

## ANNOUNCEMENTS

### TWO-PHASE GAS-LIQUID FLOW SHORT COURSE: PRINCIPLES FOR MODELLING GAS-LIQUID FLOW

Department of Chemical Engineering, University of Houston,  
Houston, TX 77004, U.S.A.

22-26 July 1991

#### *Description*

The basic framework for modelling a wide variety of gas-liquid flow problems is now well-understood, much having been completed in recent years. This course will present this modern approach in sufficient detail so that those attending can apply the results to problems of design. In addition, this should prepare the participant to understand the new literature which emerges in the years to come.

This method first predicts the flow pattern. Then for each pattern, the flow behavior is modelled. Once this is done the modelling is extended to solve problems of heat and mass transport. Reliable data is important to an understanding of the mechanisms of two-phase flow. For this reason the course reviews some modern measuring methods as well as recent data.

The extensive facilities of the two-phase flow research laboratory will be made available to participants. Demonstrations will be conducted in the two-phase flow loops and special instrumentation techniques will be shown with hands on experiments. Interaction with the research team will be possible. Problem sessions are included in which the ideas developed in the course are applied to design. Extensive course notes and references on all materials presented will be provided.

#### *Lecturers*

**A. E. Dukler:** Ph.D. (Delaware) Professor of Chemical Engineering, University of Houston, Texas, U.S.A.

**Y. Taitel:** Ph.D. (Delaware) Professor, Department of Fluid Mechanics and Heat Transfer, Tel-Aviv University, Tel Aviv, Israel.

#### *Course Outline*

##### **Monday 22 July—Introductory Concepts**

- Occurrence and application of gas-liquid flow
- Effects of two-phase flow on transport
- The role of flow patterns
- Connections with older published methods
- Two-phase flow at zero gravity

##### **Tuesday 23 July—Modelling Flow Pattern Transitions**

- Horizontal and vertical pipes
- Effect of Inclination
- Upward and Downward Flows
- Transient Effects
- Boiling/Condensation Effects
- Tube Bundles
- Transitions at Zero Gravity

**Wednesday 24 July**

## Modelling Stratified Flows

- Holdup, pressure drop, heat transfer

## Modelling Horizontal Slug Flows

- Hydrodynamics, frequency, heat transfer

## Modelling Annular Flows

- Falling and rising films (hydrodynamics, heat transfer)
- Wave motion
- Interfacial shear and friction

**Thursday 25 July**—Modelling Flow and Heat Transfer at 1 g in Vertical Tubes and at 0 g

- Bubble flow
- Annular flow
- Natural slug flow
- Modelling for zero gravity flows
- Terrain induced slugging
- Transient flows: the two-fluid and the drift flux models

**Friday 26 July**—Modern Measuring Methods

- Flow pattern detection
- Drop and bubble size and velocity
- Film thickness and wave structure
- Heat transfer parameters

*Arrangements*

The course fee is US\$800.00, including notes, coffee and a class dinner. Limited accommodation is available at the University of Houston Hotel and at area motels and hotels.

Checks should be made payable to University of Houston TPF Course, and should be sent with your reservation to:

Mrs Pat Cooks  
Department of Chemical Engineering  
University of Houston  
Houston, TX 77204-4792, U.S.A.

The last day for reserving space on the course is **22 June 1991**.

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## MODERN DEVELOPMENTS IN BOILING HEAT TRANSFER AND TWO-PHASE FLOW

Rensselaer Polytechnic Institute, Troy, New York, U.S.A.

*8–12 July 1991*

A seminar will be held at Rensselaer on important new advances in multiphase science and their engineering applications. The seminar is intended for scientists and engineers working in the field of multiphase flow and heat transfer.

Topics to be covered in this seminar include:

- Two-fluid modeling techniques
- Wave propagation in two-phase flow
- Applied fractal & chaos theory