

2024 ME-410
Course Program

Lecture	MED 0 1418
work room	SPOT

	Date	lecture topic	lec / demo title	lec / demo description	Hand-ins before the class	homework	room
1	13-Sep	Intro to the course / group formation / project ideation	JP (lec): General wearable tech and project introduction, product development, fabrication methods, project brainstorming, and project and presentation requirements for the course	Students make groups of 5 : select 3 product ideas and post on moodle by the end of the day - update the group name on moodle		Learn + create account + download tinkercad	MED 0 1418
			ZW (admin 10'): purchasing, printing, machining protocols			3 product ideas and post on moodle by the end of the day - update the group name on moodle	
2	20-Sep	Core components for wearable tech	JP (lec 45'): Product selection	How to identify and choose 3 solutions to evaluate: define functionality of product, quantifiable metrics, motor and sensor choices.	3 min presentation on the 3 project ideas / group		MED0 1418
			Hwayeong (lec 45') : Basics in applied electronics : Introduction to electronic components, their working principles and how they are used	1. Introduction to the basic components and pre built circuits 2. Become familiar with common circuits 3. Introduction to signals and communication 4. Learn how to build a circuit in a simulator and on a breadboard			
			Hwayeong (demo 30') : Tinkercad circuit design demo				
3	27-Sep	Performance & Challenges for wearable tech	JP (lec): Core challenges for each technology + Performance metrics (qualitative and quantitative measures)	How to select the final design (w sensors and actuator choices), revisit the state-of-the-art and update the references, rough sketch of the product, back hand calculations of the bench mark metrics and show how the 3 solutions compare	3 min presentation on the chosen product and the choice of functionality, metric definitions and values for 3 options	Install Arduino IDE	MED0 1418
			AB (lec 45'): Electric motor selection + (demo 30') : choosing motor based on catalogs	In-class assignment to choose a motor based on the function			
			AS (lec 45') Introduction to alternative methods of actuation and sensing: Soft/smart materials				
		10h15	VISIT SPOT facilities & Equipment			register w SPOT	SPOT visit @ 10h15
4	04-Oct	Functionality considerations of wearable tech	JP (lec) overview on the choices of design and performance, evaluation metrics	pick a parameter in the chosen solution and improve the functionality/ engineering specification by iterating the value.	3 min presentation on the final product design solution	Write a program to generate a PWM signal (to be used in the SMA demo session)	MED0 1418
			ZW (lec 45') Introduction to Arduino, ZW (demo 15') programming	1 Understand the fundamental concepts and applications of embedded systems.2 Become familiar with the Arduino platform and its basic programming. 3 Be capable of designing, implementing, and debugging simple projects based on Arduino and sensors.		download and do tutorial for MuJoCo	
			SD (lec 45' + demo 15') cost estimation	Quiz after the lecture same day			
5	11-Oct	Considerations for prototyping and demos	JP (lec) Core components of automated product functionality and considerations	test actuator and sensor solutions. Plan out the demo prototype (ie actual use / proof of the concept)	3 min presentation on the iteration of the chosen product design		MED0 1418
			YJ (lec 45' + demo 45') : learn MuJoCo Simulator for multi-joint actuated robots				
			ZW + SD+AS (demo 30' x 2) SMA Demo in SPOT	SMA: loading & bidirectional movement			SPOT
6	18-Oct	project progress comments / group	controller for the sensor and actuator "close loop" control		3 min presentation on the demo scenario		MED0 1418 SPOT
7	25-Oct	Fall Break					
8	01-Nov	1 to 1 in-depth sessions with each group at the fixed time slot	1 to 1 sessions for project evaluation		submission of A3 flyer + prototype rendering image(submit both color and black/ white) with a sinle sentence caption + 1 group photo with names + 3 min presentation on the progress		MED0 1418 SPOT
9	08-Nov	project progress comments / group	finalize the platform design		3 min presentation on the progress		MED0 1418 SPOT
10	15-Nov	project progress comments / group	polish demo scenario		3 min presentation on the progress		MED0 1418 SPOT
11	22-Nov	project progress comments / group	check the flyer, poster, presentation, report formats and contents		each group is responsible for producing their own A0 poster + A3 flyer and upload all the files (presentation in ppt format): A0 Poster, A3 flyer		MED0 1418 SPOT
12	29-Nov	project progress comments / group					MED0 1418 SPOT
13	06-Dec	demo public presentations (ME410 + ME420) prep for 8	Public presentation + apero		presentation files+ videos for all groups		MED atrium
14	13-Dec	Final Technical Presentations private grading (all groups)					MED0 1418 SPOT
15	20-Dec	Recap and feedback to all the projects, presentations, prototypes (quality, demo) -			the final report is due at 8h15.		Zoom