

## PHYSICAL SCIENCE (PHSC)

**101. Physical Science I.** Credit 3 hours. A survey course in selected topics of physics designed primarily for students majoring in a non-science degree. Course consists of three hours of lecture and demonstrations per week.

**102. Physical Science II.** Credit 3 hours. A survey course in the cultural and applied aspects of chemistry designed primarily for students majoring in a non-science degree. Credit cannot be given for both Physical Science 102 and Chemistry 109. Course consists of three hours of lecture and demonstrations per week.

**142. Elementary Physical Science.** Credit 4 hours. Prerequisites: Education major, in-service teacher, or permission of the Department Head. This course is designed to prepare prospective and in-service K-12 teachers to teach physical science as a process of inquiry. The curriculum focuses on core concepts of physics and chemistry, and students will actively engage in a process of hands-on investigation and discovery in a laboratory setting. The primary objective is to provide a student-centered, active-learning environment that promotes critical thinking, collaborative learning, and an understanding and appreciation of the processes of scientific investigations. Five hours of integrated lecture and laboratory per week.

**631. Computational Modeling in Physical Science.** Credit 3 hours. Prerequisites: PHYS 622 or CHEM 622. A course designed to address introductory level topics in physical science with high performance computational modeling. Three major themes will guide the course: helping students clearly understand the tools and techniques of computational science to better understand how they are used in both modern research and teaching; providing students with an opportunity to deepen their content knowledge in a manner very different than traditional education in physical science, and providing students with alternate strategies that enable them to more effectively teach conceptual topics in physical science. Numerical modeling, systems dynamics modeling, agent modeling, and molecular modeling software tools and techniques will be used for a variety of physics and chemistry topics.

**635. Curriculum Design for Physical Science.** Credit 3 hours. Prerequisites: PHYS 621/622 or CHEM 621/622 and PHSC 631. A graduate-level capstone course that explores the elements of research-based curriculum design and their application for physical science. The three themes of the course include: identifying the key elements of research-based curricula, investigating and evaluating the application of these elements in the existing pool of research-based curricula for physical science, and the application of these elements toward the creation of original lessons and curriculum units for physical science. Key elements that will be surveyed include how people learn, teaching for understanding, assessment and its role in “backwards design”, as well as the role of content standards, inquiry, nature of science, instructional models, technology, and various pedagogical structures (i.e. cooperative learning, questioning, science talk) in curriculum design.