

RAIL TRANSPORTATION ENGINEERING, B.S.

Begin Campus: Any Penn State Campus

End Campus: Altoona

Program Description

The Bachelor of Science in Rail Transportation Engineering (RTEAL) will provide students with the necessary skills for careers in the rail freight and passenger transportation industries. The RTEAL degree provides a solid background in engineering design, but also focuses on the maintenance and management skills required by the rail industry. The program provides a breadth of knowledge in the major areas associated with the design, operation, and maintenance of rail systems, including the engineering of rail and track structures, basic rail operating practices and safety, wheel/track dynamics, construction and maintenance of railroad infrastructure, and basic railroad communications and signals. Laboratories are used throughout the RTEAL curriculum to provide students with experiences in the field with actual rail equipment, and extensive team-based laboratory activities are used to develop the leadership qualities that are essential of rail professionals. In order to prepare students for the occupational challenges associated with careers in the rail industry, careful and candid discussions of career possibilities and working environments typical of railway professionals are provided throughout the RTEAL program.

What is Rail Transportation Engineering?

Rail Transportation Engineering (RTE) prepares students for careers in freight and transit rail. The curriculum is based on civil engineering with emphasis on rail transportation.

MORE INFORMATION ABOUT RAIL TRANSPORTATION ENGINEERING (<https://altoona.psu.edu/academics/bachelors-degrees/rail-transportation-engineering/program-overview/>)

You Might Like This Program If...

You are seeking a technological career in a robust industry.

MORE INFORMATION ABOUT WHY STUDENTS CHOOSE TO STUDY RAIL TRANSPORTATION ENGINEERING (<https://altoona.psu.edu/academics/bachelors-degrees/rail-transportation-engineering/>)

Entrance to Major

All students applying for entrance to the RTEAL major must have at least a 2.0 cumulative GPA by the end of the semester prior to applying for entrance to the major and have completed, with a minimum grade of C: CHEM 110, MATH 140, MATH 141, and PHYS 211. These courses must be completed by the end of the semester during which the admission to major process is carried out.

Degree Requirements

For the Bachelor of Science degree in Rail Transportation Engineering, a minimum of 130 credits is required:

Requirement	Credits
General Education	45
Requirements for the Major	112

27 of the 45 credits for General Education are included in the Requirements for the Major. This includes: 9 credits of GWS, 6 credits of GQ, 9 credits of GN, 3 credits of GS.

Requirements for the Major

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (<https://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44>).

Code	Title	Credits
Prescribed Courses		
ACCTG 211	Financial and Managerial Accounting for Decision Making	4
CE 310	Surveying	3
CE 360	Fluid Mechanics	3
ECON 102	Introductory Microeconomic Analysis and Policy	3
EDSGN 100	Cornerstone Engineering Design	3
ENGL 202C	Effective Writing: Technical Writing	3
GEOSC 1	Physical Geology	3
MATH 220	Matrices	2
MATH 251	Ordinary and Partial Differential Equations	4
PHYS 212	General Physics: Electricity and Magnetism	4
RTE 301	Railroad Industry Overview and Economic Regulation	3
RTE 402	Railroad Operations Practicum	3
RTE 403	Railroad Track Practicum	3
RTE 404	Railroad Mechanical Practicum	3
RTE 406	Railroad Capstone Project	4
STAT 401	Experimental Methods	3
<i>Prescribed Courses: Require a grade of C or better</i>		
CE 332	Professionalism, Economics & Construction Project Delivery	3
CE 333W	Construction Management I	3
CE 335	Engineering Mechanics of Soils	3
CE 336	Materials Science for Civil Engineers	4
CE 340	Structural Analysis	3
CHEM 110	Chemical Principles I	3
EMCH 211	Statics	3
EMCH 212	Dynamics	3
EMCH 213	Strength of Materials	3
MATH 140	Calculus With Analytic Geometry I	4
MATH 141	Calculus with Analytic Geometry II	4
PHYS 211	General Physics: Mechanics	4
RTE 302	Railroad Track Location, Construction and Maintenance	3
RTE 303	Railroad Operation and Safety	3
RTE 305	Railroad Communications and Signals	3
Additional Courses		
CAS 100A	Effective Speech	3
or CAS 100B	Effective Speech	
CMPS 201	Programming for Engineers with C++	3
or CMPS 202		
ENGL 15	Rhetoric and Composition	3

or ENGL 30H Honors Rhetoric and Composition

Select 3 credits of technical electives from departmental list in consultation with adviser 3

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (<https://bulletins.psu.edu/undergraduate/general-education/baccalaureate-degree-general-education-program/>) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required and Inter-Domain courses do not meet this requirement.)

- **Quantification (GQ):** 6 credits
- **Writing and Speaking (GWS):** 9 credits

Breadth in the Knowledge Domains (Inter-Domain courses do not meet this requirement.)

- **Arts (GA):** 3 credits
- **Health and Wellness (GHW):** 3 credits
- **Humanities (GH):** 3 credits
- **Social and Behavioral Sciences (GS):** 3 credits
- **Natural Sciences (GN):** 3 credits

Integrative Studies

- **Inter-Domain Courses (Inter-Domain):** 6 credits

Exploration

- **GN,** may be completed with Inter-Domain courses: 3 credits
- **GA, GH, GN, GS, Inter-Domain courses.** This may include 3 credits of World Language course work beyond the 12th credit level or the requirements for the student's degree program, whichever is higher: 6 credits

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (<https://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80>)). For more information, check the Suggested Academic Plan for your intended program.

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information needed to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (<https://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy/>)

Altoona

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Suggested Academic Plan

The suggested academic plan(s) listed on this page are the plan(s) that are in effect during the 2023-24 academic year. To access previous years' suggested academic plans, please visit the archive (<https://bulletins.psu.edu/undergraduate/archive/>) to view the appropriate Undergraduate Bulletin edition (*Note: the archive only contains suggested*

academic plans beginning with the 2018-19 edition of the Undergraduate Bulletin).

Rail Transportation Engineering, B.S. at Altoona Campus

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **Academic Requirements** or **What If** report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

Fall	Credits Spring	Credits
MATH 140 ^{*†#†}	4 MATH 141 ^{*#}	4
ECON 102 or 104 ^{*†}	3 CAS 100 [‡]	3
CHEM 110 ^{†#†}	3 PHYS 211 ^{*†#†}	4
CHEM 111 [*]	1 ENGL 15, 30H, or ESL 15 [‡]	3
EDSGN 100	3 General Education Course	3
PSU 3	1	
General Education Course	3	
	18	17

Second Year

Fall	Credits Spring	Credits
MATH 251	4 MATH 220	2
PHYS 212 [†]	4 CMPSC 201	3
EMCH 211 [*]	3 EMCH 212 [*]	3
GEOSC 1	3 EMCH 213 [*]	3
General Education Course	3 ENGL 202C [‡]	3
	General Education Course	3
	17	17

Third Year

Fall	Credits Spring	Credits
CE 310	3 CE 335 [*]	3
RTE 301	3 CE 336 [*]	3
RTE 303 [*]	3 CE 337	1
RTE 305 [*]	3 CE 360	3
STAT 401	3 RTE 302 [*]	3
	RTE 402	3
	15	16

Fourth Year

Fall	Credits Spring	Credits
CE 333W [*]	3 ACCTG 211	4
CE 340 [*]	3 RTE 406	4
CE 332 [*]	3 Technical Elective	3
RTE 403	3 General Education Course	3
RTE 404	3 General Education Course	3
	15	17

Total Credits 132

- * Course requires a grade of C or better for the major
- ‡ Course requires a grade of C or better for General Education
- # Course is an Entrance to Major requirement
- † Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy Cultural Diversity Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

General Education includes Foundations (GWS and GQ), Knowledge Domains (GHW, GN, GA, GH, GS) and Integrative Studies (Inter-domain) requirements. N or Q (Honors) is the suffix at the end of a course number used to help identify an Inter-domain course, but the inter-domain attribute is used to fill audit requirements. Foundations courses (GWS and GQ) require a grade of 'C' or better.

Career Paths

Career Services supports and serves students and alumni, faculty and staff, families, and employers in all areas related to career development and preparation. We can assist in any of the following: Major and Career Exploration Career Decision-Making Preparation of Employment Documents Internship and Job Search Strategies Interview Preparation Preparing for Graduate School Developing your Professional Online Brand Presentations and Workshops.

MORE INFORMATION ABOUT POTENTIAL CAREER OPTIONS FOR GRADUATES OF THE RAIL TRANSPORTATION ENGINEERING PROGRAM (<https://altoona.psu.edu/offices-divisions/center-workforce-career-development/career-services/>)

Professional Resources

- AREMA (<https://www.arena.org>)

Accreditation

The Bachelor of Science in Rail Transportation Engineering at Penn State Altoona is accredited by the Engineering Accreditation Commission of ABET, <https://www.abet.org>, under the General Criteria.

Professional Licensure/Certification

Many U.S. states and territories require professional licensure/certification to be employed. If you plan to pursue employment in a licensed profession after completing this program, please visit the Professional Licensure/Certification Disclosures by State (<https://www.psu.edu/state-licensure-disclosures/>) interactive map.

Contact

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<https://altoona.psu.edu/academics/bachelors-degrees/rail-transportation-engineering> (<https://altoona.psu.edu/academics/bachelors-degrees/rail-transportation-engineering/>)