Course title: Noise Control

Course code: 19016505

Year/term: Year 4/term 1

Credit points: 3

Contact time: 2-hour lecture and 2-hour laboratory or other activities

Prerequisite:

Course Learning Outcomes (lecture can put the additional outcome by his/herself)

C1. Students are introduced to the fundamentals of noise control, including but not limited to the following topics: Loudness and pitch perception, hearing loss, various types of sound pressure levels, international standards on noise levels, noise criteria, noise rating, sound isolation, sound transmission class.

C2. Students are also introduced to some fundamental techniques to characterize the environmental noise, including the use of sound level meter, spectrum analysis and acoustic camera.

Generic learning outcome (choose the outcome that relate to your teaching activities)

G1. students are responsible for all assigned work on time.

G2. students can use their knowledge to analyse, develop and create their own work.

G3. students have life-long learning skills.

G4. students have a good skill in English communication, especially the technical communication related to sound and acoustic engineering.

Learning & Teaching Activities

Teaching activities	Learning outcome	Remarks	Problem (MKO5)	Solution to problem (MKO5)
Lecture	C1,C2,G1,G2	Every week		
Homework	C1,C2,G1,G2,G3	Every other week		
Laboratory & Seminar	C1,C2,G1,G3	Every week		

Assessment

Name	%	Learning outcome	Remarks
Examination	30	C1,C2,G2	Midterm 15% Final 15%
Quiz	12	C1,C2,G2	6 Quizzes
Lab Report	20	C1,C2,G2,G3,G4	4 Reports (1 Report in English)
Seminar Notes	20	C1,C2,G2,G4	4 Notes
Homework	18	C1,C2,G1,G2,G4	6 Homework

Feedback

Activities	Remarks	Problem (MKO5)	Solution to problem (MKO5)
Q&A during lectures	Every week		
Homework sessions	Every other week		
Grade announcement	After midterm and final examination		

Time table

Week no.	Lecture topics	Lab topics
1	Introduction I: terminology of noise control, wave equation, plane and spherical waves, sound intensity	Sound level meters (SMLs) I: fundamental concepts and components
2	Introduction II: noise measurements, sound pressure, intensity, and power level, basic frequency analysis, band number, acoustic impedance, and flow resistance	Sound level meters (SMLs) II:measurements and weighting networks, A-, B-,C-, and Z- weighting
3	Human hearing I: anatomy of the ear and its response to sound, noise exposure, hearing loss, psychological effects	1. Sound pressure level at your location and its analysis: Is it 1/r or $1/r^2$ law?
4	Human hearing II: loudness measures, quantifying occupational and environmental noise	
5	Human hearing III: noise dose, noise rating, noise criteria, room criteria, balanced noise criteria, and room noise criteria	Thai regulations for noise control (Sept 3rd, 2021) at 13:00-14:30 Ms. Krittika Lertsawat
6	Noise measurement and analysis I: Microphone response, sensitivity, accuracy, acoustic calibration, personal sound exposure meter	Environmental noise (Sept 10th, 2021) at 13:00 -14:30 Ms. Krittika Lertsawat
7	Noise measurement and analysis II: Sound source localization, pulsating	2. Reflection coefficient with a smartphone (Sept 17th and 24th, 2021)
8		

	sphere, line sources, monopole, dipole, and radiation impedance	
9	Sound propagation: atmospheric absorption, ground effect, meteorological effects, path length and propagation times, barrier effect, diffraction, terrain shielding	Acoustic camera (Oct 1st. 2021) (Asst. Prof. Dr. Khemapat Tontiwattanakul and team) 13:00 -15:30
10		Criteria for room acoustics (Oct 8th,2021) (Asst. Prof. Dr. Khemapat Tontiwattanakul and team) 13:00 -14:30
11	Noise propagation models: CONCAWE, ISO 9613-2 (1996), and NMPB-2008 and possible uncertainties	3. Transmission coefficient with a smartphone (Oct 15th-22nd, 2021) 13:00 -14:30
12	Noise control principle I: source, path and receiver, some noise reduction techniques	
13	Noise control principle II: Sound absorption, acoustic enclosures, barriers and active noise control	4. Measuring sound of your surroundings using a smartphone (Oct 29th, 2021)
14	Mufflers and Silencers	SoundPlan by Mr. Michel (to be confirmed. Tentatively scheduled on Nov 5th, 2021
15		Soundscape (Nov 12th, 2021) by Asst. Prof. Dr. Kitipitch Meesawat