

Jordan University of Science and Technology

Faculty of Medicine

COURSE TITLE : Introduction to Research and Evidence-Based Medicine (EBM).
COURSE CODE : MED 183.
CREDIT HOURS : 3 CREDIT HOURS
SEQUENCE : YEAR 1
COURSE COORDINATOR: Dr. Abdulhakeem Okour
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Course Description:

This undergraduate course delineates the essential concepts of research and Evidence-Based Medicine (EBM), information mastery, and critical appraisal of the medical literature. It is intended for first-year medical students as an introduction to research concepts and builds up skills to be familiar with research design, analysis, interpretations of results, and applications in medical practice and science in both the medical and public health fields.

يحدد هذا المساق الجامعي المفاهيم الأساسية للبحث والطب المبني على الأدلة (EBM)، وإتقان المعلومات، والتقييم النقدي للأدبيات الطبية. وهي مخصصة لطلاب الطب في السنة الأولى كمقدمة لمفاهيم البحث وتبني مهارات للتعرف على تصميم البحث والتحليل وتفسير النتائج والتطبيقات في الممارسة الطبية والعلوم في كل من المجالات الطبية ومجالات الصحة العامة.

Course Learning Outcomes

1. Orient students with basic concepts of statistics, measurements, screening, and research.
2. Increase students' awareness about roles of scientific data in evidence-based medicine.
3. Provide students with skills needed to use medical library and trusted online search engines to find high quality scientific articles.
4. Provide students with sound knowledge about different research designs and their use.
5. Assist students in distinguishing the most appropriate study design based on available information and study conditions.
6. Enhance students' ability in evaluating the level of evidence in medical literature for a proposed cause – effect relationship.
7. Enhance students' ability in evaluating the validity and applicability of available literature in clinical practice.

Recommended Textbook:

Epidemiology: An introduction, Rothman, KJ. Oxford University Press, NY. 2012, 2nd edition (newer versions are also accepted)

Learning Objectives

(A) Lectures objectives

1	Introduction to research in health sciences	<ol style="list-style-type: none"> 1. Understand the concept of research and its importance. 2. Understand aims of conducting research, steps of conducting a study and the difference between good studies and poor studies
2	Introduction to Biostatistics:	<ol style="list-style-type: none"> 1. Define the concept of biostatistics and its importance in conducting research. 2. Describe applications of biostatistics with examples in the medical field and other fields. 3. Know how does a biostatistician work with physicians and other scientists?
3	Basic concepts in Biostatistics:	<ol style="list-style-type: none"> 1. Understand data and measurements: definitions, tools to collect. 2. Know types of scientific data: discrete, dichotomous, continuous, nominal, ordinal, interval, ratio. 3. Define concepts of sample, population, variables, and variability. 4. Know types of variables in general and variables in a study (i.e. independent, dependent)
4	Data	<ol style="list-style-type: none"> 1. Describe how to represent data with different types of distributions: normal, binomial. 2. Know the concepts of sample size, missing data, outliers and how missing data and outliers affect our results
5	Measures of centrality and dispersion	<ol style="list-style-type: none"> 1. Apply measures of tendency and to compute them: Mean, Median, Mode. 2. Apply measures of variability and their relation to sample size and measurement precision: variance, standard deviation, coefficient of variation, range.
6	Probability and Screening	<ol style="list-style-type: none"> 1. Identify and use appropriate rule of probability for a dataset: additive, multiplicative, binomial expansion. 2. Comprehend conditional probability and the use of screening tests in medical studies: sensitivity, specificity, PPV, NPV
7	Hypothesis testing	<ol style="list-style-type: none"> 1. State a null hypothesis for a proposed treatment and be able to interpret the results of rejecting or not rejecting a null. 2. Describe type 1 and 2 errors 3. Describe levels of significance and critical values 4. Interpret p - values
8	Epidemiology and Medicine	<ol style="list-style-type: none"> 1. Define concepts of epidemiology, an epidemiologist, and disease occurrence. 2. Know the emergence of epidemiology and applications of epidemiology 3. Understand why epidemiology is essential in medicine

9	Epidemiological Measures of Disease Occurrence	<ol style="list-style-type: none"> 1. Apply epidemiological measures of disease occurrence 2. Know the use of disease occurrence measures 3. Compute prevalence and incidence
10	Contrast Measures	<ol style="list-style-type: none"> 1. Compute differences, ratios, attributable proportions, 2x2 tables, and measures of associations.
11	Research Design	<ol style="list-style-type: none"> 1. Recognize different study 2. Know how to design a study 3. Describe components of a research design: problem, hypothesis, questions, variables, methods, analysis.
12	Experimental Study Designs	<ol style="list-style-type: none"> 1. Know what and why randomized clinical trials (RCTs) are the gold standard. 2. Recognize the advantages and disadvantages of RCTs 3. Know other experimental designs
13	Cohort Studies and Case-Control:	<ol style="list-style-type: none"> 1. Describe of each study design 2. Know the advantages and disadvantages of each design
14	Cross-Sectional and Case reports:	<ol style="list-style-type: none"> 1. Describe of each study design 2. Know the advantages and disadvantages of each design
15	Introduction on EBM	<ol style="list-style-type: none"> 1. Know what is evidence-based medicine (EBM)? 2. Understand the rationale for an evidence-based approach to clinical practice 3. Weight the evidence of studies: quantitative and qualitative and rank studies: Systematic reviews, RCT, Cohort, etc.
16	Medical Journal articles and credible websites	<ol style="list-style-type: none"> 1. Understand the importance of using reputable journals for evidence 2. Know how to recognize trusted and high-ranking journals 3. Know how to use JUST-library website and other reputable sources such as PubMed for extraction of medical research. 4. Comprehend the importance of reading articles in developing a career.
17	Reading Articles	<ol style="list-style-type: none"> 1. Describe the components of articles: Introduction, Methods, Results, Discussion, Conclusions. 2. Know how to critically read an article?

Course Assessment

Assessment		
Assessment Type	Expected Due Date	Weight
First Exam (Theory)		30
Second Exam (Theory)		30
Final Exam (Theory)		40
Total		100

Students Learning Outcomes

Student Learning Outcomes(SLOs) (4-8 Maximum) Upon successful completion of this course, students should be able to:			
SLOs	Related ILO(s)* (numbers only)	Evaluation Criteria (MCQ, OSCE, Homework...)	
		Type of Criteria (MCQ, OSCE, Homework...)	Weight (%)
1. To be able to effectively browse creditable medical journals and reliable sources of medical information.	1,3,4	MCQ	25
2. To critically appraise and appreciate research studies.	1,6,7	MCQ	25
3. To understand how medical literature influences and enables public policy in healthcare	2,5	MCQ	25
4. To be able to appreciate best healthcare choices based on the best available evidence.	1,5	MCQ	25
			100

Intended Learning Outcomes (ILOs)

1. Ability to distinguish between good and poor-quality studies.
2. Comprehend the importance of evidence-based medicine in improving the quality of health care.
3. Read research article in a scientific and professional way.
4. Use reputable scientific online libraries and journals.
5. Apply the best practice based on evidence-based medicine
6. Recognize, select and apply the best study design in research and community projects.
7. Understand and interpret the basic statistical concepts in a study.