Course alpha, number, title	ME 478 Product Development
Required or elective	Elective
Course (catalog) description	Simulation of industrial environment for product development. Product concept, design, and manufacturing.
Prerequisite(s)	(ME 477) and completion of Tier I writing requirement.
Textbook(s) and/or other required material	No Required Textbook
Class/Lab schedule:	Total Credits: 3 *Lecture/Laboratory/Discussion Hours: 3/0/0*
Topics covered	(a) Design (b) Computer aided manufacturing (c) Computer integrated manufacturing (d) Materials processing (e) Relationship between design and manufacturing (f) Manufacturing techniques
Course learning objectives	The student shall have: (1) An ability to apply knowledge of mathematics, science, and engineering: including both theoretical and empirical mathematical models which describe manufacturing, processes qualitatively are developed and used for problem solving. (2) An ability to design and conduct experiments, as well as to analyze and interpret data: projects often need to be solved based on experimental data. (3) An ability to design a system, component, or process to meet desired needs: for a term project: a product is focused in order to identify a variety of design and manufacturing processes. (4) An ability to function on multi-disciplinary teams: the course is focused on various aspects of manufacturing; including a multi-disciplinary team from materials science, engineering art and mechanical engineering. (5) An ability to identify, formulate, and solve engineering problems: projects require solving new problems based on the fundamentals developed in class as well as other prerequisites; requires logical development and presentation of new solutions based on engineering background. (6) An understanding of professional and ethical responsibility: the consequences of failing to properly consider at various stages of manufacturing are discussed in a number of scenarios. (7) An ability to communicate effectively: the need for strong written and oral communications is reinforced with a term project: the broad education necessary to understand the impact of engineering solutions in a global and societal context: some manufacturing processes are presented with overall cost and benefit issues in a global and social context. (8) A recognition of the need for, and an ability to engage in life-long learning: students are encouraged to participate in the SME and ASME student chapters. (9) A knowledge of contemporary issues: discussion of the real manufacturing problems encountered by students in their Co-op and summer jobs and instructors. (10) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice: calculators are used to make predictions using mathematical models. New developments in the topic related to manufacturing are introduced.
Relationship of course to ME program outcomes	The following measurement standard is used to evaluate the relationship between the course outcomes and the educational-program outcomes: 3 = Strong Emphasis, 2 = Some Emphasis, 1 = Little or No Emphasis. (a) an ability to apply knowledge of mathematics, science, and engineering—3

(b) an ability to design and conduct experiments, as well as to analyze and interpret data—1
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability—2
(d) an ability to function on multidisciplinary teams—2
(e) an ability to identify, formulate, and solve engineering problems—1
(f) an understanding of professional and ethical responsibility—2
(g) an ability to communicate effectively—2
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context —1
(i) a recognition of the need for and the ability to engage in life-long learning—1
(j) a knowledge of contemporary issues—1
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice—2
(l) application of advanced mathematics—1
(m) design, build, and test in mechanical systems area—1
(n) design, build, and test in thermal/fluids area—1
(o) capstone design experience—1

Contribution to professional component:	Engineering Design
Person(s) who prepared this description	Patrick Kwon and Brian Thompson
Date of Preparation	5/5/10