

Important to Know Registration Procedures: Make sure that you have identified second and third choices for courses and labs in case your first choice is unavailable during registration. If only one course or lab will fit your schedule and it is not available when you register, make sure to come to the faculty tables at registration and talk to a Chemistry Department representative. There are no formal “wait lists;” get help while you are still at registration!

LEVEL I CHEMISTRY COURSES—Fall 2011

The St. Olaf Chemistry Department offers two level I chemistry courses each fall: Chemistry 121 and Chemistry 125. We also partner with the Biology Department in offering the integrated Chem-Bio 125 course. All three of these fall term, level I courses are designed for students planning to take additional chemistry courses, but they also satisfy one of the college’s science requirements: either Scientific Exploration and Discovery (SED) or Integrated Scientific Topics (IST), see the Class & Lab schedule for details. *Students not interested in a science major will usually choose to take Chemistry 121 or another course designed exclusively for non-science majors (see Interim and Spring offerings). These students need not take the placement test.* More information for prospective chemistry majors can be found at this page of the department’s web site: <http://www.stolaf.edu/depts/chemistry/prospective/>.

Chemistry 125 and 121/123 both lead to Chemistry 126. For students interested in taking Chemistry 126, which is a prerequisite for all level II and III chemistry courses, there are two routes: taking Chemistry 125 in the fall followed by Chemistry 126 in the spring, or taking Chemistry 121 in the fall, Chemistry 123 during interim, and Chemistry 126 in the spring.

Note that all courses shown in the table, below, are only offered in the terms as shown.

<u>Fall</u>	<u>Interim</u>	<u>Spring</u>
Chem 125		Chem 126
Chem 121	Chem 123	Chem 126
CH/BI 125	CH/BI 126	CH/BI 127

Both Chemistry 125 and the 121/123 combination prepare students for Chemistry 126. Both Chemistry 125 and 121/123 cover an equivalent set of topics, including:

Chemical Reactions	Acids and Bases	Coordination Chemistry
Mass and Mole Relationships	The Periodic Table	Chemical Equilibrium
Solutions	Atomic Structure	Gases
Chemical Bonding	Molecular Structure	

Chemistry 125 covers all these topics in a single semester. Chemistry 121 covers primarily the first seven topics, at a slightly slower pace than 125; Chemistry 123 emphasizes atomic and molecular structure and an array of chemical bonding topics.

An alternative route through the level one Chemistry curriculum (third line in table, above) is to commit to the Integrated Chemistry-Biology sequence of courses by registering for CH/BI 125 in the fall. These courses meet fall, interim and spring term and are an equivalent experience to Chem 125, Chem 126 and Bio 125. If you choose to register for this sequence, make sure that you have alternative schedules that include Chem 125 (in case CH/BI 125 closes before you register). More information about these courses is available following the Class & Lab Schedule, below.

Calculus is a prerequisite for Chemistry 126 and CH/BI 126. If you are planning to take Chemistry 126 or CH/BI 126 this school year, be sure to take Math 120 (or beyond) this fall, according to the recommendation of the Math department.

Consider your chemistry placement recommendation. The results of the placement exam and information on your science and mathematics background will enable us to recommend the most appropriate beginning chemistry course(s) for you. *Please follow our recommendation.* Experience has shown that students who are placed into Chemistry 125 usually do well in this course; however, those who are placed into Chemistry 121 but insist on taking Chemistry 125 usually do poorly. Likewise it is not advisable to take Chemistry 121 if you are placed into Chemistry 125. You may well be bored, you will likely develop poor study habits, and your grade in the course will suffer. Better to be an enthusiastic hard worker in Chemistry 125 than a bored “coaster” in Chemistry 121. Your placement recommendation will either be to a specific course (like “Chemistry 125”) or to a set of courses from which you may choose (like “Chemistry 125 or Chemistry-Biology 125”). If offered a choice, consider both your academic and scheduling preferences. Note that there is only one section (9:05-10:00 MWF) of Chemistry/Biology 125, but two sections of Chemistry 121 and three of Chemistry 125.

Your placement results will be available to you and your advisor in the SIS system at the Registrar’s website. If you have serious reservations about your placement, seek the counsel of a chemistry faculty member. Any chemistry professor will be happy to discuss your questions about the St. Olaf Chemistry program. Simply stop by or make an appointment.

An equation-solving calculator is required for some sections of Chemistry 121, 125, 126 and CH/BI 125 and 126. Chemists use a variety of mathematical expressions and models to aid them in their study of matter. Consequently, the calculator and computer are professional tools that pervade investigations of chemical systems and theory. Students enrolling in various chemistry courses are either required or encouraged to learn to employ these tools as an integral part of their educational experience. In particular, students enrolling in level one Chemistry and CH/BI courses are required to solve equations such as "PV=nRT" or " $(0.01+x)(x)/(0.01-x) = 1E-3$ " for one variable when all others are known (that is, to get real solutions such as $P=0.3456$ or $x=8.4E-4$). Some of the possible equations cannot be solved by simple methods such as the quadratic equation. Calculators known to be capable of such equation solving and advanced features include Texas Instruments models TI-85, 86, 89, 92, and the Hewlett Packard 48gII and 50g. Other calculators may be available that perform these functions satisfactorily, but these do not include lower numbered TI calculators (like the TI-83 and 84). Students having questions about the functionality and applicability of a calculator should consult a user's manual, most of which can be found online. Students can wait for classes to begin to make sure that an upgraded calculator is necessary for their section of chemistry.

Class sections and lab sections are linked. Chemistry 121, Chemistry 125 and CH/BI 125 include laboratory programs that meet once a week, with times listed in the Class and Laboratory Schedule. Every student registering for the course must also register for an appropriate laboratory section. This semester’s schedule of classes and labs for Chemistry 121, Chemistry 125, and CH/BI 125 is shown below. Classes are in **bold**.

Class & Lab Schedule – Fall 2011

Courses (see your placement) Days/Times/Lab Choices

Chemistry 121A: General Chemistry MWF 10:45-11:40 any 121 lab

Chemistry 121B: General Chemistry MWF 11:50-12:45 any 121 lab

Chem 121 AL Mon 2:00-5:00
Chem 121 BL Tues 8:00-11:00
Chem 121 CL Tues 11:45-2:45
Chem 121 DL Tues 3:00-6:00
Chem 121 EL Fri 1:00-4:00

Chemistry 125A: Struct Chem & Eq MWF 8:00-8:55 any 125 lab

Chemistry 125B: Struct Chem & Eq MWF 10:45-11:40 any 125 lab

Chemistry 125C: Struct Chem & Eq MWF 11:50-12:45 any 125 lab

Chem 125 AL Mon 2:00-5:00
Chem 125 BL Tues 8:00-11:00
Chem 125 CL Tues 11:45-2:45
Chem 125 DL Tues 3:00-6:00
Chem 125 EL Wed 2:00-5:00
Chem 125 FL Thurs 8:00-11:00

Chemistry-Biology 125: Integrated... MWF 9:05-10:00 either CH/BI 125 Lab

CH/BI 125 AL Thurs 8:00-11:00
CH/BI 125 BL Thurs 12:50-3:50

**Chemistry 121, when combined with the Interim course Chemistry 123, is equivalent to Chemistry 125.*

**Chem-Bio 125, when combined with the Interim course Chem-Bio 126 and the second semester course Chem-Bio 127, is equivalent to Chemistry 125, Chemistry 126 and Biology 125.*

The Integrated Chemistry-Biology Sequence at St. Olaf College

The integrated chemistry/biology sequence is a unique opportunity to explore the ways in which chemistry informs biology and biology illustrates fundamental chemical principles. It may be taken in place of the traditional introductory courses in chemistry and biology (Chemistry 121/123 or 125, Chemistry 126, and Biology 125) and is intended for first year students who have an interest in chemistry *or* biology *or* other interdisciplinary fields (for example, environmental science, biomolecular science, neuroscience, pre-medicine or pre-health).

CH/BI (pronounced “chubby”) is a sequence of three courses. The first two courses, CH/BI 125 and CH/BI 126, primarily introduce chemistry topics within a biochemistry or biological context. The third course, CH/BI 127, is the most biological of the three and builds on the principles learned in CH/BI 125 and 126 to explore how chemistry informs major principles of cellular and molecular biology and genetics.

<u>Course Number and Title</u>	<u>GE Satisfied</u>	<u>Schedule</u>
CH/BI 125: Integrated Chemistry/Biology I: Fundamental Chemical Concepts and Their Biological Applications	SED or IST	Fall, MWF 9:05-10:00 Lab Th 8-11 or 12:50-3:50
CH/BI 126: Integrated Chemistry/Biology II: Chemical Thermodynamics, Kinetics, and Biological Relevance		Interim M-F (TBA)
CH/BI 127: Integrated Chemistry/Biology III: Molecular and Cellular Biology	SED or IST	Spring, MWF 10:45-11:40 Lab Th 8-11 or 12:45-3:45

Why should I take CH/BI?

- The CH/BI curriculum recognizes that many current and future challenges that face the world will require solutions that cross traditional disciplinary boundaries.
- The CH/BI program is specifically intended for first-year students, providing a group of similarly motivated students who learn and laugh together for the year-long sequence of courses.
- Some students have co-enrolled in Biology 126 in the Spring semester and completed the introductory sequences for both biology and chemistry in their first year!
- CH/BI alumni have done well in advanced courses in chemistry, biology, and related fields. They are competitive applicants for research programs as well as medical and professional schools.
- CH/BI courses are limited to only 48 students (with labs at 24) insuring that you will have significant opportunity to interact with your professors, teaching assistants, and tutors.

What else should I consider?

- If your chemistry placement includes “chemistry-biology 125” as an option, then you have the background experience that will allow you to be successful in this course sequence.
- Because CH/BI 126 is an interim course, CH/BI is not compatible with other programs (like the Great Conversation) that have interim course commitments.
- If you have AP credit in biology or chemistry, you may want to meet with your advisor or one of the CH/BI instructors to discuss whether this sequence fits with your interests and goals.

CH/BI course descriptions

CH/BI 125: Integrated Chemistry/Biology I - Fundamental Chemical Concepts and Their Biological Applications

This course introduces chemical concepts that are important for students pursuing a study of chemistry of biology. Topics include atomic structure, the Periodic Table, bonding interactions within and between particles, water and its solutions, biological membranes, chemical reactions types, chemical stoichiometry, equilibrium systems, acids and bases, introduction to protein structure. Examples are often pulled from the realm of biological molecules and processes. Students attend three classes and one 3-hour laboratory each week. Offered Fall Semester. General Education requirements satisfied: SED or IST.

CH/BI 126: Integrated Chemistry/Biology II - Chemical Thermodynamics, Kinetics, and Biological Relevance

This course introduces physical chemistry with an emphasis on the thermodynamics and kinetics of biological chemical reactions. Topics include probability as the driving force for chemical reactions; the relationship between chemical bonding energetics, entropy, and equilibria; oxidation-reduction reactions and electrochemistry; and rates of reactions, including enzyme-catalyzed reactions. Laboratory experiments and activities illustrate lecture topics and introduce new concepts. Offered during Interim.

CH/BI 127: Integrated Chemistry/Biology III - Molecular and Cellular Biology

This course builds on the principles learned in CH/BI 125 and 126 and explores how chemistry informs major principles of cellular and molecular biology and genetics. Topics include cell structure, metabolism, movement, signaling, division, and molecular and Mendelian inheritance. The course emphasizes problem-solving, quantitative reasoning, the scientific method, and scientific writing through lectures, discussions, readings, writing assignments, and laboratory work. Students attend three classes and one 3-hour laboratory each week. Offered Spring Semester. General Education requirements satisfied: SED or IST.

What the students are saying.....

“The program does a great job of integrating introductory chemistry and biology – but more importantly you go through an entire year with the same cohort. You get to know each other, learn from each other, and learn to rely on each other. After it’s all over, you know you’ll have these people to support you in the rest of your years at St. Olaf – and that’s the true strength of the CH/BI sequence.” - Ben, CH/BI class of 2008-09

“CH/BI forces one to learn how to learn.....you feel better prepared for the coming years and future courses.” - John, CH/BI class of 2010-11

“You develop close relationships with the professors and other students that carry on beyond the course.” - Jane, CH/BI class of 2009-10

“I feel like we are pushed to really understand instead of just to know.”
- Gina, CH/BI class of 2010-11