

## Subject Description Form

<b>Subject Code</b>	CSE40447
<b>Subject Title</b>	Accident Prevention and Analysis
<b>Credit Value</b>	3
<b>Level</b>	4
<b>Pre-requisite</b>	CSE376
<b>Objectives</b>	To provide students with an understanding of the causes of accidents, the principles of accident prevention, and the application of various monitoring and analysis techniques in preventing accidents from occurring or recurring.
<b>Intended Learning Outcomes</b>	Upon completion of the subject, students will be able to:  a) explain accident causation theories in accident prevention;  b) apply monitoring techniques to design and develop both active and reactive measures for system improvement and accident prevention;  c) have a basic knowledge of the purposes of accident investigation, and be able to conduct accident investigation purposefully and compile the related reports; and  d) develop, present, and make use of loss data history and accident/incident statistics for the formulation of an effective strategy for accident prevention.

<p><b>Subject Synopsis/ Indicative Syllabus</b></p>	<ol style="list-style-type: none"> <li>1. <u>Introduction</u> Learning from critical incidents. Review of government requirements on accident reporting and prevention. Classification of loss incidents.</li> <li>2. <u>Theories of Accident Causation</u> Review of accidents and incidents in the principal employment sectors. Accident Causation Models (Human Factors Model, Domino Model, Epidemiological Theory, Energy Exchange Model, System Model, Behavioural Theory of Accident Causation) and their roles in accident prevention.</li> <li>3. <u>Accident Prevention and Monitoring Techniques</u> Adoption of some well-known hazard identification and analysis techniques, such as Job Hazard Analysis, Haddon Matrix, etc. in accident prevention and monitoring. Safety inspection techniques. Comparison of active and reactive monitoring techniques. Development of active and reactive monitoring policies and procedures to meet statutory and organisational needs.</li> <li>4. <u>Accident Investigation</u> Purposes and principles of accident investigation. Accident investigation techniques: handling of accidents, collecting evidence, interviewing witnesses, and identifying causes and follow-up actions. Accident analysis techniques: Fault Tree Analysis (FTA), Event and Causal Factor Analysis (ECFA), and Bow-tie Analysis. Accident report writing. Study of well-reported and -investigated safety-at-work cases.</li> <li>5. <u>Accident Reporting and Loss Analysis</u> Local legal requirements and code of practices related to investigation and reporting of accidents/ incidents. Different levels of loss incidence analysis. State and enterprise levels of data collection. Statistical analysis. Work-related accident costs. Presentation and publishing of loss data.</li> </ol>																																		
<p><b>Teaching/ Learning Methodology</b></p>	<p>A basic understanding of accident prevention and the application of various hazard and accident analysis techniques will be covered in the lectures. Students will be required to search for related literature or articles to support what they have learnt. A site visit will be arranged for the student to conduct a safety inspection. By relating the lecture materials with real cases, students will need to prepare an accident investigation report and present a safety analysis based on the monitoring techniques acquired.</p>																																		
<p><b>Assessment Methods in Alignment with Intended Learning Outcomes</b></p>	<table border="1"> <thead> <tr> <th rowspan="2">Assessment Methods</th> <th rowspan="2">Weighting (%)</th> <th colspan="4">Intended Learning Outcomes Assessed</th> </tr> <tr> <th>a</th> <th>b</th> <th>c</th> <th>d</th> </tr> </thead> <tbody> <tr> <td>1. Coursework</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>a. Individual Assignment I</td> <td>4</td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> </tr> <tr> <td>b. Individual Assignment II</td> <td>4</td> <td></td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>c. Quiz I</td> <td>8</td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> </tr> </tbody> </table>	Assessment Methods	Weighting (%)	Intended Learning Outcomes Assessed				a	b	c	d	1. Coursework						a. Individual Assignment I	4	✓	✓	✓		b. Individual Assignment II	4		✓	✓	✓	c. Quiz I	8	✓	✓	✓	
Assessment Methods	Weighting (%)			Intended Learning Outcomes Assessed																															
		a	b	c	d																														
1. Coursework																																			
a. Individual Assignment I	4	✓	✓	✓																															
b. Individual Assignment II	4		✓	✓	✓																														
c. Quiz I	8	✓	✓	✓																															

	d. Quiz II	8		✓	✓	✓
	e. Group Assignment	16	✓	✓	✓	✓
	2. Examination	60	✓	✓	✓	✓
	<b>Total</b>	<b>100</b>				
	<p>Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</p> <p>For continuous assessment, the students are assessed in the form of quizzes through problem-solving, as well as assignments where students will submit short essays and make presentations to reflect their understanding of the module through case studies and short projects.</p> <p>A written examination is used to test the understanding/ application of principles related to Outcomes a to d.</p> <p><b>Students must attain at least a grade of D in both coursework and the final examination (wherever applicable) in order to attain a passing grade in the overall result.</b></p>					
<b>Student Study Effort Required</b>	<b>Class contact</b>	Average hours per week				
	▪ Lectures/ Tutorials	3 Hrs.				
	<b>Other student study effort</b>					
	▪ Coursework	3 Hrs.				
	▪ Self Study	3 Hrs.				
	<b>Total student study effort</b>		<b>9 Hrs.</b>			

**Reading List and References****Essential Textbook:**

Geotsch, David L., 2019, *Occupational safety and health for technologists, engineers, and managers*, 9<sup>th</sup> Edition, Prentice Hall.

**Reference Textbooks:**

1. Kjellen, U., 2000, *Prevention of accidents through experience feedback*, Taylor & Francis.
2. Viner, D., 1991, *Accident Analysis and Risk Control*, VHMS Pty Ltd.
3. Ferry, Ted S., 1998, *Modern Accident Investigation and Analysis*, 2<sup>nd</sup> Edition, John Wiley & Sons.
4. Roughton, J.E., Mercurio, J.J., 2002, *Developing an Effective Safety Culture: A Leadership Approach*, Butterworth-Heinemann.