New York City College of Technology, CUNY

CURRICULUM MODIFICATION PROPOSAL FORM

This form is used for all curriculum modification proposals. See the [Proposal Classification Chart](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/2013-10-09-Proposal_Classification_Chart.pdf) for information about what types of modifications are major or minor. Completed proposals should be emailed to the Curriculum Committee chair.

|  |  |
| --- | --- |
| **Title of Proposal** | Academic Minor in Chemistry |
| **Date** | March 1, 2024 |
| **Major or Minor** | Major |
| **Proposer’s Name** | Ivana Radivojevic Jovanovic, Alberto Martinez |
| **Department** | Chemistry Department |
| **Date of Departmental Meeting in which proposal was approved** | March 7, 2024 |
| **Department Chair Name** | Ivana Radivojevic Jovanovic |
| **Department Chair Signature and Date** | **A signature on a white background  Description automatically generated**  03/08/2024 |
| **Academic Dean Name** | Justin Vazquez-Poritz |
| **Academic Dean Signature and Date** | **3/20/24** |
| **Brief Description of Proposal**  (Describe the modifications contained within this proposal in a succinct summary. More detailed content will be provided in the proposal body. | Creation of a Chemistry minor using existing courses. This program will allow students throughout the college to add the designation “Minor in Chemistry” to their transcript. |
| **Brief Rationale for Proposal**  (Provide a concise summary of why this proposed change is important to the department. More detailed content will be provided in the proposal body). | The academic minor in Chemistry will allow students to take at least four chemistry courses and gain a solid background in chemistry. The minor in Chemistry is open to all bachelor’s students with interdisciplinary interest; in particular, students enrolled in science programs, students going to medical school as well as other post baccalaureate health programs, and those pursuing careers in the health sciences at City Tech (such as the Health Communication program). Science students continuing to graduate schools can also benefit from obtaining a minor in Chemistry.  The minor in Chemistry will require completion of 4 courses (16 -18 credits of course work): Two required courses - CHEM 1110 General Chemistry 1 (4cr) and CHEM 1210 General Chemistry 2 (4cr); Two elective courses- CHEM 2223 Organic Chemistry 1 (5cr), CHEM 2323 Organic Chemistry 2 (5cr), CHEM 3312 Analytical Chemistry (5cr), CHEM 3622 Inorganic Chemistry (4cr), CHEM 3412 Instrumental Methods of Analysis (5cr), CHEM 3222 Physical Chemistry (4cr) and BIO 3601 Biochemistry (4cr).  Many colleges offer a minor in Chemistry, including senior CUNY colleges such as CCNY, Lehman College, Hunter College, Brooklyn College, College of Staten Island, and Queens College. |
| **Proposal History**  (Please provide history of this proposal: is this a resubmission? An updated version? This may most easily be expressed as a list). | This is the initial submission |

Please include all appropriate documentation as indicated in the Curriculum Modification Checklist.

For each new course, please also complete the New Course Proposal and submit in this document.

Please submit this document as a single .doc or .rtf format. If some documents are unable to be converted to .doc, then please provide all documents archived into a single .zip file.

**ALL PROPOSAL CHECK LIST**

|  |  |
| --- | --- |
| Completed CURRICULUM MODIFICATION FORM including: |  |
| * Brief description of proposal | x |
| * Rationale for proposal | x |
| * Date of department meeting approving the modification | x |
| * Chair’s Signature | x |
| * Dean’s Signature | x |
| Evidence of consultation with affected departments  List of the programs that use this course as required or elective, and courses that use this as a prerequisite. | x |
| Documentation of Advisory Commission views (if applicable). |  |
| Completed [Chancellor’s Report Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/2013-10-09-Chancellor_Report_Quick_Reference_Guide1.doc). |  |

**EXISTING PROGRAM MODIFICATION PROPOSALS**

|  |  |
| --- | --- |
| Documentation indicating core curriculum requirements have been met for new programs/options or program changes. |  |
| Detailed rationale for each modification (this includes minor modifications) |  |

**Proposal for a Minor in Chemistry**

**Rationale for Proposal for a Minor in Chemistry**

The academic minor in Chemistry will allow students to take at least four chemistry courses and gain a solid background in chemistry. The minor in Chemistry is open to all bachelor’s students with interdisciplinary interest; in particular, students enrolled in science programs, students going to medical school as well as other post baccalaureate health programs, and those pursuing careers in the health sciences at City Tech (such as the Health Communication program). Science students continuing to graduate schools can also benefit from obtaining a minor in Chemistry.

The minor in Chemistry will require completion of 4 courses (16 -18 credits of course work): 2 required courses CHEM 1110 General Chemistry 1 (4cr) and CHEM 1210 General Chemistry 2 (4cr); two elective courses- CHEM 2223 Organic Chemistry 1 (5cr), CHEM 2323 Organic Chemistry 2 (5cr), CHEM 3222 Physical Chemistry (4cr), CHEM 3312 Analytical Chemistry (5cr), CHEM 3412 Instrumental Methods of Analysis (5cr), BIO 3601 Biochemistry (4cr) and CHEM 3622 Inorganic Chemistry (4cr).

Undergraduate minors in Chemistry are offered at many universities and colleges across the US: Stony Brook University, University of South Carolina, Penn State University, Rutgers University, University of California Berkeley, etc.

Other senior CUNY colleges also offer a minor in Chemistry. Those are: CCNY, Lehman College, Hunter College, Brooklyn College, Queens College, College of Staten Island.

**Detailed Description of the Proposed Minor**

Chemistry is a central science, and it intersects with other sciences such as biology, physics, environmental science, health sciences as well as engineering. The minor in Chemistry will enable students (non-chemistry majors) to complement their majors, allow them to explore personal interests, and enhance their employment opportunities.

The Chemistry minor provides a solid background in chemistry through series of courses. The minor includes courses that provide a broad introduction to general chemistry, and allow students to choose between organic chemistry, biochemistry, analytical, physical, or inorganic chemistry, as well as introduction to quantitative analysis and instrumentation. It is designed to provide extensive laboratory experience. Each course consists of a lecture and a lab portion. For example, CHEM 1110 and CHEM 1210 include 3h of lecture and 3h of lab class; CHEM 2223 and CHEM 2323 include 4h lecture and 3h of lab, while CHEM 3312 and CHEM 3412 include 3h lecture and 5h of lab work.

The set of courses for this minor will significantly benefit students from 4-year programs at City Tech in other science majors such as Biomedical Informatics or Applied Computational Physics enhancing their expertise. Students completing the minor will be better prepared for careers and future studies in scientific fields and academic research as these courses enhance critical thinking and analytical skills. In addition, the minor can reinforce majors in disciplines such as health sciences (Health Communication), adding a science component to their degree. Science students continuing to graduate schools can benefit from obtaining a minor in Chemistry. For some students continuing to post baccalaureate health programs the minor can provide the recognition for completion of required courses for admission to programs in professional schools (such as physician assistant, optometry, physical therapy, or genetic counseling.)

The required courses of this minor align with GenEd and Pathways regulations. General Chemistry 1 fulfills requirements for Life and Physical Sciences (LPS) and LibArt; General Chemistry 2, CHEM 1210 fulfills Scientific World (SW) and LibArt and Writing Intensive (WI) requirements. All other minor elective courses fulfill additional LibArts and Writing Intensive (WI) requirements and electives for some BS programs.

**Required and Elective Courses for the Minor**

An academic minor in Chemistry requires the completion of four courses in Chemistry: two required courses and a choice of two additional courses. The two additional courses are chosen from the list of the more advanced 2000-level classes or higher, according to the specific interests and curriculum of studies of each student.

Students must achieve a GPA of 2.0 or higher in all courses that contribute towards the minor to be granted a Minor designation on their transcripts. We recommend meeting with an advisor to customize the minor.

**REQUIRED COURSES (8 credits)**

CHEM 1110 General Chemistry 1 (LPS) (4 credits)

*-Pre- or corequisites: (ENG 1101* or ENG 1101CO or ENG 1101ML) and

(MAT 1275 or MAT1275CO or higher)

CHEM 1210 General Chemistry 2 (SW, WI) (4 credits)

- Prerequisite: CHEM 1210

Both courses consist of a lecture and laboratory work. They belong to Pathways: Life and Physical Sciences and Scientific World

**ELECTIVE COURSES (8 -10 credits) (choose two)**

CHEM 2223 Organic Chemistry 1 (WI) (5 credits)

-Prerequisite: CHEM 1210

CHEM 2323 Organic Chemistry 2 (WI) (5 credits)

-Prerequisite: CHEM 2223

CHEM 3222 Physical Chemistry: Thermodynamics and Kinetics (WI) (4 credits)

-Prerequisites: CHEM 1210, PHYS 1442, MAT 1575 or higher

CHEM 3312 Analytical Chemistry (WI) (5 credits)

- Prerequisite: CHEM 1210

CHEM 3412 Instrumental Method of Analysis (WI) (5 credits)

- Prerequisites: CHEM 1210

BIO 3601 Biochemistry (4 credits)

-Prerequisites: BIO 1101, MAT 1275 or MAT 1275CO or higher, ENG 1101, and CHEM 2223

CHEM 3622 Inorganic Chemistry (WI) (4 credits)

-Prerequisite: CHEM 1210

All courses in consist of a lecture and laboratory work.

**Program Learning Outcomes**

Students will be able to gain:

* A sound understanding of the fundamental principles of chemistry, including atomic and molecular structures and states of matter; methods for measuring matter and energy; uncertainty in scientific measurement; chemical thermodynamics and chemical kinetics; conservation of matter and the changes in composition and energy that accompany chemical reactions; mechanisms of chemical reactions; electrochemistry and energy conversion.
* Skill in written and spoken communication, particularly in the field of chemistry and experimental science: facility with the language of chemistry, with chemical formulae and chemical nomenclature; facility with descriptions of chemical energy and chemical thermodynamics.
* Experience in the discovery and development of knowledge through experimental work and in the spoken and written presentation, discussion, and critical analysis of scientific ideas.
* Skill in problem solving, critical thinking and analytical reasoning.

In addition, based on the elective courses chosen students will gain:

* Skill in experimentation and use of modern spectroscopic, chromatographic, and electroanalytical techniques; evaluation of the safety risks associated with chemical experiments and use their evaluation to discern safe laboratory practices and behaviors.
* An understanding of the principles of chemistry including: structure/function relationship of macromolecules in a biological context; the differential aspects of transition metal chemistry, including coordination complexes and organometallic species and the chemical and physical laws that govern the functioning of spectroscopic and chromatographic measurements.

**Sample Curriculum Map for Students in Biomedical Informatics/BS Program**

**Required Minor Courses Biomedical Informatics/BS Program**

CHEM 1110 Required course in major

CHEM 1210Required course in major

**Elective Minor Courses**

CHEM 2223Additional Liberal Arts or Elective

BIO 3601 or CHEM 2323 Additional Liberal Arts or Elective

**Sample Curriculum Map for Students in Health Communication/BS Program**

**Required Minor Courses Health Communication/BS Program**

CHEM 1110 Life and Physical Sciences

CHEM 1210 Scientific World

**Elective Minor Courses**

CHEM 2223Additional Liberal Arts

CHEM 2323 Additional Liberal Arts

**Sample Curriculum Map for Students in Applied Computational Physics/BS Program**

**Required Minor Courses Applied Computational Physics/BS Program**

CHEM 1110 Life and Physical Sciences

CHEM 1210 Scientific World

**Elective Minor Courses**

CHEM 3222Additional Liberal Arts or Elective

CHEM 3412 Additional Liberal Arts or Elective

**Administration and Advisement**

An Academic Minor Coordinator will be appointed by the Chemistry department Chair once the program is approved. The coordinator will be responsible for contacting and advising students who are interested in the proposed minor.

**Assessment Statement**

To assess student learning outcomes, an exit survey will be administered for students completing the minor to provide the opportunity to share overall feedback and thoughts with the academic community about the minor and how they benefitted from it. Enrollment trends will also be tracked, as well as rates of completion and grade distributions. Graduation and retention rates, successful completion and time to graduation for students declaring the minor might also be compared with those of the overall student population. Additionally, grade distributions for the classes taken by students declaring the minor could be compared with those of the general population of students who take these classes.

Additionally, we will follow admission of students successfully completing the minor to professional and graduate schools.

**Diversity and Inclusive Education Statement**

This academic minor welcomes students from all backgrounds, experiences, and perspectives. In accordance with the City Tech and CUNY missions, this academic minor intends to provide an atmosphere of inclusion, respect, and the mutual appreciation of differences so that together we can create an environment in which all students can flourish. It is the instructor’s goal to provide materials and activities that are welcoming and accommodating of diversity in all of its forms, including race, gender identity and presentation, ethnicity, national origin, religion, cultural identity, socioeconomic background, sexuality and sexual orientation, ability, neurodivergence, age, and etc. Your instructor is committed to equity and actively seeks ways to challenge institutional racism, sexism, ableism and other forms of prejudice. Your input is encouraged and appreciated. If a dynamic that you observe or experience in the courses included in the academic minor concerns you, you may respectfully inform your instructor without fear of how your concerns will affect your grade. Let your instructor know how to improve the effectiveness of the courses for you personally, or for other students or student groups. We acknowledge that NYCCT is located on the traditional homelands of the Canarsie and Lenape peoples.

**SUPPORT emails**

​**Denise Scannell Guida- Health Communication Program Director**

From: Denise Scannell-Guida <DScannell@CityTech.Cuny.Edu>  
Sent: Thursday, February 8, 2024 9:56 PM  
To: Ivana Radivojevic Jovanovic <IJovanovic@CityTech.Cuny.Edu>  
Subject: Re: Academic minor in Chemistry proposal

Dear Ivana

Thank you for sending the Chemistry minor proposal. This is a valuable minor for all of the health-related programs. We support the minor and look forward to sharing the information with our students.

Sincerely,

Denise Scannell Guida, PhD

Health Communication Program Director

Communication Curriculum Chair

NYCCT CUNY | Humanities Department

300 Jay Street, Rm L630 | Brooklyn, NY 11201

Phone: 718-260-5943

**Giovanni Ossola, Applied Computational Physics Program Director**

**From:** Giovanni Ossola <GOssola@CityTech.Cuny.Edu>  
**Sent:** Monday, February 12, 2024 9:21 AM  
**To:** Ivana Radivojevic Jovanovic <IJovanovic@CityTech.Cuny.Edu>  
**Cc:** German Kolmakov <GKolmakov@CityTech.Cuny.Edu>  
**Subject:** Re: Academic minor in Chemistry proposal

Dear Ivana,

Many thanks for sharing with us the proposal for the academic minor in Chemistry.

I foresee that some of the students in our Applied Computational Physics Major, in particular those that already took the General Chemistry sequence, will be interested in signing up for a Chemistry Minor. Moreover, this program would form a perfect synergy with the forthcoming Quantum Technology Specialization in ACP. In general, I believe that a Minor in Chemistry would be a well-needed addition to the list of academic minors offered by the College.

Best,

Giovanni

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Giovanni Ossola, PhD

Professor of Physics

ACP Program Director

New York City College of Technology

City University of New York  
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gossola@citytech.cuny.edu  
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**Andleeb Zameer Chair Biology Department**

**From:** Andleeb Zameer <AZameer@CityTech.Cuny.Edu>  
**Sent:** Friday, March 1, 2024 10:11 AM  
**To:** Ivana Radivojevic Jovanovic <IJovanovic@CityTech.Cuny.Edu>  
**Subject:** Re: Academic minor in Chemistry proposal

Hello Ivana,

On behalf of the biological sciences department, I would like to extend our full support for the Academic Minor in Chemistry.

Please do not hesitate to contact me if you need any help from us as you move forward with this very important curriculum proposal.

Best wishes,

Andleeb

Andleeb Zameer, Ph.D.

Chair, Department of Biological Sciences, A301-C

New York City College of Technology, CUNY

Brooklyn, NY 11201

718-260-5193

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**Chancellor’s Report Form**