

The Hong Kong Polytechnic University

Subject Description Form

Subject Code	ABCT 3409
Subject Title	FOOD TOXICOLOGY
Credit Value	2
Level	3
Pre-requisite	Introduction to Food Science (ABCT2416) or Biochemistry (ABCT2101)
Objectives	The subject is designed to provide students with an interactive overview to the general principles of food toxicology, with emphasis on different types of food-borne toxicants and the adverse effects of these food toxicants on humans. It furnishes students with analytical skills and conceptual framework to understand and assess food safety assurance strategies, especially regarding their importance within food-related industries.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a) understand the basic principles of food toxicology; b) define major modes of toxicity of key food-borne toxicants, based on chemical nature, metabolism, sites of action and toxicity mechanisms; c) recognize the common analytical techniques for detection of food toxicants; d) appraise critically the source of potential toxic constituents in food supply (intentionally added or naturally-occurring); e) assess the human risks from food-borne toxicants of health significance; f) demonstrate critical and analytical thinking as well as problem solving skills
Subject Synopsis/ Indicative Syllabus	<p><u>Principles of Toxicology (6 hrs)</u> Classification of toxic agents; characteristics of exposure; evaluation of toxicity: LD₅₀ and TD₅₀; spectrum of undesirable effects; interaction and tolerance; biotransformation and mechanisms of toxicity; use and interpretation of toxicity data.</p> <p><u>Natural Toxins in Food (6 hrs)</u> Determination of toxicants in foods; classification and toxicity of natural occurring toxins; natural toxins in animal foodstuffs (meat and seafood); natural toxins in plant foodstuffs; fungal toxins occurring in foods (mycotoxins); micro-organisms and food; sites of action and their toxicity mechanisms.</p> <p><u>Food Allergies and Sensitivities (4 hrs)</u> Natural sources and chemistry of food allergens; true/untrue food allergies; handle of food allergies; food sensitivities (anaphylactoid reactions, metabolic food disorders and idiosyncratic reactions); issues related to sulfites in foods.</p> <p><u>Environmental Contaminants and Drug Residues in Food (4 hrs)</u> Common environmental contaminants (e.g. heavy metals) and drugs residues (e.g. pesticides) in foods; their health impacts and risk assessment; abusive use of veterinary drugs (e.g. malachite green in fish) and other contaminants in</p>

	<p>food.</p> <p><u>Food Additives and Toxicants formed during Food Processing (9 hrs)</u> Common food additives (e.g. coloring) and their safety issues; process-induced food toxicants (e.g. acrylamine) and their health concerns.</p>																																															
<p>Teaching/Learning Methodology</p>	<p>Interactive lectures and guided readings are used to facilitate communication between lecturers and students, and also to enhance students in comprehending the taught topics and key concepts. During each lecture, in-class activities (case studies and group discussion, etc.) are conducted to stimulate students' interest and promote their critical thinking in learning. Tutorials are designed to assist students to re-think the previous learning process, and to challenge students to raise questions on the taught topics. The purpose is not only to consolidate their learned concepts but also to stimulate their further interest in the subject and to develop their problem-solving abilities. The continuous assessment is based on student's performance on quizzes, in-class learning activities and a case study report. Examination is focused on analytical and problem solving skills.</p>																																															
<p>Assessment Methods in Alignment with Intended Learning Outcomes</p>	<table border="1"> <thead> <tr> <th rowspan="2">Specific assessment methods/tasks</th> <th rowspan="2">% weighting</th> <th colspan="6">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th> </tr> <tr> <th>a</th> <th>b</th> <th>c</th> <th>d</th> <th>e</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>Quizzes</td> <td>30</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>Case study report</td> <td>20</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td>√</td> </tr> <tr> <td>Examination</td> <td>50</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> </tbody> </table> <p>Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</p> <p>Student will be assessed by the Continuous Assessment and Examination components. Continuous Assessment will be based on quizzes and lab reports. A final examination will assess students' comprehensive knowledge acquired and other learning outcomes expected.</p>		Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)						a	b	c	d	e	F	Quizzes	30	√	√	√	√	√	√	Case study report	20	√	√	√	√		√	Examination	50	√	√	√	√	√	√	Total	100 %						
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**Reading List and
References**

Essential

Helferich, W., and Winter, C.K. - Food Toxicology; CRC Press 2001

Supplementary

Aras, N.K.- Trace Element Analysis of Foods & Diet; Royal Society of Chemistry 2006

Self, R. Extraction of Organic Analytes from Foods; Royal Society of Chemistry 2005

Watson, D.H. - Natural Toxicants in Food; CRC Press 1998

Duffus, J.H. and Worth, H.G. J. - Fundamental Toxicology; The Royal Society of Chemistry 2006

Stine, K.E. and Brown, T.M. - Principles of Toxicology (2nd ed.); CRC Press 2006

Richard H. Stadler and David R. Lineback - Process-Induced Food Toxicants; Wiley, 2009

Recommended Journals for Reference

Toxicology

Food and Chemical Toxicology