ME 4900: Powertrain PREP IV
Course Policies and Syllabus

Instructor of Record: B. P. Sangeorzan, Ph.D.
402 EC
(248) 370-2236
bsangeor@oakland.edu

Office Hours: By arrangement.

Class Times: F, 12:30 – 2:30 pm, 275 EC

Course Web Site: https://moodle.oakland.edu/moodle/login/index.php

Teaching Assistant: Tim Ross, tgross@oakland.edu
Office hours: tbd

Text: Course notes (Powerpoint) will be provided

Course Overview: This is a senior-level engineering course, the fourth semester in the *Powertrain PREP* program, which is designed to further your understanding of automotive driveline, transmissions, engines and combustion and emissions.

Course Prerequisites: This course requires, as a prerequisite, the first three semesters of *Powertrain PREP* or equivalent experience.

Course Objectives: By the end of the course, students should be able to explain the functionality of powertrain manufacturing systems, understand various powertrain testing procedures, and have general knowledge of six sigma and reactive problem solving methods. Specifically, the successful student should be able to:

- Describe the various powertrain testing methods, such as dynamometer testing, friction testing, pressure testing, and emissions testing, and explain the physics and/or principles involved (a,b,e,j,k)
- Explain how various powertrain testing methods can improve the customer experience, as well as reliability (b,c,e,f,g)
- Explain how various tools and procedures, such as DFMEA and CAE, can be used to increase powertrain reliability and increase customer satisfaction (a,b,e,i,j,k)
- Explain the basics of reactive problem solving, as well as how to identify realistic cause-and-effect scenarios (d,e,g,i,j,k)
- Explain the fundamental principles of Six Sigma, and how it is used in the auto industry (b,e,k)

- Describe how virtual engineering can influence the relationship between manufacturing and powertrain design (c,d,g,h)

Course Grade : Weekly Homework Quizzes 50 %
Design/Analysis Project 50 %

Approximate Course Calendar:

Week #	Date	Topic	Location
Week 1	(1/4)	No Class First Week	N/A
Week 2	(1/11)	Quality and Reliability	EC 275
Week 3	(1/18)	DFSS	EC 275
Week 4	(1/25)	Engine Plant Tour	Dundee Engine Plant
Week 5	(2/1)	Project Proposal	FCA Headquarters (CTC)
Week 6	(2/8)		
Week 7	(2/15)	Powertrain Controls	EC 275
Week 8	(2/22)	Spring Break!	EC 275
Week 9	(3/1)	Reactive Problem Solving	EC 275
Week 10	(3/8)	Cylinder Head Pressure Testing	FCA Headquarters (CTC)
Week 11	(3/15)	Friction Testing	FCA Headquarters (CTC)
Week 12	(3/22)	Emission and Fuel Economy Testing	FCA Headquarters (CTC)
Week 13	(3/29)	Virtual Engineering	EC 275
Week 14	(4/5)	Final Presentations	FCA Headquarters (CTC)

Important Dates: (https://www.oakland.edu/registrar/important-dates/)

- ✓ Monday, January 15th – **No classes (MLK Day)**
- ✓ Wednesday, January 17th - Last day for "no-grade" drop and last Day 100% Tuition Refund
- ✓ Friday, January 26th - Last day to file application for degree for Winter 2018
- ✓ Wednesday, February 7th - Last day for official withdrawal (W)
- ✓ Friday, April 13th - Last PREP class meeting
- ✓ Tuesday, April 17th, Winter classes end at 10 pm.

Some Course Policies

Homework & Quizzes: This course is based upon the in-class presentations and hand-out slides, and therefore no traditional homework will be assigned. However, following each weekly presentation, there will be an online quiz through Moodle. Online quizzes will be open-book, but must be completed **without any assistance or collaboration.** No credit or make-up will be given for a quiz that is missed without *prior* instructor approval or a certified medical excuse.

Group Project: This course will include a group project that is disseminated in approximately the third week of class. Groups will be formed by the instructor, and final project presentations will take place on the last day of class.

Academic Conduct: All students are expected to read, understand, and comply with the *Academic Conduct Policy* found in the *Oakland University Undergraduate Catalog*. (*http://catalog.oakland.edu/content.php?catoid=17&navoid=1145*) and the *Code of Student Conduct* (http://www.oakland.edu/studentcodeofconduct). The policy applies to testing, homework and laboratory work, and is taken very seriously by the instructor. Perceived violations of this policy will be taken before the OU Academic Conduct Committee. Engineering is a profession that serves the public and demands integrity within its membership.

Course Web Site: The ***Moodle*** (https://moodle.oakland.edu/moodle/login/index.php) course manager will be used to disseminate course policies, schedules, course and lab handouts, homework assignments and solutions, last-minute changes, and other course-related information. Students should check this site regularly. Lab handouts and homework assignments will *not* be distributed in class. Any emails from the instructor will be sent to your official OU email address only.

Please note that the use of cell phones, text messaging, tablets and laptops is not allowed in this class unless you receive special permission from the instructor.

Program Outcomes: ABET (a-k)

(a) an ability to apply knowledge of mathematics, science, and engineering
(b) an ability to design and conduct experiments, as well as to analyze and interpret data
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environ., social, political, ethical, health, safety, manufactured ability, sustainability
(d) an ability to function on multi-disciplinary teams
(e) an ability to identify, formulate, and solve engineering problems
(f) an understanding of professional and ethical responsibility
(g) an ability to communicate effectively
(h) the broad education necessary to understand the impact of engineering solutions in a global economical, environmental, and societal context
(i) a recognition of the need for, and an ability to engage in life-long learning
(j) a knowledge of contemporary issues
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice