COURSE #: NUCL 350	**COURSE TITLE:** Nuclear Thermal-Hydraulics I
TERMS OFFERED: Fall	**PREREQUISITES:** ME 200 and ME 274
TEXTBOOKS: R. W Fox and A. T. McDonald, P.J. Pritchard, *Introduction to Fluid Mechanics* 6th edition, John Wiley & Sons, Inc., 1998	**COGNIZANT FACULTY:** M. Ishii, S. T. Revankar, M. L. Bertodano, K Vierow **DATE OF PREPARATION:** 5-30-07
INSTRUCTORS: K. Iyer (2005), Vierow (2003,2004) S. T. Revankar (2006)	**SCIENCE/DESIGN:** 2/1
CATALOG DESCRIPTION: The first of an integrated two-course sequence introducing the concepts of nuclear reactor thermal transport and associated hydraulics with applications to design and safety. Nuclear heat sources and conduction. Macroscopic balances, dimensional analysis, and flow measurement. Fluid behavior, momentum transfer, and applications to reactor systems and design.	**COURSE TOPICS:** Fluid fundamental concepts (2h), hydrostatics (4h), control volume- mass momentum and energy (6h), applications to reactor systems (2h), 1-D differential formulation- mass and momentum (6h), energy and Bernoulli equation (2h, flow similarity (2h), internal flow (6h), boundary Layer, fluid drag (3h), Turbomachinery (3h), compressible flow (3h), Two-phase flow and application to reactor safety (3h)

COURSE OBJECTIVES: ***Links shown in brackets are to School's Program Outcomes:***

1. To teach students basic fluid mechanics principle, engineering design and applications in different systems [1, 3, 4, 8, 9, 10]
2. To develop qualitative and quantitative understanding of the fluid transport in nuclear reactors systems based on the engineering principles and practices [2, 3, 4, 5, 11]
3. To prepare students in the analytical methods in modeling fluid problems and develop application methods [1, 3, 7,8,9]
4. To expose students to design problems through exercise in analysis, design project, in oral and written communication skills, and study overall impact of this discipline to society [3, 6, 7, 8, 10]

COURSE OUTCOMES: ***Links shown in brackets are to Course Objectives:***

1. A solid comprehension of fluid mechanics principles, practices and analytical methods [1,3,7]
2. An understanding of fluid transport phenomena and application to nuclear reactor systems [2,8,9]
3. Competence in applying analytical methods and modeling fluid flow problems [3]
4. An understanding of design concepts, systems performance criteria and design evaluation in context with fluids systems [2,3,8,9]
5. Skill in communication of engineering methods and impact [2,8,9]

ASSESSMENT TOOLS: Links shown in brackets are to Course Outcomes:

1. Classroom interaction and student participation in discussion of engineering principles and evaluation of problem solving skills [1]
2. Homework problems assigned for each class to evaluate the students' understanding of fluid mechanics principles and design application [1,2,3,6]
3. At least one mid-term examination, a final examination and a design project report and presentation that are all evaluated by the instructor with regard to comprehension of course material and communication skills [1,2,3,8.9]
4. Course and instructor evaluations by formal student questionnaires [1,2,3]
5. Evaluation of course objectives and syllabi via student exit interviews, alumni assessments, ABET review, the School's advisory committee, and employer assessments [1,2,3]