MECH 4705 CAD/CAM

(Computer-Aided Design and Manufacturing)

Instructor:

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Lectures: 1.5 hours/week, Wednesday 10:05 am-11:25 am ME 4494

CAD/CAM Laboratory: 1.5 hours/week, Tuesdays 1:05 pm-2:25 pm ME 2256

Course Outline

This course is designed to introduce the fundamental concepts of Computer-Aided Design and Manufacturing (CAD/CAM) using Creo Parametric 3 and computer numerical controlled (CNC) machines. The students will use their acquired CAD/CAM knowledge to complete a simple design/ manufacturing project throughout the course.

Part A (CAD/CAM theory)

Part I: Computer-Aided Design (CAD)

Chapter 1 Introduction to CAD/CAM

Chapter 2 Computer Aided Drafting Systems

Chapter 3 Geometric Modelling Systems

Chapter 4 Representation and Manipulation of Curves

Chapter 5 Representation and Manipulation of Surfaces

Part II: Computer-Aided Manufacturing (CAM)

Chapter 6 CAD and CAM Integration

Chapter 7 Numerical Control

Part B (CAD software — PTC Creo 3)

1. Creo Parametric 3 Interface and Customization
2. Helical and Variable Section Sweeps
3. Advanced Rounds and Tweaks
4. Patterns and Family Tables
5. User Defined Features (UDF's)
6. Assembly

Part C (CAM software — PTC Creo 3 CAM)

1. Creo Parametric 3 NC Assembly
2. Creo Parametric 3 NC Milling
3. Creo Parametric 3 NC Lathe

CAD/ CAM project

The students will use a TORMACH 1100 3-axis CNC mill to manufacture the project parts.

References

[1] Principles of CAD/ CAM/ CAE systems, Kenwood Lee. Pearson Addison-Wesley Reading, 1999, ISBN 0-201-38036-6
(This book is reserved in Carleton Library)

[2] CADCAM, principles, practice and manufacturing management, Chris McMahon and Jimmie Browne, Second Edition, Addison-Wesley, 1998, ISBN 0-201-17819-2.
(This book is reserved in Carleton Library)

[3] CAD/CAM Computer-Aided Design and Manufacturing, Mikell P. Groover, Emory W. Zimmers, Jr., Prentice-Hall, Inc., 1984, ISBN 0-13-110130-7.
(This book is reserved in Carleton Library)

[4] Computer-Aided Design and Manufacturing, Farid M. L. Amirouche, Prentice-Hall, Inc., 1993, ISBN 0-13-472341-4.
(This book is reserved in Carleton Library)

Creo Parametric 3 Tutorial

[5] Creo Parametric 3 Advanced Tutorial, Roger Toogood, SDC Publications, 2015, ISBN 978-1-58503-985-2.
(This book is available at the Carleton University Bookstore)

Marking Scheme

Creo 3 Assignments: 5%
(Please submit the electronic files to CULearn)

Creo 3 Examination: 20%
(Three hours, open book, please submit the electronic files to CULearn)

Project Report: 25%
(Please submit an electronic file of the report to CULearn)

Final Examination (CAD/CAM theory): 50%
(Three hours, open one-sheet notes on both sides, any types of calculator allowed)

cuLearn:

- The course will be supported by the cuLearn Course Management System.
- Marks for Assignment and project report will be released through cuLearn only
- Additional lecture notes in the form of slides will be available through cuLearn before class.

> **Note:** Students will be required to regularly login to cuLearn and is fully responsible for reading the information distributed to students through the cuLearn course page. Information provided to students on this page will be considered to have been delivered to all registered students within 24 hours of posting.

Academic Accommodation

You may need special arrangements to meet your academic obligations during the term. For an accommodation request the processes are as follows:

Pregnancy obligation: write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details see the Student Guide

Religious obligation: write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details see the Student Guide

The Paul Menton Centre for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in this course, please contact PMC at 613-520-6608 or pmc@carleton.ca for a formal evaluation. If you are already registered with the PMC, contact your PMC coordinator to send me your Letter of Accommodation at the beginning of the term, and no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). Requests made within two weeks will be reviewed on a case-by-case basis. After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. Please consult the PMC website (www.carleton.ca/pmc) for the deadline to request accommodations for the formally-scheduled exam (if applicable).