UNIT REPORT

Chemistry-Academic - APR Self-Study Report by Academic Unit/Department Generated: 3/15/22, 3:34 PM

Program Mission

Chemistry Mission Statement

Program Mission Statement:

The mission of the Department of Chemistry at the University of Idaho is to provide a collegial, collaborative, and supportive environment for making significant contributions to chemical research, education, and practice. We train and mentor students to become responsible scientists and scientifically literate professionals by involving them in all aspects of chemistry and the global chemical enterprise.

Program Goal (add a minimum of 3 program goal "plan items")

Program goal 2. Think and create

Goal Statement:

Partake in chemical research through positive and creative contributions

Alignment to UI Strategic Plan Goals:

Innovate (Goal 1): Scholarly and creative products of the highest quality and scope, resulting in significant positive impact for the region and the world.

Indicators/Metrics to Evaluate Progress:

Students partake in, and pass, Chem 491 (Undergraduate Research) and produce report(s) for grading. Research mentors provide descriptive evaluation. Reports and overall performance are graded; considering aptitude, effort, and results – all on an individual basis.

List of Actions the Program Will Take to Achieve Goals:

Since performance parameters are individualized, no generalized remedies are used. Expectations are adjusted in accordance with a student's status and experience.

Goal Achievement Level: Met

Program goal 1. Learn and Integrate

Goal Statement:

Gain broad knowledge in the 4 subdisciplines of Chemistry

Alignment to UI Strategic Plan Goals: Transform (Goal 3): Increase our educational impact.

Indicators/Metrics to Evaluate Progress:

Pass examinations and complete assignments with a success rate >75%

List of Actions the Program Will Take to Achieve Goals:

Perceptions based on course offerings, course content, and quality of instruction are analyzed. Instructional areas with deficiencies or weaknesses are remedied.

Goal Achievement Level: Met

Program goal 3. Communicate

Goal Statement:

Students receive training in communicating their knowledge of chemistry by both written and oral means. Their reports and essays will concisely and accurately convey the subject matter, and their oral presentations will be clear and comprehensible by an audience of peers.

Alignment to UI Strategic Plan Goals: Transform (Goal 3): Increase our educational impact.

Indicators/Metrics to Evaluate Progress:

Pass communication related courses – that either consist of an oral presentation, or have a significant component thereof – with a >85% success rate.

List of Actions the Program Will Take to Achieve Goals:

The quality of the presentations and the reaction of the peer audience are evaluated. Individual coaching is carried out as needed.

Goal Achievement Level: Met

Student Learning Assessment Report (add one "plan item" for each major, degree, and/or certificate offered by dept)

1. Chemistry BS (General Option)

Assessment Report Contact: Ray von Wandruszka

Program Changes in Past Year:

Primarily changes related to Covid restrictions, and a noted increase in online content.

Also important: the technology used for online instruction has prompted more faculty members to use it in face-to-face lecturing.

Learning Outcomes are Communicated to All Students in Program (check box if true): true

Learning Outcomes are Communicated to All Faculty (check box if true): true

Optional: Framework Alignment:

Import Outcomes Data (from Anthology Outcomes):

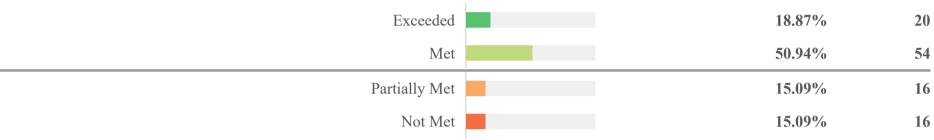


Basic Skills

The student will demonstrate a fundamental understanding of the structure of chemical compounds, their stability, their behavior under different conditions, and their tendency to react.

Academic Year 2020-2021: Chemistry-General Option (B.S.)

Term: Spring 2021



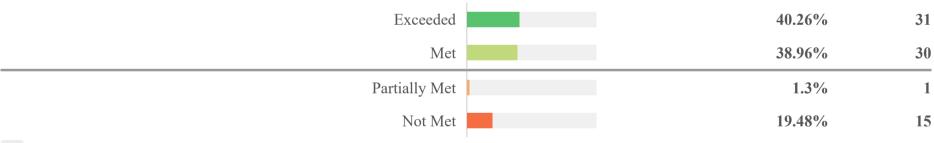
2.

Laboratory Skills

The student will demonstrate an ability to work productively and safely in a chemical laboratory. This includes: (i) the handling and manipulation of solids, liquids, and gases; (ii) the execution of prescribed procedures; (iii) the measurement and reporting of experimental results.

Academic Year 2020-2021: Chemistry-General Option (B.S.)

Term: Spring 2021



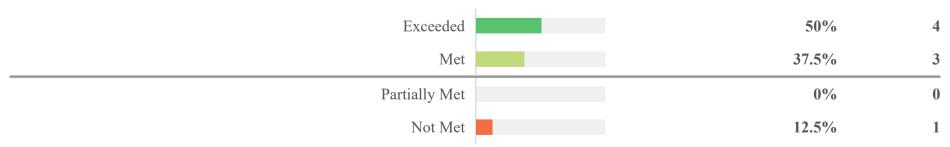
3.

Communication Skills

The student will demonstrate a familiarity with chemical terminology and an ability to communicate chemical information, both orally and in writing. This includes the answering of questions pertaining to chemical matters, the writing of original reports, and the verbal presentation of information to an audience of peers.

Academic Year 2020-2021: Chemistry-General Option (B.S.)

Term: Spring 2021



Summary of Student Learning:

Student learning was satisfactory. Laboratory courses generally produced higher grades than lecture courses.

Summary of Faculty Discussion:

Faculty is generally satisfied. Covid related needs for online classes have set the stage for more and better remote offerings.

Summary of Changes/Improvements Being Considered:

Routine improvements involve changes in pre- and co-requisites that are implemented when course contents change due to shifts in scientific developments.

A notable change that started with the Covid restrictions in 2020 and continues to be developed, is an increased use of remote technology to provide both content and practice material.

Inter-rater Reliability:

The assessment scheme is: A (\geq 90%) = exceeded; B-C (70–89%) = met; D (\geq 60%) = partially met; F(<60%) = did not meet. Faculty members generally adhere to this scheme and grade accordingly. The outcomes for courses of similar standing suggest that the assessment standards are comparable. This cannot, however, be applied to compare courses of vastly different content, standing, and student population – e.g. 100-level *vs.* 400-level.

Closing the Loop:

Change in the present assessment cycle has primarily been driven by the Covid situation, as well as the financial cutbacks that preceded it. The developments have especially affected the personnel level in the Department, and thereby its productivity and service to students. Undoing the damage is therefore our main task in the coming year(s), and present efforts to refill lost professorial positions is a positive step in the right direction.

Chemistry MS

Assessment Report Contact: Ray von Wandruszka

Program Changes in Past Year:

Primarily changes related to Covid restrictions, and a noted increase in online content.

Also important: the technology used for online instruction has prompted more faculty members to use it in face-to-face lecturing.

Learning Outcomes are Communicated to All Students in Program (check box if true): true

Learning Outcomes are Communicated to All Faculty (check box if true): true

Optional: Framework Alignment:

Import Outcomes Data (from Anthology Outcomes):

Gain specialized knowledge in a chemical subdiscipline, as demonstrated by the completion of an approved course of study

Conduct research that makes a contribution to the field of specialization (thesis option); alternatively, complete additional coursework in the field of specialization (non-thesis option)

Write a thesis; alternatively, pass an exit examination (non-thesis option)

Communicate research results to an audience of peers (thesis option); alternatively, present an in-depth discussion of an approved chemical subject to such an audience (non-thesis option).



Specialized Skills

The student will demonstrate in-depth knowledge of a chemical subdiscipline, or a hybrid field that pertains directly to the specialization of the student's project work..

Academic Year 2020-2021: Chemistry (M.S.)

Term: Overview

0	0%	Exceeded
2	100%	Met
0	0%	Partially Met
0	0%	Not Met



Research Skills

The student will demonstrate an ability to: (i) design methods for investigating chemical problem; (ii) generate and record quantitative and qualitative data; (iii) extract conclusions based on evidence supported by results.

Academic Year 2020-2021: Chemistry (M.S.)

Term: Overview

Exceeded	50%	1
Met	50%	1
Partially Met	0%	0
Not Met	0%	0



Communication Skills

The student will demonstrate an ability to communicate research findings through oral presentations and printed media.

Academic Year 2020-2021: Chemistry (M.S.)

Term: Overview

%	0%	Exceeded
%	100%	Met
%	0%	Partially Met
%	0%	Not Met

Summary of Student Learning:

A student survey indicates that they are satisfied with the program and would recommend it to a friend.

Summary of Faculty Discussion:

Faculty discussions indicate that program cuts in recent years, especially of academic personnel, have made it difficult to provide the advanced courses needed for graduate programs. Recent administrative policy changes appear to improve the situation.

Summary of Changes/Improvements Being Considered:

A forthcoming increase in professorial and instructional faculty appointments will provide more avenues for graduate students to select appropriate research projects and benefit from additional coursework offerings.

Inter-rater Reliability:

We presently have no data on this item, but we are in the process of establishing a comparison rubric for the next cycle.

Closing the Loop:

Change in the present assessment cycle has primarily been driven by the Covid situation, as well as the financial cutbacks that preceded it. The developments have especially affected the personnel level in the Department, and thereby its productivity and service to students. Undoing the damage is therefore our main task in the coming year(s), and present efforts to refill lost professorial positions is a positive step in the right direction.

Chemistry PhD

Assessment Report Contact: Ray von Wandruszka

Program Changes in Past Year:

The cumulative exams, previously administered on a monthly basis during the second year of study, have been replaced by a series of 4 comprehensive exams, given during the last 4 weeks of the 3rd semester.

Learning Outcomes are Communicated to All Students in Program (check box if true): true

Learning Outcomes are Communicated to All Faculty (check box if true): true

Optional: Framework Alignment:

Import Outcomes Data (from Anthology Outcomes):

Gain a broad, comprehensive, and in-depth knowledge of chemistry, as demonstrated by the completion of an approved course of study

Demonstrate a profound knowledge of chemistry by passing a series of comprehensive exams at the end of the 3rd semester of study

Conduct a thorough literature study and present the material to an audience of peers.

Write and defend a research proposal

Conduct research that makes a significant and unique contribution to the field of specialization

Write a dissertation and defend it

Publish the dissertation research in the chemical literature

Communicate the dissertation research results, to a knowledgeable, but not necessarily expert, audience



Specialized Expertise

The student will demonstrate a deep working knowledge of the principles, techniques, and concepts of contemporary chemistry. Academic Year 2020-2021: Chemistry (Ph.D.)

Term: Overview

0	0%	Exceeded
4	100%	Met
0	0%	Partially Met
0	0%	Not Met



Research Skills

The student will demonstrate an ability to conduct independent research that makes a significant contribution to the chosen chemical, or hybrid, field.

Academic Year 2020-2021: Chemistry (Ph.D.)

Term: Overview

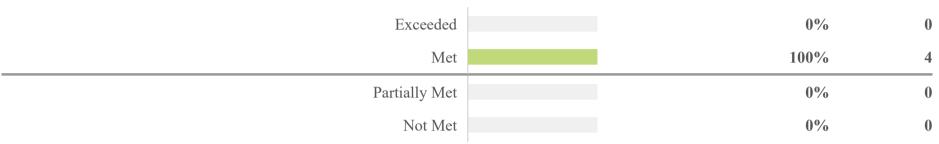
0	0%	Exceeded
4	100%	Met
0	0%	Partially Met
0	0%	Not Met



Literature Skills

The student will demonstrate a thorough familiarity with the chemical literature and an ability to extract relevant information from it. Academic Year 2020-2021: Chemistry (Ph.D.)

Term: Overview





Communication Skills

The student will demonstrate and ability to communicate scientific principles, including research results, to knowledgeable, but not necessarily expert, audiences.

Academic Year 2020-2021: Chemistry (Ph.D.)

Term: Overview

2	50%	Exceeded
2	50%	Met
0	0%	Partially Met
0	0%	Not Met

Summary of Student Learning:

A student survey indicates that they are satisfied with the program and would recommend it to a friend.

Summary of Faculty Discussion:

Faculty discussions indicate that program cuts in recent years, especially of academic personnel, have made it difficult to provide the advanced courses needed for graduate programs. Recent administrative policy changes appear to improve the situation.

Summary of Changes/Improvements Being Considered:

A forthcoming increase in professorial and instructional faculty appointments will provide more avenues for graduate students to select appropriate research projects and benefit from additional coursework offerings.

Inter-rater Reliability:

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Closing the Loop:

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2. Chemistry BS (Professional Option)

Assessment Report Contact: Ray von Wandruszka

Program Changes in Past Year:

Primarily changes related to Covid restrictions, and a noted increase in online content.

Also important: the technology used for online instruction has prompted more faculty members to use it in face-to-face lecturing.

Learning Outcomes are Communicated to All Students in Program (check box if true): true

Learning Outcomes are Communicated to All Faculty (check box if true): true

Optional: Framework Alignment: American Chemical Society Bachelor's Degree Certification

Import Outcomes Data (from Anthology Outcomes):

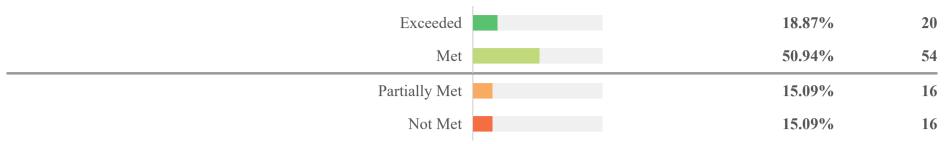


Basic Skills

The student will demonstrate a fundamental understanding of the structure of chemical compounds, their stability, their behavior under different conditions, and their tendency to react.

Academic Year 2020-2021: Chemistry - Professional Option (B.S.)

Term: Spring 2021



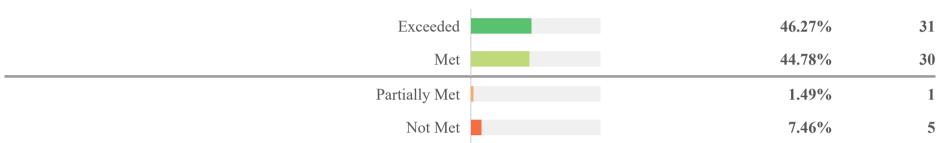


Laboratory Skills

The student will demonstrate an ability to work productively and safely in a chemical laboratory. This includes: (i) the handling and manipulation of solids, liquids, and gases; (ii) the execution of prescribed procedures; (iii) the measurement and reporting of experimental results.

Academic Year 2020-2021: Chemistry - Professional Option (B.S.)

Term: Spring 2021



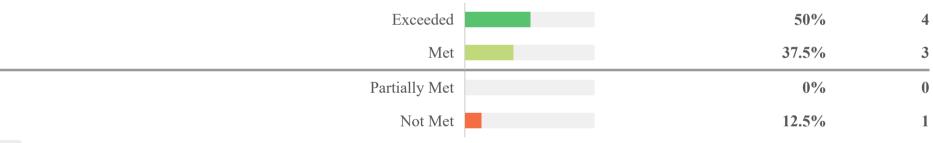


Communication Skills

The student will demonstrate a familiarity with chemical terminology and an ability to communicate chemical information, both orally and in writing. This includes the answering of questions pertaining to chemical matters, the writing of original reports, and the verbal presentation of information to an audience of peers.

Academic Year 2020-2021: Chemistry - Professional Option (B.S.)

Term: Spring 2021



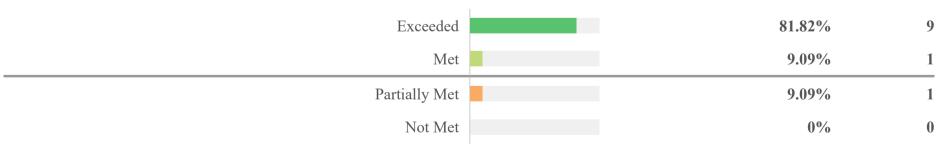


Research Skills

The student will demonstrate an ability to contribute substantially to a chemical research project by carrying out novel experimental or theoretical work under the supervision of a faculty member. The research will be accompanied by the clear and concise reporting of the findings.

Academic Year 2020-2021: Chemistry - Professional Option (B.S.)

Term: Spring 2021



Summary of Student Learning:

Student learning was satisfactory. Laboratory courses generally produced higher grades than lecture courses

Summary of Faculty Discussion:

Faculty is generally satisfied. Covid related needs for online classes have set the stage for more and better remote offerings.

Summary of Changes/Improvements Being Considered:

Routine improvements involve changes in pre- and co-requisites that are implemented when course contents change due to shifts in scientific developments.

A notable change that started with the Covid restrictions in 2020 and continues to be developed, is an increased use of remote technology to provide both content and practice material.

Inter-rater Reliability:

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Closing the Loop:

Change in the present assessment cycle has primarily been driven by the Covid situation, as well as the financial cutbacks that preceded it. The developments have especially affected the personnel level in the Department, and thereby its productivity and service to students. Undoing the damage is therefore our main task in the coming year(s), and present efforts to refill lost professorial positions is a positive step in the right direction.

3. Chemistry BS (Forensics Option)

Assessment Report Contact: Ray von Wandruszka

Program Changes in Past Year:

Primarily changes related to Covid restrictions, and a noted increase in online content.

Also important: the technology used for online instruction has prompted more faculty members to use it in face-to-face lecturing.

Learning Outcomes are Communicated to All Students in Program (check box if true):

Learning Outcomes are Communicated to All Faculty (check box if true):

Optional: Framework Alignment:

Import Outcomes Data (from Anthology Outcomes):

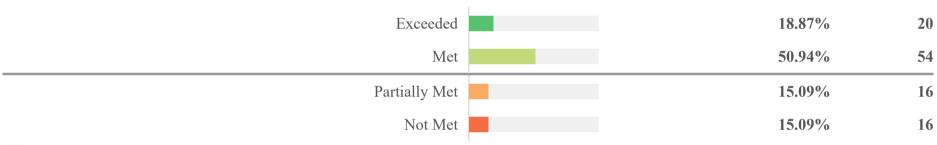


Basic Skills

The student will demonstrate a fundamental understanding of the structure of chemical compounds, their stability, their behavior under different conditions, and their tendency to react.

Academic Year 2020-2021: Chemistry - Forensics Option (B.S.)

Term: Overview



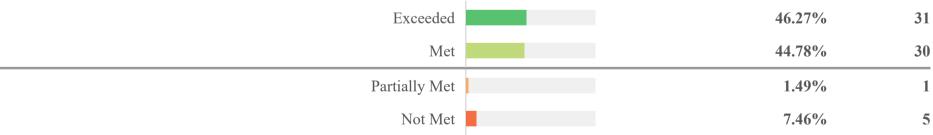


Laboratory skills

The student will demonstrate an ability to work productively and safely in a chemical laboratory. This includes: (i) the handling and manipulation of solids, liquids, and gases; (ii) the execution of prescribed procedures; (iii) the measurement and reporting of experimental results.

Academic Year 2020-2021: Chemistry - Forensics Option (B.S.)

Term: Overview





Communication Skills

The student will demonstrate a familiarity with chemical terminology and an ability to communicate chemical information, both orally and in writing. This includes the answering of questions pertaining to chemical matters, the writing of original reports, and the verbal presentation of information to an audience of peers.

Academic Year 2020-2021: Chemistry - Forensics Option (B.S.)

Term: Overview

Exceeded	50%	4
Met	37.5%	3
Partially Met	0%	0
Not Met	12.5%	1

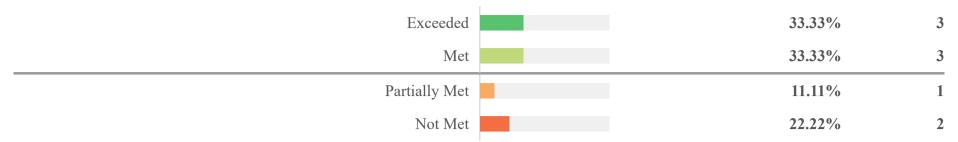


Analytical Skills

The student will demonstrate an ability to operate, and obtain results with, specialized instrumentation used in advanced qualitative and quantitative methods of analysis.

Academic Year 2020-2021: Chemistry - Forensics Option (B.S.)

Term: Overview



Summary of Student Learning:

Student learning was satisfactory Laboratory courses generally produced higher grades than lecture courses

Summary of Faculty Discussion:

Faculty is generally satisfied. Covid related needs for online classes has set the stage for more and better remote offerings

Summary of Changes/Improvements Being Considered:

Routine improvements involve changes in pre- and co-requisites that are implemented when course contents change due to shifts in scientific developments.

A notable change that started with the Covid restrictions in 2020 and continues to be developed, is an increased use of remote technology to provide both content and practice material.

Inter-rater Reliability:

The assessment scheme is: A (\geq 90%) = exceeded; B-C (70–89%) = met; D (\geq 60%) = partially met; F(<60%) = did not meet. Faculty members generally adhere to this scheme and grade accordingly. The outcomes for courses of similar standing suggest that the assessment standards are comparable. This cannot, however, be applied to compare courses of vastly different content, standing, and student population – e.g. 100-level *vs.* 400-level.

Closing the Loop:

Change in the present assessment cycle has primarily been driven by the Covid situation, as well as the financial cutbacks that preceded it. The developments have especially affected the personnel level in the Department, and thereby its productivity and service to students. Undoing the damage is therefore our main task in the coming year(s), and present efforts to refill lost professorial positions is a positive step in the right direction.

4. Chemistry BS (Premedical Option)

Assessment Report Contact: Ray von Wandruszka

Program Changes in Past Year:

Primarily changes related to Covid restrictions, and a noted increase in online content.

Also important: the technology used for online instruction has prompted more faculty members to use it in face-to-face lecturing.

Learning Outcomes are Communicated to All Students in Program (check box if true):

Learning Outcomes are Communicated to All Faculty (check box if true):

Optional: Framework Alignment:

Import Outcomes Data (from Anthology Outcomes):

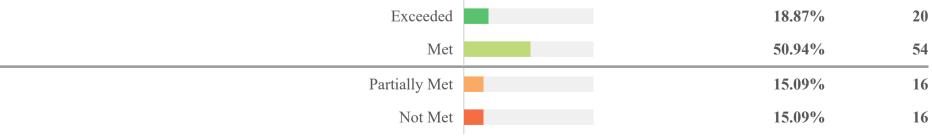


Basic Skills

The student will demonstrate a fundamental understanding of the structure of chemical compounds, their stability, their behavior under different conditions, and their tendency to react.

Academic Year 2020-2021: Chemistry - Pre-Medical Option (B.S.)

Term: Overview





Laboratory Skills

The student will demonstrate an ability to work productively and safely in a chemical laboratory. This includes: (i) the handling and manipulation of solids, liquids, and gases; (ii) the execution of prescribed procedures; (iii) the measurement and reporting of experimental results.

Academic Year 2020-2021: Chemistry - Pre-Medical Option (B.S.)

Term: Overview

Exceeded	46.27%	3 1
Met	44.789	30
Partially Met	1.49%	<u></u>
Not Met	7.46%	6 5

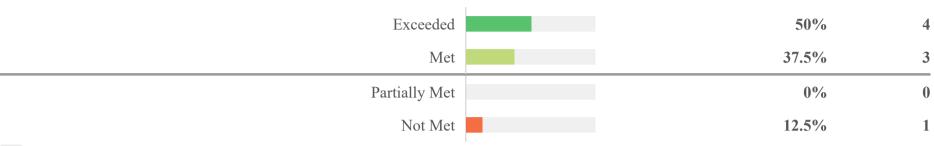


Communication Skills

The student will demonstrate a familiarity with chemical terminology and an ability to communicate chemical information, both orally and in writing. This includes the answering of questions pertaining to chemical matters, the writing of original reports, and the verbal presentation of information to an audience of peers.

Academic Year 2020-2021: Chemistry - Pre-Medical Option (B.S.)

Term: Overview



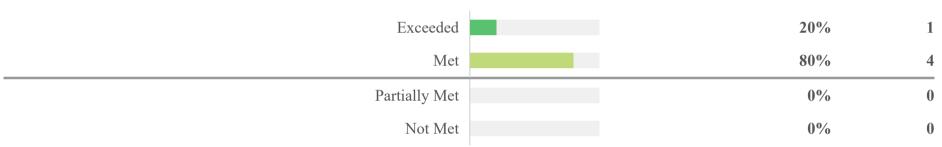


Biomedical Skills

The student will demonstrate a familiarity with synthetic chemistry necessary for the design and preparation of medicinal agents and the mechanistic chemistry relevant to the action of pharmaceuticals.

Academic Year 2020-2021: Chemistry - Pre-Medical Option (B.S.)

Term: Overview



Summary of Student Learning:

Student learning was satisfactory. Laboratory courses generally produced higher grades than lecture courses

Summary of Faculty Discussion:

Faculty is generally satisfied. Covid related needs for online classes have set the stage for more and better remote offerings

Summary of Changes/Improvements Being Considered:

Routine improvements involve changes in pre- and co-requisites that are implemented when course contents change due to shifts in scientific developments.

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Inter-rater Reliability:

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Closing the Loop:

Change in the present assessment cycle has primarily been driven by the Covid situation, as well as the financial cutbacks that preceded it. The developments have especially affected the personnel level in the Department, and thereby its productivity and service to students. Undoing the damage is therefore our main task in the coming year(s), and present efforts to refill lost professorial positions is a positive step in the right direction.

Student Achievement

Student Achievement

Student Retention:

For majors (M) in the same *calendar* year the fall retention percentage is given by:

100x[M(fall, continuing)/(M(spring)-M(graduated))]

Retention from spring 2021 to fall 2021: 88.9%

Student Persistence:

For majors (M) in the same *calendar* year the fall persistence percentage is given by:

100x[M(fall, other discipline)/(M(spring)-M(graduated))]

Persistence from spring 2021 to fall 2021: 8.9%

Student Completion:

Student completion is based on the spring graduation rate only:

100x[M(spring)/M(graduated, spring)]

spring (2021) graduation rate: 25%

Student Postgraduate Success:

The majority of contacts with postgraduate students are maintained on an *ad hoc* basis. LinkedIn is a primary tool for this, giving us access to approximately 80 former students. As this is clearly a self-selecting medium, it can be stated that virtually all of these individuals are either gainfully employed in their professional field, or are doing graduate work at another university.

Identify Equity Gaps:

Of 59 Chemistry Majors (Undergraduate), the distribution

was as follows in spring 2021:

BS Chemistry (all Options)

Category	% of Majors
White	67
American Indian	6
Asian	6
Black	2
Hispanic	14
International	4
Male	42.4
Female	57.6
18-24 yrs old	85
25-64 yrs old	15
	44 44 4

Notable: Low Black enrollment, high female enrollment

Effective Learning Environment and Closing Equity Gaps:

Efforts are underway to increase enrollment across all categories. In view of Idaho's geographic location, special emphasis is given to Hispanic individuals and Native Americans. The ethnicity of applicants is taken into account when Chemistry scholarships are awarded to students who have the necessary academic qualifications.

Demand and Productivity

Demand and Productivity

External Demand:

BS				
(Gener	al)			
	F20	S21	F21	
Fresh	6	5	3	
Soph	6	2	6	
Jun	4	9	7	
Sen	9	9	11	
Total	25	25	27	

BS (Prof)				
	F20	S21	F21	
Fresh	0	0	0	
Soph	0	1	1	
Jun	1	0	2	
Sen	10	9	2	
Total	11	10	5	

BS (Forensics)					
F20 S21 F21					
Fresh	2	1	5		
Soph	4	5	2		
Jun	2	2	1		
Sen	3	4	3		
Total	11	12	11		

BS (PreMed)			
	F20	S21	F21
Fresh	5	3	6
Soph	5	4	4
Jun	5	3	4
Sen	6	6	3
Total	21	16	17

As expected, enrollments have been affected by the Covid circumstances. Recovery has been slowest for the Professional degree option. It should be noted that this gets 'populated' primarily in the Junior and Senior years, as students develop a better appreciation for its value.

Graduate enrollment, primarily in the PhD program, has hovered around 15 in the F20–F21 period, but recruiting has trended upward recently.

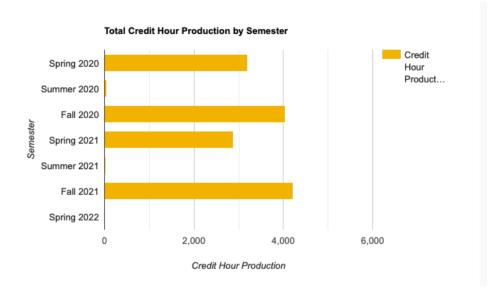
Internal Demand:

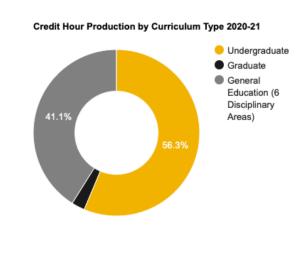
See attachment. In S21, the BS (General) produced about 305 credits, the BS (PreMed) about 220, the BS (Forensics) about 185, and the BS (Professional) about 120. The MS produced about 41, and the PhD about 140.

Attached Files



Credit Productivity:





The Chemistry Department *as a whole*, produces about 4000 credit hours in the fall, and about 3000 in the spring. A significant portion (41%) of this is in Gen Ed (6 disciplinary areas)

Financial Health and Resources

Financial Health and Resources

Financial Health:

The financial weaknesses of the Chemistry Department parallel those of the University as a whole. Cutbacks in the recent past have led to financial shortfalls that limit our ability to provide all necessary services to the students. Personnel numbers have especially been affected.

The financial strength of the Department lies in its gift accounts. A relatively large amount of money is available for scholarships and various departmental needs.

Efficient Use of Resources:

It has become necessary to use departmental donor accounts for essential services that in "normal" times would be covered by gen ed funds. This makes the department efficient in regard to the use of state and tuition money.

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