Title (Units):	**COMP2037 Computing for Creatives II (3,2,1)**

Course Aims: As a continuation of COMP1015 Computing for Creatives I, this course aims to enhance students' python programming foundation and gain concrete knowledge on sensor capture, live data transmission, manifestation, processing, and interpretation between different multimedia modalities. New trends for the creative industry involving NFT and Metaverse will also be discussed. Based on the knowledge learned, students will learn to develop an interactive multimedia art installation prototype that involves interactive 3D rendering, sonification, and/or motion capture elements.

Prerequisite: COMP1015 Computing for Creatives I

Course Intended Learning Outcomes (CILOs):
Upon successful completion of this course, students should be able to:

No.	Course Intended Learning Outcomes (CILOs)
	Knowledge
1	To equip students with in-depth knowledge of OOP (Object-Oriented Programming), and the use of different IDEs (Integrated Development Environment) for multimedia system development and creative programming.
2	Describe the basic principles and details of interactive applications based on vision, sound and motion inputs.
3	Explain the fundamental principles of machine learning in the context of art generation.
4	Integrate and apply the knowledge learnt to develop art installation prototypes that involve interactive 3D rendering, sonification, and/or motion capture elements.
5	Discuss the new trends and possibilities for the creative industry.

Calendar Description: Over the last few years, we've seen a huge growth in the number and variety of microcontroller boards, as well as the sensory and controller units. This has provided a great opportunity for art and tech enthusiasts to design creative interactive physical applications and prototypes.

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Teaching and Learning Activities (TLAs):

CILOs	Type of TLA
1, 2, 3, 5	Students will enhance their python programming skills, and learn the fundamental principles and key components of an interactive multimedia system. Students will get to understand the new trends and possibilities for the creative industry.
1 - 3	Students will gain hands on experience and apply the learnt principle on programming through lab sessions as well as lab exercises.
1, 4	Students need to develop a creative interactive project. They need to integrate and apply the knowledge and skill learnt from lectures and lab sessions for the project development.

Assessment:

No.	Assessment Methods	Weighting	CILOs to be addressed	Description of Assessment Tasks
1	Continuous Assessment	40%	1,2,3,5	1. There are lab exercises which focus in the concepts covered in the lectures.

					2. Students are asked to complete assignments which have fixed subjects and objectives. Marks are given to the technical competence, creatively and aesthetic value of the final product.
2	Workshop Projects	30%	1-5		The workshop projects are designed to evaluate the students' principle understanding and of the course content. Students are required to work on a group project. Marks are given to the originality and novelty of the creative design, the elegance and completeness of the final implementation.
3	Examination	30%	1,2,3,5		An examination covering the essential concepts of general programming and physical computing will be conducted by the end of the course.

Assessment Rubrics:

Course Content and CILOs Mapping:

Content		CILO No.
I	Object-Oriented Programming: Basic Elements	1
II	Object-Oriented Programming: Advanced Elements	1
III	Computing for Vision, Sound and Motion	2,4
IV	AI for Creatives	3
V	NFT and Metaverse Concepts	5

References:

Books and Journals
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[4] J. Huntington, Show networks and control systems. Zircon Designs, 2021.
[5] E. Pangilinan, S. Lukas, and V. Mohan, Creating augmented and virtual realities. Sebastopol, CA: O'Reilly Media, 2019.
[6] A. Richardson, Data-driven graphic design: Creative Coding for Visual Communication. London, England: Fairchild Books, 2017.
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[10] Lutz, M., Programming python: powerful object-oriented programming. O'Reilly Media, Inc., 2010.

Online resources
[11] Blender 3D, Arduino Forum, 21-May-2007. [Online]. Available: https://forum.arduino.cc/t/blender-3d/17864/5. [Accessed: 29-Apr-2022].
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Course Content:

Topic

I.   Object-Oriented Programming: Basic Elements
        A. Programming methodologies (Design, Flowchart, Pseudo code)
        B. Constructs of an OOP language
        C. Classes and objects
        Lab: Introduction yo 2D game development using Pygame

II.   Object-Oriented Programming: Advanced Elements
        A. Encapsulation
        B. Abstraction
        C. Polymorphism
        D. Inheritance
        Lab: Advanced 2D game development using Pygame and electronic components

III.   Computing for Vision, Sound and Motion
        A. Image and video data formats, processing and streaming
        B. Basic sound capture, data format, and processing
        C. Basic computer graphics and animation
        D. Introduction to interactive motion sensors
        Lab: Introduction to vision, sound and motion using Pygame, electronic components and motion tracking sensors

IV.   AI for Creatives
        A. Machine learning and neural networks basics
        B. Implicit mapping via deep neural networks: classification and regression
        C. Generative models for art

V.   NFT and Metaverse Concepts
        A.   NFT concepts and applications in art trading
        B.   Metaverse concepts and possibilities for the creative industry