

SCI - SCIENCE

SCI 105 Introduction to Nanotechnology

This course will cover the application of nanotechnology to electronic, chemical, and biological fields including a review of the basic science concepts. The impact of the commercialization of nanotechnology on society and the environment will be discussed. It is intended primarily for students in any of the various technology programs who will seek employment as laboratory technicians in research and industrial laboratories. Emphasis will be placed on providing a broad overview of the field.

Upon successful completion of this course, students should be able to:

Demonstrate an understanding of scientific notation and size relationships between nanometers and other metric measures.

Describe the societal impacts of nanotechnology on modern society.

List at least five biological applications of nanotechnology.

Find, using Internet research, five commercial applications of nanotechnology.

Describe the structures known as nanotubes and bucky balls, and one current application of each form.

Describe the application of nanotechnology in environmental and medical sensors to electronic monitoring.

Define key nanotechnology concepts such as "bottom-up", "self-assembly", and "molecular recognition".

Discuss instrumentation, such as SEM and STM, which is used at the nano level.

Hypothesize future applications of nanotechnology.

Prerequisite: Successful Placement Test Scores or (ENG 050 and REA 050) or ENG 099* or REA 075 (*may be taken concurrently).

3 Credits3 Weekly Lecture Hours

SCI 110 History of Science

This course, designed as a non-laboratory science option for non-science majors or as an open elective for Natural Science majors, traces the philosophical, cultural, intellectual, and technological developments that influenced the evolution of modern science. By examining these developments made over a span of two millennia, students in the course identify the people, places, ideas, and discoveries that led to fundamental shifts in worldviews resulting in changes in the way people obtain knowledge about, investigate, and understand the physical world. Specifically, the course explores the origin and influence of scientific methodologies by tracing the changing role of experimenters, their experiments, and the tools they used. In addition, students document the converging influences that resulted in the Scientific Renaissance and the Scientific Revolution. The course concludes by highlighting important scientific discoveries up to the present day and the continuing struggle between science and long-held misconceptions and beliefs.

Upon successful completion of this course, students should be able to:

Develop an answer to the question "What is science?", state the basic assumptions underlying modern science, and discuss the origins of these assumptions.

Define "scientific paradigm", describe its influence on the development of science, and outline the factors that result in a change of the scientific paradigm.

List the characteristics of a scientific methodology.

Understand the role politics, religion, and commerce played in the history of science.

Explain the difference between deductive and inductive arguments and their role in the study of the physical world, identify people who employed them, and give examples of each form.

Describe the approaches and contributions to science of Greek, Islamic, Chinese, Indian, and European thinkers and identify the people and places associated with these approaches and contributions.

Outline the changing role of experimentation in the history of science, the tools used in the experiments, and describe their influence on the origin of scientific methodology.

List examples and relate the significance of the people, places, ideas, and discoveries that were part of the Scientific Renaissance.

Describe the emergence of the Scientific Revolution from the Scientific Renaissance and provide examples of important scientific discoveries over the past three hundred years.

Identify current areas where scientific research is in conflict with popular beliefs and analyze a selected conflict by examining all arguments put forth in the context of the scientific method and the history of science.

Prerequisite: ENG 100.

3 Credits3 Weekly Lecture Hours

SCI 150 STEM Topics

STEM Topics is a 1-credit course designed to introduce students majoring in STEM fields to skills and topics of importance to Science, Technology, Engineering, and Mathematics. Presented by both Delaware County Community College faculty/staff and invited speakers, the weekly one-hour meetings include explorations of STEM-related transfer programs and careers, internet research methods, identification of primary research, research design, and technical writing and communication.

Upon successful completion of this course, students should be able to:

Use the internet as a research tool in STEM disciplines.

Evaluate internet sources for credibility and authority in STEM disciplines.

Differentiate between primary and secondary research in STEM disciplines.

Produce and present a research design to address a proposed hypothesis.

Identify potential STEM transfer programs based on students' interest areas.

Develop career goals in a chosen STEM field.

Prerequisite: Successful Placement Test Scores or (ENG 050 and REA 050) or ENG 099* or REA 075 (*may be taken concurrently).

1 Credit 1 Weekly Lecture Hour