Subject Description Form

Subject Code	BME1D03
Subject Title	Technologies for Smart Ageing
Credit Value	3
Level	1
Pre-requisite / Co-requisite/ Exclusion	Exclusion: Students of Biomedical Engineering
Objectives	**The objectives of this subject are to:** a) Introduce the concept and trends of smart ageing city from technology perspectives; b) Illustrate the cutting-edge technological solutions to the challenges of super-aged city like Hong Kong in coming 30 years; c) Critically explore the major socioeconomic and healthcare barriers for technology revolution and transfer.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a) Understand ideological and theoretical underpinning of smart ageing city; b) Describe the emerging and increasing demands of Hong Kong as a super-aged city; c) Articulate the major technological approaches to facilitate smart living; and d) Relate their own disciplines to this CAR subject
Subject Synopsis/ Indicative Syllabus	a) Introduction and Overview ▪ The unmet needs of a rapid growth of aged population in Hong Kong, China and around the world. ▪ Fundamental knowledge and scientific perspectives of ageing and age-related pathologies ▪ The concept of smart ageing city ▪ Health data technology development and transfer, and ▪ The trend of technology development for healthy and smart ageing b) Technological solutions to the challenges of super-aged city and to address all necessities of life including but not limited to following aspects: ➢ **Technologies to promote healthy ageing**, e.g. • Health and wellness monitoring using *wearable sensors*; • Intelligent home for the elderly; • Smart medical devices for food safety to monitor salt and sugar intake; • Natural extracts and micro-nutrition for promoting healthy ageing; ➢ **Technologies to improve active ageing** through • Medical robotics for stroke rehabilitation and elderly care;

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- Intelligent wheelchair for disabled people to enhance the mobility;
- Prosthetics and orthotics technologies for fall prevention and mobility in older people;
- Artificial intelligence for elderly care.

c) Laboratory session with hand-on experience on the equipment and devices displayed in the library of Jockey Club Smart Aging Hub.
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<tr><td>Teaching/Learning Methodology</td><td>
It is an introductory course for the undergraduate students from all disciplines in order to facilitate them to gain the basic knowledge about the healthcare-related technologies.

In the lectures, experts' experiences in technology development and transfer for smart ageing city will be shared. The guided reading and self-study will be further extended students' knowledge in the respective areas. In preparing the guided group discussion in tutorials, students will actively participate in the laboratory session in the Jockey Club Smart Ageing Hub and obtain the first-hand experiences on the cutting-edge technologies tailor-made for elderly and disabled persons. Students will critically evaluate themselves during the group discussion. The group discussion and students' preparatory work will facilitate their writing of the essay. In the student group presentation, they will present the basic principles and findings from their laboratory sessions. What they learn from the lectures and tutorials will also be reflected in this group discussion and sharing, self-study, and student presentation.
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<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>

<table>
<tr><td colspan="2" rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% Weighting</td><td colspan="4">Intended subject learning outcomes to be assessed (Please tick as appropriate)</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td></tr>
<tr><td colspan="2">Short quiz</td><td>30</td><td>v</td><td>v</td><td>v</td><td></td></tr>
<tr><td colspan="2">Presentation</td><td>30</td><td>v</td><td>v</td><td>v</td><td></td></tr>
<tr><td rowspan="2">Writing assignments</td><td>Reflection of laboratory session</td><td>10</td><td>v</td><td></td><td>v</td><td></td></tr>
<tr><td>Reflection of their own discipline and/or personal experience in critical assessments of smart ageing technologies</td><td>30</td><td>v</td><td>v</td><td>v</td><td>v</td></tr>
<tr><td colspan="2">Total</td><td>100</td><td></td><td></td><td></td><td></td></tr>
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Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

<table>
<tr><td>Specific assessment methods/tasks</td><td>Contents</td></tr>
<tr><td>Short quiz</td><td>Quiz with short MCQs will be conducted after lectures to facilitate the students to catch up the key learning points.</td></tr>
<tr><td>Presentation</td><td>In groups: basic principles of smart ageing city and evaluations of technological solutions to the challenges of super aged city.</td></tr>
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	Essay	*Individual:* reviewing the principles of smart ageing technologies, claimed health benefits, mechanism of improving health and their hidden issues. Students will also include their own experiences and critical review - the pros and cons of such technologies. Guided group discussion will facilitate students to prepare the essay in high quality.	
Student Study Effort Expected	Class contact:		
	▪ Lectures		27 Hrs.
	▪ Tutorials		9 Hrs.
	▪ Laboratory		3 Hrs.
	Other student study effort:		
	▪ Preparation for quiz and presentation		18 Hrs.
	▪ Self study (reading the books and journals) and writing essay		60 Hrs.
	Total student study effort		117 Hrs.
Reading List and References	The recommended books: 1. Haber, David. (2013). *Health Promotion and Aging: Practical Applications for Health Professionals*. (4th ed.), New York: Springer. 2. Tiago Moreira (2017). *Science, technology and the ageing society*. New York, NY : Routledge. 3. Katarina Friberg Felsted Scott D. Wright (2014). *Toward post ageing : technology in an ageing society*. Cham: Springer.		

Class Schedule

Class Time: Every Wednesday (9:30~12:30, 14:30~17:30)
Venue: To be confirmed

	Date	Date	Topics	Instructor	Remarks
1	May 30	9:30~12:30	Introductory overview.	Dr. Chunyi WEN and teaching team	Briefing the subject arrangement and lecture contents, introducing lecturers and grouping students
2		14:30~17:30	The ageing society	Prof. Teresa Tsien	
3	June 6	9:30~12:30	The science of ageing and anti-ageing	Dr. Chunyi WEN	Distribution of intelligent hand rings
4		14:30~17:30	Ageing in place: Smart-home technologies for older people	Dr. Eric Tam	
5	June 13	9:30~12:30	IoT (Internet of Things) and smart environment	Dr. James CHEUNG	
6		14:30~17:30	Smart clothing and food revolution	Dr. Hin Chung LAU	
7	June 20	9:30~12:30	Laboratory session (for Sem 3 2017/18 ONLY, three filed visits to Science park, Hong Kong Housing Society, Friendly Home Exploration Centre and Senior Citizen Home Safety Association will be arranged.).	Dr. Chunyi WEN Eric/Will/James	Submission of 1000-word individual reflection (1st writing assignment) on the visit;
8		14:30~17:30	Tutorial and mid-term exam	Dr. Chunyi WEN and teaching team	Each group of students will pick one topic of "elderly products" to provide detailed description of proper use and evaluation.
9	June 27	9:30~12:30	Smart technologies for mobility independence	Dr. Aaron Leung	
10		14:30~17:30	Supporting active and healthy aging with robotics	Dr. Xiaoling Hu	
11	July 4	9:30~12:30	Artificial intelligence for elderly care	Dr. James CHEUNG	
12		14:30~17:30	Future elderly care: from hospital to community	Dr. Chunyi WEN	
13	July 11	9:30~12:30	Review on group presentations and Final exam	Dr. Chunyi WEN and teaching team	Submission of 1500-word reflection (2nd writing assignment)

Tentative schedule (subject to change based on progress)