Accommodation

The organizers have arranged block reservations with Husa Hotels Chain in different hotel categories, offering special rates to the COMPLAS participants. Please, note that block reservations expire on 3th July 2009. See details on:
http://congress.cimne.com/complas09/frontal/Acom.asp

Registration Fees

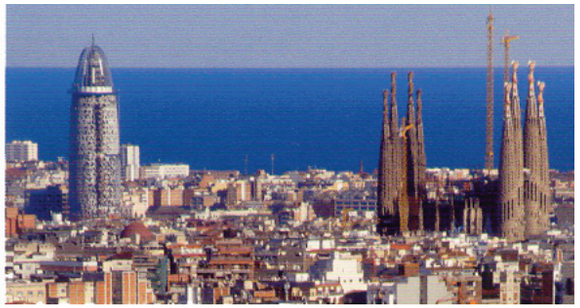
The fee for the Short Course is **390** €
This includes extended course material and coffee.

The **reduced combined fees** for participants to both the course and the COMPLAS X Conference are:
Delegates: **780** €
Students: **520** €

REGISTRATION TO THE COURSE MUST BE PERFORMED ELECTRONICALLY VIA THE COURSE WEB SITE:
http://congress.cimne.upc.es/complas09/course

For more information on the 10th COMPLAS conference visit the web address given below.

COMPLAS X
X International Conference on Computational Plasticity. Fundamentals and Applications.
2-4th September 2009
http://congress.cimne.upc.es/complasX



Location

The Short Course will take place at the CIMNE Conference Room, Universitat Politècnica de Catalunya, Edificio C1, Campus Norte UPC, Gran Capitán s/n, 08034 Barcelona, Spain

Secretariat:

International Center for Numerical Methods in Engineering (CIMNE)
COMPLAS IX SECRETARIAT
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Supporting Organisations

Universitat Politècnica de Catalunya

University College of Swansea

COMPLAS Course

10th Short Course on

Computational Techniques for Plasticity

31 August - 1 September 2009, Barcelona, Spain

In conjunction with the 10th International Conference on Computational Plasticity: Fundamentals and Applications, COMPLAS 2009
2-4th September 2009, Barcelona, Spain

http://congress.cimne.upc.es/complas09/course

This is a course to be run in conjunction with the 9th International Conference on Computational Plasticity - COMPLAS X, held at Barcelona 2-4th September 2009. The pre-conference course should be of benefit to participants interested in acquiring a detailed and in-depth description of the application of finite element techniques to a range of plasticity problems; particularly those involving finite strains. The course can be attended separately from the conference, but a reduced combined fee is available to participants in both events.

Lecturers

D. R. J. Owen, D. Peric & E. A. de Souza Neto — University of Wales Swansea, UK

E. Oñate, C. Agelet de Saracibar, M. Cervera & S. Oller — Universitat Politècnica de Catalunya, Barcelona, Spain

Objectives

The purpose of the course is to present and demonstrate the use of finite element based methods for the solution of problems involving plasticity. Particular attention will be devoted to finite strain conditions, with consideration being given to both rate independent and rate dependent situations. The use of numerical techniques is essential for solving problem involving complex geometry and including non-linear geometrical and material behaviour and such computations are being increasingly undertaken in industrial and research environments. The continuing advances in computer hardware developments will accelerate the acceptance of such numerical techniques for commercial analysis and design.

There have been significant advances in the last few years in the development of robust and efficient solution procedures for elasto-plastic problems. In particular, the treatment of finite strain plasticity problems has reached a sufficient stage of maturity for the solution of practical problems to be undertaken with confidence. The course considers rate independent (quasi-static) and rate dependent (viscoplastic and dynamic) situations for both infinitesimal and finite strain conditions.

In addition to establishing the fundamental theoretical expressions in a form suitable for numerical implementation, emphasis is placed on the development and implementation of consistently linearised algorithms to ensure quadratic convergence rates. Other topics associated with the simulation of practical problems will be covered; including contact/friction modelling, damage evolution, advanced constitutive models, adaptive meshing concepts and the fundamentals of multi-scale modelling.

The course will also provide a short introduction to the topic of discrete elements which, when used in conjunction with conventional finite elements, provide a powerful procedure for several important classes of problems, such as multi-fracturing solids.

Consideration will be given to the practical difficulties encountered in the solution of industrial problems and time will be devoted to general discussion and the provision of specific problem advice.

Programme

Day 1 August 31th

9.00-11.00 **Computational Plasticity - Basic principles and theory,** *D. Peric*
- Introduction to elasto-plasticity and visco plasticity
- The basic approach to incremental solution - consistent linearisation
- Finite element modelling

11.00-11.30 Coffee

11.30-13.30 **Elasto-plasticity/viscoplasticity with finite strains**, *D. Peric and E.A. de Souza Neto*
- Fundamentals
- Constitutive modelling - Hyperelastic & plasticity relations
- Operator split methodology for numerical integration of the constitutive model
- Mesh adaptivity procedures

13.30-15.00 Lunch

15.00-16.30 **Further issues in plasticity modelling** *E. A. de Souza Neto*
- Treatment of singular and other yield surfaces
- Element formulation for near-incompressibility

16.30-17.00 Coffee

17.00-18.00 **Explicit time integration procedures** *E. Oñate*
- Finite element formulation and implementation
- Applications to metal forming problems

Day 2 September 1st

9.00-10.00 **Thermo-mechanical problems with frictional contact,** *C. Agelet de Saracibar*
- Fundamentals formulation
- Finite element formulation
- Applications to metal forming problems

10.00-11.00 **Plastic damage approach to fatigue analysis,** *S. Oller*
- Concepts of fatigue damage
- Computational formulation
- Numerical examples

11.00-11.30 Coffee

11.30-12.30 **Strain localisation and size effect in J2 plasticity,** *M. Cervera and M. Chiumenti*
- Discrete and smeared approaches
- Weak and strong discontinuities
- Local and non-local models
- Numerical examples

12.30-13.30 **Discrete element approaches to multi-fracturing solids,** *D.R.J. Owen*
- Fundamentals of discrete elements
- Continuum to discrete transformation
- Coupled field problems
- Numerical examples

13.30-15.00 Lunch

15.00-16.30 **Introduction to multi-scale modelling**, *E.A. de Souza Neto*
- Fundamentals
- Computational modelling
- Applications

16.30-17.30 **General discussion & Course closure**