ISDN 2400 (Spring,2022-23)

Physical Prototyping

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Hong Kong University of Science and Technology

Division of Integrative Systems and Design

ISDN 2400 – Physical Prototyping

Course Vector: 3

Course Description:

The aim of this course is to take design concepts to reality. Students will convert their concepts that were created using sketches or 3D design software to tangible prototypes. Quick prototyping using various materials will provide hands-on experience. The course will also provide knowledge on various 3D prototyping technologies so that students can explore the most suitable means to generate functional and aesthetically pleasing prototypes. Hands-on experience with assembly to generate complete prototypes will be emphasized.

Course Learning Outcomes:

At the completion of the course you will be able to:

1. Use manual and prototyping technologies for making prototype
2. Validate and develop proof of concept models
3. Acquire skills to assemble parts into an assembled product
4. Acquire skills to change concepts to desirable, feasible and viable alternatives

Grading:

Labs/Assignments		40%
Quiz		15%
Project		
Proposal	5%	
Mid-Presentation	10%	
Presentation	15%	
Report	15%	
		45%
		100%

Late Policy: All assignment are due @ 11:59pm, They may be submitted late by no more than 48 hours (weekend and holiday included). The penalty for late submission is 50% of the score. No score will be given for submissions after 48 hours.

Course Outline:

Week	Date	Description
1	Feb 6	Introduction to ISDN 2400 Physical Prototyping Lab: CAD Modelling: Parts (SolidWorks)
2	Feb 13	Additive Manufacturing I Lab: FDM 3D printing of moulds for silicone casting
3	Feb 20	Casting Lab: Silicone casting of soft actuators
4	Feb 27	3D Scanning Lab: 3D Scanning of objects for final competition
5	Mar 6	Topology Optimization (Guest lecture) Lab: Topology optimization in Matlab
6	Mar 13	Low Fidelity Prototyping Lab: Low-fidelity prototyping of manipulator
7	Mar 20	Solid Modelling and Parametric Modelling Lab: CAD Modelling: Assemblies (SolidWorks)
8	Mar 27	Electronic Prototyping Lab: Arduino & Pneumatics
9	Apr 3	Mid-term Break
10	Apr 10	- Mid-term Presentation
11	Apr 17	Subtractive Manufacturing Lab: Laser cutting, water jetting, CNC milling
12	Apr 24	Additive Manufacturing II Lab: Additive Manufacturing – SLA and DLP
13	May 1	- Final presentation (Competition)
	May 8	Deadline for final report

Reference book:

1. Making It by Chris Lefteri
2. Prototyping for Designers by Kathryn McElroy