PENNSTATE Altoona 1855

RAILROAD AT PENN STATE

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Introduction

- Penn State has developed a rail baccalaureate degree
  - Built on civil engineering foundation – first two years very similar to many other PSU ENGR degrees
  - Students take calculus, physics, differential equations
  - Includes eight new specialized rail courses, and introductory accounting
  - Prepares graduates for unique rail industry environment, business and technologies, fast-track into management

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Lower Division Curriculum

Recommended Academic Plan for Rail Transportation Engineering (BS)

Semester 1	Credits
MATH 140 (GQ) Calculus I	4
ECON 102, 104, or 14 (GS)	3
CHEM 110 (GN) Chemical Principles	3
EDSGN 100 Engineering Design & Graphics	3
GS/GH/GA	3
Total Credits	**16**

Semester 2	Credits
MATH 141 (GQ) Calculus II	4
CAS 100 (GWS) Effective Speech	3
PHYS 211 (GN) Mechanics	4
ENGL 015 or 030 (GWS) Rhetoric and Comp	3
GS/GH/GA	3
Total Credits	**17**

Semester 3	Credits
MATH 251 Ordinary & Partial Differential Equatns	4
PHYS 212 (GN) Electricity & Magnetism	4
E MCH 211 Statics	3
GEOSC 001 Physical Geography	3
GS/GH/GA	3
Total Credits	**17**

Semester 4	Credits
MATH 220 Matrices	2
CMPSC 201 Programming for Engineers	3
E MCH 212 Dynamics	3
E MCH 213 Strength of Materials	3
GHA Gen Ed Health & Physical Activity	3
ENGL 202C Technical Writing	3
Total Credits	**17**

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Upper Division Curriculum

Semester 5	Credits
C E 310 Surveying	3
RTE 301 RR Ind Overview & Econ Regulation	3
RTE 303 Rail Operations & Safety	3
RTE 305 RR Communication & Signals	3
STAT 401 Experimental Methods	3
Total Credits	**15**

Semester 6	Credits
C E 335 Soil Mechanics	3
C E 360 Fluid Mechanics	3
RTE 402 RR Operations Practicum	3
RTE 302 RR Track Location, Const, & Maint	3
C E 336 Materials	3
C E 337 Materials Lab	1
Total Credits	**16**

Semester 7	Credits
C E 333W Construction Management	3
C E 340 Structural Analysis	3
C E 332 Prof, Econ, & Const Proj Delivery	3
RTE 403 RR Track Practicum	3
RTE 404 RR Mechanical Practicum	3
Total Credits	**15**

Semester 8	Credits
ACCTG 211 Finanical & Managerial Accounting	4
Technical Elective - See list	3
GS/GH/GA	3
RTE 406 RR Capstone Project	4
GS/GH/GA	3
Total Credits	**17**

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Support

- Strong support from industry
  - Equipment and Space
    - Labs in space provided in new Altoona Railroader's Memorial Museum roundhouse, with access to other museum facilities
  - Internships
  - Marketing

Norfolk Southern T3-S locomotive simulator at ARMM

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Program Status

- Freshman RTE class enrolled Fall 2011
- First graduates expected Spring 2015
- 13th AREMA Student Chapter in the nation
- Research opportunities

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Research Facilities

- EMS Civil Engineering Lab
- Railroaders Museum Roundhouse
- Larson Transportation Institute
- CITEL located at Penn State main
- High Performance Computing Center

On-Going Research

- ✓ Vehicle-Track Dynamic Interactions – Supported by FRA
- ✓ Railroad Ballast Modeling – Supported by FRA
- ✓ “Smart Ballast” technology – Supported by FRA
- ✓ “Automatic Track Inspection” – Supported by RITA
- ✓ Rail Coating – Supported by FRA
- ✓ Positive Train Control – Supported by Rajant

Challenges

- Students
- Faculties