Subject Description Form

<table>
<tr><td>Subject Code</td><td>ME574</td></tr>
<tr><td>Subject Title</td><td>Product Noise Control</td></tr>
<tr><td>Credit Value</td><td>3</td></tr>
<tr><td>Level</td><td>5</td></tr>
<tr><td>Pre-requisite/
Co-requisite/
Exclusion</td><td>Students should have basic knowledge in Dynamics and Thermofluids.</td></tr>
<tr><td>Objectives</td><td>To provide the advanced knowledge of noise radiation mechanisms including the vibration of moving parts and flow induced noise. The principle and methodology of noise control, in particular during designing a product, are then demonstrated with a few of examples.</td></tr>
<tr><td>Intended Learning Outcomes</td><td>Upon completion of the subject, students will be able to:
a. possess state-of-the-art knowledge and skills in the area of noise radiation mechanisms and noise/vibration control principles;
b. apply their knowledge, skills and hand-on experience to design, develop, manufacture, and analyze new products by considering noise/vibration control and keeping aware of the environmental issues, existing regulation and policies concerning noise control;
c. extend their knowledge of noise radiation mechanism and noise/vibration control principles to different situations of engineering context and professional practice; and
d. have recognition of the need for, and an ability to engage in life-long learning.</td></tr>
<tr><td>Subject Synopsis/
Indicative Syllabus</td><td>Acoustic Quality of Products: Basics of sound radiation; hearing and hearing loss; A-weighting; Characterization of sound sources and sound propagation; ISO standards of noise source testing for typical products and industrial facilities, use of anechoic and reverberation chambers.
Basic Sources of Product Noise: Mechanisms, estimates and measurement of noise radiated by a variety of mechanical equipment such as fans, blowers, compressors, pumps, cooling towers, turbines and jets; flow-induced noise.
Noise Abatement Techniques and Applications: Sound absorption by fibrous materials, sound reflection by impedance discontinuities, active noise control; noise isolation, enclosures, control of flow noise in fans, pumps and compressors, silencers/mufflers and other control of noise along its propagation path.
Vibration Control and Applications: Structural response to excitation, vibration and flutter of engineering structure; active and passive vibration control and suppression; structural vibration control for engineering products, including bridge, aircraft, etc.</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>1. The teaching and learning methods include lectures/tutorial sessions, homework assignments, test, case study report and examination.
2. The continuous assessment and examination are aimed at providing students with integrated knowledge required for product noise control.
3. Technical/practical examples and problems are raised and discussed in class/tutorial sessions.
<table>
<tr><td rowspan="2">Teaching/Learning Methodology</td><td colspan="4">Intended subject learning outcomes</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td></tr>
<tr><td>1. Lecture</td><td>√</td><td>√</td><td>√</td><td>√</td></tr>
<tr><td>2. Tutorial</td><td>√</td><td>√</td><td>√</td><td>√</td></tr>
<tr><td>3. Homework assignment</td><td>√</td><td>√</td><td>√</td><td>√</td></tr>
<tr><td>4. Case study report and presentation</td><td>√</td><td>√</td><td>√</td><td></td></tr>
</table>
</td></tr>
</table>

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed			
		a	b	c	d
1. Homework assignment	20%	√	√	√	√
2. Test	20%	√	√		
3. Case study report and presentation	10%	√	√	√	
4. Examination	50%	√	√	√	√
Total	100%				

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Overall Assessment:

$0.50 \times$ End of Subject Examination + $0.50 \times$ Continuous Assessment

The continuous assessment consists of three components: homework assignments, test, and case study report & presentation. They are aimed at evaluating the progress of students study, assisting them in self-monitoring of fulfilling the respective subject learning outcomes, and enhancing the integration of the knowledge learnt.

The examination is used to assess the knowledge acquired by the students for understanding and analyzing the problems critically and independently; as well as to determine the degree of achieving the subject learning outcomes.

Student Study Effort Expected

Class contact:	
▪ Lecture	24 Hrs.
▪ Tutorial/Case study/Laboratory	15 Hrs.
Other student study effort:	
▪ Self Study	45 Hrs.
▪ Case study report preparation and presentation	21 Hrs.
Total student study effort	105 Hrs.

Reading List and References

1. Beranek L. L. and Ver I. L. (editors), *Noise and Vibration Control Engineering, principles and applications*. New York: Wiley, latest edition.
2. Pierce A. D., *Acoustics: An Introduction to its Physical Principles and Applications*. Woodbury, N.Y. : Acoustical Society of America, latest edition.
3. Fahy F., *Sound Intensity*. London : E & FN Spon, latest edition.
4. Koopmann G. H., *Designing Quiet Structures: A Sound Power Minimization Approach*. San Diego : Academic Press, latest edition.
5. Crocker M. J. (editor), *Handbook of Acoustics*. New York : Wiley, latest edition.