B6)	b2	Analyze and evaluate the gained information in the area of biotechnology.

2.3. Professional and Practical Skills

After completion of the course, graduates will be able to

(C1)	c1	Specify the suitable technique for production of valuable metabolite
(C3)	c2	Master basic and modern professional skills in the area of natural product discovery and biotechnology.

2.4. General and Transferable Skills

After completion of the course, graduates will be able to

(D1)	d1	Communicate effectively by verbal and written means.
(D2)	d2	Manipulate computer program, online database, software and other IT to get information and analyze the obtained research data.
(D6)	d3	Evaluate and criticize scientific work, literature and research data.

3. Course Contents

Week No.	Topics	Lecture Hours	Practical / Tutorial hr.
1	Basic principles and concepts	8	0
2	Application of PTC	16	0
Total:		**24**	**0**

4- Matrix of knowledge and skills of the course (contents versus ILOs of the course)

Week	Topics	Course ILOs			
		K.U*	IS**	P.P.S***	G.T.S****
1	Basic principles and concepts	A1, A4	B1, B6	C1, C3	D1, D2
2	Application of PTC	A1, A2, A4	B1, B6	C1, C3	D6

** Knowledge and Understanding* ***Intellectual Skills* ****Professional and Practical Skills*
*****General and Transferable Skills*

5- Teaching and Learning Methods:

5.1	**Lectures using Power Point** (PPT) presentations
5.2	**Lectures using whiteboard**
5.3	**Video-recorded lectures**, uploaded to the University Portal for Online learning
5.4	Activities and **tasks required to develop students' self-learning skills**.
5.5	**Tutorial**, **Class Activity** and **Group Discussion** to explain what has not been understood
5.6	**Interactive Sessions** using Microsoft Teams
5.7	Internet search and Research Assignments to design **Formative Assignments**

6- Student Assessment:

	Assessment Methods		**Assessment Schedule**	**Weighing of Assessments**
Assessment 1	**Written Exam (Final)**	Paper exams that are corrected electronically and/or manually. To assess understanding, intellectual, professional skills	week 15	90
Assessment 2	**Oral Exam**	To assess understanding, intellectual skills, General and Transferable skills	week 15	10
				100 %

7- List of References

	Reference	Type
1	Plant Tissue Culture: Applications and Limitations , 19 of Developments in Crop Science, S.S. Bhojwani, 2000 Elsevier,	Course notes
2	Gohar A.Ahmed, Hand book of plant cell, Tissue and organ culture, 2010	Essential Book **(Text Books)**
3	-Biotechnology: Genetic fundamentals and genetic engineering, By Hans-Jürgen Rehm, Alfred Pühler, Gerald Reed, 2003	Recommended Book (electronic Books)
4	http://www.fao.org/docrep/003/X3910E/X3910E04.html	Websites

8- Facilities required for teaching and learning

-Class room	**Data show- Computers, Internet.**
- Library	**supplied by recent scientific books and journals.**

9. Signature

Course Coordinator	Head of Department	Date*
Prof. Dr. Ahmed A. Gohar	Prof Dr. Mona G.Zaghloul	…….

* Date of faculty Council Approval

Dept. of Pharmacognosy	Course Specification	PhD

Pharmacognosy PhD

Course Specification

Academic year: 2021/2022

توصيف مقرر
السموم الطبيعية
Natural Toxins

البرنامج
دكتوراة

منسق المقرر
ا. م. د. السيد مهدي مروان

رئيس القسم
أ د. منى جودة زغلول

General

University	Mansoura
Faculty	Pharmacy
Department offering the course	Pharmacognosy
Department supervising the course	Pharmacognosy
Program on which the course is given	PhD degree of Pharmacognosy PGP- 300
Academic Level	Postgraduate
Academic year	2021/2022 - second semester
Date of course specification approval	11/5/2022

A.Basic Information : Course data :

Course Title	Natural Toxins
Course Code	PGP-304
Prerequisite	------
Teaching Hours: Lecture	2
Practical:	------
Total Credit Hours	2

B. Professional Information

1- Overall Aims of Course:

On completion of course, the students will be able to

2.1 Understand the concept of Natural toxins
2.2 Acquire a good knowledge about the different types of toxic constituents of plants, as well as the principles of poisoning treatment and examples of poisonous plants & mushrooms.
2.3 Identify the different types of mycotoxins & bacterial toxins as well as the different methods of their analysis &detection

2- Intended Learning Outcomes (ILOs)

2.1. *Knowledge and Understanding*

After completion of the course, graduates will be able to

(A1)	a1	Recognize the different toxic constituent of plants

(A2)	a2	Explain the mechanism of toxicity of the different types of mycotoxins & bacteriotoxins
(A5)	a3	Recognize knowledge about the effects of the professional practice of pharmacognosy on the environmental toxins and methods of public hygiene.

2.2. Intellectual Skills

After completion of the course, graduates will be able to

(B1)	b1	Explain the mechanism of toxicity of the different types of mycotoxins & bacteriotoxins
(B3)	b2	Recognize the serious effect of mycotoxins & bacterial toxins on human health

2.3. Professional and Practical Skills

After completion of the course, graduates will be able to

(C1)	c1	Utilize available methods for first aid any toxicity case with natural toxins

2.4. General and Transferable Skills

After completion of the course, graduates will be able to

(D1)	d1	Work effectively in team.
(D3)	d2	Take responsibility for continuing learning and the ability to work with and motivate others.
(D4)	d3	Manage scientific meetings and ability to manage time.

3. Course Contents

Week No	Topics	No.of hours	Lecture credit hours
1.	Introduction: Toxic constituents of plants Basic principles of treatment of toxicity with poisonous plants	2	2
2.	Examples of drugs containing poisonous alkaloids (Nuxvomica, Belladonna, Hyosyamous, Stramonuim ,Dubisia, Potatoes)	2	2
3.	Poisonous plants containing hallucinogens (Cannbis, Nutmg & Mace, Ergot, Morning glory. Peyote)	2	2
4.	Toxic mushrooms (Psilocybe, Fly agaric, Amanita phalloides)	2	2
5.	Miscellaneous toxic plants (Castor seed, Digitalis, Oleander, Hemlock, Aconite, Dieffenbachia)	4	4

6.	Biological Contaminants as infectious pathogens: Types of Microbial contamination Effect of the microbial contamination on the medicinal plants I-Mycotoxins :Major acute and chronic effects of mycotoxins, Mycotoxins main groups: Nephrotoxic mycotoxins Neurotoxic Mycotoxins Mycotoxins vs. phytotoxins	2	2
7.	Detection of mycotoxins: A- Membrane based immunoassay B- Flow-through assay C- Lateral flow test	2	2
8.	Endotoxins and Exotoxin: Differences between Endotoxins and Exotoxins Bacterial Contamination and Bacterial Toxins Mechanism of Endotoxin and Exotoxin Toxicity Toxins and Toxoids (how to fight)	2	2
9	Determination of microbial contaminants: Microbial limit test, Pathogen detection, Quantitative estimation Membrane filtration method, Plate count method, Multiple or serial dilution method TLC test for aflatoxins, Rapid detection methods for microbial contamination	2	2
10	**Assignment on some toxicity cases with poisonous cases**	4	4
Total:		**24**	**0**

4- Matrix of knowledge and skills of the course (contents versus ILOs of the course)

Week	Topics	Course ILOs			
		K.U*	IS**	P.P.S***	G.T.S****
1	Introduction: Toxic constituents of plants Basic principles of treatment of toxicity with poisonous plants	A1, A2 A5	B1, B3	C1	D1, D3
2	Examples of drugs containing poisonous alkaloids (Nuxvomica, Belladonna, Hyosyamous, Stramonuim ,Dubisia, Potatoes)	A1, A2	B1, B3	C1	D4

3	Poisonous plants containing hallucinogens (Cannbis, Nutmg & Mace, Ergot, Morning glory. Peyote)	A1, A2 A5	B1, B3	-	D1
4	Toxic mushrooms (Psilocybe, Fly agaric, Amanita phalloides)	A1, A2	B1, B3	C1	D4
5	Miscellaneous toxic plants (Castor seed, Digitalis, Oleander, Hemlock, Aconite, Dieffenbachia)	A1, A2	B1	C1	D1
6	Biological Contaminants as infectious pathogens: Types of Microbial contamination Effect of the microbial contamination on the medicinal plants I-Mycotoxins :Major acute and chronic effects of mycotoxins, Mycotoxins main groups: Nephrotoxic mycotoxins Neurotoxic Mycotoxins Mycotoxins vs. phytotoxins	A1, A2 A5	B1, B3	C1	D1, D3
7	Detection of mycotoxins: A- Membrane based immunoassay B- Flow-through assay C- Lateral flow test	A1, A2	B3	C1	D1
8	Endotoxins and Exotoxin: Differences between Endotoxins and Exotoxins Bacterial Contamination and Bacterial Toxins Mechanism of Endotoxin and Exotoxin Toxicity Toxins and Toxoids (how to fight)	A1, A2 A5	B1, B3	C1	-
9	Determination of microbial contaminants: Microbial limit test, Pathogen detection, Quantitative estimation Membrane filtration method, Plate count method, Multiple or serial dilution method	A1, A2	-	C1	D1

	TLC test for aflatoxins, Rapid detection methods for microbial contamination				
10	**Assignment on some toxicity cases with poisonous cases**	A1, A2	B1, B3	C1	D4

** Knowledge and Understanding* ***Intellectual Skills* ****Professional and Practical Skills*
*****General and Transferable Skills*

5- Teaching and Learning Methods:

5.1	**Lectures using Power Point** (PPT) presentations
5.2	**Lectures using whiteboard**
5.3	**Video-recorded lectures**, uploaded to the University Portal for Online learning
5.4	Activities and **tasks required to develop students' self-learning skills**.
5.5	**Tutorial**, **Class Activity** and **Group Discussion** to explain what has not been understood
5.6	**Interactive Sessions** using Microsoft Teams
5.7	Internet search and Research Assignments to design **Formative Assignments**

6- Student Assessment:

	Assessment Methods		Assessment Schedule	Weighing of Assessments
Assessment 1	**Written Exam (Final)**	Paper exams that are corrected electronically and/or manually. To assess understanding, intellectual, professional skills	week 15	90
Assessment 2	**Oral Exam**	To assess understanding, intellectual skills, General and Transferable skills	week 15	10
				100 %

7- List of References

	Reference	Type
1	Glossary of biotechnology and genetic engineering	Course notes
2	-Biotechnology and Genetic Engineering, By Kathy Wilson Peacock, 2001	Essential Book **(Text Books)**

3	-Biotechnology: Genetic fundamentals and genetic engineering, By Hans-Jürgen Rehm, Alfred Pühler, Gerald Reed, 2003	Recommended Book (electronic Books)
4	http://www.fao.org/docrep/003/X3910E/X3910E04.html	Websites

8- Facilities required for teaching and learning

-Class room	**Data show- Computers, Internet.**
- Library	**supplied by recent scientific books and journals.**

9. Signature

Course Coordinator	Head of Department	Date*
Ass.Prof. Dr. Elsayed Mahdy Marawan	Prof Dr. Mona G.Zaghloul	……

* Date of faculty Council Approval