Course Objectives:

To provide an overview of the state of the art of high performance computing as applied to engineering applications. Special reference will be given to parallel, distributed and grid computing and how serial or sequential algorithms for engineering problems may be parallelized for the efficient solution of large scale problems in engineering, analysis, simulation and design.

Course Organiser:

Prof. Amalia Ivanyi
Pollack Mihály Faculty of Engineering
University of Pécs

Invited Lecturers:

In alphabetical order:

- Dr. M. Dolencz,
        University of Ljubljana
        Slovenia
- Dr. P. Iványi,
        University of Pécs
        Hungary
- Prof. P.K. Jimack,
        University of Leeds
        United Kingdom
- Prof. B.H.V. Topping,
        Heriot-Watt University
        United Kingdom and
        University of Pécs, Hungary

Provisional Course Programme:

Monday 20th March:
- Introduction: HPC terms and definitions, overview of hardware architectures, parallelization schemes, quality measures, static and dynamic partitioning
- Mesh and Model Generation: Models, Advancing Front, Delaunay, Paving, Sequential and Parallel Meshing
- Tutorial: Working with the sequential mesh generator - differences between parallel and sequential process

Tuesday 21st March:
- Mesh Partitioning: SGM, Coordinate Bisection, Graph Partition, Greedy and Multi-Level
- Tools for Mesh Partitioning: Jostle, Metis Chaco, etc.
- Parallel Programming: Parallel Programming with MPI: Tips & Techniques
- Tutorial: Partitioning Meshes using the tools described in Lectures

Wednesday 22nd March:
- Parallel Solution Techniques: direct versus iterative methods & domain decomposition solvers
- Dynamic Load Balancing I: Introduction and Examples
- Dynamic Load Balancing II: Further Examples and Current Challenges
- Tutorial: Programming with MPI

Thursday 23rd March:
- Engineering Problems & Parallelisation: Genetic Algorithms, Neural Networks and Contact Detection
- Grid Computing: introduction, standards, Globus toolkit, scheduling, security, portals, data management
- Tutorial: Tutorial on Grid Computing

Friday 24th March:
- Grid Computing: EU Grid related projects, industrial use of Grid Technology
- Parallel Computational Mechanics: Dynamic Relaxation & Fluid-Structure Interaction
- Closing Session: Question Panel: Certificates of Participation

HIGH PERFORMANCE COMPUTATIONS FOR ENGINEERING

Pécs, 19-24 March 2006

Registration Form

Surname: _____

Name: _____

Affiliation: _____

Address: _____

_____

_____

E-mail: _____

Phone: _____

Fax: _____

_____   _____
Date   Signature

Admission and Accomodation

Course Fee:
The Course Fee is 200 Euro including lecture notes, course events. Students from Non-EC Central and Eastern European Countries (including Russia) may apply for a scholarship for partial or full remission of the fees.

Hotels:
In the Hotel Hunyor a number of double rooms are available for approx. 34 Euro per night per person and a number of single rooms for approx. 23 Euro per night per person. For further information please ask the Secretariat. Keep in mind that You should book your room in this hotel by the 20th of February.

Pécs

On the 19th of March, 2006 (Sunday) a sight-seeing tour is organised in Pécs. Pécs will be the cultural capital of Europe in 2010

Lectures

All lectures will be given in English. Lecture notes will be distributed to the participants during the course.

For further information please contact:

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University of Pécs, Hungary
Pollack Mihály Faculty of Engineering

HIGH PERFORMANCE COMPUTATIONS FOR ENGINEERING

PhD Course

Coordinated by:
Prof. B.H.V. Topping
Heriot-Watt University, UK
University of Pécs, Hungary

Pécs, HUNGARY
19-24 March, 2006