142L. Water Quality Laboratory (1)
Prerequisite: C E 142 (or concurrently). Study and analysis of the physical, chemical and biological characteristics of raw and waste waters. (3 lab hours)

143. Engineering Hydraulics (3)
Prerequisite: Engr 116. Theory and analysis of pressure-conduit and open-channel flow systems. Applications to hydraulic structures and control works, hydraulic power conversion, sediment transport, and channel stabilization.

144. Water Quality Control (3)
Prerequisite: C E 142 or senior-level chemical or biological science. Physical, chemical, and biological operations and processes in water quality control. Process and hydraulic design of water purification and wastewater treatment facilities. (Field trips required)

145. Hydrology, Water Supply, and Wastewater Disposal (2)
Prerequisite: one year high school algebra; high school chemistry or Chem 2A. Occurrence and movement of water about the earth's land masses; measurement and estimation of precipitation, evaporation, groundwater flow, streamflow; man's influence on natural waters; water supply, wastewater disposal systems; collection, treatment, distribution of water supplies; wastewater collection, treatment.

150. Transportation Planning and Design (3)
Prerequisite: C E 2. Transportation as a multimode system; functions, development, elements, and characteristics. Transportation planning; design of geometric elements of route and terminal. (2 lecture, 3 lab hours)

151. Pavement and Drainage Design (2)
Prerequisite: C E 123 (or concurrently). Factors affecting drainage and load-bearing elements of transportation facilities. Capacity design of drainage facilities. Structural design of highway and airfield pavements.

152. Transportation Engineering Materials (2)
Prerequisite: C E 123. Soil stabilization with bitumen, lime, and portland cement for pavement construction; properties of bituminous road materials; properties, design, and testing of bituminous paving mixtures for pavement construction. (1 lecture, 3 lab hours; field trips required)

153. Traffic Operations and Control (2)
Prerequisite: C E 150 (or concurrently). Highway traffic characteristics and studies; regulation and control; administration. Air traffic control; railroad operation control.

180. Senior Project (1)
Prerequisite: senior standing in civil engineering or in surveying and photogrammetry; approved subject; Engr 182 (or concurrently). Study of a problem under supervision of a faculty member; final typewritten report required. (Individual project except by special permission)

185. Civil Engineering Practice (1)
Prerequisite: senior standing in Civil Engineering. Practice of Civil Engineering; opportunities in Civil Engineering; transition from student to professional engineer; technical communication. (1 lecture, 2 lab hours)

186. Surveying Practice (1)
Prerequisite: senior standing in Surveying and Photogrammetry. Application of various surveying and photogrammetric methods.

190. Independent Study (1–3; max see reference)
See *Academic Placement—Independent Study.*

193. Internship in Civil Engineering (1–3; max total 3)
Prerequisite: senior standing in Civil Engineering. Supervised professional practice in a private firm or public agency.