

## **Explosives Engineering Undergraduate**

### Explosives Engineering Certificate

This certificate program is designed to provide formalized education in the area of Explosives Engineering. Students will be exposed to the theoretical and practical approaches of explosives engineering. Students will learn analysis and design of explosive-related systems and both natural and built structure effects. The Explosives Engineering Certificate Program is open to all persons enrolled in an engineering or approved physical science program that have achieved sophomore status in that program. The applicant must also pass a background check. Once admitted to the program, the student must take four designated 3 credit hour explosives courses for a total of 12 credit hours as given below. In order to receive an Undergraduate Certificate, the student must have an average cumulative grade of 2.0 or better in the certificate courses. Students admitted to the certificate program will have non-matriculated status; however, if they complete the four-course sequence with a grade of B or better in each of the courses taken, they will be eligible to apply to the S&T Mining Engineering B.S. program. The certificate credits taken by students admitted to the B.S. program may be eligible to count toward their bachelor's degrees depending on the degree requirements. Prerequisite courses outside of those in this certificate program may be waived at the discretion of the administrative co-coordinators for persons that are not regular Missouri S&T mining engineering students. Once admitted to the certificate a student will be given three years to complete the certificate so long as he/she maintains a 2.0 GPA in the courses taken.

The following courses constitute the undergraduate certificate in Explosives Engineering:

- **Two Required Courses:**
  - Exp Eng 5612-Principles of Explosives Engineering
  - Exp Eng 5622-Blasting Design and Technology
- Select Two Additional Explosive Related Classes

Students with a GPA of 3.0 in the certificate program may take graduate level (6000) explosives classes as electives.

### Explosives Engineering Minor

A student who receives a Bachelor of Science degree in an accredited engineering program from Missouri S&T may receive the Minor in Explosives Engineering by completing 15 credit hours from the courses listed below. Non-engineering students who have a **strong background in mathematics and the physical sciences** may also qualify for the Minor in Explosives Engineering, with the approval of the Department and based on an individually designed program of study. The program granting the Bachelor of Science degree shall determine whether or not courses taken for the Explosives Engineering Minor may also be used to fulfill the requirements of the B.S. degree from that program.

The following courses are required for the Minor in Explosives Engineering:

Exp Eng 5612: Principles of Explosives Engineering

Exp Eng 5622: Blasting Design and Technology

Plus three other explosives related courses as approved by program coordinator

## Explosives Technology Certificate

The Explosives Technology Certificate is open to non-engineering students whereas the Explosives Engineering Certificate is for students in engineering programs or programs in which the courses are calculus based.

This certificate program is designed to provide formalized education in the area of Explosives. Students will be exposed to the theoretical and practical approaches of explosives technology. Students will learn analysis and design of explosive-related systems. The Explosives Technology Certificate Program is open to all persons holding a High School Diploma who have a mathematics background through trigonometry and a minimum of 12-months of post-High School professional employment or college experience.

The student must have a cumulative GPA of 2.0 or higher in the four courses (12 credits) required for this undergraduate certificate. Students admitted to an undergraduate certificate program will have non-degree student status, but will earn undergraduate credit for the courses they complete. If the four-course sequence is completed with a grade of B or better in each of the courses taken, the student will be eligible to apply to the BS degree in Mining Engineering. The certificate courses taken by students admitted to the BS program may be eligible to apply toward their bachelor's degree depending on the degree requirements. Prerequisite courses outside of those in this certificate program may be waived at the discretion of the administrative coordinators for persons that are not regular Missouri S&T mining engineering students. Once admitted to a certificate program, a student will be given three years to complete the program so long as he or she maintains at least a 2.0 average in the courses taken.

The applicant must also pass a background check.

The following courses constitute the undergraduate certificate in Explosives Technology:

- Required – One of the following four courses:
  - Exp Eng 5612: Principles of Explosives Engineering
  - Exp Eng 5711 – Explosives in Industry
  - Exp Eng 5721 – Specialty Uses of Energetic Materials
  - Exp Eng 5914 – Explosives Manufacturing
  
- Choose an additional three courses from those listed above or the list below:
  - Exp Eng 5112: Explosives Handling and Safety
  - Exp Eng 5512: Commercial Pyrotechnics Operations
  - Exp Eng 5513: Stage Pyrotechnics and Special Effects
  - Exp Eng 5514: Display Fireworks Manufacturing
  - Exp Eng 5555: Computer Fired Pyrotechnic Show Design & Firing System Operation
  - Exp Eng 5622: Blasting Design and Technology
  - Exp Eng 5713: Demolition of Buildings and Structures
  - Exp Eng 5922: Advanced Tunneling & Underground Construction Techniques
  - Exp Eng 6112: Explosives Regulations

Other courses approved by the explosives engineering faculty may be substituted for any of the above listed courses on a case-by-case basis. Students with a GPA of 3.0 in the certificate program may take advanced graduate level (6000) explosives classes as electives.