Academy of Visual Arts
Bachelor of Arts (Hons) in Visual Arts Programme

VART3157 Human Machine Interface

No. of units: 3
Pre-requisite: VART 2155 Bodyscape or VART2156 Interactive Art
Duration: 52 hours
Cluster: Body as Interface (2012 & 2013 Intakes) / Media Arts (2014 Intake and onwards)

I.1. Course Description & Rationale (200–300 words):

Digital media products have moved beyond the use of standard graphical interface. Buttons and display screens will not be sufficient to cater for the ubiquitous and mobile usage. Moreover, contemporary interactive artworks often embed the interfaces into a spatial environment or custom made artefacts. Both cases demand a revisit of the existing desktop metaphor and the graphical user interface. These interfaces are the subject of the studies. The course aims to investigate the creative use of physical interfaces for digital media artworks and products.

Because digital technologies are incorporated into our daily life, there is a crucial need to strengthen the communication between these systems and their users. The interaction between the digital and the physical world is a field with increasing meaning for designers and artists. This course will explore the history of interface design – related to time and space – with regards to usability and cultural issues. The development of interfaces has always been driven by technical progress along with the needs of human beings. By analysing users' interaction with machines, and adopting knowledge on basic electronics and computer programming, students will research on interaction design, digital media content and create new concepts for interfaces that enhance users' experience.

I.2. Course Content:

No.		Hours		%
1.	History and cultures of the human machine interface	8		15.4
2.	Principles and concepts of user interface	8		15.3
3.	Basic programming with interactive media: · Introduction to computer programming; · Integration of audio-visual media in Processing; · Serial port communication with peripheral devices.	12		23.1
4.	Basic electronics: · Electronic components; · Simple circuits; · Sensors – light, touch, temperature, orientation; · Actuators – motor, LED, speaker.	12		23.1
5.	Interaction design with micro-controller: · Introduction to micro-controller programming with Arduino; · Research methods in interface design; · Prototypes creation.	12		23.1
		52		100

I.3. Intended Course Learning Outcomes (CILOs):
(Please take note of the PILOs for the overall BA programme in the Programme Document.)

Upon successful completion of this course, students should be able to:

No.	Intended Course Learning Outcomes (CILOs)
1.	Describe the cultural context of the tactile sense in interactive art and interaction design, and reflect on the effectiveness of tactile interfaces in relation with aesthetics and usability;
2.	Apply the skills of computer programming for use in interaction design projects;
3.	Master authoring tools commonly used in the creative industries to produce interactive content;
4.	Formulate design concepts for interfaces and manage the implementation process themselves;
5.	Analyse the basic technical principles of physical interfaces and sensors and develop prototypes for the projects; and

6.	Adhere to standards of professional practice and ethos.

* More may be added.

I.4. Alignment of CILOs with PILOs:

Learning Outcomes	Please indicate alignment by checking '√' the appropriate box					
	CILO1	CILO2	CILO3	CILO4	CILO5	CILO6
PILO1.1	✓					
PILO1.2		✓	✓			
PILO2.1				✓		
PILO2.2				✓		
PILO2.3	✓				✓	
PILO3.1						✓
PILO3.2						✓

* There may not be 6 CILOs, in which case, just leave columns empty.

I.5. Alignment of Teaching and Learning Activities with CILOs:

No.	Teaching and Learning Activities	CILO	Hours
1.	Lectures on the tactile sense and interactive media, with screening of relevant examples. Live demonstration of interactive products will be included to showcase the principles of interaction design.	1, 5, 6	8
2.	Programming workshop with assigned tasks. Students need to figure out the ways to solve the problem and present the solutions.	2, 3, 6	12
3.	Electronics workshop with assigned tasks. Students need to complete a number of electronic circuits using simple components.	5, 6	12
4.	Interaction design workshop with micro-controller – Arduino. Students need to program a micro-controller to control peripheral hardware to function as an interface to communicate with the audio-visual media in the host computer.	4, 5, 6	12
5.	Project workshops for integrating all the skills and techniques to build a project. Students communicate the design considerations and findings after a live demonstration of the interactive product.	4, 6	4

*More may be added.

I.6. Assessment:

No.	Assessment Methods/Activities	Weighting	Alignment with CILOs
1.	Design and implement a reactive light sculpture. It is evaluated on the responsiveness, aesthetics, and reliability.	15%	2, 3, 4, 5
2.	Analyse and present a study of physical interfaces in daily products or interactive art and suggest improvement. It is evaluated by the effectiveness of the observation, data collection, analysis, and communication.	15%	1, 5
3.	Build an integrated project with physical interface. It is evaluated on the criteria students proposed in the beginning of the project, mainly with the concepts of usability, emotional exchange, responsiveness, etc.	30%	2, 3, 4, 5
4.	Prepare class journal and project documentation. It is evaluated on the students' ability to formulate creative ideas in everyday life encounter and reflect on their own creative and production processes.	10%	1
5.	Professional Attitude: Professional Attitude does not necessarily define its own learning outcomes, but takes a look at 'how' the other, non-attitudinal outcomes are achieved. Assessment will always be based on direct personal contact with the student. Assessment methods include personal conversations – formal and informal –, class observation, individual and group-tutorials, and such like. Assessment evidence is continuously produced through attendance and participation class-records, public presentations, peer-reviews, evaluation of sketchbooks or visual diaries, personal notes of students and teachers, etc. For more information, please refer to the BA (Hons) in Visual Arts' Programme Document.	30%	6

*More may be added.

I.7. References *(up to 10 books):*

Aicher, Otl. *Analogous and Digital*. Berlin: Ernst & Sohn Verlag, 1991.

Buxton, Bill. *Sketching User Experiences: Getting the Design Right and the Right Design*. Oxford: Morgan Kaufmann, 2007.

Chung, Bryan WC. *Multimedia Programming with Pure Data*. Birmingham: Packt Publishing, 2013.

Dawes, Brendan. *Analog In, Digital Out: Brendan Dawes on Interaction Design*. Indianapolis: New Riders, 2006.

Banzi, Massimo. *Getting Started with Arduino*. Cambridge: O'Reilly Media, 2009.

Maeda, John, Casey Reas, and Benjamin Fry. *Processing: A Programming Handbook for Visual Designers and Artists*. Cambridge: MIT Press, 2007.

Marks, Laura U. *Touch: Sensuous Theory and Multisensory Media*. Minneapolis: University of Minnesota Press, 2002.

Moggridge, Bill. *Designing Interactions*. Cambridge: MIT Press, 2006.

O'Sullivan, Dan, and Tom Igoe. *Physical Computing*. Portland: Premier Press, 2004.

Platt, Charles. *Make: Electronics*. Sebastopol: O'Reilly Media, 2009.

Saffer, Dan. *Designing for Interaction: Creating Smart Applications and Clever Devices*. Berkeley: Peachpit Press, 2006.

Tidwell, Jenifer. *Designing Interfaces.* Sebastopol: O'Reilly, 2005.

Wardrip-Fruin, Noah, and Nick Montfort, eds. *The New Media Reader*. Cambridge: MIT Press, 2003.

I.8. Academic Integrity:

Students will endeavour to only claim work that they have actually produced themselves. Claiming the work of others is considered plagiarism, and will be dealt with under the academic policies of the university.

I.9. Health and Safety:

Every effort will be made to comply with the intent of Hong Kong's law or acts and the University's policies to maintain a safe and healthy working environment.

I.10. Final Note:

The instructor reserves the right to modify the class and the syllabus or the schedule to adjust to the dynamics of the particular group or to take advantage of opportunities that may arise.