Engineering Faculty Document No. 27-01

January 16, 2003

TO: Engineering Faculty

FROM: Faculty of the School of Nuclear Engineering

DATE: January 16, 2003

SUBJECT: NUCL 355, Change in Course Title, Semesters Offered, Course Credit, Description of Course Content

The Faculty of the School of Nuclear engineering have approved the new undergraduate course described below. This action is now submitted to the Engineering Faculty with a recommendation for approval.

FROM:

NUCL 355 **Fluid Mechanics Lab**
Sem. 1, Class 1, Lab 2, cr. 1.
Co-requisite: NUCL 350 or equivalent

Companion laboratory course offered with NUCL 350 to illustrate various fluid flow phenomena applied to nuclear reactor systems and design.

TO:

NUCL 355 **Nuclear Thermalhydraulics Laboratory**
Sem. 2, Class 2, Lab. 2, cr. 3.
Pre-requisite: NUCL 350 or equivalent
Co-requisite: NUCL 351 or equivalent

Laboratory course corresponding to NUCL 350 and NUCL 351. Various fluid flow and heat transfer phenomena applied to nuclear reactor systems and design.

REASON: This course was offered as two courses: NUCL 355, Nuclear Thermalhydraulics Laboratory I, Sem. 1, cr. 1 and NUCL 356, Heat Transfer Lab, Sem. 2, cr. 1. The new course, NUCL 355, covers the same experiments plus some new ones (see attachment). In addition, two-hour lecture per week has been added to introduce the students to the theory, background and measurement principles.

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Professor and Head
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NUCL 355
NUCLEAR THERMALHYDRAULICS LABORATORY

1. **Justification**: The course is a laboratory course corresponding to NUCL 350 NUCLEAR THERMALHYDRAULICS and NUCL 351 NUCLEAR HEAT TRANSFER. This is a course introducing the concepts of nuclear reactor fluid transport and heat transfer with applications to nuclear reactor design and safety.

2. **Course Level:** Junior Engineering Course

3. **Objective:** To provide junior engineering students with experimental aspects of fluid flow and heat transfer phenomena related to nuclear reactor systems.

4. **Co-requisite:** NUCL 351 or equivalent, **Pre-requisite**: NUCL 350 or equivalent.

5. **Course Instructor**: Nuclear engineering faculty will teach the course.

6. **Course Outline:** The course consists of fourteen laboratory experiments:

   Fluid Mechanics:

   (1) Basic Hydrostatic Pressure and Manometer Experiments (New).
   (2) Turbulence and Vortex Visualization in Vertical Channel. (New).
   (3) Flow around body in channel flow.
   (4) Reynolds experiment.
   (5) Flow meters and DP measurement (New Additional set up to existing one).
   (6) Friction in Pipe and Similarity Law (New).
   (7) Drag Force on Sphere (New).
   (8) Two-Phase Flow Regime (New).
   (9) Two-phase Natural Circulation (New).

   Heat Transfer:

   (1) Thermal Conduction
   (2) Forced Convention and Natural Convection (Improvement).
   (3) Pool Boiling
   (4) Forced Flow Boiling (New).
   (5) Critical Flow with Phase Change (Improvement).

A lecture of two hours will be given before each experiment covering the theory and the measurement principles. A prelab problem will be given with every experiment handout. The objective of the prelab problem is to acquaint the student with the experiment. Students submit solution to the prelab problem and a report as required on each experiment for grading.