DEPARTMENT OF RIVER-COASTAL SCIENCE AND ENGINEERING

Programs

Graduate

Certificate

- River Science and Engineering Certificate of Completion (https://catalog.tulane.edu/science-engineering/river-coastal-science-engineering/river-science-engineering-certificate-completion)

Courses

River Coastal Science and Engineering (RCSE)

RCSE 6660 Special Topics (1-3 Credit Hours)
Special Topics.

RCSE 6800 Intro to River Science & Eng (3 Credit Hours)
Rivers drain the majority of non-ice-covered land surfaces on Earth and are the primary conduit for freshwater, minerals, carbon, and dissolved ions to the global ocean. In the 21st century, rivers large and small are being increasingly managed for flood control, as a source of water (agricultural, industrial, potable), recreation and navigation, all of which can have system-wide environmental consequences. Future basin and global-scale climate changes must also be considered in management decisions. This course is designed to be a graduate and advanced undergraduate, interdisciplinary examination of river science and engineering practices that can serve as a springboard to more advanced coursework on the disciplinary aspects covered. It will also be useful to practitioners who require an interdisciplinary overview of river systems to more effectively perform their professional duties.

RCSE 6810 River and Stream Restoration (3 Credit Hours)
Rivers and streams are complex ecosystems which have interconnected geologic, geomorphologic, chemical and biological underpinnings. As the demands of human populations have increased over the past several centuries, rivers and streams have often been pushed beyond their ability to maintain the dynamic equilibrium inherent to the system. In recent decades, in an attempt to restore some of the values and functions to these systems, river and stream restoration has emerged as a multi-billion-dollar industry. This course will cover the definitions of river and stream restoration, discuss the planning process associated with solid restoration efforts, present restoration techniques, discuss environmental flows as restoration measures, present commonly applied design concepts and consider how uncertainty, monitoring, and adaptive management may be applied to river and stream restoration efforts.

Prerequisite(s): SCEN 6800 or 6800.

RCSE 6820 Hydraulic/ Hydrologic Modeling (3 Credit Hours)
The substantial advancement in computational power has allowed numerical models to be viable and efficient tools to solve complex problems and improve our understanding of the fundamentals in the water resources field. Despite these advancements, it is critical to fully understand the basics of numerical modeling techniques, and recognize the strengths and limitations of these techniques. This introductory modeling course provides a general overview of the basics of numerical modeling; model development and applications, and includes hands-on training on model applications to watersheds, streams, large rivers, and coastal settings.

Prerequisite(s): SCEN 6800 or RCSE 6800.

RCSE 6830 River Mechanics & Management (3 Credit Hours)
This course will provide a thorough understanding of the practical application of river mechanics. This science is a critical, but often overlooked component, of any river management project. The River Mechanics and Management course introduces the student to a wide range of river topics related to the engineering and management of river systems. This includes an advanced examination of fluvial processes, channel stability concepts, sediment transport, and design considerations for commonly used engineering features. The course will also provide instruction on designing structural elements to aid in the management of river channels and floodplain. The course will emphasize the interdisciplinary nature of river science and engineering.

Prerequisite(s): SCEN 6800 or RCSE 6800.

RCSE 6840 Methods in River Sampling (3 Credit Hours)
Tools and procedures developed for sampling and monitoring riverine systems over the last century are distinct from those developed for other aqueous environments. In addition to the need for tools tailored for systems of a wide range of size, energy, and setting, effective river monitoring also needs to capture highly episodic hydrographs that encompass large overbank areas during floods. River monitoring has profound implications in managing rivers for human use and for channel and riparian ecosystem health. Rivers are also highly sensitive to climate, and historical records of their behavior are a key indicator of changing climate on a basin and global scale. This course is designed to examine river sampling as conducted by agencies and academic researchers, including the use of remote sensing, and the collection of ecological, water chemistry, hydrological, sediment dynamics, and morphological evolution data sets. Historical data will be examined to define statistical data analytical procedures.

Prerequisite(s): SCEN 6800 or RCSE 6800.

RCSE 6900 Independent Study (1-3 Credit Hours)
Independent study on a research topic of choice under the direction of a faculty member.