Advising Guide for Pre-Engineering Students

Students expressing an interest in a career in engineering should be aware that they will need specific skills learned through a major in the natural sciences and mathematics. Students should also be aware that the liberal arts core curriculum will be beneficial in terms of their future career as skills in communication both written and oral are extremely important in engineering along with knowledge of such topics as economics and ethics.

When students are trying to decide upon a major, they should consider what discipline or sub-discipline of engineering they are considering and try to match a major here at HSC to the discipline of engineering. For the broad major categories of engineering: civil, mechanical, or electrical, students should major in either physics or engineering physics. For a specific discipline of petroleum engineering, students should major in chemistry and minor in mathematics. When a student needs to start thinking about declaring a major, it is a good idea to have them meet with either Dr. Cheyne, Dr. McDermott, or Dr. Thurman in the physics and astronomy department to help them with that decision.

Suggested Course Schedules for the Physics and Astronomy Department

No calculus background from high school and/or Math SAT < 600

Freshman Year

Fall		Spring	
Course	Credits	Course	Credits
MATH 105	1	MATH 141	4
PHYS 101	3	PHYS 106	3
RHET 1xx	3	RHET 1xx	3
WCUL 101	3	WCUL 102	3
Foreign Language	3	Foreign Language	3
Core Requirement	3		
	16		16

Sophomore Year

Fall		Spring	
Course	Credits	Course	Credits
MATH 142	4	MATH 231	4
PHYS 131	3	PHYS 132	3
PHYS 151	1	PHYS 152	1
GCUL 10x	3	Core Requirement	3
Foreign Language	3	Core Requirement	3
Core Requirement	3		
	17		14

Some calculus background from high school and/or Math SAT > 600

Freshman Year

Fall		Spring	
Course	Credits	Course	Credits
MATH 141	4	MATH 142	4
PHYS 101	3	PHYS 106	3
RHET 1xx	3	RHET 1xx	3
WCUL 101	3	WCUL 102	3
Foreign Language	3	Foreign Language	3
	16		16

Sophomore Year

Fall		Spring	
Course	Credits	Course	Credits
MATH 242	4	MATH 231	4
PHYS 131	3	PHYS 132	3
PHYS 151	1	PHYS 152	1
GCUL 10x	3	Core Requirement	3
Foreign Language	3	Core Requirement	3
Core Requirement	3		
	17		14

Suggestions for Further Education in Engineering

GRE

A student's Graduate Record Exam (GRE) score is an important factor in determining whether students will be admitted to a top-tier graduate school program for engineering.

Advisees should be encouraged to begin GRE preparation in the junior year of undergraduate academic career with the goal of taking the exam no later than the fall of their senior year. (Many students take the GRE at least twice, so the spring of their junior year is often the best time to schedule an initial test.) Students should be encouraged to take graded practice exams to increase their exposure to the test format and lower test anxiety. There is a plethora of free or inexpensive online preparation materials.

GPA

Regardless of major, students need a strong GPA to be admitted into nationally recognized engineering graduate programs in Virginia and elsewhere. Consequently, students should be reminded that *all classes matter* from the standpoint of being accepted into their school of choice and receiving financial aid. Students must dedicate themselves to excelling in coursework, even in core curriculum courses that may not be of immediate interest.

Students should be advised to build a resume that demonstrates a dedication to a career in engineering that goes beyond "I have a family member who is an engineer." or "I've always been interested in engineering." For example, students should consider:

- Internship and/or professional shadowing opportunities with engineering firms.
- Volunteering at RVA-STEM, Engineers Without Borders, Code for America, or Develop for Good. Students should also contact their local government agencies to inquire about volunteering opportunities that require some level of engineering work.
- Focusing on engineering research in their Advanced Project course, independent study, or summer research. (This work can then be used as demonstrating application of engineering principles to solve a problem.)

Student Groups

Advisors should encourage students to engage with campus groups and organizations.

Society of Physics Students (SPS)

An HSC student run organization, SPS membership provides many benefits to its members. For example, active membership in SPS allows students to:

- Networking – access to professionals in the discipline
- Leadership – opportunities to develop teamwork skills
- Presenting – access to conferences and journals for research findings
- Funding – opportunities to receive monies for education, research, or travel to conferences

Sigma Xi

An international non-profit science and engineering honor society, membership is by invitation only, where members nominate others on the basis of their research achievements or potential.