

REGISTRATION FORM

also available at

http://www.grnspg.ing.unipi.it/natural_circulation/

Complete and return by fax to

P. Pla

San Piero a Grado Nuclear Research
Group - GRNSPG

Fax. +39-050-2210-384

Course Inscription Fee:

1500 euro for each participant

Family Name: _____

First Name: _____

Middle Name: _____

Passport Number: _____

Date of issue: _____

Place of issue: _____

Expiry date: _____

Place of birth (*City and Country*): _____

Date of birth (*Year - Month - Day*): _____

Present Nationality: _____

Full name/address of Institution: _____

Tel: _____

Mobile: _____

Fax: _____

E-mail: _____

Current scientific activities:

1) Work field:

2) Specific topic of interest:



COURSE INFORMATION

[http://www.grnspg.ing.unipi.it/
natural_circulation](http://www.grnspg.ing.unipi.it/natural_circulation)

EMAIL ADDRESS

GRNSPG: grnspg@ing.unipi.it



UNIVERSITÀ DI PISA



IAEA-UNIFI Training Course on Natural Circulation Phenomena and Modelling in Water Cooled Nuclear Power Plants



**San Piero a Grado (Pisa), Italy
22 to 26 June 2009**

Organized by:

San Piero a Grado Nuclear Research
Group (GRNSPG)

University of Pisa

Via Livornese 1291

San Piero a Grado (Pisa), Italy

In cooperation with:

International Atomic Energy Agency
(IAEA)

Department of Nuclear Energy

Wagramerstrasse 5

1400 Vienna, Austria

AIMS AND SCOPE

The objectives of the Course are to provide participants with instruction on:

- natural circulation during reactor start-up and operation, methods of analyses and governing equations, passive system initiation and operation, flow stability, scaling laws for experiments;
- phenomena that influence natural circulation (e.g. behaviour in large pools of liquid, effects of non-condensable gasses on condensation heat transfer; condensation on containment structures, behaviour of containment emergency systems, thermo-fluid dynamics and pressure drops in various configurations, steam-liquid interaction, gravity driven cooling, liquid temperature stratification, behaviour of emergency heat exchangers and isolation condensers, stratification and mixing of boron);
- experimental databases for these phenomena;
- methodology for determining the reliability of passive systems that utilize natural circulation.

The Course will conclude with an exam and presentation of Certificates to the participants confirming successful completion of the Course, if examination is taken.

A team of 7 experts in Natural Circulation systems will give all the lectures at the course:

- Professor Francesco D'Auria (University of Pisa, Italy),
- Dr. Nusret Aksan (**Course Director**, University of Pisa, Italy),
- Ing. Juan Carlos Ferreri (Autoridad Regulatoria Nuclear, Argentina),
- Professor Yassin A. Hassan (Texas A&M University, USA),
- Professor José N. Reyes Jr. (Oregon State University, USA),
- Dr. D. Saha (Reactor Engineering Division, Bhabha Atomic Research Centre, Mumbai, India),
- Dr. Michel Marquès (CEA/Cadarache, France).

Course material and CDs with the lecturers' presentations and papers will be distributed during the course week.

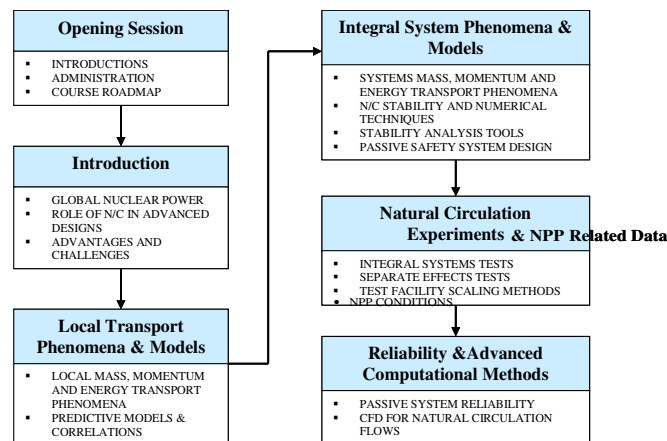
PARTICIPATION

The Course has been already successfully organized in four occasions:

- in 2004 at the International Centre for Theoretical Physics (ICTP), Trieste, Italy,
- in 2007 at the International Centre for Theoretical Physics (ICTP), Trieste, Italy,
- in 2008 at the Idaho National Laboratory, USA,
- in 2008 at the International Centre for Theoretical Physics (ICTP), Trieste, Italy.

The Course is intended for graduate engineers/physics working in the nuclear field and post-graduate students wishing to become more informed and involved in natural circulation and its application in nuclear power plants. A basic knowledge in thermo-hydraulics, fluid mechanics and heat transfer is required.

Logistics limit the number of participants to a minimum of 15 to activate the course.



COURSE ORGANIZATION

LOCAL ORGANIZATION:

**San Piero a Grado Nuclear Research Group
(GRNSPG)**

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IN COLLABORATION WITH:

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COURSE INSCRIPTION FEE

Course Inscription Fee: **1500 euro** for each participant. It includes the course material, CD, coffee breaks and the official dinner.

Please make the payment by bank transfer (Bank charges to be added to registration fees).

Bank transfer information will be communicated individually after registration.

Cancellations will be charged a 25% cancellation fee.

REGISTRATION FORM available at
[http://www.grnspg.ing.unipi.it/
natural_circulation/](http://www.grnspg.ing.unipi.it/natural_circulation/)

Registration deadline is April 20th 2009

Possible support could be requested through the competent official authorities of your country (Ministry of Foreign Affairs or National Atomic Energy) in relation to the available related projects.

WORKING LANGUAGE

The working language of the Course and materials will be English.