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** | LAS Specializations in Biology, Chemistry and Physics |
| **Date** | February 12, 2021 |
| **Major or Minor** | Major |
| **Proposers’ Names** | Giovanni Ossola  Diana Samaroo  Joanne Weinreb  Julian Williams |
| **Department** | LAS Program, School of Arts and Sciences |
| **Date of Departmental Meeting in which proposal was approved** | February 4, 2021 |
| **Department Chair Name** | Julian Williams |
| **Department Chair Signature and Date** |  |
| **Academic Dean Name** | Justin Vazquez-Poritz |
| **Academic Dean Signature and Date** | 2/12/21 |
| **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. | This proposal creates Biology, Chemistry, Physics, and Natural Sciences specializations within the AS degree program in Liberal Arts and Sciences (LAS). |
| **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 Associate in Science degree program for Liberal Arts and Sciences (LAS) is seeking to create specializations in Biology, Chemistry, Physics, and Natural Sciences. In addition to providing academic depth, these will serve as pathways to the BS programs in Biomedical Informatics, Applied Chemistry, and Applied Computational Physics. In particular, the LAS specializations are designed so that upon completion of the LAS degree only 60 more credits are needed to complete the corresponding BS programs. |
| **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 a new curriculum modification proposal. |

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). | N/A |
| 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. | N/A |
| Detailed rationale for each modification (this includes minor modifications) | X |

**Description of Proposal**

This proposal creates Biology, Chemistry, Physics, and Natural Sciences specializations within the AS degree program in Liberal Arts and Sciences (LAS). This will provide a primary science focus for students, as well as serve as pathways to the BS programs in Biomedical Informatics, Applied Chemistry, and Applied Computational Physics. These specializations are designed to be linked with the corresponding BS science programs in a 2+2 structure. Namely, all classes taken within the LAS specialization can also be used to fulfill the BS degree requirements. Therefore, upon completion of an LAS specialization, only 60 more credits will be needed in order to complete the corresponding bachelors degree. Students who prefer not to have a primary science focus can opt for the Natural Sciences specialization, which provides the same flexibility as the current LAS program.

The chart below details how all specialization-specific requirements relate to the current LAS requirements:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Current LAS Requirement** | **Biology Specialization** | **Chemistry Specialization** | **Physics Specialization** | **Natural Sciences Specialization** |
| MAT 1575 or MAT 1372 w/ MAT 1476L | MAT 1372 and  CST 1101 | MAT 1575 | MAT 1575 | MAT 1575 or  MAT 1372 and  (MAT 1630 or  CST 1101) |
| Science Sequence | BIO 1101 and BIO 1201 | CHEM 1110 and CHEM 1210 | PHYS 1441 and PHYS 1442 | Science Sequence |
| Capstone | BIO 2450 | CHEM 2323 | PHYS 2443 | Capstone |
| Free Electives | Choose 2 Biology Specialization Electives | BIO 1101 and CHEM 2223 | CST 1101 and CST 1201 | Free Electives |

**Rationale for Proposal**

The LAS program is seeking to create specializations in Biology, Chemistry, Physics, and Natural Sciences. This will provide students the choice to have a specific focus in their studies that could more effectively enable them to secure entry-level positions within the science and technology sectors upon completion of the degree. Moreover, should students choose to continue to one of our BS degree programs in science, they will have already completed the first 60 credits and would only need to take 60 more credits to complete the bachelors degree. The charts on the following pages detail how a student can complete an LAS Specialization in Biology, Chemistry or Physics, and then complete the corresponding BS degree in Biomedical Informatics, Applied Chemistry, or Applied Computational Physics with an additional 60 credits.

In principle, students could take the same classes that are required for the proposed specializations within the current LAS curriculum by selecting specific classes for mathematics, the science sequence, the Capstone course and electives as indicated in the chart above. The purpose of this proposal is to encapsulate these course selections within formalized specializations, since having them specified in the college catalog, on degree audits and in advisement materials will better enable advisors to provide guidance to students who are interested in focusing on these disciplines. This will also enable the students to receive recognition on their official transcripts for having completed these specializations.

Over the past several years City Tech has been number one within CUNY for the number of associate degrees awarded through the Reverse Transfer Initiative. For example, in the 2019-2020 academic year, there were 448 associate degrees awarded via reverse transfer at our college, and many of those were LAS degrees awarded to our students in the BS in Biomedical Informatics program. These specializations will enable even more students in the corresponding bachelors programs to automatically be able to claim their LAS degrees.

One of the features of the LAS program is its flexibility, which we maintain by including an LAS Specialization in Natural Sciences. This is essentially the LAS program in its current form with one exception. Namely, based on input from the Math and Science Departments, since the course MAT 1476L is being phased out, it has been replaced by either MAT 1630 Introduction to Computational Science or CST 1101 Computer Programming and Problem Solving. Not only does this give students the choice not to specialize in a specific science discipline, but it also provides the option for them to change their mind. Namely, should a student in any of the science discipline-specific specializations choose to opt out, all of their credits can still be used to fulfill the LAS Specialization in Natural Sciences.

Students will also be provided with flexibility within each specialization by being able to choose classes as free electives. Through the activation of double duty, science classes that satisfy the specific requirements of the specialization can also be used to satisfy the common core requirements of Life and Physical Sciences and Scientific World. This dual usage of courses serves to increase the number of free electives available for the students.

These specializations will enable students to be more effectively matched with faculty advisors within the Biology, Chemistry and Physics Departments who would be able to continue to advise these students if/when they choose to transition to the corresponding BS programs. Throughout the course of a student’s academic journey through the LAS specialization and the bachelors degree program, a faculty advisor will be able to guide the student on undergraduate research opportunities, preparations for applying for internships, and on the consideration of various post-graduation career options. This could lead to a more rewarding advisement experience for both students and faculty members.

**LAS SPECIALIZATION IN NATURAL SCIENCES**

This is the same as the current LAS curriculum, except that since MAT 1476L is being phased out, it is replaced by either MAT 1630 or CST 1101.

|  |  |  |
| --- | --- | --- |
| **COURSE** | **COURSE TITLE** | **CREDITS** |
| ENG 1101 | English Composition I | 3 |
| ENG 1121 | English Composition II | 3 |
|  | Math and Quantitative Reasoning  (Recommended MAT 1275, 1375, 1475, 1575) | 3-4 |
|  | Life and Physical Sciences (Recommended BIO 1101, 2311, CHEM 1110, PHYS 1117, 1433, 1441) | 3-5 |
|  | World Cultures and Global Issues | 3 |
|  | US Experience in its Diversity | 3 |
|  | Individual and Society | 3 |
|  | Creative Expression | 3 |
|  | Scientific World (Recommended BIO 1201, 2311, 2312, 3302, 3350, CHEM 1210, PHYS 1118, 1434, 1442) | 3-5 |
|  | Additional Flexible Common Core Course | 3-5 |
| MAT 1475 | Calculus I | 4 |
| MAT 1575  or  MAT 1372 and  (MAT 1630 or CST 1101) | Calculus II  or  Statistics with Probability and Calculus Lab  or  Statistics with Probability and Introduction to Computational Science  or  Statistics with Probability and Computer Programming and Problem Solving | 4-6 |
|  | Science Sequence Course I | 4-5 |
|  | Science Sequence Course II | 4-5 |
|  | Capstone | 3-5 |
|  | Free Electives to reach 60 credits | **60** |

**LAS SPECIALIZATION IN BIOLOGY**

|  |  |  |
| --- | --- | --- |
| **COURSE** | **COURSE TITLE** | **CREDITS** |
| ENG 1101 | English Composition I | 3 |
| ENG 1121 | English Composition II | 3 |
|  | Math and Quantitative Reasoning  (Recommended MAT 1275, 1375, 1475, 1575) | 3-4 |
|  | Life and Physical Sciences (Recommended BIO 1101) | 3-4 |
|  | World Cultures and Global Issues | 3 |
|  | US Experience in its Diversity | 3 |
|  | Individual and Society | 3 |
|  | Creative Expression | 3 |
|  | Scientific World (Recommended BIO 1201) | 3-4 |
|  | Additional Flexible Common Core Course  (Recommended CHEM 1110) | 3-4 |
| MAT 1475 | Calculus I | 4 |
| MAT 1372 | Statistics with Probability | 3 |
| CST 1101 | Computer Programming and Problem Solving | 3 |
| BIO 1101 | General Biology I (Science Sequence Course I ) | 4 |
| BIO 1201/ID | General Biology II (Science Sequence Course II) | 4 |
| BIO 2450 | Genetics (Capstone) | 4 |
|  | Choose two Biology Specialization Courses from List Below | 6-8 |
|  | Free Electives to reach 60 credits  (Recommended additional Biology Specialization courses) | **60** |

List of Biology Specialization Courses

|  |  |  |
| --- | --- | --- |
| **COURSE** | **COURSE TITLE** | **CREDITS** |
| CHEM 1110\* | General Chemistry I | 4 |
| BIO 1020 | Artificial Intelligence and the Brain | 3 |
| BIO 2110\* | Programming for Biologists | 4 |
| BIO 2250 | Evolution | 3 |
| BIO 2311 | Human Anatomy and Physiology I | 4 |
| BIO 2312 | Human Anatomy and Physiology II | 4 |
| BIO 3302 | Microbiology | 4 |
| BIO 3350 | Bioinformatics I | 4 |
| BIO 3620 | Molecular and Cell Biology | 4 |

\*CHEM 1110 and BIO 2110 are recommended for students who wish to continue to the BS in Biomedical Informatics.

**BS IN BIOMEDICAL INFORMATICS**

|  |  |  |
| --- | --- | --- |
| **COURSE CODE** | **COURSE TITLE** | **CREDITS** |
| COM 1330 or higher | Speech/Oral Communication | 3 |
|  | Interdisciplinary Course | 3 |
|  | Liberal Arts Elective or World Language Sequence | 3 |
|  | Liberal Arts Elective or World Language Sequence | 3 |
| BIO 3620 | Molecular and Cell Biology | 4 |
| CHEM 1110 | General Chemistry I (Recommended to take in LAS) | 4 |
| CHEM 1210 | General Chemistry II | 4 |
| CST 1201 or CST 2403 | Programming Fundamentals or  Introductory C++ Programming Language Part I | 3 |
| CST 1204 | Database Systems Fundamentals | 3 |
| BIO 2110 | Programming for Biologists (Recommended to take in LAS) | 4 |
| BIO 3350 | Bioinformatics I | 4 |
| BIO 3352 | Bioinformatics II | 4 |
| BIO 3450 | Biomedical Data Analysis I | 4 |
| BIO 4050 | Biomedical Informatics Colloquium | 1 |
| BIO 4900 or BIO 4910/4920 | Internship/Research in Biomedical Informatics or  Independent Research Study: Information Literacy and  Independent Research Study: Guided Research | 5 |
|  | Choose 3 Biomedical Informatics Specialization Courses | 11-12 |
|  | Electives to reach 120 credits | **120** |

**LAS SPECIALIZATION IN CHEMISTRY**

|  |  |  |
| --- | --- | --- |
| **COURSE** | **COURSE TITLE** | **CREDITS** |
| ENG 1101 | English Composition I | 3 |
| ENG 1121 | English Composition II | 3 |
|  | Math and Quantitative Reasoning  (Recommended MAT 1275, 1375, 1475, 1575) | 3-4 |
|  | Life and Physical Sciences (Recommended CHEM 1110) | 3-4 |
|  | World Cultures and Global Issues | 3 |
|  | US Experience in its Diversity | 3 |
|  | Individual and Society | 3 |
|  | Creative Expression | 3 |
|  | Scientific World (Recommended CHEM 1210) | 3-4 |
|  | Additional Flexible Common Core Course (Recommended BIO 1101) | 3-4 |
| MAT 1475 | Calculus I | 4 |
| MAT 1575 | Calculus II | 4 |
| CHEM 1110 | General Chemistry I (Science Sequence Course I ) | 4 |
| CHEM 1210 | General Chemistry II (Science Sequence Course II) | 4 |
| CHEM 2223 | Organic Chemistry I | 5 |
| CHEM 2323 | Organic Chemistry II (Capstone) | 5 |
| BIO 1101 | General Biology I | 4 |
|  | Free Electives to reach 60 credits | **60** |

**BS IN APPLIED CHEMISTRY**

|  |  |  |
| --- | --- | --- |
| **COURSE CODE** | **COURSE TITLE** | **CREDITS** |
| COM 1330 or higher | Speech/Oral Communication | 3 |
|  | Interdisciplinary Course | 3 |
|  | Liberal Arts Elective or World Language Sequence | 3 |
|  | Liberal Arts Elective or World Language Sequence | 3 |
| PHYS 1441 | General Physics I: Calculus Based | 5 |
| PHYS 1442 | General Physics II: Calculus Based | 5 |
| BIO 3601 | Biochemistry | 4 |
| CHEM 3222 | Physical Chemistry: Thermodynamics and Kinetics | 4 |
| CHEM 3312 | Analytical Chemistry | 5 |
| CHEM 3412 | Instrumental Methods of Analysis | 5 |
| CHEM 3622 | Inorganic Chemistry | 4 |
| CHEM 4312 | Instrumental Chromatography | 4 |
| CHEM 4323 | Advanced Laboratory Applications of Spectroscopy | 2 |
| CHEM 4901 | Internship/Research in Applied Chemistry I | 3 |
|  | Math/Science Electives to reach 120 credits | **120** |

**LAS SPECIALIZATION IN PHYSICS**

|  |  |  |
| --- | --- | --- |
| **COURSE** | **COURSE TITLE** | **CREDITS** |
| ENG 1101 | English Composition I | 3 |
| ENG 1121 | English Composition II | 3 |
|  | Math and Quantitative Reasoning  (Recommended MAT 1275, 1375, 1475, 1575) | 3-4 |
|  | Life and Physical Sciences (Recommended PHYS 1441) | 3-5 |
|  | World Cultures and Global Issues | 3 |
|  | US Experience in its Diversity | 3 |
|  | Individual and Society | 3 |
|  | Creative Expression | 3 |
|  | Scientific World (Recommended PHYS 1442) | 3-5 |
|  | Additional Flexible Common Core Course | 3 |
| MAT 1475 | Calculus I | 4 |
| MAT 1575 | Calculus II | 4 |
| PHYS 1441 | General Physics I: Calculus Based  (Science Sequence Course I) | 5 |
| PHYS 1442 | General Physics II: Calculus Based  (Science Sequence Course II) | 5 |
| PHYS 2443 | Modern Physics (Capstone) | 4 |
| CST 1101 | Computer Programming and Problem Solving | 3 |
| CST 1201 | Programming Fundamentals | 3 |
|  | Free Electives to reach 60 credits | **60** |

**BS IN APPLIED COMPUTATIONAL PHYSICS**

|  |  |  |
| --- | --- | --- |
| **COURSE CODE** | **COURSE TITLE** | **CREDITS** |
| COM 1330 or higher | Speech/Oral Communication | 3 |
|  | Interdisciplinary Course | 3 |
|  | Liberal Arts Elective or World Language Sequence | 3 |
|  | Liberal Arts Elective or World Language Sequence | 3 |
| CST 1204 | Data Systems Fundamentals | 3 |
| PHYS 2607 | Introduction to Quantum Mechanics | 3 |
| PHYS 3100 | Classical Mechanics | 4 |
| PHYS 3200 | Electricity and Magnetism | 4 |
| PHYS 3300 or  PHYS 2609 | Computational Fluid Dynamics or Introduction to Quantum Computing | 3-4 |
| PHYS 3600ID | Machine Learning for Physics and Astronomy | 3 |
| PHYS 4100 | Computational Methods | 4 |
| PHYS 4150 | Computational Methods Laboratory | 2 |
| PHYS 4200 | Internship/Real Research Experience | 4 |
| MAT 2580 | Linear Algebra | 3 |
| MAT 2675 | Calculus III | 4 |
| MAT 2572 | Probability and Mathematical Statistics I | 4 |
|  | Free Electives to reach 120 credits | **120** |

**EVIDENCE OF CONSULTATION AND DEPARTMENTAL VOTES**

**AFRICAN AMERICAN STUDIES:**

**From:** Marta Effinger  
**Sent:** Thursday, February 4, 2021 4:10 PM  
**To:** Justin Vazquez-Poritz  
**Subject:** Re: Departmental Voting Results for Proposed LAS Specializations

African American Studies, in a vote 2-0-0, approved the LAS Specialization in today's faculty meeting. (Only  members in attendance voted.)

Best,

Marta

Marta Effinger-Crichlow, PhD

Chair and Professor

African American Studies

meffinger@citytech.cuny.edu

718.260.5205

*she/her/hers*

*We are on the Land of the Munsee Lenape and Canarsie*

**BIOLOGY:**

**From:** Andleeb Zameer  
**Sent:** Friday, February 5, 2021 12:01 PM  
**To:** Justin Vazquez-Poritz  
**Subject:** Re: Departmental Voting Results for Proposed LAS Specializations

Dear Justin,

The department vote for comprehensive LAS specialization proposal was 14-0-3 (yes-no-abstain) in favor of the proposal.

Best,

Andleeb

Andleeb Zameer, Ph.D.

Chair, Department of Biological Sciences

New York City College of Technology, CUNY

Brooklyn, NY 11201

Phone: 718-260-5193

**CHEMISTRY:**

**From:** Diana Samaroo  
**Sent:** Monday, February 8, 2021 6:22 PM  
**To:** Justin Vazquez-Poritz  
**Subject:** Re: Departmental Voting on LAS Specializations

Hi Justin

The Department met last Thursday.   Two votes were by proxy (phone/email).  The results were 6-0-0.

Regards,

Diana

**ENGLISH:**

**From:** Robert Leston  
**Sent:** Friday, February 5, 2021 1:46 PM  
**To:** Justin Vazquez-Poritz  
**Subject:** Re: Departmental Voting Results for Proposed LAS Specializations

Hi Justin,

29-0-0

Robert Lestón, Ph.D.

English Department Chair

Associate Professor of English

New York City College of Technology, CUNY

English Department

Namm 512

300 Jay Street

Brooklyn, NY 11216

**HUMANITIES:**

**From:** Ann Delilkan

**Sent:** Friday, February 5, 2021 12:53 PM

**To:** Justin Vazquez-Poritz

**Cc:** Sharon Boyd; Christopher Swift

**Subject:** updateRe: Departmental Voting Results for Proposed LAS Specializations

Dear Justin,

I was wrong: the vote was 11-0-0, with one vote cast in absentia.

Apologies,

Ann

Ann Delilkan, Ph.D.

Chair and Associate Professor, Department of Humanities

New York City College of Technology, City University of New York

300 Jay Street, Room L630 (formerly A630)

Brooklyn NY 11201

Tel: (718) 260-5018

**MATHEMATICS:**

**From:** Sandie Han  
**Sent:** Monday, February 8, 2021 5:22 PM  
**To:** Justin Vazquez-Poritz  
**Subject:** Re: Departmental Voting Results for Proposed LAS Specializations

Hi Justin,

The LAS specialization proposal passed with 26 in favor, 0 against, 2 abstain.  A comment regarding the LAS specialization is why MAT 1476L is still being listed when it is being phased out.

***Sandie Han, Ph.D.***

*Mathematics Department, Chair*

*New York City College of Technology*

*300 Jay Street, Room N711*

*Brooklyn, NY  11201*

*718-260-5380*

[shan@citytech.cuny.edu](mailto:shan@citytech.cuny.edu)

**PHYSICS:**

**From:** German Kolmakov  
**Sent:** Thursday, February 4, 2021 2:26 PM  
**To:** Justin Vazquez-Poritz  
**Subject:** Voting count UPDATE

Dear Justin,

now, it is

**11-0-0.**

Best wishes,

German

**SOCIAL SCIENCE:**

**From:** Peter Parides  
**Sent:** Thursday, February 4, 2021 3:09 PM  
**To:** Justin Vazquez-Poritz  
**Subject:** LAS Specializations vote

Dear Justin,

The LAS Specializations proposal was approved unanimously by Social Science. The vote was 21-0-0.

Best,

Peter

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Peter Parides, PhD  
Associate Professor of History and Chair  
Department of Social Science  
New York City College of Technology, CUNY  
Phone: 718.260.5080