

Course Title: Acoustics Engineering and Noise Reduction

Course Code: ETEG 440

Credit Hours: 3

Course Description:

The course aims to provide the fundamentals of Acoustic engineering and noise reduction (basic principles and phenomena, analysis methods and control techniques). By the end of this course, students should be able to identify Acoustic behaviour and able to provide solution for reduction of noise in general; specify and analyse the sources and propagation of sound and vibration, define and evaluate alternative solutions and suggest measures to solve noise problems.

Course Contents:

Unit 1: Fundamental of Acoustic

Energy of Vibration, Mechanical resonance and frequency, Speed of sound in air and fluid, Decibel scale and Acoustic intensity, Acoustic intensity and impedance measurements, Acoustic sources and echo, Acoustic Regulations

Unit 2: Hearing and Speech

Fundamental Properties of Hearing, Loudness, Echo, Pitch, Tone and audio frequency, Speech interference

Unit 3: Architectural Acoustic

Model for the sound growth and decay, Propagation of sound wave, Reflection Refraction, Interference and Diffraction analysis of Sound, Acoustic reciprocity, Reflection and Transmission model, Absorption, Attenuation and Diffusion of Sound

Unit 4: Acoustic Noise Reduction

Analyzing effect of Acoustic noise and echo, weighted sound level and noise rating, Isolation, absorption, diffuser and active noise reduction technology

Unit 5: Case Study on Environmental Acoustic

References:

1. Lawrence E. Kinsler, Austin R. Frey, Ala B. Coppers, James V. Sanders, *Fundamentals of Acoustics*, 4th Edition, Wiley
2. Michel Bruneau, *Fundamentals of Acoustics*, ISTE Ltd, London
3. Eberhard Hansler, Gerhard Schmidt, *Acoustic Echo and Noise Control: A Practical Approach*, Wiley
4. Peter Haughton, *Acoustics for Audiologists*, Emerald Group Publishing Limited
5. Michael Möser, *Engineering Acoustics, An Introduction to Noise Control*, Springer

Evaluation:

In-Semester Evaluation: 50%

End-Semester Evaluation: 50%