

# FIRE PROTECTION ENGINEERING MAJOR

**Notice of Addendum:** The program description on this page was updated via an Addendum. To see the update, visit ADDENDA TO THIS CATALOG (<https://academiccatalog.umd.edu/undergraduate/addenda/#fire-protection-engineering-major>).

**Program Director:** Peter Sunderland, Ph.D.

Fire Protection Engineering is concerned with the applications of scientific and technical principles to the dynamics, mitigation, and suppression of fire. This includes the effects of fire on people, on structures, on commodities, and on operations. The identification of fire hazards and their risk, relative to the cost of protection, is an important aspect of fire safety design.

The fire protection engineering student receives a fundamental engineering education involving the subjects of mathematics, physics, and chemistry. The program builds on other core engineering subjects of materials, fluid mechanics, thermodynamics and heat transfer with emphasis on principles and phenomena related to fire. Fluid mechanics includes applications to sprinkler design, suppression systems, and smoke movement. Heat transfer introduces the student to principles of evaporation for liquid fuels. The subject of combustion is introduced involving premixed and diffusion flames, ignition and flame spread, and burning processes. Laboratory experience is gained by being exposed to standard fire tests and measurements. Design procedures are emphasized for systems involving suppression, detection, alarm, and building safety requirements. The background and application of codes and standards are studied to prepare the student for practice in the field. System concepts of fire safety and methods of analysis are presented. A senior design or research project is required which gives the student an opportunity to explore issues beyond the normal classroom environment.

The Bachelor of Science degree in Fire Protection Engineering degree program at the University of Maryland is accredited by the Engineering Accreditation Commission of ABET, <https://www.abet.org>, under the General Criteria and the Fire Protection Engineering Program Criteria.

## Program Education Objectives

The educational objectives of the undergraduate program in Fire Protection Engineering are to produce graduates who:

1. Practice fire protection engineering regionally and/or globally;
2. Pursue advanced studies in fire protection engineering or related fields;
3. Actively participate in the development of engineering decisions on societal, environmental, economic and safety issues at the local or global levels;
4. Achieve professional certification and licensure; and
5. Maintain continual professional competency and practice ethically.

The practice of fire protection engineering has developed from the implementation and interpretation of codes and standards directed at fire safety. These safety codes contain technical information and prescriptions derived from experience and research. Research has also led to quantitative methods to assess aspects of fire and fire safety. Thus, fire protection engineers need to be versed in the current technical

requirements for fire safety and in the scientific principles that underlie fire and its interactions.

## Student Learning Outcomes

Students graduating from the Department of Fire Protection Engineering will have:

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. An ability to communicate effectively with a range of audiences
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

## REQUIREMENTS

In general, the curriculum is designed to give the student a grounding in the science and practice of fire safety. The field touches on many disciplines and its scientific basis is expanding. It is an engineering discipline that is still growing, and offers a variety of excellent career opportunities. These cover a wide spectrum involving safety assessment reviews, hazards analysis and research, loss prevention and regulatory issues.

Freshman Year			
First Semester	Credits	Second Semester	Credits
CHEM135		3 ENES102	3
ENES100		3 MATH141	4
ENFP101 (Optional)		0-1 PHYS161	3
ENGL101		3 Gen Ed: General Education Requirements	6
MATH140		4	
		<b>13-14</b>	<b>16</b>
Sophomore Year			
First Semester	Credits	Second Semester	Credits
ENES221		3 ENES220	3
ENFP250		3 ENES232	3
PHYS260 & PHYS261		4 ENFP201	3
MATH240 or 241		4 MATH246	3
Gen Ed: General Education Requirements		3 Gen Ed: Oral Communication	3
		<b>17</b>	<b>15</b>

Junior Year			
First Semester	Credits	Second Semester	Credits
ENFP300	3	ENFP310	3
ENFP440	3	ENFP312	3
Elective: Technical Elective <sup>1</sup>	3	ENFP350	1
Gen Ed: General Education Requirements	3	ENFP413	3
Gen Ed: Professional Writing	3	Elective: Technical Elective <sup>1</sup>	3
		Gen Ed: General Education Requirements	3
	<b>15</b>		<b>16</b>
Senior Year			
First Semester	Credits	Second Semester	Credits
ENFP405	3	ENFP411	3
ENFP410	3	ENFP420	4
ENFP415	3	ENFP426	3
ENFP425	3	Elective: Technical Elective <sup>1</sup>	3
Elective: Technical Elective <sup>1</sup>	3		
	<b>15</b>		<b>13</b>

Total Credits 120-121

<sup>1</sup> Technical electives are chosen in consultation with the academic advisor but must include the following:

- at least 3 credits of: MATH400+ or STAT 400+;
- at least 3 credits of: ENFP 400+; and
- at least 6 credits of: Engineering coursework 300+, CHEM 400+, CMSC400+, MATH400+, or PHYS 400+.

## FOUR-YEAR PLAN

Click here (<https://eng.umd.edu/advising/four-year-plans/>) for roadmaps for four-year plans in the A. James Clark School of Engineering.

Additional information on developing a four-year academic plan can be found on the following pages:

- <http://4yearplans.umd.edu>
- the Student Academic Success-Degree Completion Policy (<https://academiccatalog.umd.edu/undergraduate/registration-academic-requirements-regulations/academic-advising/#success>) section of this catalog