

# ACOUSTICAL ANALYSIS FOR THE LECTURE ROOMS IN UNIMAP

## Abstract

Acoustic analysis is a measurement used to analyse the behaviour of sound waves in enclosed spaces, which influences speech intelligibility. Another parameter that influences speech intelligibility is reverberation time. Reverberation time is the time for the sound source to decay by 60 dB. A high reverberation time causes sound to dissipate more slowly, resulting in continual reflection of sound waves, which disrupts student concentration in class. Furthermore, a poor acoustic environment could have an impact on health and lecture delivery. The objective of this study is to determine and analyse the acoustic performance for five selected lecture rooms in UniMAP. The reverberation time is the parameter of this study that was obtained from the Root Mean Square (RMS) of the sound pressure by using the impulsive sound source method from a burst balloon. In this study, the "balloon pop" sound pressure was consistently recorded at approximately 105dB across all cases. This measurement indicates the peak sound intensity of the stimulus. The influence of the location of receiver, design, and space volume for the lecture room on the reverberation time was investigated. At a location of 6 m from the sound source, at the back wall of a room with chairs, BKN 5 and BPU 5 measured longer reverberation times of 1.3 s and 1.2 s, respectively. The higher value of reverberation time is caused by where the sound receiver is. If it is close to a wall, the sound receiver will be exposed to numerous reflections of sound waves, causing the room to become reverberant. Compared to other lecture rooms, the length of BKN 5 and BPU 5 is shorter. Their lengths are 11.639 m and 11.689 m, so the sound receiver is closer to the wall and makes the reverberation time higher. BKN 5 room, which has a volume of 258.3 m<sup>3</sup>, had the highest reverberation time (1.2 s on average in a room with chairs). This is because it is larger than the other rooms. So, the reverberation times get longer as the room's volume increases. BPU 5 room had the longest reverberation time for a condition room without chairs (an average of 2.4 s), but it also had the smallest space volume (242.4 m<sup>3</sup>) compared to the other rooms. Thus, it takes longer for the sound waves in the room to fade away when there are no chairs there. If the smaller room didn't have enough sound-absorbing materials, the reverberation times would be longer.

## Keywords

Acoustics; Reverberation Time; Sound-Absorbing Material Lecture Room; Speech Intelligibility