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## MODULE DESCRIPTOR

### Module Title

Engineering Analysis 1

Reference	EN3501	Version	4
Created	May 2017	SCQF Level	SCQF 9
Approved	March 2004	SCQF Points	15
Amended	May 2017	ECTS Points	7.5

### Aims of Module

To provide the student with the ability to analyse and interpret the static and dynamic structural behaviour of engineering system components.

### Learning Outcomes for Module

On completion of this module, students are expected to be able to:

- 1 Determine the natural frequencies and mode shapes of linear and rotational vibrational systems having two, three and more degrees of freedom (of vibration isolators and absorbers, rotational machinery, gear shaft systems and shafts).
- 2 Apply dynamic theory and use of numerical calculations for problems related to vibration.
- 3 Analyse the behaviour of structural elements such as struts, cylinders, plates and rotating components.
- 4 Apply static load theory for standard cases in stress concentration and fatigue.

### Indicative Module Content

Dynamics of engineering systems of two and more degrees of freedom; vibrational analysis of engineering components; basic numerical methods for dynamic analysis; Rayleigh's energy method; the mechanics of engineering materials in common components such as struts, cylinders, plates and rotating components; effects of stress concentrations; fatigue analysis and life predictions of components.

### Module Delivery

The module is delivered by means of lectures, tutorials and self-guided study and is integrated with applications in the laboratory.

Indicative Student Workload	Full Time	Part Time
Contact Hours	46	46
Non-Contact Hours	104	104
Placement/Work-Based Learning Experience [Notional] Hours	N/A	N/A
TOTAL	150	150
Actual Placement hours for professional, statutory or regulatory body		

## ASSESSMENT PLAN

If a major/minor model is used and box is ticked, % weightings below are indicative only.

### Component 1

Type:	Coursework	Weighting:	30%	Outcomes Assessed:	2, 4
Description:	Component 1 consists of a dynamics coursework assessing learning outcome 2 (15% weighting) and a statics coursework assessing learning outcome 4 (15% weighting).				

### Component 2

Type:	Examination	Weighting:	70%	Outcomes Assessed:	1, 3
Description:	Closed book examination.				

## MODULE PERFORMANCE DESCRIPTOR

### Explanatory Text

To pass the module, you must achieve a 40% weighted average mark from the exam and coursework. In addition you need to achieve at least 35% in both the individual exam and coursework components.

Module Grade	Minimum Requirements to achieve Module Grade:
<b>A</b>	=>70% and above
<b>B</b>	60-69%
<b>C</b>	50-59%
<b>D</b>	40-49%
<b>E</b>	35-39%
<b>F</b>	0-34%
<b>NS</b>	Non-submission of work by published deadline or non-attendance for examination

## Module Requirements

Prerequisites for Module	Mechanics of Solids (EN2701) and Dynamics (EN2500), or their equivalent.
Corequisites for module	None.
Precluded Modules	None.

**INDICATIVE BIBLIOGRAPHY**

- 1 RAO, S.S., 2017. Mechanical Vibrations. 6th ed. Upper Saddle River, NJ: Prentice Hall.
- 2 THOMSON W.T., 2013. Theory of Vibrations with Application. 5th ed. Cheltenham: Nelson Thornes.
- 3 MERIAM, J.L. and KRAIGE, L.G., 2016. Engineering Mechanics -vol. 2 Dynamics. 8th ed. Hoboken, NJ: Wiley.
- 4 HEARN, E.J., 1997. Mechanics of Materials, Vols. 1 & 2. 3rd ed. Oxford: Butterworth-Heinemann.
- 5 CASE, J., CHILVER, L. and ROSS, C.T.F., 1999. Strength of Materials and Structures. 4th ed. London: Arnold.
- 6 BENHAM, P.P., CRAWFORD, R.J. and ARMSTRONG, C.G., 1996. Mechanics of Engineering Materials. 2nd ed. Harlow: Longman.