Subject Description Form

Subject Code	ABCT5016
Subject Title	Global Food Security
Credit Value	3
Level	5
Pre-requisite / Co-requisite/ Exclusion	Nil
Objectives	Environmental changes, including climate change, aquatic acidification and increasing contamination, are posing a major threat to global food security. This subject aims to enhance students' understanding of the roles of environmental factors in regulating food security in terms of yield and safety at regional and global scales.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. recognise the severity of climate change and aquatic acidification, their interactions with environmental contaminants and associated effects on global food production systems; b. define the risks that may lead to food insecurity, identify the causes and recommend possible solutions; c. demonstrate critical thinking and communication skills; and d. appreciate the value of social and national responsibilities as well as professional integrity and ethics.
Subject Synopsis/ Indicative Syllabus	<u>Agriculture and fisheries under global environmental changes</u> Food production systems are largely dependent on natural resources through agriculture and fisheries. We will study how global environmental changes, namely climate change and aquatic acidification, will impact agriculture and fisheries in different regions of the world and for different food types. For instance, corn yield is expected to decrease by up to 40% in the United States under global warming, and that productivity of aquaculture in the United Kingdom can be reduced by 20% due to ocean acidification. The sustainability of agriculture and fisheries under environmental changes, associated impact on food supply and possible mitigation measures will be discussed. <u>Fate of contaminants under global environmental changes</u> We will look at the effects of climate change and aquatic acidification on the formation, long- and short-range transport and breakdown of environmental contaminants including pathogens and chemical compounds. This in turn has a profound impact on the occurrence of contaminants in food. For example, raising air temperature by 1 °C is associated with a 6% increase in reported salmonellosis (food poisoning by the bacteria *Salmonella* spp.) in Singapore. Moreover,

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<tr><td></td><td>bioaccumulation of chemical contaminants such as cadmium in oysters cultivated in China can increase by >50% in a more acidic marine environment. Interactions between contaminants and food products under different environmental conditions will be demonstrated with case studies around the globe.

<u>One Health</u>

More than half of known human infectious diseases have their source in animals. Global meat production can be reduced by about a quarter due to animal diseases. Some pathogens are more active and infectious under global warming and in combination with modern intense farming practices. These are the reasons that give rise to the One Health initiative initiated by the World Organisation for Animal Health (OIE); Food and Agriculture Organization (FAO) and World Health Organization (WHO) of the United Nations – a concept that humans, animals and the environments are inextricably linked and sharing health issues as one. In the context of global food security, public health problems and food shortage can be expected if animal diseases will become more prevalent under future environmental changes. Here we will explore how infectious diseases spread at the interfaces among humans, animals and the ecosystems in which they live.

<u>Novel food production in the face of global environmental changes</u>

New food production approaches have been proposed in recent decades to meet the rising global demand for food. These approaches, such as urban farming, genetically modified food, edible insects and lab-cultured meat, are substantially different from conventional practices and present unique food safety and ecological issues. In some cases, their use remains controversial. These issues related to novel food production will be presented with case examples.</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>Interactive lectures and guided reading will be used to facilitate students' learning of key concepts and to promote communication between teachers and students. Materials of case studies will be made available to students. Through small group discussions of relevant topics, tutorials will enhance interaction among students and their awareness of social and environmental responsibilities, as well as professional integrity and ethics.</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 (Please tick as appropriate)</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td><td></td><td></td></tr>
<tr><td>1. Individual essay</td><td>30 %</td><td>√</td><td>√</td><td>√</td><td></td><td></td><td></td></tr>
<tr><td>2. Group project presentation</td><td>30 %</td><td>√</td><td>√</td><td>√</td><td></td><td></td><td></td></tr>
<tr><td>3. Online exercise</td><td>20%</td><td>√</td><td>√</td><td>√</td><td>√</td><td></td><td></td></tr>
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	4. Quiz	20 %	√	√	√	√		
	Total	100 %						

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

The assessment of this subject comprises both formative and summative parts. To ensure that students learn and reflect continuously, we use a continuous assessment which contains four components including individual essay, group project presentation, online exercise and quiz. The individual essay will be assessed using the Biggs' Structure of the Observed Learning Outcome (SOLO) taxonomy, which will allow us to recognise where students find difficulties and to address the problems. The group project presentation and online exercise aim to foster students' ability to make connections with what they have learnt. They are comprehensive in nature and will encourage students to apply the knowledge gained in class to real-world issues. For the summative part, a quiz will be used to evaluate students' level of understanding and will provide high order thinking questions to assess students' analytical and problem-solving skills.

Student Study Effort Expected	Class contact:	
	▪ Lecture	30 Hrs.
	▪ Tutorial/Seminar	9 Hrs.
	Other student study effort:	
	▪ Online video + exercise	20 Hrs.
	▪ Preparation for individual essay and group project presentation	20 Hrs.
	▪ Self study	40 Hrs.
	Total student study effort	119 Hrs.
Reading List and References	Reading materials will be provided in class.	