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** [√] **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 tools used in specialty	**C5- Formulate clinical questions soundly, search for the evidence, 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 technology to improve his/her professional practice	**d1-Communicate through group discussion** **d2- Develop skills in Information Technology**
D3- Practice self appraisal and determines his learning needs	**d3- Develop skills in Information Technology**
D4- Share in determination of standards for evaluation of others (e.g.: subordinates/ trainees etc.)	**d4- Develop skills in independent learning.**
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**
D7- Manage time effectively	**d5-develop skills in time Management**
D8- Work as team leader in situations comparable to his work level	**d2- Work as a part of team**
D9- Learn independently and seek continuous learning	**d3- Develop skills in Information Technology**

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:

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	Thesis	8	Total	38
Compulsory		Elective		Optional	0		

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

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

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	
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 /week		Total credit hours
		Lectures	Practical	
1221708	Hospital statistics	2	1	3
1221709	Ethics in Research and Internet	1	1	2

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.

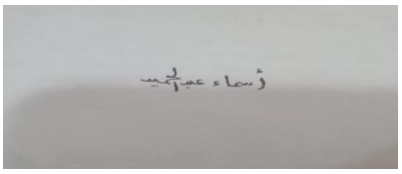
Tool evaluation	Intended learning outcomes being assessed
Written	ILOs a &b
Practical	ILOs c
Oral	ILOs a ,b &d
Semester Work	ILOs b & d

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 External Examiner (s)	Reports	Dr Refaat Raouf Sadek
5- Other		

Program coordinator :

Name: Dr Asmaa Abd Elhameed Ahmed Signature:



Department Head:

Name: Dr.Iman El Sayed Signature: ……

Date of Department Council Approval: 29/8/2023

Generic graduate attributes vs program aims

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

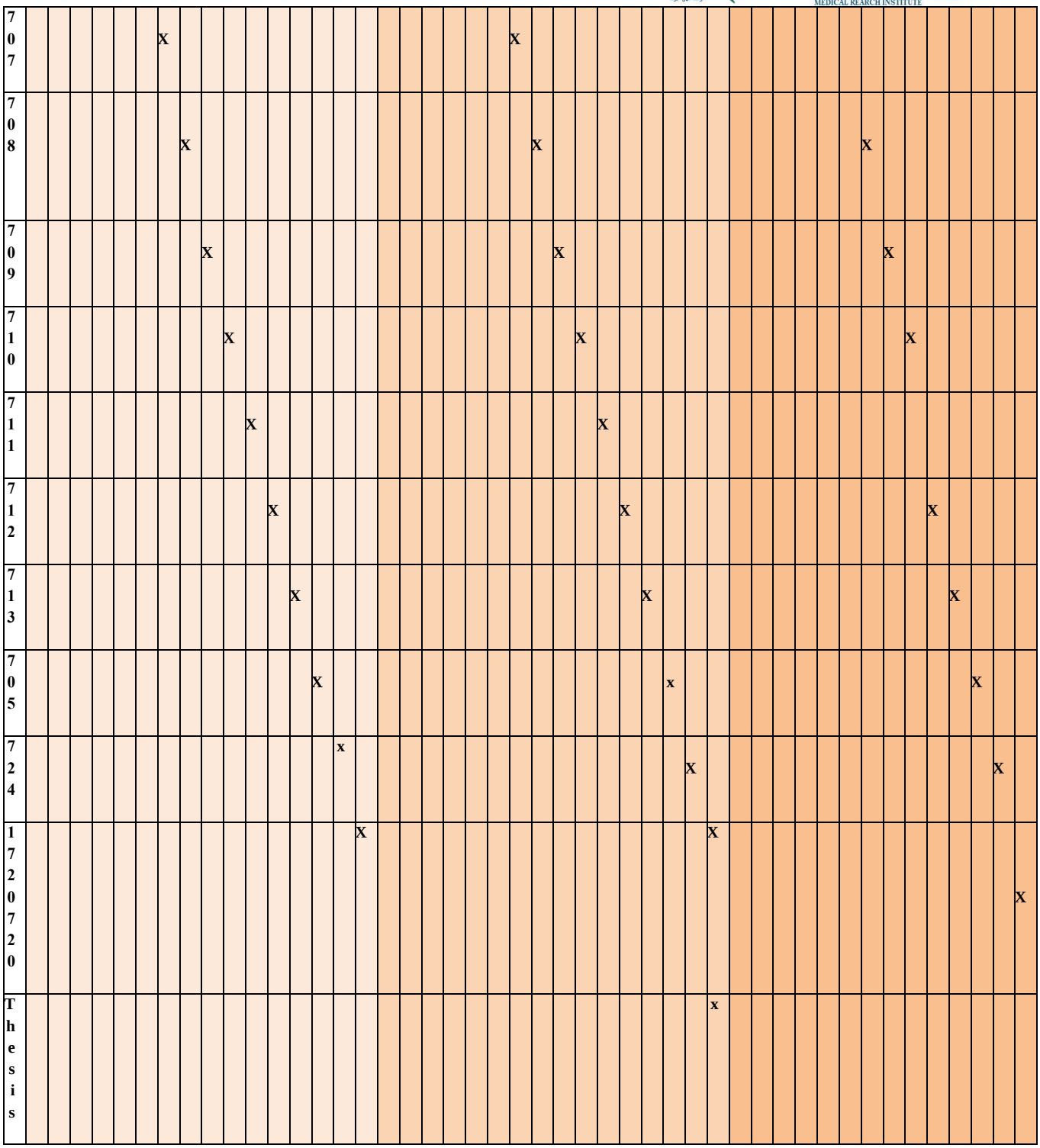
Demonstrate awareness of current problems and modern visions in the field of specialty	Demonstrate awareness of current problems and modern visions in the field of disease epidemiology and drug & genetic epidemiology	Use systematic approach to design and conduct scientific research
Identify professional problems in the field of specialty and propose solutions to them.	Identify professional problems in the field of Medical statistics and propose solutions to them.	Select appropriate study designs to address questions of medical relevance
Master an appropriate of professional skills in the field of including use of technology.	Master an appropriate of professional skills in the field of internet search and scientific writing.	Apply appropriate statistical methods for analyzing data typically encountered in medical applications, including binary, categorical, count, quantitative data
Communicate efficiently and lead work teams.	Communicate efficiently and lead work teams.	Learn the rules of scientific writing
Take Decision in different professional contexts.	Take Decision in different statistical problems& critically appraise researches	Present results of statistical analyses
Employ the available resources to achieve the highest benefit and maintain them.	Employ the available softwares to achieve the highest benefit.	Use a range of software packages to: organize and manage datasets
Show awareness of his/her role in community development and environmental preservation in light of global and regional changes.	Show awareness of his/her role in community development and environmental preservation in light of global and regional changes.	Develop judgement in scientific basis
Act in a manner that reflects a commitment to integrity, credibility, professionality, and	Act in a manner that reflects a commitment to integrity, credibility, professionality, and	Critically evaluate the appropriateness of the selected research designs to answer common, various

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

Course	a1	a2	a3	a4	a5	a6	a7	a8	a9	a10	a11	a12	a13	a14	A15	A16	b1	b2	b3	b4	b5	b6	b7	b8	b9	b10	b11	b12	b13	b14	B15	B16	B17	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14
701	X																X																	X														
702		X																X																	X														
703			X																X																	X													
704				X																	X															X												
705					X																	X														X											
706						X																	X										x						X								

Course Title	a1	a2	a3	a4	a5	a6	a7	a8	a9	a10	a11	a12	a13	a14	A14	A15	b1	b2	b3	b4	b5	b6	b7	b8	b9	b10	b11	b12	b13	b14	b15	B16	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14



Teaching and Learning Methods Vs Courses Matrix
Degree: Master Code: 1221700

	1221701	1221702	1221703	1221704	1221705	1221706	1221707	1221708	1221709	1221710	1221711	1221712	1221713	1213705	171372 4	1220720
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
Problem Solving	X	x	x	x		x		x			x	x	x	x		x
Case Study								x	X		x		x	x		
Field Training																
Role playing																
Training Workshops																
Self-Directed	x	X				x		x	x	x		x	x	x		

Learning																
e-learning									**X**							
Project				**x**				**x**	**X**			**x**		**x**		

ARS Vs ILos matrix

ARS	a1	a2	a3	a4	a5	a6	a7	a8	a9	a10	a11	a12	a13	a14	A15	A16	b1	b2	b3	b4	b5	b6	b7	b8	b9	b10	b11	b12	b13	b14	B15	B16	B17	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	D1	D2	D3	D4	D5
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ARS	a1	a2	a3	a4	a5	a6	a7	a8	a9	a10	a11	a12	a13	a14	A15	A16	b1	b2	b3	b4	b5	b6	b7	b8	b9	b10	b11	b12	b13	b14	B15	B16	B17	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	D1	D2	D3	D4	D5
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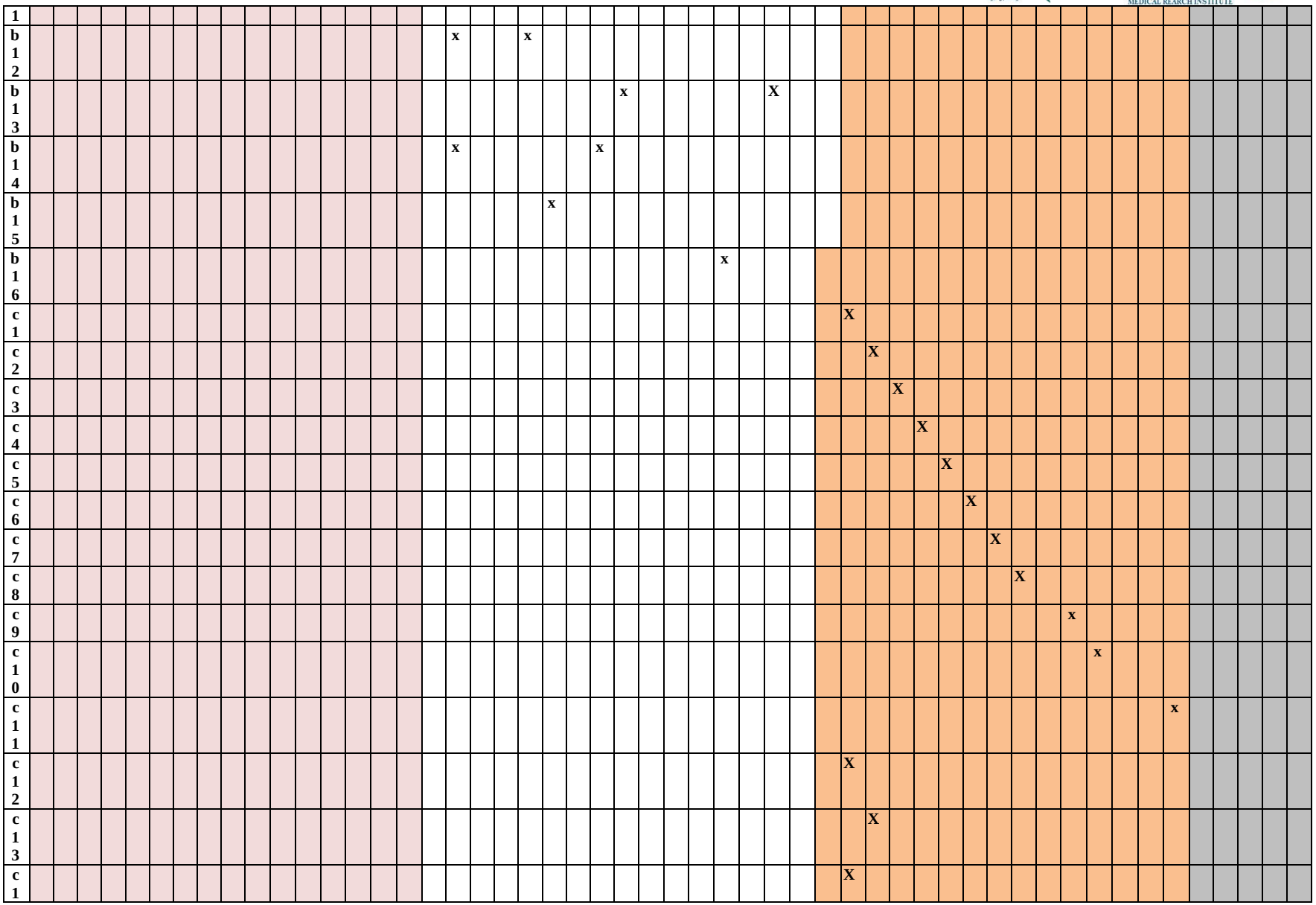

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Program aims vs. ILos matrix

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	A 15	A 16	b 1	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 15	B 16	B 17
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													X		X		X						X					
3-Interpret correctly the results of statistical analyses	X		X	X													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			X																X											
7-Apply appropriate statistical methods for analyzing data typically encountered in medical applications	X		X	X													X															
8-Use a range of software packages to: organise and manage datasets	X															X	X														X	
Present results of statistical analyses9-9-	X		X	X													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											

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 develop statistical analysis specific to common, various types of research problems	X		X												X	X	X	X
Describe the limitations and issues surrounding currently used statistical methods	X	X	X												X	X	X	X
Interpret correctly the results of statistical analyses							X								X	X	X	X
Use systematic approach to design and conduct scientific research		X														X	X	X
Explain the principles behind regression methods to allow application with building regression models				X			X		X			X				X	X	X
Select appropriate study designs to address questions of medical relevance						X	X		X	X					X		X	X
Apply appropriate statistical methods for analyzing data typically encountered in medical applications									X						X		X	X
Use a range of software packages to: organise and manage datasets	X													X	X	X	X	X
Present results of statistical analyses	X				X					X					X	X		X
Develop judgement in scientific basis		X			X										X	X		X
Critically evaluate the appropriateness of the selected research designs to answer common, various research questions		X			X										X	X	X	X
Learn the rules of scientific writing						X									X	X	X	

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		X	X	X	X
Improve scientific and communication skills											X				X	X	X	X
Participate in multidisciplinary teamwork											X				X	X	X	X