

ENGINEERING PROGRAM OF STUDY

Pathway Description

Science and engineering occupations are leaders in economic competitiveness in an increasingly globalized world. Science and engineering workforces of sufficient size and quality are essential for any 21st century economy to prosper. These professional workforces also are crucial for addressing challenges such as international security, global climate change, and domestic and global health. Of the top 10 highest-paying college majors, seven of them are in engineering.

Our Engineering program engages students in open-ended problem-solving, where they learn to apply the engineering design process to solve real-world problems and help to make the world a better place through innovation. Students will utilize the same industry-leading technology and software present in some of the world's top companies. They will be immersed in design as they investigate topics such as sustainability, forces, structures, digital electronics and circuit design, manufacturing, and the environment. All of these exposures provide our students with the opportunity to learn about different engineering disciplines before beginning post-secondary education or careers. Additionally, our program provides opportunities for students to develop highly transferable skills in collaboration, communication, and critical thinking, which are relevant for any coursework or career.

This pathway includes a rigorous series of courses designed by Project Lead The Way (a nonprofit, STEM education program taught across the U.S. and endorsed by the nationally recognized College Board). The courses include: Introduction to Engineering Design, Digital Electronics, Principles of Engineering, Environmental Sustainability, Computer Integrated Manufacturing, and Civil Engineering and Architecture. Students who successfully complete CCTEC's Engineering program and meet the acceptance criteria of Rowan University will automatically be accepted into Rowan's College of Engineering. Furthermore, as a part of our dual credit arrangement with the University, students will earn dual college engineering credits.

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Course Sequence

CORE	GRADE 9	GRADE 10	GRADE 11	GRADE 12
ENGLISH	ENGLISH I	ENGLISH II	ENGLISH III OR AP LANGUAGE/COMP	ENGLISH IV OR AP LITERATURE
SOCIAL STUDIES	WORLD HISTORY	US HISTORY I	US HISTORY II	AP GOVERNMENT
MATHEMATICS	GEOMETRY	ALGEBRA II OR PRECALCULUS	PRECALCULUS OR AP CALCULUS AB	AP CALCULUS AB OR AP CALCULUS BC
SCIENCE	BIOLOGY	CHEMISTRY	PHYSICS OR AP PHYSICS	AP SCIENCE
HEALTH/PHYSICAL EDUCATION	FITNESS AND HEALTH I	FITNESS AND HEALTH II	FITNESS AND HEALTH III	FITNESS AND HEALTH IV
CTE MAJOR	INTRODUCTION TO ENGINEERING DESIGN*	COMPUTER INTEGRATED MANUFACTURING	DIGITAL ELECTRONICS	CIVIL ENGINEERING AND ARCHITECTURE*
INTERDISCIPLINARY STUDIES	GRAPHIC DESIGN OR ALGEBRA II (OPTIONAL)	PRINCIPLES OF ENGINEERING*	ENVIRONMENTAL SUSTAINABILITY*	GRAPHIC DESIGN OR ELECTIVE
WORLD LANGUAGE	SPANISH I	SPANISH II	SPANISH III	AP SPANISH

* Potential College Credits Awarded by Rowan University

Engineering Program of Study Course Credits

Freshman

English I	5 credits
World History	5 credits
Algebra I or Geometry	5 credits
Biology	5 credits
Spanish I	5 credits
Fitness and Health I	5 credits
Graphic Design	5 credits
Introduction to Engineering Design	5 credits

Sophomore

English II	5 credits
US History I or AP US History I	5 credits
Geometry or Algebra II	5 credits
Chemistry	5 credits
Spanish II	5 credits
Fitness and Health II	5 credits
Computer Integrated Manufacturing	5 credits
Principles of Engineering	5 credits

Junior

English III or AP Language/Comp	5 credits
US History II or AP US History II	5 credits
Algebra II or Pre-calculus	5 credits
Physics or AP Physics I	5 credits
Spanish III	5 credits
Fitness and Health III	5 credits
Digital Electronics	5 credits
Environmental Sustainability	5 credits

Senior

English IV/AP Literature/Comp	5 credits
AP Government	5 credits
Pre-calculus or AP Calculus	5 credits
AP Science	5 credits
AP Spanish	5 credits
Fitness and Health IV	5 credits
Civil Engineering and Architecture	5 credits
Elective	5 credits

Engineering Program of Study
Course Descriptions

Course Title: Introduction to Engineering Design

Grade Level: 9

Credits: 5

Students dig deep into the engineering design process, applying math, science, and engineering standards to hands-on projects. They work both individually and in teams to design solutions to a variety of problems using 3D modeling software, and use an engineering notebook to document their work.

Course Title: Principles of Engineering

Grade Level: 10

Credits: 5

Through problems that engage and challenge, students explore a broad range of engineering topics, including mechanisms, the strength of structures and materials, and automation. Students develop skills in problem solving, research, and design while learning strategies for design process documentation, collaboration, and presentation.

Course Title: Computer Integrated Manufacturing

Grade Level: 10

Credits: 5

Manufactured items are part of everyday life, yet most students have not been introduced to the high-tech, innovative nature of modern manufacturing. This course illuminates the opportunities related to understanding manufacturing. At the same time, it teaches students about manufacturing processes, product design, robotics, and automation. Students can earn a virtual manufacturing badge recognized by the National Manufacturing Badge system.

Course Title: Environmental Sustainability

Grade Level: 11

Credits: 5

In Environmental Sustainability (ES), students investigate and design solutions in response to real-world challenges related to clean and abundant drinking water, food supply issues, and renewable energy. Applying their knowledge through hands-on activities and simulations, students research and design potential solutions to these true-to-life challenges.

Course Title: Digital Electronics

Grade Level: 11

Credits: 5

From smart phones to appliances, digital circuits are all around us. This course provides a foundation for students who are interested in electrical engineering, electronics, or circuit design. Students study topics such as combinational and sequential logic and are exposed to circuit design tools used in industry, including logic gates, integrated circuits, and programmable logic devices.

Course Title: Civil Engineering and Architecture

Grade Level: 12

Credits: 5

Students learn important aspects of building and site design and development. They apply math, science, and standard engineering practices to design both residential and commercial projects and document their work using 3D architecture design software.