

# PDH Academy

## Sound Advice for Acoustics

### Timed Outline

*Course Description:* Unwanted sound impacts and affects inhabitants of our created spaces. If it not already, controlling noise will quickly become a mandated concern for designers. Attesting to increasing regulatory focus on noise, is a recent proliferation of standards, guidelines, and codes regarding acoustics. Very soon, many of these guidelines will no longer be mere suggestions. Most concerns covered in these standards, can be addressed with a basic understanding on how sound travels and is reflected, blocked, absorbed, or transmitted by materials and assemblies chosen in designing envelopes. Acoustic design is best addressed in an incremental fashion. This course was written to do just that. Fundamentals are first covered, including basic principles regarding sound, how its energy moves through matter, how its path and intensity can be altered, and how success in the manipulation of sound is measured. Known design strategies are discussed for controlling sound moving; from exterior to interior spaces, from interior spaces to adjacent spaces, within interior spaces, through structural components, and through building systems. Design considerations are outlined for numerous common building functions. Finally, acoustic codes and guidelines in existence now, are listed for consideration.

*Course Hours:* 5 Hours

*Course Availability:* Online 24/7

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## Course Outline and Learning Objectives

<b>Module</b>	<b>Learning Objectives</b>	<b>Time</b>
<b>1. Course Introduction</b>	1. Learning Objectives	2 min <b>2 min</b>
<b>2. Acoustics in General</b>	1. General Vocabulary Regarding Sound 2. General Nature of Sound 3. Production 4. Control 5. Sound Transmission 6. Reception 7. Audible Sound Frequencies 8. Effects of Sound on People	5 min 5 min 5 min 4 min 5 min 3 min 2 min 4 min <b>33 min</b>
<b>3. Principles of Acoustics</b>	1. Sound Behavior Patterns	5 min <b>5 min</b>
<b>4. Primary Acoustic Measurements</b>	1. NRC- Noise Reduction Coefficient 2. STC- Sound Transmission Class 3. IIC- Impact Insulation Class	5 min 5 min 5 min <b>15 min</b>
<b>5. Additional Measurements</b>	1. RT-Reverberation Time 2. CAC- Ceiling Attenuation Class 3. AC- Articulation Class	2 min 2 min 2 min <b>6 min</b>
<b>6. Amplified Sound</b>	1. Amplified Sound Overview	5 min <b>5 min</b>

<b>7. Design Solutions</b>	<ol style="list-style-type: none"> <li>1. Resisting Transmission of Noise: Exterior into Interior</li> <li>2. Resisting Horizontal Transmission of Noise from Space to Adjacent Space</li> <li>3. Resisting Vertical Transmission of Noise from Space to Adjacent Space, including Structure Borne Sound</li> <li>4. Controlling Reverberation Time of Sound Generated within a Space</li> <li>5. Masking unwanted Noise with Sound Generating Systems</li> <li>6. Controlling System Sounds, especially HVAC Noises, that Enter a Space</li> </ol>	<p>10 min 10 min 10 min 15 min 5 min 5 min</p> <p><b>55 min</b></p>
<b>8. Design Considerations by Specific Project Type</b>	<ol style="list-style-type: none"> <li>1. Speaking Venues: Auditorium</li> <li>2. Speaking Venues: Lecture Hall</li> <li>3. Speaking Venues: Meeting or Conference Room</li> <li>4. Performance Venues: Dance Hall</li> <li>5. Performance Venues: Movie Theatre</li> <li>6. Performance Venues: Recording Studio</li> <li>7. Performance Venues: Home Theatre</li> <li>8. Dining Venues: Dining Hall/Restaurant</li> <li>9. Dining Venues: Outdoor Dining</li> <li>10. Common Use Venues: Common Gather/Multi-Use</li> <li>11. Common Use Venues: Atrium</li> <li>12. Common Use Venues: Hallway</li> <li>13. Healthcare Venues: Healthcare Facility</li> <li>14. Healthcare Venues: MRI Suite</li> <li>15. Work Venues: Office</li> <li>16. Work Venues: Home Office</li> <li>17. Education Venues: Classroom</li> <li>18. Education Venues: Library</li> <li>19. Fitness Venues: Gym</li> <li>20. Multi-Family Venues: Hotel</li> <li>21. Multi-Family Venues: Multi-Family Housing</li> <li>22. Worship Venues- Churches</li> </ol>	<p>10 min 5 min 5 min 5 min 5 min 5 min 5 min 5 min 2 min 5 min 2 min 3 min 5 min 3 min 20 min 5 min 20 min 2 min 5 min 5 min 3 min 10 min</p> <p><b>135 min</b></p>
<b>9. Codes and Testing</b>	<ol style="list-style-type: none"> <li>1. Applicable to All Building Types</li> <li>2. Applicable to Schools</li> <li>3. Applicable to Health Care</li> <li>4. Applicable to Offices</li> <li>5. Applicable to Outdoor Noise Guidelines</li> </ol>	<p>2 min 3 min 1 min 1 min 1 min</p> <p><b>8 min</b></p>

<b>10. Summation</b>	1. Summary	3 min <b>3 min</b>
	<b><i>TOTAL TIME</i></b>	<b><i>267 min</i></b>