Department of Bioinformatics

Academic Reference Standards and M.Sc. Program of Bioinformatics

(2015/2016)

CONTENTS

Academic Reference Standards (ARS) for <u>Master's</u> Postgraduate Studies, NAQAAE, March 2009

1. Attributes of the graduate:

The graduate of Master program of any specialty must be able to:

1.1. Master basics and methodologies of scientific research and the use of different tools.

1.2. Apply the analytical method and its use in the field of specialization.

1.3. Apply and integrate specialized knowledge with the relevant knowledge in professional practice.

1.4. Demonstrate awareness of the ongoing problems and visions in the modern area of specialization.

1.5. Identify and solve professional problems.

1.6. Master appropriate scale of the professional skills, and use of appropriate technological means to serve his /her professional practice.

1.7. Communicate effectively and lead work teams.

1.8. Make decisions in different professional contexts.

1.9. Use available resources to achieve the highest benefit and preservation.

1.10. Be aware of his/her role in community development and environmental conservation according to global and regional changes.

1.11. Behave to reflect commitment to act with integrity, credibility and to the rules of the profession.

1.12. Dedicate to academic and professional self-development and continuous learning.

2- General academic standards:

2.1. Knowledge & Understanding:

By the end of the study of Master program of any specialty, the graduate must have sufficient knowledge & understanding of:

2.1.1. Basic facts, theories, of the specialty and related subjects/ fields.

2.1.2. Mutual relation between professional practice and effects on environment.

2.1.3. Main scientific advances in the field of practice.

2.1.4. Fundamentals of ethical & legal practice.

2.1.5. Quality standards of the practice.

2.1.6. Basics and ethics of scientific research.

2.2 Intellectual skills:

By the end of the study of Master program of any specialty, the graduate must be able to

perform the following (related to the specialty):

2.2.1. Interpret, analyze & evaluate the information to solve problems.

2.2.2. Solve some problems that do not conform to classic data (incomplete data).

2.2.3. Integrate different information to solve professional problems.

2.2.4. Conduct a scientific research &/ or write scientific systematic approach to a research problem (hypothesis).

2.2.5. Evaluate risks imposed during professional practice.

2.2.6. Plan for professional improvement.

2.2.7. Take professional decisions in a wide range of professional situations.

2.3. Professional & Practical skills:

By the end of the study of Master program of any specialty, the graduate must be able to:

2.3.1. Competent in all basic and some of the advanced professional skills.

2.3.2. Write and appraise reports

2.3.3. Evaluate methods and tools used in specialty.

2.4. General & transferable skills:

By the end of the study of Master program of any specialty, the graduate must be able to:

2.4.1. Communicate effectively using all methods.

2.4.2. Use information technology to improve his/her professional practice.

2.4.3. Practice self appraisal and determines his/her learning needs.

2.4.4. Use different sources of information to obtain data.

2.4.5. Share in determination of standards for evaluation of others (e.g.: subordinates/ trainees etc.)

2.4.6. Work in teams and lead teams in situations comparable to his/her work level.

2.4.7. Manage time effectively.

2.4.8. Learn independently and seek continuous learning.

Program Reference Academic Standards
(Program ARS)

1. Program Graduate Attributes
The graduate of the program must be able to:

1.1. Master basics and methodologies of scientific research in the field of Bioinformatics.

1.2. Apply the analytical method and its use in the Bioinformatics applications.

1.3. Apply and integrate specialized knowledge with the relevant knowledge in professional practice of Bioinformatics tools.

1.4. Demonstrate awareness of the ongoing problems and visions in the modern area of Bioinformatics.

1.5. Identify and solve Bioinformatics professional problems.

1.6. Master appropriate scale of the Bioinformatics skills, and use of appropriate technological means to serve his /her Bioinformatics professional practice.

1.7. Communicate effectively and lead work teams.

1.8. Make decisions in different professional contexts of Bioinformatics applications.

1.9. Use available resources to achieve the highest benefit and preservation of Bioinformatics.

1.10. Be aware of his/her role in community development and environmental conservation

1.11. Behave to reflect commitment to act with integrity, credibility and to the rules of the Bioinformatics professionality.

1.12. Dedicate to academic and professional self-development and continuous learning in the field of Bioinformatics.

2- General academic standards:

2.1. Knowledge & Understanding:

By the end of the study of Master program of any specialty, the graduate must have sufficient knowledge & understanding of:

2.1.1. Basic facts, theories, of the Bioinformatics and related subjects/fields.

2.1.2. Mutual relation between Bioinformatics professional practice and effects on environment.

2.1.3. Main scientific advances in the Bioinformatics field of practice.

2.1.4. Fundamentals of ethical & legal Bioinformatics practice.

2.1.5. Quality standards of the Bioinformatics practice.

2.1.6. Basics and ethics of scientific research in the field of Bioinformatics.

2.2 Intellectual skills:

By the end of the study of Master program of any specialty, the graduate must be able to

perform the following (related to the specialty):

2.2.1. Interpret, analyze & evaluate the information to solve Bioinformatics related problems.

2.2.2. Solve some problems that do not conform to classic Bioinformatics data (incomplete data).

2.2.3. Integrate different information to solve Bioinformatics professional problems.

2.2.4. Conduct a scientific research &/ or write scientific systematic approach to a research problem
(hypothesis) in the field of Bioinformatics.

2.2.5. Evaluate risks imposed during Bioinformatics professional practice.

2.2.6. Plan for professional Bioinformatics improvement.

2.2.7. Take Bioinformatics professional decisions in a wide range of professional situations.

2.3. Professional & Practical skills:

By the end of the study of Master program of any specialty, the graduate must be able to:

2.3.1. Competent in all basic and some of the advanced Bioinformatics skills.

2.3.2. Write and appraise Bioinformatics reports

2.3.3. Evaluate methods and tools used in Bioinformatics.

2.4. General & transferable skills:

By the end of the study of Master program of any specialty, the graduate must be able to:

2.4.3. Communicate effectively using all Bioinformatics methods.

2.4.4. Use information technology to improve his/her professional Bioinformatics practice.

2.4.3. Practice self appraisal and determines his/her Bioinformatics learning needs.

2.4.4. Use different sources of information to obtain Bioinformatics data.

2.4.5. Share in determination of standards for evaluation of others (e.g.: subordinates/ trainees etc.)

2.4.6. Work in teams and lead teams in situations comparable to his/her work level.

2.4.7. Manage time effectively.

2.4.8. Learn independently and seek continuous learning.

I

Matrix between Program Graduate Attributes and NAQAAE Graduate Attributes

Program Graduate Attributes	NAQAAE Graduate Attributes											
	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	1.10	1.11	1.12
1.1	X											
1.2		X										
1.3			X									
1.4				X								
1.5					X							
1.6						X						
1.7							X					
1.8								X				
1.9									X			
1.10										X		
1.11											X	
1.12												X

II

Matrix between

Program ARS

and

NAQAAE ARS

2.1 Knowledge & Understanding

Program ARS	NAQAAE ARS					
	2.1.1	2.1.2	2.1.3	2.1.4	2.1.5	2.1.6
2.1.1	X					
2.1.2		X				
2.1.3			X			
2.1.4				X		
2.1.5					X	
2.1.6						X

2.2. Intellectual Skills

Program ARS	NAQAAE ARS						
	2.2.1	2.2.2	2.2.3	2.2.4	2.2.5	2.2.6	2.2.7
2.2.1	X						
2.2.2		X					
2.2.3			X				
2.2.4				X			
2.2.5					X		
2.2.6						X	
2.2.7							X

2.3.1 Professional and Practical Skills

Program ARS	NAQAAE ARS		
	2.3.1	2.3.2	2.3.3
2.3.1	X		
2.3.2		X	
2.3.3			X

2.3.2 General and Transferable skills

Program ARS	NAQAAE ARS							
	2.4.1	2.4.2	2.4.3	2.4.4	2.4.5	2.4.6	2.4.7	2.4.8
2.4.1	X							
2.4.2		X						
2.4.3			X					
2.4.4				X				
2.4.5					X			
2.4.6						X		
2.4.7							X	
2.4.8								X

Bioinformatics Master Program Specification

(2015/2016)

A- Basic Information

1. **Program Title:**   **M.Sc. Bioinformatics**

2. **Awarding University:**   **University of Sadat City**

3. **Teaching Institution:**   **GEBRI**

4. **Name of Final Award:**   **M.Sc.**

5. **Name of Department:**   **Bioinformatics**

6. **Name of Institute:**   **GEBRI**

7. **Program Coordinator:**   **Prof. Dr. Alaa Hemeida**
   alaa.hemeida@gebri.usc.edu.eg

8. **Relevant QAA Subject Benchmarking Group(s):**
   1- ARS of NAQAA 2009 as approved by the department council.

   2- The Quality Assurance Agency for Higher Education 2007, www.qaa.ac.uk

9. **Program Type:**   **Single**

10. **Relevant QAA External Audit:**   **Prof. Dr. Khaled El Dougdoug, Fac. Agriculture, Ain Shams University**

11. **Relevant QAA Internal Audit:**   **Prof. Dr. Ibrahim ElSayed**

12. **Mode of Study:**   **Full Time**

13. **Date of Approval of this program specification:**   **20/9/2015**

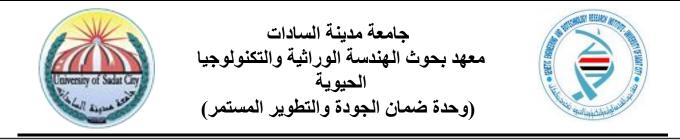# B- Professional Information

1- Educational aims of the program:

1.1- Produce graduates equipped to pursue careers in Bioinformatics in industry, the public sector and non-governmental organizations;

1.2- Develop understanding of Bioinformatics supported with an awareness of current biological issues together with combination of programming and mathematical skills;

1.3- Develop and show understanding of tools and methods of modern Bioinformatics and its application;

1.4- Develop broad research and analytical skills related research in Bioinformatics

1.5- Attract highly motivated students, from Egypt and regional Arab countries.

1.6- To be aware and appreciate the ethical implications of Bioinformatics; and Develop new areas of teaching in response to the advance of scholarship and the needs of vocational (technical) training.

2. Program Intend Learning Outcomes (ILOS):

2/1   Knowledge and Understanding

Knowledge and understanding of:

A. Understanding of principles and practice of Biological data bases, Bioinformatics software's and web-based Bioinformatics tools.

B. Research techniques, including information and data retrieval, study design, program development and implementation, data analysis and statistics, and mathematical modelling;

C. Management and communication skills, including problem definition, project design, decision processes, teamwork, written and oral reports, scientific publications.

D. Develop a multi-disciplinary/inter-disciplinary perspective of bioinformatics that brings together biological, computational and mathematical skills in application to practical problems in a professional setting;

E. Engage with the essential facts, major concepts, principles and theories associated with bioinformatics;

F. Be competent users of the basic experimental skills of bioinformatics;

G. Understand information and data, and their setting within a theoretical framework, accompanied by critical analysis and assessment of the subject area as a coherent whole;

H.   Be familiar with the terminology, nomenclature and classification systems, as appropriate;

Teaching/learning methods and strategies
Acquisition of A to H is through a combination of lectures, computer-based work and coursework. Throughout the students are encouraged to undertake independent reading both to supplement and consolidate what is being taught/learnt and to broaden their individual knowledge and under-standing of the subject.

Assessment of knowledge is through written examinations and presentation, individual participation.
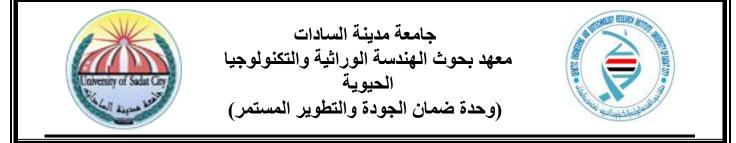
Skills and other Attributes

2/2   Intellectual Skills

A. Be able to specify, test and replicate computational solutions in the analysis of biological data;
B. be able to undertake self-directed research in bioinformatics;
C. Demonstrate skills in managing research-based work in bioinformatics, especially in an industrial setting;
D. Produce an original research paper in bioinformatics, involving the critical appraisal of the literature, problem specification, data collection and analysis.
E. Demonstrate an ability to relate these techniques to computational methods appropriate for the solution of bioinformatics problems in a professional setting;
F. Be able to apply bioinformatics solutions in a novel manner when analyzing common problems in industry or research.
G. Place their existing knowledge of biology, mathematics or computing into a bioinformatics context.

Teaching/learning methods and strategies

During the research projects students are exposed to and can discuss ongoing research and published work with their academic and their research groups. Bioinformatics research design and mathematical/statistical skills are developed in lectures and computer-based practical work in the taught part of the course, and research projects.

Assessment is through coursework, oral presentations, written examinations and the research projects.
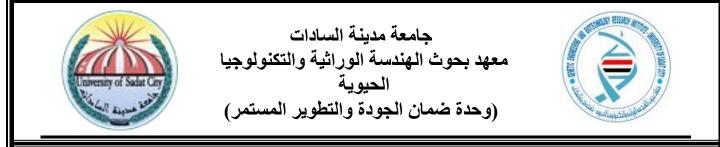
2/3 Professional and Practical Skills

A. Make creative and knowledgeable use of a range of existing theories, techniques and tools relevant to their field of research.

B. Refine existing techniques or define novel ones, as necessary, in the process of solving research problems.

C. Organize and carry out research tasks

D. Propose, plan and manage well defined research and design projects involving a team of individuals.

E. Interpret and critically assess existing theories and models within his field of specialization.

F. Have the ability to assess research and implementation projects that include components from both computer science and biomedical sciences and identify the key factors in a given situation.

G. Work on a project in a team of professionals from different fields, contributing to the analysis of the project; participate in implementing and carrying out the work needed, and in evaluating the results.

H. Work with confidence in a typical biological laboratory and be aware of safety and contamination issues.

Teaching/learning methods and strategies

Practical skills are developed through the teaching and learning program. Practical skills are developed through laboratory, computer-based and project work, feedback on reports written and presentations made as part of coursework assignments.

2/4 Transferable Skills

A. Communicate effectively through oral presentations, computer processing and presentations, written reports and scientific publications;

B. Apply Biostatistical and modelling skills;

C. Improve management skills: decision processes, objective criteria, problem definition, project design and evaluation, risk management, teamwork and coordination, extension needs;

D. Integrate and evaluate information from a variety of sources;

E. Transfer techniques and solutions from one discipline to another;

F. Use Information and Communications Technology;

G. Manage resources and time; learn independently with open-mindedness and critical enquiry; learn effectively for continuing professional development.

Teaching/learning methods and strategies

Transferable skills are developed through the teaching and learning program. Skills are taught through coursework and developed through feedback on reports and oral presentations, practical work, during the individual research project, through computer-based exercises, projects and other coursework activities and individual learning.

3- Program Academic standards

The Genetic Engineering and Biotechnology Research Institute (GEBRI) developed M.Sc. programs' academic standards for different academic specialties in accordance with the General Academic Reference Standards for Post Graduate programs (GARS) of NAQAAE. These standards set out the graduate attributes and academic characteristics that are expected to be achieved by the end of the program.

4-Bemch Marks

1- ARS of NAQAA 2009 as approved by the department council.
2- The Quality Assurance Agency for Higher Education 2007, www.qaa.ac.uk

5. Curriculum Structure and Contents:

a. Program duration: at least 3 years.

b. Program structure: No. of hours/units:

Lectures	28	Lab./Exercise	16	Total	44
Compulsory	24	Optional	---	Elective	12

▪ **Basic sciences courses**	No.	%
	10	23

	No.	%
▪ **Social sciences and** ▪ **humanity courses**	3	7

	No.	%
▪ **Specialized courses**	31	70

	No.	%
▪ **Other sciences courses**	---	---

	No.	%
	---	---
▪ **Practical (Thesis)**	**The time spent in achievement of a thesis (8 hrs/week)**	

c. Program Levels (in credit-hours system): Not Applicable

2. Program Contents:
i. Compulsory:

Code No.	Course Title	No. of Units	No. of hours/week			Year/ Level	Semester
			Lect.	Ex.	App.		
A-35	English language	3	3	---	---		
A-80	Use of Microcomputers (Computer)	3	2	---	2		
	Research and research methodology	6	2	---	8		
B8-23	Special topics	3	3	---	---		
B8-24	Seminars	3	---	---	6		
B8-2	Bioinformatics	3	3	---	---		
A-23	Biotechnology-1	3	3	---	---		
	Total	24	16	---	16		

ii. Elective: Specialized courses (At least 4 courses from the listed below courses)

Code No.	Course Title	No. of Units	No. of hours/week			Year/ Level	Semester
			Lect.	Ex.	App.		
B8-1	Biodiversity information	3	3	---	---		
B8-6	Computational molecular biology	3	3	---	---		
B8-8	Databases	3	3	---	---		
B8-10	DNA/RNA sequence	3	3	---	---		
B8-11	Ecoformatics	3	3	---	---		
B8-15	Gene banks	3	3	---	---		
B8-20	Protein sequence analysis	3	3	---	---		
B1-35	Molecular biology I	3	3	---	---		
C-101	Practical approach in PCR	3	2	2	---		
B1-85	Structure and function relationship of protein	3	3	---	---		

iii. M.Sc. thesis

All M.Sc. degree students should prepare a thesis in Bioinformatics. The department and the ethical committees must approve the protocol of the research. The thesis should include a review part and a research part. The thesis is supervised by one or more senior staff members of the Bioinformatics Department and may include other specialties according to the nature of the research. The thesis should be evaluated and approved by a committee of three professors including one of the supervisors and an external professor.

3. Program admission requirements:

Bachelor degree from appropriate practical faculty from Egyptian or an equivalent university with general grade (Acceptable) or Diploma in Bioinformatics.

4. Regulations for progression and program completion:

- Successful completion of the required courses (equivalent to at least 18 units) in addition to compulsory courses: English language, Computer, Research and research methodology, special topics and Seminars.

- Student success in any course of study is estimated in one of the following estimates:

Excellent	From 90 to 100 degrees
Very Good	From 80 to less than 90 degrees
Good	From 70 to less than 80 degrees
Pass	From 60 to less than 70 degrees

- Approved completion of the research experiments.

- Approved scientific writing of M.Sc. thesis.

- Successfully passes of thesis open defense examination.

5. Assessment methods for Evaluating program Applicants:

No.	Method	Intended Learning Outcomes ' ILO's '
1	Semester Works (5th & 10th)	Measure Problems Solving Skills, Presentation Data and Discussion, and Work on team. -Knowledge and Understanding ,Intellectual Skills & General and Transferable Skills.
2	Midterm Exam (6th) Week.	Measure Abilities on Concentration and understanding Scientific Points & Background. -Knowledge and Understanding and Intellectual Skills.
3	Oral Exam (14th) Week.	Measure Analysis, Presentation, and Discussion Skills. -Knowledge and Understanding ,Intellectual Skills and General and Transferable Skills.
4	Written (Final) Exam (15th) Week.	Measure Remembering & Innovating Skills. -Knowledge and Understanding and Intellectual Skills.

5	Thesis discussion	To assess the ability to write a review of literature, perform the needed practical steps and to present the results in tables and graphs. In addition, the skills of analysis of results and discussion with previous findings obtained by other authors are also assessed. -Knowledge and Understanding, Intellectual Skills, Professional and practical Skills & General and Transferable Skills

6. Program Evaluation methods:

No.	Evaluator	Tool	Sample
1	Students	Questionnaire	20
2	Alumni	Depth Meeting	5
3	Stakeholders (Employers)	Nucleus Meeting	5
4	External (Evaluators & Examiners)	Remarking Questionnaire & Nucleus Meeting	2
5	Staff	Questionnaire	---------

Head of Department   **Program coordinator**

Prof. Dr. Haddad El Rabey   **Prof. Dr. Alaa Hemeida**

Matrix of Knowledge and skills

Matrix of Knowledge and Skills of Bioinformatics Master Program Targeted

Knowledge and understanding

No.	Course No.	Course title	Knowledge and understanding							
			A	B	C	D	E	F	G	H
1	A-35	English language							X	
2	A-80	Use of Microcomupters (Computer)							X	
3		Research and research methodology			X					
4	B8-23	Special topics					X			
5	B8-24	Seminars					X			X
6	B8-2	Bioinformatics	X							X
7	A-23	Biotechnology-1	X							
8	B8-1	Biodiversity information	X							
9	B8-6	Computational molecular biology		X						X
10	B8-8	Databases		X						
11	B8-10	DNA/RNA sequence				X				
12	B8-11	Ecoformatics						X		X
13	B8-15	Gene banks						X		
14	B8-20	Protein sequence analysis					X			
15	B1-35	Molecular biology I				X				
16	C-101	Practical approach in PCR			X					
17	B1-85	Structure and function relationship of protein					X			
		MSc Thesis	X	X	X	X	X	X	X	X

Intellectual abilities

No.	Course No.	Course title	Intellectual abilities						
			A	B	C	D	E	F	G
1	A-35	English language							
2	A-80	Use of Microcomupters (Computer)							
3		Research and research methodology						X	
4	B8-23	Special topics				X			
5	B8-24	Seminars					X		
6	B8-2	Bioinformatics	X						
7	A-23	Biotechnology-1		X					
8	B8-1	Biodiversity information	X						
9	B8-6	Computational molecular biology		X					
10	B8-8	Databases			X				
11	B8-10	DNA/RNA sequence				X			
12	B8-11	Ecoformatics						X	
13	B8-15	Gene banks					X		
14	B8-20	Protein sequence analysis				X			
15	B1-35	Molecular biology I			X				
16	C-101	Practical approach in PCR							X
17	B1-85	Structure and function relationship of protein				X			
		MSc Thesis	X	X	X	X	X	X	X

Professional skills

No.	Course No.	Course title	Professional skills						
			A	B	C	D	F	G	H
1	A-35	English language				X			
2	A-80	Use of Microcomupters (Computer)				X			
3		Research and research methodology	X				X		
4	B8-23	Special topics			X				
5	B8-24	Seminars	X					X	
6	B8-2	Bioinformatics				X			X
7	A-23	Biotechnology-1				X			
8	B8-1	Biodiversity information				X		X	
9	B8-6	Computational molecular biology	X					X	
10	B8-8	Databases				X			X
11	B8-10	DNA/RNA sequence		X					
12	B8-11	Ecoformatics	X						X
13	B8-15	Gene banks				X			
14	B8-20	Protein sequence analysis		X			X		
15	B1-35	Molecular biology I		X					
16	C-101	Practical approach in PCR		X					
17	B1-85	Structure and function relationship of protein		X					X
		MSc Thesis	X	X	X	X	X	X	X

General and transferable skills

No.	Course No.	Course title	General and transferable skills						
			A	B	C	D	E	F	G
1	A-35	English language			X				
2	A-80	Use of Microcomupters (Computer)					X		
3		Research and research methodology				X			
4	B8-23	Special topics				X			
5	B8-24	Seminars				X			
6	B8-2	Bioinformatics							X
7	A-23	Biotechnology-1		X					
8	B8-1	Biodiversity information					X		
9	B8-6	Computational molecular biology		X					
10	B8-8	Databases	X						
11	B8-10	DNA/RNA sequence							
12	B8-11	Ecoformatics							X
13	B8-15	Gene banks		X					
14	B8-20	Protein sequence analysis		X					
15	B1-35	Molecular biology I							
16	C-101	Practical approach in PCR				X			
17	B1-85	Structure and function relationship of protein	X						
		MSc Thesis	X	X	X	X	X	X	X

Head of Department

Prof. Dr. Haddad El Rabey

Program coordinator

Prof. Dr. Alaa Hemeida

The matrix between Program ARS and Program ILo's

2/1 (Knowledge & Understanding)

Program Academic Standard	Program ILo's (Knowledge & Understanding)							
	A	B	C	D	E	F	G	H
2.1.1	X							
2.1.2		X						
2.1.3			X					
2.1. 2.1.4				X				
2.1. 2.1.5					X	X	X	X

2/2 Intellectual Skills

Program Academic Standard	Program ILo's (Intellectual Skills)						
	A	B	C	D	E	F	G
2.2.1	X						
2.2.2		X					
2.2.3			X				
2.2.4				X			
2.2.5					X		
2.2.6						X	
2.2.7							X

2/3/1 (Practical and Professional Skills)

Program Academic Standard	Program ILo's (Practical and professional Skills)							
	A	B	C	D	E	F	G	H
2.3.1	X			X			X	
2.3.2		X	X			X		X
2.3.3			X		X		X	X

2/3/2 (General and Transferable skills)

Program Academic Standard	Program ILo's (General and Transferable skills)						
	A	B	C	D	E	F	G
2.4.1	X						
2.4.2		X					
2.4.3			X				
2.4.4				X			
2.4.5					X		
2.4.6						X	
2.4.7.							X
2.4.8							
2.4.9			X			X	

Head of Department

Prof. Dr. Haddad El Rabey

Program coordinator

Prof. Dr. Alaa Hemeida

The matrix between Program aims and Program ILo's

2/1 (Knowledge & Understanding)

Program Aims	Program ILo's (Knowledge & Understanding)							
	A	B	C	D	E	F	G	H
1.1	X							
1.2		X						
1.3			X					
1.4				X				
1.5					X		X	
1.6						X		X

2/2 Intellectual Skills

Program Aims	Program ILo's (Intellectual Skills)						
	A	B	C	D	E	F	G
1.1	X						
1.2		X					
1.3			X				
1.4				X			
1.5					X		
1.6						X	X

2/3/1 (Practical and Professional Skills)

Program Aims	Program ILo's (Practical and professional Skills)							
	A	B	C	D	E	F	G	H
1.1	X							
1.2		X						
1.3			X					
1.4				X				X
1.5					X		X	
1.6						X		

2/3/2 (General and Transferable skills)

Program Aims	Program ILo's (General and Transferable skills)						
	A	B	C	D	E	F	G
1.1	X						
1.2		X					
1.3			X				
1.4				X			
1.5					X		
1.6						X	X

Head of Department   **Program coordinator**

Prof. Dr. Haddad El Rabey   **Prof. Dr. Alaa Hemeida**