

**(F) Narrative
Catalog
Description:***

Degree programs offered by the Department of Chemistry are the Bachelor of Science (BS) in Chemistry and the BS in Education – Chemistry. Additionally, Pre-medical, Pre-pharmacy and Interdisciplinary tracks are available in the BS program. Preparatory programs for other professional schools can also be developed, using the Interdisciplinary track, and a minor in chemistry is offered.

Chemistry is a field that has historically enjoyed very strong career possibilities. Many students are employed directly after their undergraduate education by the chemical, pharmaceutical or related industries, in jobs that have excellent career prospects. Graduate school in chemistry or biochemistry usually includes very generous financial support, and can lead to outstanding career paths in industry, government or academic areas. These opportunities are available to students completing any of the degree programs offered by the IUP Department of Chemistry, and graduates of these programs have gone on to industrial leadership positions, and some of the most prestigious graduate programs in the country.

The BS degree in Chemistry is designed for a student intending a career in chemistry and is certified by the American Chemical Society. The advanced courses and strong laboratory component in this degree program gives the student excellent preparation for the challenges of employment or graduate school.

The Pre-medical and Pre-pharmacy tracks of the BS degree allow students to take all courses required for entrance into their

Liberal Studies: As outlined in the Liberal Studies section with the following specifications:		44
Mathematics: MATH 125 (1)		
Natural Sciences: PHYS 111/121 and 112/122 or 131/141 and 132/142		
Liberal Studies Elective: 3cr, MATH 126 (1), no course with CHEM prefix		
Major:		35-
Required Courses:		37
CHEM 111 General Chemistry I or CHEM 113 Advanced General Chemistry I		4cr
CHEM 112 General Chemistry II or CHEM 114 Advanced General Chemistry II		4cr
CHEM 214	Intermediate Inorganic Chemistry	3cr
CHEM 231	Organic Chemistry I	4cr
CHEM 232	Organic Chemistry II	4cr
CHEM 290	Chemistry Seminar I	1cr
CHEM 325	Analytical Chemistry I	4cr
CHEM 341	Physical Chemistry I	4cr
Controlled Electives:		
CHEM 343 (1cr) or 390 (1cr) and 490 (2cr) (2)		1-2cr
BIOC 301 (3cr) or CHEM 351 (4cr)		3-4cr
At least 3cr additional CHEM or BIOC courses at the 300-level or above. (3)		3cr
Other Requirements:		25
BIOL 202	Principles of Cell and Molecular Biology	4cr
One course from the following: MATH 171, 216, 225 or 241		3cr
Minor (or second major) in a field outside chemistry. (4)		18cr
Free Electives: (2)		14-16
Total Degree Requirements:		120

(1) For students transferring into the program, MATH 121 and 122 may be substituted for MATH 125 and 126, respectively.

(2) Program contains one writing-intensive credit; students need to acquire another W-credit in Liberal Studies, or as a free or controlled elective.

(3) CHEM 343, 390 and 490 can all be taken, but student still requires at least 1cr additional of CHEM or BIOC courses at the 300-level or above. BIOC 301 and CHEM 351 cannot both be taken.

(4) A pre-law concentration has been established – information on this and suggested minor programs is available on the chemistry department website. Alternate (non-minor) programs containing at least 18cr are also possible – they must be approved by the advisor and department chair.

(H) Student Learning Outcomes*

Student Learning Outcomes for the Bachelor of Science – Chemistry / Interdisciplinary Chemistry Track

Objective 1:

Students will demonstrate preparation for application to pharmacy school, graduate school in chemistry or employment in the chemical industry.

Rationale:

Curriculum has been designed with emphasis on meeting the specific expectations of medical schools, but also incorporates the courses expected by graduate schools of chemistry and chemical employers.

Objective 2:

Students will demonstrate the ability to analyze data and scientific arguments.

Rationale:

Course content throughout the program, in both lecture and laboratory courses, support this objective by requiring students to respond to questions at the application, analysis and synthesis levels.

Objective 3:

Students will show the ability to synthesize and apply concepts from multiple sub-disciplines of chemistry.

Rationale:

Course content in the advanced chemistry courses requires a foundation knowledge across the breadth of chemistry. Advanced courses, seminar courses and undergraduate research require students to apply concepts from a variety of courses in novel ways.

Objective 4:

Students will be able to work with peers to solve complex, multi-step problems.

Rationale:

Starting with General Chemistry, all chemistry lecture courses require higher-level quantitative problem-solving ability. In laboratory courses, students often work in small groups, and are required to transfer the problem-solving strategies learned in the classroom to real-world, hands-on situations.

Objective 5:

Students will demonstrate the ability to communicate answers and scientific reasoning clearly, in both written and oral forms.

Rationale:

Laboratory reports and oral presentations require students to learn and master the ability to communicate in the context of scientific discourse.

Objective 6:

Students will progressively develop effective and safe chemistry laboratory skills that require the methods and instrumentation of modern chemistry.

Rationale:

As students progress, laboratory course content requires an increasing level of synthesis and evaluation, with a greater emphasis on procedure development and independent thinking. Throughout the laboratory experience, safety is stressed and students are expected to critically analyze procedure for safety and effectiveness.

Assessment

There are two components proposed for the periodic assessment of this degree program:

Senior Survey– A questionnaire will be given to students who are in the last semester of their degree program. This questionnaire will address the graduates' perceptions of whether they have achieved the program learning outcomes set by the Chemistry Department. It will also have the students indicate where they plan to go once they leave IUP, and the strengths and weaknesses of the program.

DUCK Exam - Students in their last semester will be given the Diagnostic of Undergraduate Chemical Knowledge (DUCK) exam provided by the American Chemical Society's Exam Institute. The student's scores will be compared to the published national norms for this exam.

Rationale for Proposal

(I) Why is this track being proposed?*

The BS in Chemistry / Interdisciplinary Chemistry Track is intended to meet a variety of student needs: a) students who are

Are Resources Available/Sufficient for this Course?

Is the Proposal Congruent with the College Mission?

Has the Proposer Attempted to Resolve Potential Conflicts with Other Academic Units?

Comments:

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