Department of Bioinformatics

Ph.D. Program of *Bioinformatics*

(2015/2016)

CONTENTS

Academic Reference Standards (ARS) for Doctorate Postgraduate Studies, NAQAAE, March 2009

1-The graduate of Doctorate program of any specialty must be able to:

1.1. Master basics and methodologies of scientific research.
1.2. Add to the knowledge in the specialization field.
1.3. Apply analytical and critical approach to the knowledge in specialty and related areas.
1.4. Integrate specialized knowledge with relevant knowledge by extrapolating and developing relations between the two interfaces
1.5. Show in depth awareness of recent theories and ongoing problems in the specialization field.
1.6. Identify professional problems and find innovative solutions.
1.7. Master a wide range of professional skills in the specialty area.
1.8. Work towards the development of new methods, tools and procedures in professional practice.
1.9. Use appropriate technological means to serve his/her professional practice.
1.10.Communicate effectively and lead team-work in different professional contexts.
1.11.Make decisions according to available information.
1.12.Employ available resources efficiently and work to find and develop new resources.
1.13.Show awareness of his/her role in community development and environmental conservation.
1.14.Reflect the commitment to integrity and credibility of the profession and its rules
1.15.Commit him/her self to continuous self-development and to transfer knowledge and experience to others

2- General academic standards:

2.1. Knowledge & Understanding:

By the end of the study of Doctorate program of any specialty, the graduate must have fluent deep knowledge & understanding of:

2.1.1. Basic facts, theories and recent advances of the specialty and related subjects.
2.1.2. Basics, methodologies and scientific research ethics as its different tools.
2.1.3. Ethical and legal regulations of professional practice.
2.1.4. Quality standards of professional practice.
2.1.5. Knowledge related to the professional practice impact on the environment maintenance and conservation.

2.2. Intellectual skills:

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

2.2.1. Analyze, evaluate and deduce the information in the specialty fields.
2.2.2. Solve the specialized problems according to available data.
2.2.3. Conduct research studies that add to specialty knowledge.
2.2.4. Write and publish scientific articles.
2.2.5 Evaluate professional practice risks.

2.2.6. Plan to improve specialty performance.
2.2.7. Take decisions in various professional situations including dilemmas and controversial issues.
2.2.8. Add to the specialty field through creativity & innovation.
2.2.9. Manage discussions on basis of evidence and proofs.

2.3. Professional skills:

By the end of Doctorate program study in any specialty, the graduate must:

2.3.1. Master basic and advanced professional skills in the specialty field.
2.3.2. Write and appraise professional reports.
2.3.3. Evaluate and improve methods and tools used in the specialty.
2.3.4. Use technological tools to serve professional practice.
2.3.5. Plan for professional practice development and performance of others.

2.4. General & transferable skills:

By the end of the study of Doctorate program of any specialty, the graduate must:

2.4.1. Communicate effectively using different means.
2.4.2. Use information technology to improve professional practice.
2.4.3. Teach and evaluate others.
2.4.4. Perform self appraisal and seek continuous learning.
2.4.5. Use different resources to obtain information and knowledge.
2.4.6. Work in and lead a team.
2.4.7. Manage scientific meetings and time.

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. Add to the knowledge in the in the field of Bioinformatics.
1.3. Apply analytical and critical approach to the knowledge in Bioinformatics and related areas.
1.4. Integrate Bioinformatics knowledge with relevant knowledge by extrapolating and developing relations between the two interfaces
1.5. Show in depth awareness of recent theories and ongoing problems in the field of Bioinformatics.
1.6. Identify professional problems and find innovative solutions concerning Bioinformatics fields.
1.7. Master a wide range of Bioinformatics professional skills.
1.8. Work towards the development of new methods, tools and procedures in Bioinformatics practice.
1.9. Use appropriate technological means to serve his/her Bioinformatics professional practice.
1.10. Communicate effectively and lead team-work in different Bioinformatics contexts.
1.11. Make decisions according to available information.
1.12. Employ available resources efficiently and work to find and develop new Bioinformatics resources.
1.13. Show awareness of his/her role in community development and environmental conservation.
1.14. Reflect the commitment to integrity and credibility of the Bioinformatics and its rules
1.15. Commit him/her self to continuous self-development and to transfer knowledge and Bioinformatics experience to others

2- General academic standards:

2.1. Knowledge & Understanding:

By the end of the study of Doctorate program of any specialty, the graduate must have fluent deep knowledge & understanding of:

2.1.1. Basic facts, theories and recent advances of the Bioinformatics and related subjects.
2.1.2. Basics, methodologies and scientific Bioinformatics research ethics as its different tools.
2.1.3. Ethical and legal regulations of Bioinformatics practice.
2.1.4. Quality standards of Bioinformatics practice.
2.1.5. Knowledge related to the Bioinformatics practice impact on the environment maintenance and conservation.

2.2. Intellectual skills:

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

2.2.1. Analyze, evaluate and deduce the information in the Bioinformatics fields.
2.2.2. Solve the Bioinformatics problems according to available data.
2.2.3. Conduct research studies that add to Bioinformatics knowledge.

2.2.4. Write and publish scientific articles.
2.2.5 Evaluate Bioinformatics professional practice risks.
2.2.6. Plan to improve Bioinformatics performance.
2.2.7. Take decisions in various Bioinformatics situations including dilemmas and controversial issues.
2.2.8. Add to the Bioinformatics field through creativity & innovation.
2.2.9. Manage discussions on basis of evidence and proofs.

2.3. Professional skills:

By the end of Doctorate program study in any specialty, the graduate must:

2.3.1. Master basic and advanced professional skills in the Bioinformatics field.
2.3.2. Write and appraise Bioinformatics reports.
2.3.3. Evaluate and improve methods and tools used in the Bioinformatics.
2.3.4. Use technological tools to serve Bioinformatics professional practice.
2.3.5. Plan for Bioinformatics professional practice development and performance of others.

2.4. General & transferable skills:

By the end of the study of Doctorate program of any specialty, the graduate must:

2.4.1. Communicate effectively using different means.
2.4.2. Use information technology to improve Bioinformatics practice.
2.4.3. Teach and evaluate others.
2.4.4. Perform self appraisal and seek Bioinformatics continuous learning.
2.4.5. Use different resources to obtain information and knowledge.
2.4.6. Work in and lead a team.
2.4.7. Manage scientific meetings and time.

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	1.13	1.14	1.15
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			
1.13													X		
1.14														X	
1.15															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
3.1.1	X				
3.1.2		X			
3.1.3			X		
3.1.4				X	
3.1.5					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	2.2.8	2.2.9
3.2.1	X								
3.2.2		X							
3.2.3			X						
3.2.4				X					
3.2.5					X				
3.2.6						X			
3.2.7							X		
3.2.8								X	
3.2.9									X

2.3.1 Professional Skills

Program ARS	NAQAAE ARS				
	2.3.1	2.3.2	2.3.3	2.3.4	2.3.5
3.3.1	X				
3.3.2		X			
3.3.3			X		
3.3.4				X	
3.3.5					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
3.4.1	X						
3.4.2		X					
3.4.3			X				
3.4.4				X			
3.4.5					X		
3.4.6						X	
3.4.7							X

Bioinformatics Ph.D.

Program Specification

(2015/2016)

A- Basic Information

1. Program Title:	Ph.D. Bioinformatics
2. Awarding University:	University of Sadat City
3. Teaching Institution:	GEBRI
4. Name of Final Award:	Ph.D.
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

I- Educational aims of the program:

1.1- Produce qualified graduates with skills 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 and advanced Bioinformatics and its application;

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

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

1.5- To be aware and appreciate with high confidence the ethical implications of Bioinformatics;

1.6- Develop the graduate skills to create new impacts on the Bioinformatics field that service wide range of medical and other important applications.

2. Program Intend Learning Outcomes (ILOS):

2/1 Knowledge and Understanding

Knowledge and understanding of:

A. Deep understanding of principles and practice of Biological data bases, Bioinformatics software's and web-based Bioinformatics tools.
B. Research techniques, including study design, new bioinformatics program development and implementation, complex data analysis and biostatistics, and 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 advanced facts, concepts, principles and theories associated with

bioinformatics;

F. Acquire, interpret and analyze biological information with a critical understanding of the appropriate contexts for their use through the study of the existing primary literature in the field;
G. Be aware of the contribution of their subject to the development of knowledge about the diversity of other subjects;
H. Use a range of communication techniques and methodologies relevant to bioinformatics, including data analysis of DNA, RNA, NGS and Protein and the use of biological databases and biostatistics;
I. Engage with some of the current developments in bioinformatics and their applications, and the philosophical and ethical issues involved.

Teaching/learning methods and strategies
Acquisition of A to I 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 complex biological data;
B. Be able to undertake self-directed advanced research in bioinformatics;
C. Demonstrate skills in managing research-based work in bioinformatics, especially in an industrial and medical 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 modelling and 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, with the ability to create and develop new scope of Bioinformatics applications.

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. Define novel methods in the process of solving research problems in different research areas.
B. Propose, plan and manage well defined research and design projects involving a team of individuals.
C. Interpret and critically assess existing theories and models within his field of specialization with the ability to develop and create new theories or models.
D. 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.
E. 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.
F. Work with confidence in advanced biological laboratory and be aware of biosafety and contamination issues.
G. Appreciate the meaning and importance of professionalism, including integrity and adherence to independent informed judgement.
H. Be able to make an expert use of software tools embodying the most recent theoretical advances in their area of research and able to improve such tools.

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

D. Integrate, asses and evaluate information from a variety of sources;
E. Transfer techniques and solutions from one discipline to another;
F. Use advanced 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 Ph.D. programs' academic standards for different academic specialties in accordance with the General Academic Reference Standards for Post Graduate programs (GARS). 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

	No.	%
▪ **Basic sciences courses**	10	23
▪ **Social sciences and humanity courses**	3	7
▪ **Specialized courses**	31	70
▪ **Other sciences courses**	---	---
	---	---

- **Practical (Thesis)** — **The time spent in achievement of a thesis (8 hrs/week)**

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

2. Program courses:

i. Compulsory:

Code No.	Course Title	No. of Units	No. of hours/week			Year/Level	Semester
			Lect.	Ex.	Lab/ App.		
A-48	German language	3	3	---	---		
A-81	Use of Microcomupters 3 (Advanced computer)	3	2	2	---		
	Research and research methodology	6	2	8	---		
B8-23	Special topics	3	3	---	---		
B8-24	Seminars	3	---	6	---		
B8-3	Biological information systems	3	3	---	---		
A-24	Biotechnology II	3	3	---	---		
Total		24	16	16	---		

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

Code No.	Course Title	No. of Units	No. of hours/week			Year/Level	Semester
			Lect.	Ex.	App.		
B8-9	Database management systems	**3**	**3**	---	---		
B8-16	Germplasm banks	**3**	**3**	---	---		
B8-21	Proteomics	**3**	**3**	---	---		
B8-22	Sequence analysis, submission, retrieval and comparisons	**3**	**3**	---	---		
B1-73	Plant genetic transformation	**3**	**3**	---	---		
B1-76	Plasmid, recombinant DNA and genetic engineering	**3**	**3**	---	---		
B1-2	Advanced molecular genetics	**3**	**3**	---	---		
B1-62	Molecular taxonomy I	**3**	**3**	---	---		
B1-86	Techniques for the analysis of complex genomes	**3**	**3**	---	---		
C-81	Methods in protein analysis	**3**	**2**	**2**	---		

iii. PhD dissertation

All PhD-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 Department of Environmental biotechnology 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:

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

B) Master in the field of Bioinformatics or equivalent.

4. Regulations for progression and program completion:

A) Successful completion of the required courses (equivalent to at least18 units) in addition to compulsory courses: German language, advanced computer, Research and research, special topics and Seminars.

B) 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

C) Successfully passes of both oral and written qualifying examinations.

D) Approved completion of the research experiments.

E) Approved scientific writing of Ph.D. dissertation.

F) Successfully passes of dissertation 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.
2	Midterm Exam (6th) Week.	Measure Abilities on Concentration and understanding Scientific Points & Background.
3	Oral Exam (14th) Week.	Measure Analysis, Presentation and Discussion Skills.
4	Written (Final) Exam (15th) Week.	Measure Remembering & Innovating Skills.
5	Thesis discussion	To assess the ability to write a review article, 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.

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 Ph.D. Program Targeted

Knowledge and Understanding

No.	Course No.	Course title	Knowledge and understanding								
			A	B	C	D	E	F	G	H	I
1	A-48	German Language									X
2		Research and research methodology			X						
3	A-81	Use of Microcomupters 3									X
4	B8-23	Special Topics					X				
5	B8-24	Seminars									X
6	B8-3	Biological information systems	X								
7	A-24	Biotechnology II		X			X				
8	B8-9	Database management systems	X								
9	B8-16	Germplasm banks								X	
10	B8-21	Proteomics		X			X				
11	B8-22	Sequence analysis, submission, retrieval and comparisons			X	X					
12	B1-73	Plant genetic transformation			X					X	
13	B1-76	Plasmid, recombinant DNA and genetic engineering							X		
14	B1-2	Advanced molecular genetics						X			
15	B1-62	Molecular taxonomy I						X			
16	B1-86	Techniques for the analysis of complex genomes				X					
17	C-81	Methods in protein analysis							X		
PhD dissertation			X	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-48	German Language	X						
2		Research and research methodology			X				
3	A-81	Use of Microcomupters 3						X	
4	B8-23	Special Topics			X				
5	B8-24	Seminars			X				
6	B8-3	Biological information systems		X					
7	A-24	Biotechnology II						X	
8	B8-9	Database management systems		X					
9	B8-16	Germplasm banks					X		
10	B8-21	Proteomics						X	
11	B8-22	Sequence analysis, submission, retrieval and comparisons				X			X
12	B1-73	Plant genetic transformation				X			
13	B1-76	Plasmid, recombinant DNA and genetic engineering				X			
14	B1-2	Advanced molecular genetics							
15	B1-62	Molecular taxonomy I					X		
16	B1-86	Techniques for the analysis of complex genomes	X						
17	C-81	Methods in protein analysis	X						
PhD dissertation			X	X	X	X	X	X	X

Professional skills

No.	Course No.	Course title	Professional skills							
			A	B	C	D	E	F	G	H
1	A-48	German Language				X				
2		Research & Res. methodology			X					
3	A-81	Use of Microcomupters 3	X					X		
4	B8-23	Special Topics					X			
5	B8-24	Seminars					X			
6	B8-3	Biological information systems		X					X	
7	A-24	Biotechnology II					X			
8	B8-9	Database management systems		X						
9	B8-16	Germplasm banks		X						
10	B8-21	Proteomics	X							
11	B8-22	Sequence analysis, submission, retrieval and comparisons				X			X	
12	B1-73	Plant genetic transformation			X			X		
13	B1-76	Plasmid, recombinant DNA and genetic engineering				X				X
14	B1-2	Advanced molecular genetics			X					
15	B1-62	Molecular taxonomy I			X					
16	B1-86	Techniques for the analysis of complex genomes				X			X	
17	C-81	Methods in protein analysis				X				X
PhD dissertation			X	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-48	German Language	X						
2		Research and research methodology	X						
3	A-81	Use of Microcomupters 3				X			
4	B8-23	Special Topics			X				
5	B8-24	Seminars					X		
6	B8-3	Biological information systems				X			
7	A-24	Biotechnology II			X				
8	B8-9	Database management systems							X
9	B8-16	Germplasm banks				X			
10	B8-21	Proteomics	X						
11	B8-22	Sequence analysis, submission, retrieval and comparisons					X		
12	B1-73	Plant genetic transformation						X	
13	B1-76	Plasmid, recombinant DNA and genetic engineering							X
14	B1-2	Advanced molecular genetics						X	
15	B1-62	Molecular taxonomy I	X						
16	B1-86	Techniques for the analysis of complex genomes						X	
17	C-81	Methods in protein analysis			X				
PhD dissertation			X	X	X	X	X	X	X

Head of Department **Program coordinator**

Prof. Dr. Haddad El Rabey **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	I
2.1.1	X								
2.1.2		x		X					
2.1.3			x		X				
2.1.4				x		X			
2.1.5			x		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
2.2.8		X					
2.2.9			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		
2.3.2		X					X	
2.3.3			X					X
2.3.4				X				
2.3.5					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

Head of Department **Program coordinator**

Prof. Dr. Haddad El Rabey **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	I
1.1	X								
1.2		x		X					
1.3			x		X				
1.4				x		X			
1.5			x		x		X	X	X
1.6									

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		X
1.6						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					X	
1.3			X					X
1.4				X				
1.5					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			X
1.5					X		
1.6						X	

Head of Department **Program coordinator**

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