B.S. in Biology

Learning Outcomes

1. Mastery of the basic principles underlying modern Biology (Departmental Goal): 
   A student can describe, both orally and in writing (Learning Outcomes):
   - the roles and contributions of organ systems to homeostasis.
   - why statistics are necessary for the understanding of scientific information.
   - how genetic information is encoded, decoded, mutated and transmitted.
   - a general overview of the scientific method.
   - the general physical organization of cells and their contribution to the growth and development of multicellular organisms.
   - the basic structure and roles of macromolecules in cellular processes.
   - basic mechanisms by which organisms use and convert energy.
   - different examples of the ways in which organisms interact with each other and their environment.
   - the way in which evolutionary processes underlie the changing pattern of organisms over time.

2. Understanding of the diversity of fields and approaches within Biology and an appreciation of how Biology relates to other fields (Departmental Goal): 
   A student can discuss and describe (Learning Outcomes):
   - some of the current areas in which modern science intersects with issues of ethics, religion or philosophy.
   - some of the various disciplines within Biology, and the types of methodologies used in these disciplines.
   - how various other scientific disciplines such as chemistry and physics have an impact on our understanding of biological principles.
   - how interdisciplinary fields such as biophysics, biochemistry, biostatistics, etc. rely on the development and integration of different fields.

3. Gaining an ability to understand the scientific process and to critically analyze information scientifically (Departmental Goal). 
   A student can (Learning Outcomes):
   - discuss and critically analyze aspects of a research seminar, poster presentation, and/or published research journal article.
   - describe the component steps of the experimental process.
   - design and implement basic experimental protocols, relate the experiments to underlying assumptions and hypotheses, and describe the necessary experimental controls.
   - explain and defend the scientific approach as a valid form of inquiry.
   - use statistical analysis (where appropriate) to interpret the significance and validity of research data.

4. Gaining an ability to articulately communicate scientific information, in both written and oral forms (Departmental Goal).

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A student can (Learning Outcomes):
- present a coherent and well-organized oral presentation or written report that describes the objectives, methodologies, experimental results and interpretations of a research investigation.
- develop and write a review paper on a particular scientific topic.
- explain the structure of a scientific paper and explain which parts of a scientific paper contain which specific types of information.
- develop lab report, papers, or oral presentations that use scientific terminology articulately - using it accurately, precisely, and in the appropriate context.

5. Having the curricular foundation and working knowledge of laboratory and/or field skills necessary for entrance into professional and graduate programs.
A student can (Learning Outcomes):
- have competencies to score competitively on the Biology portions of national pre-professional tests (e.g. GRE, MCAT, DAT, etc.).
- have sufficient lab or field research competencies to be competitive for their desired career discipline.
- have sufficient lab or field experience to be able to outline or describe some basic principles of carrying out lab or field practice in their chosen area of study.