Module details for Finite element analysis and application

Module Details

SCQF Level:

10

Module Code:

EEM409

Credit Value:

20

Year:

2020/1

Term:

Term 2

School:

School of Applied Sciences

A-Z of all Modules<https://modules.abertay.ac.uk/>
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Search by Term
Search by SCQF Level

Description

Introduction to the theory of finite element analysis and its application in research and industry

Aims

The aim of this Module is to provide the student with : an understanding of the theoretical background of finite element analysis and an appreciation of the complexity of finite element analysis for practical use.

Learning Outcomes

By the end of this module the student should be able to:

1. Understand and evaluate the concepts of numerical analysis and governing equations

2. Able to create and analyse finite element models for structural analysis based on structural and continuum elements

3. Interpret results of the analyses and assess error levels

4. Critically evaluate the constraints and implications imposed by the finite element method.

5. Understand the theoretical background to the applications considered in the module

Indicative Content

1 Finite element method

• Background, history, applicability to different physics problems • Illustration of direct stiffness method based on 2 dimensional beam elements • Introduction to the Principle of Minimum Potential Energy • Development of Finite Element stiffness and mass matrix for a 2-dimensional membrane element • Isoparametric 1,2 and 3D elements • Numerical integration • Meshing and post processing considerations • Problems and errors associated with applying FEM to the solution of actual problems

2 Application

Application of the FE method in research e.g. the modelling of shell and plate buckling and the implementation of dynamic loading in FE

Teaching and Learning Work Loads

For session 2020/21 the expectation is that the teaching and learning hours stated in this descriptor will form a mix of synchronous and asynchronous student/staff activity, with the majority of this being online. The exact pattern of this activity is likely to vary from the standard face-to-face hours listed below but the overall student effort remains the same. Up-to-date information on the delivery of the module can be found on the relevant module MLS site and on your student timetable.

TEACHING AND LEARNING METHOD	HOURS
Lecture	30
Tutorial/Seminar	30
Practical Activity	5
Assessment	90
Independent	45
Total	200

Guidance notes

SCQF Level - The Scottish Credit and Qualifications Framework provides an indication of the complexity of award qualifications and associated learning and operates on an ascending numeric scale from Levels 1-12 with SCQF Level 10 equating to a Scottish undergraduate Honours degree.

Credit Value – The total value of SCQF credits for the module. 20 credits are the equivalent of 10 ECTS credits. A full-time student should normally register for 60 SCQF credits per semester.

Disclaimer

We make every effort to ensure that the information on our website is accurate but it is possible that some changes may occur prior to the academic year of entry. The modules listed in this catalogue are offered subject to availability during academic year 2020/21 , and may be subject to change for future years.

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