Engineering (EGR)

In addition to developing a deep conceptual understanding of fundamental principles and putting this understanding into practice through exciting real-world applications, Smith engineering students understand the social, political, economic and environmental impact of their work. An integrated curriculum of liberal arts, science and engineering courses provides the breadth and depth needed to think critically, act reflectively and make informed choices. In the best Smith tradition, we believe that engineers should think deeply and broadly about the effect that their professional actions will have on the well-being of those whose trust they hold.

Smith's engineering program offers students two options to study engineering: a Bachelor of Science (S.B.) in Engineering Science [EGR], and a minor in Engineering Science. The Bachelor of Science in Engineering Science is accredited by the Engineering Accreditation Commission of ABET*, https://www.abet.org*, and is designed for those students who intend to pursue a career in engineering or graduate study in engineering or a related field. Engineering science combines the foundation that underlies all engineering disciplines with technical depth, design, and practice. Our students go on to pursue graduate degrees and careers in a range of engineering disciplines that include electrical, civil and environmental, materials, mechanical, bioengineering, aerospace, and industrial design. Because of their ability to think critically, act ethically, and communicate effectively as they frame and solve complex problems, Smith engineers are also widely sought after for opportunities in industry and nonprofit organizations.

The minor in Engineering Science enables students to study engineering in a meaningful and flexible way. It comprises EGR 100, EGR 110, and three additional engineering courses, at least one of which must be at the 300-level or higher, approved by an engineering academic advisor. The minor requires prerequisite courses in math and science that depend on the set of engineering courses chosen by the student. The flexibility allows multiple pathways through engineering with different areas of focus.

No matter which option appeals to you, first-year students considering engineering should take the engineering design course, *EGR 100 Engineering for Everyone*. Additionally, students who think they wish to pursue the engineering major are advised to take MTH 111 and CHM 111 in the fall if they have not had Calculus. If the Registrar has awarded the first-year student AP, IB, or Cambridge A-level credit for Calculus then they should take CHM 111 and one of (MTH 112 or PHY 117/119 or CSC 110) in the fall. Student who wish to pursue an Engineering major are advised to declare their major in the spring of their first year. Declared EGR majors have priority in registration for 200, 300, and 400-level engineering courses. Visit the Picker Engineering Program website for detailed program information, https://www.smith.edu/academics/engineering. The Engineering Office is located in Ford Hall 155.

Engineering – EGR

EGR designates a Bachelor of Science (S.B.) in Engineering Science major

Courses appropriate for entering first-year students

- EGR 100 *Engineering for Everyone*: Engineering majors and minors are required to take this course, which provides an introduction to engineering practice through design projects (offered in the fall and spring semesters)
- EGR 110 *Fundamental Engineering Principles*: Engineering majors and minors are required to take this course focused on quantitative problem solving and analysis. Coupled with EGR 100, these courses form an introduction to the field of engineering (only offered in the spring semester)
- CHM 111 *General Chemistry* (only offered in the fall semester)
- MTH 111 & 112 or more advanced math as appropriate

Courses for non-majors

- EGR 100 *Engineering for Everyone* is open to all first-year students and is offered in both the fall and spring of each year.

Additional Information

Students who think they wish to pursue the Engineering major are advised to:

- Consult the Picker Engineering Program website for more information
- Take MTH 111, CHM 111, and EGR 100 in the fall if they have **not** had Calculus
- Take CHM 111, EGR 100 and one of [PHY 117/119 or MTH 112 or Computer Science Req (one of CSC 110, 120, 205, 210, 220)] in the fall if the Registrar has awarded AP, IB, or Cambridge A-level credit for Calculus
- Take EGR 100 and EGR 110 and the required math and science courses [MTH111, CHM111 (fall), MTH112, and PHY117/119] in their first year
- Declare the EGR major before spring break of their first year. (Majors have priority for 200, 300, and 400-level EGR courses)

Pre-Matriculation Credit

Students who wish to apply pre-matriculation credit toward their degree are required to follow the college guidelines found on the Registrar's Office website. These guidelines include, but are not limited to, the following:

- only 16 pre-matriculation credits may be applied toward a Smith degree; and
- no more than 32 credits of combined summer, interterm, Advanced Placement or other pre-matriculation credits may be used. It is the student's responsibility to ensure through the Registrar's Office that all approved credits appear on their transcript.

Advanced Placement Exam (Score of 4 or 5)	Engineering Requirement Satisfied	Recommended Fall Course
Calculus AB	MTH 111	Consider one of (MTH 112 or PHY 117/119 or CSC 110)
Calculus BC	MTH 111 & 112	Consider one of (MTH 212 or PHY 117/119 or CSC 110)
Chemistry	CHM 111	Consider PHY 117/119 or CSC 111 or CHM 118 /222/224 that can count as a lab-based science course toward EGR degree
Physics C: Mechanics	PHY 117	Recommend PHY 118. PHY 118 will count as the major's additional lab-based science requirement. If PHY 119 is taken, it will count in lieu of AP Mechanics, and student would still need an additional lab science.
Physics C: E&M	Can count as PHY 118 and will satisfy the major's lab-based science course requirement depending on the introductory physics course the student chooses.	Take PHY 117 or PHY 119. Taking PHY 117 will satisfy the introductory physics requirement. If PHY119 is taken, it will fulfill the program's Introductory Physics requirement and the engineering program will waive the additional lab-based science requirement.
Physics C: Mechanics + Physics C: E&M	PHY 117 & Additional Lab Science Requirement	Consider PHY 119. PHY 119 will fulfill the program's Introductory Physics requirement and the engineering program will waive the additional lab-based science requirement.
Statistics	SDS 201 (Probability & Statistics Requirement)	
Statics	SDS 201 (Probability & Statistics Requirement)	
Biology	Can count as a lab-based science course toward EGR major	

International Baccalaureate Higher Level Exam (Score of 5, 6 or 7)	Engineering Requirement Satisfied	Recommended Fall Course
Chemistry	CHM 111	Consider PHY 117/119 or CSC 110 or CHM 118 /222/224 that can count as a lab-based science course toward EGR degree
Mathematics	MTH 111 & 112	Consider one of (MTH 212 or PHY 117/119 or CSC 110)
Physics	None	Consider PHY 117/119
Biology	Can count as a lab-based science course toward EGR degree	
Math Applications	SDS 201 (Probability & Statistics Requirement)	

International Cambridge A Level Exam (Score of A or B)	Engineering Requirement Satisfied	Recommended Fall Course
Chemistry	CHM 111	Consider PHY 117/119 or CSC 110 or CHM 118 /222/224 that can count as a lab-based science course toward EGR degree
Mathematics	MTH 111 & 112	Consider one of (MTH 212 or PHY 117/119 or CSC 110)
Physics	None	Consider PHY 117/119
Biology	Can count as a lab-based science course toward EGR degree	

Department/Program Advising Liaison

Martin J. Green
Assistant Director of Engineering Ford Hall, Room 155 mjgreen@smith.edu

BS in Engineering Science
Example Course Sequences

Example 1

YEAR	FALL	SPRING
1	EGR 100 or Breadth MTH 111 (or PHY 119*) CHM 111 or 118 Writing Intensive (FYS)	EGR 100 or Breadth MTH 112 PHY 117 (or Elective) EGR 110
2	**EGR 270 + lab (offered fall only)** EGR 290, CSC 110, or SDS 220 MTH 212 Breadth	**EGR 220 + lab (offered spring only)** EGR 290, CSC 110, SDS 220, or EGR 374 PHY 210 Breadth
3	EGR 374+lab or Technical Depth CSC 110 or SDS 220 Lab Science Breadth	EGR 374+lab or Technical Depth EGR Technical Depth EGR Technical Depth Breadth
4	EGR 410D and Capstone Project EGR Technical Depth EGR Technical Depth Elective	EGR 410D and Capstone Project Elective Elective Elective

*PHY119 is open to students with AP/IB/A-level calc and strong prior physics

Example 2 (early explorer)

YEAR	FALL	SPRING
1	Writing Intensive (FYS) MTH 111 Breadth Breadth	EGR 100 PHY 117 MTH 112 Breadth
2	**EGR 270 + lab (offered fall only)** CSC 110 or SDS 220 or lab science CHM 111 MTH 212	**EGR 220 + lab (offered spring only)** EGR 110 PHY 210 Breadth
3	EGR 290 CSC 110 or SDS 220 or lab science EGR 374+lab or Technical Depth Breadth	EGR 374+lab or Technical Depth CSC 110 or SDS 220 or lab science EGR Technical Depth Elective
4	EGR 410D and Capstone Project EGR Technical Depth EGR Technical Depth Elective	EGR 410D and Capstone Project EGR Technical Depth Elective Elective

BS in Engineering Science
Example Course Sequences

Example 3 (study away, no engineering away)

YEAR	FALL	SPRING
1	EGR 100 MTH 111 (or PHY 119*) Writing Intensive Foreign Language	EGR 110 MTH 112 PHY 117 (or Elective) Foreign Language
2	**EGR 270 + lab (offered fall only)** CHM 111 or 118 MTH 212 Breadth	**EGR 220 + lab (offered spring only)** EGR 290 PHY 210 SDS 220 or CSC 110
3	EGR 374 + lab SDS 220 or CSC 110 Lab Science EGR Technical Depth	*Breadth (study away)* *Breadth (study away)* *Breadth (study away)* *Elective (study away)*
4	EGR 410D and Capstone Project EGR Technical Depth EGR Technical Depth Elective	EGR 410D and Capstone Project EGR Technical Depth EGR Technical Depth Elective

*PHY119 is open to students with AP/IB/A-level calc and strong prior physics

Example 4 (study away, w engineering away)

YEAR	FALL	SPRING
1	EGR 100 MTH 111 (or PHY 119*) Writing Intensive (FYS) Foreign Language	EGR 110 MTH 112 PHY 117 (or Elective) Foreign Language
2	**EGR 270 + lab (offered fall only)** CHM 111 or 118 MTH 212 Breadth	**EGR 220 + lab (offered spring only)** EGR 290 PHY 210 SDS 220 or CSC 110
3	EGR 374 + lab SDS 220 or CSC 110 Lab Science Breadth	*EGR Technical Depth (study away)* *EGR Technical Depth (study away)* *Breadth (study away)* *Elective (study away)*
4	EGR 410D and Capstone Project EGR Technical Depth EGR Technical Depth Breadth	EGR 410D and Capstone Project EGR Technical Depth Elective Elective

*PHY119 is open to students with AP/IB/A-level calc and strong prior physics

BS in Engineering Science
Example Course Sequences

EGR Technical Depth indicates one of the five required engineering courses for the EGR major (four of five at the 300-level)

Breadth indicates courses taken for Latin Honors or in pursuit of a humanities or social science minor.

Elective indicates a course that is entirely free from constraints – could be within engineering, could be outside.

AP, IB, or other credits may enable more freedom and flexibility in course selection.