SM2716: PHYSICAL COMPUTING AND TANGIBLE MEDIA

Effective Term
Semester A 2025/26

Part I Course Overview

Course Title
Physical Computing and Tangible Media

Subject Code
SM - School of Creative Media
Course Number
2716

Academic Unit
School of Creative Media (SM)

College/School
School of Creative Media (SM)

Course Duration
One Semester

Credit Units
3

Level
B1, B2, B3, B4 - Bachelor's Degree

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
SM1103A Introduction to Media Computing or CS1103B Media Computing

Precursors
Nil

Equivalent Courses
SM2705 Creative Media Studio III - Technology, Coding and Tangible Media

Exclusive Courses
Nil

Part II Course Details

Abstract

This is a hands-on studio course focusing on using modern, open-source hardware platforms for artistic embodiment. In this course, students will learn to build interactive systems that can sense and response to the physical world using embedded systems and electronic components. They will learn to use a highly popular, open-source hardware platform, Arduino, with a vast range of sensors and actuators, and develop practical skills for creating interactive installations. Techniques in rapid prototyping, such as 3D printing and laser cutting, will be introduced with hands-on workshops as well.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Identify and understand basic electronic components andprinciples of electric circuits		x	x	
2	Understand the technologies of 3D printing and laser cutting		x	x	
3	Re-design electronic systems for creative intention		x	x	x
4	Apply 3D printing and laser cutting in creating interactive works.		x	x	x
5	Create original tangible interactive media works			x	x

A1: Attitude
Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability
Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments
Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Learning and Teaching Activities (LTAs)

	LTAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Lecture	Theory and principles of electronics and digital fabrication	1, 2	
2	Workshop	Practice of Arduino circuit making and digital fabrication	3, 4, 5	

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	In-class tasks	1, 2, 3, 4, 5	50	-	No
2	Final project	1, 2, 3, 4, 5	50	-	Yes

Continuous Assessment (%)

100

Examination (%)

0

Minimum Continuous Assessment Passing Requirement (%)

0

Minimum Examination Passing Requirement (%)

0

Assessment Rubrics (AR)

Assessment Task

1. In-class Tasks

Criterion

- Fully achieving the system functions defined in the task
- Efficiency in finishing the task
- Ability to raise questions and instill insights about the process of conception, creative strategization and production
- Ability to troubleshoot the system independently

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reachingmarginal levels

Assessment Task

1. Final Projects

Criterion

- Affective quality and articulation of personal styles and signature
- Excellent appreciation, exploration and/or application of the aesthetic and expressive qualities of the medium
- Ability to raise questions and instill insights about the process of conception, creative strategization and production
- Innovative exploration by combining knowledge from different disciplines (e.g. mathematics, psychology, physics, anthropology, etc.) to create an inter-disciplinary project
- Efficient adjustment of plans and strategies in response to resources (time, space, equipment, etc) available with constructive adjustment

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reachingmarginal levels

Additional Information for AR

All A+/A/A- grade assignment should comply with the highest performance of Discovery-oriented learning.

Part III Other Information

Keyword Syllabus

hardware, software, technology, open-source, computer programming, interactivity, libraries, physical computing, Arduino, embedded system, microprocessor, sensor, actuator, analogy/digital, input/output, 3D printing, laser cutting

Reading List

Compulsory Readings

	Title
1	Nil

Additional Readings

	Title
1	Ishii, Hiroshi, and Brygg Ullmer. "Tangible bits: towards seamless interfaces between people, bits and atoms." Proceedings of the ACM SIGCHI Conference on Human factors in computing systems. ACM, 1997.
2	Ishii, Hiroshi, et al. "Radical atoms: beyond tangible bits, toward transformable materials." interactions 19.1 (2012): 38-51.
3	Banzi, Massimo. Getting Started with arduino. Make, 2009.
4	Margolis, Michael. Arduino cookbook. O'Reilly Media, Incorporated, 2011.
5	Karvinen, Tero, and Kimmo Karvinen. Make: Arduino Bots and Gadgets: Six Embedded Projects with Open Source Hardware and Software. Make, 2011.
6	Margolis, Michael. Make an Arduino-controlled Robot. Make Books, 2012.