



MENG 245 - Manufacturing Processes 3 - Summer 2018

COURSE OUTLINE

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and

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Office: **TEC 111**
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Lecture Hours: Tues 8:30-10:30am (**TEC 175**)
Office Hours: **Mohit** – Tues & Thur 14:30 – 15:30
Salah – Tues 14:30-15:30 & Thur 15:00-16:30

Mohit Garg - Tutorials (TEC 174)
Tuesday 12:30-14:30-X01B
Thursday 8:30-10:30-X01C
Thursday 10:30-12:30-X01D
Friday 8:30-10:30-X01A

Welding and composite Labs

Welding: Lab-(CTEI 141A)

Thursday June 28- Full day

Friday June 29- Full day

Composite Lab: July 17-27 (Jack White -102)

Tuesday 12:30-14:30-X01B

Thursday 8:30-10:30-X01C

Thursday 10:30-14:30-X01D

Friday 8:30-10:30-X01A

Calendar Description:

Students will be introduced to manufacturing processes including welding and composites. Corrosion protection methods will be discussed. Quality control methods will also be introduced.

Additional description:

The course will introduce the students to the importance of quality control in maintaining the standards in today's manufacturing environment. During the tutorial sessions students will be able to apply the principles and tools to solve challenging industry based quality control problems. Topics related to quality control that will be covered are: Inspection tools – OC curve, DMAIC, Pareto Diagram, Histograms, and Cause and Effect Diagram.

Further, the students will be introduced to the underlying science of corrosion and fundamentals of corrosion engineering. The deterioration of the metallic components of critical structures by corrosion is often life-limiting. Topics include: principles of Electrochemistry and types of corrosion. Case studies on corrosion failures in marine industry, possible material alternatives and protective coatings to mitigate corrosion will be discussed during lectures.

In addition, students will be introduced to manufacturing processes including welding and composites. This hands-on course will focus on fundamentals of arc welding processes. Topics related with weldability of metals (mild steel, carbon steels, stainless steels, alloy steels and non-ferrous metals). Also, the welding processes covered are: Shielded Metal Arc Welding (SMAW), Gas Metal Arc Welding (MIG), and Gas Tungsten Arc Welding (TIG). Topics include: safety, setup of equipment, electrode selection, shielding gases.

Moreover, demonstrate and define and utilize composite manufacturing processes. Also, student will be able to know the safety procedures when working with composites. Processes will be applied including hand lay-up, bonding, and the composite layup process explain the role of matrix and resin, hardener, how to prepare and lay out all materials and tooling to work with composites.

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Intended Learning Outcomes:

- Describe and specify commonly used welding processes used in manufacturing.
- Identify and explain the types of composite materials and their characteristic features including advantages, disadvantages, and applications.
- Prepare a mold and layup a composite part.
- Describe attributes of corrosion protection processes including electroplating, painting and powder coating and specify the appropriate process when corrosion protection is required.
- Specify quality control measures for a manufacturing operation.
- Determine the average, range and standard deviation of part characteristics

Specifically, students will learn to:

- Employ the vocabulary and terms used in the quality field correctly, like non-conformance, specifications, differentiate between quality assurance and quality control
- Develop OC curves to decide the probability of accepting the lot
- Illustrate the meaning of Lean Manufacturing, Six Sigma and its relevance in today's business.
- Construct Pareto Diagram, Histogram, cause and effect diagram, check sheet, flow charts and tree diagrams
- Understand the mechanisms of corrosion; costs of corrosion across industry
- Recognize the importance of corrosion prevention and control planning
- Considerations for different material selection and design to minimize corrosion
- Describe safe working practices in welding shop
- Identify components of welding equipment
- Understand and explain the methods employed in composite fabrication
- Learn basic hand skills for the layup of composites materials using fiberglass, carbon fiber and polyester resin.

Evaluation Method:

Category	Labs	Tutorials	Quizzes	Project	Final Exam
Welding process	15	-	-	-	15
Fiberglass materials	15	-	5	-	
Quality control & measure	-	10	10		20
Corrosion protection	-			Report - 5 Presentation - 5	

Standard Grading System:			
90-100%	A+	70-72%	B-
85-89%	A	65-69%	C+
80-84%	A-	60-64%	C
77-79%	B+	50-59%	D
73-76%	B	0-49%	F

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Textbooks:

1. 'Juran's Quality Handbook: The Complete Guide to Performance Excellence, Seventh Edition, McGraw Hill. ISBN: 9781259643613 (Recommended)
2. Sanjay K Mazumdar - Composites manufacturing _ materials, product, and process engineering (2002, CRC Press)
3. Welding Principles and Applications by Larry Jeffus (2011, 7th Edition)

Important Notes:

In order to pass the course, attendance is mandatory during lectures, tutorials and successful completion of all labs.

There will be no make-up quizzes, assignments or exams. If you miss any, you will be assigned a grade of Zero for that particular evaluation type.

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.