

The University of British Columbia
Faculty of Applied Science
Department of Mechanical Engineering

MECH 596 – “CAD/CAM Principles and Practice”

3 Credits / [2-2*-1*]

OBJECTIVES: This course focuses on the introduction of modern computer-aided manufacturing technologies as well as the related computer-aided geometric modeling methods. Students will develop practical knowledge and understanding of the applications, underlying mathematical principles, and limitations of these technologies through lectures, seminar tutorials, and laboratory tutorials/projects.

PREREQUISITE: An undergraduate course on Manufacturing Processes

TOPICS:

1. CNC Machine Tool Basics and Milling Operations
2. NC Part Programming
3. Parametric Representation of Curves and Surfaces
4. Sculptured Surface Machining: Three-Axis and Five-Axis

LECTURES: 2 lecture hours per week – Tuesdays, 4:00-6:00 pm, MacMillan 158

LABS: 10 laboratory sessions – Thursdays, 5:00-7:00 pm, PACE Lab (ICICS X060)

TUTORIALS: 2 seminar presentation/discussion sessions – 2 afternoons (2:00-6:00 pm) – TBA

REFERENCE TEXTS:

1. Zeid, I., *Mastering CAD/CAM*, McGraw-Hill, 2005
2. Lee, K., *Principles of CAD/CAM/CAE Systems*, Addison-Wesley, 1999

EVALUATION: The course grade will be determined according to the following:

Project #1 – Individual	10%
Project #2 – Group	10%
CAD Seminar Presentation	10%
CAM Seminar Presentation	10%
Quiz (closed book)	10%
Final Examination (closed book)	50%

INSTRUCTOR: Professor Hsi-Yung (Steve) Feng
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NOTE: The items listed above are subject to adjustments and changes as needed.

MECH 596 Lecture & Laboratory Schedule

Week	Lecture ¹	Date	Topic	Lab ²	Date	Topic
1	1	Jan. 7	Course overview	1	Jan. 9	Basic Concepts in NX
	2	Jan. 7	CAM/NC/CNC			
2	3	Jan. 14	Machine tool basics	2	Jan. 16	Sketch Essentials & Feature Modeling
	4	Jan. 14	Milling operations			
3	5	Jan. 21	NC part programming – 1	3	Jan. 23	Curves
	6	Jan. 21	NC part programming – 2			
4	7	Jan. 28	3D modeling schemes – 1	4	Jan. 30	Free Form Modeling – 1
	8	Jan. 28	3D modeling schemes – 2			
5	9	Feb. 4	Parametric curves – 1	5	Feb. 6	Free Form Modeling – 2
	10	Feb. 4	Parametric curves – 2			
6	11	Feb. 11	Parametric curves – 3	6	Feb. 13	Free Form Modeling – 3
	12	Feb. 11	Parametric curves – 4			
Midterm Break: February 17 – 21						
7	13	Feb. 25	Parametric curves – 5	Project #1		
	14	Feb. 25	Parametric curves – 6			
8	15	Mar. 4	Parametric curves – 7	Project #1		
	Quiz: March 4					
9	16	Mar. 11	Parametric surfaces – 1	7	Mar. 13	Cavity Milling
	17	Mar. 11	Parametric surfaces – 2			
10	18	Mar. 18	Machine tool control basics	8	Mar. 20	Surface Contouring
	19	Mar. 18	Accuracy and repeatability			
11	20	Mar. 25	Milling operation setup	Project #2 & Drop-in Sessions		
	21	Mar. 25	CAD/CAM part programming			
12	22	Apr. 1	Tool path generation – 1	Shop Machining Sessions March 31 – April 8		
	23	Apr. 1	Tool path generation – 2			
13	24	Apr. 8	Tool path generation – 3			
	25	Apr. 8	Review			
Final Exam: April 12 – 30						

¹ Tuesdays, 4:00-6:00 pm, MacMillan 158

² Thursdays, 5:00-7:00 pm, PACE Computer Laboratory (ICICS X060)