

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ON

COURSE OUTLINE

COURSE TITLE: Drafting

CODE NO.: DRF101 SEMESTER: One

PROGRAM: Mechanical

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DATE: Aug. 1994 PREVIOUS OUTLINE DATED: June 1987

APPROVED: *J.P. Crozetta*  
DEAN

94-08-24  
DATE

COURSE NAME  
DRAFTING

COURSE NO.  
DRF 101

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TOTAL CREDITS: Five (5)

PREREQUISITE(S): None

**I. PHILOSOPHY/GOALS:**

Although the drawing board has largely been replaced by a computer in the workplace, manual drafting knowledge and skills remain important tools for engineering students and technical people.

A progressive development through basic drafting principles provides the following:

- i) A working knowledge of drafting standards and conventions.
- ii) An natural ability to interrupt technical drawings.
- iii) Hand-drawing skills required to produce professional sketches and field modifications to existing prints.
- iv) The qualifications to supervise or train people in the area of technical drawing.
- v) The opportunity study the detail of the engineering characteristics of common mechanical devices.
- vi) The opportunity to become disciplined in the conventional practices of Mechanical Engineering.
- vi) An appreciation for the traditions of Mechanical Engineering.

In this course, students will learn and practice the basic skills of drafting, while developing their knowledge of drafting as an essential instrument of technical communication.

**II. STUDENT PERFORMANCE OBJECTIVES (OUTCOMES):**

Upon completion of this course the student will be able to:

1.0 Demonstrate working knowledge of basic drafting practices and conventions.

1.1 Explain the importance of drafting as technical communication.

1.2 Explain the importance of and demonstrate familiarity with the C.S.A. Standards for Mechanical Engineering Drawing.

II. PERFORMANCE OBJECTIVES (OUTCOMES), con't:

- 1.3 Explain the functions of draftspersons and drawing offices in industry, including career opportunities and organizational structure.
  - 1.4 Identify by correct name the various drafting tools and supplies. Demonstrate proficiency with the proper use and care tools and supplies.
  - 1.5 Accurately draw and measure scaled lengths using Engineer's Scales (Imperial and SI), and an Architect's Scale.
  - 1.6 Identify and explain the important characteristics of various drawing media, including standard sizes, and standard sheet lay out.
- 2.0 Demonstrate proficiency with basic drafting skills.
- 2.1 Recognize the various standard line types, explain their characteristics, and select the suitable line type for various applications.
  - 2.2 Recognize the various standard types of lettering, explain their characteristics and select the suitable style for various applications.
  - 2.3 Draw neat, consistent straight lines, correct in pattern, thickness and darkness, for various applications.
  - 2.4 Produce neat, consistent lettering, correct in style, size, thickness and darkness, for various applications.
  - 2.5 Complete efficient erasing of unwanted line work.
  - 2.6 Explain the functions and characteristics of title blocks, material lists and revision tables.
  - 2.7 Produce neat, complete, technically correct title blocks for given drawing applications.
  - 2.8 Complete neat, technically correct sketches of objects having normal, inclined, oblique, circular and hidden features, using isometric and oblique representation styles.

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**II. PERFORMANCE OBJECTIVES (OUTCOMES), con't:**

- 3.0 Complete practical geometric construction exercises.
- 3.1 Define geometric terms including: bisect, circumscribe, inscribe, intersecting, parallel, perpendicular, polygon, skew, tangent.
  - 3.2 Identify by name common geometric shapes.
  - 3.3 Accurately and neatly draw: parallel lines, perpendicular lines, lines tangent to circles,
  - 3.4 Accurately and neatly complete the following graphical operations: bisect a straight line, bisect an arc, bisect an angle, divide a line into equal parts, divide a line proportionally.
  - 3.5 Accurately and neatly draw: arc tangent to perpendicular lines, arc tangent to acute angle, arc tangent to obtuse angle, circle on a regular polygon, reverse curve, arc tangent to circle and straight line, arc tangent to circles, arc or circle through three points.
  - 3.6 Accurately and neatly draw: hexagons, octagons, regular polygon, inscribed polygon, ellipses, regular curves (helix, parabola), best smooth curve through given points.
- 4.0 Apply Orthographic Projection techniques in the drawing of objects.
- 4.1 Define shape parameters such as : width, height, depth, diameter, length, thickness.
  - 4.2 Explain the terms: Orthographic Projection, first angle projection, third angle projection.
  - 4.3 Explain and apply the concepts of view selection and placement.
  - 4.4 Employ third angle projection to complete missing or incomplete views of objects having normal, inclined, oblique, cylindrical and hidden features, intersections.
  - 4.5 Employ third angle projection in the drawing of objects having normal, inclined, oblique, cylindrical, and hidden features, intersections.

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**II. PERFORMANCE OBJECTIVES (OUTCOMES), con't:**

5.0 Apply principles of basic dimensioning to properly specify sizes and information on technical drawings.

5.1 Define, identify and properly use the different elements of dimensioning: dimension lines, extension lines, leaders, notes, symbols.

5.2 Differentiate between and apply the appropriate standards associated with Imperial and SI units of measure.

5.3 Differentiate between the different standard methods of dimensioning: unidirectional, alignment, reference, datum.

5.4 Recite and apply the rules of dimensioning to properly dimension objects, including those with common features such as: circular features, machined hole features, chamfers, symmetrical shape, repetitive features, tapers, slopes, undercuts, knurls.

6.0 Produce neat, accurate and technically correct sectional views of objects.

6.1 Explain the function of a sectional view.

6.2 Properly locate and identify cutting plane lines.

6.3 Differentiate between and properly use the different patterns of section lining.

6.4 Draw neat, accurate and technically correct sectional views of the following types: full, half, partial, offset, revolved, removed, phantom.

6.5 Draw neat, accurate and technically correct sectional views of common items such as: threads, threaded assemblies, shafts, keys, keyseats, holes, ribs, lugs, spokes, webs, simple assemblies.

7.0 Produce neat, accurate and technically correct auxiliary views.

7.1 Explain the function of auxiliary views, relating to distorted appearance of inclined and oblique surfaces.

7.2 Using rules of view placement, properly position auxiliary views on a drawing.

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**II. PERFORMANCE OBJECTIVES (OUTCOMES), con't:**

- 7.3 Draw neat, accurate and technically correct primary auxiliary views.
- 7.4 Draw neat, accurate and technically correct secondary auxiliary views.
- 7.5 Draw neat, accurate and technically correct auxiliary views of circular features.
- 8.0 Produce neat, accurate and technically correct assembly drawings for simple arrangements.
  - 8.1 Define the following terms: assembly drawing, detail drawing, fit, tolerance, allowance, bill of material.
  - 8.2 Explain the applications of detailed drawings and assembly drawings.
  - 8.3 Complete a bill of material for a simple assembly.
  - 8.4 Draw a neat, accurate and technically correct assembly drawing for a simple mechanical assembly.

NOTE: THIS TOPIC WILL BE COVERED ONLY IF TIME PERMITS.

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<u>III. TOPICS TO BE COVERED</u>	<u>APPROXIMATE HOURS</u>
1.0 Introduction graphic language, C.S.A. Standards, office procedure, equipment use, scaling, drawing media.	6
2.0 Basic Drafting Conventions of line work and lettering, straight line work, text, erasing, sketching and dimensioning, pictorial, title blocks.	10
3.0 Geometric Construction straight lines, arcs and circles, tangents, polygons, ellipse, curves and curve smoothing.	12
4.0 Orthographic Projection Orthographic systems, third angle projections, hidden surfaces and edges, inclined, circular features, oblique surfaces.	30
5.0 Basic Dimensioning Elements, units, basic rules, circular features, machined hole features, common features.	6
6.0 Sections and Conventions Sectional views, partial sections, special features, revolved, removed, offset, intersections.	12
7.0 Auxiliary Views Primary, multi and secondary auxiliary views, circular features,	10
8.0 Assembly Drawings - (IF TIME PERMITS) Simple assembly drawing, bill of material, part details, general tolerances.	10

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**IV. LEARNING ACTIVITIES/REQUIRED RESOURCES:**

**1.0 STUDENT ACTIVITIES**

- i) Participate in classroom lectures and demonstrations.
- ii) Review and study textbook theory and examples.
- iii) Produce summary notes of theory and procedures.
- iv) Practice the use of drawing instruments.
- v) Complete drawing exercises, drawings and other assignments as either in class or take home work.
- vi) Attempting quizzes and assignments as administered throughout the term.

**2.0 RESOURCES**

- i) Textbook: Engineering Drawing and Design, 4th edition, JENSON and HELSEL, McGraw Hill
- ii) Drafting room, drafting tables, and student provided supplies.
- iii) Supplementary hand out material provided by instructor.
- iv) Regular classroom facilities.
- v) Mechanical Engineering Drawing Standards, C.S.A. B78.1 and B78.2



**V. EVALUATION METHODS:** (INCLUDES ASSIGNMENTS, ATTENDANCE REQUIREMENTS, ETC.)

**1.0 GRADING SYSTEM**

There will be a maximum of four major tests throughout the term. A minimum of one week notice will be provided for each test.

In addition to the major tests there will be a variety of drawings/exercises that will be assigned and marked. These assignments will take place throughout the term. The marking of assignments may be on a random basis.

Scheduled or unscheduled mini-tests MAY be held throughout the term. These exercises will be referred to as quizzes.

Final grades will be calculated in the following manner:

Tests.....	70%
Assignments/Quizzes.....	30%

Numerical marks will relate to grads according to the schedule below:

A+	---	90-100%
A	---	80-89%
B	---	70-79%
C	---	60-69%
R	---	less than 60%

**2.0 ATTENDANCE**

The policies regarding attendance are the responsibility of the individual professor, and will be issued as supplementary documentation.

**3.0 REWRITES**

The policies regarding rewrites are the responsibility of the individual professor, and will be issued as supplementary documentation.

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**V. EVALUATION METHODS, con't:**

**4.0 LATE ASSIGNMENTS AND MISSED TESTS**

The policies regarding late assignments and missed tests are the responsibility of the individual professor, and will be issued as supplementary documentation.

**VI. REQUIRED STUDENT RESOURCES:**

- i) Textbook: Engineering Drawing and Design, JENSEN and HELSEL, 4th edition, McGraw Hill.
- ii) Note taking supplies: 3-ring binder, paper etc.
- iii) Drafting supplies: Quad ruled paper, blank paper, T-square, set squares, dividers, compass, engineering scales (Imperial and SI), architects scale, protractor, pencils, etc.
- iv) "Scientific" calculator.

**VII. ADDITIONAL RESOURCE MATERIALS:**

The following texts are used as reference and sources of supplementary information:

- i) Engineering Drawing and Graphic Technology, FRENCH and VIERCK, 12th edition, McGraw Hill
- ii) Engineering Graphics, GIESECKE and others, 5th edition, MacMillian
- iii) Mechanical Engineering Drawing Standards, C.S.A. B78.1 and B78.2
- iv) Machinery's Handbook, Industrial Press

In addition to the above, there are several of texts and periodicals related to this study, available in the college library.

In the event that hand out materials are supplied by the instructor, students are responsible for the content knowledge.

**VIII. SPECIAL NOTES:**

1/ Your instructor reserves the right to modify the course and course outline as deemed necessary to meets the needs of the students, or in the case of special circumstance.

2/ Students with special needs are encouraged to discuss their required accommodations in confidence with the instructor.

3/ Disruptive conduct of any kind is not acceptable, and will not be tolerated in lecture or lab periods.

4/ General College policies, including those described in the "Students Rights and Responsibilities" document will be upheld.

