

Subject Description Form

Subject Code	BSE541
Subject Title	Building Acoustics
Credit Value	3
Level	5
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	<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>
Intended Learning Outcomes	<p>Upon completion of the subject, students will be able to:</p> <ol style="list-style-type: none"> a. identify problems in building acoustics and plan for solutions b. understand the acoustic design needs of various indoor environments c. predict common acoustical phenomena in buildings d. carry out engineering calculations related to building acoustics
Subject Synopsis/ Indicative Syllabus	<p>Acoustic fundamentals: 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>Acoustic design and planning: 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>Problem investigations: Instrumentation, noise and vibration measurement and data analysis techniques, problem identification and assessment, software packages.</p>
Teaching/Learning Methodology	<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.

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. In-class test	20%		✓		✓		
2. Self study report	20%	✓	✓	✓			
3. Examination	60%	✓	✓	✓	✓		
Total	100%						

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.

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)).

The examination will test all the four outcomes.

Reading List and References

Beranek, L.L. (1995). *Noise and Vibration Control Engineering*.

Beranek, L.L. (1996). *Concert Halls and Theatres: How they sound*.

Fry, A. (1988). *Noise Control in Building Services*.

Harris, C.M. (1953) *Handbook of Noise Control*.

Kinsler, L.E. Frey, A.R. Coppens, A.B. et al. (1982). *Fundamentals of Acoustics*.

Reynolds, D.D. (1981). *Engineering Principles of Acoustics*.