

MECH 220 Course Syllabus

2015W

Overview

MECH 220 is the technical skills practicum course incorporated into the Mech 2 program. In MECH 220 you will start to learn the skills required to undertake the development and building of a small engineering project. Your education in Mechanical Engineering begins with this course.

The course goals are:

- to provide you with skills you need in your other Mech 2 courses and your subsequent engineering work
- to highlight some key elements of a typical Mechanical Engineering project and to give you a sense of what Mechanical Engineering is all about
- to show the “big picture” so that later on you have a reference to see how the theory you learn fits with a practical engineering project

You will complete four one-week modules that include training in machine shop practice, engineering drawing, computer aided design, and electronic instrumentation. At the end of the four weeks, you will have modelled, documented, fabricated and tested your own electronically controlled magnetic levitation (*MagLev*) device.

Particulars

Dates: August 31 – September 25, 2015

Exam: Thursday, Oct 1, 2015 (time and location to be confirmed)

Credits: 4

Instructors

- Course Coordinator: Dr. Carl Ollivier-Gooch
- Physics and Math Review: Dr. Carl Ollivier-Gooch, Dr. Sheldon Green, and Prof. Jon Mikkelsen
- Machining Module: Mr. Markus Fengler
- Instrumentation Module: Dr. Gary Schajer
- Software Module: Mr. Henrik Johansen
- Drawing Module: Mr. Markus Fengler

Meeting Locations: please refer to the schedules on Connect.

Format

MECH 220 is divided into four modules: Machining Instrumentation, Software and Engineering Drawing. The four groups in Mech 2 rotate through each of the four modules and spend four days on each topic. During each module you will complete a different element of your *MagLev* device. Once you have completed the machining and instrumentation portion of the course, you will need to demonstrate and submit your working *MagLev* for marking. On Friday of Week 4, there will be some time to assemble and demonstrate your *MagLev*. If you need extra time to get your device operational and ready for marking, the final opportunity to demonstrate will be on the first Thursday of MECH 221.

The table below shows the basic schedule for MECH 220. “Module 1.1” refers to the first day of your first module (depending on which STT you are in, this could be any of the four activities), “Module 1.2” refers to the second day, and so on. Please refer to the timetables on Connect for complete details.

Dates	Monday	Tuesday	Wednesday	Thursday	Friday
Week 1 Aug 31 – Sept 4	Welcome Day Mech 2 Review Quiz 1	Module 1.1	Module 1.2	Module 1.3	Module 1.4
Week 2 Sept 7 - 11	Holiday	Imagine Day	Module 2.1	Module 2.2	Module 2.3
Week 3 Sept 14 - 18	Module 2.4	Module 3.1	Module 3.2	Module 3.3	Module 3.4
Week 4 Sept 21 - 25	Module 4.1	Module 4.2	Module 4.3	Module 4.4	Mech 2 Review Quiz 2 Project time <i>MagLev</i> Demos
Sept 28 – Oct 2	MECH 221 Starts			MECH 220 Final Exam <i>MagLev</i> Demos	

Academic Standards

Grading

Your final grade in MECH 220 will be determined based on the following component weights:

Exercises conducted in the four modules	60% (15% per module)
Demonstration of <i>MagLev</i> device	20%
Final Exam	20%

Details on grading exercises in each module will be distributed in class by the instructor(s) in charge. The instrumentation module contains substantial theoretical content that will be examined during the module and in the Final Exam. The *MagLev* device grading will be based on the quality of your device (proper function of mechanical and electronic parts, overall workmanship, appearance and whether or not the unit properly levitates the object). Examples of some elements that may be considered include, but are not limited to:

Function of Mechanical Parts

- Parts fit together with appropriate clearances
- Vertical supports are parallel to each other and perpendicular to base
- The Base Clamp holds the vertical supports securely
- The Coil Housing axis is parallel to the vertical support axes

Function of Electronic Parts

- The soldering and electronic assembly is of high quality

Function of the Assembly

- Device levitates object effectively
- You are able to explain any notable aspects of your particular device

In addition, instructors will observe your actions in class and may use this information to refine your grade. Positive influences include display of a positive and constructive approach to your work, timely completion of tasks and taking initiative to help your classmates. Adverse influences include inattention, carelessness and tardy attendance. The need to replace lost or damaged components will also incur a monetary cost.

Pass Requirements

In order to pass MECH 220, the following conditions must all be satisfied:

- You must successfully complete all four modules
- You must achieve an overall course grade of at least 50%

In the event that one or more of your module grades falls below 50%, the assigned course grade will be equal to the highest of the module grades below 50%. A student with a failing grade in MECH 220 will generally not be permitted to continue Mech 2 studies until the following year. (MECH 220 is a prerequisite for all other Mech 2 courses.) In exceptional circumstances (such as due to illness, medical procedures, or extreme personal hardship) contact the Mech 2 Coordinator, Dr. Ollivier-Gooch, as soon as possible to discuss your situation.

Policies

The Mech 2 “General Policies and Standards” (found on the Mech 2 Home Page on Connect) apply to MECH 220. You are required to be familiar with and to adhere to these standards. You are expected to conduct yourself in a mature and responsible manner and to act in a way that ensures your safety as well as the safety of others. Please note that it is especially important for you to follow all instructions and to be attentive during demonstrations of machinery use in the machining module. Students who fail to adequately follow instructions, particularly with respect to safety, will not be allowed to operate machinery; they will not be allowed to use the shop facilities to make their parts and consequently will get a failing grade in the course. Academic misconduct or other dishonest practices will not be tolerated and will be dealt with severely. If you have questions or are unclear on any of the policies that apply to Mech 2 or MECH 220, you should speak to a Mech 2 instructor as soon as possible.

Components

A “parts kit” for the *MagLev* device will be sold at the start of MECH 220. The Department pays most of the cost of your parts kit and you are responsible to pay the remaining portion. In case of loss or damage, a limited number of replacement parts will be available; some of the replacement components will only be available for purchase (at cost) from your instructors. At the completion of MECH 220 you will submit your *MagLev* for marking. After it is marked, you will get it back to keep.

To simplify things for everyone, a combined payment for the parts kit, the course note package and Student Accident Insurance is required. The accident insurance is required by the Department for all students using the shop. Details will be announced during MECH 220.