

Aid for Graduate Courses in Process Systems Engineering: Virtual Library from PASI Conference

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If you are teaching or taking a graduate level course in the area of Process Systems Engineering, you may want to learn about a virtual library that has been created from the Pan American Advanced Studies Institute (PASI) on Process Systems Engineering (<http://cepac.cheme.cmu.edu/pasi.htm>). This workshop, which was organized by Ignacio Grossmann, Jaime Cerdá and Jose Pinto, took place on August 16-25, 2005, in the Hotel Cataratas in the Parque Nacional Iguazú, Argentina. The goal of the PASI on Process Systems Engineering was to provide an advanced workshop that would bring together faculty and Ph.D. students from various countries in the Americas (U.S., Canada, Mexico, Argentina, Brazil, Chile, Colombia and Venezuela). Several students from Spain are also participated. This workshop was also part of the activities of the CEPAC (Chemical Engineering Pan American Collaboration) group (<http://cepac.cheme.cmu.edu>).

There were a total of 69 participants, and 21 lecturers and seminar speakers. The U.S. representation consisted of 25 Ph.D. students belonging to 21 universities: Auburn, Austin, Carnegie Mellon, Delaware, Florida, Georgia Tech, Illinois-Chicago, Illinois-Urbana, Lamar, Lehigh, Maryland, Northwestern, U. Pittsburgh, U. Pennsylvania, Penn State, Polytechnic, Princeton, Purdue, Rutgers, Texas A&M, Wisconsin (see list of participants in <http://cepac.cheme.cmu.edu/pasiparticipants.htm>). Funding was provided by the National Science Foundation and the Department of Energy. Matching funds were obtained from the Agencia Nacional de Promoción Científica y Tecnológica from Argentina, Carnegie Mellon University, Petrobras, Bayer and Honeywell <http://cepac.cheme.cmu.edu/pasisponsors.htm>

A major objective of the PASI on Process Systems Engineering was to expose to the participants state-of-the-art developments in Process Systems Engineering in the following areas:

- Optimization
- Process and Product Design
- Process and Supply Chain Operations
- Process Dynamics and Control

There were a total of 12 modules in these areas, and each module was covered through a lecture lasting between 3 to 6 hours. There were also a number of one-hour seminars that complemented the lectures. A major outcome of the PASI conference was the development of *virtual library on Process Systems Engineering*. This library consists of the Powerpoint slides of the presentations of each topic, which are largely tutorial in nature. These are complemented with background articles that provide comprehensive reviews. Exercises, as well as MATLAB and GAMS files are also available, including an

exam that contains a total of 36 questions with answers. The virtual library, which can be found in, <http://cepac.cheme.cmu.edu/pasilectures.htm>, contains the following topics:

Part 1. Optimization Modules:

Nonlinear and Dynamic Optimization, *Lorenz T. Biegler*

Mixed-integer Optimization, *Ignacio E. Grossmann*

Global Optimization and Optimization under Uncertainty, *Nikolaos V. Sahinidis*

Seminars:

Dynamic modeling and optimization of large-scale cryogenic separation processes, *María Soledad Díaz*.

Disjunctive Programming: algorithms, implementation and solution of linear and non-linear models, *Aldo Vecchiotti*.

Uncertainty analysis of process design and scheduling, *Marianthi Ierapetritou* .

Part 2. Process and Product Design Modules:

Biological pathways analysis and engineering, *Costas Maranas*

Heat Integration, *Miguel J. Bagajewicz*

Mass Integration and Pollution Prevention, *Mahmoud M. El-Halwagi*

Seminars:

Water treatment network, *Juan Zamora*

Synthesis of membrane processes for effluent treatment and metal recovery, *Ana Maria Eliceche*

Synthesis of crystallization-based separation systems, *Luis Cisternas*

Instrumentation Upgrade for Improved Process Monitoring, *Miguel J. Bagajewicz*

Part 3. Process and Supply Chain Operations Modules:

Batch Scheduling, *Jaime Cerdá*

Supply chain optimization, *Jose Pinto*

New product development, *Rex Reklaitis*

Seminars:

Operations management in the fruit industry, *Alberto Bandoni*

Constraint programming techniques for batch scheduling, *Gabriela Henning*.

Part 4. Process Dynamics and Control Modules:

Advanced Process Dynamics and Control, *Oscar Crisalle*

Model Predictive Control, *Jay H. Lee*

Process Control Design, *Thomas E. Marlin*

Seminars:

Dynamic process simulation, *Argimiro Secchi*

Robust control, *Darci Odloak*

Members of the CACHE should hopefully find the material in this virtual library to be helpful since it contains useful overviews of areas that are of current interest and that are not normally found in textbooks and reference texts. We intend to periodically update the presentations, and we will appreciate your feedback or comments.