**Scientific Research of Biomedical Science**

**Intended Learning Outcomes**

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| Course Code | 70004080. |
| Course Title | Scientific Research of Biomedical Science |
| Course Instructor/s | DrAidahAlkaissiDr. EmanAlshawishand Dr. ImadThultheen |
| Prerequisites | * Epidemiology
* Introduction to Biostatistics
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| Duration of Course | 16 weeks |
| **Course Description** |
| This course presents the steps of quantitative and qualitative research process including research problem, review of literature, clarifying research designs, population and samples, measurement, data collection and data analysis. The student will consider the ethical concerns related to the development and application of research. The emphasis is ona practical way ofclinical research.StudentswillPracticeto write astudyproposal |
| **Aim** |
| 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 Outcomes (ILOs)** |
| On completion of this course, student should be able to: **A.Knowledge and understanding**A.1 Define quantitative and qualitative researchA.2 Recognize the importance of research in developing an evidence-based practice for the profession. A.3 Describe the steps of the quantitative & qualitative research processA.4 Recognize the purpose and process of a literature review. A.5 Depict Ethical ResearchA.6 Classify Quantitative research design A.7 Describe Qualitative Research Approaches (phenomenology, phenomenography, ground theory)A.8 Specify Sampling DesignsA.9 Design a Data Collection PlanA.10 Express the aspects of reliability and validityA.11 Identify the methods of Analyzing Quantitative dataA.13 Explain styles of referencingA.14 Describe the basic guidelines that direct the conduct of a research critique **B- Intellectual skills**B.1 Formulate potential research objectives, questions, and hypotheses. B.2 compare research methodology and research process in qualitative and quantitative StudiesB.3 debatethe ethical issues related to conducting a research study B.4 analyse different types of sampling techniquesB.5 use library resources and bibliographic aids for the preparation of literature review**C- Professional skills**C.1 apply the steps of the quantitative research process in a research articleC.2 devise the different types of quantitative research reports: experimental and non-experimental C. design a consent process in a research projectC.4 write proposal on research topicC.5 communicate the research proposal orallyD. **General and transferable skills**D.1 case study based learningD.2 self learningD.3 Time managementD.4 work in team |
| **Learning/ Teaching Methods** |
| ***Methods*** | ***Purpose*** | ***ILOs*** |
| * Lectures
 | - Explain the theoretical knowledge for each topic- Provide  information  successfully  communicates the idea or information for which it isdesigned | A1,A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A12, A13 |
| * Group discussion
 | Encourage active learningIncrease the students' enjoyment of the topic and hence their desire to learn | A4, A6, A7, A11, A13, B1,B2, B3, B44, B5, C2, D4 |
| * Students Presentation
 | Explain the practical knowledge for each topicAllow the application of theoretical concepts to be demonstrated, thus bridging the gap between theory and practice | B14, C5 |
| * Practical computing sessions
 | Provide an opportunity for the development of key skills in processing &analysing the data | A11, A12, A4, B5 |
| * Article analysis
 | -Provide an opportunity for the development of key skills such as communication, group working and problem solving | A5, A6, A11, A13, B3, B4, C2, D1 |
| * Assignment
 | Practice skills & to test oneself on whether the material makes senseDeveloping skills & knowledge in students | C1, C3, C4, D2, D3 |
| **Assessment** |
| * Formative Assessment:
* Research Presentation
* Feedback
* Self-assessment
* Summative assessment:

**Points Needed for Grade/Grade Scale/*** Midterm Exam : 20 points
* Proposal: 30
* Final exam- 40 points
* Total 100 points
* *Proposal –* students will develop detailed familiarity with the application of one methodology to a particular research issue within biomedical science through reading the research literature.
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| **Course Polices** |
| * 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. Additionally, students should turn mobile phones off and refrain from doing work for other courses and excessive talking.
* Punctuality: class will begin at 8am; students are required to be in the classroom by the time the session begins. Recurring lateness will not be tolerated
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| **Course Content** |
| ILOs | WEEK | Content |
| A.1, A.2, B.3, B.5, A.4,C3 | Week 1& 2 | * Introduction to Research Science
* Review of research concepts and uses in the context of Biomedical science
* Basic research skills:
* Bibliographic skills (2 sessions)
* Ethics in health research
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| A3, A.4, C.1, C.6 | Week 3 | * Steps in writing a research proposal
* Principles and guidelines
* Checklist of elements
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| B.1, B2, A1, A3 | Week 4 | * Formulation of a topic
* Defining a research problem based on the interest of students
* Defining and refining the research question
* Assignment 1
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| B.1, B2, A3 | Week 5 | * Study objectives
* Generating hypothesis
* Stating Research Question
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| A4 | Week 5 | Reviewing the literature |
| A.3, A.5, A6 | Week 6 | * Types of research methods and its uses in biomedical science
* Non experimental research ( types, uses and applications)
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| A.5,C.2, A6 | Week 7 | * Experimental research (types, uses and applications
* Assignment 2
 |
| A.1, A.4 , A7, A.10 | Week 8 | * Qualitative research methodologies (phenomenology, Phenomenography, grounded theory)
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| A.8, B.4 | Week 9 | * Study population vs Study sample
* Sampling methodologies and its implications in health research
* Sample size
* Assignment 3
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| A.8 | Week 10 | * Study variables (types of variables)
* Validity and reliability if measurement
* Assignment 4
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| A.9 | Week 11 | * Data collection Tools
* Questionnaire
* Interview
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| A.11, A.12 | Week 12 | * Principles of Data Analysis and Presentation
* Assignment 5
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| C.4, C.5 | Week 13 | * Pre-testing the methodology
* Work plan
* Budget
* Plan for administration, monitoring and utilization of results
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| A13, C.4, C5 | Week 14 | * Presentation of Students Proposals
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| A13, C.4, C5 | Week 15 | * Presentation of Students Proposals
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|  | Week 16 | Final Exam |
| **Assignments** |
| ***Assignment 1*** | Prepare a 2 page paper on a specific research problem following the prepared guidelines |
| ***Assignment 2*** | Describe in 2-3 pages the research design that you will use in your study and why this design is more appropriate than other designs |
| ***Assignment 3*** | Prepare a description of the target population and sampling techniques that you will use in the study |
| ***Assignment 4*** | prepare the set of independent and dependent variables that you will need to measure in you study including the validity and reliability threats that can influence your study |
| ***Assignment 5*** | Write one page describing the methods of data analysis including your analysis plan. |
| **References** |
| **Text book**1. Denise F Polite, Cheryl tatanoBec. Nursing ***research, Principles and methods***. Lippincott williams& Wilkin. Seventh Edition. ISBN: 0-7817-3733-8.
2. Stephen B. ***Designing clinical research***, 3rd ED.

**Recommended References**1. WHO-EMRO. ***A Practical Guide For Health Researchers***. Cairo 2004
2. Varkevisser C, Pathmanathan I, lee A. ***Designing and Conducting Health Systems Research Projects*** Volume I. WHO regional office for Africa. 2003
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