Code # Enter text…

**New Course Proposal Form**

**[X] Undergraduate Curriculum Council**

|  |
| --- |
| **[X] New Course or [ ]Experimental Course (1-time offering) (Check one box)** |

Signed paper copies of proposals submitted for consideration are no longer required. Please type approver name and enter date of approval.

Email completed proposals to [curriculum@astate.edu](mailto:curriculum@astate.edu) for inclusion in curriculum committee agenda.

|  |  |
| --- | --- |
| John Hershberger 9/29/2017 **Department Curriculum Committee Chair** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **COPE Chair (if applicable)** |
| William Burns 9/29/2017 **Department Chair:** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **Head of Unit (If applicable)** |
| David F. Gilmore 9/29/2017 **College Curriculum Committee Chair** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **Undergraduate Curriculum Council Chair** |
| Anne A. Grippo 10/3/2017 **College Dean** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **Graduate Curriculum Committee Chair** |
| |  |  | | --- | --- | | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Enter date |   **General Education Committee Chair (If applicable)** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **Vice Chancellor for Academic Affairs** |

1. Contact Person (Name, Email Address, Phone Number)

William Burns, [wburns@astate.edu](mailto:wburns@astate.edu) 870-972-3086

2. Proposed Starting Term and Bulletin Year

Spring 2018

3. Proposed Course Prefix and Number (Confirm that number chosen has not been used before. For variable credit courses, indicate variable range. *Proposed number for experimental course is 9*. )

CHEM 4501

4. Course Title – if title is more than 30 characters (including spaces), provide short title to be used on transcripts. Title cannot have any symbols (e.g. slash, colon, semi-colon, apostrophe, dash, and parenthesis). Please indicate if this course will have variable titles (e.g. independent study, thesis, special topics).

Chemistry Capstone

5. Brief course description (40 words or fewer) as it should appear in the bulletin.

A one-credit required course for all chemistry majors, focused on applying knowledge learned in various chemistry courses to solving broad, integrated chemical problems.

6. Prerequisites and major restrictions. (Indicate all prerequisites. If this course is restricted to a specific major, which major. If a student does not have the prerequisites or does not have the appropriate major, the student will not be allowed to register).

1. Are there any prerequisites? Yes
   1. If yes, which ones?

Submission of Application/Intent to Graduate Form, BS or BA Chemistry major

* 1. Why or why not?

Students should have completed as much as possible of the degree requirements prior to enrolling in the proposed course because a focus is applying this previously acquired knowledge to solving problems.

1. Is this course restricted to a specific major? Yes
   1. If yes, which major? Chemistry

7. Course frequency(e.g. Fall, Spring, Summer). *Not applicable to Graduate courses.*

Fall, Spring

8. Will this course be lecture only, lab only, lecture and lab, activity, dissertation, experiential learning, independent study, internship, performance, practicum, recitation, seminar, special problems, special topics, studio, student exchange, occupational learning credit, or course for fee purpose only (e.g. an exam)? Please choose one.

Lecture

9. What is the grade type (i.e. standard letter, credit/no credit, pass/fail, no grade, developmental, or other [please elaborate])

Standard letter

10. Is this course dual listed (undergraduate/graduate)?

No

11. Is this course cross listed? (If it is, all course entries must be identical including course descriptions. It is important to check the course description of an existing course when adding a new cross listed course.)

No

1. If yes, please list the prefix and course number of cross listed course.

Enter text...

1. Are these courses offered for equivalent credit? Yes / No

Please explain. Enter text...

12. Is this course in support of a new program? No

a. If yes, what program?

Enter text...

13. Does this course replace a course being deleted? No

a. If yes, what course?

Enter text...

14. Will this course be equivalent to a deleted course? No

a. If yes, which course?

Enter text...

15. Has it been confirmed that this course number is available for use? Yes

*If no: Contact Registrar’s Office for assistance.*

16. Does this course affect another program? No

If yes, provide contact information from the Dean, Department Head, and/or Program Director whose area this affects.

Enter text...

**Course Details**

17. Outline (The course outline should be topical by weeks and should be sufficient in detail to allow for judgment of the content of the course.)

Week 1 Course syllabus and introduction

Week 2 Review: Electronic Structure

Week 3 Review: Chemical Bonding and Molecular Geometry

Week 4 Review: Thermodynamics

Week 5 Review: Intermolecular Interactions

Week 6 Test 1

Week 7 Review: Kinetics

Week 8 Review: Equilibrium

Week 9 Review: Acid-base Chemistry

Week 10 Review: Electrochemistry

Week 11 Test 2

Week 12 multi concept practice problems

Week 13 multi concept practice problems

Week 14 multi concept practice problems

Final exam

18. Special features (e.g. labs, exhibits, site visitations, etc.)

None

19. Department staffing and classroom/lab resources

The course will be taught using current staffing and resources.

1. Will this require additional faculty, supplies, etc.?

No

20. Does this course require course fees? Yes

*If yes: please attach the New Program Tuition and Fees form, which is available from the UCC website.*

**Course Justification**

21. Justification for course being included in program. Must include:

a. Academic rationale and goals for the course (skills or level of knowledge students can be expected to attain)

Due to the broad nature of chemistry, many of the courses required for a chemistry degree largely focus on a single chemistry sub-discipline. While such focus is useful to gain an understanding of the various sub-disciplines, it does not highlight solving realistic chemical problems which involve integrating knowledge from two or more chemistry sub-disciplines. A primary objective of the course is to provide examples of chemical problems which are solved by integrating such knowledge, and to provide experience in identifying and solving these real-world scenarios.

b. How does the course fit with the mission established by the department for the curriculum? If course is mandated by an accrediting or certifying agency, include the directive.

An important goal of chemistry education is to provide students with the tools to solve problems. This course is a formal classroom opportunity students will have to apply knowledge of multiple chemistry sub-disciplines to solve problems. It is expected this experience will help students to further develop their problem-solving skills.

c. Student population served.

Chemistry majors

d. Rationale for the level of the course (lower, upper, or graduate).

Ideally this course will be taken during the last term in a chemistry degree program. This will ensure students are taking or have completed all degree requirements. As several of these degree requirements will be upper level (3000 and 4000) courses, it is appropriate to make this a 4000-level course.

**Assessment**

**University Outcomes**

22. Please indicate the university-level student learning outcomes for which this new course will contribute. Check all that apply.

|  |  |  |
| --- | --- | --- |
| * 1. **[ ]** Global Awareness | * 1. **[ ]** Thinking Critically | * 1. **[ ]** Information Literacy |

**Relationship with Current Program-Level Assessment Process**

23. What is/are the intended program-level learning outcome/s for students enrolled in this course? Where will this course fit into an already existing program assessment process?

Appropriately apply presented concepts and chemical principles to chemistry related issues.

24. Considering the indicated program-level learning outcome/s (from question #23), please fill out the following table to show how and where this course fits into the program’s continuous improvement assessment process.

*For further assistance, please see the ‘Expanded Instructions’ document available on the UCC - Forms website for guidance, or contact the Office of Assessment at 870-972-2989.*

|  |  |
| --- | --- |
| **Program-Level Outcome 1 (from question #23)** | Appropriately apply presented concepts and chemical principles to chemistry related issues. |
| Assessment Measure | Students will take Diagnostic of Undergraduate Content Knowledge (DUCK) exam. This exam is copyrighted by the American Chemical Society (ACS) Division of Chemical Education Examinations Institute. It is a 60 question (120 minute), multiple-choice, nationally normalized instrument designed to be taken at the end of the undergraduate career. It is a fundamentally interdisciplinary exam built on scenarios that require utilization of knowledge from more than one traditional area of chemistry. |
| Assessment  Timetable | Outcome assessed every term the course is taught |
| Who is responsible for assessing and reporting on the results? | William Burns, Chair Department of Chemistry & Physics |

*(Repeat if this new course will support additional program-level outcomes)*

**Course-Level Outcomes**

25. What are the course-level outcomes for students enrolled in this course and the associated assessment measures?

|  |  |
| --- | --- |
| **Outcome 1** | Type outcome here. What do you want students to think, know, or do when they have completed the course? An important goal of chemistry education is to provide students with the tools to solve problems. This course is a formal classroom opportunity students will have to apply knowledge of multiple chemistry sub-disciplines to solve problems. It is expected this experience will help students to further develop their problem-solving skills. |
| Which learning activities are responsible for this outcome? | Review of general chemistry concepts (e. g. quantum mechanics, thermodynamics, kinetics, chemical bonding) that are utilized in all chemistry sub-disciplines. Practice problems which utilize knowledge of multiple chemistry sub-disciplines and/or concepts. |
| Assessment Measure | What will be your assessment measure for this outcome? Students will take Diagnostic of Undergraduate Content Knowledge (DUCK) exam. This exam is copyrighted by the American Chemical Society (ACS) Division of Chemical Education Examinations Institute. It is a 60 question (120 minute), multiple-choice, nationally normalized instrument designed to be taken at the end of the undergraduate career. It is a fundamentally interdisciplinary exam built on scenarios that require utilization of knowledge from more than one traditional area of chemistry. |

*(Repeat if needed for additional outcomes)*

**Bulletin Changes**

|  |
| --- |
| **Instructions** |
| **Please visit** [**http://www.astate.edu/a/registrar/students/bulletins/index.dot**](http://www.astate.edu/a/registrar/students/bulletins/index.dot) **and select the most recent version of the bulletin. Copy and paste all bulletin pages this proposal affects below. Follow the following guidelines for indicating necessary changes.**  **\*Please note: Courses are often listed in multiple sections of the bulletin. To ensure that all affected sections have been located, please search the bulletin (ctrl+F) for the appropriate courses before submission of this form.**  - Deleted courses/credit hours should be marked with a red strike-through (~~red strikethrough~~)  - New credit hours and text changes should be listed in blue using enlarged font (blue using enlarged font).  - Any new courses should be listed in blue bold italics using enlarged font (***blue bold italics using enlarged font***)  *You can easily apply any of these changes by selecting the example text in the instructions above, double-clicking the ‘format painter’ icon 🡪 , and selecting the text you would like to apply the change to.*  *Please visit* [*https://youtu.be/yjdL2n4lZm4*](https://youtu.be/yjdL2n4lZm4) *for more detailed instructions.* |

Paste bulletin pages here...

Page 387 2017-2018 UG Bulletin

**Major in Chemistry**

**Bachelor of Science**

|  |  |
| --- | --- |
| **University Requirements:** |  |
| See University General Requirements for Baccalaureate degrees (p. 41) |  |
| **First Year Making Connections Course:** | **Sem. Hrs.** |
| PHSC 1003, Making Connections - Chemistry and Physics | **3** |
| **General Education Requirements:** | **Sem. Hrs.** |
| See General Education Curriculum for Baccalaureate degrees (p. 84)  **Students with this major must take the following:**  *MATH 2204, Calculus I*  *CHEM 1013* ***AND*** *1011, General Chemistry I and Laboratory BIO 2013* ***AND*** *2011, Biology of the Cell and Laboratory*  *Twelve hours of Social Sciences (Required Departmental Gen. Ed. Option)* | **36** |
| **Major Requirements:** | **Sem. Hrs.** |
| CHEM 1023 **AND** 1021, General Chemistry II and Laboratory | 4 |
| CHEM 2002, Computers in Chemistry | 2 |
| CHEM 2004, Descriptive Inorganic Chemistry | 4 |
| CHEM 3054, Quantitative Analysis | 4 |
| CHEM 3103 **AND** 3101, Organic Chemistry I and Laboratory | 4 |
| CHEM 3113 **AND** 3111, Organic Chemistry II and Laboratory | 4 |
| CHEM 3124, Physical Chemistry | 4 |
| CHEM 3134, Physical Chemistry II | 4 |
| CHEM 4204, Inorganic Chemistry | 4 |
| CHEM 4224, Instrumentation | 4 |
| CHEM 4243, Biochemistry | 3 |
| CHEM 427V, Research in Chemistry | 3 |
| CHEM 4281, Chemistry Seminar | 1 |
| CHEM 4501 Chemistry Capstone | 1 |
| MATH 2214, Calculus II | 4 |
| MATH 3254, Calculus III | 4 |
| PHYS 2034, University Physics I | 4 |
| PHYS 2044, University Physics II | 4 |
| **Sub-total** | **~~61~~ 62** |
| **Electives:** | **Sem. Hrs.** |
| Electives | **~~20~~ 19** |
| **Total Required Hours:** | **120** |

A complete 8-semester degree plan is available [at http://registrar.astate.edu/.](http://registrar.astate.edu/)

**Page 388 2017-2018 UG Bulletin**

**Major in Chemistry**

**Bachelor of Science**

**Emphasis in Pre-Health Profession Studies**

A complete 8-semester degree plan is available [at http://registrar.astate.edu/.](http://registrar.astate.edu/)

|  |  |
| --- | --- |
| **University Requirements:** |  |
| See University General Requirements for Baccalaureate degrees (p. 41) |  |
| **First Year Making Connections Course:** | **Sem. Hrs.** |
| PHSC 1003, Making Connections - Chemistry and Physics | **3** |
| **General Education Requirements:** | **Sem. Hrs.** |
| See General Education Curriculum for Baccalaureate degrees (p. 84)  **Students with this major must take the following:**  *MATH 2204, Calculus I*  *CHEM 1013* ***AND*** *1011, General Chemistry I and Laboratory BIO 2013* ***AND*** *2011, Biology of the Cell and Laboratory*  *Twelve hours of Social Sciences (Required Departmental Gen. Ed. Option)* | **36** |
| **Major Requirements:** | **Sem. Hrs.** |
| CHEM 1023 **AND** 1021, General Chemistry II and Laboratory | 4 |
| CHEM 2002, Computers in Chemistry | 2 |
| CHEM 2004, Descriptive Inorganic Chemistry | 4 |
| CHEM 3054, Quantitative Analysis | 4 |
| CHEM 3103 **AND** 3101, Organic Chemistry I and Laboratory | 4 |
| CHEM 3113 **AND** 3111, Organic Chemistry II and Laboratory | 4 |
| CHEM 3124, Physical Chemistry | 4 |
| CHEM 3134, Physical Chemistry II | 4 |
| CHEM 4204, Inorganic Chemistry | 4 |
| CHEM 4224, Instrumentation | 4 |
| CHEM 4243, Biochemistry | 3 |
| CHEM 427V, Research in Chemistry | 3 |
| CHEM 4281, Chemistry Seminar | 1 |
| CHEM 4501 Chemistry Capstone | 1 |
| MATH 2214, Calculus II | 4 |
| MATH 3254, Calculus III | 4 |
| PHYS 2034, University Physics I | 4 |
| PHYS 2044, University Physics II | 4 |
| **Sub-total** | **~~61~~ 62** |
| **Emphasis Area (Pre-Health Profession Studies):**  *Six hours of the electives below must be upper-level.* | **Sem. Hrs.** |
| BIO 1303 **AND** 1301, Biology of Animals and Laboratory | 4 |
| Biology Electives | 8 |
| **Sub-total** | **12** |
| **Electives:** | **Sem. Hrs.** |
| Electives | **~~8~~ 7** |
| **Total Required Hours:** | **120** |

*The bulletin can be accessed at* [*http://www.astate.edu/a/registrar/students/*](http://www.astate.edu/a/registrar/students/)

388

**Page 389 2017-2018 UG Bulletin**

**Major in Chemistry**

**Bachelor of Arts**

A complete 8-semester degree plan is available [at http://registrar.astate.edu/.](http://registrar.astate.edu/)

|  |  |
| --- | --- |
| **University Requirements:** |  |
| See University General Requirements for Baccalaureate degrees (p. 41) |  |
| **First Year Making Connections Course:** | **Sem. Hrs.** |
| PHSC 1003, Making Connections - Chemistry and Physics | **3** |
| **General Education Requirements:** | **Sem. Hrs.** |
| See General Education Curriculum for Baccalaureate degrees (p. 84)  **Students with this major must take the following:**  *MATH 2204, Calculus I*  *CHEM 1013* ***AND*** *1011, General Chemistry I and Laboratory BIO 2013* ***AND*** *2011, Biology of the Cell and Laboratory*  *Twelve hours of Social Sciences (Required Departmental Gen. Ed. Option)* | **36** |
| **Major Requirements:** | **Sem. Hrs.** |
| CHEM 1023 **AND** 1021, General Chemistry II and Laboratory | 4 |
| CHEM 2004, Descriptive Inorganic Chemistry | 4 |
| CHEM 3054, Quantitative Analysis | 4 |
| CHEM 3103 **AND** 3101, Organic Chemistry I and Laboratory | 4 |
| CHEM 3113 **AND** 3111, Organic Chemistry II and Laboratory | 4 |
| CHEM 3154 3, Survey of Physical Chemistry | 4 3 |
| CHEM 4243, Biochemistry | 3 |
| CHEM 4501 Chemistry Capstone | 1 |
| PHYS 2054, General Physics I **AND**  PHYS 2064 General Physics II **OR** PHYS 2034, University Physics I **AND** PHYS 2044, University Physics II | 8 |
| **Sub-total** | **35** |
| **Electives:**  *Twenty-six hours of the electives below must be upper-level.* | **Sem. Hrs.** |
| Electives | **46** |
| **Total Required Hours:** | **120** |

*The bulletin can be accessed at* [*http://www.astate.edu/a/registrar/students/*](http://www.astate.edu/a/registrar/students/)

389

**Page 390 2017-2018 UG Bulletin**

**Major in Chemistry**

**Bachelor of Arts Emphasis in Pre-pharmacy**

A complete 8-semester degree plan is available [at http://registrar.astate.edu/.](http://registrar.astate.edu/)

|  |  |
| --- | --- |
| **University Requirements:** |  |
| See University General Requirements for Baccalaureate degrees (p. 41) |  |
| **First Year Making Connections Course:** | **Sem. Hrs.** |
| PHSC 1003, Making Connections - Chemistry and Physics | **3** |
| **General Education Requirements:** | **Sem. Hrs.** |
| See General Education Curriculum for Baccalaureate degrees (p. 84)  **Students with this major must take the following:**  *MATH 2204, Calculus I*  *CHEM 1013* ***AND*** *1011, General Chemistry I and Laboratory BIO 2013* ***AND*** *2011, Biology of the Cell and Laboratory ECON 2313, Principles of Macroeconomics*  *Twelve hours of Social Sciences (Required Departmental Gen. Ed. Option)* | **36** |
| **Major Requirements:** | **Sem. Hrs.** |
| CHEM 1023 **AND** 1021, General Chemistry II and Laboratory | 4 |
| CHEM 2004, Descriptive Inorganic Chemistry | 4 |
| CHEM 3054, Quantitative Analysis | 4 |
| CHEM 3103 **AND** 3101, Organic Chemistry I and Laboratory | 4 |
| CHEM 3113 **AND** 3111, Organic Chemistry II and Laboratory | 4 |
| CHEM 3154 3, Survey of Physical Chemistry | 4 3 |
| CHEM 4243, Biochemistry | 3 |
| CHEM 4501 Chemistry Capstone | 1 |
| PHYS 2054, General Physics I **AND**  PHYS 2064 General Physics II **OR** PHYS 2034, University Physics I **AND** PHYS 2044, University Physics II | 8 |
| **Sub-total** | **35** |
| **Emphasis Area (Pre-pharmacy):** | **Sem. Hrs.** |
| BIO 1303 **AND** 1301, Biology of Animals and Laboratory | 4 |
| BIO 4104, Microbiology | 4 |
| **Sub-total** | **8** |
| **Electives:**  *Twenty-two hours of the electives below must be upper-level.* | **Sem. Hrs.** |
| Electives | **38** |
| **Total Required Hours:** | **120** |

Page 561 2017-2018 UG Bulletin

**CHEM 4241. Biochemistry Laboratory** Experiments aimed to acquaint the student with problems and more important methods of biochemical research. Laboratory three hours per week. Special course fees may apply. Corequisite, CHEM 4243. Fall.

**CHEM 4243. Biochemistry** Presentation of the important areas of modern biochemistry and a description of methods commonly employed in biochemical research. Lecture three hours per week. Special course fees may apply. Prerequisites, CHEM 3113 and 3111. Fall, Spring, Summer.

**CHEM 427V. Research in Chemistry** Directed study in some specialized phase of chemistry designed to provide experience in independent investigations. Special course fees may apply. Prerequisite, permission of the Chemistry Departments Independent Studies Committee. Fall, Spring, Summer.

**CHEM 4281. Chemistry Seminar** Preparation and presentation of a professional quality com- puter based seminar focusing on research completed during Research in Chemistry, CHEM 427V. Chemistry majors are required to take this course in their senior year. Prerequisite, third hour of CHEM 427V. Fall, Spring.

**CHEM 4343. Pharmacology** The study of drugs and their mechanisms of action at the system, cellular, and molecular levels. Special course fees may apply. Prerequisites, BIO 2223 or BIO 3233, BIO 4104, and CHEM 4243. Spring.

**CHEM 4393. Special Problems** Selected special or current topics of interest to faculty and stu- dents that require prerequisite coursework. See individual semester schedules for more information about each offering. Registration restricted by permission of instructor. Demand.

**CHEM 4443. Advanced Biochemistry** Acontinuation of CHEM 4243 biochemistry with a focus on anabolic metabolism and bioinformation processes vital in biological systems and current research in biochemistry and medical correlates. Dual listed as CHEM 5243. Prerequisite, CHEM 4243. Spring.

**CHEM 4501. Chemistry Capstone** A one-credit required course for all chemistry majors, focused on applying knowledge learned in various chemistry courses to solving broad, integrated chemical problems. Prerequisite, Chemistry major, submission of Application/Intent to Graduate Form. Fall, Spring.

**Forensic Science (FOSC)**

**FOSC 411V. Practical Training in Forensic Science** Directed study or crime laboratory internship in some specialized field of forensic science designed to provide experience and practical training in forensic chemistry and forensic biology. Special course fees may apply. Special course fees may apply. Prerequisite, permission of the Forensic Science Internship Coordinator. Fall, Spring, Summer.

**Geology (GEOL)**

**GEOL 1001. Environmental Geology Laboratory** Two hours per week. Laboratory exercises in environmental aspects of the geosciences. To be taken concurrently with GEOL 1003. Fall, Spring. (ACTS#: GEOL 1124)

**GEOL 1003. Environmental Geology** A survey of fundamental geologic processes and associ- ated hazards earthquakes, volcanic eruptions, floods, etc. and the interactions of humans with the environment. Lecture three hours. Prerequisite, MATH 0013 or ACT mathematics score of 16. Fall, Spring. (ACTS#: GEOL 1124)

**GEOL 1014. Historical Geology** History and sequence of development of the earth and its in- habitants, including an introduction to the taxonomy and morphology of common fossils from plant and animal kingdoms. Lecture three hours, laboratory two hours per week. Demand.