MonarchTeach Introduces A Technology Education Licensure Option

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OLD DOMINION UNIVERSITY
IDEA FUSION

Evolution of Technology & Engineering Education in the United States

- Manual Training (1876-1904) - Calvin Woodward, The Manual Training School in St. Louis, MO and John Runkle, President of the Massachusetts Institute of Technology
- Industrial Arts (1904-1985) - William E. Warner founded AIAA (now ITEEA) in 1939 and presents "A Curriculum to Reflect Technology" in 1947
- Technology Education (1985-2010)
- Technology & Engineering Education (2010-present)

International Technology and Engineering Educators Association

The Many Definitions of Technology

	Technology Education	Science Education	Instructional Technology	Technical Education
Focus:	Study of the human designed world.	Study of the natural world.	The use of technology to facilitate teaching and learning.	Preparation for a specific occupation.
Attributes:	Based on *Standards for Technological Literacy* (ITEEA, 2007). Virginia's program has a dual purpose of focusing on technological literacy *and* providing a foundation for technical education. Referred to as *Design and Technology* in countries using the British educational model.	Based on *Next Generation Science Standards* (NGSS Lead States, 2013).	Content neutral. All disciplines utilize technology to enhance the learning process. Also known as *educational technology*.	Based on industry standards. Commonly associated with community colleges, trade schools, and apprenticeship programs. Virginia's secondary program is *Trade and Industry* (T & I). A significant factor in STEM education and employment (see Rothwell, 2013; Symonds, Schwartz, and Ferguson, 2011).

A Nationally Recognized, Standards-Based Program

The technology education program at Old Dominion University is based on *Standards for Technological Literacy: Content for the Study of Technology* (ITEEA, 2007). These standards were developed with support from the National Aeronautics and Space Administration (NASA) and the National Science Foundation (NSF) and are endorsed by the National Academy of Engineering.

The program is nationally recognized by the Council on Technology and Engineering Teacher Education (CTETE), an affiliate council of the International Technology and Engineering Educators Association (ITEEA).

Council on Technology and Engineering Teacher Education

NAEP TEL Assessment

Technological & engineering literacy is now being tested by NAEP with the first assessment results released May 17th, 2016. The Technology and Engineering Literacy Assessment, or TEL assessment, helps to measure whether students are able to apply technology and engineering skills to real-life.

Focus: Design-Based Learning

The technology education program at Old Dominion University uses authentic design challenges to develop student knowledge, capabilities, and ways of thinking and acting about technology.

References

International Technology & Engineering Educators Association (ITEEA). (2007). *Standards for Technological Literacy: Content for the Study of Technology.* (3rd Ed.). Reston, VA: Author.

National Center for Educational Statistics. (2016). Technology and engineering literacy assessment. Retrieved from http://nces.ed.gov/nationsreportcard/tel/

NGSS Lead States. (2013). *Next Generation Science Standards: For States, By States.* Washington, DC: The National Academies Press.

Pearson, G. & Young, A. T. (Editors). (2002). *Technically Speaking: Why all Americans Need to Know more about Technology.* Washington, DC: National Academies Press.

Rothwell, J. (2013). *The Hidden STEM Economy.* Washington, DC: The Brookings Institute.

William C. Symonds, Robert B. Schwartz & Ronald Ferguson, February 2011. *Pathways to Prosperity: Meeting the Challenge of Preparing Young Americans for the 21st Century.* Report issued by the Pathways to Prosperity Project, Harvard Graduate School of Education.

Content Coursework

CHEM 103. Introductory Chemistry. 3 Credits.
An introductory course designed to acquaint the student with the basic principles of chemistry.

BIOL 121N. General Biology I. 3 Credits. (Co-requisite: BIOL 122N lab. 1 credit)
An introduction to the process of science, biological molecules, cell biology, metabolism, molecular biology, and Mendelian genetics.

PHYS 111N. Introductory General Physics. 4 Credits.
Emphasizes mechanics, wave motion and heat and will also cover the needed elements of trigonometry and vectors (offered fall, spring, summer).

MET 120. Computer Aided Drafting. 3 Credits.
Computer based drafting methods are taught with a major emphasis on 'Hands On' practice using 2-D AutoCAD software in the computer lab, along with the various methods of editing, manipulation, visualization and presentation of technical drawings. This course includes the basic principles of engineering drawing/hand sketching, dimensioning and tolerancing.

STEM 110T. Technology and Your World. 3 Credits.
An overview of the resources and systems of technology. Emphasis is on impacts that technology has on individuals and their careers. Activities explore the evolution of technology, its major systems and their impacts.

STEM 221. Industrial Materials. 3 Credits.
A study of materials used by industry to produce products. Emphasis is on the study of ceramics, plastics, composites, and biotechnological materials. Students learn materials identification, use and processing.

STEM 231. Materials and Processes Technology. 3 Credits.
A study of the production processes used with metallic and forest product materials. Industrial resources, their location, extraction, and processing into standard stocks are also covered. Students learn properties, uses and processing of metal and wood materials.

STEM 241. Energy Systems: Basic Electricity. 3 Credits.
A study of direct and alternating current and its use in contemporary technology. Activities include experiments and projects to supplement the theory of electricity.

STEM 242. Technological Systems Control. 3 Credits.
Students will develop an understanding of systems control technology for application to energy and power, manufacturing, processing and transportation systems. Emphasis will be placed on research and development, creativity and experimentation, and trouble shooting in designing control systems.

STEM 251G. Computer Literacy: Communication and Information. 3 Credits.
A guided review of communication technology and information sources to help students discern between reliable and unreliable sources and techniques. Students develop skills in computer applications, information retrieval, filtering and analyzing data, and formatting and presenting information.

STEM 320. Manufacturing and Construction Technology. 3 Credits.
A study of production processes used in manufacturing and construction systems. Students will research and design manufactured products for mass production and constructed products for building. The social, cultural, environmental and economic impacts of manufacturing and constructed products on society are discussed.

STEM 330. Medical, Agricultural, and Biological Technologies. 3 Credits.
A course for technology education majors that studies technological systems related to medical and food processing technologies. Students learn the basis of these technologies and complete activities that integrate the content with processes and products found in our technological world.

STEM 350. Communication Technology Processes. 3 Credits.
The study of communication design principles and techniques for technology education. Emphasis is placed on the skills and equipment used in design, production, and distribution of communications. Print and electronic media are explored through technical illustration, video, audio, and other specialty processes of communications.

STEM 351. Communication Technology. 3 Credits.
A study of the development and impact of communication technology. Emphasis is placed on the integration of technical skills to produce information-based products in print and electronic media.

STEM 360. Energy, Power, and Transportation Technologies. 3 Credits.
Study of the development of energy, power, and transportation systems and the movement of energy, power, people, and cargo. Areas of concern include vehicle systems design and support systems.

STEM 370T. Technology and Society. 3 Credits.
A multidisciplinary course designed to provide insight into the fundamental, historical, and contemporary nature of technology as an area of human knowledge. Attention is given to the positive and negative aspects of technology and how they affect society. (This is a writing intensive course.)

STEM 382. Industrial Design. 3 Credits.
Students will analyze and design products representative of today's industrial technological society. Emphasis will be placed upon design methodology, aesthetic value, and design thinking.

SEPS 401/501. Foundations of Career and Technical Education. 3 Credits.
This course is designed to teach career and technical education majors to plan, develop, and administer a comprehensive program of career and technical education for high school students and adults. Students also develop an understanding of the historical and sociological foundations underlying the role, development and organization of public education in the United States.

SEPS 450/550. Assessment, Evaluation and Improvement. 3 Credits.
This course prepares training and educational professionals to plan for and conduct assessments to use in planning instructional programs, evaluate individual learning, monitor student progress, measure program effectiveness and efficiency, and evaluate the return on investments of training courses and programs.