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COLLEGE OF ENGINEERING

FAST FACTS

1,054 UNDERGRADUATES
84% GRADUATE WITHIN 5 YEARS (VERSUS NATIONAL AVERAGE OF 47%)
91% FRESHMAN-TO-SOPHOMORE RETENTION RATE (VERSUS NATIONAL AVERAGE OF 76%)
29% FEMALE (VERSUS NATIONAL AVERAGE OF 21%)
13:1 STUDENT TO FACULTY RATIO
22 AVERAGE CLASS SIZE
WHAT CHANGE WILL YOU IGNITE?

With an engineering degree you’ll learn how the world works—and how to make it work better. Many schools graduate engineers who solve problems. We graduate engineers who ignite change.

IN THE CLASSROOM
From day one, you’ll learn to think like an engineer in small classes taught by faculty members. You’ll benefit from the expertise of those who bring engineering to life through hands-on instruction that bridges theory and practice. Entrepreneurially minded learning experiences both inside and outside the classroom will help you realize your creative and innovative potential. You’ll collaborate with your classmates to help each other succeed.

IN THE LABORATORY
Work alongside faculty on their latest research. Connect with industry professionals on real-world challenges in the Multidisciplinary Design Lab. Collaborate on a senior project, which may benefit a community down the street or around the world. In the process, you’ll develop leadership and team building skills, and learn best practices for laboratory research and technical communication.

IN THE COMMUNITY
With service learning built into the curriculum, there are countless opportunities for Villanova engineers to take what they learn in the classroom and apply it to some of the world’s most complex challenges. Our rigorous curriculum is rooted in the liberal arts and our Augustinian values. You don’t just learn what to do as an engineer, but how to do it in a way that benefits humanity and builds a sustainable society.

Let us help you—in the words of St. Augustine—“become what you are not yet.”
THE FRESHMAN EXPERIENCE

A SOLID FOUNDATION

Your Villanova Engineering experience begins in the fall semester of your first year with courses in math, science and Augustinian culture, as well as a core course in engineering fundamentals. Our active-learning, problem-based approach prepares you for a team-based, faculty-mentored multidisciplinary engineering project later in the semester. Each student team presents its project findings, which strengthens communication skills and teaches best practices for presenting scientific information.

As a freshman you are assigned an academic advisor who is a full-time faculty member in your major. Your advisor will help ensure proper course selection and your advancement in the program.

RECENT MULTIDISCIPLINARY FRESHMEN PROJECTS:

• Biomimicry
• Biomedical Signal Analysis
• Sustainable Systems Design
• SMARTBEAM
• DIY Biosensor
• Biofuels
• Disaster Shelters

PROFILE OF THE FRESHMAN CLASS (CLASS OF 2022):

- 265 STUDENTS
- 31% FEMALE
- 17% ETHNIC/RACIAL MINORITY
- REPRESENTS 26 STATES
- AND 5 COUNTRIES

- 1470 – 1330 MIDDLE 50% COMBINED RANGE SAT SCORE (MATH/VERBAL)
- 96% IN THE TOP 25% OF THEIR HIGH SCHOOL CLASS
- 33 – 30 MIDDLE 50% COMPOSITE ACT RANGE

ENGINEERING HONORS

Each year, 25 to 30 incoming engineering students are selected to the Honors Program. No special application is required, however, interested students should apply to Villanova by November 1 to be considered and must indicate their interest on the member section of the Common Application. Students admitted to Villanova are invited to the Honors Program within a week of their acceptance to the University.

Ten Honors classes are required to earn an Honors degree and engineering students choose between a research track and a design track.

“"The freshman project gives you a chance to see a real application of what you’ll be doing as an engineer, and provides a great introduction to the field as a whole. It also helps you adjust to working in teams, which is something you’ll do throughout your career.”

DANIEL FETSKO
CIVIL ENGINEERING
HUDSON, OH

“"Villanova is going to provide you with so much more than a piece of paper with a degree on it. Your classmates will quickly turn from strangers to lifelong best friends. This is all thanks to the freshman engineering program.”

KENNA BRYAN
COMPUTER ENGINEERING
NEWTOWN SQUARE, PA
CHEMICAL ENGINEERING

CAUSING A REACTION

Using the principles of mathematics, chemistry, physics and engineering sciences, Villanova chemical engineering students learn to produce, transform and properly use chemicals and energy to produce almost anything. You will be taught to creatively solve technical, commercial and social problems arising in industries which manufacture bulk chemicals, fuels, pharmaceuticals, cell therapies, plastics, cosmetics, foods and much more.

THE FUNDAMENTALS
- Fluid Mechanics
- Heat Transfer
- Thermodynamics
- Reactor Design
- Chemical Process Control
- Process Design

TECHNICAL ELECTIVES
- Biochemical Engineering
- Nano and Advanced Materials
- Energy and Sustainability
- Cell and Genetic Engineering

RELATED MINORS
- Biochemical Engineering
- Biomedical Engineering

REAL-WORLD OPPORTUNITIES
Through the two-semester Senior Project Studio, Chemical Engineering majors can participate in an industry-sponsored design or research project. In addition, a number of students work directly with professors, which can lead to co-authored papers and presentations at industry conferences.

RECENT UNDERGRADUATE RESEARCH PROJECTS INCLUDE:
- Optimization of T cell growth and manufacture
- Preparing LtEc-alginate hydrogels for animal cell culture
- Synthetic production of plasmids for gene therapy
- Optimization of wetland microbial fuel cells using novel electrodes
- High temperature CO₂ sorption by mesoporous lithium orthosilicate

ORGANIZATIONS AND TEAMS
- American Institute of Chemical Engineers Student Chapter
- Chem-E Car
- Omega Chi Epsilon Honor Society

OUTCOMES
Demand is increasing for chemical engineers in emerging areas such as nanotechnologies, alternative energy and biotechnology. The Bureau of Labor Statistics reports that the retirement of many current chemical engineers by 2024 will create favorable job prospects.

In 2017, 12 percent of Villanova Chemical Engineers continued their education after graduation. Those who entered the job market earned an average starting salary of $61,859.

GRADUATES ARE WORKING FOR COMPANIES INCLUDING:
- Air Products & Chemicals
- Axalta Coating Systems
- Dow Chemical
- GlaxoSmithKline
- Johnson & Johnson
- Mars Wrigley Confectionary
- Merck
- Proctor & Gamble
- The Estee Lauder Company
- U.S. Navy

“Professors are extremely enthusiastic about their research and really care about the students who work for them. They continuously reached out to help me learn more.”

JOHN AQUINO
CHEMICAL ENGINEERING
FAIRFIELD, CT
JOHN CONDUCTED SUMMER RESEARCH WITH FACULTY THROUGH A ROSAS CHEMICAL ENGINEERING SCHOLARSHIP.

- FAST FACTS -

13
FULL-TIME FACULTY

255
CHEMICAL ENGINEERING UNDERGRADUATES

44%
FEMALE
Civil and Environmental Engineering

Designing and Constructing the Future

Civil and environmental engineers design, construct and protect the physical and natural environment. Because the scale of these projects often affects large segments of the population, the responsibilities of civil engineers extend beyond mere physical facilities. Villanova faculty prepare students to play vital roles in enhancing quality of life while protecting the environment and improving sustainability.

The Fundamentals

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

Related Minor

- Sustainability Studies

- Fast Facts -

19 Full-Time Faculty
222 Civil and Environmental Engineering Undergraduates
36% Female

Real-World Opportunities

In addition to a senior capstone design project, students may take a course of undergraduate research where they work directly with a faculty advisor and a graduate student mentor, and receive academic credit.

Recent Undergraduate Projects include:

- Restoration of SEPTA’s commuter rail service
- Green stormwater infrastructure for Panama City, Panama
- Examining water flow through constructed wetlands
- Investigation of reclaimed asphalt pavement properties for sustainable infrastructure
- Design of a single span steel superstructure highway bridge
- Water supplementing solutions for the dry season in India

Organizations and Teams

- American Society of Civil Engineers Student Chapter
- Chi Epsilon Honor Society
- Collegiate Traffic Bowl
- Concrete Canoe
- GeoWall
- Institute of Transportation Engineers Student Chapter
- NovaCANE (Villanova Community Action by New Engineers)
- Steel Bridge

Outcomes

Civil engineers and environmental engineers rank among the “100 Best Jobs” and the top 25 “Best STEM Jobs,” according to U.S. News & World Report (2018). Civil engineers also account for the most jobs of any engineering field and the U.S. Bureau of Labor Statistics predicts continued growth.

In 2017, 25 percent of Villanova Civil Engineers continued their education after graduation. Those who entered the job market earned an average starting salary of $60,085.

Graduates Are Working For Companies Including:

- AECOM
- Dewberry
- SEPTA
- Skanska USA
- Thornton-Tomasetti
- Turner Construction
- Urban Engineers
- Whiting-Turner

“My courses and internships provided an abundance of civil engineering knowledge and real-world experience, while I also enjoyed a research opportunity that would be reserved for graduate students at other schools”

NATHANIEL GALLISHAW
CIVIL ENGINEERING
SEEKONK, MA
COMPUTER ENGINEERING

ADVANCING TECHNOLOGY

Computer engineers blend theories from computer science and applications from electrical engineering to develop new hardware and software for computer systems. These engineers optimize and advance the core technologies behind the Internet, wireless communications and mobile computing.

FUNDAMENTALS
• C and C++ Programming Languages
• Computer Hardware and Architectures
• Computer Interfacing
• Computer Networks
• Digital System Design
• Efficient Computer Algorithms
• Microprocessor Systems

SPECIALIZATIONS
• Cybersecurity
• Microcontrollers
• Multimedia
• Real-time Digital Signal Processing
• Software Engineering

TECHNICAL ELECTIVES
• Biomedical Signal Processing
• Game Development
• Artificial Intelligence
• Select courses from the Department of Computer Science

RELATED MINORS
• Electrical Engineering
• Mechatronics

REAL-WORLD OPPORTUNITIES

Every student completes a senior capstone design project, which covers three semesters and involves student teams working on a variety of real-world problems, many of which are sponsored by industry partners. You can also speak with your advisor about research opportunities with faculty.

RECENT UNDERGRADUATE PROJECTS INCLUDE:
• Mario Kart system to measure focus and attention levels in players with ADHD
• Measurements of multicore microstructured optical fibers heated up to 100 C
• Information management system for El Bluff hospital in Nicaragua
• Wheelchair communication system
• Facial recognition of Philadelphia Zoo animals
• Active defense cybersecurity

ORGANIZATIONS AND TEAMS
• Eta Kappa Nu Honor Society
• National Cyber Analyst Challenge
• RobotX

OUTCOMES

The College Board lists computer engineers among the top 10 occupations with the most job openings (2018). In 2017, 32 percent of Villanova Computer Engineers continued their education after graduation. Those who entered the job market earned an average starting salary of $66,410.

GRADUATES ARE WORKING FOR COMPANIES INCLUDING:
• Brooks Instrument
• Ernst & Young
• Goldman Sachs
• Harris Corporation
• Lockheed Martin

“Our freshman year cybersecurity project prompted my interest in developing a two-factor fingerprinting device. I went to the department with my idea and they funded my work, which I now hope to patent!”

LAUREN HENDERSON
COMPUTER ENGINEERING
ANNAPOLIS, MD

- FAST FACTS -

21
FULL-TIME FACULTY

157
COMPUTER ENGINEERING UNDERGRADUATES

17%
FEMALE
ELECTRICAL ENGINEERING

HARNESSING THE POWER

Electrical engineers use mathematics, science and technology to design, construct and maintain a wide array of products, services and information systems. From the nanoscale to the macroscale, products and systems that utilize electromagnetic waves, electrons and photons in their operation belong to the field of electrical engineering.

FUNDAMENTALS
- Analog and Digital Electronics
- Communication Systems
- Control Systems
- AC and DC Circuits
- Electric Energy Systems
- Electromagnetics
- Electronic Materials and Devices
- Signal Processing

SPECIALIZATIONS
- Biomedical Engineering
- Electric Energy Systems
- Electronics
- Embedded Systems
- High Frequency Systems
- Signal Processing

RELATED MINORS
- Computer Engineering
- Biomedical Engineering
- Mechatronics

REAL-WORLD OPPORTUNITIES
Over three semesters, students complete a real-world senior capstone design project with a team of fellow Electrical and Computer Engineering majors. These projects are often sponsored by industry partners or reflect international service work.

RECENT UNDERGRADUATE PROJECTS INCLUDE:
- A cost-effective chromatography system
- Interfacing the smart home with the smart grid
- 3-D space-filling curve antennas
- Autonomous perceptive vision through haptic feedback
- Smart baseball

ORGANIZATIONS AND TEAMS
- Eta Kappa Nu Honor Society
- Formula SAE (Nova Racing)
- Institute of Electrical and Electronic Engineers Student Chapter
- RobotX

OUTCOMES
The National Association of Colleges and Employers lists Electrical Engineering majors among the top 10 most in demand by employers (2017).

In 2017, 15 percent of Villanova Electrical Engineers continued their education after graduation. Those who entered the job market earned an average starting salary of $67,675.

GRADUATES ARE WORKING FOR COMPANIES INCLUDING:
- Harris Corporation
- IBM
- Jaros, Baum & Bolles
- Lockheed Martin
- Raytheon
- Texas Instruments
- U.S. Navy

“Working on real-world projects with Villanova faculty has given me the skills that I’m going to need to have the career that I want to have.”

BRIANNA CONTE
ELECTRICAL ENGINEERING
HILLSDALE, NJ

- FAST FACTS -

21 FULL-TIME FACULTY
109 ELECTRICAL ENGINEERING UNDERGRADUATES
18% FEMALE
The field of mechanical engineering nurtures designers and inventors who layer scientific principles on a strong mathematical foundation to develop creative solutions to the world’s challenges. As one of the broadest engineering disciplines, mechanical engineering students are exposed to many different career possibilities, including robotics, aerodynamics, biomedical and energy systems. The curriculum includes both engineering fundamentals and cutting-edge technology.

**CONCENTRATIONS**
- Mechanics and Materials
- Thermal Fluids Systems

**TECHNICAL ELECTIVES**
- Biomechanics
- Flight Dynamics
- Mechatronics

**RELATED MINORS**
- Aerospace Engineering
- Biomedical Engineering
- Dynamics and Controls
- Nanomaterials
- Robotics
- Renewable Energy
- Mechatronics

**REAL-WORLD OPPORTUNITIES**
All seniors complete a two-semester capstone design experience. Many of these projects are industry-sponsored, while others are based on international service learning projects. Research opportunities are available for a selected number of students, both during the academic year, and over summers.

**RECENT UNDERGRADUATE PROJECTS INCLUDE:**
- Lap time simulator for motorsport applications
- Hybrid-electric system for AWD Christini Technologies’ fatbike
- 3-D underwater mapping with stereo sonar
- Unexploded ordnance remediation robot for Cambodia
- Water technology for Madagascar

**ORGANIZATIONS AND TEAMS**
- American Institute of Aeronautics and Astronautics Student Chapter
- American Society of Mechanical Engineers Student Chapter
- Formula SAE (Nova Racing)
- Pi Tau Sigma Honor Society
- RobotX

**OUTCOMES**
U.S. News & World Report ranks “Mechanical Engineer” #34 on its list of the 100 Best Jobs and #7 on their list of Best STEM Jobs (2018).

In 2017, 13 percent of Villanova Mechanical Engineers continued their education after graduation. Those who entered the job market earned an average starting salary of $62,978.

**GRADUATES ARE WORKING FOR COMPANIES INCLUDING:**
- Army Research Labs
- Exelon Nuclear
- Goldman Sachs
- Harris Corporation
- IBM
- Jaros, Baum & Bolles
- Lockheed Martin
- Naval Surface Warfare Center
- Piasecki Aircraft
- SencorpWhite
- Skanska USA
- Turner Construction

“At Villanova, I learned engineering fundamentals and had the opportunity to conduct state-of-the-art research on globally important engineering problems with professors who are experts in their fields.”

JOSEPH SCHAADT
MECHANICAL ENGINEERING, 2016 FULBRIGHT SCHOLAR
SUNNYVALE, CA
ENGINEERING MINORS

BROADEN YOUR HORIZONS

Engineering students may choose to expand their studies in a number of engineering minor program areas. You can satisfy other curiosities by exploring dozens of options offered by Villanova’s College of Nursing, College of Liberal Arts and Sciences or the Villanova School of Business.

MINORS IN THE COLLEGE OF ENGINEERING

The following programs are available to all engineering students who satisfy the prerequisites:

AEROSPACE ENGINEERING
Provides a thorough background in aerospace topics to prepare students for careers or advanced study in the aerospace field.

BIOCHEMICAL ENGINEERING
Prepares graduates for the biopharmaceutical industry—designing and optimizing processes for the manufacture of antibiotics, vaccines, antibodies and cell therapy products.

BIOMEDICAL ENGINEERING
Combines engineering principles with medical and biological sciences such that students learn to design and create equipment, devices, computer systems and software used in healthcare and the human body.

COMPUTER ENGINEERING
Provides students with the fundamentals of computer engineering and offers electives in networks, security, programming, design and more.

ELECTRICAL ENGINEERING
Provides a foundation in MATLAB programming and electromagnetics and offers courses in Signal Processing, Electronic Materials and Devices, and Analog Electronics.

ENGINEERING ENTREPRENEURSHIP
Provides a thorough introduction to the “entrepreneurial mindset” for all students. The College’s most popular minor program begins with a course in Creativity and Innovation and covers a range of topics, including opportunity identification, technical and business feasibility, prototyping and business model development.

The Engineering Entrepreneurship minor can be completed over three years, or through the Engineering Entrepreneurship Summer Institute, a condensed, 7-week, 16-credit program.

MECHATRONICS
Offers an interdisciplinary look at the design, development and control of advanced hybrid systems—robotics, vehicles, automotive subsystems and more.

SUSTAINABILITY STUDIES
This interdisciplinary minor (offered with the College of Liberal Arts and Sciences) requires all students to take Seminar in Sustainability Studies, and to select two courses from the humanities, social sciences and technology. The Sustainability Studies program also offers two summer study abroad opportunities in Lille, France, and Costa Rica.

CAREER COMPASS

PREPARING TOMORROW’S PROFESSIONALS

As part of Villanova’s comprehensive undergraduate engineering program, students learn not only the scientific, mathematical and engineering principles expected of every engineer, but also the professional skills they need to succeed in any career. Career Compass is a professional development program that augments the College’s technical engineering curriculum. Spanning the freshman through junior years, Career Compass was designed in collaboration with industry leaders, alumni, faculty and current students and consists of four areas of focus:

• THE ENGINEERING PROFESSION
• SETTING THE STAGE FOR PERSONAL SUCCESS
• POST-GRADUATION PLANNING
• COMMUNICATING IN THE 21ST CENTURY

In addition to these areas of focus, in year two, Career Compass matches students with alumni mentors. Summer internship, research and engineering service programs are also important experiential components.

Year four of the Career Compass Program is voluntary for all engineering students and is directly focused on project management by industry, not by major. This will help prepare students for the specific industries that they’re planning to enter after graduation.

“Career Compass is really useful in terms of being exposed to careers in engineering, as well as preparing you for the job search we will eventually face.”

REBECCA NAPOLI
MECHANICAL ENGINEERING
WILMETTE, IL

“An authentic relationship formed between me and my mentor. I look up to her as a role model and as a fellow female engineer I see her as a resource who can offer insight based on her experiences and opinions.”

COLLEEN CAWLEY
CHEMICAL ENGINEERING
CARMEL, NY

“The Engineering Entrepreneurship minor gave me the tools and knowledge to start a business; the experience of working on a long-term project; and, most importantly, the confidence to face challenges and obstacles after graduation.”

MARY SPILLANE
MECHANICAL ENGINEERING
TRUMBULL, CT
Villanova’s College of Engineering believes the best way for students to learn engineering is to practice engineering. With that in mind, the College offers undergraduates the opportunity for hands-on engineering experiences, many of which are supported by partner companies.

**MULTIDISCIPLINARY DESIGN LAB (MDL)**

Teams of senior engineering students can be found in the MDL working with professional engineers to produce real-world design projects. Students help companies solve engineering challenges in a space custom-made for and dedicated to high-tech collaborative design—a core activity of engineering.

**RECENT MDL PARTNERS AND PROJECTS:**

- **Air Products**
  - Cryogenic tank insulation optimization
- **Base2 Engineering**
  - Internet of Things
- **Boeing**
  - Ad hoc communications with autonomous vehicles
- **Christini Technologies**
  - Primary electric hybrid AWD motorcycle
- **GlaxoSmithKline**
  - 3-D printing of single-use tubing exoskeletons for process flowpath routing
- **Harris Corporation**
  - 3-D underwater mapping with stereo sonar
- **PPL Corporation**
  - Equipment and line monitoring
- **RT Logic**
  - Satellite communication channel simulator

**HARRIS SUMMER INNOVATION PROGRAM**

HSIP is a competitive, self-directed engineering design program for multidisciplinary student teams. This partnership program of the College of Engineering and Harris Corporation allows students to engage in the open design process to pursue innovative solutions to unmet societal and technological needs. Students manage all aspects of their projects, from initial design concepts through delivery of prototypes and final presentations at Harris Corporation. During their two-month residency, students receive stipends, free on-campus room and board, project budgets and access to subject matter experts, labs and facilities.

**RECENT HSIP PROJECTS:**

- Solar and cycle chargers for head lights and cellular phones in Burundi, Africa
- Hemabyte: a low-cost, portable blood testing unit
- AtmoGEN: an atmospheric water generator
- Zoo animal recognition app
- ExoH₂: a small, portable, inexpensive incubator powered by exothermic processes to determine viable water sources in developing communities

“Working with an industry leading company like Christini Technologies (owned by Villanova Engineering alumnus Steve Christini ’95 ME) was an incredibly rewarding experience that allowed our team to transition our work from the classroom to the real world. We utilized a diverse set of skills and perspectives to elevate our design and transform it into a working prototype.”

**BEN CRAWFORD**
**MECHANICAL ENGINEERING**
**AVON, CT**

“Working on our own self-directed project taught us a lot about managing our time and resources. It definitely helped to have faculty mentors whom we could turn to, but at the end of the day we are incredibly proud to know how much we were able to accomplish in such a short time.”

**STEPHANIE KRAKOWER**
**CIVIL ENGINEERING**
**ROBBINSVILLE, NJ**

“Villanova’s College of Engineering provides students with project-based experiences through the whole product lifecycle—from visioning to prototyping to testing and retesting, through producing a finished product and interacting with customers. Students also have to manage a budget and meet timelines. These experiences set Nova engineers apart.”

**JOHN MONAHAN ’86 EE**
**PRESIDENT, RT LOGIC**
UNDERGRADUATE RESEARCH

Villanova’s size, access to top-notch facilities and committed teacher-scholars mean that Villanova Engineering students enjoy research opportunities rarely available to undergraduates in other top-tier engineering programs.

STUDENT RESEARCHERS:
• Apply classroom and laboratory concepts to real world problems
• Become motivated to pursue graduate studies
• Network with and receive mentoring from faculty outside of class
• Make industry connections
• Develop leadership and team-building skills
• Understand best practices for research and scientific communication
• Improve critical thinking skills
• Get paid, get credit and get experience!

CENTERS OF EXCELLENCE
In addition to research conducted within individual departments, undergraduates have opportunities to work in the College’s high profile research centers:

CENTER FOR ADVANCED COMMUNICATIONS
CAC advances the state-of-the-art in the analysis and development of wireless communications, satellite navigations, acoustic and ultrasound sensing, and radar imaging.

CENTER FOR NONLINEAR DYNAMICS AND CONTROL
CENDAC is distinguished by its strong interdisciplinary teams working on real-world applications of nonlinear dynamic systems and control theory.

CENTER FOR ENERGY-SMART ELECTRONIC SYSTEMS
This National Science Foundation Industry/University Cooperative Research Center develops methodologies, tools and systems to maximize energy efficiency for the operation of data centers.

NOVACELL CENTER FOR CELLULAR ENGINEERING
The College’s newest research center, NovaCell’s mission is to lead efforts to improve cell and gene therapy products, and the bioprocesses used to make them.

VILLANOVA CENTER FOR RESILIENT WATER SYSTEMS
The team of nationally-recognized researchers in VCRWS is committed to engaging with society to create resilient engineered solutions for global water challenges.

VILLANOVA CENTER FOR THE ANALYTICS OF DYNAMIC SYSTEMS
VCADS develops new tools and techniques for uncovering the underlying dynamics of big data in medicine and engineering.

“Conducting research allowed me to apply knowledge gained in class to real world scenarios. It’s also a good foundation for the work I that I will be doing after graduation.”
DAVID HARVEY
CIVIL ENGINEERING
RENO, NV

“Being on a research team that was essentially trying to find a cure for cancer was life-changing. I felt like all of my engineering knowledge was being put to work to try to create a positive impact on society.”
TATYANA CHOUIKHA
CHEMICAL ENGINEERING
BOYDS, MD
THE ENTREPRENEURIAL MINDSET

The College’s unique Engineering Entrepreneurship minor (page 16) is just one example of the entrepreneurial mindset you’ll find across Villanova’s campus. The College has incorporated entrepreneurially minded thinking throughout the curriculum, and offers numerous extracurricular activities and competitions as well, including:

INNOVATION CHALLENGE
Every month in the Idea Accelerator (the physical home of the University’s Innovation, Creativity, & Entrepreneurship Institute), teams of students are given an hour to complete an impromptu challenge for prizes.

IDEA BOUNCE®
A required freshmen event, teams are given 90 seconds to present, or “bounce,” an idea to an audience and panel of judges.

24-HOUR IMAGINATION QUEST
In this quick-moving, innovative entrepreneurship competition, students work on multi-disciplinary teams across colleges to develop new ideas, products or services in just 24 hours.

ARDUINO AND RASPBERRY PI WORKSHOPS AND HACKATHONS
After learning the basics of these platforms, teams are challenged to put their newfound knowledge to work.

VILLANOVA ENGINEERING STUDENTS HAVE RECENTLY STUDIED IN:

- Melbourne, Australia
- New South Wales, Australia
- Sydney, Australia
- Lille, France
- Dublin, Ireland
- Galway, Ireland
- Rome, Italy
- Siena, Italy
- South Korea
- Krakow, Poland
- Madrid, Spain
- Dubai, United Arab Emirates

“Take the leap. Don’t be afraid of going to an unfamiliar place—the experiences and lessons you will learn will all be worth it. Going abroad was the best five months of my life, so don’t hesitate in anything you do, be all in and at the end you will look back and see how incredible the entire experience was.”

ASHLEY MEIER
ELECTRICAL ENGINEERING
MANALAPAN, NJ

“Living and working abroad allowed me to live independently, further my professional development and communication skills, learn about and conduct research in an advanced field, and experience a completely different culture.”

BRENT STUDENROTH
MECHANICAL ENGINEERING
GLENVIEW, IL

“The University’s Office of International Studies offers information sessions four days a week, twice a day, so there are plenty of opportunities to get information about studying abroad!”

BRYAN RAMIREZ
CIVIL ENGINEERING
CENTRAL ISLIP, NY

STUDY ABROAD

According to the Institute of International Education, only 5 percent of U.S. engineering majors study abroad. At Villanova University, that figure is an impressive 23 percent. The College of Engineering has built flexibility into the curriculum to allow more of its students to pursue this transformative experience, whether for a summer, a semester or an entire academic year. In fact, individual departments have mapped out course selections to enable students to take advantage of study abroad opportunities. Your faculty advisor will be happy to work with you to make your international education experience a reality.

VILLANOVA STUDENT ENTREPRENEURSHIP COMPETITION
This one-semester, interdisciplinary competition asks students to innovate, create and design products, businesses or services to fill a variety of needs. Finalists work with outside judges and mentors and deliver pitches to an investor boardroom.

HARRIS SUMMER INNOVATION PROGRAM (PAGE 19)
Self-directed teams of engineering students receive resources and support to tackle real-world challenges. Students spend two months on Villanova’s campus in an incubator-like environment pursuing technological solutions of their own design.

The University’s Office of International Studies offers information sessions four days a week, twice a day, so there are plenty of opportunities to get information about studying abroad!

“‘We’re very fortunate to have such an extensive, supportive network at Villanova that has allowed us to pursue our passion for engineering, service and innovation.”

BRYAN RAMIREZ
CIVIL ENGINEERING
CENTRAL ISLIP, NY

“‘In an increasingly global environment, studying abroad as an engineer taught me the valuable lesson that not everyone does it like America does it.’

GEORGE ZIMMER
CIVIL ENGINEERING
TRENTON, NJ
SERVICE

AUGUSTINIAN IDEALS IN ACTION

Whether rolling up their sleeves halfway around the world or inspiring the next generation of American engineers, our students’ passion for serving others is unparalleled. In fact, in Colleges that Create Futures, the Princeton Review ranks Villanova among 50 schools that launch careers by going beyond the classroom. Specifically referencing the College of Engineering, it says, “Not every engineering program in the country offers service learning opportunities to its students, but in the College of Engineering at Villanova, service forms the cornerstone of the engineering curriculum, and in many cases students participate by applying the engineering skills they learn in the classroom to help benefit communities around the world.” The review also recognizes the strength of the College’s STEM outreach programs.

VILLANOVA ENGINEERING SERVICE LEARNING

VESL provides students with project-based learning experiences that reinforce engineering fundamentals and build a commitment to service with a global perspective. Participation comes in a variety of forms, from in-class projects, independent study and undergraduate research, to school break trips and summer internships.

RECENT PROJECTS INCLUDE:

- School design and STEM education in Cambodia with the Caramanico Foundation
- Unexploded ordnance detection, removal and remediation in Southeast Asia with Golden West Humanitarian Foundation
- Water resources, renewable energy and STEM outreach in India with Pro Futuro and Himalayan Hope Charitable Foundation
- Community infrastructure in Panama with the Cheypo-Bayano Mission
- Water and sustainability in Madagascar with Catholic Relief Services
- Handpump sustainability in Ghana with Lifetime Wells
- Sustainability projects in Tanzania with Catholic Relief Services

“My time in Panama has yielded some of my favorite memories. My service took me not only a better student of engineering, but of life. I encourage every student to take advantage of at least one of the many service trips, reap the rewards, and do what we Villanovans do best: Ignite Change!”

SAMANTHA SCHAFER
CHEMICAL ENGINEERING
RIVER FOREST, IL

STEM OUTREACH

The College of Engineering has been involved with STEM (Science, Technology, Engineering and Math) education outreach to middle- and high-school students for more than a decade.

In addition to outreach initiated by individual students and faculty, and student chapters of professional organizations like the Society of Hispanic Professional Engineers, the College of Engineering established these programs:

- NovaCANE (Villanova Community Action by New Engineers) volunteers visit area middle schools where they conduct hands-on engineering projects with students and provide teacher education.
- VESTED (Villanova Engineering, Science, and Technology Enrichment and Development) brings Philadelphia-area high school students to campus over seven weekends for engineering experiences, college preparation classes, team-building opportunities and discussions with industry leaders.
- Engineering Is for Girls! brings local Girl Scout troops and school students to campus for a full day of hands-on, mechanical engineering projects.
- NovaEDGE (Villanova Engineering Diversity Growth Experience) is a one-week, on-campus program that introduces students from different ethnic and social backgrounds to the traditional fields of engineering. The program also includes a presentation on the college admissions process.
- HEARTS (Health Education and Enrichment in Arithmetic, Technology and Science) is a collaborative program that assists Catholic middle schools with the enrichment of existing science and math curricula.

VILLANOVA ENGINEERING ALSO PARTICIPATES IN NATIONAL STEM PROGRAMS AND EVENTS:

In partnership with the School District of Philadelphia, Villanova hosts a FIRST (For Inspiration and Recognition of Science and Technology) Tech Challenge, an annual robotics competition.

Villanova’s Department of Mechanical Engineering organizes one of the regional MATE (Marine Advanced Technology Education) competitions, which involves underwater robotics.

Villanova’s Department of Civil and Environmental Engineering participates in Introduce a Girl to Engineering Day with a local, all-girls school.

“It’s one thing to be really involved and enjoy a subject, but to get to teach that to someone and see their eyes light up—that makes everything we do worthwhile.”

ZACH ELLENHORN
CHEMICAL ENGINEERING
CALVARY, NY

“Villanova Engineering sets itself apart with the number of opportunities it offers. Whether through an internship, a career or service experience, Villanova engineers are privileged with a seemingly endless amount of opportunities.”

JACOB HOLMAN
CIVIL ENGINEERING
BARNESVILLE, PA
PROFESSIONAL ASSOCIATIONS
• American Institute of Aeronautics and Astronautics
• American Institute of Chemical Engineers
• American Society of Civil Engineers
• American Society of Mechanical Engineers
• Institute of Electrical and Electronics Engineers
• Institute of Transportation Engineers
• National Society of Black Engineers
• National Society of Professional Engineers
• Society of Asian Scientists and Engineers
• Society of Hispanic Professional Engineers
• Society of Women Engineers

INDUSTRY EXPOSURE
Students connect with members of the engineering industry through a variety of on- and off-campus opportunities, such as:
• Alumni career panels
• Career Compass (see page 17)
• Career fairs and information sessions
• Company site visits
• Engineering and University-wide student competitions
• Guest speakers
• Industry-sponsored projects
• Internships
• Research opportunities
• Service learning and STEM programs

“Many people at Villanova are involved in extracurriculars because we recognize that while academics are the focus, it is important to participate in other activities we enjoy to have a proper balance and contribute to the community.”

AUSTIN HAKE
CHEMICAL ENGINEERING
SAN JOSE, CA

“I was looking for a school that had big time sports, but also matched what I was looking for with academics. I wanted the whole college experience and Villanova has everything I wanted.”

EMMA MEYER
CHEMICAL ENGINEERING, FORMER WOMEN’S VARSITY SOCCER GOALIE
MASSAPEQUA, NY

IGNITING BOTH HEARTS AND MINDS
With dozens of extracurricular activities available campus wide, engineering students can pursue everything from athletics and the arts, to race cars and roboboats.

ENGINEERING COMPETITION TEAMS
• Formula SAE Racing
• Steel Bridge
• Chemical Engineering Car
• GeoWall
• Concrete Canoe
• RobotX
WHAT MAKES VILLANOVA SO EASY TO GET TO, BUT SO HARD TO LEAVE?

The location. Our stunning 260 acres are nestled in the safe, storied and lush Main Line, just 12 miles (19 km) west of Philadelphia, the most historic city in the United States. Should you need to expand your reach, or just want to go adventuring, Washington, DC is 135 miles (215 km) south and New York City is a mere 95 miles (150 km) north.

The transportation. Three campus rail stops provide quick access to all that Philadelphia has to offer: from culture to dining to the arts to professional sports. If shopping is your thing, turn to our car sharing service or free weekend shuttle to visit the King of Prussia Mall—one of America’s largest retail corridors. Outdoor enthusiasts, too, can tap into their interests, with Valley Forge National Historical Park a short ride away.

The sites. The Philadelphia area has a number of points of particular interest for engineering students. The military-minded may want to check out the Navy Yard, Battleship New Jersey and Independence Seaport Museum. The Franklin Institute demonstrates the science involved in disciplines ranging from sports to space. You can take the “Engineering in the City” self-guided walking tour to better understand engineering’s role in creating some of Philadelphia’s most recognizable landmarks and some lesser-known attractions, including the Fireman’s Hall Museum and Waterworks. And, if museums are your thing, head to the Chemical Heritage Foundation Museum, the SEPTA Transit Museum or the American Helicopter Museum.
GRADUATE STUDIES

NEXT STEPS

Your Villanova education doesn’t need to end with a bachelor’s degree. The College of Engineering offers a five-year BS/MS option for each of its undergraduate majors, plus nine master’s degree programs, a PhD program and more than 15 graduate certificates. Degrees can be pursued on a full- or part-time basis, online or on campus, entirely at your convenience. With more than 100 courses to choose from, you can tailor a program to meet your professional interests.

MASTER’S DEGREES

Biochemical Engineering
Chemical Engineering
Civil Engineering
Computer Engineering
Cybersecurity
Electrical Engineering
Mechanical Engineering
Sustainable Engineering
Water Resources and Environmental Engineering

PhD PROGRAM

Earn a doctorate in engineering with a focus in any of the above disciplines.

“I was able to take courses from renewable energy and manufacturing to composites and finite element analysis—a wide range of topics that I couldn’t find in other programs.”

MARY BETH BIDDLE
MASTER’S IN MECHANICAL ENGINEERING
PLYMOUTH MEETING, PA

“I formed close relationships with my professors. The faculty genuinely want to see you succeed. If it were not for them, I would not have ended up in a job that I am excited to go to each and every day.”

TERESA LORD
MASTER’S IN CIVIL ENGINEERING
PHOENIXVILLE, PA

“There aren’t really any comparable programs to Villanova’s MSSE. The forward-thinking curriculum, and professors who are industry experts, played a large role in my decision to attend.”

MATTHEW MCMONAGLE
MASTER’S IN SUSTAINABLE ENGINEERING
HIGHLANDS RANCH, CO

“I would have been hard-pressed to complete my degree without the E-learning option, and I found the recorded lectures and online tools to be a tremendous help in learning and retaining the material.”

JEFF NAUMICK
MASTER’S IN WATER RESOURCES AND ENVIRONMENTAL ENGINEERING
MOUNT LAUREL, NJ
WHERE WILL VILLANOVA TAKE YOU?

ANYWHERE YOU WANT TO GO!

93% GRADUATES WITH INTERNSHIPS, RESEARCH OR MILITARY EXPERIENCES

$62,964 AVERAGE STARTING SALARY FOR ENGINEERING GRADUATES (CLASS OF 2017)

95.9% SUCCESSFUL PLACEMENT RATE (CLASS OF 2017)

17% PERCENT OF GRADUATES CONTINUE THEIR EDUCATION

MEAN STARTING SALARY BY MAJOR (CLASS OF 2017)

Chemical Engineers: $61,859
Civil Engineers: $60,085
Computer Engineers: $66,410
Electrical Engineers: $67,675
Mechanical Engineers: $62,978

84% GRADUATE WITHIN 4 YEARS (VERSUS NATIONAL AVERAGE OF 33%)