Subject Description Form

Subject Code	ABCT1D12
Subject Title	**Science behind Crime Scene Investigation (CSI)**
Credit Value	3
Level	1
Pre-requisite / Co-requisite/ Exclusion	Nil
Objectives	This subject aims to use forensic investigation as an example to enable students to understand and apply the scientific knowledge and methods, and to trigger students' interest toward science.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: (a) describe the basic principles of the scientific methods used in crime scene investigation, (b) apply the acquired acknowledge to solve problems in related issues, (c) realize the importance of science in forensic investigation and daily life, (d) develop logical thinking, life-long learning, teamwork and communication skills.
Subject Synopsis/ Indicative Syllabus	Brief introduction to crime scene investigation (3 Hrs) Arson investigation (6 Hrs) • The fundamental chemistry of fire • Evidence collection and analysis: basic principle of chromatography Investigation of explosions (3 Hrs) • The fundamental chemistry of explosions • Detection of explosives: how does mass spectrometry work? Nuclear terrorism (3 Hrs) • The stories of nuclear isotopes • Applications of nuclear isotopes • Detection of radioactivity Forensic analysis of physical evidence (6 Hrs) • Hairs, fingerprints, questioned documents, etc • Evidence analysis: use of microscope, etc Fundamental forensic toxicology (9 Hrs) • Common poisons and drugs of abuse • Methods of analysis: basic principles of immunoassay, GC-MS and LC-MS

	Identification of victims and suspects: DNA analysis (6 Hrs) • DNA, genes and their relationship to individuality • Basic principles of forensic DNA analysis and DNA profiling Summary (3 Hrs)
Teaching/Learning Methodology	**Lectures:** Fundamentals of related knowledge and basic principles of relevant techniques will be introduced with the aid of lecture notes. Case studies will be employed to show how different techniques are combined to solve problems. Videos will be used to demonstrate applications of various scientific methods in crime scene investigation. **Tutorials:** Students will be required to search for information and discuss about the pre-designed topics in groups. CSI challenge questions will also be used to attract students' interest and reinforce their logical thinking. **Guest lectures:** Guest speakers from Government Laboratory or professionals will be invited to deliver seminars on selected topics such as general procedures in crime scene investigation, how results are presented and used in court and real cases in Hong Kong. **Term paper:** Students are required to write a short term paper on selected published cases. They will be required to identify the key elements of the cases and to propose and justify the techniques and methods for analysis, using their acquired knowledge through lectures, tutorials and self-study and through information-searching. **Group presentations:** Groups of 3-4 students will deliver a presentation on selected topics. They will be required to investigate cases using their acquired knowledge, and propose possible conclusions and actions for current practices. The activity will reinforce their teamwork efforts, as well as strengthen their literacy, high order thinking and communication skills. **Laboratory component:** We will conduct blood identification on fabric sample and fingerprint to confirm the murder of the case investigation. The objective of this experiment is to learn the mechanism of blood identification and the type of fingerprint.

Assessment Methods in Alignment with Intended Learning Outcomes	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
			a	b	c	d		
	1. Test	50%	✓	✓	✓	✓		
	2. Term paper	20%	✓	✓	✓	✓		
	3. Group presentation	30%	✓	✓	✓	✓		
	Total	100 %						

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

Test:
Assess the students' understanding of the basic principles of scientific methods related to crime scene investigation. [Outcomes (a), (b) and (c)]

Term paper:
Evaluate students' ability to apply the acquired knowledge to solve problems, and their abilities in literature searching, organization and writing. [Outcomes (a), (b), (c) and (d)]

Group presentation:

Students will be evaluated based on their individual performance in the following aspects: poster content and sufficiency of information (30%), poster organization and design (10%), fluency and accuracy in presentation (30%), interaction with audience, Q&A (20%), timing (10%). [Outcomes (a), (b), (c) and (d)]

Student Study Effort Expected	Class contact:	
	▪ Lecture	24 Hrs.
	▪ Tutorial	13 Hrs.
	▪ Seminars/guest lectures	2 Hrs.
	Other student study effort:	
	▪ Preparation of presentation and term paper	20 Hrs.
	▪ Self study	58 Hrs.
	Total student study effort	117 Hrs.

Reading List and References	1. Forensic science, Andrew R. W. Jackson, Harlow, England: Pearson Prentice Hall, 2008, ISBN: 0-131-99880-3.
	2. Investigating chemistry: a forensic science perspective, Matthew E. Johll, New York, N.Y.: W.H. Freeman, 2007, ISBN: 0-7167-6433-4.

	3. Forensic chemistry, Bell Suzanne, Upper Saddle River, N.J.: Pearson/Prentice Hall, 2006, ISBN: 0-131-47835-4.
	4. The forensic laboratory handbook [electronic resource in PolyU]: procedures and practice, Ashraf Mozayani, Carla Noziglia, 2002.
	5. Mute witnesses: trace evidence analysis, Max M. Houck, London: Academic Press, 2001, ISBN: 0-12-356760-2.