Title (Units):	**GDSC1816 Interactive Computing for Visual Communication (3,3,0)**

Course Aims: Media convergence has transformed the computational machine into an unprecedented rich multimedia communication medium with ubiquitous connectively and interactive capability. This new medium presents endless possibilities with applications full of dynamic contents and rich visual user interface experience. Expertise in both computer science and visual communication are needed in order to fulfill the application demands.

This course aims to address these demands and prepare the students with all-around trainings and skills to master the challenges. Unlike traditional courses which are merely designed for one specific discipline of students, this course offers a unique platform for students without and prerequisites in mathematics, computer programming or visual design to acquire and establish the knowledge necessarily for the challenges.

This course introduces high-level programming concepts and approaches visual design on the new medium using approachable and intuitive computational visual building block environment such as Processing developed by MIT.

Prerequisite: Nil

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

No.	Course Intended Learning Outcomes (CILOs)
	Knowledge
1	Describe the fundamental principles and high-level concepts of programming.
2	Describe the basic visual communication principles for interactive applications.
	Professional Skill
3	Make use of the core programming concepts to develop applications with high-level block building development environment such as Processing.
4	Make use of essential visual communication theories to develop interactive applications.
5	Integrate and apply the knowledge learnt to develop applications such as interactive games and augmented reality.
	Attitude
6	Appreciate professional's work.

Calendar Description: Media convergence has transformed the computational machine into an unprecedented rich multimedia communication medium with ubiquitous connectively and interactive capability. This new medium presents endless possibilities with applications full of dynamic contents and rich visual user interface experience. Expertise in both computer science and visual communication are needed in order to fulfill the application demands.

This course aims to address these demands and prepare the students with all-around trainings and skills to master the challenges. Unlike traditional courses which are merely designed for one specific discipline of students, this course offers a unique platform for students without and prerequisites in mathematics, computer programming or visual design to acquire and establish the knowledge necessarily for the challenges.

This course introduces high-level programming concepts and approaches visual design on the new medium using approachable and intuitive computational visual building block environment such as Processing developed by MIT.

Teaching and Learning Activities (TLAs):

CILOs	Type of TLA
1-2	Students will learn the fundamental principles and high level concepts of programming, basic visual communication principles through lectures.
3-4	Students will gain hands on experience, and apply the learnt principle and theory on programming and visual communication through lab sessions as well as lab exercises.
5	Students need to develop an interactive visual communication project. They need to integrate and apply the knowledge and skill learnt from lectures and lab sessions for the project development
6	Through the case studies during lectures as well as their project development process, they would appreciate professional's work.

Assessment:

No.	Assessment Methods	Weighting	CILOs to be addressed	Description of Assessment Tasks
1	Continuous Assessment	10%	1-3, 5	There are 5 to 6 lab exercises which focus in the concepts covered in the lectures. Each exercise has to be completed within the lab session. There is no absolute answer to each exercise but students have the freedom to experiment the concepts and strengthen their understanding. Full marks are given to those who can complete the exercise and demonstrate a thorough understanding with his own implementation. Those techniques acquired in these exercises are applicable in developing the final project.
2	Assessments	20%	1-5	Students are asked to complete two assignments which have fixed subjects and objectives. They need to analysis the problem and address the objective through the application of the principles and skills learnt in the course. Marks are given to the technical competence, creatively and aesthetic value of the final application.
3	Group project	40%	1-6	The group project consists of proposal and final stages. In the proposal stage, students need to present, explain and identify clearly their problem and objectives. In the final stage, students have to present their final implementation in addressing the proposed problem. Marks are given to the originality and novelty of the proposal, the elegance and completeness of the final implementation.
4	Examination	30%	1-5	A 2-hour examination covering the essential concepts of general programming and principles of visual communication will be conducted by the end of the course.

Assessment Rubrics:

	Excellent (A)	Good (B)	Satisfactory (C)	Marginal Pass (D)	Fail (F)
Understand the high-level of programming concepts	All of the concepts	Most of the concepts	Some of the new concepts	Few of the new concepts	Completely do not understand any concepts
Understand the general principles of visual	All of the concepts	Most of the concepts	Some of the new concepts	Few of the new concepts	Completely do not

communication for interactive applications					understand any concepts
Devise visual interfaces with proper usage of graphic principles in colors, layouts and types	Principles are applied and well-executed creativity	Principles are well-applied	Some principles are applied	Few principles are applied	Cannot apply any principles
Logically breakdown problems into simpler sub-problems and solve with elementary programming codes	Solve all the problems and exception cases are well-handled	Solve most of the problem	Solve majority of the problem	Only solving parts of the problem	Cannot solve the problem
Integrate knowledge from both programming and visual communication principles to design simple interactive visual communication applications	Demonstrate an excellent interactive visual communication application with novelty and creativity use of the principles taught	Can demonstrate a good applications with solid integration of visual and programming principles	Some levels of integration	Elementary integration	No integration at all

Course Content and CILOs Mapping:

Content		CILO No.
I	General Programming Concepts	1,3
II	Visual Communication Principles	2,4
III	Interactive Visual Communication and Computing	5
IV	Laboratory session and Presentations	6

References:
- General Programming
- Daniel Shiffman, Learning Processing: A Beginner's Guide to Programming Images, Animation, and Interaction. Morgan Kaufmann, 2nd edition, 2015
- Casey Reas and Ben Fry, Processing: A Programming Handbook for Visual Designers and Artists, the MIT Press, 2nd edition, 2014
- Ira Greenbery, Dianna Xu, Deepak Kumar, Processing: Creative Coding and Computational Art in Processing 2, FriendsofEd, 2nd edition, 2013
- Visual Communication
- Charles Wallschaeger and Cynthia Busic-Snyder, Basic Visual Concepts and Principles for Artists, Architects and Designers. McGraw-Hill, 1992
- Bo Bergestrom, Essentials of Visual Communication. Laurence King Publishers, 2009
- John Bowers, Introduction to two-dimensional Design: Understanding Form and Function. Wiley, 2008

Course Content:

Topic

I.   General Programming Concepts
      A. Basic programming syntax
      B. Variables and data types
      C. Operators and expressions
      D. Control structures
      E. Arrays and structures
      F. Functions

II.   Visual Communication Principles
   A. Color models
   B. Contrast and gradation
   C. Repetition
   D. Symmetrical and Asymmetrical
   E. Grouping and alignment
   F. Typography
   G. Composition

III.   Interactive Visual Communication and Computing
   A. Image processing
   B. Interactivity design
   C. Communication and message

IV.   Laboratory session and Presentations
   A. Lab sessions
   B. Assignments and Project presentation