

Program SPECIFICATION FOR Master Degree in Master in Biomedical Informatics & Medical statistics

Code: 1721700

University: Alexandria

Faculty: Medical Research Institute

Program Specification

A-Basic information

1- Program title :Master in Biomedical Informatics & Medical statistics

2- Program type: single $\sqrt{}$ double multiple

3- Department(s): Biomedical Informatics & Medical statistics

4- Coordinator :Asmaa Abd Elhameed Ahmed

5- External evaluator(s): Dr.Refaat Raouf Sadek, Professor of Public health, Department of Public health, Faculty of Medicine., University of ElMinya

6- Last date of program specification approval: 5/6/2014

B-Professional Information

1- Program aims:

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

- **1.** Recall the principles behind statistical methods to develop statistical analysis specific to common, various types of research problems
- 2. Examine the limitations and issues surrounding currently used statistical methods
- **3.** Interpret correctly the results of statistical analyses
- 4. Use systematic approach to design and conduct scientific research
- 5. Select appropriate study designs to address questions of medical relevance
- 6. Apply appropriate statistical methods for analyzing data typically encountered in medical applications, including binary, categorical, count, quantitative data
- 7. Use a range of software packages to: organize and manage datasets
- 8. Present results of statistical analyses
- **9.** Explore the principles behind regression methods to allow application with building regression models



- **10. Develop judgement in scientific basis**
- 11. Critically evaluate the appropriateness of the selected research designs to answer common, various research questions
- **12.** Learn the rules of scientific writing
- 13. Recall classification and coding of diseases& different disease registries
- 14. Identify the common hospital rates and its importance
- 15. Possess broad ethical principles
- 16. List components of epidemiology to identify levels of prevention & and drug epidemiology
- 17. Identify the principles of principles of quality of healthcare
- **18. Improve scientific and communication skills**
- **19.** Participate in multidisciplinary teamwork

2- Intended learning outcomes (ILOS)

a- knowledge and understanding:

a1- Identify data types, determine their distribution, summarize them soundly and recognize how to make inference using statistical significance

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 and explain the performance of diagnostic tests and concept behind ANOVA tests.

a4- Explain regression analysis, identify different types of regression and regression assumptions

a5- Define the concept of evidence based medicine(EBM)

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

a7- Define chronic diseases, their determinants, their impact, importance of their reporting and ICD coding& medical records

a8- List the commonly used hospital rates and its importance in successful management and importance of proper financial management.

a9- Report ethical issues in research and publications

a10-Explain the scope of epidemiology and list different epidemiological types and levels of prevention

a11- Discuss different types of probability

- a12- Explain pharmaco-epidemiology and its main objectives
- a13- Recognize basic principles of healthcare
- a14- Recognize genetic variation in the population and rules of Mendelian inheritance
- a15-Identify burden of genetic diseases and mode of inheritance

a16- Recognize the benefits of popular softwares in different academic uses.



b- Intellectual skills

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

b2-Analyze research questions to choose suitable research design

b3- Distinguish commonly used statistical tests , different types of ANOVA and non parametric tests, and different parameters used to evaluate the diagnostic performance and interpret its results

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

b5- Appraise the type of clinical questions and evaluate the level of evidence

b6- Derive ideas for scientific research and organize paper sections

b7- 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

b8- Explain the results of hospital statistics and understand their implication& and apply financial accounting in healthcare organization

b9- Differentiate between types of plagiarism

b10- Judge the validity of different epidemiological studies

b11- Discriminate different types of probabilities

b12- Explain different methodological issues raised by pharmaco-epidemiological studies

b13- Analyze the different processes of healthcare

b14- Analyze genetic frequencies and Interpret the results of Hardy Weinberg law

b15- Differentiate between modes of inheritance

b16-Compare between different charts for data representation in different softwares

b17-Write a thesis protocol using a scientific systematic approach to a research problem 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- Formulate clinical questions soundly, search for the evidence, evaluate the level of evidence and make scientific conclusion

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

c7- Use ICD in coding diseases and interpret the results provided chronic disease registries.

c8- Calculate different hospitals rates and report them soundly.

c9- Conduct scientific research without violating ethical issues

c10- Apply appropriate statistical tests for different epidemiological studies.

c11- Solve probabilities of different scenarios



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

- c13- Use special tools in quality of healthcare
- c14- Use different softwares .

d- General and transferable skills

- d1-Communicate through group discussion
- d2- Work as a part of team
- d3- Develop skills in Information Technology
- d4- Develop skills in independent learning.
- **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)

adopted at MRI council 12/2/2014 and re-adopted at 15/1/2023 Last date of Academic Reference standards (ARS) approval by Institute Council: 15/1/2023

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 basic theories in statistics &probability a2- Identify basics in Research design a3- Recognize the aim and components of each section of a scientific paper and the principles of scientific writing and publication ethics a4- Define chronic diseases, their determinants, their impact, importance of their reporting and ICD coding& medical records a5-Recognize the commonly used hospital rates a6- Explain the scope of epidemiology &principles of quality of healthcare a7- Explain scope of pharmaco-epidemiology and its main objectives a8- Recognize population genetics and rules of Mendelian inheritance
A2-Mutual relation between professional practice and effects on environment	A9- Identify appropriate statistical test which is essential to make valid research conclusion A10- Explain different sampling techniques, and different research designs to allow for proper conduction of useful research A12- Recognize role of drug-epidemiology in the prevention of ADE and the importance of pharmacovigilance application A11-Recognize main commonly used hospital rates and its importance in successful management and importance of proper financial management a13- Recognize the benefits of popular softwares for different academic uses
A3-Main scientific advances in the field of practice	a 14- Identify the role for literature search for evaluating evidence in research a15-Recognize ICD coding of diseases and its importance a 16- Define advances in epidemiology , geneticepidemiology and drug epidemiology



NAQAAE	ARS of Master of Biomedical informatics & Medical			
	statistics			
A4-Fundamentals of ethical & legal practice	a17- Define ethical issues in research and publications			
A5 -Quality standards of the practice	a15-Recognize ICD coding of diseases and its importance A18- Recognize standards in statistical analysis , designing research, scientific writing			
A6- Basics and ethics of scientific research	A17- Define ethical issues in research and publications			
B1 -Interpret, analyze & evaluate the information to solve problems	 b1- Distinguish the appropriate statistical test to present different types of data and interprete results b2- Examine the type of clinical questions and evaluate the level of evidence b3- Interpret the results of hospital statistics and understand their implication b4 Interpret the results of Hardy Weinberg law 			
B2- Solve some problems that do not conform to classic data (incomplete data)	 B5- Solve unusual statistical issues &probability problems B6- Identify & analyze the suitable research design answer different research questions B7- solve debate in disease coding 			
B3- Integrate different information to solve professional problems	 B6- Identify & analyze the suitable research design answer different research questions B8- Distinguish the appropriate regression analysis and interpret its results soundly b9- Integrate different information to evaluate evidence b10-Integrate different information to solve problems in the field of Genetic epidemiology and pharmacoepidemiology 			
B4- Conduct a scientific research &/Or write scientific systematic approach to a research problem (hypothesis)	 b1- Distinguish the appropriate statistical test present different types of data and interprete results b2- Examine the type of clinical questions and evaluate the level of evidence B6- Identify & analyze the suitable research design answer different research questions b11-Identify rules of scientific writing b17- Write a thesis protocol using a scientific systematic .approach to a research problem 			



NAQAAE	ARS of Master of Biomedical informatics & Medical statistics
B5- Evaluate risks imposed during professional practice.	b12- Ensure the validity of the research by using suitable study design sample size and statistical analysis b13-Assess plagiarism in research
B6- Plan for professional improvement	b14- Recognize the different methodological and statistical issues raised by different epidemiological studies b15-Gain skills in scientific writing and scientific search b16-Identify principles of quality of healthcare
B7- Take professional decisions in wide range of professional situations	 b2- Examine the type of clinical questions and evaluate the level of evidence B5- Solve unusual statistical issues &probability problems B6- Identify & analyze the suitable research design answer different research questions
C1- Competent in all basic and some of the advanced professional skills (to be determined according to the specialty board/ department)	 c1- Use statistical softwares for data entry, manipulation, summarization and presentation c2- Plan and calculate the required sample size for different reserch designs. c3-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- Formulate clinical questions soundly, search for the evidence, evaluate the level of evidence and make scientific conclusion C6-Apply the rules of scientific writing C7- Use of ICD in Coding and interpret the results in chronic disease registries C8- Calculate different hospitals rates and report them soundly. C9-Apply appropriate statistical tests for different epidemiological studies. C10-Design different pharmaco-epidemiological studies. C11- Use MS Word, Excel, Access, Powerpoint in different academic needs.
C2- Write and appraise reports	C6-Apply the rules of scientific writing C8- Calculate different hospitals rates and report them soundly C12- Write the report for different statistical analyses results C13- Write the report for the required sample size for different research designs



NAQAAE	ARS of Master of Biomedical informatics & Medical
	statistics
C3-Evaluate methods and	C5- Formulate clinical questions soundly, search for the evidence,
tools used in specialty	evaluate the level of evidence and make scientific conclusion
	C14- Evaluate the appropriateness of the used statistical tests
	C15- Evaluate the appropriateness of the research design
	C16- Evaluate tools used in assessing quality of healthcare
D1- Communicate effectively using all methods	d1-Communicate through group discussion
D2- Use information	d1-Communicate through group discussion
technology to improve	d2- Develop skills in Information Technology
his/her professional practice	
D3- Practice self appraisal and determines his learning	d3- Develop skills in Information Technology
needs	
D4- Share in determination	d4- Develop skills in independent learning.
of standards for evaluation	
of others (e.g.: subordinates/	
trainees etc.)	12 December delle in Laforma di ca Tacha da ca
D5- Use different sources of information to obtain data	d3- Develop skills in Information Technology
D6- Work in teams	d2- Work as a part of team
D0- Work in teams D7- Manage time effectively	d5-develop skills in time Management
D7- Wanage time effectively D8- Work as team leader in	d2- Work as a part of team
situations comparable to his	
work level	
D9- Learn independently	d3- Develop skills in Information Technology
and seek continuous	r
learning	



4- curriculum structure and contents

4.a program duration: 2.5 years on average

Program durations was determined according to the average time needed for student graduation over the last 10 years

4.b program structure :

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

Compulsory

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	Lectures	18	Practical	12	Thesis	8	Total	38
hours								
			-		-			

Elective

Optional

0

4.b.iii- No. of credit hours of specialized courses (Those	No.	30	%	100
related to your department)				

4.b.iv-	No. of credit hours of other courses (The	No.	0	%	0
elective	courses that are not directly related to your				
departn	nent)				



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			
		Lectures	Practical	Total Credit hours	
1221701	Principles of Medical Statistics	2	1	3	
1221702	Principles of Medical Research Designs	2	1	3	
1221703	Intermediate Medical Statistics	2	1	3	
1221704	Regression Analysis	2	1	3	
1221705	Evidence Based Medicine	2	1	3	
1221706	Scientific Writing	2	1	3	
1221707	Registration of chronic diseases	1	1	2	
		13	7	Total20	

5.2- Elective I (10 CH)

Course no.	Course title	No. of hours /w	eek	
		Lectures	Practical	Total credit hours
1221708	Hospital statistics	2	1	3
1221709	Ethics in Research and Internet	1	1	2



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1221710	Fundamentals of epidemiology	2	1	3	
1221711	Probability	1	1	2	
1221712	Pharmacoepidemiology	2	1	3	
1221713	Principles of quality of healthcare	1	1	2	
1213705	Population Genetics	2	0	2	
1213724	Genetic Epidemiology	2	0	2	
1220721	Computer	1	1	2	

6- Program admission requirement

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

7- Teaching and Learning methods

Lecture Practical/Clinical Brainstorming Group discussion Problem Solving Case Study

8- 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 30 credit hours (30 credit hours with CGPA of at least C+ through courses

2- Complete ...8. credit hours with through thesis.

3- 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	Questionnaire	At least 50 %
2- Alumni	Questionnaire	Representative sample
3- Stakeholders (Employers)	Meeting	Representative sample
4- External Evaluator(S) or	Reports	Dr Refaat Raouf Sadek
External Examiner (s)		
5- Other		

Program coordinator :

Name: Dr Asmaa Abd Elhameed Ahmed Signature:



		/
Department Head:		.1//
Name: Dr.Iman El Sayed	Signature:	
Date of Department Coun	cil Approval: 29/8/2	2023



Generic graduate attributes vs program aims

	Graduate Attributes of Master	Program aims
Generic Graduate	of Science in Biomedical Informatics & Medical statistics	
Attributes of NAQAAE	By the end of this program, Graduate of Master of Science in Biomedical Informatics & Medical statistics, <i>should be</i> <i>able to</i>	
Apply the basics and	Apply the basics and	Recall the principles behind statistical
methodologies of scientific	methodologies of scientific research and statistics	methods to develop
research and using its various tools proficiently.	using its various tools	statistical analysis specific to common,
	proficiently.	various types of
		research problems
		Learn the rules of
		scientific writing
Use the analytical methods	Use the analytical methods	Examine the limitations and issues surrounding
in the field of specialty	in medical research & data management	currently used
	management	statistical methods
Apply specialized	Apply acquired knowledge	-Interpret correctly the
knowledge in the field of	in the field of disease	results of statistical analyses
specialty and integrate it	registration and	
with relevant knowledge in	international coding and	-Use systematic approach to design and
his professional practice.	integrate it with relevant knowledge in his	conduct scientific
	professional practice.	research
		-Explore the principles
		behind regression methods to allow
		application with
		building regression
		models



Demonstrate awareness of current problems and modern visions in the field of specialtyDemonstrate awareness of current problems and modern visions in the field of disease epidemiology and drug & genetic epidemiologyUse systematic approach design and conduct scientific researchIdentify professional problems in the field of specialty and propose solutions to them.Identify professional problems in the field of professional skills in the field of including use of technology.Identify professional skills in the field of internet search and scientific writing.Select appropriate study designs to address questions of medical relevanceCommunicate efficiently and lead work teams.Communicate efficiently and lead work teams.Apply appropriate statistical problems& critically appraise researchesPresent results of statistical analysesEmploy the available resources to achieve the highest benefit and regional cealegomentShow awareness of his/her role in community development and regional changes.Show awareness of his/her professionality, andDevelop judgement in scientific basisAct integrity, credibility, professionality, andAct in a manner that reflects a commitment to integrity, credibility, professionality, andCritically revaluate the appropriate select appropriate critically credibility, professionality, andCritically evaluate the appropriate select researches		وحفة علمان الجونة	معهد البحوث الطبيـــة MEDICAL REARCH INSTITUTE
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accountability.	accountability.	research questions
Realize the need for self- development and engaging in continuous learning.	Realize the need for self- development and engaging in continuous learning.	Critically evaluate the appropriateness of the selected research designs to answer common, various research questions

Courses Vs ILOs matrix

C o r s e	a 1	a 2	a 3	a 4	a 5	a 6	a 7	a 8	a 9	a 1 0	a 1 1	a 1 2	a 1 3	a 1 4	A 1 5	A 1 6	b 1	b 2	b 3	b 4	b 5	b 6	b 7	b 8	b 9	b 1 0	b 1 1	b 1 2	b 1 3	b 1 4	B 1 5	B 1 6	B 1 7	с 1	c 2	с 3	с 4	с 5	с б	с 7	с 8	с 9	с 1 0	с 1 1	с 1 2	с 1 3	c 1 4
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Teaching and Learning Methods Vs Courses Matrix Degree: Master Code: 1221700

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Lecture	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X
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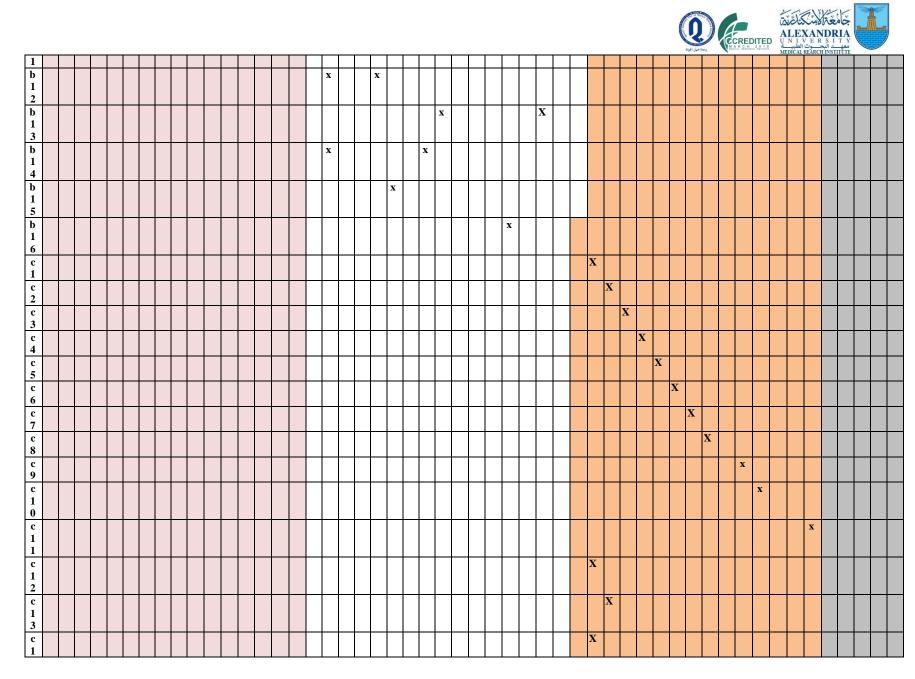


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ARS Vs ILos matrix

A R S	a 1	a 2	a 3	a 4	a 5	a 6	a : 7 :	a 8	a 9	a 1 0	a 1 1	a 1 2	a 1 3	a 1 4	A 1 5	A 1 6	b 1	b 2	b 3	b 4	b 5	b 6	b 7	b 8	b 9	b 1 0	b 1 1	b 1 2	b 1 3	b 1 4	B 1 5	B 1 6	B 1 7	C 1	C 2	C 3	C 4	C 5	C (6	C (7	C (8	C 9	C 1 0	C 1 1	C 1 2	C 1 3	C 1 4	D 1	D 2	D 3	D 4	D 5
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Program aims vs. ILos matrix

Program aims	a 1	a 2	a 3	a 4	a 5	a 6	a 7	a 8	a 9	a1 0	a1 1	a1 2	a1 3	a1 4	1 1) L	b 2	b 3	b 4	b 5	b 6	b 7	b 8	b 9	b1 0	b1 1	b1 2	b1 3	b1 4		B 1 7
1-Explain the principles behind statistical methods to develop statistical analysis specific to common, various types of research problems	X		X	X							X					x		X													
2-Describe the limitations and issues surrounding currently used statistical methods	X		X	X											2	x		X		X						X					
3-Interpret correctly the results of statistical analyses	X		X	X											2	x		X													
4-Use systematic approach to design and conduct scientific research		X					X										X													X	x
5-Explain the principles behind regression methods to allow application with building regression models				X			X												X												
6-Select appropriate study designs to address questions of medical relevance		X			х															X											
7-Apply appropriate statistical methods for analyzing data typically encountered in medical applications	X		X	X											2	x															
8-Use a range of software packages to: organise and manage datasets	X														X Z	x														X	
Present results of statistical analyses9- 9-	X		X	X											2	X															
10-Develop judgement in scientific basis					X	X											X				X										
11-Critically evaluate the appropriateness of the selected research designs to answer common, various research questions		X			X								X							X											



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12-Learn the rules of scientific writing			X											X										
13-Explore classification and coding of diseases& different disease registries				X											X									
14-Identify the common hospital rates and its importance					X						X					X								
15-Possess broad ethical principles						X																		
16-Recall components of epidemiology to identify levels of prevention & and drug epidemiology							X	X		X							X	X				X	X	
17-Identify the principles of principles of quality of healthcare									X												X			
18-Improve scientific and communication skills					X				X	X										X		X		
Participate in multidisciplinary teamwork					X				X	X										X		X		



Program aims	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	d1	d2	d3	d4
Explain the principles behind statistical methods to	X		X												Χ	X	Х	X
develop statistical analysis specific to common, various																		
types of research problems																		
Describe the limitations and issues surrounding currently	X	X	Х												Х	X	Х	X
used statistical methods																		
Interpret correctly the results of statistical analyses							X								Х	X	Х	X
Use systematic approach to design and conduct scientific		Χ														X	Х	X
research																		
Explain the principles behind regression methods to allow				X			X		X			X				X	Х	X
application with building regression models																		
Select appropriate study designs to address questions of						X	X		X	Х					Х		Х	X
medical relevance																		
Apply appropriate statistical methods for analyzing data									X						X		Х	X
typically encountered in medical applications																		
Use a range of software packages to: organise and	X													X	Х	X	Х	X
manage datasets																		
Present results of statistical analyses	Х				X					Х					Х	X		X
Develop judgement in scientific basis		X			Χ										X	X		X
	1																	
Critically evaluate the appropriateness of the selected		Х			X	1									Х	X	X	X
research designs to answer common, various research	1																	
questions	1																	
Learn the rules of scientific writing						Χ									X	X	Х	



											1	MEDICAL K	EARCHINSTE
Explore classification and coding of diseases& different disease registries				X						X	X	X	
Identify the common hospital rates and its importance					X					X	X	X	X
Possess broad ethical principles							X			X	X	X	X
Recall components of epidemiology to identify levels of prevention & and drug epidemiology								X		X		X	X
Identify the principles of principles of quality of healthcare									X	Х	X	X	X
Improve scientific and communication skills							X			Х	X	X	X
Participate in multidisciplinary teamwork							X			Х	X	X	X