190. Independent Study (1-3; max total 6)
Prerequisite: CHEM 160 or permission of instructor. See *Academic Placement — Independent Study*. Approved for ***SP*** grading.

GRADUATE COURSES

(See *Course Numbering System.)*

Chemistry (CHEM)

201. Chemistry Laboratory Teaching Techniques (1)
Laboratory safety, lab lecture techniques, equipment setups, grading, etc. Primarily for teaching assistants in chemistry.

211. Chemical Thermodynamics (3)
Prerequisites: CHEM 110A, 110B, 111. Principles of thermodynamics; application to chemical problems; introduction to statistical methods, calculation of thermodynamic functions from spectroscopic data.

212. Chemical Applications of Group Theory (1-2; max total 2)
Prerequisites: CHEM 110A, 110B. Introduction to symmetry operations, point groups and their properties. Application of group theory to chemical problems such as; selection rules for electronic, IR, Raman and microwave activity, molecular orbital theory, transition metal complexes, hybridization, and other chemical topics.

215. Quantum Chemistry (3)
Prerequisite: graduate standing. Seminar on recent advances in quantum mechanics; chemical bonding, and atomic and molecular spectroscopy.

220. Theoretical Inorganic Chemistry (3)
Prerequisites: CHEM 110A, 110B. Seminar on theoretical inorganic chemistry emphasizing structure and bonding of inorganic and coordination compounds, valence bond, molecular orbital and ligand field theories; correlation of structure and reactivity.

222. Advances in Inorganic Chemistry (3)
Prerequisites: CHEM 110A, 110B, 128B. Seminar on recent advances in inorganic chemistry. Topics may include, but are not limited to, organometallic chemistry, solid-state chemistry, nonmetallic complexes, and the chemistry of rare-earth compounds.

225. Separation Methods in Chemistry (1-3)
Prerequisites: CHEM 106 and 129B. Seminar on the theory, application, and literature of various separation methods for organic and inorganic analysis. May include laboratory.

226. Electrochemistry (1-3)
Prerequisite: CHEM 106. Seminar on the theory, application, recent developments, and literature of electrochemistry and electrochemical methods of organic and inorganic analysis. May include laboratory.

227. Analytical Spectroscopy (1-3)
Prerequisites: CHEM 106, 110A, 110B, or permission of instructor. Theory, instrumentation, and application. Recent developments and literature of spectroscopic techniques. May include laboratory.

230. Advanced Organic Chemistry (3)
Prerequisites: CHEM 128B, 129B. Seminar on recent advances in organic chemistry including reaction mechanisms and synthetic applications with references to current literature.

235. Physical Organic Chemistry (3)
Prerequisites: CHEM 110A, 110B, 128B. Seminar in application of modern theoretical concepts to the chemical and physical properties of organic compounds.

240T. Topics in Advanced Chemistry (1-3)
Seminar covering special topics in one of the areas of chemistry: analytical, biochemistry, inorganic, organic, physical. Some topics may have a laboratory.

241A-B. Molecular Biology I-II (3-3)
(Same as BIOL 241A-B.) Prerequisites: BIOSC 140A-B, CHEM 150 or 155, or permission of instructor. BIOL/CHEM 241A is prerequisite for BIOL/CHEM 241B. Current topics in molecular biology are addressed, including protein and nucleic acid structure, DNA replication, transcription, translation, prokaryotic and eukaryotic regulation, mechanisms of exchange of genetic material, and recombinant DNA technology.

242. Techniques in Protein Purification and Analysis (3)
(Same as BIOL 242.) Prerequisite: CHEM 151 or 156 or permission of instructor. Corequisite: BIOL/CHEM 241A. Deals with the technologies relevant to protein isolation, purification, analysis, immobilization, and modification in micro and macro quantities. (1 lecture, 6 lab hours)

243. Nucleic Acid Technology Lab (3)
(Same as BIOL 243.) Prerequisites: BIOL/CHEM 241A and 242. Corequisite: BIOL/CHEM 241B. A lecture/laboratory course focusing on the technologies used in nucleic acid chemistry; specifically, synthesis, translation, mutagenesis, and genetic engineering. (1 lecture, 6 lab hours)

244. Cell Culture and Hybridoma (3)
(Same as BIOL 244.) Prerequisites: MICRO 185 or PHYAN 160 and 160L. The theory and practice of *in vitro* propagation of eukaryotic cells, including growth characteristics, metabolic requirements and genetic analysis. Cloning, fusion and generation of monoclonal antibody (hybridoma) are presented relative to cultured cell biology and application to biotechnology. (1 lecture, 6 lab hours)

248. Seminar in Molecular Biology and Biotechnology (1-2; max total 4)
(Same as BIOL 248.) Prerequisite: admission into the Biotechnology Certificate Program. Reviews and reports on current literature in various aspects of biotechnology and molecular biology.

260. Advanced Research Techniques (3)
Prerequisites: classified standing, permission of instructor. Advanced concepts in the design of experiments. Development of practical research skills through the planning and undertaking of a short laboratory project. (1 lecture, 6 lab hours)

280. Seminar in Chemistry (1; max total 3)
Approved for ***SP*** grading.

290. Independent Study (1-3; max total 6)
See *Academic Placement — Independent Study*. Approved for ***SP*** grading.

295. Research (2)
Prerequisite: permission of instructor. Independent investigations of an advanced character for the graduate student with adequate preparation. Approved for ***SP*** grading. (May include conferences, laboratory, library.)

299. Thesis (4)
Prerequisite: See *Criteria for Thesis and Project*. Preparation, completion, and submission of an acceptable thesis for the master's degree. Approved for ***SP*** grading.