

I. COURSE DESCRIPTION:

This course will introduce the student to drawing principles and skills as they relate to structural detailing. The student will be introduced to the various phases of structural drawing from line drawings to shop drawings. Emphasis will be on steel and reinforced concrete. Upon completion of the course, the student will be able to detail simple beams, columns and connections using CAD and Revit Structural software, understand shop methods, standards, and to prepare and read structural drawings.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

Upon successful completion of this course the student will demonstrate the ability to:

1. Identify different types of structural shapesPotential Elements of the Performance:

- Use the correct terminology to describe various steel sections
- Identify different steel sections and representative symbols.
- Identify and name components of a steel structure
- Use the Handbook of Steel Construction to determine shape properties

2. Interpret structural plans, elevations and detailsPotential Elements of the Performance:

- Recognize and describe the function of a structural grid
- Layout a structural grid using requisite software and insert symbols
- Utilize drawing conventions for structural plans
- Create prototype drawings and symbols
- Utilize standard dimensioning practices in structural drawing
- Interpret structural drawings

3. Identify and describe members used in steel constructionPotential Elements of the Performance:

- Identify and locate girts, beams, purlins
- Identify and locate bents, columns, rigid frames
- Identify and locate bracing, gussets, connection plates and angles

4. Determine and draw steel beam connection detailsPotential Elements of the Performance:

- Understand the use of different types of connections
- Use connection detailing tables in the Handbook of Steel Construction
- Calculate the size and type of connection required given beam size and load
- Calculate clearance and interference
- Draw steel connection details including clearance dimensions and coping cuts
- Label and apply notes to steel connection details
- Draw end plans of steel connection details
- Define pitch and gauge

5. Interpret and draw steel column detailsPotential Elements of the Performance:

- Draw steel column plans and elevations given a sketch
- Apply appropriate labeling and dimensioning techniques to columns
- Create a three dimensional model of a steel column

6. Create and interpret schedules for structural elementsPotential Elements of the Performance:

- Read and determine information from a standard structural schedule
- Given a sketch, or description, create a schedule in AutoCAD and Revit
- Generate a schedule in AutoCAD and Revit by extracting attributes from a structural plan

7. Detail gussets and bracingPotential Elements of the Performance:

- Recognize and define gussets and bracing
- Define and establish working points
- Calculate draw for bracing, and calculate brace length
- Create a bracing drawing given a sketch

8. Understand types of reinforced concrete constructionPotential Elements of the Performance:

- Identify reinforced concrete construction
- Review use of reinforced concrete construction
- Compare use of reinforced concrete to use of steel frame construction
- Identify reinforcing steel and standard identification markings
- Recognize standard bends of steel reinforcing
- Describe accepted procedures for placement of reinforcing steel
- List acceptable concrete cover dimensions
- Discuss special types of reinforcing steel

9) Create details for reinforced concrete assembliesPotential Elements of the Performance:

- Draw details of one and two way slabs and walls
- Draw details of slabs and column connections
- Draw and interpret details for concrete foundations
- Use the RSIC Manual of Standard Practice to check steel placement
- Use the RSIC Manual of Standard Practice to check bar bends
- Draw details of a concrete stair given a sketch

10) Understand and draw details for composite construction assembliesPotential Elements of the Performance:

- Draw details for reinforced lintels in masonry construction
- Determine and draw details for steel joist and masonry wall connections
- Draw details for masonry supporting wood frame construction

III. TOPICS:

1. Structural Drawings
2. Structural Steel Shapes
3. Structural Element Identification and Terminology
4. Detailing Steel Connections
5. Detailing steel columns
6. Gussets and Bracing Detailing
7. Reinforced Concrete Construction
8. Identification and Placement of Reinforcing Steel

9. Detailing Reinforcing Steel in Reinforced Concrete Construction
10. Composite Systems Detailing

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Reinforcing Steel Institute of Canada
Handbook of Standard Practice
Latest Edition

Handbook of Steel Construction
Canadian Institute of Steel Construction
Latest Edition

V. EVALUATION PROCESS/GRADING SYSTEM

Each student will be assigned a final grade on successful completion of assignments and tests, weighted as follows:

| | |
|--------------|-------------|
| Assignments | 50% |
| Two tests | 50% |
| TOTAL | 100% |

Each test carries equal weight. Late submittals will receive a maximum grade of 60%. Assignments handed in more than one week late will receive a grade of zero. The following letter grades will be assigned to students in postsecondary courses:

| Grade | Definition | <i>Grade Point Equivalent</i> |
|--------------|--|-------------------------------|
| A+ | 90 – 100% | |
| A | 80 – 89% | 4.00 |
| B | 70 - 79% | 3.00 |
| C | 60 - 69% | 2.00 |
| D | 50 – 59% | 1.00 |
| F (Fail) | 49% and below | 0.00 |
| CR (Credit) | Credit for diploma requirements has been awarded. | |
| S | Satisfactory achievement in field /clinical placement or non-graded subject area. | |
| U | Unsatisfactory achievement in field/clinical placement or non-graded subject area. | |

| | |
|----|--|
| X | A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course. |
| NR | Grade not reported to Registrar's office. |
| W | Student has withdrawn from the course without academic penalty. |

VI. SPECIAL NOTES:

Disability Services:

If you are a student with a disability (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your professor and/or the Disability Services office. Visit Room E1101 or call Extension 2703 so that support services can be arranged for you.

Retention of Course Outlines:

It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

Communication:

The College considers **WebCT/LMS** as the primary channel of communication for each course. Regularly checking this software platform is critical as it will keep you directly connected with faculty and current course information. Success in this course may be directly related to your willingness to take advantage of the **Learning Management System** communication tool.

Plagiarism:

Students should refer to the definition of "academic dishonesty" in *Student Code of Conduct*. Students who engage in academic dishonesty will receive an automatic failure for that submission and/or such other penalty, up to and including expulsion from the course/program, as may be decided by the professor/dean. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, it is the policy of the department to employ a documentation format for referencing source material.

Course Outline Amendments:

The professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

Substitute course information is available in the Registrar's office.

Testing Absence

If a student is unable to write a test on the date assigned, the following procedure must be followed:

1. The student shall provide the professor with advance notice, preferably in writing of his/her need to miss the test.
2. The student may be required to document the absence at the discretion of the professor
3. All decisions regarding whether tests shall be rescheduled will be at the discretion of the professor.
4. The student is responsible for making arrangements with the professor, immediately upon return to the College, with respect to make-up of the missed test prior to the next scheduled class for the course in question.
5. In the event of an emergency on the day of the test, the student may be required to produce documentation to support the absence and must telephone the College to identify the absence. The college has a 24-hour electronic voice messaging system at 759-2554.

VII. PRIOR LEARNING ASSESSMENT:

Students who wish to apply for advance credit transfer (advanced standing) should obtain an Application for Advance Credit from the program coordinator (or the course coordinator regarding a general education transfer request) or academic assistant. Students will be required to provide an unofficial transcript and course outline related to the course in question.

Credit for prior learning will also be given upon successful completion of a challenge exam or portfolio.