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 in Fire Protection Engineering is accredited by the Engineering Accreditation Commission of ABET, www.abet.org (http://www.abet.org).

Program Objectives

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

1. Practice fire protection engineering regionally, nationally and internationally in a broad range of modern professional settings;
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.

Program 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.

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火灾防护工程学是与数学、物理学、化学等科学和技术原理的应用相关的工程学领域。该领域的目的是通过研究和设计来解决火灾事故中的问题，包括火灾对人、建筑结构和商品的影响。该课程还强调热传输原理，以蒸发过程对液体燃料的研究为例。燃烧学的研究涉及到预混合和扩散火焰，点火和火焰传播，以及燃烧过程。实验室经验的获得是为了让学生接触标准的火灾测试和测量方法。设计程序在系统中得到强调，这些系统包括灭火、探测、报警和建筑安全要求。背景和应用的代码和标准被研究，以准备学生在实际工作中实践。

Fire Protection Engineering Major

Program Learning Outcomes

学生从消防防护工程系毕业时，将具备以下能力：

1. 能够识别、提出并解决复杂工程问题，将工程原理应用到工程、科学和数学中
2. 能够将工程设计应用到满足特定需求的解决方案中，并考虑公共安全、健康和福利，以及全球、文化、社会、环境和经济因素
3. 能够有效地与各类观众沟通
4. 能够识别工程问题中的道德和职业责任，并做出判断，这些判断必须考虑工程解决方案在全球、经济、环境和社会领域的影响
5. 能够在团队中有效工作，共同提供领导力，创建合作和包容的环境，制定目标，计划任务，并达到目标
6. 能够设计和执行适当的实验，分析和解释数据，并使用工程判断来得出结论
7. 能够获取并应用新知识，使用适当的学习策略。

Requirements

总的来说，课程旨在为学生提供火灾安全的科学与实践的教育。该领域涉及许多学科，其科学基础正在不断扩展。这是一个仍在发展中的工程学科，提供了多种优秀的职业机会。这些领域涉及安全评估审查、风险分析和研究、损失预防和监管问题。

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### Senior Year

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Total Credits 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:

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