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)
Carnegie Mellon University	**NOTE: Core Course is in 2 parts (half-semester each)** **12-721 Environmental Biotechnology Principles** This course presents the theory of microbiological pricesses relevant to environmental systems. Environmental microbiology, cell stucture, metabolism, energetics, information storage, and microbial ecology, is followed by development of models for kinetics of suspended growth and fixed film biological systems. **12-724 Biotechnology Applications in Engineered Systems** This course presents application of microbiology in water and wastewater treatment. Biological processes discussed include: aerobic municipal wastewater treatment, nitrification, denitrification, phosphorus removal, methanogenic treatment. Specific unit operations discussed include: activated sludge, trickling filters, fluidized beds, tertiary nutrient removal, methanogenesis, drinking water treatment, and bioremediation.	**12-722 Wastewater Treatment: Design and Practice:** Consideration of planning, process design, specifications, and costing of facilities and systems for treatment of municipal and industrial wastewaters. The subject matter is developed through references to current pracitce, critique of completed design, design exercises, and field trips.	**12-720 Water Resources Chemistry** **12-726 Math Modeling of Env. Qual. Syst.** **12-727 Charact./Analyze Env. Samples & Syst.** **12-725 Physicochemical Treatment** **12-728 Remediation Engineering** **12-729 Env. Microbiology for Engrs.** **12-657 Water Resources Engr.** **12-658 Hydraulic Structure Design** **12-751 Air Quality Engr.** **12-704 Probability & Est. Meth. for Engr. Syst.** **12-711 Project Mgmt. for Constr.** **24-424 Energy & the Environment** **24-425 Combustion & Air Pol. Contr.** **12-712 Intro. to Sustainability Engr.** **12-713 Ind. Ecology & Sustainable Engr. Design** **12-714 Env. Life Cycle Assess. & Green Design** **12-715 Case Studies in Sust. Engr.**