

Minimum Requirements on “Technical Acoustics and Noise Control”

(Final modification: 25th May 2022)

- ◆ The subject and classification of acoustics. The concept of sound and their two-fold nature. Sound in different mediums and as a function of frequency and effective sound pressure.
- ◆ The linear acoustic model. The mathematic and physical consequence of the linearity and speed of sound.
- ◆ Derive and analyse the 1D homogeneous acoustic wave equation! The mathematic formulation and physical meaning of the general solution of the homogeneous wave equation.
- ◆ The wave function of harmonic waves, trigonometric and complex representation, and their importance. Variables to describe the acoustic waves.
- ◆ The solution of the 1D homogeneous wave equation on closed space, tube resonators.
- ◆ Model testing and similitude, the Helmholtz-number, and the limitation.
- ◆ Important composition of harmonic waves, standing wave and beat, the wave functions and applications.
- ◆ Acoustic resonators, the operation, the mechanic analogy and the natural frequency of a Helmholtz-resonator. The application of the acoustic resonators.
- ◆ Harmonic analysis, sound spectra, octave and one third octave band. The pitch and colour of a sound, consonance and dissonance, test sounds in the acoustic measurement technics.
- ◆ Energetic relations of acoustic waves. Kinetic and potential energy density, sound intensity, sound power and RMS value, instantaneous and averaged variables.
- ◆ Levels in acoustics, mathematic operation with levels. Transmission loss, insertion loss, noise reduction. Impedances.
- ◆ Classification of sound sources, monopole, dipole, longitudinal and lateral quadrupole radiators and the model law.
- ◆ Free field sound propagation, simple geometrical acoustics, far field approximation of point-like, coherent and incoherent line sources. The meteorological effects on atmospheric sound propagation.
- ◆ Room acoustics, the energetic model of closed sound space. Direct and reverberant sound fields, room constant, reverberation time.
- ◆ The concept of noise, the subject of noise control. Physiological effects of noise. Subjective measurement units, the loudness level and the A-weighted sound pressure level, and equivalent sound pressure level. The general methodology of noise control.
- ◆ Acoustic measurements, microphones, analysers, calibrators, anechoic and reverberating chambers.
