

# DEGREE PROGRAMS

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Missouri S&T offers bachelor of science (BS) and bachelor of arts (BA) degrees. You can major in engineering, science, business, or the liberal arts. You can get a background for law or medicine or other professional studies.

In many disciplines there are emphasis areas which are areas of concentration within a degree program. If you choose an emphasis area, you will take some of your elective hours in specified courses in that area. Your advisor can guide you toward the election of courses you should take if you choose an emphasis area.

Degree programs and emphasis areas are listed below. Degree programs are in capitals, emphasis areas are lower case subheads followed by degree abbreviation if restricted to that degree.

## AEROSPACE ENGINEERING (BS)

### APPLIED MATHEMATICS (BS)

- Actuarial Science
- Algebra/Discrete Mathematics
- Applied Analysis
- Computational Mathematics
- Secondary Education
- Statistics

### ARCHITECTURAL ENGINEERING (BS)

- Construction Engineering & Project Management
- Construction Materials
- Environmental Systems for Buildings
- Structural Engineering

### BIOLOGICAL SCIENCES (BA, BS)

- Medical Laboratory Scientist (BS)
- Pre-Medicine (BA)
- Secondary Education (BA)

### BUSINESS AND MANAGEMENT SYSTEMS (BS)

- E-commerce
- Enterprise Resource Planning
- Finance
- Human Computer Interaction
- Management Information Systems
- Marketing
- Secondary Education

### CERAMIC ENGINEERING (BS)

### CHEMICAL ENGINEERING (BS)

- Biochemical Engineering

### CHEMISTRY (BA, BS)

- Biochemistry (BS)
- Polymer & Coatings Science (BS)
- Pre-Medicine (BS)
- Secondary Education (BA)

### CIVIL ENGINEERING (BS)

- Construction Engineering
- Environmental Engineering
- Geotechnical Engineering
- Materials Engineering
- Structural Engineering
- Transportation Engineering
- Water Resources Engineering

### COMPUTER ENGINEERING (BS)

- Computational Intelligence
- Computer Architecture & Embedded Systems
- Integrated Circuits & Logic Design
- Networking, Security, & Dependability

### COMPUTER SCIENCE (BS)

### ECONOMICS (BA, BS)

- Economics/Business (BS)
- Secondary Education (BA)

### EDUCATION (BS)

- Elementary
- Middle School Language Arts
- Middle School Math
- Middle School Science
- Middle School Social Studies

### ELECTRICAL ENGINEERING (BS)

- Circuits & Electronics
- Communications & Signal Processing
- Computer Engineering
- Controls & Systems
- Electromagnetics
- Optics & Devices
- Power & Energy

### ENGINEERING MANAGEMENT (BS)

- Industrial Engineering
- Management of Technology
- Manufacturing Engineering
- Packaging Engineering
- Quality Engineering

### ENGLISH AND TECHNICAL COMMUNICATION (BS)

### ENVIRONMENTAL ENGINEERING (BS)

### GEOLOGICAL ENGINEERING (BS)

- Engineering Geology & Geotechnics
- Environmental Protection & Hazardous Waste
- Groundwater Hydrology & Contaminant Transport
- Petroleum, Energy & Natural Resources
- Quarry Engineering

### GEOLOGY AND GEOPHYSICS (BS)

- Geochemistry

Geology  
 Geophysics  
 Groundwater & Environmental Geochemistry  
 Petroleum Geology

## HISTORY (BA, BS)

Secondary Education (BA)

## INFORMATION SCIENCE &amp; TECHNOLOGY (BS)

Enterprise Resource Planning  
 Human Computer Interaction

## MECHANICAL ENGINEERING (BS)

Control Systems  
 Energy Conversion  
 Environmental Systems  
 Instrumentation  
 Manufacturing Processes  
 Materials Science  
 Mechanical Design and Analysis  
 Systems Integration  
 Thermal Science

## METALLURGICAL ENGINEERING (BS)

Chemical Metallurgy  
 Manufacturing Metallurgy  
 Physical Metallurgy

## MINING ENGINEERING (BS)

Coal  
 Explosives Engineering  
 Mining & the Environment  
 Mining Health & Safety  
 Quarry Engineering  
 Sustainable Development

## MULTIDISCIPLINARY STUDIES (BA)

## NUCLEAR ENGINEERING (BS)

## PETROLEUM ENGINEERING (BS)

## PHILOSOPHY (BS)

## PHYSICS (BS)

Applied Physics  
 Geophysics  
 Secondary Education

## PSYCHOLOGY (BA, BS)

Cognition & Neuroscience  
 Diversity & Inclusion  
 Health Psychology  
 Human Factors  
 Industrial/Organizational Psychology  
 Secondary Education

## Bachelor of Arts Degree

### General Requirements

This degree can be earned in the following areas: biological sciences, chemistry, economics, history, multidisciplinary studies, philosophy, and psychology.

A minimum of 120 credit hours is required for a bachelor of arts degree with an average of at least two grade points per credit hour to be obtained. At least 45 hours of the student's work must be taken of the upper-class (course numbered 3000 or above) level.

Requirements for the bachelor of arts degree follow:

### I. Basic Skills and Concepts <sup>(a)</sup>

1. Composition: ENGLISH 1120 and one additional three hour composition course<sup>(b)</sup> 6 hrs.
2. Western Civilization (HISTORY 1100 and HISTORY 1200) 6 hrs.
3. Foreign languages,<sup>(c)(d)</sup> 12 hours of a single foreign language or 16 hours (8+8) of two foreign languages.
  - A. At least three semesters of basic study in a single foreign language or two semesters in each of two foreign languages: French, German, Russian, Spanish, or an approved substitute language.
  - B. One year of basic study in one foreign language, either French, German, Russian, Spanish, or an approved substitute, and a humanities or social sciences course taught in a foreign country and employing the language of that country.
  - C. One year of basic study in each of two foreign languages: French, German, Russian, Spanish, or an approved substitute language.

### II. General Education Requirements

1. Sciences (12 hrs.): At least one course taken in each of the biological (biological sciences), physical (chemistry, geology and geophysics, and physics), and mathematical<sup>(e)</sup> (mathematics/ statistics and computer science) sciences, but not to include MATH 1101 or COMP SCI 1010. A laboratory also may count – at the discretion of the student's major department – toward the total requirement.
2. Humanities (12 hrs.): At least one course in each of the three areas of literature (English and American), philosophy, and fine arts (art, music and theater), but not to include studio and performance offerings. This requirement is exclusive of courses in the student's major field.
3. Social Sciences (12 hrs.): Courses in at least two of the following areas: economics, political science, psychology, and sociology. This requirement is exclusive of courses in the student's major field.

### III. Major Field Requirements

1. Specific major field requirements in each discipline are given in the entry of that discipline.
2. A cumulative grade point average of 2.0 must be earned in all course work taken in the major field. Upper-class (3000- and 4000-level) courses completed with grades of "D" may not be included in the major field without the approval of the chairman of the department concerned.
3. At least nine hours of upper-class work in the major field must be completed in residence at Missouri S&T.

### IV. Minor Field Requirements

1. Specific minor field requirements in each discipline are given in the entry of that discipline.

2. A cumulative grade point average of 2.0 must be earned in all course work required in the minor field.
3. A least six hours of work in the minor field must be completed in residence at Missouri S&T.

## V. Elective Credits

1. In consultation with his or her advisor, each student will elect sufficient additional courses to complete a minimum of 120 credit hours.
2. Basic ROTC (military science and aerospace studies) may be taken in the freshman and sophomore years. Up to 12 credit hours (depending on the student's major) of advanced courses in ROTC may be credited toward a degree.

## Notes

- (a) For transfer students these requirements may be met by equivalent course work completed at other institutions.
- (b) An entering student may quiz out of ENGLISH 1120 Exposition And Argumentation (3 hours) on the basis of Advanced Placement (AP) standing, through various examinations offered by the College-Level Examinations Program (CLEP subject exams) through the Missouri S&T placement examination program based on Missouri College English Test (MCET) and Cooperative School and College Ability Test (SCAT) scores.
- (c) This requirement cannot be satisfied through foreign civilization courses which are taught in English. A student who has studied French or Spanish prior to enrolling in courses at Missouri S&T will be required to take a placement exam that will determine the appropriate course for his/her level of preparation. Students may not enroll in or receive credit for a course taken below their placement level. All course placement requires instructor's approval. A student may receive foreign language credit by examination with a score of 3, 4, or 5 on the language or literature AP exam or with a score in the 75th percentile or above on the CLEP exam.
- (d) Upon approval of the department chair students seeking teacher certification may substitute 11-16 hours of certification courses for their foreign language requirement. Students electing to make this substitution must complete the certification program to receive their chosen bachelors of arts degree.
- (e) The mathematics/statistics requirement may be satisfied by (1) examination or (2) the presentation of 2.5 high school units, including 1.5 units of algebra and excluding general mathematics. The student will not, however, receive hour credit so he or she must take another course to fulfill the 12 hours.

## VI. General Education Communications Requirements

Each department will provide students with opportunities to enhance their writing and speaking skills (beyond the required class) by requiring that they complete at least two communications intensive courses (CI), at least one of which should be in the student's major. Communication intensive (CI) courses may be focused on writing, speaking, or combinations thereof. Two communications emphasized (CE) courses may be used at the equivalent of one CI course (for example, four CE courses would substitute for two CI courses, but an appropriate substitute for the one CI course in the student's major). These requirements will be formally tracked and monitored by the degree audit to ensure that each graduating student is meeting the communications component of the general education requirement.

## VII. Experiential Learning Requirement

All students at Missouri S&T are required to participate in appropriate experiential learning activities. Experiential learning refers to learning stimulated by a variety of structured activities that differ significantly from the traditional lecture format. Experiential learning activities are designed to require students to go beyond mastering basic skills and knowledge in the application of that material to problem solving challenges. These activities involve collaboration and reflective learning and allow students to learn in environments that align with their aptitudes.

## VIII. Missouri Higher Education Civics Achievement Examination

In accordance with the Missouri Senate Bill 807 (section 170.013.1), 'any student entering a public institution of higher education for the first time after July 2019 who is pursuing an associate's or bachelor's degree from such institution shall successfully pass an examination on the provisions and principles of American civics with a score of seventy percent or greater as a condition of graduation from such institution'. To satisfy this requirement at Missouri S&T, students access the exam through the Canvas site. This requirement will be listed in the degree audit system as "ALL STUDENTS ARE REQUIRED TO PASS A CIVICS EXAM PRIOR TO GRADUATION. EXAM IS AVAILABLE IN CANVAS" and listed on the transcript as 'Missouri Civics Examination'.

For Missouri S&T, any student who has a catalog year of FS2019 or later, will have the graduation requirement of the civics exam.

## Bachelor of Science Degree

This degree can be earned in the following areas: aerospace engineering, architectural engineering, biological sciences, business and management systems, ceramic engineering, chemical engineering, chemistry, civil engineering, computer engineering, computer science, economics, education, electrical engineering, engineering management, English and technical communication, environmental engineering, geological engineering, geology and geophysics, information science and technology, mathematics, mechanical engineering, metallurgical engineering, mining engineering, nuclear engineering, petroleum engineering, physics, and psychology.

## Accreditation

Missouri S&T bachelor's level engineering programs in aerospace engineering, architectural engineering, ceramic engineering, chemical engineering, civil engineering, computer engineering, electrical engineering, engineering management, environmental engineering, geological engineering, mechanical engineering, metallurgical engineering, mining engineering, nuclear engineering, and petroleum engineering are accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org>.

Missouri law requires that all applicants for registration as professional engineers be graduates of engineering programs accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org>, (<http://www.abet.org>) or possess an education which includes at the minimum a baccalaureate degree in engineering and which, in the opinion of the registration board, equals or exceeds the education received by a graduate of a program accredited by EAC/ABET. Applicants who receive advanced degrees from Missouri S&T engineering programs, but do not have undergraduate engineering degrees, may not be eligible for registration in Missouri. Such applicants may wish to consider studying toward a bachelor's degree in their chosen engineering field. If so they

should consult with their department chairman regarding specific requirements. All eligible graduates are strongly encouraged to seek professional engineer registration.

Missouri S&T bachelor's level computer science program is accredited by the Computing Accreditation Commission of ABET, <http://www.abet.org>.

## Minimum Requirements

A minimum of 120 credit hours is required for a Bachelor of Science degree with an average of at least two grade points per credit hour to be obtained. The following general education requirements must be met:

1. Communications
  - A. ENGLISH 1120
  - B. One writing intensive course in major OR two writing emphasized courses in major
  - C. One writing intensive course out of major OR two writing emphasized courses out of major
2. Humanities plus Social Sciences
  - A. 21 credit hours (must be content approved by the department and school)
3. Mathematics and Science
  - A. Total of 18 credit hours
  - B. College algebra or higher
  - C. May include up to 3 credit hours of psychology

## Experiential Learning Requirement

All students at Missouri S&T are required to participate in appropriate experiential learning activities. Experiential learning refers to learning stimulated by a variety of structured activities that differ significantly from the traditional lecture format. Experiential learning activities are designed to require students to go beyond mastering basic skills and knowledge in the application of that material to problem solving challenges. These activities involve collaboration and reflective learning and allow students to learn in environments that align with their aptitudes.

## Missouri Higher Education Civics Achievement Examination

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## Dual Bachelor's Degree

Combination curricula leading to two baccalaureate degrees can be arranged in any two fields. The amount of additional credit required for the second baccalaureate degree will be based on the student's educational background and determined for each case by the academic department which offers the curriculum leading to the second degree.

The chair of the department will submit a list of the specific course and credit hour requirements, together with the student's transcript, to the provost for approval. This list will then be forwarded to the registrar and constitute the official requirement for the second degree. Since the B.A. degree is unspecified as to major there will be no dual bachelor of arts degree offerings. A student entering Missouri S&T with a baccalaureate degree must take a minimum of 30 hours to receive another bachelor's degree.

When requirements for a degree in two departments have been completed without either degree being awarded, both degrees may be awarded at the same commencement.

## Engineering Degree Requirements

All engineering degree programs must be consistent with the following minimum requirements.

The requirements of the degree program shall consist of 128-132 credit hours. Additional hours may be required for specific choices of electives or emphasis areas. Courses that are at a lower level of coverage than the required courses in the curriculum (e.g. algebra, trigonometry, intro to physics, etc.) may not be counted toward the degree program credit hours. An average of at least two grade points per credit hour must be obtained for all credits counted toward the degree. In addition, an average of at least two grade points per credit hour must be obtained for all credits taken in the student's major department.

The degree program shall include all courses in the common engineering freshman year, as listed in the current catalog under the Foundational Engineering and Computing Program.

Engineering degree programs will have a minimum of 21 credit hours of humanities/social-sciences as specified below. Many engineering degree programs will require specific humanities and social sciences courses to meet the requirements below. Specific engineering programs should be reviewed for their added requirements. Engineering degree programs shall include:

- ENGLISH 1120
- HISTORY 1200 or HISTORY 1300 or HISTORY 1310 or POL SCI 1200
- ECON 1100 or ECON 1200
- Communication elective: ENGLISH 1160 or ENGLISH 1600/TCH COM 1600 or ENGLISH 3560 or SP&M S 1185
- The remaining minimum of 9 additional credit hours must be three-credit hour lecture courses offered in disciplines in the humanities and social sciences. \*Humanities courses are defined as those in : art, English and technical communication, etymology, foreign languages, music, philosophy, speech and media studies, and theatre. Social sciences courses are defined as those in: economics, history, political science, and psychology. Some curricula may require the completion of a specified number of upper-level humanities/social sciences (H/SS) courses. Upper-level H/SS courses are defined as those at the 2000-level or above, and that require as a prerequisite the successful completion of a lower-level H/SS course. Study abroad courses may count as upper-level H/SS courses, even if they do not have a prerequisite. H/SS courses numbered 2001, 3001, and 4001 (experimental courses) may also be used to complete these elective requirements.

Courses in business, education, information science and technology, or any other discipline not listed above will **not** satisfy the humanities/social sciences elective requirement, although such courses may count toward

general education requirements. Transfer credits from other universities in sociology and general humanities may count as humanities or social science electives.

\*ENGLISH 1160, ENGLISH 1600/TCH COM 1600, ENGLISH 3560, and SP&M S 1185 do **not** count toward the remaining minimum of 9 additional credit hours in humanities/social sciences electives