

## Subject Description Form

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| <b>Subject Code</b>                                   | CSE376                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Subject Title</b>                                  | Safety Technology                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Credit Value</b>                                   | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Level</b>                                          | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Pre-requisite/<br/>Co-requisite/<br/>Exclusion</b> | Nil                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Objectives</b>                                     | This subject aims to introduce major occupational hazards that exist in workplace and the basic technologies and statutory requirements that control these hazards.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Intended Learning Outcomes</b>                     | <p>Upon completion of the subject, students will be able to:</p> <ol style="list-style-type: none"> <li>apply engineering principles and inspection checklist to identify equipment and workplace hazards;</li> <li>develop and design safe system of work for high risk operations;</li> <li>exercise professional judgment and knowledge to assist the engineering team to formulate emergency response plans to minimize work injuries;</li> <li>embrace new developments in safety technologies;</li> <li>develop critical thinking ability.</li> <li>recognise the need for, and to engage in life-long learning.</li> </ol>                                                                                                                                                                                                                                                                                                                    |
| <b>Subject Synopsis/<br/>Indicative Syllabus</b>      | <ol style="list-style-type: none"> <li><u>General Principles of Hazard Control</u><br/>Sources of hazards. Principles of hazards controls. Tripping and slipping. Falls. Preventing falls and injuries.</li> <li><u>Electrical Safety</u><br/>Fundamentals of electricity. Electrical hazards and their control. Electrical safety equipment. Static electricity. Lightning protection.</li> <li><u>Tools and Machines</u><br/>Tool and machine hazards. Machine guarding. Controls for hand tool hazards. Controls for portable power tool. Cartridge operated fixing tools. Abrasive wheel. Metal working machineries. Wood working machineries. Associated statutory regulations.</li> <li><u>Materials Handling</u><br/>Manual materials handling. Mechanical aids such as jacks, hand operated materials handling vehicles, powered vehicles, lifting appliances and lifting gears, and conveyors. Associated statutory regulations.</li> </ol> |

|                                                                 | <p>5. <u>Fire Protection and Prevention, Explosion</u><br/>Fire safety in buildings. Fire detection and alarm system. Water supply and storage, pipe sizing. Wet and dry risers, hose reel and sprinkler system. Gas protection system. Foam and dry powder system. Smoke control system. Fire risk assessment. Associated statutory regulations. General characteristics of explosions. Explosion hazards. Dust explosions. Pressurized containers. Controls for explosions.</p> <p>6. <u>High Risk Operations</u><br/>Confined Space Operation: Common types of confined space. Main hazards associated with confined space operations. Associated statutory regulations.</p> <p>Welding and Flame Cutting: General principles of welding. Electric arc welding. Gas welding and flame cutting. Safe operation. Associated statutory regulations.</p> <p>7. <u>Personal Protective Equipment</u><br/>General principles. Head protection. Eye and face protection. Hearing protection. Respiratory protection. Hand, finger and arm protection. Foot and leg protection. Body protection. Fall protection. Electrical worker protection. Emergency showers and eye wash fountains.</p> |                                   |             |                                                   |   |   |   |  |  |   |   |   |   |   |   |                |     |   |   |   |   |   |  |                                             |     |   |  |   |  |   |   |                      |     |   |   |   |  |   |  |       |      |  |  |  |  |  |  |
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| Teaching/Learning Methodology                                   | The lectures will begin with fundamental knowledge followed by an in-depth study of their applications in safety and health. The learning of these subject matters will be supported by workshop, slide/video illustrations, case studies, and unannounced quizzes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                   |             |                                                   |   |   |   |  |  |   |   |   |   |   |   |                |     |   |   |   |   |   |  |                                             |     |   |  |   |  |   |   |                      |     |   |   |   |  |   |  |       |      |  |  |  |  |  |  |
| Assessment Methods in Alignment with Intended Learning Outcomes | <table><tr><th rowspan="2">Specific assessment methods/tasks</th><th rowspan="2">% weighting</th><th colspan="6">Intended subject learning outcomes to be assessed</th></tr><tr><th>a</th><th>b</th><th>c</th><th>d</th><th>e</th><th>f</th></tr><tr><td>1. Assignments</td><td>30%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td></tr><tr><td>2. Workshop / Case Studies / Seminar Report</td><td>10%</td><td>✓</td><td></td><td>✓</td><td></td><td>✓</td><td>✓</td></tr><tr><td>3. Final Examination</td><td>60%</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></table> <p><b>Students must pass the final examination and achieve a passing overall score / grade to pass the subject.</b></p> <p>Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</p>                                                                                                                                                                                                                                                                        | Specific assessment methods/tasks | % weighting | Intended subject learning outcomes to be assessed |   |   |   |  |  | a | b | c | d | e | f | 1. Assignments | 30% | ✓ | ✓ | ✓ | ✓ | ✓ |  | 2. Workshop / Case Studies / Seminar Report | 10% | ✓ |  | ✓ |  | ✓ | ✓ | 3. Final Examination | 60% | ✓ | ✓ | ✓ |  | ✓ |  | Total | 100% |  |  |  |  |  |  |
| Specific assessment methods/tasks                               | % weighting                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                   |             | Intended subject learning outcomes to be assessed |   |   |   |  |  |   |   |   |   |   |   |                |     |   |   |   |   |   |  |                                             |     |   |  |   |  |   |   |                      |     |   |   |   |  |   |  |       |      |  |  |  |  |  |  |
|                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | a                                 | b           | c                                                 | d | e | f |  |  |   |   |   |   |   |   |                |     |   |   |   |   |   |  |                                             |     |   |  |   |  |   |   |                      |     |   |   |   |  |   |  |       |      |  |  |  |  |  |  |
| 1. Assignments                                                  | 30%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ✓                                 | ✓           | ✓                                                 | ✓ | ✓ |   |  |  |   |   |   |   |   |   |                |     |   |   |   |   |   |  |                                             |     |   |  |   |  |   |   |                      |     |   |   |   |  |   |  |       |      |  |  |  |  |  |  |
| 2. Workshop / Case Studies / Seminar Report                     | 10%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ✓                                 |             | ✓                                                 |   | ✓ | ✓ |  |  |   |   |   |   |   |   |                |     |   |   |   |   |   |  |                                             |     |   |  |   |  |   |   |                      |     |   |   |   |  |   |  |       |      |  |  |  |  |  |  |
| 3. Final Examination                                            | 60%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ✓                                 | ✓           | ✓                                                 |   | ✓ |   |  |  |   |   |   |   |   |   |                |     |   |   |   |   |   |  |                                             |     |   |  |   |  |   |   |                      |     |   |   |   |  |   |  |       |      |  |  |  |  |  |  |
| Total                                                           | 100%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                   |             |                                                   |   |   |   |  |  |   |   |   |   |   |   |                |     |   |   |   |   |   |  |                                             |     |   |  |   |  |   |   |                      |     |   |   |   |  |   |  |       |      |  |  |  |  |  |  |

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|                                      | <p>Assignments – Problem solving teaches students how to identify, evaluate and control occupational hazards. It teaches students to apply safety principles and use of inspection checklist to identify hazards at works. Case study helps students to develop professional judgment and knowledge to formulate safety procedures and emergency response plans. It also helps to develop critical thinking ability.</p> <p>Workshop training allows students to gain practical experience and to appreciate the hazards. It demonstrates safe system of work to students. Seminar requirements allow students to recognize the need for, and to engage in life-long learning.</p> <p>The final examination is to assess how much the students has learnt in this subject.</p> |                        |
| <b>Student Study Effort Expected</b> | Class contact:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Average hours per week |
|                                      | ▪ Lectures / Tutorials                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 3 Hrs.                 |
|                                      | Other student study effort:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                        |
|                                      | ▪ Assignments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 3 Hrs.                 |
|                                      | ▪ Self Study                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3 Hrs.                 |
|                                      | Total student study effort                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 9 Hrs.                 |
| <b>Reading List and References</b>   | <ol style="list-style-type: none"> <li>1. Brauer, R. L. (1994). <i>Safety and Health for Engineers</i>. New York: Van Nostrand Reinhold.</li> <li>2. Cadick, J. (2012). <i>Electrical Safety Handbook</i>, 4<sup>th</sup> edition, McGraw Hill.</li> <li>3. Perry, P. (2023). <i>Fire safety in buildings : questions and answers</i>. ICE Publishing. Hong Kong (China). Department of Justice. (n.d.). HK e-legislation for Factories and Industrial Undertakings Ordinance and subsidiary legislation.</li> </ol>                                                                                                                                                                                                                                                           |                        |