Undergraduate Research Course Redesign Project Narrative

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Project Title

Course Redesign for Biomedical Research Centered Learning Experience

Project Summary

My Undergraduate Genetics course (BIOL 3402) is one of the most challenging courses in the Department of Biological and Health Sciences. This is a required course and is offered during Fall, Spring and Summer II. The average student enrollment per regular semester for past 2 years is 71. This course mainly serves sophomore and junior students in biology, biomedical, pre-med, pre-pharmacy, pre-dental, physical education, animal science and wildlife programs. My ultimate objective for the course redesign is to increase students' research learning experience within the classroom and to help students prepare for further studies in graduate or professional school, or for careers in the biomedical research and teaching fields. Each student is supposed to develop a research proposal that focuses on the genetic technologies that are used in the modern biomedical laboratories. Each proposal is also peer-reviewed and revised based on the reviewers' comments.

Methodology

Each student develop a research proposal regarding the recombinant DNA technologies and tumor suppressor gene cloning strategies in a small group setting during the course's recitation sessions. Students choose their own research topics with the guidelines provided by the instructor. Each proposal is peer-reviewed, revised based on the reviewers' comments and submitted as a final research proposal for evaluation.

Student-Learning Outcomes

Students have the opportunity to master the modern concepts of biomedical genetics, including

- Develop cloning strategies for gene delivery and protein purification
- Analyze genetic data from the research articles published in scientific journals

- Master the concepts of technologies including restriction enzyme digestion, polymerase chain reaction, recombinant DNA cloning, protein purification and immunoblotting that are frequently used in modern biomedical research
- Design their own experiment protocols for successful gene cloning, protein purification and functional analyses