Program SPECIFICATION FOR Master Degree in Master in Bio-medical Informatics & Medical statistics

Code: 1721700

University: Alexandria **Faculty:** Medical Research Institute

Program Specification

A-Basic information

1- Program title :Master in Bio-medical Informatics & Medical statistics

2- Program type: single [√] **double** [ ] **multiple** [ ]

3- Department(s) : Bio-medical Informatics & Medical statistics

4- Coordinator :Gihan Mohamed Shehata

5- External evaluator(s): Prof Dr. Aly abdel Halim Hasseb

6- Last date of program specification approval: 8/1/2017

B-Professional Information

1- Program aims:

By end of the program, the student should be able to:

Understand the principles behind statistical methods to develop statistical analysis specific to common, various types of research problems

Understand the limitations and issues surrounding currently used statistical methods

Understand the limitations and issues surrounding currently used research designs

Understand the principles behind statistical methods to allow future adoption and appreciation of new statistical methodologies

Select appropriate study designs to address questions of medical relevance

Select appropriate statistical methods for analyzing data typically encountered in medical applications, including binary, categorical, count, quantitative data

Interpret correctly the results of statistical analyses

Critically evaluate the use of statistics in the medical literature

Critically evaluate the appropriateness of the selected research designs to answer common, various research questions

Apply appropriate statistical methods for analyzing data typically encountered in medical applications, including binary, categorical, count, quantitative data

Use a range of software packages to: organise and manage datasets

Design scientific studies to address questions of medical relevance

Use a range of software packages to carry out statistical analysis

Use a range of software packages to construct tables and figures

Present results of statistical analyses through written and oral presentations

Communicate effectively with other statisticians and the wider medical community

2- Intended learning outcomes (ILOS)

a- knowledge and understanding:

a1- Recall data types, determine their distribution, summarize them soundly and recongise how to make inference using statistical significane

a2- Explain different sampling techniques, sample size calculation and different research designs.

a3- Define appropriate statistical test based on type of data and dependence of the observation and explain the performance of diagnostic tests.

a4- Explain regression analysis, its types and assumptions

a5- Discuss the benefits of popular softwares in different academic uses.

a6- Recall the aim and components of each section of a scientific paper and the principles of publication ethics

a7- Define ethical issues in research and publications

a8- Recall the commonly used hospital rates and its importance in successful management.

a9- Define the concept of evidence based medicine(EBM)

a10- Discussconcepts of bio-informatics

a11- Recall population genetics and rules of Mendelian inheritance

a12- Explain pharmaco-epidemiology and its main objectives

a13- Explain the scope of epidemiology and list different epidemiological studies

a14- Define chronic diseases, their determinants, their impact, importance of their reporting and different levels of their prevention

b- Intellectual skills

b1- Select the appropriate measures and graphs to present different types of data

b2-Analyze research questions to choose suitable research design

b3- Calculate commonly used statistical tests,and different parameters used to evaluate the diagnostic performance and interpret its results

b4- Choose the appropriate regression analysis and interpret its results soundly

b5- Compare between different charts for data representation in MS Excel

b6- Derive ideas and organize them

b7- Differentiate between types of plagiarism

b8- Interpret the results of hospital statistics and understand their implication

b9-Examine the type of clinical questions and evaluate the level of evidence

b10- Analyze and interpret results of bio-informatics

b11- Interpret the results of Hardy Weinberg law

b12- Outline the different methodological issues raised by pharmaco-epidemiological studies

b13- Judge the validity of different epidemiological studies

b14-Categorise different data sources used by a disease registry, appraise the importance of medical coding and different statistical methods used in chronic disease and cancer registries

c- professional and practical skills:

c1- Use statistical softwares for data entry, manipulation, summarization and presentation.

c2- Plan and calculate the required sample size for different reserch designs

c3- Use statistical softwares for conducting commonly used statistical tests and evaluate the performance of diagnostic tests.

c4- Use statistical software to conduct appropriate regression analysis, test its assumption and report its results soundly

c5- Use MS Word, Excel, Access, Powerpoint in different academic needs.

c6- Employ the principles of effective writing, present tables and graphs and manage references.

c7- Conduct scientific research without violating ethical issues

c8- Calculate different hospitals rates and report them soundly.

c9- Formulate clinical questions soundly, search for the evidence, evaluate the level of evidence and make scientific conclusion

c10- Manage data bases in bioinformatics

c11- Estimate probabilities of genetic diseases for different individuals

c12- Design different pharmaco-epidemiological and pharmaco-econmics studies.

c13- Apply appropriate statistical tests for different epidemiological studies.

c14- Code diseases used ICD-10 and interpret the results provided chronic disease registries

d- General and transferable skills

d1-Communicate through group discussion

d2- Work as apart of team

d3- Develop skills in Information Technology

d4-Learn skills for planning and organization

3- Academic standards

3a External references for standards (Benchmarks)

Generic Academic Reference Standards if the National Authority for Quality Assurance and Accreditation of Education (NAQAAE)

Date of Academic Reference standards (ARS) approval by Institute Council: 12/2/2014

3b Comparison of provision to selected external references

NAQAAE	ARS of Master of Biomedical informatics & Medical statistics
A1-Basic facts , theories, of the specialty and related subjects/ fields	a1- Identify data types, determine their distribution, summarize them soundly and recongize how to make inference using statistical significance a2- Explain different sampling techniques, sample size calculation and different research designs. a5- Explain regression analysis, its types and assumptions a7- Recognize the commonly used hospital rates and its importance in successful management. a8- Define the concept of evidence based medicine(EBM) a9- Recognize bi-informatics, population genetics and rules of Mendelian inheritance a10- Explain pharmaco-epidemiology and its main objectives a11- Define chronic diseases, their determinants, their impact, importance of their reporting and different levels of their prevention
A2-Mutual relation between professional practice and effects on environment	a2- Explain different sampling techniques, sample size calculation and different research designs. a3- Identify appropriate statistical test based on type of data and dependence of the observation. a4- Explain the performance of diagnostic tests. a5- Explain regression analysis, its types and assumptions a6- Recognize the aim and components of each section of a scientific paper and the principles of publication ethics a7- Recognize the commonly used hospital rates and its importance in successful management.
A3-Main scientific advances in the field of practice	a8- Define the concept of evidence based medicine(EBM) a9- Recognize bi-informatics, population genetics and rules of Mendelian inheritance

NAQAAE	ARS of Master of Biomedical informatics & Medical statistics
A4-Fundamentals of ethical & legal practice	a6- Recognize the aim and components of each section of a scientific paper and the principles of publication ethics
A5 -Quality standards of the practice	a5- Explain regression analysis, its types and assumptions a6- Recognize the aim and components of each section of a scientific paper and the principles of publication ethics
A6- Basics and ethics of scientific research	a6- Recognize the aim and components of each section of a scientific paper and the principles of publication ethics
B1 -Interpret, analyze & evaluate the information to solve problems	b1- Select the appropriate measures and graphs to present different types of data and Compare between different charts for data representation in MS Excel b3- Identify which research design is suitable to answer different research questions b4- Choose the appropriate regression analysis and interpret its results soundly b8- Examine the type of clinical questions and evaluate the level of evidence b9- Analyze and interpret results of bio-informatics b10- Interpret the results of Hardy Weinberg law
B2- Solve some problems that do not conform to classic data (incomplete data)	b1- Select the appropriate measures and graphs to present different types of data and Compare between different charts for data representation in MS Excel b3- Identify which research design is suitable to answer different research questions b12- Categories different data sources used by a disease registry, appraise the importance of medical coding and different statistical methods used in chronic disease and cancer registries

NAQAAE	ARS of Master of Biomedical informatics & Medical statistics
B3- Integrate different information to solve professional problems	b3- Analyze different research question to choose suitable research design b4- Choose the appropriate regression analysis and interpret its results soundly b6- Judge the validity of different epidemiological studies and differentiate between types of plagiarism b7-Translate the results of hospital statistics and understand their implication
B4- Conduct a scientific research &/Or write scientific systematic approach to a research problem (hypothesis)	b1- Select the appropriate measures and graphs to present different types of data and Compare between different charts for data representation in MS Excel b2- Calculate commonly used statistical tests, e.g., t-test, ANOVA, Mann-Whitney and interpret its results b3- Identify which research design is suitable to answer different research questions b4- Choose the appropriate regression analysis and interpret its results soundly b5- Derive ideas and organize them b6- Judge the validity of different epidemiological studies and differentiate between types of plagiarism b11- Outline the different methodological issues raised by pharmaco-epidemiological studies
B5- Evaluate risks imposed during professional practice.	b3- Identify which research design is suitable to answer different research questions b6- Judge the validity of different epidemiological studies and differentiate between types of plagiarism

NAQAAE	ARS of Master of Biomedical informatics & Medical statistics
B6- Plan for professional improvement	b1- Select the appropriate measures and graphs to present different types of data and Compare between different charts for data representation in MS Excel b2- Calculate commonly used statistical tests, e.g., t-test, ANOVA, Mann-Whitney and interpret its results b3- Identify which research design is suitable to answer different research questions b4- Choose the appropriate regression analysis and interpret its results soundly b5- Derive ideas and organize them b6- Judge the validity of different epidemiological studies and differentiate between types of plagiarism b11- Outline the different methodological issues raised by pharmaco-epidemiological studies
B7- Take professional decisions in wide range of professional situations	b1- Select the appropriate measures and graphs to present different types of data and Compare between different charts for data representation in MS Excel b2- Calculate commonly used statistical tests, e.g., t-test, ANOVA, Mann-Whitney and interpret its results b3- Calculate different parameters used to evaluate the diagnostic performance b4- Choose the appropriate regression analysis and interpret its results soundly

NAQAAE	ARS of Master of Biomedical informatics & Medical statistics
C1- Competent in all basic and some of theadvanced professional skills (to be determined according to the specialty board/ department)	c1- Use statistical softwares for data entry, manipulation, summarization and presentation and for conducting commonly used statistical tests and evaluate the performance of diagnostic tests. c2- Plan and calculate the required sample size for different reserch designs. c3- Use statistical software to conduct appropriate regression analysis, test its assumption and report its results soundly c4- Use MS Word, Excel, Access, Powerpoint in different academic needs. c6- Calculate different hospitals rates and report them soundly. c7- Formulate clinical questions soundly, search for the evidence, evaluate the level of evidence and make scientific conclusion c8- Manage data bases in bioinformatics c9- Estimate probabilities of genetic diseases for different individuals c10- Design different pharmaco-epidemiological and pharmaco-econmics studies. c11- Apply appropriate statistical tests for different epidemiological studies. c12- Code diseases used ICD-10 and interpret the results provided chronic disease registries
C2- Write and appraise reports	c2- Plan and calculate the required sample size for different research designs. c3- Use statistical software to conduct appropriate regression analysis, test its assumption and report its results soundly c4- Use MS Word, Excel, Access, Powerpoint in different academic needs. c5- Employ the principles of effective writing, present tables and graphs and manage references and Conduct scientific research without violating ethical issues c6- Calculate different hospitals rates and report them soundly. c12- Code diseases used ICD-10 and interpret the results provided chronic disease registries

NAQAAE	ARS of Master of Biomedical informatics & Medical statistics
C3-Evaluate methods and tools used in specialty	c3- Use statistical software to conduct appropriate regression analysis, test its assumption and report its results soundly c7- Formulate clinical questions soundly, search for the evidence, evaluate the level of evidence and make scientific conclusion c10- Design different pharmaco-epidemiological and pharmaco-econmics studies. c12- Code diseases used ICD-10 and interpret the results provided chronic disease registries

4- curriculum structure and contents

4.a program duration:*2-5 years*

4.b program structure :

4.b.i- No. of hours per week in each year/semester:

Semester	Core courses	Elective Courses
	No. of hours	No. of hours
First semester	7	3
Second semester	7	3
Third semester	3	2
Fourth semester	3	2

4.b.ii- No. of credit hours	**Lectures**	**18**	**Practical**	**12**	**Total**	**30**
	Compulsory	**20**	**Elective**	**10**	**Optional**	**0**

4.b.iii- No. of credit hours of basic science courses	**No.**	**30**	**%**	**100**
4.b.iv- No. of credit hours of courses of social sciences and humanities.	**No.**	**0**	**%**	**0**
4.b.v- No. of credit hours of specialized courses (Those related to your department)	**No.**	**30**	**%**	**100**
4.b.vi- No. of credit hours of other courses (The elective courses that are not directly related to your department)	**No.**	**0**	**%**	**0**
4.b.vii- Practical/Field Training	**Yes**	√	**No**	

4.b.viii- Program levels (in credit-hours system)

Student is required to pass at least 12 credit hours with CGPA not less than C+ before submitting a thesis proposal.

5- Program Courses

5.1- Compulsory(20 CH)

Course no.	Course title	No. of hours /week		Total Credit hours
		Lectures	Practical	
1721701	Principles of Medical Statistics	2	4	4
1721702	Principles of Medical Research Designs	2	2	3
1721703	Intermediate Medical Statistics	2	4	4
1721704	Regression Analysis	2	2	3
1721705	Introduction to Personal Computers and the Internet	2	2	3
1721706	Scientific Writing	2	2	3

5.2- Elective I (10 CH)

Course no.	Course title	No. of hours /week		Total credit hours
		Lectures	Practical	
1721707	Ethics in Research and Internet	1	2	2
1721708	Hospital statistics	2	2	3
1721709	Introduction to Evidence Based Medicine	1	2	2
1721710	Bioinformatics	2	2	3
1721711	Basic genetic epidemiology	2	2	3
1721712	Basic pharmaco-epidemiology	2	2	3
1721713	Basic Epidemiology	2	2	3
1721714	Principles of Registration of chronic diseases	2	2	3

6- Program admission requirement

Graduate students with a M.B.CH.B. of Medicine, dentistry, B.Sc. Pharmacy

7- Regulations for progression and program completion

For the progression and completion of the program to obtain the degree of Master in Biomedical informatics and Medical statistic, the student must:

1-complete a total of 38 credit hours (30 credit hours with CGPA of at least C+ and 8 credit hours for thesis).

2- Submit a thesis validity report by an examination committee approved by the department council and their members include at least two external examiners.

8-Evaluation of Students enrolled in the program.

Tool evaluation	Intended learning outcomes being assessed
Written	ILOs a&b
Practical	ILOs c
Oral	ILOs a ,b &d
Semester Work	ILOs b& d

Evaluation of program:

Evaluator	Tool	Sample
1- Senior students	Interview	At least 50 %
2- Alumni	Interview	Representative sample
3- Stakeholders (Employers)	Interview	Representative sample
4- External Evaluator(S) or External Examiner (s)	Reports	Name of evaluator or examiner
5- Other		

Dates of Previous editions/revisions:

Editions/Revisions Number	Date
Edition no.1	2009
Edition no. 2	2011
Edition no.3	5/6/2014
Edition no.3, revision no.1	12/2014
Edition no.3, revision no.2	10/2016
Edition no.3, revision no.3	9/ 2017

Programcoordinator :

Name: Gihan Mohamed Shehata Signature:

Department Head:

Name:Prof d fayekElkwesky Signature: …….

Date of Department Council Approval:6/9/2017

Courses Vs ILOs matrix

Course Title	a1	a2	a3	a4	a5	a6	a7	a8	a9	a10	a11	a12	a13	a14	b1	b2	b3	b4	b5	b6	b7	b8	b9	b10	b11	b12	b13	b14	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	d1	d2	d3	d4
Principles of Medical Statistics	X														X														X															X			
Principles of Medical Research Designs		X														X														X													X	X	X	X
Intermediate Medical Statistics			X														X	X													X												X	X	X	
Regression Analysis				X															X													X											X		X	X
Introduction to Personal Computers and the Internet					X															X												X											X			X
Scientific Writing						X															X												X											X		X	
Ethics in research and internet							X															X												X										X	X		X

Ethics in Research and Internet							X															X														X								X	X		X
Hospital statistics								X															X														X							X			
Introduction to Evidence Based Medicine									X															X														X									X
Bioinformatics										X															X														X					X	X		
Basic genetic epidemiology											X															X														X				X	X		
Basic pharmaco-epidemiology												X															X														X			X	X	X	X
Basic Epidemiology													X															X														X		X			
Principles of Registration of chronic diseases														X															X														X	X	X	X	

Overall Aim/ILO matrix	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B12	B13	B14	C1	C2	C3	C4	C5	C6	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	D1	D2	D3	D4
1Understand the principles behind statistical methods to develop statistical analysis specific to common, various types of research problems	X														x																																	X	X	X	
2Understand the limitations and issues surrounding currently used statistical methods			x													X	X														x																X	X		X
3Understand the limitations and issues surrounding currently used research designs		x															x														x																X	X	X	X
4Understand the principles behind statistical methods to allow future adoption and appreciation of new statistical methodologies		x																																													X	X	X	X
5Select appropriate study designs to address questions of medical relevance		x																						X							x																X	X	X	X
Select appropriate statistical methods for analyzing data typically encountered in medical applications, including binary, categorical, count, quantitative data	x																		X																													X	X	X	X
Interpret correctly the results of statistical analyses																		X																		X												X	X	X	X
Critically evaluate the use of statistics in the medical						X														X																												X	X	X	X

literature																																																		
Critically evaluate the appropriateness of the selected research designs to answer common, various research questions		x																		X																									x		X	X	X	X
Apply appropriate statistical methods for analyzing data typically encountered in medical applications, including binary, categorical, count, quantitative data							X														X																										X	X	X	X
Use a range of software packages to: organise and manage datasets															X																						x	x									X	X	X	X
Design scientific studies to address questions of medical relevance							x	X										X																													X	X	X	X
Use a range of software packages to carry out statistical analysis					x																	X											X	x								x					X	X	X	X
Use a range of software packages to construct tables and figures					x																												x	x													X	X	X	X
Present results of statistical analyses through written and oral presentations											X														X																		x				X	X	X	X
Communicate effectively with other statisticians and the wider medical community								X		x		X														X																x					X	X	X	X

Master program ILO																																															
ILO ARS	a 1	A 2	A 3	A 4	A 5	A 6	A 7	A 8	A 9	A 10	A 11	A 12	A 13	A 14	B 1	B 2	B 3	B 4	B 5	B 6	B 7	B 8	B 9	B 10	B 11	B 12	B 13	B 14	C 1	C 2	C 3	C 4	C5	C 6	C 7	C 8	C 9	C 10	C 11	C 12	C 13	C 14
A1	X																																														
A2		X																																												
A3			X																																										
A4			X																																										
A5				X																																									
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A8							X																																						
A9								X																																					
A10									X																																				
A11										X			X																																
B1											X	X		X										X																				
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C6																															x	x													
C7																									x								x						x						
C8																																	x	x											
C9																																		x	x	x									
C10																																			x	x		x		x					
C11																																						x	x							
C12																																								x		x					

Teaching and Learning Methods Vs Courses Matrix
Degree: Master **Code: 1721700**

	1721 701	1721 702	1721 703	1721 704	1721 705	1721 706	1721 707	1721 708	1721 709	1721 710	1721 711	1721 712	1721 713	1721 714	1721 720
Lecture	X	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Practical /Clinical	X	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Brainstorming	X	x				x		x						x	
Group discussion	x	x	x	x		x	x	x	x			X	x	x	x
Problem Solving	X	x	x	x		x		x			x		X		x
Case Study								x			x				
Field Training															
Role playing															
Training Workshops															
Self-Directed Learning						x		x	x	x			x	x	
e-learning									x						
Project				x				x	x						