CHEMISTRY

Academic Year

2012-2013

School

School of Science, Engineering and Technology School Web site

School Dean

Winston F. Erevelles, Ph.D. werevelles@stmarytx.edu

Department

Chemistry

Department Chair

Michael D. Losiewicz, Ph.D. mlosiewicz@stmarytx.edu

Description of Program/Major

The Chemistry and Biochemistry majors at St. Mary's University provide excellent preparation for graduate school, professional school, or entering a career in industry. The degree programs offered include the B.S. in Chemistry, B.A. in Chemistry, B.S. in Chemistry with Biochemistry Emphasis, B.S. in Biochemistry, B.S. in Forensic Science with Chemistry Option, and also a major in Chemistry with Secondary Teaching Certification. Our programs place a strong emphasis on critical problem solving. Students learn to work as part of a laboratory team yet also develop the ability to work independently. The Chemistry and Biochemistry programs promote versatility and prepare students for a wide range of options after graduation. The programs stress not only the fundamentals of chemistry, but the development of the intellectual skills necessary to apply them. The department offers small class sizes, close interaction with the faculty and a variety of tutoring options.

Degree Requirements

Core Curriculum (SMC)

St. Mary's University Core (30 Hours)
All St. Mary's Core SMC13## "Reflection" courses must be completed before registering for SMC23## "Practice" courses. "Reflection" courses can be taken in any order followed by "Practice" courses in any order.

SMC 1301	Foundations of Civilization	3
SMC 1311	Foundations of Reflection: Self (Formerly PL 1310)	3
SMC 1312	Foundations of Reflection: Nature	3

SMC 1313	Foundations of Reflection: Others	3
SMC 1314	Foundations of Reflection: God (Formerly TH 2301)	3
SMC 2301	Foundations of Practice: Ethics (Formerly PL 2332)	3
SMC 2302	Foundations of Practice: Civic Engagement and Social Action	3
SMC 2303	Foundations of Practice: Fine Arts and Creative Process (Formerly FA 1101, FA 1102, FA 1103)	3
SMC 2304	Foundations of Practice: Literature	3
SMC 4301	Capstone Seminar: Prospects for Community and Civilization	3

School Specific Core (SSC)

School of Science, Engineering, and Technology Specific Core (21 Hours)

Speech	SE 1321 (for international students), SE 1341, SE 2333, SE 3391	3
Composition and Rhetoric (grade of "C" or better)	EN 1311, EN 1313 (for international students)	3
Foreign Languages	Six hours at the sophomore level (2311, 2312) in a Foreign Language previously studied for a minimum of one year; Or, 6 hours of introductory level (1311, 1312) in a Foreign Language not previously studied; Or, 12 hours of CLEP credit for a language previously studied.	6
Social Science	BA 1310, BA 3325, CJ 2300, CJ 3300, EC 2301, EC 2303, PO 1311, PO 1312, PO 1314, PS 1301, PS 3386, SC/CR 1311, SC 3321, HU 3300, HU 3303	3
Theology	Advanced Theology 33XX	3
Fine Arts	AR, DM, MU or Literature: EN 2321, 2322, 2353, 2354, 2355, 2356	3

Four Year Degree Plan

Sample 4-year degree plan, Chemistry (BA)
Sample 4-year degree plan, Chemistry (BS)
Sample 4-year degree plan, Biochemistry (BS)
Sample 4-year degree plan, Chemistry (BS) emphasis Biochemistry

Department Courses and Descriptions

Preparatory Chemistry (3)
CH 1303
This course is designed for students with inadequate background for CH1401. Manipulative skills and basic concepts requiring problem solving will be stressed. Not accepted in lieu of CH1401,1402. This course satisfies the general education requirement.

Chem Concepts & Applications (3)

CH 1304
This course is designed for the non-science major as part of one's general education. Chemistry is a fundamental science, some of its basic concepts will be developed as well as some of its applications to every day life. No prerequisites.

General Chemistry I (4)
CH 1401
Fundamental principles; descriptive chemistry of more important elements; brief study of qualitative analysis by semimicro methods. Prerequisite: Approval of Instructor based on the Toledo Chemistry Placement Test performance and other relevant factors. This course may also be used to fulfill the general education requirement. Prerequisite for ALL of the following courses. (Lecture 3 hours; Lab 4 hours.)

General Chemistry II (4)
CH 1402
Fundamental principles; descriptive chemistry of more important elements; brief study of qualitative analysis by semimicro methods. Prerequisite: Approval of Instructor based on the Toledo Chemistry Placement Test performance and other relevant factors. This course may also be used to fulfill the general education requirement. Prerequisite for ALL of the following courses. (Lecture 3 hours; Lab 4 hours.)

Intro to Organic & Biochem (4)
CH 1404
This course is designed to provide a general overview of these two specific areas of chemistry for non-majors. It will provide the general basics of organic chemistry including basic carbon chemistry, nomenclature, structures of organic compounds, chemical characteristics and function,reactions, and mechanisms. This will provide the background necessary to study the concepts of organic chemistry that apply to the structure and function of biological macro molecules. Topics in this course will cover the main biological macro molecules of proteins, nucleic acids, carbohydrates, and lipids, and their role in cellular metabolism, states of disease, and drug applications. Upon completion of this course, students should be able to demonstrate an understanding of fundamental chemical concepts needed to pursue studies in related professional fields. Prerequisite: CH 1401. (Lec ture 3 hours; Lab 4 hours.)

Organic Chemistry I (4)
CH 3411
The study of the compounds of carbon. The major functional groups are examined on their basis of the physical and chemical properties. Fundamental theories of bonding, structures, mechanisms, synthesis, and spectros copy are topics covered in the organic chemistry curriculum. (Lecture 3 hours; Lab 4 hours.)

Organic Chemistry II (4)
CH 3412
The study of the compounds of carbon. The major functional groups are examined on their basis of the physical and chemical properties. Fundamental theories of bonding, structures, mechanisms, synthesis, and spectros copy are topics covered in the organic chemistry curriculum. (Lecture 3 hours; Lab 4 hours.)

Analytical Chemistry (4)
CH 3423
An introduction to traditional methods of chemical analysis, i.e. ¿wet¿ chemistry. Emphasis is on lab

performance. Experiments cover volumetric, gravimetric colorimetric, potentiometric, and other techniques. (Lecture 3 hours; Lab 4 hours)

Instrumental Analysis (4)
CH 3424
An introduction to chemical analysis via instrumentation. Emphasis is on lab performance. Instruments are spectroscopic and chromographic. (Lecture 3 hours; Lab 4 hours)

Physical Chemistry I (4)
CH 3433
An introduction to chemical thermodynamics and kinetics. Prerequisites: Calculus, CH 3423; PY1402 is recommended. (Lecture 3 hours; Lab 4 hours). The Lab is writing intensive.

Intermediate Physical Chem (4)
CH 3434
An introduction to chemical analysis via instrumentation. Emphasis is on lab performance. Instruments are spectro scopic and chromographic. (Lecture 3 hours; Lab 4 hours)

Toxicology (4)
CH 3440

Seminar in Chemistry (1)
CH 4100
Presentation and discussion of current research in the field of chemistry. (May be repeated for a maximum of 2 semester hours.) Prerequisite: Permission of Instructor.

Chemical Reseach (1)
CH 4125
Practical literature and laboratory experience with an original problem in chemical research. (May be repeated for a maximum of 4 semester hours.) Prerequisite: Permission of the Instructor.

Spec. Topics Chemistry/Biochem (1)
CH 4150
This advanced course introduces a field of chemistry that is of current interest in the chemistry community of today. Examples of possible topics are material sciences, polymer chemistry, chemical separations, and chemical spectroscopy. This course may be repeated only if the current topic is different from any previous enrollment of that student. Prerequisite: Permission of Instructor.

Chemical Research (2)
CH 4225
Practical literature and laboratory experience with an original problem in chemical research. (May be repeated for a maximum of 4 semester hours.) Prerequisite: Permission of the Instructor.

Spec. Topics Chemistry/Biochem (2)
CH 4250

This advanced course introduces a field of chemistry that is of current interest in the chemistry community of today. Examples of possible topics are material sciences, polymer chemistry, chemical separations, and chemical spectroscopy. This course may be repeated only if the current topic is different from any previous enrollment of that student. Prerequisite: Permission of Instructor.

Intermediate Organic Chemistry (3)
CH 4310
Elaboration and extension of fundamentals of Organic Chemistry. May be repeated when topics vary. Prerequisite: CH 3411, 3412.

Chemical Research (3)
CH 4325
Practical literature and laboratory experience with an original problem in chemical research. (May be repeated for a maximum of 4 semester hours.) Prerequisite: Permission of the Instructor.

Chemical Thermodynamics (3)
CH 4330
Introduction to the principles and chemical applications of thermodynamics for chemists and engineers. Prerequisite: CH 3433.

Advanced Inorganic Chemistry (3)
CH 4340
A study of molecular symmetry, structure and bonding, inorganic solid state chemistry, solution chemistry, chemistry of the representative elements, transition metal chemistry, and organometallic chemistry. Prerequisite: CH 3412.

Spec. Topics Chemistry/Biochem (3)
CH 4350
This advanced course introduces a field of chemistry that is of current interest in the chemistry community of today. Examples of possible topics are material sciences, polymer chemistry, chemical separations, and chemical spectroscopy. This course may be repeated only if the current topic is different from any previous enrollment of that student. Prerequisite: Permission of Instructor.

Biochem of Specialized Tissues (3)
CH 4353
Biomolecular aspects of the structure and controlled functioning of specialized systems in prokaryotes and eukaryotes, highlighted by studies of the sensory and immune systems, muscle contraction/mobility and membrane transport phenomena. Prerequisites: CH/BL4451 or concurrent registration.

Biochemistry of the Hormones (3)
CH 4354
The biochemical basis of normal versus abnormal functioning of the hormonal control mechanisms in mammalian systems; this will include a detailed discussion of molecular mechanisms for hormonal control of the path ways of intermediary metabolism and of the absence/aberration of such regulatory processes evidenced in metabolic disease. Prerequisites: CH/BL4452 or concurrent registration.

Immunochemistry (3)
CH 4355
The molecular basis of the normal operation of the vertebrate immune system and studies of aberrations of immune mechanisms in disease processes. The latter is exemplified by the biomolecular aspects of infectious diseases (caused by pathogenic microorganisms) autoimmune disorders, tissue damage, and cancer. Prerequisites: CH/BL 4451 or concurrent registration.

Enzyme Chemistry (3)
CH 4356
The molecular architecture of enzymes and the dynamics of enzyme mediated catalysis. Topics include a classification of enzyme systems, enzyme kinetics, mechanisms of enzyme action and the regulation of the activity of enzymes. Prerequisites: CH/BL 4451.

Biochemistry I (4)
CH 4451
Study of the processes of life at the molecular level. The physiochemical properties of the biologically important molecules and macromolecules is presented with the goal of understanding their structure vs. biological activity relationships. Major topics include the study of enzymes, metabolism, bioenergetics, and regulation of biochemical processes, membranes and molecular genetics. Prerequisites: CH 3411, 3412 (Lecture 3 hours; Lab 4 hours)

Biochemistry II (4)
CH 4452
Study of the processes of life at the molecular level. The physiochemical properties of the biologically important molecules and macromolecules is presented with the goal of understanding their structure vs. biological activity relationships. Major topics include the study of enzymes, metabolism, bioenergetics, and regulation of biochemical processes, membranes and molecular genetics. Prerequisites: CH 3411, 3412 (Lecture 3 hours; Lab 4 hours)

Department Faculty

Chemistry Faculty Website

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