Seoul National University of
Science & Technology
232 Gongneung-ro,Nowon-gu,
Seoul 01811 Korea

MSDE Module Descriptor

Module Title Mechanical Vibrations	**Module Code** MSDE 418	**Semester (Sem 1 / Sem 2)** Sem 1
Credits 10	**Level** 6	**Professor and email** Dong-Young JANG dyjang@seoultech.ac.kr
Delivery Method Tutorials	**Delivery Location** SeoulTech, Mugung Hall	

Module Synopsis

This module provides students with ability to analyse, test, and perform numerical treatment of vibration phenomena. Topics include linear oscillator analysis (Laplace Transforms, balance, Fourier Transforms, eigenvalue problems, modal analysis and simulations), experimental methods, and an introduction to nonlinear dynamic systems. Free and forced vibrations of mechanical systems with lumped inertia, springs, and dampers are the primary emphasis. Assessment is through one exam at the mid-term and one exam at the end of semester. There are also a number of short assignments given throughout the semester.

Outline Syllabus

Review of basics: dynamics, kinematics, and kinetics

Free vibration and forced vibration including damping models and harmonic excitation

Fourier transformation and eigenvalue theory and problem solving

Continuous systems and modal analysis

The module aims to provide students with the necessary understanding and mathematical skills to solve dynamic problems such as nominal frequencies and damping of a dynamic system. They will also understand how to make a model of a dynamic system for engineering analysis and be able to use the Fourier transform to identify the nominal signals of a given dynamic system.

Indicative Reading:

Mechanical Vibration by Palm (Wiley, 2007)
Vibrations by Balakumar, Balachandran and Edward Magrab (Thomson Books/Cole 2004)

Pre-requisite(s)
MSDE310 Dynamics

NOTIONAL STUDENT WORKLOAD	**Hours**
MODE OF DELIVERY (FT / PT / DL)	FT
Lectures	40
Seminars	5
Tutorials	
Laboratories/studios/practical	5
Directed learning	
Independent Learning	50
Work experience/fieldwork	
Other: eg formal presentation	
Total Workload 100 hours for a 10 credit module 200 hours for a 20 credit module	100

Module Outcomes	
KU1,2,3,4	KU1. Evaluate and apply complex knowledge of the scientific and mathematical principles of engineering to solve Real-World problems. KU2. Perform advanced analysis of unfamiliar engineering systems. KU3. Introduce and utilise complex methodologies to create solutions to a variety of Real-World engineering problems. KU4. Define and investigate complex problems and constraints that occur in engineering design with the aid of advanced tools.
IPSA1,5	IPSA1. Apply advanced approaches to solving unfamiliar real world engineering problems. IPSA5. Demonstrate the ability to solve advanced design problems and apply advanced manufacturing systems

PVA2	PVA2. Critically analyse advanced solutions to complex engineering problems.

Assessments	Assessment Type	Weighting %	Midterm/interim/final
Course Work	3xAssignments (report 3 pages presentation 10min each)	30	
EXAM	Mid-term Exam/2hrs	30	Midterm
EXAM	Final Exam/2hrs	40	Final
Course Work			
Laboratory			
Exam			