Subject Description Form

Subject Code	EIE2903/IC2140
Subject Title	Practical Training
Credit Value	5 Training Credits
Level	2
Pre-requisite/Co-requisite/Exclusion	Nil
Objectives	The objective of this subject is to provide hands-on technical training to students with focus on multimedia electronic product fabrication and development. Training on practical scientific computing software will also be provided. Practical training will be conducted in Industrial Centre (IC) of the university to prepare student for a professional career.
Intended Learning Outcomes	**Upon completion of the subject, students will be able to:** 1. design and fabricate multimedia electronic product prototype for demonstration, development and experimentation purposes; 2. use electronic design automation software to product circuit and perform simple PCB design; 3. prescribe and perform parametric test, analysis and troubleshooting of simple electronic circuits; and 4. use scientific computation software in academic study.
Subject Synopsis/ Indicative Syllabus	1 <u>Advanced Electronic Practice with Multimedia Application (60 hours)</u> 1.1 Training in design modification from circuit prototype for multimedia application. 1.2 Embedded device programming practice for multimedia electronic product. 1.3 Multimedia electronic product prototype fabrication. 1.4 Testing and troubleshooting techniques in multimedia electronic product. 1.5 Project presentation using Internet. 2 <u>Application of Computing Tool (21 hours)</u> 2.1 Introduction to Python; interactive calculations and basic operations with basic data type; mathematical operations, matrix and array operations, data analysis and curve fitting; 2.2 Use of functions and popular Python packages, such as Numpy, Panda and Matplotlib; 2.3 Python script programming & debugging; logic operations & flow control; Data visualization by using graphics packages; 2.4 Data manipulation and data science operations with Panda 3 <u>Microcomputer Application and Practice (27 hours)</u> 3.1 Introduction to Microchip Microcomputer families and development tools. 3.2 Hands-on practice on memory, I/O, data communications, ADC operations. 3.3 Hands-on practice on LED and LCD displays. 3.4 Hands-on practice on motor control and sensors. 3.5 Application of Microcomputer on consumer electronic products,

	mechatronics, home automation products, wired and wireless connectivity. **Training Pattern:** Year 1, Summer
Learning Methodology	The teaching and learning approach is based on practical workshop training arranged in modules and it can be broadly divided into two parts based on their contents; practice in multimedia electronic product and scientific computing: (i) Training in multimedia electronic product practice will enable student to learn the requirement of practical electronic product fabrication, appreciate the fabrication process so as to create, develop and integrate their knowledge into future design. On completion of the training, student should be able to manage the fabrication of multimedia electronic product prototype for design and development. In "Electronic Product Assembly Design & Practice", student will learn the basics of electronic product construction practice, printed circuit assembly prototype construction skills, techniques and best practice of the electronic industry. Training activities will include tutorials, practical assignments, test and report. Student will work on microcomputer programming for embedded application. In "Advanced Electronic Practice with Multimedia Application", students will participate in training groups under an industrial environment with an objective to produce a prototype of electronic product. The product will normally contain multimedia feature with embedded controller. Student will develop the product under an electronic design automation environment and tackle different parts of product design so as to produce a working prototype for demonstration. Student will experience practical problems that are commonly encountered in the electronic industry during product development. Student will derive solutions to overcome difficulties, produce deliverables for the project in a given time frame. Individual merit will be assessed together with group performance. As such, the training task and activities will be organized in a way to enable a clear identification of work involved while allowing students to work independently and in groups for assessment. Besides fabrication technologies and prototype implementation, students should be able to cultivate their personal quality, creativity, management skills and leadership in teamwork collaborations. Tutorials and inductions will be provided as require. In addition to the quality and output of the practical tasks such as PCB assembly fabrication, chassis fabrication, prototype testing and demonstration, assessment will include creativeness and a web site for product presentation on the Internet. (ii) In "Application of Computing Tools", student will learn to use Python.

Assessment Methods in Alignment with Intended Learning Outcomes

Assessment Methods	Weighting (%)	Intended Learning Outcomes Assessed				
		1	2	3	4	5
1. Assignment / Project	30	✓	✓	✓	✓	✓
2. Test	30	✓	✓	✓	✓	✓
3. Report and Logbook	40	✓	✓	✓	✓	✓
Total	100					

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Assessment Methods	Remarks
Assignment / Project	Project is designed to facilitate students to reflect and apply the knowledge periodically throughout the training.
Test	Test is designed to facilitate students to review the breadth and depth of their understanding on specific topics.
Report and Logbook	Report writing is designed to facilitate students to acquire deep understanding on the topics of the training and to present those concepts clearly.

Student Study Effort Expected

Class contact (time-tabled):

▪ Lecture/Tutorial	16 Hours
▪ Workshop	134 Hours
Total student study effort:	**150 Hours**

Reading List and References

Reference Reading List:

1. R.S. Villanucci, A.W. Avtgis, W.F. Megow, *Electronic Techniques: Shop Practices and Construction*, 7th ed., Practice-Hall, 2002.
2. IPC-A-610F-2014, *Acceptability of Electronic Assemblies*, IPC.
3. McKinney, W. (2017). Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython (Second ed.). Sebastopol, CA: O'Reilly.

Reference Software List:

1. PADS from Mentor Graphics Inc.
2. LabVIEW from National Instrument.
3. SPYDER from Spyder-IDE.org

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Prepared by: Industrial Centre