Subject Description Form

Subject Code	BME5111
Subject Title	Wearable Technology for Digital Health
Credit Value	3
Level	5
Responsible staff & Department/School	Prof Lei SUN (BME) & Dr Christina MA (BME)
Pre-requisite / Co-requisite/ Exclusion	Nil
Objectives	Wearable technology is becoming a hot commodity that enables personal health tracking over long periods, while healthcare providers and physicians can make better clinical decision based on the remote data. This subject aims to enable students to 1) understand how wearable technology can facilitate digital health to evaluate and improve health and fitness; 2) appreciate the applications of wearable technology in digital health for different populations; 3) gain hands-on experience in implementing state-of-the-art wearables and digital health data analysis; and 4) discuss the opportunities and challenges in wearable technology and digital health.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. Appreciate the key functions and basic principles of various wearable technologies; b. Recognize the demand and importance of wearable technology and digital health data in different populations; c. Comprehend basic operation of wearable technology, data collection, handing, visualization, analytics, and machine learning. d. Demonstrate understanding to the design, development, marketing and other contemporary issues in wearable technology; e. Critically appraise the strengths and limitations of current wearable healthcare devices and predict future trend in this area.
Contribution to Programme Outcomes (Refer to Part I Section 2)	Program Learning Outcome (a) Acquire and apply advanced levels of knowledge and skills in BME discipline. (Teaching, Practice, Measure) Program Learning Outcome (b) Apply critical analysis and problem-solving skills for evidence-based practice in BME discipline. (Teaching, Practice, Measure) Programme Learning Outcome (c) Demonstrate a higher level of professional competence to cope with the rapid changes in practice in BME discipline. (Teaching and Practice) Programme Learning Outcome (d) Develop research skills that will help incorporate evidence-based practice in the delivery of healthcare services and industry. (Teaching and Practice)

<table>
<tr><td></td><td>Programme Learning Outcome (e) Demonstrate abilities to continuously develop in professional practice. (Teaching and Practice)</td></tr>
<tr><td>Subject Synopsis/ Indicative Syllabus</td><td>▪ Digital Health data: definitions, data collection and visualization, accuracy, normal aging effects, other factors influencing the measured data
▪ Comprehensive understanding on healthcare data: evaluation of health and fitness status, understanding on different diseases, disabilities and populations that can be reflected by the healthcare data
▪ Basic concepts of sensors and feedback technology
▪ Understanding and evaluation of wearable technology that are used to evaluate and promote health and fitness for healthy and disabled people
▪ Design and application of X-reality technology
▪ Hands-on experiences in wearables</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>There will be lectures about commonly used healthcare data, sensing and feedback technologies. Some guided reading and self-study will further extend their knowledge in respective areas. Group presentation among students will be arranged in the class, on the topics related to wearable technology, application, or other contemporary issues.
Hands-on and illustration sections will be arranged to enable students to develop the necessary skills in wearable device and system for a mini-project. In the group project, students need to work together on a mini-project with hands-on experience in wearable technology and perform data analytics and cloud computing for an individual lab report. The students will have the chance to show and demonstrate their mini-project to other classmates.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="6">Intended subject learning outcomes to be assessed</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td></td></tr>
<tr><td>1. Quiz</td><td>30%</td><td>√</td><td>√</td><td></td><td>√</td><td></td><td></td></tr>
<tr><td>2. Individual laboratory report</td><td>20%</td><td>√</td><td>√</td><td>√</td><td>√</td><td></td><td></td></tr>
<tr><td>3. Group mini-project with demonstration</td><td>20%</td><td>√</td><td>√</td><td>√</td><td>√</td><td></td><td></td></tr>
<tr><td>4. Group Presentation</td><td>30%</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td></td></tr>
<tr><td>Total</td><td>100 %</td><td colspan="6"></td></tr>
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</td></tr>
<tr><td rowspan="2">Student Study Effort Expected</td><td>Class contact:</td><td></td></tr>
<tr><td>▪ Lecture</td><td>22 Hrs.</td></tr>
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	▪ Tutorial	9 Hrs.
	▪ Quiz	2 Hrs.
	▪ Laboratory work / Practical	6 Hrs.
	Other student study effort:	
	▪ Mini-Project	38 Hrs.
	▪ Group Project Presentation	20 Hrs.
	▪ Self-study	20 Hrs.
	Total student study effort	117 Hrs.
Reading List and References	**<u>Textbooks</u>** ▪ Isabel Pedersen (Editor), Andrew Iliadis (Editor), Embodied Computing: Wearables, Implantables, Embeddables, Ingestibles (The MIT Press), 2020. ▪ Haider Raad, Fundamentals of IoT and Wearable Technology Design, Wiley, 2021. ▪ Fawzi Behmann, Kwok Wu, Collaborative Internet of Things (C-IOT) For Future Smart Connected Life and Business. Hoboken: John Wiley and Sons, Inc., 2015. ▪ Janet Holland, Wearable technology and Mobile Innovation for Next-Generation Education. Hershey, PA: Information Science Reference, 2016. **<u>Other Reading Materials</u>** ▪ http://www.medgadget.com ▪ https://www.wareable.com/ ▪ Selected publications from relevant journals ▪ Scientific American, Scientific American Inc. ▪ Popular Mechanics, Popular Mechanics Co. ▪ Popular Science, Bonnier Co.	
Date of Last Major Revision	3 January 2022	
Date of Last Minor Revision	3 January 2022	