



CAMOSUN COLLEGE
School of Trades and Technology
Department of Mechanical Engineering

MENG -141 Manufacturing Processes-I
Fall - 2019

COURSE OUTLINE

The calendar description is available on the web @
<http://camosun.ca/learn/calendar/current/web/meng.html#MENG141>

Students will be introduced to manufacturing processes including cutting machine tool. Steel Manufacture and Heat Treatment will be discussed. Non-Traditional Manufacturing Processes will also be introduced.

Credits: 3

Format: 2 lecture hours and 3 lab hours per week

Ω Please note: This outline will not be kept indefinitely. It is recommended students keep this outline for their records, especially to assist in transfer credit to post-secondary institutions.

1. Instructor Information

(a) Instructor	Salah S. Elfurjani, PhD.	(d) Phone	250-370-3864
(b) Office hours	Schedule on office door	(e) E-mail	ElfurjaniS@camosun.ca
(c) Location	TEC 261	(f) Website	N/A

2. Intended Learning Outcomes

Upon successful completion of this course, a student will be able to:

- Interpret drawings and plan operations required to make parts.
- Operate measuring and layout tools to prepare parts for machining.
- Select an appropriate hand tool for the task and operate it safely and effectively.
- Operate machine tools including drill press, grinder, band saw, manual lathe and milling machine, both safely and effectively.
- Calculate cutting feeds and speeds to operate machine tools at optimum effectiveness.
- Identify thread forms for diameter, handedness, pitch, and number of starts.
- Select and use appropriate drills, taps and reamers to create plain and threaded holes.
- Discuss the purpose of tolerances and calculate appropriate tolerances in manufactured parts.

3. Required Materials

- a) Texts: Technology of Machine Tools, 8th Edition, Steve Krar, Arthur Gill and Peter Smid
- b) Other Safety glasses, and 6 inch Digital Caliper (recommended)

4. Course Content and Schedule

Anticipated Lecture Topics (Over the 14 week term):

- **Drawings:** Read and interpret assembly and part drawings based on drawing geometry and title block information. Development of orthographic projection and the difference between 1st angle and 3rd angle projection. Understand the use of different line types, drawing symbols, annotations and dimensioning methods for both engineering and manufacturing drawings. Interpret technical information presented by different drawing views (detail, auxiliary, section). Both Metric and Imperial units will be covered.
- **Common Industrial Measuring Equipment:** Rulers, calipers, center and prick punches, layout equipment. Micrometers, vernier micrometers, verniers. Gauges including optical comparator, gauge blocks, sine bars, dial test indicators.
- **Tolerances:** Definitions of terms including nominal size, basic size, limit dimensions, bilateral tolerance, unilateral tolerance, clearance and force fits. Calculating tolerances. Relationship between tolerance and cost.
- **Drilling Operations:** Different drilling machines including bench press, radial arm and gang drilling machines. Drill bit types. Drilling, reaming, countersinking, counter-boring, tapping and spot facing. Feed, speed and time calculations. Work holding devices.
- **Lathe Types and Equipment:** Various lathe types including engine, turret, copy and CNC lathes. Work and tool holding equipment including: face plates, collets, three-jaw universal and four-jaw independent chucks. Ancillary equipment including: steady and follower rests, dead and live center and mandrels.
- **Turning Operations:** Common operations that can be performed on a lathe including turning, facing, parting off, thread cutting, knurling, drilling, reaming and tapping. Calculations of turning speeds and feeds and machining time.
- **Milling Machines:** Differences between the horizontal, vertical and universal milling machines. Description of the types of machining operations that can be carried out on each. Description of the various work and tool holding equipment including rotary table, dividing head and split collets. Simple indexing calculations. Calculations of milling speeds and feeds and machining time.
- **Band Saws:** Description of saw blade types. Explanation of set and form. Explanation of various band saw type operations including: high speed, friction and electro band sawing, band filing and polishing.
- **Abrasives:** Types of abrasive, grit sizes, bond types, grade and structure. Description of various manufacturing processes that use abrasives including: surface, cylindrical, center less, and plunge grinding, lapping, honing, super-finishing, tumbling and shot blasting.
- **Forging and Casting** Purpose of and differences in forging processes. Explanation of more common casting techniques including sand, investment, permanent mold, resin shell and die-casting. Advantages and limitations of each.
- **Sheet Metal forming Operations:** Cutting operations, forming operations and bending operations using shear and break. Precision sheet metal processes and equipment.

- **Non-Traditional Manufacturing Processes (NTMP):** Introduction and applications of more recent manufacturing techniques including: water jet cutting, laser machining, electric discharge machining, rapid prototyping and chemical grinding.

Lab Topics (Over the 14-week term):

Students will obtain hands-on experience working on projects using typical machine shop equipment. Lab experience will reinforce understanding of lecture topics

5. Basis of Student Assessment (Weighting)

Assignments/Quizzes	25%
Final exam	25%
Labs and project	50%
Total	100%

6. Grading System

Standard Grading System (GPA)

Competency Based Grading System

7. Recommended Materials to Assist Students to Succeed Throughout the Course

N/A

8. College Supports, Services and Policies



Immediate, Urgent, or Emergency Support

If you or someone you know requires immediate, urgent, or emergency support (e.g. illness, injury, thoughts of suicide, sexual assault, etc.), **SEEK HELP**. Resource contacts @

<http://camosun.ca/about/mental-health/emergency.html> or <http://camosun.ca/services/sexual-violence/get-support.html#urgent>

College Services

Camosun offers a variety of health and academic support services, including counselling, dental, disability resource centre, help centre, learning skills, sexual violence support & education, library, and writing centre. For more information on each of these services, visit the **STUDENT SERVICES** link on the College website at <http://camosun.ca/>

College Policies

Camosun strives to provide clear, transparent, and easily accessible policies that exemplify the college's commitment to life-changing learning. It is the student's responsibility to become familiar with the content of College policies. Policies are available on the College website at <http://camosun.ca/about/policies/>. Education and academic policies include, but are not limited to, Academic Progress, Admission, Course Withdrawals, Standards for Awarding Credentials, Involuntary Health and Safety Leave of Absence, Prior Learning Assessment, Medical/Compassionate Withdrawal, Sexual Violence and Misconduct, Student Ancillary Fees, Student Appeals, Student Conduct, and Student Penalties and Fines.

A. GRADING SYSTEMS <http://camosun.ca/about/policies/index.html>

The following two grading systems are used at Camosun College:

1. Standard Grading System (GPA)

Percentage	Grade	Description	Grade Point Equivalency
90-100	A+		9
85-89	A		8
80-84	A-		7
77-79	B+		6
73-76	B		5
70-72	B-		4
65-69	C+		3
60-64	C		2
50-59	D		1
0-49	F	Minimum level has not been achieved.	0

2. Competency Based Grading System (Non GPA)

This grading system is based on satisfactory acquisition of defined skills or successful completion of the course learning outcomes

Grade	Description
COM	The student has met the goals, criteria, or competencies established for this course, practicum or field placement.
DST	The student has met and exceeded, above and beyond expectation, the goals, criteria, or competencies established for this course, practicum or field placement.
NC	The student has not met the goals, criteria or competencies established for this course, practicum or field placement.

B. Temporary Grade

Temporary grades are assigned for specific circumstances and will convert to a final grade according to the grading scheme being used in the course. See Grading Policy at <http://camosun.ca/about/policies/index.html> for information on conversion to final grades, and for additional information on student record and transcript notations.

Temporary Grade	Description
I	<i>Incomplete:</i> A temporary grade assigned when the requirements of a course have not yet been completed due to hardship or extenuating circumstances, such as illness or death in the family.
IP	<i>In progress:</i> A temporary grade assigned for courses that are designed to have an anticipated enrollment that extends beyond one term. No more than two IP grades will be assigned for the same course.
CW	<i>Compulsory Withdrawal:</i> A temporary grade assigned by a Dean when an instructor, after documenting the prescriptive strategies applied and consulting with peers, deems that a student is unsafe to self or others and must be removed from the lab, practicum, worksite, or field placement.