MODULE DESCRIPTOR

Guidelines for completion are available[1] as are Red Guides on developing a new module and Delivering a module[2].

1. Module Code	MSDE 418	**2. Title of new module**	Mechanical Vibrations
3. Subject Division *where relevant*	Engineering		
4. Module level *4, 5, 6 etc.*	6	**5. Module Tutor**	Dong Young Jang
6. Credit points *10, 20,30 etc*	10	**7. Year long or semester based**	Semester
8. Type of module *eg standard, dissertation, work-based study A full list of module types is provided in the guidelines[1].*	Standard		
9. Location(s) of delivery *For collaborative delivery, please state name(s) of institution(s) with country and start month(s) for each. A full list is available on the SITS help file in eLP*	SeoulTech, Korea, March		

MODULE DESCRIPTIONS

10. Synopsis of module (SITS Module Descriptor Sequence 0001)
A brief overview of aims, learning outcomes, learning, teaching, assessment, & feedback methods, and rationale

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.

11. Indicative reading list or other learning resources (SITS 0002)

1. Recommendations for purchase by students

N/A

2. Books

[1] *http://northumbria.ac.uk/sd/central/ar/qualitysupport/approval/forms/*
[2] http://northumbria.ac.uk/sd/central/library/marcet/redguides/browse/?view=Standard

Mechanical Vibration by Palm (Wiley, 2007)

Vibrations by Balakumar, Balachandran and Edward Magrab (Thomson Books/Cole 2004)

3. Journal Articles

N/A

4. Journals and Newspaper Titles

N/A

5. Databases and Websites

N/A

6. Any Other Resources

N/A

12. Outline syllabus (SITS 0003)
A list of module contents

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

13. Aims of module (SITS 0004)
Broad statement of educational intent and overall purpose of module

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.

14. Learning outcomes (SITS 0005)
State what expected to know and/or be able to do at end of module

Upon completion of the module students will be able to :

1. Apply mathematical methods relevant to the Engineering subjects covered.(A1)
2. Define problems and identify the key issues/parameters affecting their solution.(B1)
3. Use relevant instrumentation and test equipment and evaluate the accuracy of data obtained.(C3)
4. Apply an engineering approach to the solution of problems using scientific principles.(D2)

15. Pre-requisite(s) (SITS 0006)
Any module which must already have been taken at a lower level, or any stipulated level of prior knowledge required

MSDE310 Dynamics

16. Co-requisite(s) (SITS 0007)
Modules at this level which must be taken with this module

MSDE 422 Capstone Design I

17. Distance learning delivery (SITS 0008)
If the module is offered (wholly or in part) by distance learning, please give detail of delivery arrangements and the specific resources required
e.g. materials, communication facilities, hardware, software etc.

None

18. Learning and teaching strategy (SITS Module Descriptor Sequence 0009)

This module will be delivered using a combination of lectures, set work and presentations, and independent learning. Formal lectures provide essential guidance as well as some explanation of the more difficult aspects. Time will be made available during the scheduled lectures to answer questions arising from directed learning using the source materials indicated. Assignment work will be provided to help students apply the theory they have learned and gain a more solid understanding of the material.

19. Assessment and feedback strategy (SITS Module Descriptor Sequence 0010)
Please provide details of assessment (formative and summative) and indicate how students will be provided with feedback on their performance. (A breakdown of summative tasks is also provided in section 23.) If the module or an assessment component is exempt from the Anonymous Marking Policy please indicate this below.

a. Summative assessment and rationale for tasks A mid-term examination worth 30% is set to provide students with the opportunity to gauge their progress and reinforce their understanding of the dynamic analysis of vibration system before moving on to higher level of engineering modeling and analysis. The final examination worth 40% provides students with a test of their understanding of high level tools of analysis and engineering applications for the practical understanding of a system. Three short assignments consisting of short reports and presentations worth 30% designed to provide understanding of practical design examples covering each step of vibrational analysis. The assignments will be group projects for which students will have to organize their own groups early in the semester. b. Formative assessment – detail of process and rationale Scheme of the formative assessments on the assignments: presentations and reports of each design group will be provided to the students. Verbal feedback during the presentations will be given to each of the design projects. c. Indication of how students will get feedback and how this will support their learning Feedback will be in the form of verbal (formative) during the presentations on the projects and summative feedback on assignments and tests will be via written comments on the papers.

20. Implications for Choice (SITS Module Descriptor Sequence 0011)
Possible follow-on modules, or exclusions, or modules which require this one as a pre-requisite

Pre-requisite for MSDE 423 Capstone Design II

21. Notional Student Workload (NSW) for each mode of delivery
(SITS Module Descriptor Sequence 0012)

Complete a separate table where the distribution of NSW differs for a particular delivery pattern **- Mode of Delivery FT**			
Activity type*	**Hours**	**KIS category**	**KIS category hours**
Lecture	40	**Scheduled**	
Seminar	5		
Tutorial			
Project Supervision			
Demonstration			
Practical classes and workshops	5		
Supervised time in studio/ workshop			
Fieldwork			
External visits			
Work based learning			
Guided independent study	50	Independent	
Placement		Placement	
Year abroad			
Total workload *200 hours for 20 credit module, 100 for 10 credit module etc.)*	100		

SUMMATIVE ASSESSMENT

22. Form of Reassessment
Either *synoptic* ***or*** *non-synoptic reassessment*

	Y/N
Synoptic reassessment *One form of reassessment that tests all module learning outcomes*	Y
Non-synoptic reassessment *Where module referred overall, individual failed components of assessment are reassessed*	

23. Component Assessment
To be completed for each component of assessment

Sequence *001, 002 etc.*	**Activity type**[3] *indicate* ***ONE*** *of the following types:* ***AO*** *Attendance only* ***CP*** *Clinical Placement* ***CW*** *Coursework* ***EXAM*** ***PRE*** *Presentation*	**Brief description of assessment** *e.g. type/ length of exam, type/ word limit of coursework*	**Weighting** % or Pass/Fail (for grade only components) *Note: % weightings should add up to 100% for module overall*	**Final assessment Y/N**
001	EXAM	Mid-term Exam/2hrs	30	
002	EXAM	Final Exam/2hrs	40	Y

[3] *For KIS reporting, CP and PRE will be aggregated together as 'Practical' assessment types*

003	CW	3xAssignments (report 3 pages presentation 10min each)	30	

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24. Date of SLE Approval

25. Subject code
This ensures that the correct area receives appropriate funding and should be completed in consultation with the School Registrar or nominee. Advice can also be sought from Financial Planning.

26. Module mark scheme assigned[4]

27.	**Component mark scheme assigned**[3] • *For each component listed in section 23 indicate the mark scheme attached.* • ***Note that for synoptic mark schemes (ie MOD1, MOD3 and M50SY only) an additional component should be entered for the reassessment with sequence 900 and assessment type SYN.***	
	001	

28.	**Date of entry onto SITS**	

29.	**LOG OF CHANGES POST APPROVAL** *Please indicate any changes to the approved module descriptor from 2012/13 onwards*			
	Section No.	**Brief description of change**	**Date of approval**	**Semester and year of first implementation**

[3] *A list of marking schemes (module and component) can be accessed from* *http://northumbria.ac.uk/sd/central/ar/qualitysupport/approval/forms/*