

# RAILWAY ENGINEERING, CERTIFICATE

All programs of study must be approved by the student's academic advisor and the director of the Graduate Certificate in Railway Engineering.

## Learning Outcomes

1. Identify and describe the technical elements of a railway system including (but not limited to): (i) Track alignment, crossings, bridges, (ii) Train controls, signaling, communications, (iii) Traction power, freight, transit and passenger systems, and (iv) methods of ensuring safe operation.
2. Demonstrate the necessary skills to organize and present rail related project results in written and oral form.
3. Apply appropriate engineering principles, solution methods and knowledge gained from engineering curriculum to accomplish a design at standards consistent with the railway industry practice.

## Certificate Requirements (12 Hours)

The Graduate Certificate in Railway Engineering consists of a minimum of twelve (12) credit hours of core and elective courses. Students shall take three (3) credit hours from a list of core courses, six (6) credit hours from a list of Railway Engineering technical elective courses, and three (3) credit hours from a list of other elective courses. Students can take up to three ECIV 790 courses with a Railway Engineering focus for a maximum of nine (9) credit hours, and up to two ECIV 797 courses with a Railway Engineering focus for a maximum of six (6) credit hours.

### Core Course (3 Hours)

| Course                    | Title                                      | Credits  |
|---------------------------|--|----------|
| ECIV 580                  | Railway Engineering I                      | 3        |
| or ECIV 582               | Operation and Logistics of Railway Systems |          |
| <b>Total Credit Hours</b> |  | <b>3</b> |

### Railway Engineering Technical Elective Courses (6 Hours)

Students shall take six (6) credit hours of Railway Engineering technical elective courses. Elective courses are: (i) any core course not applied as a core course; and (ii) any course from the following list:

| Course   | Title                                    | Credits |
|----------|--|---------|
| ECIV 588 | Design of Railway Bridges and Structures | 3       |
| ECIV 784 | Dynamic Analysis of Railway Systems      | 3       |
| ECIV 789 | Design Project in Railway Engineering    | 4       |
| ECIV 790 | Selected Topics in Civil Engineering     | 3       |
| ECIV 797 | Research in Civil Engineering            | 3       |

### Other Elective Courses (3 Hours)

Students shall take three (3) credit hours of other elective courses. Other elective courses are: (i) any Railway Engineering elective course not applied as a Railway Engineering elective course; and (ii) any course from the following list:

| Course   | Title   | Credits |
|----------|---|---------|
| ECIV 705 | Deterministic Civil and Environmental Systems Engineering | 3       |
| ECIV 707 | Management of Engineering Projects                        | 3       |
| ECIV 708 | Engineering Risk and Reliability                          | 3       |
| MGMT 718 | Management of Human Resources                             | 3       |