

Subject Description Form

Subject Code	BSE4314
Subject Title	Active Fire Protection Systems Analysis
Credit Value	3
Level	4
Pre-requisite / Co-requisite/ Exclusion	Nil
Objectives	The objectives of this subject are to introduce various active fire protection systems, such as the smoke control; stair/lift/lobby shaft pressurization; fire alert systems; fire suppression systems; enable students to understand the operation principles, design, application of these systems; and develop fire test methods and analyze the data.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: <ul style="list-style-type: none"> a. describe the usages of various active fire protection systems for buildings and the codes and standards that regulate them; b. identify the system components and explain the operations and applications of various active fire services systems; c. link relevant fundamentals with practical design and make rational choices of the systems, materials and equipment based on both economics and performance; d. evaluate the design, inspection, testing and maintenance of various active fire protection systems; and e. develop fire test methods and analyze the data.
Subject Synopsis/ Indicative Syllabus	<ol style="list-style-type: none"> 1. Introduction to building fires and the active fire protection systems Fundamental concepts of fire. Fire extinguishing mechanisms. Fire fighting agents. Usages of various active fire protection systems for buildings 2. Smoke control systems and stair/ lift/ lobby shaft pressurization systems Smoke and its movement. Static and dynamic smoke control systems. System components, design and application. 3. Fire detection and alarm systems System components. Operating principles and selection of detectors. Stratification. Beam detection systems. Conventional and addressable systems. False Alarm. 4. Water-based systems Sprinkler systems. Fire Hydrant/ Hose Reel (FH/HR) systems. System components. Source of water. Hazard classification. Design and application. High-rise systems. 5. Non water-based systems Gas protection systems, clean agent fire suppression systems, halon and halon alternatives, Methods of application, system components, operation and maintenance.

<p>Teaching/Learning Methodology</p>	<p>Teaching approach includes lectures, tutorials, laboratory work, seminar group report, seminar presentation and end-of-semester examination to facilitate learning to achieve all the intended learning outcomes.</p> <p>The design of various active protection systems will be discussed in lectures with all the intended learning outcomes being achieved. Tutorials will be used to support lectures. Student participation is expected in solving selected examples in tutorial work, including examination questions and longer open-ended problems. In addition, discussion on problematic areas will be held during tutorials in order to develop a better understanding of the subject. These will facilitate learning to achieve all intended learning outcomes.</p> <p>Related laboratory work is an integral part of this subject, to serve as a vehicle for contrasting theory with practice, and provide students familiarity with equipment and testing techniques. This will help to achieve the intended learning outcomes, in particular (a), (b) and (c).</p> <p>The seminar group report and presentation allow students to work as teams. These may be tasks on the design and performance evaluation of the fire services systems through a student-centered learning approach. These seminar report and presentation will facilitate learning to achieve all the intended learning outcomes, in particular (b), (c) and (d).</p> <p>End-of-semester examination is the final assessment for students to ensure their understanding and learning abilities in solving real problems by applying their knowledge of various fire services systems.</p> <p>Independent study by students, such as literature and information searching, is required to achieve all the intended learning outcomes.</p>																																																			
<p>Assessment Methods in Alignment with Intended Learning Outcomes</p>	<table border="1"> <thead> <tr> <th data-bbox="507 1108 767 1220" rowspan="2">Specific assessment methods/tasks</th> <th data-bbox="767 1108 954 1220" rowspan="2">% Weighting</th> <th colspan="5" data-bbox="954 1108 1401 1182">Intended subject learning outcomes to be assessed</th> </tr> <tr> <th data-bbox="954 1182 1038 1220">a</th> <th data-bbox="1038 1182 1134 1220">b</th> <th data-bbox="1134 1182 1230 1220">c</th> <th data-bbox="1230 1182 1326 1220">d</th> <th data-bbox="1326 1182 1401 1220">e</th> </tr> </thead> <tbody> <tr> <td data-bbox="507 1220 767 1294">1. Laboratory Reports</td> <td data-bbox="767 1220 954 1294">20</td> <td data-bbox="954 1220 1038 1294">✓</td> <td data-bbox="1038 1220 1134 1294">✓</td> <td data-bbox="1134 1220 1230 1294"></td> <td data-bbox="1230 1220 1326 1294">✓</td> <td data-bbox="1326 1220 1401 1294"></td> </tr> <tr> <td data-bbox="507 1294 767 1368">2. Seminar Report</td> <td data-bbox="767 1294 954 1368">10</td> <td data-bbox="954 1294 1038 1368"></td> <td data-bbox="1038 1294 1134 1368">✓</td> <td data-bbox="1134 1294 1230 1368">✓</td> <td data-bbox="1230 1294 1326 1368">✓</td> <td data-bbox="1326 1294 1401 1368"></td> </tr> <tr> <td data-bbox="507 1368 767 1442">3. Seminar Presentation</td> <td data-bbox="767 1368 954 1442">10</td> <td data-bbox="954 1368 1038 1442"></td> <td data-bbox="1038 1368 1134 1442">✓</td> <td data-bbox="1134 1368 1230 1442">✓</td> <td data-bbox="1230 1368 1326 1442">✓</td> <td data-bbox="1326 1368 1401 1442"></td> </tr> <tr> <td data-bbox="507 1442 767 1516">4. Final Examination</td> <td data-bbox="767 1442 954 1516">60</td> <td data-bbox="954 1442 1038 1516">✓</td> <td data-bbox="1038 1442 1134 1516">✓</td> <td data-bbox="1134 1442 1230 1516">✓</td> <td data-bbox="1230 1442 1326 1516">✓</td> <td data-bbox="1326 1442 1401 1516">✓</td> </tr> <tr> <td data-bbox="507 1516 767 1603">Total</td> <td data-bbox="767 1516 954 1603"></td> <td colspan="5" data-bbox="954 1516 1401 1603"></td> </tr> </tbody> </table>					Specific assessment methods/tasks	% Weighting	Intended subject learning outcomes to be assessed					a	b	c	d	e	1. Laboratory Reports	20	✓	✓		✓		2. Seminar Report	10		✓	✓	✓		3. Seminar Presentation	10		✓	✓	✓		4. Final Examination	60	✓	✓	✓	✓	✓	Total						
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	Students must attain at least grade D in both coursework and final examination (whenever applicable) in order to attain a passing grade in the overall result.	
Student Study Effort Expected	Class contact:	
	▪ Lectures	21 Hrs.
	▪ Tutorials/ Seminars	12 Hrs.
	▪ Laboratory	6 Hrs.
	Other student study effort:	
	▪ Coursework	35 Hrs.
	▪ Self Study	46 Hrs.
	Total student study effort	120 Hrs.
Reading List and References	References: <ol style="list-style-type: none"> 1. Chartered Institution of Building Services Engineers (CIBSE) Guide E: Fire Safety Engineering, the latest edition, CIBSE, London, UK. 2. Fire Protection Handbook, the latest edition, National Fire Protection Association, Quincy, USA. 3. SFPE Handbook of Fire Protection Engineering, the latest edition, The Society of Fire Protection Engineers (SFPE). 	