

**MODULE DESCRIPTOR**

Guidelines for completion are available<sup>1</sup> as are Red Guides on Developing a new module and Delivering a module<sup>2</sup>.

<b>1. Module Code</b>	MSDE 218	<b>2. Title of new module</b>	Mechanics of Materials
<b>3. Subject Division</b> <i>where relevant</i>	Engineering		
<b>4. Module level</b> <i>4, 5, 6 etc.</i>	4	<b>5. Module Tutor</b>	Hyuk-dong KWON
<b>6. Credit points</b> <i>10, 20,30 etc.</i>	10	<b>7. Year long or semester based</b>	Semester
<b>8. Type of module</b> <i>eg standard, dissertation, work-based study</i> <i>A full list of module types is provided in the guidelines<sup>1</sup>.</i>	Standard		
<b>9. Location(s) of delivery</b> <i>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</i>	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*

Analysis and design of structural members subjected to tension, compression, torsion, and bending are main topics of this unit. Specialized topics such as thermal effects, dynamic loading, non-prismatic members, beams of two materials, shear centers, pressure vessels and statically indeterminate beams are investigated.

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

**1. Recommendations for purchase by students**

N/A

**2. Books**

1) Mechanics of Materials, 7th edition, Gere JM, Brooks/Cole, 2009

<sup>1</sup> <http://northumbria.ac.uk/sd/central/ar/qualitysupport/approval/forms/>

<sup>2</sup> <http://northumbria.ac.uk/sd/central/library/marcel/redguides/browse/?view=Standard>

2) Mechanics of Materials, 2<sup>nd</sup> edition, Philpot TA, Wiley, 2011

**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*

**Introduction of Mechanics of Deformable Bodies**

Elasticity, Plasticity, Methodology of analysis

**Stress and Strain**

Definition of stress and strain, Free body diagram, relationship between them

**Mohr's Circle of Plane Stress**

Principle axis, angle, equations and plotting of Mohr's circle

**Shear Forces and Bending Moments**

Calculation of SF, BM in various cases, Draw diagrams

**Torsion**

Derive torsional equations, application to various problems

**Deformation of Beams**

Governing equations for beam deflection

**Stresses in Beams**

Stress analysis in beam elements

**13. Aims of module (SITS 0004)**

*Broad statement of educational intent and overall purpose of module*

To help students to understand the strength and physical performance of structures, and to teach fundamental concepts such as stresses and strains, deformations and displacements, elasticity and inelasticity, strain energy, and load-carrying capacity for design and analysis of mechanical structural systems.

**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 the student will be able to:

1. understand manufacturing science with advanced work in process technology and manufacturing systems(A1)

- 2. use mathematical methods relevant to the engineering subjects covered.(A2)
- 3. produce innovative solutions to problems through the application of engineering principles.(B3)
- 4. use appropriate methods for modelling and analysing manufacturing engineering problems.(C2)

**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*

None

**16. Co-requisite(s)** (SITS 0007)

*Modules at this level which must be taken with this module*

None

**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.*

Lectures for the whole related theories of this module are provided with pre-recorded lectures through internet. Students have access to these materials during semester any time.

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

Lectures are given three hours every week. Theory, mathematical modelling for real problems and solutions are delivered.  
Laboratory for material test such as tensile, hardness and impact tests are carried out independently.  
Analysis for a real engineering problem is assigned for final term project. Modelling and solution with computer program are required.

**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.)*

a Summative assessment and rationale for tasks

An exam worth 60% is set to provide students with a range of problems to solve and test their individual ability to logically make engineering model and develop a solution for stresses and strains.

An assignment worth 30% is designed to provide tests of the students understanding and application ability of the work covered in the lectures. Programming skills are required for solving the assignment.

b. Additional formative assessment – detail of process and rationale

Formative assessment is carried out via verbal feedback during lectures and laboratory class. Explanations about problems and misunderstanding are given.

c. Indication of how students will get feedback and how this will support their learning

Feedback will be via written comments in the students assignment work and verbal comments on exam question solutions.

**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 323 Design of Machine Elements, MSDE 318 Mechanical Engineering Experiments, MSDE 327 Computer Aided Engineering, and MSDE 324 Intermediate Engineering Design

**21. Notional Student Workload (NSW) for each mode of delivery**

(SITS Module Descriptor Sequence 0012)

*The total hours should be 100 for a 10 credit module, 200 for a 20 credit module etc. Note that time taken to undertake assessments should be included in any category where appropriate. Time in formal examinations or tests should be shown separately.*

<b>Mode of delivery (eg FT, PT, DL)</b> <i>Please complete a separate column where the distribution of notional student workload differs for a particular delivery pattern</i>	<b>FT</b>			
<b>Lectures</b>	60			
<b>Seminars</b>				
<b>Tutorials</b>				
<b>Laboratory/studio/practical work</b>	10			
<b>Directed learning</b>	5			
<b>Independent learning</b>	20			
<b>Placement/work experience learning/fieldwork</b>				
<b>Duration of examination(s)/test(s)</b>	5			
<b>Other (please give details of other hours indicated)</b>				
<b>Total workload</b> <i>200 hours for 20 credit module, 100 for 10 credit module etc.)</i>	100			

**SUMMATIVE ASSESSMENT**

**22. Form of Reassessment**

*Either synoptic or non-synoptic reassessment*

	<b>Y/N</b>
<b>Synoptic reassessment</b> <i>One form of reassessment that tests all module learning outcomes</i>	100 Y
<b>Non-synoptic reassessment</b> <i>Where module referred overall, individual failed components of assessment are reassessed</i>	

**23. Component Assessment**

*To be completed for each component of assessment*

<b>Sequence</b> <i>001, 002 etc.</i>	<b>Assessment type</b> <i>indicate ONE of the following types: AO Attendance only CP Clinical Placement CW Coursework</i>	<b>Brief description of assessment</b> <i>e.g. type/length of exam, type/word limit of coursework</i>	<b>Weighting</b> <i>% or Pass/Fail (for grade only components) Note: %</i>	<b>Final assessment</b> <b>Y/N</b>

	<b>EXAM</b> <b>PRE</b> Presentation		<i>weightings should add up to 100% for module overall</i>	
001	CW	Laboratory	10	
002	CW	Assignment (semester long)	30	
004	EXAM	Final formal examination /2hours	60	Y

**FOR OFFICE USE ONLY**

24. **Date of SLT 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<sup>3</sup>**

<b>27.</b>	<b>Component mark scheme assigned<sup>3</sup></b>	
	<ul style="list-style-type: none"> <li>• <i>For each component listed in section 23 indicate the mark scheme attached.</i></li> <li>• <b><i>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.</i></b></li> </ul>	
	<b>001</b>	<input style="width: 100%; height: 15px;" type="text"/>
		<input style="width: 100%; height: 15px;" type="text"/>
		<input style="width: 100%; height: 15px;" type="text"/>
		<input style="width: 100%; height: 15px;" type="text"/>

<b>28.</b>	<b>Date of entry onto SITS</b>	<input style="width: 550px; height: 30px;" type="text"/>
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<sup>3</sup>A list of marking schemes (module and component) can be accessed from <http://northumbria.ac.uk/sd/central/ar/qualitysupport/approval/forms/>