

BMED 3121 – Independent Research I (Sophomore Fall) – RESEARCH PRINCIPLES & ETHICS

Topics

- The importance of research
- Introduction to the scientific method and evidence-based medicine
- Introduction to different types of research
 - Basic/fundamental vs.applied research
 - Qualitative vs quantitative basic clinical research
 - Community based research, inter-professional based research
- The importance of ethics in research
- UTRGV Research Compliance procedures
 - IRB
 - IACUC
 - IBC
- The importance of record keeping/lab notebook
- CITI training
 - Responsible Conduct of Research
 - Basic Course, Human Subjects Protection
- Reading assignment (book) – “The Immortal Life of Henrietta Lacks”

Example of Assessment

- Attendance and class participation – 25%
- In-class activity/Team Based Learning (TBL) – 25%
- Individual reflective essay of book – 20%
- Individual written review dissecting an assigned journal article based on topics from this course – 30%

Student Learning Objectives/Outcomes

- 5A: Describe the basic principles of scientific method including common research approaches, methods and designs.
- Describe the principles of ethics in research and how these principles should be applied in the design and conduct of scientific research
- 7A: Use information technology for gathering and processing biomedical or scientific information; managing information; and assimilating evidence from scientific studies.
- 9.A: Demonstrate a desire to help others and sensitivity to others’ needs and feelings.
- 9.B: Demonstrate knowledge of socio-cultural factors that affect interaction and behaviors; multiple dimensions of diversity; strategies for interacting effectively with people from diverse backgrounds.
- 9.C: Demonstrate ability to work collaboratively with others to achieve shared goals.
- 10.A: Behave in an honest and ethical manner; cultivate personal and academic integrity and adhere to ethical principles and follow rules and procedures.
- 10.B: Consistently fulfill obligations in a timely and satisfactory manner; take responsibility for personal actions and performance
- 10.C: Set goals for continuous improvement and for learning new concepts and skills; solicit and respond appropriately to feedback
- 10.D: Appropriately utilize campus, community, and other resources to help one succeed in the university setting, including progressive awareness of how and when to seek academic assistance or other professional support.

BMED Independent Research Courses

- 11A: Effectively and confidently convey information to others through powerful written communication in academic, professional and informal communication settings
- 11.B: Analyze and interpret a variety of text and other media, using a range of theoretical approaches and disciplinary modes of inquiry
- 12.A: Effectively and confidently convey information to others through oral communication in academic, professional and informal communication settings.

***At end of semester, students' written reports are to be submitted to the department by instructors. Students will not be permitted to register in next IR level unless the written report from previous IR is documented by the department.**

BMED 3122 – Independent Research II (Sophomore Spring) – RESEARCH METHODS

Topics

- Elements of designing a research project
 - Background research
 - Identifying a gap
 - Hypothesis and research question
 - Objectives and specific aims
 - Establishing a framework/research design to answer the research question
- Components of Research design
 - Different types of research (human subject, animal, cell)
 - Cross sectional vs. longitudinal studies
 - Population vs. Sample
 - Independent vs. dependent variables
 - Selecting appropriate method(s) to conduct the study
- How to perform literature review
 - Search engines/Databases (Pubmed, Google scholar)
 - How to cite references (In-text citation, Bibliography, Endnote)
 - How to use the references to identify a gap and support your work
- How to analyze data and draw conclusions
 - How to use Excel to prepare different types of graphs
 - Basic statistics (such as T-test and Anova and Tukey HSD)
 - Discussion and drawing conclusions from the data obtained
- Critiquing/dissecting journal article
 - 1st time (example) – instructor assigns the same journal article to all of the students and implements a quiz at the beginning of the class to make sure the students read the journal article (or any other method to accomplish this). The instructor can demonstrate how to dissect/critique the paper in class with the students participating in the dissecting process. If needed, instructor can do this more than once.
 - 2nd time (assignment) – instructor assigns different articles to each student for the written assignment

Example of Assessment

- Attendance and class participation – 25%
- In-class activity/Team Based Learning (TBL) – 25%
- Individual written review dissecting an assigned journal article based on topics from this course – 50%

Student Learning Objectives/Outcomes

- 5A: Describe the basic principles of scientific method including common research approaches, methods and designs.
- 5B: Review and evaluate prior research and related literature, and defend a rationale for which sources should be referenced.
- 5C: Identify and develop biomedical science questions as they emerge in case-based, lab and clinical activities and identify and apply relevant evidence to answer those questions.
- 6B: Utilize mathematical, algorithmic, statistical, and logic tools to explain causes and effects and to solve problems.

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- 6D: Identify the bias, limitations and pitfalls of biomedical research and be able to take these into account when drawing conclusions from a given research study.
- 7A: Use information technology for gathering and processing biomedical or scientific information; managing information; and assimilating evidence from scientific studies.
- 9.A: Demonstrate a desire to help others and sensitivity to others' needs and feelings.
- 9.B: Demonstrate knowledge of socio-cultural factors that affect interaction and behaviors; multiple dimensions of diversity; strategies for interacting effectively with people from diverse backgrounds.
- 9.C: Demonstrate ability to work collaboratively with others to achieve shared goals.
- 10.A: Behave in an honest and ethical manner; cultivate personal and academic integrity and adhere to ethical principles and follow rules and procedures.
- 10.B: Consistently fulfill obligations in a timely and satisfactory manner; take responsibility for personal actions and performance
- 10.C: Set goals for continuous improvement and for learning new concepts and skills; solicit and respond appropriately to feedback
- 10.D: Appropriately utilize campus, community, and other resources to help one succeed in the university setting, including progressive awareness of how and when to seek academic assistance or other professional support.
- 11A: Effectively and confidently convey information to others through powerful written communication in academic, professional and informal communication settings
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BMED 3223 – Independent Research III (Junior Fall) – RESEARCH PROJECT I

Topics

- Prepare a research proposal
- Execute project and analyze data
- Prepare and present a poster or powerpoint presentation to disseminate the data
- Prepare a written report (journal article format)
- Critiquing/dissecting journal articles

Example of Assessment

- Team proposal (written and/or presentation) – 20%
- Team report (written and/or presentation) – 30%
- Individual written review dissecting journal articles used by their group in the proposal/report (each student will be responsible for different journal articles that were used) – 50%

Student Learning Objectives/Outcomes

- 5A: Describe the basic principles of scientific method including common research approaches, methods and designs.
- 5B: Review and evaluate prior research and related literature, and defend a rationale for which sources should be referenced.
- 5C: Identify and develop biomedical science questions as they emerge in case-based, lab and clinical activities and identify and apply relevant evidence to answer those questions.
- 5D: Engage in scholarly inquiry, and contribute to the discovery and dissemination of biomedical knowledge.
- 6B: Utilize mathematical, algorithmic, statistical, and logic tools to explain causes and effects and to solve problems.
- 6D: Identify the bias, limitations and pitfalls of biomedical research and be able to take these into account when drawing conclusions from a given research study.
- 7A: Use information technology for gathering and processing biomedical or scientific information; managing information; and assimilating evidence from scientific studies.
- 7B: Identify and appraise sources of scientific and biomedical information, assimilate evidence from the literature and apply that evidence to the resolution of knowledge gaps.
- 9.A: Demonstrate a desire to help others and sensitivity to others' needs and feelings.
- 9.B: Demonstrate knowledge of socio-cultural factors that affect interaction and behaviors; multiple dimensions of diversity; strategies for interacting effectively with people from diverse backgrounds.
- 9.C: Demonstrate ability to work collaboratively with others to achieve shared goals.
- 10.A: Behave in an honest and ethical manner; cultivate personal and academic integrity and adhere to ethical principles and follow rules and procedures.
- 10.B: Consistently fulfill obligations in a timely and satisfactory manner; take responsibility for personal actions and performance
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BMED Independent Research Courses

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*** Instructors in BMED 3223 and BMED 3224 have to clear student proposals with chair, if funds are being requested for research project. There is no guarantee on availability of funds, but if proposals are very good, all effort will be made to try to support them, especially for projects involving lab research.**

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BMED 3224 – Independent Research IV (Junior Spring) – RESEARCH PROJECT II

Topics

- Prepare a research proposal
- Execute project and analyze data
- Prepare and present a poster or powerpoint presentation to disseminate the data
- Prepare a written report (journal article format)
- Critiquing/dissecting journal articles

Example of Assessment

- Team proposal (written and/or presentation) – 20%
- Team report (written and/or presentation) – 30%
- Individual written review dissecting journal articles used by their group in the proposal/report (each student will be responsible for different journal articles that were used) – 50%

Student Learning Objectives/Outcomes

- 5A: Describe the basic principles of scientific method including common research approaches, methods and designs.
- 5B: Review and evaluate prior research and related literature, and defend a rationale for which sources should be referenced.
- 5C: Identify and develop biomedical science questions as they emerge in case-based, lab and clinical activities and identify and apply relevant evidence to answer those questions.
- 5D: Engage in scholarly inquiry, and contribute to the discovery and dissemination of biomedical knowledge.
- 6B: Utilize mathematical, algorithmic, statistical, and logic tools to explain causes and effects and to solve problems.
- 6D: Identify the bias, limitations and pitfalls of biomedical research and be able to take these into account when drawing conclusions from a given research study.
- 7A: Use information technology for gathering and processing biomedical or scientific information; managing information; and assimilating evidence from scientific studies.
- 7B: Identify and appraise sources of scientific and biomedical information, assimilate evidence from the literature and apply that evidence to the resolution of knowledge gaps.
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