**Course Outline**

* **Course Details**

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| Course Title | Scientific Research for Clinical Medicine |
| Course Number | 7000401 |
| Academic Year | 2019-2020 |
| Term | First Semester |
| Prerequisite(s) | Epidemiology (7106201)Biostatistics (7106101) |
| Course Type: Compulsory / Elective… etc. | Compulsory |
| Credit Hours | 2 CHs |

* **Instructor Information**

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| Instructor Name | Dr. Zaher Nazzal |
| Office | Building# 17 office 2110 |
| Email Address | znazzal@najah.edu |

* **Class Details**

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| --- | --- |
| Days | Thursday |
| Time | 12-14pm |
| Class Room | 17G0060 |

* **Course Description and Objectives**

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| This course presents the steps of research process including research problem, review of literature, clarifying research designs, population and sampling, measurement, data collection and data analysis. Ethical issues will be considered related to the development and application of research. The emphasis is on the practical ways of conducting clinical and health research. Students will Practice to write a study proposal.The aim of this course is to provide training in the essential skills of preparing for, conducting and communicating research in the biomedical sciences. This course will assist students in the preparation of their dissertation |

* **Intended Learning Outcome (ILO’s)**

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| **A- Knowledge and understanding**A.1 Define quantitative and qualitative researchA.2 Recognize the importance of research in developing evidence-based practice. A.3 Describe the steps of research processA.4 Recognize the purpose and process of a literature review. A.5 Specify Sampling Designs A.6 Design a Data Collection PlanA.7 Identify the methods of Analyzing Quantitative dataA.8 Explain styles of referencing**B- Intellectual skills**B.1 Formulate potential research questions, objectives and hypotheses. B.2 Compare research methodology and research process in qualitative and quantitative StudiesB.3 Debatethe ethical issues related to conducting a research studyB.4 Choose the appropriate methods to conduct a study B.5 Identify the appropriate test needed to analyze the resultsB.6 Contextualize the findings and results**C- Professional and practical skills**C.1 Design a conceptual framework for a given research title. C.2 Design a research proposal by following the recommended format.C.3 Design a questionnaire by applying the appropriate methods. C.4 Analyze data using the appropriate tests using a statistical program.C.5 Practice referencing citation using the Endnote program**D- General and transferable skills**D.1 Case study based learningD.2 Self learningD.3 Time managementD.4 Work in team |

* **Textbook(s) and References**

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|  | **Textbook(s)** |
| 1. Stephen B. ***Designing clinical research***, 3rd ED. (The main reference)
2. Leon Gordis: **Epidemiology**,*5th edition,*Elsevier 2014
 |  |  |
|  | **References** |
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* **Topics Covered / Weekly Lecture Schedule**

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| **Week** | **Topics** |
| 1 | **Introduction:**In this week, the following sub-topics would be discussed: * Introduction to clinical research
* A brief narration of history of clinical research
* Types of research
* General objectives of research
* Components of a research study
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| 2 | **Research questions and hypotheses testing:**In this week, the following sub-topics would be discussed: * Problem statement: sources, criteria for selecting a researchable problem, criteria for a good problem statement, formulation of a problem statement
* Research questions
* Aims and objectives
* Hypotheses & Hypotheses testing (Type 1 & 2 errors)
* Answering research questions
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| 3 | **Literature review:**Training on using search engines, databases and conducting the Literature review. In this week, training will involve how to do a search using proper keywords, finding information and extracting a full text from the following databases and search engines: * Pubmed, Google scholar, Scopus, Web of knowledge, Hinari,..etc
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| 4 | **Citations and reference styles****Training on Endnote as a reference manager:**Students will be divided into groups and each group will be asked to select a research topic. Students will use the practical skills acquired at this stage and to be acquired later during the course to continuously improve the final research proposal due before the end of this course. At this stage, students should be ready to formulate problem statements, pose research questions, put aims and objectives and formulate hypotheses.  Using Endnote, students will learn how to: * Create a new library
* Connect to a proper database
* Find references using different search options
* Insert citations
* Change citation and reference styles
* Import or export citations
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| 5 | **Ethical issues, IRB and originality:**In this week, * Ethical issues in research will be discussed
* The principle of originality and the software options used to check for plagiarism and originality

Students will be trained to fill out an IRB application  |
| 6 | **Study designs and research errors:**In this weeks, the different study designs would be discussed, in addition to * Inclusion and exclusion criteria
* Bias

**Measures of association** (RR, OR, & correlation coefficient) |
| 7 | **Study variables and scales of measurement** In this week, the different types of variables (measures) would be discussed |
| 8 | **Midterm exam:**  30% |
| 9 | **Data collection methods and designing a questionnaire:*** Data collection methods
* Selecting items and designing a questionnaire
* The Concept of ***Validity*** (Accuracy) & ***Reliability*** (Precision)
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| 10 | Critical Appraisal and evaluating literature |
| 11 | **Sampling methods, sample size and power:*** Various sampling methods
* Calculation of sample size for different types of studies

Introduction to various samples size calculation formulas and software or online calculators |
| 12-14 | **Statistical analysis using SPSS:*** Getting to know SPSS- Preparing the data file
* Preliminary analyses- Descriptive statistics
* Categorical variables and Continuous variables
* Assessing normality
* Manipulating the data
* Checking the reliability of a scale

Statistical techniques to explore relationships among variables* Correlation

Statistical techniques to compare groupsParametric statistics* Independent-samples t-test
* Paired-samples t-test
* One-way analysis of variance
* One-way between-groups ANOVA with post-hoc tests

Non-parametric statistics* Chi-square
* Mann-Whitney U Test
* Kruskal-Wallis Test
* Spearman’s Rank Order Correlation
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| 15 | Presentation of the proposals  |
| 16 | **Final Exam 45 %** |

* **Assessment Measures and Methods of Evaluation**

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| **Tool** | **%** |
| Midterm Exam  | 30% |
| Final Exam | 45% |
| Proposal Writing | 15% |
| In-class activities and Homeworks | 10% |
| **Total** | **100** |

* **Important Dates**

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| **Week 8**: Midterm exam **Week 16**: Final exam |

* **Content-ILOs matrix**

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| Content | **ILOS** |
| Knowledgeandunderstanding | IntellectualSkills | Professionalandpractical skills | General andTransferableskills |
| * **Introduction to research methods**
 | A1, A2 | B2 | C1, C2 |  |
| * **Research questions and hypotheses testing:**
 | A3 | B1, | C1, C2, C3 | D1 |
| * **Literature review**
 | A4, |  | C2 | D2 |
| * **Citations and reference styles**
 | A4, A8 |  | C2, C5 | D2, D3 |
| * **Ethical issues, IRB and originality**
 | A2,  | B3,  | C2 |  |
| * **Study designs and research errors**
 | A1, A3 | B2, b4 | C2, C3 | D1, D3 |
| * **Sampling methods, sample size and power**
 | A3, A5 | B4 | C4 | D1 |
| * **Statistical analysis using SPSS**
 | A7 | B5, B6 | C4 | D1 |
| * **Proposal writing**
 | A1-A8 | 81-B6 | C1-C5 | D1, D2, D3 |

* **Teaching Learning Methods**

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| **Tool** | **purpose** | **ILOs** |
| * Lectures
 | * Explain the theoretical knowledge for each topic
* Provide  information  successfully  communicates the idea or information for which it is designed
 | A1-A8 |
| * Group discussion
 | * Encourage active learning
* Increase the students' enjoyment of the topic and hence their desire to learn
 | B1-B6D1-D4 |
| * Practical computing sessions
 | * Provide an opportunity for the development of key skills in processing & analyzing the data
 | B5, C4, C5D1, D3, D4 |
| * Article analysis
 | * Provide an opportunity for the development of key skills such as communication, group working and problem solving
 | B1-B6C1, C2, C4D1-D4 |
| * Assignment
 | * Practice skills & to test oneself on whether the material makes sense
* Developing skills & knowledge in students
 | B1-B6C1-C6D1-D4 |

* **Teaching resources**

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| * White board
* One lecture hall
* LCD
* Computer
 | * Moodle
* Endnote software
* SPSS software
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**Course Policies**

* Attendance: attendance of all sessions is required. If a class is missed for any reason, it is the student’s responsibility to cover the material and obtain any information she/he might have missed from other students. Student must attend at least 75 % of the lectures
* Students should turn mobile phones off and refrain from doing work for other courses and excessive talking.
* Punctuality: class will begin on time; students are required to be in the classroom by the time the session begins. Recurring lateness will not be tolerated