Cost

The registration fee of the workshop will be £650+VAT (pound sterling) which includes course notes and lunches. You should make your own arrangements for accommodation.

For more information on accommodation in Glasgow please visit http://peoplemakeglasgow.com/

Payment

Payments can be made by cheque (made payable to ASRANet Ltd.), cash or bank transfer. Please enquire for details.

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Advanced Finite Element Concepts and Applications

(A Maritime Company for Courses, Conferences and Research)

Glasgow, UK

ABOUT THE COURSE

Finite Element Analysis (FEA) is one of the most powerful tools used to assess the strength of engineering structures. This course is aimed at engineers, of various disciplines, who intend to use the commercially available FEA Packages to analyse structures. Participants are assumed to have knowledge of the basic principles of structural mechanics.

The syllabus will include: General overview of the technique, Finite element types (bars, beams, 2D, 3D, plate and shell elements) and their derivation via constant and higher order shape functions, pre and post processing, basic terminology, range of applications, basic introduction to materials modelling. Multidimensional FE modelling; Constitutive models in FE codes; FE model development; Assembly of stiffness matrices, loading and boundary conditions, material models, convergence; Advanced FE techniques; Modelling of 2D and 3D problems, buckling, non-linear analysis, advanced non-linear material models including failure and damage, explicit methods for dynamic problems; FE modelling accuracy, efficient mashing techniques, convergence and model verification.

WHO SHOULD ATTEND

Engineers and scientists involved in the design, operation and assessment of both onshore and offshore structures and their associated equipment. Personnel from oil companies, consultancy organisations, classification societies and certifying authorities will benefit from attending this course.

PROGRAMME

Day 1

08.30 - 09.00	Delegate Registration
09.00 - 10.30	Lecture 1: Concepts of Elastic Analysis
10.30 - 10.45	*Break*
10.45 - 12.15	Lecture 2: Non-linear FE Analysis
12.15 -13.30	*Lunch*
13.30 – 15.00	Lecture 3: Procedures for Dynamic and Impact Analysis
15.00 - 15.30	*Break*
15.30 - 17.00	Lecture 4: FE concepts for Thermal analysis

Day 2

09.00 - 10.30	Lecture 5: Solution Schemes of FE Analysis - I
10.30 - 10.45	*Break*
10.45 - 12.15	Lecture 6: Solution Schemes of FE Analysis – II
12.15 -13.30	*Lunch*
13.30 - 15.00	Lecture 7: Application of FE Modelling and analysis in Industry
15.00 - 15.30	*Break*
15.30 - 17.00	Lecture 8: Design validation by FE modelling and analysis in Industry’

Lecture Content:

Lecture 1: Concepts of Elastic Analysis
Basic Concepts – History of development of FE methods – Theory of linear Elasticity – Numerical representation of Solid Mechanics – Linear static analysis for: Bar & Beam elements, 2D Plane Stress / Strain problems using Plate/Shell elements – Solid elements for 3D problems

Lecture 2: Non-linear FE Analysis
Description of nonlinearities: Geometrical/Material/Contact mechanisms – Nonlinear elasticity and plasticity theories – Failure theories – Buckling analysis - Numerical representation of nonlinear problems

Lecture 3: Procedures for Dynamic and Impact Analysis
Basic equations – Vibration concepts – Damping issues – Approach to modal analysis – Transient dynamic analysis – Frequency response analysis – Mechanics of Impact – Formulation of impact analysis in FE

Lecture 4: FE concepts for Thermal analysis
Thermal Stress-strain relations – Temperature field (steady or unsteady state) – FE formulation for thermal simulation – Heat conduction, radiation and transfer problems – Case studies

Lecture 5: Solution Schemes of FE Analysis – I
Different Technics for FE Analysis will be discussed

Lecture 6: Solution Schemes of FE Analysis – II
Different Technics for FE Analysis will be discussed

Lecture 7: Application of FE Modelling and analysis in Industry
Adaptive meshing concepts – Advanced computational methods (sub modelling and super element techniques) – Overview of State of art FEA techniques and software programs – Approach for Buildings, Trusses & Frames, Pipe applications, Processing methods, Biomedical applications.

Lecture 8: Design validation by FE modelling and analysis in Industry
Analysis and Design examples from Automotive, Aerospace, Civil Engineering, Offshore & Marine, Conventional & Renewable Energy, Consumer goods and Life Sciences industries – FEA for reverse engineering and product remediation