

THE UNIVERSITY OF NORTH CAROLINA AT ASHEVILLE  
FACULTY SENATE

Senate Document Number 4316S  
Date of Senate Approval 1/14/16

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Statement of Faculty Senate Action:

**APC Document 35**                      **Delete CHEM 237, 314, 315, 413, 435 (specialized chemistry laboratory courses), replacing with CHEM 312 (an integrated laboratory course);**  
**Delete CHEM 406, 407 and 408 (research courses), replacing with CHEM 409;**

**Effective Date: Fall 2016**

**1. Delete:** On pages 102 and 104, the entries for CHEM 237, 314, 315, 413 and 435:

**237 Analytical Chemistry (2)**

A laboratory-based course with emphasis on quantitative analyses including gravimetric, volumetric, electrochemical, and spectrometric analyses. Laboratory experiments are evaluated on technique, accuracy and precision. Topics covered include sampling and sample preparation, acid-base and redox equilibria, thermodynamic properties of ionic solutions, and experimental statistics. Prerequisite: CHEM 145. Pre or co-requisites: CHEM 236 and MATH 191. Spring.

**314, 315 Physical Chemistry I and II Lab (1, 1)**

A series of experiments involving physical measurements, which provide an examination of various statistical procedures used in the reporting of data. Individual experiments will demonstrate fundamental principles of physical chemistry. Also included will be group, multi-week projects requiring students to design and conduct experiments and communicate results in written and oral format. Experiments will involve modern instruments, vacuum systems, and use of cryogenic fluids. CHEM 314 corequisite: CHEM 334. CHEM 315 corequisite: CHEM 335. CHEM 314: Fall. CHEM 315: Spring.

**413 Inorganic Chemistry Laboratory (1)**

Syntheses, characterizations and structural investigations of representative main group, organometallic and coordination compounds utilizing methods such as high temperature reactions, inert-atmosphere and vacuum line manipulations, non-aqueous solvent systems, electrochemistry, spectroscopic and magnetic susceptibility measurements. Prerequisite: CHEM 328. Spring.

**435 Bio-Analytical Instrumentation Laboratory (2)**

The course is designed primarily to develop the laboratory skills of students in specific areas associated with and related to chemistry and biochemistry. Special emphasis will be placed upon experiment design and instrumental methods. Because the major methods covered are also used in other subdisciplines of chemistry, students with a primary interest other than biochemistry are also encouraged to enroll. Prerequisites: CHEM 145, 314. Spring.

**Add:** On page 102, **CHEM 312, Interdisciplinary Chemistry Project Lab:**

**312 Interdisciplinary Chemistry Project Lab (2)**

A laboratory-based course in which students use the laboratory techniques and approaches of analytical, physical, organic, inorganic, computational, and biochemistry to conduct interdisciplinary project-based experiments that include synthesis, characterization, and analysis of chemical compounds and their properties. Scientific writing in this course will be a component of determining writing competency in the chemistry major. Students are required to take this course twice, but may not enroll in two sections involving the same projects. Prerequisites: CHEM 145, 222, 223, 231, 232, 233. Pre- or corequisites: CHEM 323, 331. Fall and Spring.

**Impact Statement:** This interdisciplinary laboratory experience in chemistry (which students will be required to take twice for 4 hours) will replace the following laboratory experiences for students CHEM 237 (2 hrs spring), CHEM 314 (1 hr fall), CHEM 315 (1 hr spring) and CHEM 413 (1 hr spring). CHEM 435 has not been offered in some time and is to be removed from the catalog. Over the past semesters, 1 lecture plus 2 lab sections of CHEM 237 was taught each academic year in the spring semester at 9 total contact hours. In addition 2 lab sections each of CHEM 314 (fall), 315 (spring) and 413 (spring) were offered each academic year at 3 contact hours per section, totaling 6 contact hours in the fall and 12 contact hours in the spring. It is expected that in the new curriculum, 4 sections of CHEM 312 will be taught each academic year (2 sections in fall and 2 sections in spring, at 6 contact hours per section). (See attached staffing table.) This change will result in an increase from 33 to 36 faculty contact hours to deliver the laboratory courses, and a shift in faculty contact hours from spring to fall semester. This increase in laboratory contact hours comes with a simultaneous reduction in contact hours for lecture courses from other deleted courses. As a laboratory course, Department of Chemistry budget is needed for laboratory equipment and chemicals.

No change in expenses is expected as the new course expenses replace expenses from laboratory courses no longer offered. There will be manageable impact on current students who have either, taken the deleted courses and not declared a major, or have declared a major and require these deleted courses. Three one-credit hour lab classes taught in specific semesters and two two-credit hour lab classes taught in specific semesters are being replaced by a two-credit hour course that will be taught each semester and may be re-taken as content changed. The following direct substitutions will be made for students:

- CHEM 237 (2 hours) will be replaced by one course of CHEM 312 (2 hours)
- CHEM 335 (1 hour) and CHEM 413 (1 hour) will be replaced by one course of CHEM 312 (2 hours)
- CHEM 314 (1 hour) & CHEM 332 (2 hours) will be replaced by 223 (3 hours)

A possible student impact will be that students who previously received a failing grade in these deleted courses will not have the opportunity to retake the course for a grade replacement.

**Rationale:** A laboratory course in chemistry is a hands-on experiential learning environment that often requires the techniques and approaches of multiple different sub-disciplines within chemistry to solve problems. CHEM 312 will enable the laboratory experience to be integrated for students to enhance their learning and is a natural evolution of the curriculum to better match the experiential learning and problem solving in chemistry.

2. **Delete:** On page 103, the entries for **CHEM 406, 407 and 408:**

**406, 407, 408 Chemical Literature Research I, II, III (1, 1, 1)**

Directed library research and independent study in a specialized area of chemistry, which results in a comprehensive, written report and formal research seminar at the end of CHEM 408. Students submit reports and make presentations documenting their progress at the end of CHEM 406 and 407. CHEM 406 prerequisite: CHEM 380. CHEM 407 prerequisite: CHEM 406. CHEM 408 prerequisite: CHEM 407. CHEM 406: Spring. CHEM 407: Fall. CHEM 408: Spring.

**Add:** On page 103, in place of deleted entries, new course, **CHEM 409:**

**409 Chemical Literature Research Seminar (3)**

A research based seminar course that focuses on the current state of chemistry across subdisciplines using primary literature as a foundation for discussion. Students will research, write, and present an independent thesis reviewing chemical literature related to a subdiscipline. Scientific writing will be a component of this course. Prerequisites: CHEM 223, 323, 331. Pre- or corequisite: CHEM 312. Spring.

**Impact Statement:** Change is to condense the literature-based undergraduate research experience in chemistry into an intensive, single-semester 3 credit hour course (which BA students will be required to take and BS students could take as an upper-level course). CHEM 409 will replace CHEM 406 (1 hr spring), CHEM 407 (1 hr fall), and CHEM 408 (1 hr spring). By creating a single-semester intensive course, 3 new faculty contact hours in the spring semester will be needed to deliver this course. (See attached staffing table.) This increase in contact hours comes with a simultaneous reduction in contact hours for lecture courses from other deleted courses. As a non-laboratory research course, no Department of Chemistry budget is needed.

There will be minimal and manageable impact on current students who have either taken these courses and not declared a major, or have declared a major and require these courses. The following direct substitutions will be made for students who have either taken all of these courses and not declared a major, or have declared a major and require all these courses.

- CHEM 406 (1 hour) & CHEM 407 (1 hour) & CHEM 408 (1 hour) will be replaced by CHEM 409 (3 hours)

1 credit hour special topics classes will be offered for CHEM 407 and 408, as needed, for students who are midway through the research sequence.

**Rationale:** The single CHEM 409 course changes the literature-based undergraduate research experience for B.A. chemistry majors from three 1-credit hour courses over three semesters into one intensive 3-credit hour course taken in one semester. The change reduces the timeline for a B.A. chemistry major to complete the research requirement from three consecutive semesters to one, streamlining the completion of the major without reducing the rigor of the experience.