I. **Department, number, and title of course:** ME 495a Mechanical Engineering Design

II. **Designation as a 'Required' or 'Elective' course:** Required Course

III. **Course (catalog) description:**
Project development skills, feasibility and cost-benefit analysis, ethical issues, professionalism, preliminary design, identification of tasks, assignment of tasks to project team members, coordination of interdisciplinary team effort, development of final proposal, oral presentation of final proposal.

IV. **Prerequisite(s)**
Prerequisite or concurrent enrollment in ENGR 351, ENGR 361 or ME 361; one of ME 301 or 400; two ME design electives; and senior standing in Mechanical Engineering (second to last semester).

V. **Textbook(s) and/or other required material**
Saluki Engineering Company Policy and Procedures Manual Version 6.2,
K. Purcell, I. Margon, M. Blankenship, A. Weston, F. Harackiewicz, available on Desire2Learn, August 2010

Clive L. Dym and Patrick Little, *Engineering Design: A Project Based Introduction*, Wiley 2008.

VI. **Course objectives**
The objective of this course is to introduce students to engineering design practice through the use of group projects involving a system, component or process to meet the desired needs of a customer. Focus is on development of creativity, communication skills, production of working drawings taking into consideration production processes and constraints such as economic factors, safety, reliability and social impact.

VII. **Topics covered**

1. **Course Introduction** – Purpose, Goals, Methodology, Soft Skills, Resumes
2. **Teamwork** – Norms & Expectations, Cultural Influences, Conflict Management
3. **Project Management Tools** – Risk Management, Action Item Lists, RASI Charts, Alternate Plans, Agendas, Iterative Development, Timelines, Design Reviews
4. **Memos and Design Notebooks** – Memo Organization, Composition of Design Notebooks
5. **Scheduling** – Activities & Milestones, Prioritization, Project & Implementation Schedules, As Bid, As Worked & As Finished Timelines
6. **Proposals** – RFPs, Proposal Sections, Composition, End of Proposal Memo, Oral Presentation
7. **Ethics& Intellectual Property** – Patents, Copyrights, Trademarks, Trade Secrets; case studies
8. **What Young Engineers Need To Know** – Fear of Failure, Meetings, Ethics, Professional Societies, International Considerations,

9. **Writing Style Guide** – Writing, Tables, Figures, Engineering Drawings, etc.

Additional Topics from quest lecturers:

1. Career Services
2. Internships, Externships and Coops
3. Library Services
4. Intellectual Property & Ethics
5. Safety - Presentation from Center for Environmental Health and Safety

VIII. Class/laboratory schedule, i.e., number of sessions each week and duration of each session

Two 75 minute sessions per week.

IX. Contribution of Homework, Quizzes, Tests, Laboratory Reports, or Research Papers

Course content does not have quizzes nor tests. Laboratory experiments are conducted for many build projects and are reported in standard Laboratory Report format in notebooks and further along in appendices of Design Report from part b of the course.

X. Contribution of course to meeting the professional component. Describe how the course devotes adequate attention and time to the professional component, which includes mathematics and basic sciences, engineering topics, and general education.

This is an applied design course, which addresses real-world design challenges. The course is taught in the format of staff meetings as all students are members of the Saluki Engineering Company. In part A, students prepare proposals for work to be conducted in part B. All designs relate to engineering problem solving and thus require the basic sciences that at the core of all levels of the curriculum.

XI. Relationship of course to program outcomes

Outcome Code	Outcome Description	Course
ME-SO1	The ability to apply knowledge of mathematics, science and engineering to problem solving	ME261, ME302, ME309, ME435, ME440
ME-SO2	The ability to design and conduct experiments, as well as to analyze and interpret data	ME401, ME402, ME407, ME440
ME-SO3	The ability to design a system, component, or process to meet desired needs within realistic constraints	ME406, ME440. ME411, ME475
ME-SO4	The ability to function on multi-disciplinary teams	ME440
ME-SO5	The ability to identify, formulate and solve engineering problems	ME309, ME406, ME440
ME-SO6	An understanding of professional and ethical responsibility	ME101
ME-SO7	The ability to communicate effectively	ME440
ME-SO8	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	ENGR303I, ME101
ME-SO9	A recognition of the need for and an ability to engage in life-long learning	ME101
ME-SO10	Knowledge of contemporary issues	ENGR303I, ME101
ME-SO11	The ability to use the techniques, skills and modern engineering tools necessary for engineering practice	ME440

XII. Person(s) who prepared this description and date of preparation:

Alan Weston, September 2014