DRAFT COURSE OUTLINE
Last Update – 2013 Nov 5

COURSE INFORMATION (REQUIRED)

Instructor: Jonathan Nakane
Email: jnakane@physics.ubc.ca
Phone: 604-822-2110
Office hours: M-F 9-4pm by appointment

Teaching Assistant:
Email:
Phone:
Office hours:

Division: ---
Section number: 001
Course duration: Mar 10, 2014 to Apr 19, 2014
Pre-requisites:

Term/period: ?????
Class meeting times: M W 1400-1600
Classroom location: TBD
Tutorials / labs: n/a

Course website: http://projectlab.engphys.ubc.ca/baen580B-2014

BRIEF COURSE DESCRIPTION

This course will expose BINV track students to the fundamentals of prototyping: key tools for practical advancement of initiatives in innovation and entrepreneurship.

Students will be taken through a systematic approach to planning and designing different levels of prototypes and learning fundamental tools and methods available in mechanical, electronics prototyping to allow customer and stakeholder feedback at early stages and on sub-components.

It is intended that students take Prototyping and Qualitative models in parallel. Some of the testing of prototypes will occur in Qualitative Models.

COURSE GOALS

This course is designed to provide an introduction to prototyping methods. Students will get hands-on experience in a range of methods.

PROGRAM GOALS (REQUIRED) *(Check those that apply)*

MBA
X Critical Thinking
X Analytical Decision-making
X Integration
X Business Writing
X Oral Presentation Skills
☐ Ethics
☐ Sustainability

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LEARNING & ASSESSMENT ALIGNMENT

Learning Objectives

Students will be able to:

1. Deconstruct a new product or service ideas into component parts that can each be separately prototyped and tested.
2. Sketch the components of an innovative product or service.
3. Develop basic abilities in a range of software tools to create 2D and 3D, static and moving prototype models.
4. Create prototypes at different stages of project development and complexity that can be customer tested.
5. Present the prototypes to a range of stakeholders.

Assignments:

Project 1 (10%) - Design in CAD for fabrication using one of our digital fabrication tools

- Criteria: Basic technical competence, conceptual understanding,
- Assessment – prototype, including the computer CAD model, the physical prototype fabricated using one of the campus facilities or outsourced, and a comparison of the computer model and the actual final part (function, physical dimension, tolerances)

Project 2 (25%) – Physical Prototopye of Item Selected By The Class

- Criteria: Physical and semi-functional prototype (all groups do same project)
- Assessment: Technical prototype and CAD model of final product. Uniqueness, visual impact, and appropriateness of methods used for fabrication. Group should provide a computer CAD model of the item, any physical prototypes, a comparison of the computer model and the actual final part, and a 1-page analysis of the prototype and how their model compares with any existing products.

Project 3 (10%) - Software Prototype for Mobile and Web Application

- Criteria: demonstration of software prototype using mock-up / wireframing tools used in class.
- Assessment: Appropriateness of model used

Project 4 (35%) – Physical Prototopye of self-selected item.

- Criteria: Physical and semi-functional prototype. Topic will be discussed in collaboration with course instructors.
- Assessment: as in Project 2.

Peer Review of Projects (10%) (5% each for Projects 2 and 4)

- Students will be asked to submit written feedback for 3-4 projects done by other students, to be returned to the students. The quality and usefulness of the feedback with respect to aspects discussed in the course will be assessed.

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Class Participation (10%)

- The quality of participation you exhibit during class (relevance, insight and clarity of your remarks, questions or presentations). You may share insights based on your work experience, research, or business sector, and relevant information.
- Work habits, such as punctuality, attendance and preparation. Students should be well-prepared for class and ready to answer questions.

COURSE MATERIALS & REQUIREMENTS

Windows or Mac laptop to be used in class. Access to computers with Solidworks software during office hours will be arranged.

BIBLIOGRAPHY

Suggested but not required:

Prototyping and Low Volume Production, R Thompson, 2011.

Prototyping and Modelmaking for Product Design, B. Hallgrimsson, 2012.

COURSE STRUCTURE (Teaching and Learning Activities)

Students will be engaged in in-class discussion, group projects, and presentations. Instructional approaches will include the case-based method, peer instruction, and reflective writing exercises.

It is highly recommended that students complete some of the required readings before the first class.

SCHEDULE

Wk	Day	Activity	Homework (due at start of class)	Percentage
0	Nov.	Intro Electronics - microcontrollers and sensors (from APSC 150)		
1	Mon	Overview of 4 Class projects + 2 Peer Reviews Lab Tour Examine 3d/laser/waterjet parts Solidworks Computer account setup in Hennings building		

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1	Wed	Hand Sketching (lego exercise). Progression from Idea generation to sketch to 3d model. 3D capture with laser scanner and multiple photos. Solidworks pt2. Class vote on topic for Project 2		
2	Mon	Hand Tool fabrication Solidworks pt3	Project 1 (1 object for waterjet/laser/3d printer)	10
2	Wed	Return Project 1 Items Mass Manufacturing - examining commerical parts Mass Manufacturing - hands-on casting, molding, stamping Machining tolerances - fit and manufacturing technique Surface finishes		
3	Mon	Tour of machine shop. Working day		
3	Wed	Group discussion of Project2 results. Software - wireframing and working demos for mobile and web applications	Project 2 (prototype, common project)	25
4	Mon	Electronics pt2 (sensors, parts selection)	Peer Review - Project2	5
4	Wed	Group discussion of Project3 results Working day	Project 3 (software mock-up)	10
5	Mon	Working day		
5	Wed	Group discussion of Project4 results.	Project 4 (final physical model)	35
6	Mon	--	Peer Review - Project 4	5
6	Wed	--		
			Class Participation	10
			TOTAL	100

OTHER INFORMATION