Summary of Course Requirements

*** (Note: Core Courses and Electives listed are for the Engineering The Future Funding Program - Students must also satisfy their University's degree requirements regarding core courses and electives, which may differ from those listed here.)**

Descriptions for Core Courses (Required)			Elective Courses (must take 3)
University of Minnesota	**CE 8504 Theory of Unit Operations** The goal is to understand the behavior and design principles for the physical and chemical processes that are commonly used in water and wastewater treatment. Specific objectives of the course are to develop a strong theoretical basis for understanding process behavior, to determine how operating conditions influence process behavior, to determine and understand the basis for design practice, to design processes for specific application, and to predict the performance and behavior of designed systems. Processes covered include adsorption, ion exchange, sedimentation, thickening, filtration, gas transfer, coagulation, flocculation, membrane processes, and disinfection.	**CE 8505 Biological Processes** This class focuses on the biological treatment of wastewater. The following topics are covered: modeling suspended and attached growth systems, the fundamentals of nutrient removal, the fundamentals of floc formation and filamentous organism growth, and areas of future interest in wastewater effluent, The course is publication based, using a mixture of older seminal papers and newer papers as teaching aids. All of the students read the papers, and each week a different student presents a paper augmenting their presentation with traditional literature and leading the class discussion. The relevance of the topics covered in the class to industrial waste treatment, hazardous waste treatment, biological drinking water treatment is also discussed.	**CE 5541 Environmental Water Chemistry** **CE 5542 Experimental Methods in Environmental Engineering** **CEE 5551 Environmental Microbiology Lab** **CE 8551 Env. Microbiology: Molecular Theory and Methods** **CE 4561 Solid and Hazardous Wastes** **CE 4562 Remediation Technologies** **CE 8542 Chemistry of Organic Pollutants in Env. Systems** **CE 8561 Analysis and Modeling of Aquatic Env. I** **CE 8562 Analysis and Modeling of Aquatic Env. II** **CE 8501 Environmental Fluid Mechanics I** **CE 8503 Environmental Mass Transport** **CE8490 Research & Prof. Ethics in Water Resources & Env. Sci.**