

FIRE PROTECTION AND SAFETY ENGINEERING TECHNOLOGY

The fire protection and safety engineering technology (FPST) curriculum is structured to prepare individuals for assessing and reducing the risk for loss potential from fire, industrial incidents, exposure to toxic materials, and hazardous materials management. Reducing loss potential from fire involves setting design criteria with a particular emphasis on life safety, fire resistivity, automatic detection, or extinguishing systems specification. Reducing the risk of industrial incidents requires the application of specialized assessment techniques, redesign of machinery, processes and procedures, or use of special protective equipment or clothing. Reducing exposure to toxic materials requires sampling air for contaminants, such as toxic chemicals, monitoring noise levels, and developing procedures to address practical approaches for both risk reduction and compliance with state and federal regulations. Addressing hazardous materials management risks includes evaluating proper storage requirements, transportation, spill prevention, control and response, and regulatory reporting. Managing the risks of commercial and industrial operations, emphasizing risk reduction and compliance with laws and regulations, is an increasingly important job activity.

The fire protection and safety engineering technology program began at Oklahoma State University in 1937, the oldest fire-related program in North America. The demand by business and industry for loss control specialists has resulted in the program's evolution, emphasizing risk management for on fire protection, safety and occupational health. The FPST program prepares graduates for careers in loss control. The loss control profession is segmented into three major areas: loss from fire, loss from physical accidents and loss from environmental exposure.

The curriculum immediately introduces students to fire protection and safety studies, allowing them to measure their interests in a fire protection and safety career early in their academic career. The curriculum is rigorous in mathematics and the physical sciences requiring two semesters of calculus and a minimum of one semester of chemistry, and two semesters of physics. Computer usage is an essential component of most fire protection and safety courses. Interested high school students should design their high school programs to prepare them for college-level mathematics and science classes.

The program concludes with the Bachelor of Science in Engineering Technology degree in Fire Protection and Safety Engineering Technology.

Program Educational Objectives

OSU Fire Protection and Safety graduates a few years after graduation will be:

1. Earning and pursuing personal, technical and professional advancement through certifications, licensure, and their employment.
2. Continuing the pursuit of life-long learning through membership and participation in professional organizations.
3. Developing business expertise within their selected employment organization.
4. Successfully applying mathematical, analytical and technical skills to solve complex problems in the selected field.
5. Meeting the highest standards of ethical practice in their profession.

Fire Protection and Safety Technology degree graduates can expect to obtain these student outcomes upon graduation:

- (1) an ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly-defined engineering problems appropriate to the discipline;
- (2) an ability to design systems, components, or processes meeting specified needs for broadly-defined engineering problems appropriate to the discipline;
- (3) an ability to apply written, oral, and graphical communication in broadly-defined technical and non-technical environments; and an ability to identify and use appropriate technical literature;
- (4) an ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes;
- (5) an ability to function effectively as a member as well as a leader on technical teams; and
- (6) an ability to understand ethical and professional responsibilities and the impact of technical and/or scientific solutions in global, economic, environmental, and societal contexts.

The graduates of the fire protection and safety engineering technology program at Oklahoma State University are consistently recruited by the major businesses and industries of the United States. Graduate placement, salary offers and advancement into managerial positions have been excellent due to the uniqueness and high technical quality of the OSU fire protection and safety engineering technology program.

The Fire Protection and Safety Engineering Technology program is accredited by the Engineering Technology Accreditation Commission of ABET, <http://www.abet.org> (<http://www.abet.org/>).

Courses

FPST 1103 Applied Techniques in Fire Suppression

Description: Provides requisite knowledge to achieve basic certifications in fire suppression and emergency operations for municipal and industrial fire protection.

Credit hours: 3

Contact hours: Lecture: 2 Lab: 3 Contact: 5

Levels: Undergraduate

Schedule types: Lab, Lecture, Combined lecture and lab

Department/School: Engineering Technology

FPST 1203 Applied Techniques in Emergency Operations

Description: Provides requisite knowledge to achieve advanced certifications in fire suppression and emergency operations for municipal and industrial fire protection.

Credit hours: 3

Contact hours: Lecture: 2 Lab: 3 Contact: 5

Levels: Undergraduate

Schedule types: Lab, Lecture, Combined lecture and lab

Department/School: Engineering Technology

FPST 1213 Fire Safety Hazards Recognition

Description: "The Fire Problem" Physical, chemical and electrical hazards and their relationship to loss of property and/or life. Safe storage, transportation and handling practices to eliminate or control the risk of fire in the home, business and industry.

Credit hours: 3

Contact hours: Lecture: 3 Contact: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Engineering Technology

FPST 1373 Fire Suppression and Detection Systems

Description: The design, installation, maintenance and utilization of portable fire-extinguishing appliances and pre-engineered systems. Operational capabilities and utilization requirements of fire detection and signaling systems. Fire detection and suppression applied in practical laboratory problems.

Credit hours: 3

Contact hours: Lecture: 2 Lab: 3 Contact: 5

Levels: Undergraduate

Schedule types: Lab, Lecture, Combined lecture and lab

Department/School: Engineering Technology

FPST 2023 Industrial and Occupational Safety

Prerequisites: A grade of "C" or better in FPST 1213 and a grade of "C" or better in either MATH 1613 or MATH 1715 or MATH 1813 or MATH 2123 or MATH 2144 or an ALEKS score of 65.

Description: Occupational facilities, equipment and operations and their inherent hazards. Directed toward worker, machine and environmental control.

Credit hours: 3

Contact hours: Lecture: 2 Lab: 3 Contact: 5

Levels: Undergraduate

Schedule types: Lab, Lecture, Combined lecture and lab

Department/School: Engineering Technology

FPST 2050 Studies in Loss Control

Prerequisites: Consent of instructor and adviser.

Description: Problems in applied fire protection technology, occupational safety, industrial hygiene or hazardous materials management of particular interest to the loss control specialist. Offered for variable credit, 1-4 credit hours, maximum of 6 credit hours.

Credit hours: 1-4

Contact hours: Contact: 1-4 Other: 1-4

Levels: Undergraduate

Schedule types: Independent Study

Department/School: Engineering Technology

FPST 2153 Fire Protection Management

Description: Applied human relations, technical knowledge and skills for achieving optimum effectiveness from a fire protection organization.

Credit hours: 3

Contact hours: Lecture: 3 Contact: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Engineering Technology

FPST 2243 Design and Analysis of Sprinkler Systems

Prerequisites: Grade of "C" or better in (FPST 2483 and (ENGR 1322 or CET 2253)) or (MAE 3333 and (ENGR 1332 or ENGR 1322)).

Description: Detailed current standards for selection, design, installation, operation and maintenance of automatic fire suppression systems. Laboratory problems on applicable technological principles.

Credit hours: 3

Contact hours: Lecture: 2 Lab: 3 Contact: 5

Levels: Undergraduate

Schedule types: Lab, Lecture, Combined lecture and lab

Department/School: Engineering Technology

FPST 2343 Elements of Industrial Hygiene

Prerequisites: Grade of "C" or better in STAT 2013, CHEM 1515 or CHEM 1225 or CHEM 1414.

Description: Toxic or irritating substances, physical, biological, ergonomic and other occupational stress factors causing employee illness or discomfort. Environmental pollution sources and controls. Previously offered as FPST 2344.

Credit hours: 3

Contact hours: Lecture: 2 Lab: 3 Contact: 5

Levels: Undergraduate

Schedule types: Lab, Lecture, Combined lecture and lab

Department/School: Engineering Technology

FPST 2483 Fluid Mechanics for Fire Protection

Prerequisites: Prior (grade of "C" or better) or concurrent enrollment in FPST 1373. A grade of "C" or better in MATH 1613 or MATH 1715 or MATH 1813 or MATH 2123 or MATH 2144 or an ALEKS score of 65.

Description: Fluid flow through hoses, pipes, pumps and fire protection appliances. Water supply and distribution analysis using hydraulic calculations. Testing techniques to detect anomalies in design or performance capabilities.

Credit hours: 3

Contact hours: Lecture: 2 Lab: 3 Contact: 5

Levels: Undergraduate

Schedule types: Lab, Lecture, Combined lecture and lab

Department/School: Engineering Technology

FPST 2650 Technical Problems and Projects

Description: Special problems or projects assigned by advisers with the approval of the department head. A comprehensive written report or equivalent creative effort. Offered for variable credit, 1-4 credit hours, maximum of 4 credit hours.

Credit hours: 1-4

Contact hours: Contact: 1-4 Other: 1-4

Levels: Undergraduate

Schedule types: Independent Study

Department/School: Engineering Technology

FPST 3013 Safety Management (S)

Prerequisites: A grade of "D" or better in ENGL 1113 or ENGL 1123 or ENGL 1313. Must be enrolled in one of the following classes: Sophomore (SO), Junior (JR), or Senior (SR).

Description: Understanding and implementing techniques for a safer work environment. Recognition, evaluation and control of occupational health and safety hazards. Accident prevention, accident analysis, training techniques, worker's compensation insurance, guarding and personal protective equipment.

Credit hours: 3

Contact hours: Lecture: 3 Contact: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Engineering Technology

General Education and other Course Attributes: Society & Human Behavior

FPST 3113 Advanced Special Hazard Suppression and Detection

Prerequisites: FPST 2483 or ENSC 3233.

Description: Design and analysis of special hazard suppression and detection systems using code requirements. Emphasis is also placed on the ability to select the appropriate system for a given hazard. May not be used for degree credit with FSEP 5123.

Credit hours: 3

Contact hours: Lecture: 3 Contact: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Engineering Technology

FPST 3143 Life Safety Analysis

Prerequisites: A grade of "C" or better in FPST 1373 or CMT 3463 or ARCH 2263.

Description: Life safety concepts related to building codes including means of egress design criteria and components, exits, component details, occupancy types, occupancy load, emergency lighting, marking of means of egress, evacuation movement, human performance capabilities, human response to fire cues, occupant pre-evacuation, and toxicology.

Credit hours: 3

Contact hours: Lecture: 2 Lab: 3 Contact: 5

Levels: Undergraduate

Schedule types: Lab, Lecture, Combined lecture and lab

Department/School: Engineering Technology

FPST 3213 Human Factors in Accident Prevention

Prerequisites: Grade of "C" or better in (STAT 2013, STAT 4013, or STAT 4033) and (GENT 2323 or ENSC 2113).

Description: Human factors and workplace ergonomics as it relates to the prevention of accidents and workplace injuries. Fundamentals and techniques of task analysis.

Credit hours: 3

Contact hours: Lecture: 3 Contact: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Engineering Technology

FPST 3373 Fire Dynamics

Prerequisites: A grade of "C" or better in CHEM 1414 or CHEM 1215 or CHEM 1515, MATH 2133 or MATH 2153, STAT 2013, and FPST 2483.

Description: Fundamental thermodynamics of combustion, fire chemistry and fire behavior. The physical evidence left by fire for investigation and the use of computer models to study fire behavior. Previously offered as FPST 4373.

Credit hours: 3

Contact hours: Lecture: 2 Lab: 3 Contact: 5

Levels: Undergraduate

Schedule types: Lab, Lecture, Combined lecture and lab

Department/School: Engineering Technology

FPST 3383 Building Electrical Systems

Prerequisites: A grade of C or better in FPST 1373 and a grade of C or better in PHYS 2014.

Description: Detail current standards for design, selection and installation of electrical distribution and utilization equipment. Emphasis on personnel safety and fire prevention using current codes and standards. May not be used for degree credit with FSEP 5163.

Credit hours: 3

Contact hours: Lecture: 3 Contact: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Engineering Technology

FPST 3611 Explosion Impact on Infrastructure

Description: Concepts related to explosions in terms of both the identification of hazards and solutions for protecting the building infrastructure. May not be used for FSEP 5173.

Credit hours: 1

Contact hours: Lecture: 1 Contact: 1

Levels: Undergraduate

Schedule types: Lecture

Department/School: Engineering Technology

FPST 3621 Wildland Urban Interface Fire Impact on Infrastructure

Description: Concepts related to wildland urban interface fires in terms of both the identification of hazards and solutions for protecting the building infrastructure. May not be used with FSEP 5173.

Credit hours: 1

Contact hours: Lecture: 1 Contact: 1

Levels: Undergraduate

Schedule types: Lecture

Department/School: Engineering Technology

FPST 3631 Fire Impact on Tall Building Infrastructure

Description: Concepts related to tall building fires in terms of both the identification of hazards and solutions for protecting the building infrastructure. May not be used with FSEP 5173.

Credit hours: 1

Contact hours: Lecture: 1 Contact: 1

Levels: Undergraduate

Schedule types: Lecture

Department/School: Engineering Technology

FPST 3713 Hydraulic Design of Automatics Sprinkler Systems

Prerequisites: FPST 1373, FPST 2483, MATH 1513.

Description: Hydraulic calculation technique for the design and analysis of automatic sprinkler fire extinguishing systems.

Credit hours: 3

Contact hours: Lecture: 3 Contact: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Engineering Technology

FPST 3723 Industrial Fire Pump Installations

Prerequisites: FPST 2483, MATH 1513.

Description: Applications, design and analysis of industrial fire pump installations. Graphical analysis of fire pump contributions to existing fire protection water supply systems emphasized.

Credit hours: 3

Contact hours: Lecture: 3 Contact: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Engineering Technology

FPST 3733 Sprinkler System Design for High Piled and Rack Storage

Prerequisites: FPST 2243, MATH 1513.

Description: Specific design techniques for sprinkler system protection of commodities stored in solid piles or racks over 12 feet in height.

Credit hours: 3

Contact hours: Lecture: 3 Contact: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Engineering Technology

FPST 4050 Special Problems in Loss Control

Prerequisites: Consent of department head.

Description: Special technical problems in fire protection and safety. Offered for variable credit, 1-4 credit hours, maximum of 6 credit hours.

Credit hours: 1-4

Contact hours: Contact: 1-4 Other: 1-4

Levels: Undergraduate

Schedule types: Independent Study

Department/School: Engineering Technology

FPST 4143 Industrial Ventilation and Smoke Control

Prerequisites: A grade of "C" or better in FPST 2343 and FPST 2483 and FPST 3373 and ENSC 2213 or MET 3433 or MET 3453.

Description: Principles of dilution and comfort ventilation; contaminant control; ventilation system testing and guidelines. Design and analysis of smoke management systems in buildings. Performance characteristics of smoke control systems. Previously offered as FPST 4133.

Credit hours: 3

Contact hours: Lecture: 3 Contact: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Engineering Technology

FPST 4153 Issues in Local Government and Fire Services

Prerequisites: FPST 2153, MGMT 3013.

Description: Issues relating to the proper operation of a fire department and the fire department's role within the structure of local government.

Credit hours: 3

Contact hours: Lecture: 3 Contact: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Engineering Technology

FPST 4213 Advanced Building Design and Analysis

Prerequisites: Grade of "C" or better in FPST 2243 or CMT 3463 or ARCH 2263.

Description: Fire protection and life safety concepts and applications in the built environment related to building and fire codes including building height and area, structural fire protection, occupancy classifications, passive fire protection systems, means of egress, active fire protection systems, fire detection systems, and fire department access. May not be used for degree credit with FSEP 5213.

Credit hours: 3

Contact hours: Lecture: 3 Contact: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Engineering Technology

FPST 4233 Advance Exposure Assessment

Prerequisites: Grade of "C" or better in FPST 2344.

Description: Evaluation of CBRNE exposure risks in industry and emergency response including statistical/computational techniques, regulatory obligations, and the use of instrumentation. Same course as FPST 3233.

Credit hours: 3

Contact hours: Lecture: 3 Contact: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Engineering Technology

FPST 4333 System and Process Safety Analysis

Prerequisites: Grade of "C" or better in FPST 2023, STAT 2013, and MATH 2123 or MATH 2144.

Description: Fire and safety techniques to anticipate, recognize and control hazards. Fault Tree, HazOp, FMEA and other process safety techniques.

Credit hours: 3

Contact hours: Lecture: 2 Lab: 3 Contact: 5

Levels: Undergraduate

Schedule types: Lab, Lecture, Combined lecture and lab

Department/School: Engineering Technology

FPST 4383 Fire and Evacuation Modeling

Prerequisites: A grade of "C" or better in CHEM 1515 or CHEM 1225 or CHEM 1414 and FPST 2483 and MATH 2133 or MATH 2153 and STAT 2013 and GENT 3433 or MET 3433 or ENSC 2213 or GENT 4433 or MET 4433.

Description: Fundamentals of fire dynamics and occupant egress and their numerical approaches for computer models. Practical knowledge of how to use fire and evacuation modeling tools: CFAST, FDS, Pyrosim, and Pathfinder, and how to analyze modeling results. May not be used for degree credit with FSEP 5383.

Credit hours: 3

Contact hours: Lecture: 3 Contact: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Engineering Technology

FPST 4403 Hazardous Materials Management

Prerequisites: Grade of "C" or better in FPST 2023, FPST 2344, and CHEM 1225 or CHEM 1414 or CHEM 1515.

Description: An integrated approach to hazardous materials management with emphasis on comprehensive environmental, health, safety, and fire protection program compliance relating to the transportation, storage, use and disposal of hazardous materials and wastes.

Credit hours: 3

Contact hours: Lecture: 3 Contact: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Engineering Technology

FPST 4683 Risk Control Engineering

Prerequisites: A grade of "C" or better in FPST 2023, FPST 2343, FPST 2243, FPST 3373, FPST 4982, ENGL 3323, and Department Permission.

Description: Analysis of specific processes, equipment, facilities and work practices for detecting and controlling potential hazards, evaluating risk and developing risk control methodologies.

Credit hours: 3

Contact hours: Lecture: 2 Lab: 3 Contact: 5

Levels: Undergraduate

Schedule types: Lab, Lecture, Combined lecture and lab

Department/School: Engineering Technology

FPST 4982 Fire Protection and Safety Projects I

Prerequisites: A grade of "C" or better in ENGL 1113 or ENGL 1123 or ENGL 1313. A grade of "C" or better or concurrent enrollment in ENGL 3323. A grade of "C" or better or concurrent enrollment in FPST 3013.

Description: Two-semester project with team format. Team members work with sponsors and faculty who serve as mentors in fields related to their topics. Students complete topic selection, progress reports, final reports, and poster presentations.

Credit hours: 2

Contact hours: Lecture: 2 Contact: 2

Levels: Undergraduate

Schedule types: Lecture

Department/School: Engineering Technology

FPST 4992 Fire Protection & Safety Projects II

Prerequisites: A grade of "C" or better in ENGL 3323 and FPST 4982.

Description: Two-semester project with team format. Second of two-semester sequence of senior project courses.

Credit hours: 2

Contact hours: Lecture: 2 Contact: 2

Levels: Undergraduate

Schedule types: Lecture

Department/School: Engineering Technology

FPST 4994 Fire Protection and Safety Interdisciplinary Projects

Prerequisites: A grade of "C" or better in ENGL 1113 or ENGL 1123 or ENGL 1313. A grade of "C" or better or concurrent enrollment in ENGL 3323. A grade of "C" or better or concurrent enrollment in FPST 3013 and FPST 3373.

Description: Students work in small teams on a semester-long design project sponsored by a company, agency, or individual. Team members work with mentors from sponsors and with faculty members in fields related to their topics. Presentations on safety, patent law, product liability, report writing, oral presentations, scheduling and ideation. Oral presentations, progress reports, and a professional log book documenting personal activity and contributions. Previously offered as FPST 4993.

Credit hours: 4

Contact hours: Lecture: 4 Contact: 4

Levels: Undergraduate

Schedule types: Lecture

Department/School: Engineering Technology

Undergraduate Programs

- Fire Protection and Safety Engineering Technology, BSET (<http://catalog.okstate.edu/engineering-architecture-technology/fire-protection-safety-engineering-technology/bset/>)

Graduate Programs

The Fire Protection and Safety Engineering Technology (FPST) program offers a graduate program leading to the Master of Science in Engineering Technology with an option in Fire Safety and Explosion Protection (FSEP). The program extends the FPST undergraduate program into graduate research, scholarship and creative activities. The FSEP program is designed to prepare students for professional practice that may include research or consulting components, with major emphasis in fields of interest such as fire protection engineering, explosion protection, fire and explosion hazards, and process safety. This is the nation's only master's degree program that is dedicated to both fire and explosion protection and related to safety. The program is geared toward recent graduates and professionals in a variety of industries, including insurance companies, the oil & gas industry, and fire protection engineering companies. The graduates of this program will have the deeper knowledge base that is needed to safeguard people in Oklahoma, the nation, and the world. The FSEP program is intended to be especially attractive to engineering and engineering technology graduates from any discipline, and many science majors. The program is interdisciplinary in nature and hence students with undergraduate degrees in fire and safety related fields or other STEM disciplines are invited to apply for admission. Students can complete degree requirements either online as distance students or as a resident on campus.

Admission Requirements

Admission to the Master of Science degree program requires a B.S. degree in engineering or engineering technology from an ABET-accredited (or equivalent) program or a B.S. from other related disciplines with foundations in mathematics. Admission is competitive based on undergraduate GPA and TOEFL (for international students), statement of interests, experience and recommendation letters. The GRE exam is optional but encouraged.

Degree Requirements

A candidate for the graduate degree must satisfy at least the minimum University requirements for that particular degree. The program consists of 30 hours of coursework with a thesis option or 33 hours of coursework

with a non-thesis option. For both options, the courses taken must include FSEP 5013, 5023, and 5133. Both options require nine hours from the FSEP core courses that include 5033, 5113, 5143, and 5043.

Minors

- Safety and Exposure Sciences (SAES), Minor (<http://catalog.okstate.edu/engineering-architecture-technology/fire-protection-safety-engineering-technology/safety-exposure-sciences-minor/>)

Faculty

Virginia Charter, PhD, PE, FSFPE—Associate Professor and Program Coordinator

Associate Dean of Engineering Extension and Professor of Professional Practice: Ed Kirtley, PhD

Associate Professor and Graduate Advisor: Bryan Hoskins, PhD, PE

Associate Professors: Haejun Park, PhD

Assistant Professor: Diana Rodriguez Coca, PhD; Ruiqing (Ryan) Shen, PhD

Associate Professor of Professional Practice: Leslie Stockel, PhD, CSP