

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



Sault College

COURSE OUTLINE

COURSE TITLE: Structural Drafting

CODE NO. : DRF 209

SEMESTER: 04 (Winter)

PROGRAM: Civil/Architectural/Construction

AUTHOR: B. Sparrow

DATE: Jan 05

PREVIOUS OUTLINE DATED: Jan 04

APPROVED:

DEAN

DATE

TOTAL CREDITS: 4

PREREQUISITE(S): CAD 120

HOURS/WEEK: 3

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*For additional information, please contact the Dean,
School of Technology, Skilled Trades and Natural Resources
(705) 759-2554*

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, 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 shapes

Potential 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 details

Potential Elements of the Performance:

- Recognize and describe the function of a structural grid
- Layout a structural grid using CAD 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 construction

Potential 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

**II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:
(continued)****4) Determine and draw steel beam connection details**

Potential 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 details

Potential 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 elements

Potential Elements of the Performance:

- Read and determine information from a standard structural schedule
- Given a sketch, or description, create a schedule in AutoCAD
- Generate a schedule in AutoCAD by extracting attributes from a structural plan
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7) Detail gussets and bracing

Potential 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

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE: (continued)

8) Understand types of reinforced concrete construction and procedures

Potential 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

8) Create details for reinforced concrete assemblies

Potential 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

9) Understand and draw details for composite construction assemblies

Potential 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

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- 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

The student will also require a minimum of three 3.5" floppy disks, for saving work and submitting assignments.

V. EVALUATION PROCESS/GRADING SYSTEM

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

| | |
|--------------------|-------------|
| Assignments | 40% |
| <u>Three tests</u> | <u>60%</u> |
| 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% | 4.00 |
| A | 80 – 89% | |
| 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 | |

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| | |
|----|---|
| X | placement or non-graded subject area. 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:

- **Special Needs**

If you are a student with special needs (e.g. physical limitations, visual impairments, hearing impairments, learning disabilities), you are encouraged to discuss required accommodations with the instructor and/or contact the Special Needs Office, Room E1101, Ext. 703 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 post-secondary institutions. Substitute Course Information is available at the Registrar's Office

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

- **Plagiarism**

Students should refer to the definition of academic dishonesty in the *Students Rights and Responsibilities* handbook. Students who engage in academic dishonesty will receive an automatic failure for that submission and/or other such penalty, up to and including expulsion from the course as may be decided by the professor. 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.

- **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.

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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 advanced credit in the course should consult the instructor. Credit for prior learning will be given upon successful completion of the following:

VIII. DIRECT CREDIT TRANSFERS

Students who wish to apply for direct credit transfer (advanced standing) should obtain a direct credit transfer for from the Dean's secretary. Students will be required to provide a transcript and course outline related to the course in question.