

# TECHNOLOGY MANAGEMENT (TM)

**TM 4040 (s) Special Topics (1-16 credits, max 99)**  
Credit arranged.

**TM 4190 Industrial Sustainability Analysis (3 credits)**  
Cross-listed with INDT 4190  
Joint-listed with TM 5190

This course covers two practical topics, which are Sustainability Assessment (Topic 1) and Advanced Manufacturing (Topic 2). Topic 1 establishes the concept of sustainability, and sustainable design and manufacturing. Under this section, we introduce the intersection of sustainability and manufacturing through sustainable development, sustainability principles, and sustainable engineering. Topic 2 provides an overview of what Advanced Manufacturing (AM) is, what approaches are used, what the possible applications are, and what the limitations of the technology are. We focus on AM processes, principles, sustainability performance of AM, and sustainability assessment of AM at the macro and micro level. Students will complete one project including techno-economic and socio-environmental studies in the broad area of food-energy-water processes and systems.

**TM 4820 Project Engineering (3 credits)**  
Modern project engineering techniques for planning, scheduling, and controlling typical engineering and construction projects; linear programming and other optimization techniques as applied to resource allocation; microcomputer applications are emphasized and appropriate software used throughout the course.  
**Prereqs:** 'C' or better in STAT 2510, STAT 3010, or equivalent; and Senior standing; or Permission.

**TM 5000 Master's Research and Thesis (1-16 credits, max 99)**  
Credit arranged

**TM 5010 (s) Seminar (1-16 credits, max 99)**  
Credit arranged

**TM 5020 (s) Directed Study (1-16 credits, max 99)**  
Credit arranged

**TM 5040 (s) Special Topics (1-16 credits, max 99)**  
Credit arranged

**TM 5050 (s) Professional Development (1-16 credits, max 99)**  
Credit arranged

**TM 5100 Engineering and Technology Management Fundamentals (3 credits)**  
Cross-listed with EM 5100  
Fundamental principles of engineering and technology management addressing management theory applied to the technical environment; management processes and techniques; attitudes that facilitate the leadership role of the engineering manager in a technology-driven organization. Typically Offered: Varies.

**TM 5120 Fundamental Concepts of Nuclear Science (3 credits)**  
Fundamental concepts of nuclear science and engineering technologies: nuclear radiations (origin, detection & measurement, shielding & health physics), the chart of the nuclides, the neutron (life cycle, multiplication & criticality, cross sections, fission, activation), nuclear fuel cycles (fuels, reactors and waste streams), and basic reactor behavior. Typically Offered: Spring (Even Years).

**TM 5130 Nuclear Criticality Safety (3 credits)**  
Cross-listed with NE 535

Nuclear criticality safety including nuclear physics, fusion and neutron multiplication, moderation and reflection of neutrons, criticality issues in the fuel cycle, critical experiments and sub-critical limits, calculations of criticality, nuclear criticality safety practices, emergency procedures, and nuclear regulations and standards.

**Prereqs:** NE 4500 or Permission

**TM 5140 Nuclear Safety (3 credits)**  
Cross-listed with NE 5140

An in-depth technical study of safety issues within the nuclear fuel cycle and within various reactor types. Evaluation methods, system disturbances, safety criteria, containment, NRC licensing, and codes for safety analysis will be presented. Case studies of reactor accidents and corrective measures included.

**Prereqs:** Permission

**TM 5150 (s) Advanced Topics in Engineering Management (2-9 credits, max 9)**  
Advanced topics in Engineering Management and Technology Management.

**Prereqs:** Instructor Permission.

**TM 5160 Nuclear Rules and Regulations (3 credits)**  
Cross-listed with NE 5160

An in-depth examination of nuclear regulatory agencies; major nuclear legislation; current radiation protection standards and organizational responsibility for their implementation.

**Prereqs:** Permission

**TM 5170 Critical Infrastructure Security and Resilience Fundamentals (3 credits)**  
This course provides an introduction to the policy, strategy, and practical application of critical infrastructure security and resilience from an all-hazards perspective. It describes the strategic context presented by the 21st century, and discusses the challenges and opportunities associated with public-private partnerships in infrastructure protection, risk analysis and mitigation, and incident response.

**TM 5190 Industrial Sustainability Analysis (3 credits)**  
Joint-listed with INDT 4190, TM 4190

This course covers two practical topics, which are Sustainability Assessment (Topic 1) and Advanced Manufacturing (Topic 2). Topic 1 establishes the concept of sustainability, and sustainable design and manufacturing. Under this section, we introduce the intersection of sustainability and manufacturing through sustainable development, sustainability principles, and sustainable engineering. Topic 2 provides an overview of what Advanced Manufacturing (AM) is, what approaches are used, what the possible applications are, and what the limitations of the technology are. We focus on AM processes, principles, sustainability performance of AM, and sustainability assessment of AM at the macro and micro level. Students will complete one project including techno-economic and socio-environmental studies in the broad area of food-energy-water processes and systems.

**TM 5200 Leadership and Conflict Resolution in a Technological Environment (3 credits)**

Joint-listed with INDT 4200

The course explores leadership and related conflict management issues; personal and collective ways in which interpersonal and organizational conflict from a leadership perspective can be managed; focuses on theoretical and practical analysis of principles and processes for the management of conflict in relationships. Through a leadership framework, the skills and techniques for the identification, prevention, and resolution of conflict in interpersonal and workplace relationships will be discussed. Additional work required for graduate credit. Typically Offered: Fall.

**TM 5250 Emergency Management and Planning (3 credits)**

A study of the basic principles in emergency management and planning in the United States. This course is not directed at any particular type of hazard, but the processes and considerations of planning for all-hazards along with the basics of generic protective actions and the planning concepts supporting effective protective action recommendations.

**TM 5260 Community Emergency Planning (3 credits)**

A study of the theory and practice of community emergency planning. The Citizen Corps, Principles of Emergency Planning, and CERT programs will be studied. Cases are studied in order to assist students in understanding the management and leadership complexity associated with modern emergencies and disasters. Recommended Preparation: TM 525.

**TM 5280 Accident Investigation (3 credits)**

In-depth examination and implementation of system safety concepts, principles, and methods; development of skills in accident investigation, audit and appraisal, operational readiness, and system safety analysis and review. Recommended Preparation: INDT 442.

**TM 5290 Risk Assessment (3 credits)**

Cross-listed with NE 5290

In-depth evaluation and analysis techniques used to determine the risk of industrial, process, nuclear, and aviation industries; fault tree analysis; human reliability analysis; failure mode and effect analysis.

**TM 5330 Chemical Hazards (3 credits)**

Emergency responders can encounter a wide range of chemical hazards. Topics include information on interpreting hazardous chemical labels and Material Safety Data Sheets and the relationship between those two methods of hazard communication. Acute and chronic effects of hazardous chemicals to which responders may be exposed will be discussed. Recommended Preparation: TM 525.

**TM 5340 Biological Hazards (3 credits)**

Emergency responders can encounter a wide range of biological hazards. The objectives of this course are to understand the nature of biological hazards and how to control them. The biological hazards to be discussed are Bacteria, Viruses, Fungi/Molds, Protozoa, Prions – infectious proteins, Biological Toxins. Recommended Preparation: TM 525.

**TM 5350 Radiation Detection and Shielding (3 credits)**

Cross-listed with NE 5351

Radiation transport and shielding concepts. Methods for quantifying attenuation of nuclear particles and electromagnetic radiation. Radiation detection methods, data acquisition and processing.

**Prereqs:** MATH 3100 or Permission

**TM 5370 Nuclear Material Storage, Transportation and Disposal (3 credits)**

Cross-listed with NE 5270

There is a wide range of nuclear materials that are stored, transported and disposed of each day. The materials include medical radioisotopes, new fuel pellets, used fuel, and industrial radioisotopes. This course will cover the regulations that govern nuclear material storage, transportation and disposal, as well as the engineering requirements and practical aspects of handling these materials.

**TM 5380 Management of Nuclear Facilities (3 credits)**

Cross-listed with NE 5280

Nuclear facilities need a sustainable management system to make sure that matters of importance are not dealt with in isolation of other issues in the decision making process. Integrating all relevant issues, ranging from safety, security and safeguards to health and economic and environmental questions, leads to well-informed and balanced decisions. This course addresses from a practical point of view the safety and regulatory issues of operating and planned reactors in the U. S. and other countries.

**TM 5520 Industrial Ergonomics (3 credits)**

A course designed to focus on work design and ergonomics in occupational settings. Specific attention will be focused on introducing the terminology and the techniques used in work design, and on the fundamental concepts embodied in industrial ergonomics. Typically Offered: Varies.

**TM 5960 Capstone Integration (1 credit)**

Capstone integration of degree material in Technology Management and comprehensive final exam.

**Prereqs:** Advisor or Major Professor Permission

**TM 5980 (s) Internship (1-16 credits, max 99)**

Credit arranged

**TM 5990 (s) Non-thesis Master's Research (1-16 credits, max 99)**

Credit arranged. Research not directly related to a thesis or dissertation.

**Prereqs:** Permission