Welcome to The College of Engineering at Virginia Tech

Information Session
What Does It Take To Be An Engineer?

01 Creativity
02 Teamwork
03 Study Habits
04 Interest in Math and Science
05 Challenging High School Background
- AP/IB/CLEP and Honors Classes
- Extracurricular Activities
Freshman Engineering
Class of 2018*

Average Reported GPA: 4.19/5.0
Average SAT (Math/Reading): 707/655
Females: 22.3%
Minority: 32%
1. Common Entry Point & Classes
   https://goo.gl/SurRTA

2. AP/IB/CLEP/Dual Enrollment Credit Accepted
   • www.tranguide.registrar.vt.edu

3. Pathways for General Education Curriculum

4. Select Major at end of Freshman Year
   (3.0 guarantees first choice)

Freshman Year: General Engineering
Foundations of Engineering

- Design and Teamwork
- Disciplines
- Algorithms
- Graphing
- Problem Solving
- The Future of Engineering
<table>
<thead>
<tr>
<th>Field</th>
<th>Enrollment</th>
</tr>
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<tbody>
<tr>
<td>Engineering Education</td>
<td>2733</td>
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<tr>
<td>Aerospace</td>
<td>430</td>
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<td>Biological Systems</td>
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<td>*Biomedical</td>
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<td>Chemical</td>
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<td>Civil</td>
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<tr>
<td>Construction Engineering and Management</td>
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<tr>
<td>Electrical</td>
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<td>Engineering Science and Mechanics</td>
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<td>Industrial and Systems</td>
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<tr>
<td>Materials Science and Engineering</td>
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<td>Mechanical</td>
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<tr>
<td>Mining</td>
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</tr>
<tr>
<td>Ocean</td>
<td>66</td>
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</tbody>
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**Fall 2018: Approximate Undergraduate Enrollment**
Electrical Engineering

• What you do:
  • Electrical Systems
  • Electronics and microelectronics
  • Electromagnetics
  • Communication systems
  • Controls
• Lab-based design projects
• Job types/industry:
  • Power and Energy
  • Microelectronics/semiconductors
  • Communications
  • Needed everywhere
• Information Session at 2pm on Mon/Fri in 340 Whittemore
Computer Science

- Design and develop software from operating systems to applications
- Possible Areas of Study:
  - Human Computer Interaction
  - Knowledge, Information & Data
  - Media Creative Computing
  - Scientific Computing
  - Systems & Networking
- Possible 5 year B.S./M.S. Track
- Job Types:
  - Software Design & Development
  - Network & Computer Security
  - Mobile Applications
  - Game Design & Development
- Information Session at 1:15 in 114 McBryde Hall
Computer Engineering

- Incorporating computing systems into everyday life
- Developing ways to make computers, faster, smaller, and more capable
- Areas of Specialization
  - Networking
  - Hardware
  - Computer Systems
  - CyberSecurity, Software & Machine Intelligence
  - Communications
  - And more!
- Information Session at 2pm on Mon/Fri in 340 Whittemore
Biological Systems Engineering

• Land and Water Resource Engineering
  • Watersheds, Hydrology, Environmental Health, Resource Management

• Bio-processing Engineering (pre-med, pre-vet, pre-dental)
  • Biomolecular, Biomedical, Food Processing

• Job Types:
  Biopharmaceutical/Biotechnology/Biochemical/Biofuels/Biomass Industries, Food Processing, Ecological Engineering & Watershed Management, Government Agencies, Nonprofit Organizations
Chemical Engineering

• Applications of chemistry, mathematics, physics and biochemistry
• Find solutions in fuels and energy, chemical production, environmental quality and sustainability, food, health and pharmaceuticals
• International options for summer laboratory experience (Denmark or Germany)
• Job Types: Fuels, Chemicals, Ceramics, Paper, Pharmaceuticals, Consumer Products, Consulting, etc.
Materials Science and Engineering

- Key Areas:
  - Studying the properties and structure of materials
  - Creating new and better materials
  - Selecting appropriate materials for a wide range of applications
- Possible Areas of Study:
  - Metals
  - Polymers
  - Ceramics
  - Composites
  - Nuclear materials
  - Electronic materials
  - Biomaterials
- Hands-on laboratories (including a foundry)
- Job Types: Design, Aerospace, Automotive, Biomaterials, Metallurgical, Semiconductors, Defense
Mining and Minerals Engineering

- Areas of Emphasis
  - Exploration (finding new reserves)
  - Evaluation (determining economic potential)
  - Development (creating the mine)
  - Extraction (removing the ore)
  - Mineral Processing (recovering valuable materials from ore)
  - Reclamation (restoring the land)

- Job Types: *Mine Scheduling and Supervision, Mine Design, Equipment Selection, Mineral Purification*
Civil Engineering

• Design, build, and maintain infrastructure
• Areas of Emphasis:
  - Construction
  - Land Development
  - Transportation
  - Materials
  - Environmental
  - Water Resources
  - Geotechnical
  - Structures
• Job Types: Structural Engineer, Environmental Engineer, Construction Manager, Water Resources Engineer, Transportation Engineer, and Geotechnical Engineer
Construction Engineering and Management

- Plan, direct, and coordinate construction projects (residential, commercial, public works, etc)
- Integration of
  - Civil & Environmental Engineering
  - Building Construction
  - Business
- Engineering with construction and business management
- Job Types: Project Engineer, Field Engineer, Assistant Project Manager, Field Planner, Estimator, & Construction Manager
Aerospace and Ocean Engineering

- Aerodynamics, hydrodynamics, structures, propulsion, flight mechanics, design optimization, flight control, etc.
- Wind tunnels (including stability, open-jet, cascade, supersonic, hypersonic, etc.)
- Double Major with Aerospace and Ocean Engineering available
- Job Types: Structural Analysis, Design Engineering, Control Engineering, Naval Architecture, Underwater Vehicle Development, etc.
Mechanical Engineering

• Apply principles (motion, energy, heat, force) to design, construct, and operate machines or devices

• Topic Areas include:

  Acoustics  Energy Mgmt  Power
  Aeronautics  Fluid  Generation
  Automotive  Mechanics  Propulsion
  Biomedical  HVAC  Robotics
  Combustion  Manufacturing  Smart Materials
  CAD  Mechatronics  Vehicle
  Controls  Nuclear  Dynamics
Biomedical Engineering

• Produces interdisciplinary trained engineers who can solve problems associated with complex biological systems by applying the principles of biology, chemistry, medicine, physics, and engineering

• Areas of interest:
  • Biomedical Devices and Bioinstrumentation
  • Biomedical Imaging
  • Biomechanics
  • Biomaterials
  • Cardiovascular Engineering
  • Nanomedicine and Nanoengineering
  • Neuroengineering
  • Tissue Engineering and Regenerative Medicine
  • Translational Cancer Research

• Sample Job Types: Medical Devices, Tissue Engineering, Cancer Research, Automotive and Military Safety, Product and Sports Safety, Consulting, as well as advanced degree programs such as medical school and biomedical engineering graduate programs.
Engineering Science and Mechanics

• Three main pillars:
  Fluid Mechanics
  Solid Mechanics and Structures
  Dynamics

• Concentrations in:
  Biomechanics
  Physics

• Emphasis of engineering fundamentals to provide a strong mathematical background applicable to any field

• Job Types: Biomedical, Civil, Nuclear, Aerospace, Mechanical, and many more!
Industrial and Systems Engineering

• Analyze, design, implement, and improve integrated work systems

• Areas of emphasis:
  • Human Factors and Ergonomics
  • Manufacturing Systems
  • Management Systems
  • Operations Research

• Job Types: Health Care, Transportation, Manufacturing, Cost Analysis, Optimization, Product Design and Evaluation, Consulting
Explore Engineering Virginia Tech
Opportunities Available

• Engineering Minors:
  • Computer Science
  • Cybersecurity
  • Green Engineering
  • Microelectronics
  • Naval Engineering
  • Biomedical Engineering
  • Interdisciplinary Engineering & Science (Scieneering)

• Study Abroad
• Undergraduate Research
• Engineering Professional Societies & Organizations
Internships and Co-Op Experiences
Support: Outside of Class

Career Fairs
STEP

CEED Peer Mentoring
Hypatia/Galileo
Hands-On, Minds-On

Astrobotics
Baja SAE
BioactiVT
Battery Operated Land Transport
Concrete Canoe
Design, Build, Fly
Formula SAE
Houses for the Future
Human Powered Submarine
Hybrid Electric Vehicle
Hyperloop
Programming Competitions
Steel Bridge
VT Engineering Rankings

• Virginia Tech Ranked 13th Overall in Wall Street Journal “The Top 25 Recruiter Picks,” 5th for Engineering

• Among Accredited Engineering Schools Nationwide: 13th
  • Aerospace 15th
  • Biological 8th
  • Civil 7th
  • Environmental 10th
  • Industrial 8th
  • Mechanical 14th

• *U.S. News & World Reports America’s Best Colleges 2017
Outcomes

• Freshman who continued to a second year in engineering:
  • Last 5 years averaged 90%

• After graduation:
  • For the Class of 2018
    • 67% are employed
    • 13% plan to attend graduate school OR have accepted admission

• Median Starting Salary: $65,000 for Class of 2017
Scholarships

- For Freshmen
  - Davenport Leadership Scholar
  - Pratt Engineering Scholarship
  - Financial Aid
  - Leo A. Padis Scholarship
    - VCCS transfer students

- For Upperclassmen
  - College of Engineering Funds
  - Departmental Scholarships
  - One Application!
Computer Guidelines & Requirements

- A laptop or 2-in-1 tablet PLEASE CHECK SPECIFICATIONS ON WEBSITE!
- Special pricing and warranty through bookstore
- Don’t buy until summer before entering
  - Specs will be posted by March 31, 2019
- Benefits:
  - Digital ink for taking notes
  - Drawing diagrams
  - Writing equations
  - Submitting/grading homework
Lab Tours

• Ware Lab
  • Military Building (203)
  • 10:00 AM – 6:00 PM
• Doors are open for visits!
Why Did I Come to the College of Engineering at Virginia Tech?
Where Should I Eat Lunch?

- Au Bon Pain – Squires
- Burger ‘37 – Squires
- D2
- Deet’s Place
- DXpress
- Owens Food Court
- Turner Place
- West End
- Off Campus