



THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Advanced MCAD modeling with CATIA

MECHENG 5670

Credit Hours:

3.00

Course Levels:

Undergraduate (1000-5000 level)

Graduate (5000-8000 level)

Course Components:

Lecture

Lab

Course Description:

Advanced techniques for solid, surface and assembly modeling using CATIA workbenches. Covers not only construction methods, but also how geometric modelers work internally: constraint solving, geometric DoFs, history roll forward-rollback, BRep data structure, Boolean ops, math representations of curves and surfaces. Teaches effective strategies for modeling, parametrization and robust histories.

Prerequisites and Co-requisites:

Prereq: 3670, or Grad standing in Engr, or permission of instructor.

Course Goals / Objectives:

- Solid, surface, curve construction techniques in CAD systems
 - Assembly modeling
 - Effective strategies for parametrization and build histories
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Course Topics:

- Overview of Class; Intro to CAD, CATIA
 - Simple construction techniques: primitives, Booleans, Linear & rotational sweeps
 - Geometric constraints, DOFs; constraint based modeling
 - Topology; Euler eqn, Boolean ops
 - Solid modeling theory: CSG & Brep; construction history
 - Parametrics; part families, standard parts; features
 - Advanced geometry construction techniques: lofting, general & variational sweeps
 - Assembly design; assembly constraints; BOM, interference detect, exploded view
 - Geom. Transformations; Assembly animation; assembly display options
 - Parametric curves; bicubics
 - B-spline, Bezier, Rational curves
 - Surface design & analysis in CATIA
 - GD&T synthesis; Tolerance analysis methods
 - Surface modification functions
 - Data exchange formats: IGES, STEP
 - Combining surface and solids in assemblies
 - Building robust histories
 - Building robust parametric models
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Designation:

Elective