MECHANICAL ENGINEERING PROGRAM

ABET COURSE SYLLABUS

ME 251 Introduction to Detailed Design with Solid Modeling (2) Required

Course Description: (2019-20 Catalog)	Part and system or assembly design with solid modeling using current software and hardware. Techniques of advanced communication including weld symbols, threaded fasteners, dimensioning and tolerancing. Creation of design layouts and part models with varied configurations and dynamic assembly models. Introduction to section mass and inertia properties. Emphasis of group work and peer review in the production of part for assemblies. 1 Lecture, 1 Laboratory.
Prerequisite Courses:	ME 130 or ME 228; Recommended: IME 146 or IME 143
Prerequisites by Topic:	Fundamentals of: Detail drawings, size tolerances & notes Clearance, interference & transition fit calculations Geometric Dimensioning & Tolerancing (ASME Y14.5) Functional layouts & assembly drawings Thread representation and specification Weld symbology CAD skills: Parametric modeling, dimensioning, tolerance specification assembly mates, functional assemblies
Textbook: (and/or other required material)	Technical Graphics Communication, 4th Edition, Bertoline Engineering Drafting Toolkit
References:	Any specified by Instructor
Course Coordinator/Instructor:	John Larson, Lecturer of ME
Course Learning Outcomes:	1. Ability to apply form, orientation, position, profile, and runout geometric tolerances. 2. Select and apply datums. 3. Construct and apply basic dimensions as necessary. 4. Determine mass properties for parts. 5. Define and assign a part's material and properties. 6. Construct and utilize equations & part configurations. 7. Construct advanced functional layouts and assemblies. 8. Develop a Bill of Materials from part properties. 9. Create motion studies from functional assemblies

Relationship of Course to Mechanical Engineering Student Outcomes:	SO 1: Develop (D) SO 2: SO 3: Develop (D) SO 4: SO 5: SO 6: SO 7:
Topics Covered:	1. Advanced Detail Drawings, GD&T, and Notes 2. Fit Calculations & Tolerance Stacks 3. Equation Driven Dimensions 4. Part Configurations 5. Design of Functional Layouts & Advanced Mates 6. Determination of Volume & Center of Mass 7. Advanced Assembly Drawings & Part Driven Bill of Materials 8. Lofts 9. Three Dimensional Sketches & Sweeps
Laboratory Projects:	Individual and group assignments and projects that require students to use industrial CAD software to: Create part models and detail drawings: Geometric tolerances, basic dimensions, datums Tolerance Stacks Assemblies & exploded assembly drawings Construct parts & configurations with equations driven dimensions Design of functional layouts using collision detection Defining part properties necessary for bill of materials Motion studies & animations Instructor gives group and individual assistance as needed.
Class/Lab Schedule:	One 50 minute lecture & one 170 minute lab per week
Contribution of Course to Meeting the Professional Component:	(a) College-level math and basic sciences: 0 credits (b) Engineering Topics: 2 credits Design - Yes (c) General Education: 0 credits (d) Other: 0 credits
Prepared by: John Larson	**Date:** 02/27/20