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## UTILIZING THE UMASS-LOWELL RESEARCH REACTOR TO ENHANCE KNOWLEDGE TRANSFER IN REACTOR OPERATIONS

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A renaissance of nuclear science and technology has begun. To meet the expected needs of the nuclear power industry and various governmental organizations (e.g. DOE and NRC), there will be an increased need to train (non-nuclear) scientists and engineers with some specialized training in the safe and effective application of various nuclear technologies. To this end UML is developing a new online Nuclear Power Fundamentals program focusing on the operation and safety of nuclear power systems.

The primary target audience is Civil, Mechanical, Electrical, and Chemical engineering students or working professionals. Engineers who take this program will be able to contribute to the nuclear workforce. The goal of the online Nuclear Power Fundamentals program is to provide a strong educational base in the fundamentals of nuclear technology and reactor safety including reactor operations. Fundamental concepts needed to understand the key aspects of nuclear technology, with a focus on the basic design and safe operation of nuclear power systems will be taught. Topics will include basic nuclear and radiation physics, nuclear reactor physics, shielding, nuclear heat transport, and nuclear power systems and safety.

The unique aspect of the proposed curriculum will be the “hands-on” live remote reactor laboratory experiences and general emphasis on experiential learning that will be integrated throughout the online program. The “hands-on” distance nuclear engineering training will offer a meaningful nuclear reactor laboratory component within the online curriculum. This laboratory capability is available via the *nuclear101.com* website and the UMass-Lowell Research Reactor (UMLRR) Online application. The UMLRR Online application will be used to provide a number of live demonstrations and laboratory experiences using the full capabilities of the UMLRR facility. These learning experiences will involve both core physics and balance-of-plant considerations. Typical physics-related experiments and demonstrations might include, for example, a normal reactor startup sequence, an approach-to-critical experiment, the generation of differential and integral blade worth curves, some basic reactor kinetics, or the effects of xenon and temperature on core operations.

Utilizing the UMass-Lowell Research Reactor will enhance knowledge transfer in nuclear engineering theory and reactor operations. The “hands-on” approach to engineering education is a proven pedagogy and will be used to provide a strong foundation in nuclear power and safety fundamentals that would not otherwise be available to a wide range of students and working engineers who will, upon completion of the program, add to the nuclear talent pool and help resolve some of the current workforce concerns within the nuclear industry.