

## Subject Description Form

<b>Subject Code</b>	BSE541
<b>Subject Title</b>	Building Acoustics
<b>Credit Value</b>	3
<b>Level</b>	5
<b>Pre-requisite/ Co-requisite/ Exclusion</b>	Nil
<b>Objectives</b>	<p>To extend knowledge of students on acoustics, noise and vibration control to acoustical design of special rooms and the practices of noise and vibration control, and to enable graduates to become specialists of their design office.</p> <p>To train students in greater breadth and depth to achieve a satisfactory acoustical environment.</p>
<b>Intended Learning Outcomes</b>	<p>Upon completion of the subject, students will be able to:</p> <ol style="list-style-type: none"> <li>a. identify problems in building acoustics and plan for solutions</li> <li>b. understand the acoustic design needs of various indoor environments</li> <li>c. predict common acoustical phenomena in buildings</li> <li>d. carry out engineering calculations related to building acoustics</li> </ol>
<b>Subject Synopsis/ Indicative Syllabus</b>	<p><b>Acoustic fundamentals:</b> Fundamental properties of sound and waves, sound sources, sound field in enclosures, sound propagation and transmission inside buildings, external impact, room acoustics, sound generation and transmission in air ducts. Effects of noise on human beings.</p> <p><b>Acoustic design and planning:</b> Acoustic design requirements for auditorium, lecture theatres, plant rooms and etc. Requirements for speech and music: loudness, directional and special impression, reverberation, echo, clarify and etc., silencers, active noise control. Prediction methods for building acoustics and flow generated noise, noise indices, practical noise control strategy, sound absorption technology.</p> <p><b>Problem investigations:</b> Instrumentation, noise and vibration measurement and data analysis techniques, problem identification and assessment, software packages.</p>
<b>Teaching/Learning Methodology</b>	<p>The subject will start with a discussion on indoor noise and vibration sources and their effects on human beings.</p> <p>Acoustic design needs of various indoor environments will be identified. Noise control methods will be discussed and examined.</p> <p>Instrumentation, measurement techniques and acoustic application software will be examined and discussed. The use of equipment will be demonstrated.</p> <p>Seminars will be used for the introduction of concepts and fundamentals of the subjects.</p>

	Tutorials will be conducted to supplement the lectures for the application and better understanding of complex engineering theories. Students are required to read and discuss course materials and relevant publications at seminars and to prepare alternative solutions to problem.																																																					
<b>Assessment Methods in Alignment with Intended Learning Outcomes</b>	<table border="1" data-bbox="443 342 1469 815"> <thead> <tr> <th data-bbox="443 342 770 544" rowspan="2">Specific assessment methods/tasks</th> <th data-bbox="775 342 927 544" rowspan="2">% weighting</th> <th colspan="6" data-bbox="932 342 1469 472">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th> </tr> <tr> <th data-bbox="932 479 1018 544">a.</th> <th data-bbox="1023 479 1109 544">b.</th> <th data-bbox="1114 479 1200 544">c.</th> <th data-bbox="1204 479 1291 544">d.</th> <th data-bbox="1295 479 1382 544"></th> <th data-bbox="1386 479 1469 544"></th> </tr> </thead> <tbody> <tr> <td data-bbox="443 551 770 611">1. In-class test</td> <td data-bbox="775 551 927 611">20%</td> <td data-bbox="932 551 1018 611"></td> <td data-bbox="1023 551 1109 611">✓</td> <td data-bbox="1114 551 1200 611"></td> <td data-bbox="1204 551 1291 611">✓</td> <td data-bbox="1295 551 1382 611"></td> <td data-bbox="1386 551 1469 611"></td> </tr> <tr> <td data-bbox="443 618 770 678">2. Self study report</td> <td data-bbox="775 618 927 678">20%</td> <td data-bbox="932 618 1018 678">✓</td> <td data-bbox="1023 618 1109 678">✓</td> <td data-bbox="1114 618 1200 678">✓</td> <td data-bbox="1204 618 1291 678"></td> <td data-bbox="1295 618 1382 678"></td> <td data-bbox="1386 618 1469 678"></td> </tr> <tr> <td data-bbox="443 685 770 745">3. Examination</td> <td data-bbox="775 685 927 745">60%</td> <td data-bbox="932 685 1018 745">✓</td> <td data-bbox="1023 685 1109 745">✓</td> <td data-bbox="1114 685 1200 745">✓</td> <td data-bbox="1204 685 1291 745">✓</td> <td data-bbox="1295 685 1382 745"></td> <td data-bbox="1386 685 1469 745"></td> </tr> <tr> <td data-bbox="443 752 770 815">Total</td> <td data-bbox="775 752 927 815">100%</td> <td colspan="6" data-bbox="932 752 1469 815"></td> </tr> </tbody> </table> <p data-bbox="443 831 1469 936">The in-class test is basically focused on engineering acoustics calculations and the noise requirements for indoor environment. This is a short but quick check on the students' progress in the understanding.</p> <p data-bbox="443 965 1469 1099">Each student is required to carry out a self study on a specific topic assigned by the subject examiner. This assessment is in general not related to calculation but students are required to demonstrate their understandings of various acoustical issues in practice (outcomes (a), (b) and (c)).</p> <p data-bbox="443 1128 1054 1160">The examination will test all the four outcomes.</p>								Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)						a.	b.	c.	d.			1. In-class test	20%		✓		✓			2. Self study report	20%	✓	✓	✓				3. Examination	60%	✓	✓	✓	✓			Total	100%						
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<b>Reading List and References</b>	<p data-bbox="443 1200 1262 1232">Beranek, L.L. (1995). <i>Noise and Vibration Control Engineering</i>.</p> <p data-bbox="443 1261 1326 1292">Beranek, L.L. (1996). <i>Concert Halls and Theatres: How they sound</i>.</p> <p data-bbox="443 1321 1091 1352">Fry, A. (1988). <i>Noise Control in Building Services</i>.</p> <p data-bbox="443 1382 1064 1413">Harris, C.M. (1953) <i>Handbook of Noise Control</i>.</p> <p data-bbox="443 1442 1469 1518">Kinsler, L.E. Frey, A.R. Coppens, A.B. et al. (1982). <i>Fundamentals of Acoustics</i>.</p> <p data-bbox="443 1547 1219 1579">Reynolds, D.D. (1981). <i>Engineering Principles of Acoustics</i>.</p>																																																					