Course Acronym:	ETEC
Course Number:	18B
Descriptive Title:	Engineering Design and Development II
Division:	Industry and Technology
Department:	Engineering Technology
Course Disciplines:	Engineering Technology, Manufacturing Technology
Catalog Description:	This is the second course in a two-course sequence that covers engineering design and development. In this capstone course, students work together in teams to design and construct solutions to engineering problems. Emphasis will be placed on testing methods, project construction, project presentation and professional peer review. *Note: The two-course sequence Engineering Technology 18A and Engineering Technology 18B is the same as Engineering Technology 18.*
Prerequisite:	Engineering Technology 18A with a minimum grade of C
Co-requisite:	
Recommended Preparation:	
Enrollment Limitation:	
Hours Lecture (per week):	1
Hours Laboratory (per week):	2
Outside Study Hours:	2
Total Course Hours:	54
Course Units:	1.50
Grading Method:	Letter Grade only
Credit Status:	Credit, degree applicable
Transfer CSU:	Yes
Effective Date:	12/15/2008
Transfer UC:	Yes
Effective Date:	
General Education: ECC	
Term:	

Other:	
CSU GE:	
Term:	
Other:	
IGETC:	
Term:	
Other:	
Student Learning Outcomes:	**SLO #1 Redefining & Justifying Alternative Solutions** The students will be able to conduct preliminary patent searches to determine the originality of their alternative choices. **SLO #2 Project Tracking** The student will employ industrial scheduling techniques to demonstrate project tracking. **SLO #3 Tech Review Presentation** The student will make a formal presentation to defend their research, design criteria, prototype, applications, and conclusions to a technical review panel.
Course Objectives:	1. Create, simulate and test complex designs using industry standard computers and software. 2. Interpret complex sketches, designs and drawings for technical content. 3. Work in teams to research, design, manufacture, test and evaluate mechanical, electronic or electromechanical assemblies. 4. Prepare portfolios to organize, display and present information. 5. Create presentations using media such as posters, digital images, PowerPoint and video.
Major Topics:	**I. CAPSTONE ENGINEERING PROJECT (6 hours, Lecture)** A. Capstone Engineering Project B. Daily engineering journals C. Sketches, models and drawings D. Model simulation data and project photos E. Safety, reliability and cost effectiveness **II. CAPSTONE ENGINEERING PROJECT (12 hours, Lab)** A. Documentation exercise B. Reliability exercise **III. CAPSTONE PROJECT CONSTRUCTION (6 hours, Lecture)** A. Teamwork and delegation B. Component construction

	C. Project assembly D. Testing and evaluation E. Protocols for writing the formal report **IV. CAPSTONE PROJECT CONSTRUCTION (12 hours, Lab)** A. Capstone Project Construction B. Tool use exercise C. Construction exercise **V. PROJECT PRESENTATION (6 hours, Lecture)** A. PowerPoint B. Digital images **VI. PROJECT PRESENTATION LAB (12 hours, Lab)** A. PowerPoint exercise B. Project demonstration exercise
Total Lecture Hours:	18
Total Laboratory Hours:	36
Total Hours:	54
Primary Method of Evaluation:	2) Problem solving demonstrations (computational or non-computational)
Typical Assignment Using Primary Method of Evaluation:	Assemble a prototype of the manufactured components of your capstone project consisting of RP parts and standard fasteners. Analyze the fit and function of the assembly and record the team's recommendations for improving the function and manufacturability of the assembly. Review your recommendations with the instructor prior to construction of final assembly parts.
Critical Thinking Assignment 1:	At the labor rate of $100 per hour, prepare a cost estimate for your capstone project in quantities of 10, 100 and 1,000 units. Present a three-page report which justifies your estimates and explains the production processes which reduce cost as quantity increases. Post the report on the class website for critique and evaluation.
Critical Thinking Assignment 2:	Using a minimum of three detail models for your project, create a mechanism assembly model with necessary linkages. Using the Inventor software simulation feature, perform a kinematic analysis on this model. Evaluate the results of the analysis to determine if design changes are required. Obtain screen shots of the analysis. Submit assembly model file electronically to the instructor.
Other Evaluation Methods:	Class Performance Completion Laboratory Reports Matching Items Multiple Choice Other Exams

	Performance Exams Quizzes True/False Written Homework
Instructional Methods:	Lab Lecture Multimedia presentations
If other:	Computer simulation
Work Outside of Class:	Journal (done on a continuing basis throughout the semester) Problem solving activity Required reading Study
If Other:	
Up-To-Date Representative Textbooks:	Michael Hacker. Engineering and Technology. 1st edition. Cengage Learning, 2010. DISCIPLINE STANDARD
Alternative Textbooks:	Project Lead the Way (PLTW) handouts
Required Supplementary Readings:	
Other Required Materials:	Flash drive Supplies for term project
Requisite:	Prerequisite
Category:	sequential
Requisite course(s): List both prerequisites and corequisites in this box.	Engineering Technology-18A
Requisite and Matching skill(s):Bold the requisite skill. List the corresponding course objective under each skill(s).	**Perform research on the internet and in conventional libraries.** ETEC 18A - Perform research using conventional libraries, the internet, and other resources. **Ability to create drawings using computer software.** ETEC 18A - Create, simulate and test basic designs using industry standard computers and software. **Ability to analyze designs, sketches and drawings for technical content.** ETEC 18A - Interpret sketches, designs, and drawings for technical content.
Requisite Skill:	
Requisite Skill and Matching Skill(s): Bold	

the requisite skill(s). If applicable	
Requisite course:	
Requisite and Matching skill(s):Bold the requisite skill. List the corresponding course objective under each skill(s).	
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Enrollment Limitations and Category:	
Enrollment Limitations Impact:	
Course Created by:	S. Cocca and E. Carlson
Date:	02/22/2016
Original Board Approval Date:	12/15/2008
Last Reviewed and/or Revised by:	Steve Cocca
Date:	11/16/2021
Last Board Approval Date:	