New York City College of Technology - CUNY

**Applied Mathematics Program Curriculum Change Proposal**

Department of Mathematics

Spring 2018

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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://www.300jaystreet.com/college-council/resources/2010/04/2013-10-09-Proposal_Classification_Chart.docx) for information about what types of modifications are major or minor. Completed proposals should be emailed to the Curriculum Committee chair.

|  |  |
| --- | --- |
| **Title of Proposal** | **Modified Degree Requirements for Applied Mathematics** |
| **Date** | **12/07/17** |
| **Major or Minor** | **Major** |
| **Proposer’s Name** | **Huseyin Yuce** |
| **Department** | **Mathematics** |
| **Date of Departmental Meeting in which proposal was approved** | **3/6/18** |
| **Department Chair Name** | **Professor Sandie Han** |
| **Department Chair Signature and Date** | 2/13/2018 |
| **Academic Dean Name** | **Dean Justin Vazquez-Poritz** |
| **Academic Dean Signature and Date** | **3/1/18** |
| **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. | **Our new degree requirements remove the areas of concentration and replace them with free electives to create a flexible degree to meet the needs of individual students. The proposed mathematics core requires all applied mathematics majors to have extensive coursework in computation, industrial applications, probability, statistics and simulation.** |
| **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). | **Statistical analysis, particularly on large data sets, and computation are crucial to the economy and used in virtually every industry. With the added electives students will be able to take advantage of a wider range of courses to meet their interests and career goals.** |
| **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 proposal.** |

**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://www.300jaystreet.com/college-council/resources/2010/04/2013-10-09-Chancellor_Report_Quick_Reference_Guide.doc). | X |

**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) |  |

**GENERAL RATIONALE:**

This proposal follows from the results of our 2017 Self-Study. We remove the areas of concentration and replace them with elective credits. Our new requirements have: a mathematics core, a general education core, and free electives to accommodate the needs of individual students. The free electives can be chosen in a way to create personalized specialization/concentration. Our internship program remains part of the mathematics core.

Overview:

* Applied Math Majors will have at least 17 credits of free electives (other programs in our college offer free electives). This will lead to more employment opportunities, increased retention and graduation rates.
* Two new courses are developed in response to our 2017 self-study: MAT 1630 Introduction to Computational Science and MAT 4800 Topics in Applied Mathematics. MAT 1630 will replace MAT 1476L in the degree requirements.
* Prerequisites are changed for MAT 2440,2630, 3770 and 4788. MAT 1630 is a suitable alternative to MAT 1476L. MAT 1476L is no longer required, and the new perquisites are needed to allow students to advance through the program.
* No courses are removed from the college catalog
* We are working on an articulation agreement with a new master’s degree program in Data Science being developed at the CUNY Graduate Center so that our students will get credit for some upper level mathematics course. We expect interested graduates to finish the master’s program with one additional year of study.

During their required internships (MAT 4900 and MAT 4901), Applied Mathematics majors are applying mathematics in ways that differ from 10 years ago when we had our last self-study. For example, the emergence of big data has led to our interns analyzing twitter data, identifying trends in health care expenses, and evaluating the impact of global warming.

Based upon the experiences of our interns, the comments of our advisory board and alumni, it is clear that our degree requirements need to be more flexible. These new requirements will allow for a greater number of opportunities for graduates seeking employment rather than graduate studies. The learning outcomes for Applied Mathematics are still appropriate with the new curriculum change.

With a minimum of 17 credits of electives, our majors will have the possibility of taking a wide range of new and innovative courses that our college faculty are continually developing. These courses respond to rapid changes in technology and will enhance opportunities for our graduates. The divisions of industry into financial, pharmaceutical and Information are becoming more artificial. The unifying principal is the analysis of data.

Since some degree requirements (such as Calculus I MAT 1475) satisfy the general education requirement, it is nearly certain our students will take an additional 3-9 credits of electives. Thus, while a minimum of 17 credits will be taken, in practice most applied mathematics majors will need to take between 20-26 credits of electives.

We propose an enriched core of mathematics courses with an emphasis on probability, statistics, and modeling. These changes are supported by our advisory board, see page 12.

A CUNY wide initiative in data science resulted an MS in Data Science program at the Graduate Center (GC). The proposed curriculum change will prepare students to the MS in Data Science program at the GC. Dean Brumberg, the dean of Sciences at GC, proposes (an articulation agreement) combined BS and MS degree, a 5-year program. The proposed degree requirements with this articulation agreement will make it possible to have our students to graduate with a 5-year combined BS and MS degrees. This opportunity makes our curriculum change more meaningful as the graduate courses could be used as free electives in combining two degrees.

The program receives more transfer students than incoming freshmen, most coming from our own Computer Science Associate Science (CSC) program. Page 10 shows how credits would transfer from CSC to the new degree requirements for Applied Math. With this curriculum change, all credits will transfer, and CSC students can comfortably complete the degree within 2 more years of classwork. The new degree requirements will give transfer students from other colleges/universities flexibility to use their courses as free electives to create their own concentration. With the implementation of this proposal we expect an increase in retention and graduation rates. We also expect our enrollment to grow approximately 10%-20%.

Based on the self-study of the program in 2017, an average of 68% of our majors graduate in 4 years or less. The average time to finish the program is 3.7 years. With the new degree requirements, we propose to increase our average rate of graduation to 78% by allowing students to take free electives. This change better meets the needs of our majors. Information technology, financial, and pharmaceutical, are not separate industries. Modern industry is data driven. Therefore, having areas of concentration is not the best way to serve our students.

Our internships remain essential to our program. Many of our interns are offered employment at their internship site. The feedback we get from supervisors is invaluable, and this helps us maintain a high-quality degree program. The table below is a brief summary of internship and employment status of recent students (based on self-study of the program in 2017). Variety of internships and employments of students also support our curriculum change.

|  |  |  |
| --- | --- | --- |
| Student | Internship | Employment |
| 1 | The Jackson Laboratory | The Jackson Laboratory |
| 2 | Data Analyst at CANVS | Data Analyst at CANVS |
| 3 | Partner Egr and Sci Inc. & NOAA-CREST | Graduate school in atmospheric sciences |
| 4 | JCrew - IT Department | JCrew - IT Department |
| 5 | SpaceJam data | SpaceJam data |
| 6 | Worldwide Business research |  |
| 7 | East Harlem Tutorial Program | East Harlem Tutorial Program |
| 8 | Summer Research Opportunity Program (SROP) at Michigan State University |  |
| 9 | Brookhaven National Laboratory | PhD program in Statistics |
| 10 | University of Pittsburg School of Medicine / Global Public Health | Attending Medical school |
| 11 | IFG Trade, NY | IFG Trade, NY |
| 12 | Hereford Insurance Company |  |
| 13 | StatInMed, Inc. | Employed and Graduate school in Columbia University |
| 14 | Data analyst at Federal Reserve Bank of NY | NYU Graduate School |

Overall, our applied mathematics program is meeting our learning outcomes (self-study 2017). Our program offers a unique degree of high quality, but an update is needed so as to continue to prepare our majors for work in industry. Our proposed new curriculum is rigorous enough to prepare students for elite graduate programs and to successfully compete for highly sought-after positions. We will continue to make use of our advisory board so that our curriculum continues to offer paths to careers in industry. With the implementation of our proposed curriculum, we will increase enrollment, graduation rates, and better serve the needs of our students.

# DEGREE REQUIREMENTS: Mathematics Core – Part 1 of 3

|  |  |  |
| --- | --- | --- |
| Mathematics | MAT | Credits |
| Introduction to Computational Science\* | 1630 | 3 |
| Calculus I | 1475 | 4 |
| Calculus II | 1575 | 4 |
| Discrete Structures and Algorithms I | 2440 | 3 |
| Probability & Mathematical Statistics I | 2572 | 4 |
| Linear Algebra | 2580 | 3 |
| Numerical Methods | 2630 | 3 |
| Calculus III | 2675 | 4 |
| Differential Equations | 2680 | 3 |
| Probability & Mathematical Statistics II | 3672 | 4 |
| Math Modeling I | 3770 | 3 |
| Stochastic Models | 3772 | 3 |
| Introduction to Partial Differential Equations | 3880 | 3 |
| Computational Statistics | 4672 | 3 |
| Financial Risk Modeling | 4788 | 3 |
| Math Modeling II | 4880 | 3 |
| Topics in Applied Math\* | 4800 | 4 |
| Internship I | 4900 | 2 |
| Internship II | 4901 | 2 |
|  |  |  |
| Subtotal |  | 61 |

# DEGREE REQUIREMENTS - General Education – Part 2 of 3

|  |  |  |  |
| --- | --- | --- | --- |
| General Education |  |  | Credits |
| *Required* |  |  |  |
| English I | ENG | 1101 | 3 |
| English II | ENG | 1121 | 3 |
| Math & Quantitative Reasoning |  |  | 3 |
| Life/Physical Science |  |  | 3 |
|  |  |  |  |
| *Flexible Core* |  |  |  |
| World Cultures and Global Issues |  |  | 3 |
| US Experience in its Diversity |  |  | 3 |
| Creative Expression |  |  | 3 |
| Individual and Society |  |  | 3 |
| Scientific World |  |  | 3 |
| One additional Flex Core |  |  | 3 |
|  |  |  |  |
| *College Option* |  |  |  |
| Speech/Oral Communication |  |  | 3 |
| Interdisciplinary |  |  | 3 |
| Liberal Arts I |  |  | 3 |
| Liberal Arts II |  |  | 3 |
|  |  |  |  |
| Subtotal |  |  | 42 |

# DEGREE REQUIREMENTS – Free Electives – Part 3 of 3

Take electives to reach 120 credits (minimum of 17 credits).

There is overlap between the mathematics core and the general education (Pathways) requirements. For example, a student takes Calculus I in semester 1. Those credits will satisfy two requirements, one for the mathematics core and the other a 3-credit quantitative reasoning (Pathways general education). This student would need to take an additional 3 credits of electives.

A few technical details concerning prerequisites. We are changing the pre-requisites for MAT 2440, 2630, 3770 and MAT 4788 so that students with the new course MAT 1630 will have access. We are not removing any courses from the catalog and will continue to offer MAT courses needed by other departments.

# Transfer Students from CSC to Applied Math

The majority of the program’s transfer students are coming from Computer Science Associate Degree (CSC) program. The table below shows how credits would transfer from CSC to the new degree requirements for Applied Math. CSC students will be encouraged to MAT courses, such as MAT 1630, MAT 2572 and MAT 2675. So that all 60 credits will transfer.

It is important to keep in mind that the Applied Mathematics program is a 0-4 baccalaureate program, and not all CSC majors choose to transfer to Applied Mathematics. Currently a small number of credits are lost, but the new proposed requirements will reduce that number. CSC majors will be able to finish the Applied Mathematics program in 2 years.

|  |  |  |  |
| --- | --- | --- | --- |
| **CSC-Applied Math** | | *Sample Sequence 120 Credits* | |
| **FALL Year 1** | 16 | **SPRING Year 1** | 16 |
| *Calculus I MAT 1475 (4 cr)* | *QR* | *Calculus II MAT 1575 (4cr)* |  |
| *Intro to Program CST 1101* |  | *World Cultures & Global Issues* | *WC* |
| *English Composition ENG 1101* | *EC* | *CST elective-MAT 1630 Into Computation Recommended* |  |
| *Individual and Society* | *IS* | *English Composition II ENG 1121* | *EC* |
| *Macro Economics ECON 1101* | *US* | *C++ CST 3503* |  |
| **FALL Year 2** | 16 | **SPRING Year 2** | 15 |
| *Linear Algebra MAT 2580* | *SW* | *CST elective* |  |
| *C++ CST 2403* |  | *Probability and Statistics I MAT 2572-recommended (4cr)* |  |
| *CSC Elective-MAT 2675 Calc III recommended* |  | *Physics I PHYS 1441+lab (5)* | *LPS* |
| *Discrete Structures I MAT 2440* |  | *Discrete Structures II MAT 2540* |  |
| *Creative Expression* | *CE* |  |  |
| **FALL Year 3** | 16 | **SPRING Year 3** | 15 |
| Probability & Statistics II MAT 3672 (4cr) |  | Computational Stats MAT 4672 |  |
| Numerical Methods MAT 2630 |  | Math Modeling I MAT 3770 |  |
| Differential Equations MAT 2680 |  | Intro PDE MAT 3880 |  |
| Interdisciplinary | ID | Liberal Arts Elective I |  |
| Communication COMM 1330 or higher | CO | Stochastic Modeling MAT 3772 |  |
| **FALL Year 4** | 14 | **SPRING Year 4** | 12 |
| Internship I MAT4900 (2cr) |  | Internship II MAT 4901 (2cr) |  |
| Math Modeling II MAT 4880 |  | Free Elective |  |
| Risk Management MAT 4788 |  | Free Elective |  |
| Liberal Arts Elective II |  | Free Elective (4cr) |  |
| Topics in Applied Math MAT 4800 |  |  |  |
| All CSC required courses indicated in blue. | | | |
| All courses transfer. |  |  |  |

# Sample Sequence – Applied Mathematics

|  |  |  |  |
| --- | --- | --- | --- |
| **Applied Math** | | *Sample Sequence 120 Credits* | |
| **FALL Year 1** | 14 | **SPRING Year 1** | 16 |
| Calculus I MAT 1475 (4 cr) | QR | Calculus II MAT 1575 (4cr) |  |
| Intro to Computational Sci MAT 1630 (4) |  | Linear Algebra MAT 2580 (3) | SW |
| English Composition ENG 1101 | EC | English Composition II ENG 1121 | EC |
| Creative Expression | CE | Communications COMM 1330 or higher | CO |
|  |  | World Cultures Global Issues | WC |
| **FALL Year 2** | 16 | **SPRING Year 2** | 14 |
| Discrete Structures I MAT 2440 (3) |  | Probability and Statistics I MAT 2572 (4) |  |
| Calculus III MAT 2675 Calc (4) |  | Differential Equations MAT 2680 (3) |  |
| Life and Physical Science (3 to 5) | LPS | Interdisciplinary Course | ID |
| Individual and Society | IS | Free Elective (3) |  |
| Elective |  |  |  |
| **FALL Year 3** | 16 | **SPRING Year 3** | 14 |
| Numerical Methods MAT 2630 (3) |  | Intro PDE MAT 3880 (3) |  |
| Probability & Statistics II MAT 3672 (4) |  | Computational Stats MAT 4672 (3) |  |
| US Experience and its Diversity | US | Advanced Liberal Arts Elective |  |
| Liberal Arts Elective |  | Free Elective (4) |  |
| Free Elective (3) |  |  |  |
| **FALL Year 4** | 15 | **SPRING Year 4** | 15 |
| Math Modeling MAT 3770 (3) |  | Topics in Applied Math MAT 4800 (4) |  |
| Financial Risk MAT 4788 (3) |  | Math Modeling II MAT 4880 (3) |  |
| Internship I MAT4900 (2cr) |  | Internship II MAT 4901 (2cr) |  |
| Free Elective (3)  Free Elective (4) |  | Free Elective (3) |  |
|  |  | Free Elective (3) |  |
|  | | | |
|  |  |  |  |

# Mathematics Department Meeting Minutes

This curriculum proposal of the program along with the new courses MAT 1630 and MAT 4800 was approved at the Mathematics Department meeting on December 7, 2017.

**Evidence of Consultations**

City Tech Department Chairs within SoAS has been contacted via email. None of the departments requested a meeting. The table below is the short summary of responses from each department. E-mail correspondences from those who replied are at the Appendix.

|  |  |  |
| --- | --- | --- |
| **Department Name** | **Replied** | **Date** |
| African American Studies | No | N/A |
| Architectural Technology | No | N/A |
| Biological Science | Yes | 12/2/17 |
| Business | Yes | 11/20/17 |
| Career & Technical Teacher Education | No | N/A |
| Chemistry | No | N/A |
| Communication Design | No | N/A |
| Computer Engineering Technology | No | N/A |
| Computer Systems Technology | Yes | 11/20/17 |
| Construction Management Technology | No | N/A |
| Dental Hygiene | No | N/A |
| Electrical Engineering & Telecommunications Technologies | Yes | 11/21/17 |
| English | No | N/A |
| Entertainment Technology | No | N/A |
| Environmental Control Technology | No | N/A |
| Health Services Administration | No | N/A |
| Human Services | No | N/A |
| Hospitality Management | No | N/A |
| Humanities | Yes | 11/20/17 |
| Law & Paralegal Studies | No | N/A |
| Library | Yes | 11/22/17 |
| Mechanical Engineering Technology | Yes | 11/20/17 |
| Nursing | No | N/A |
| Physics | Yes | 11/20/17 |
| Radiologic Technology & Medical Imaging | No | N/A |
| Restorative Dentistry/ Dental Lab Technology | No | N/A |
| Social Science | No | N/A |
| Vision Care Technology | No | N/A |

../../../Desktop/OnurLtrNov2017.pdf

**[[1]](#footnote-1)**

**CHANCELLOR’S REPORT**

# Section AIII: Changes in Degree Programs

The following revisions are proposed for the Bachelor of Science in Applied Mathematics. Rationale: More jobs opportunities for graduates; increase retention and graduation rates

Program: BS in Applied Mathematics

Program Code: xxxx

Effective Date: Spring 2019

Applied Mathematics-(~~Financial Science Concentration~~)

Rationale: More jobs opportunities for graduates; increase retention and graduation rates

|  |  |
| --- | --- |
| FROM: ~~Financial Science~~ | TO: Applied Mathematics |
| **BS APPLIED MATHEMATICS -~~FINANCIAL SCIENCE~~**  **GENERAL EDUCATION COMMON CORE**  **42 CREDITS**  **I- REQUIRED CORE1 (4 COURSES, 13-15 CREDITS)**  **English Composition (2 courses, 6 credits)**  ENG 1101 English Composition I 3  ENG 1121 English Composition II 3  **Mathematical and Quantitative Reasoning2 (1 course, 4 credits)**  ~~MAT 1475 Calculus I or higher meets a degree requirement~~4  **Life and Physical Sciences**  ~~PHYS 1441 General Physics I: Calculus Based (recommended)~~ 3-5  **II – FLEXIBLE CORE (6 COURSES, 18-20 CREDITS)**  **World Cultures and Global Issues**  Any approved course3  US Experience in its Diversity 3  ~~ECON 1101 Macroeconomics (recommended)~~  **Individual and Society 3**  **Creative Expression**  3  **Scientific World**  ~~PHYS 1442 General Physics II: Calculus Based (recommended) 3-5~~  **One additional course from any group 3**  ~~MAT 2440 Discrete Structures and Algorithms I (recommended)~~  **III – COLLEGE OPTION REQUIREMENT3 (12 CREDITS)**  • One course in Speech/Oral Communication  COM 1330 Public Speaking or higher 3  • One interdisciplinary Liberal Arts and Sciences course  Any approved course 3  • Additional liberal arts credits to reach a minimum total of 42 credits in general education. In meeting their general education requirements overall, students must take at least one advanced  liberal arts course or two sequential courses in a foreign language  **Writing Intensive Requirement**  Students at New York City College of Technology must complete two courses designated WI for the associate level, one from GenEd and one from the major; and two additional courses designated WI for the baccalaureate level, one from GenEd and one from the major.  **~~PROGRAM-SPECIFIC DEGREE REQUIREMENTS 78 CREDITS~~**  ~~CST 1204 Database Systems 3~~  ~~CST 2403 C++ Programming I 3~~  ~~CST 3503 C++ Programming II 3~~  ~~CST 3504 Database Design 3~~  ~~ECON 1101 Macroeconomics 3~~  ~~ECON 2301 Money and Banking 3~~  MAT 1475 Calculus I 4  ~~MAT 1476L Calculus Laboratory 1~~  MAT 1575 Calculus II 4  MAT 2440 Discrete Structures and Algorithms I 3  MAT 2572 Probability and Mathematical Statistics I 4  MAT 2580 Introduction to Linear Algebra 3  MAT 2630 Applied Mathematics Technology – Numerical Methods 3  MAT 2675 Calculus III 4  MAT 2680 Differential Equations 3  MAT 3672 Probability and Mathematical Statistics II 4  MAT 3770 Mathematical Modeling I – Optimization 3  MAT 3772 Stochastic Models 3  ~~MAT 3788 Applications of the Heat Equation for Financial Mathematics 3~~  MAT 4672 Computational Statistics with Applications 3  MAT 4788 Financial Risk Modeling 3  MAT 4900 Internship I 2  MAT 4901 Internship II 2  ~~PHYS 1441 General Physics I: Calculus Based~~  ~~5~~  **~~Electives (select as needed to add up to 78 credits)~~**  ~~MAT 2540 Discrete Structures and Algorithms II 3~~  ~~MAT 3787 Applied Mathematics – Finite Fields 3~~  ~~MAT 3880 An Introduction to Partial Differential Equations 3~~  ~~MAT 4872 Probability and Mathematical Statistics III 4~~  ~~CST 3603 Object Oriented Programming 3~~  ~~CST 3604 Quality Database Implementation 3~~  ~~PHYS 1442 General Physics II: Calculus Based 5~~    TOTAL PROGRAM-SPECIFIC REQUIRED AND ELECTIVE COURSES 78  TOTAL NYSED LIBERAL ARTS/SCIENCE CREDITS 42  TOTAL CREDITS REQUIRED FOR THE DEGREE 120  1 Students are strongly urged to consult degree requirements for “double-duty”  courses: degree requirements that also meet CUNY Pathways general education  requirements in that category.  2 Applied Mathematics is a STEM degree program, requiring 4 or 5 credit courses in mathematics and science. Students may elect to use their required 4 or 5 credit Math  or science courses to meet Common Core requirements.  3 Complete lists of liberal arts and sciences courses and advanced liberal arts  courses, as well as semester-specific lists of interdisciplinary courses and writing  intensive courses, are available online at the City Tech Pathways website.  4 Students without the requisite math background to enter MAT 1475 must take MAT 1175, MAT 1275 and/or, MAT 1375 in preparation, depending on initial placement. This will increase the number of required credits for the degree by 4-12.  5 Some program-specific required courses might also satisfy the General Education Common Core. For example, a student satisfies quantitative reasoning by taking MAT  1475 Calculus I for 4 credits. ~~The student could them take MAT 4872 as a 4 credit~~  ~~elective.~~ | **BS APPLIED MATHEMATICS**  **GENERAL EDUCATION COMMON CORE**  **42 CREDITS**  **I- REQUIRED CORE1 (4 COURSES, 13-15 CREDITS)**  **English Composition (2 courses, 6 credits)**  ENG 1101 English Composition I 3  ENG 1121 English Composition II 3  **Mathematical and Quantitative Reasoning2 (1 course, 4 credits)**  **Life and Physical Sciences**  **II – FLEXIBLE CORE (6 COURSES, 18-20 CREDITS)**  **World Cultures and Global Issues**  Any approved course3  US Experience in its Diversity 3  **Individual and Society 3**  **Creative Expression**  3  **Scientific World**  **One additional course from any group 3**  **III – COLLEGE OPTION REQUIREMENT3 (12 CREDITS)**  • One course in Speech/Oral Communication  COM 1330 Public Speaking or higher 3  • One interdisciplinary Liberal Arts and Sciences course  Any approved course 3  • Additional liberal arts credits to reach a minimum total of 42 credits in general education. In meeting their general education requirements overall, students must take at least one advanced  liberal arts course or two sequential courses in a foreign language  **Writing Intensive Requirement**  Students at New York City College of Technology must complete two courses designated WI for the associate level, one from GenEd and one from the major; and two additional courses designated WI for the baccalaureate level, one from GenEd and one from the major.  **PROGRAM SPECIFIC DEGREE REQUIREMENTS 61 CREDITS**  MAT 1475 Calculus I 4  MAT 1630 Introduction to Computational Science 3  MAT 1575 Calculus II 4  MAT 2440 Discrete Structures and Algorithms I 3 MAT 2572 Probability and Mathematical Statistics I 4 MAT 2580 Introduction to Linear Algebra 3  MAT 2630 Applied Mathematics Technology – Numerical Methods 3  MAT 2675 Calculus III 4  MAT 2680 Differential Equations 3  MAT 3672 Probability and Mathematical Statistics II 4  MAT 3770 Mathematical Modeling I – Optimization 3  MAT 3772 Stochastic Models 3  MAT 3880 An Introduction to Partial Differential Equations 3 MAT 4672 Computational Statistics with Applications 3  MAT 4788 Financial Risk Modeling 3  MAT 4800 Topics in Applied Mathematics 3  MAT 4900 Internship I 2  MAT 4901 Internship II 2    **TOTAL PROGRAM-SPECIFIC REQUIRED COURSES 61**  **TOTAL NYSED LIBERAL ARTS/SCIENCE CREDITS 42**  **Take free electives to reach 120 Credits**  **TOTAL CREDITS REQUIRED FOR THE DEGREE 120**  1 Students are strongly urged to consult degree requirements for “double-duty”  courses: degree requirements that also meet CUNY Pathways general education  requirements in that category.  2 Applied Mathematics is a STEM degree program, requiring 4 or 5 credit courses in mathematics and science. Students may elect to use their required 4 or 5 credit Math  or science courses to meet Common Core requirements.  3 Complete lists of liberal arts and sciences courses and advanced liberal arts  courses, as well as semester-specific lists of interdisciplinary courses and writing  intensive courses, are available online at the City Tech Pathways website.  4 Students without the requisite math background to enter MAT 1475 must take MAT 1275 and/or MAT 1375 in preparation, depending on initial placement. |

**Applied Mathematics- ~~(Information Science Concentration)~~**

Rationale: More jobs opportunities for graduates; increase retention and graduation rates

|  |  |
| --- | --- |
| FROM: ~~Information Science~~ | TO: |
| **~~BS APPLIED MATHEMATICS~~ -~~INFORMATION SCIENCE~~**  **~~GENERAL EDUCATION COMMON CORE~~**  **~~42 CREDITS~~**  **~~I- REQUIRED CORE~~~~1~~ ~~(4 COURSES, 13-15 CREDITS)~~**  **~~English Composition (2 courses, 6 credits)~~**  ~~ENG 1101 English Composition I 3~~  ~~ENG 1121 English Composition II 3~~  **~~Mathematical and Quantitative Reasoning~~~~2~~ ~~(1 course, 4 credits)~~**  ~~MAT 1475 Calculus I or higher meets a degree requirement~~~~4~~  **~~Life and Physical Sciences~~**  ~~PHYS 1441 General Physics I: Calculus Based (recommended)~~ ~~3-5~~  **~~II – FLEXIBLE CORE (6 COURSES, 18-20 CREDITS)~~**  **~~World Cultures and Global Issues~~**  ~~Any approved course~~~~3~~  ~~US Experience in its Diversity 3~~  ~~ECON 1101 Macroeconomics (recommended)~~  **~~Individual and Society 3~~**  **~~Creative Expression~~**  ~~3~~  **~~Scientific World~~**  ~~PHYS 1442 General Physics II: Calculus Based (recommended) 3-5~~  **~~One additional course from any group 3~~**  ~~MAT 2440 Discrete Structures and Algorithms I (recommended)~~  **~~III – COLLEGE OPTION REQUIREMENT~~~~3~~ ~~(12 CREDITS)~~**  ~~• One course in Speech/Oral Communication~~  ~~COM 1330 Public Speaking or higher 3~~  ~~• One interdisciplinary Liberal Arts and Sciences course~~  ~~Any approved course 3~~  ~~• Additional liberal arts credits to reach a minimum total of 42 credits in general education. In meeting their general education requirements overall, students must take at least one advanced~~  ~~liberal arts course or two sequential courses in a foreign language~~  **~~Writing Intensive Requirement~~**  ~~Students at New York City College of Technology must complete two courses designated WI for the associate level, one from GenEd and one from the major; and two additional courses designated WI for the baccalaureate level, one from GenEd and one from the major.~~  ~~PROGRAM-SPECIFIC DEGREE REQUIREMENTS 78 CREDITS~~  ~~CST 2403 C++ Programming I 3~~  ~~CST 3503 C++ Programming II 3~~  ~~EET 1222 Circuit Analysis II 5~~  ~~EET 1240 Electronics 4~~  ~~EET 2140 Communications Electronics 3~~  ~~EET 2162 Digital Electronics I 3~~  ~~MAT 1475 3 Calculus I 4~~  ~~MAT 1476L Calculus Laboratory 1~~  ~~MAT 1575 Calculus II 4~~  ~~MAT 2440 Discrete Structures and Algorithms I 3~~  ~~MAT 2572 Probability and Mathematical Statistics I 4~~  ~~MAT 2580 Introduction to Linear Algebra 3~~  ~~MAT 2630 Applied Mathematics Technology –~~  ~~Numerical Methods 3~~  ~~MAT 2675 Calculus III 4~~  ~~MAT 3770 Mathematical Modeling I – Optimization 3~~  ~~MAT 4880 Mathematical Modeling II 3~~  ~~MAT 4900 Internship I 2~~  ~~MAT 4901 Internship II 2~~  ~~PHYS 1441 General Physics I: Calculus Based 5~~  ~~PHYS 1442 General Physics II: Calculus Based 5~~  ~~TCET 2102 Analog and Digital Telephony 4~~  ~~TCET 2242 Microcomputer Interfacing 3~~  ~~TCET 3102 Analog and Digital Communications I 4~~  ~~Electives (select as needed to add up to 78 4)~~  ~~CST 2307 Networking Fundamentals 3~~  ~~CST 3507 Advanced Single-LAN Concepts 3~~  ~~MAT 2540 Discrete Structures and Algorithms II 3~~  ~~MAT 2680 Differential Equations 3~~  ~~MAT 3672 Probability and Mathematical Statistics II 4~~  ~~MAT 3772 Stochastic Models 3~~  ~~MAT 3777 Applied Mathematics –~~  ~~Applications of the Wave Equation 3~~  ~~MAT 3787 Applied Mathematics – Finite Fields 3~~  ~~MAT 3788 Applied of the Heat Equation for~~  ~~Financial Mathematics 3~~  ~~MAT 3880 An Introduction to Partial Differential Equations 3~~  ~~MAT 4672 Computational Statistics 3~~  ~~MAT 4872 Probability and Mathematical Statistics III 4~~  ~~TOTAL PROGRAM-SPECIFIC REQUIRED AND ELECTIVE COURSES 78~~  ~~TOTAL NYSED LIBERAL ARTS/SCIENCE CREDITS 42~~  ~~TOTAL CREDITS REQUIRED FOR THE DEGREE 120~~ |  |

**Applied Mathematics- ~~(Science Concentration)~~**

Rationale: More jobs opportunities for graduates; increase retention and graduation

|  |  |
| --- | --- |
| FROM: ~~Science~~ | TO: |
| **~~BS APPLIED MATHEMATICS - SCIENCE~~**  **~~GENERAL EDUCATION COMMON CORE~~**  **~~42 CREDITS~~**  **~~I- REQUIRED CORE~~~~1~~ ~~(4 COURSES, 13-15 CREDITS)~~**  **~~English Composition (2 courses, 6 credits)~~**  ~~ENG 1101 English Composition I 3~~  ~~ENG 1121 English Composition II 3~~  **~~Mathematical and Quantitative Reasoning~~~~2~~ ~~(1 course, 4 credits)~~**  ~~MAT 1475 Calculus I or higher meets a degree requirement~~~~4~~  **~~Life and Physical Sciences~~**  ~~PHYS 1441 General Physics I: Calculus Based (recommended)~~ ~~3-5~~  **~~II – FLEXIBLE CORE (6 COURSES, 18-20 CREDITS)~~**  **~~World Cultures and Global Issues~~**  ~~Any approved course~~~~3~~  ~~US Experience in its Diversity 3~~  ~~ECON 1101 Macroeconomics (recommended)~~  **~~Individual and Society 3~~**  **~~Creative Expression~~**  ~~3~~  **~~Scientific World~~**  ~~PHYS 1442 General Physics II: Calculus Based (recommended) 3-5~~  **~~One additional course from any group 3~~**  ~~MAT 2440 Discrete Structures and Algorithms I (recommended)~~  **~~III – COLLEGE OPTION REQUIREMENT~~~~3~~ ~~(12 CREDITS)~~**  ~~• One course in Speech/Oral Communication~~  ~~COM 1330 Public Speaking or higher 3~~  ~~• One interdisciplinary Liberal Arts and Sciences course~~  ~~Any approved course 3~~  ~~• Additional liberal arts credits to reach a minimum total of 42 credits in general education. In meeting their general education requirements overall, students must take at least one advanced~~  ~~liberal arts course or two sequential courses in a foreign language~~  **~~Writing Intensive Requirement~~**  ~~Students at New York City College of Technology must complete two courses designated WI for the associate level, one from GenEd and one from the major; and two additional courses designated WI for the baccalaureate level, one from GenEd and one from the major.~~  **~~PROGRAM-SPECIFIC DEGREE REQUIREMENTS 78 CREDITS~~**  ~~BIO 1101 Biology I 4~~  ~~BIO 2311 Human Anatomy and Physiology I 4~~  ~~CST 1101 Problem Solving with Computer programming 3~~  ~~CST 2403 C++ Programming I 3~~  ~~CST 3503 C++ Programming II 3~~  ~~CHEM 1110 General Chemistry I 4~~  ~~CHEM 1210 General Chemistry II 4~~  ~~CHEM 2223 Organic Chemistry I 5~~  ~~MAT 1475 Calculus I 3 4~~  ~~MAT 1575 Calculus II 4~~  ~~MAT 2440 Discrete Structures and Algorithms I 3~~  ~~MAT 2572 Probability and Mathematical Statistics I 4~~  ~~MAT 2580 Introduction to Linear Algebra 3~~  ~~MAT 2630 Applied Mathematics Technology –~~  ~~Numerical Methods 3~~  ~~MAT 2675 Calculus III 4~~  ~~MAT 2680 Differential Equations 3~~  ~~MAT 3672 Probability and Mathematical Statistics II 4~~  ~~MAT 3770 Mathematical Modeling I – Optimization 3~~  ~~MAT 3772 Stochastic Models 3~~  ~~MAT 3880 An Introduction to Partial Differential Equations 3~~  ~~MAT 4672 Computational Statistics 4~~  ~~MAT 4900 Internship I 2~~  ~~MAT 4901 Internship II 2~~  ~~Electives (select as needed to add up to 78 4)~~  ~~BIO 2312 Human Anatomy and Physiology I 4~~  ~~CHEM 2323 Organic Chemistry I 5~~  ~~MAT 2540 Discrete Structures and Algorithms II 3~~  ~~MAT 3777 Applied Mathematics~~  ~~Applications of the Wave Equation 3~~  ~~MAT 3787 Applied Mathematics – Finite Fields 3~~  ~~MAT 3788 Applications of the Heat Equation for~~  ~~Financial Mathematics 3~~  ~~MAT 4788 Financial Risk Modeling 3~~  ~~MAT 4872 Probability and Mathematical Statistics III 4~~  ~~MAT 4880 Mathematical Modeling II 3~~  ~~TOTAL PROGRAM-SPECIFIC REQUIRED AND ELECTIVE COURSES 78~~  ~~TOTAL NYSED LIBERAL ARTS/SCIENCE CREDITS 42~~  ~~TOTAL CREDITS REQUIRED FOR THE DEGREE 120~~ |  |

# Section AIV: New Courses

1. **New courses to be offered in the Mathematics department**

|  |  |
| --- | --- |
| **Department(s)** | Mathematics |
| **Academic Level** | **[X] Regular  [   ] Compensatory  [   ] Developmental  [   ] Remedial** |
| **Subject Area** | Mathematics |
| **Course Prefix** | MAT |
| **Course Number** | 1630 |
| **Course Title** | Introduction to Computational Science |
| **Catalog Description** | A project-based introduction to computational thinking and problem solving. Covers a wide range of topics, including data visualization, statistical techniques, simulations of dynamical systems, computational techniques to understand data, using regression to fit models to data, as well as an introduction to some more advanced topics: Monte Carlo simulations, optimization, dynamic programming, image processing, natural language processing, geospatial data analysis and modern data science. |
| **Prerequisite** |  |
| **Corequisite** |  |
| **Pre- or corequisite** | MAT 1475 |
| **Credits** | 3 |
| **Contact Hours** | 2 class hours, 2 lab hours |
| **Liberal Arts** | **[ ] Yes  [X] No** |
| **Course Attribute (e.g. Writing Intensive, etc.)** |  |
| **Course Applicability** | |  |  |  | | --- | --- | --- | | **[X] Major** |  | | | **[ ] Gen Ed Required** | **[ ] Gen Ed - Flexible** | **[ ] Gen Ed - College Option** | | **[ ] English Composition** | **[ ] World Cultures** | **[ ] Speech** | | **[ ] Mathematics** | **[ ] US Experience in its Diversity** | **[ ] Interdisciplinary** | | **[ ] Science** | **[ ] Creative Expression** | **[ ] Advanced Liberal Arts** | |  | **[ ] Individual and Society** |  | |  | **[ ] Scientific World** |  | |
| **Effective Term** | Spring 2019 |

**Rationale:** Based on our 2017 Applied Mathematics Self-Study, we found our students need greater facility in using technology for problem solving. For maximum impact, this course would be taken in the first semester. It will also help students in more advanced courses who struggle to learn both advanced concepts and the tools used in problem solving. The course will develop the computational, problem solving, and programming skills to help students succeed in their applied math courses for the rest of their academic study. The course will follow the current programming languages and technologies.

New York City College of Technology, CUNY

NEW COURSE PROPOSAL FORM

This form is used for all new course proposals. Attach this to the [Curriculum Modification Proposal Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/2013-10-10-Curriculum_Modification_Proposal_Form.docx) and submit as one package as per instructions. Use one New Course Proposal Form for each new course.

|  |  |
| --- | --- |
| **Course Title** | Introduction to Computational Science |
| **Proposal Date** | 11/30/17 |
| **Proposer’s Name** | Huseyin Yuce |
| **Course Number** | MAT 1630 |
| **Course Credits, Hours** | 3 credits: 2 class hours, 2 lab hours |
| **Course Pre / Co-Requisites** | Pre/Co Requisite MAT 1475 |
| **Catalog Course Description** | This is a project-based course introduces students with little or no prior programming experience to computational thinking and problem solving. This course covers a wide range of topics, including data visualization, statistical techniques, simulations of dynamical systems, computational techniques to understand data, using regression to fit models to data, as well as an introduction to some more advanced topics: Monte Carlo simulations, optimization, dynamic programming, image processing, natural language processing, geospatial data analysis, and modern data science. |
| **Brief Rationale**  Provide a concise summary of why this course is important to the department, school or college. | Based on our 2017 Applied Mathematics Self-Study, we found our students need greater facility in using technology for problem solving. For maximum impact, this course would be taken in the first semester. It will also help students in more advanced courses who struggle to learn both advanced concepts and the tools used in problem solving. The course will develop the computational, problem solving, and programming skills to help students succeed in their applied math courses for the rest of their academic study. Also, the course will follow the current programming languages and technologies. |
| **CUNY – Course Equivalencies**  Provide information about equivalent courses within CUNY, if any. | None. |
| **Intent to Submit as Common Core**  If this course is intended to fulfill one of the requirements in the common core, then indicate which area. | No |
| **For Interdisciplinary Courses:**   * Date submitted to ID Committee for review * Date ID recommendation received   - Will all sections be offered as ID? Y/N | No |
|  |
|  |
| **Intent to Submit as a Writing Intensive Course** | No |

**NEW COURSE PROPOSAL CHECK LIST**

Use this checklist to ensure that all required documentation has been included. You may wish to use this checklist as a table of contents within the new course proposal.

|  |  |
| --- | --- |
| **Completed NEW COURSE PROPOSAL FORM** |  |
| * Title, Number, Credits, Hours, Catalog course description | X |
| * Brief Rationale | X |
| * CUNY – Course Equivalencies | X |
| Completed [Library Resources and Information Literacy Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/curriculum_modification_library_form.doc) |  |
| **Course Outline**  Include within the outline the following. |  |
| Hours and Credits for Lecture and Labs  If hours exceed mandated Carnegie Hours, then rationale for this | X |
| Prerequisites/Co- requisites | X |
| Detailed Course Description | X |
| Course Specific Learning Outcome and Assessment Tables   * Discipline Specific * General Education Specific Learning Outcome and Assessment Tables | X |
| Example Weekly Course outline | X |
| Grade Policy and Procedure | X |
| Recommended Instructional Materials (Textbooks, lab supplies, etc.) | X |
| Library resources and bibliography | X |
| **Course Need Assessment.**  Describe the need for this course. Include in your statement the following information. |  |
| Target Students who will take this course. Which programs or departments, and how many anticipated?  Documentation of student views (if applicable, e.g. non-required elective). | X |
| Projected headcounts (fall/spring and day/evening) for each new or modified course. | X |
| If additional physical resources are required (new space, modifications, equipment), description of these requirements. If applicable, Memo or email from the VP for Finance and Administration with written comments regarding additional and/or new facilities, renovations or construction. | X |
| Where does this course overlap with other courses, both within and outside of the department? | X |
| Does the Department currently have full time faculty qualified to teach this course? If not, then what plans are there to cover this? | X |
| If needs assessment states that this course is required by an accrediting body, then provide documentation indicating that need. | X |
| **Course Design**  Describe how this course is designed. |  |
| Course Context (e.g. required, elective, capstone) | X |
| Course Structure: how the course will be offered (e.g. lecture, seminar, tutorial, fieldtrip)? | X |
| Anticipated pedagogical strategies and instructional design (e.g. Group Work, Case Study, Team Project, Lecture) | X |
| How does this course support Programmatic Learning Outcomes? | X |
| Is this course designed to be partially or fully online? If so, describe how this benefits students and/or program. | N/A |
| **Additional Forms for Specific Course Categories** |  |
| [Interdisciplinary Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/Application-for-Interdisciplinary-Course-Designation.docx) (if applicable) | N/A |
| Interdisciplinary Committee Recommendation (if applicable and if received)\*  \*Recommendation must be received before consideration by full Curriculum Committee | N/A |
| [Common Core (Liberal Arts) Intent to Submit](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/CommonCoreCourseSubmissionForm_4.2.12.doc) (if applicable) | N/A |
| Writing Intensive Form if course is intended to be a WIC (under development) | N/A |
| If course originated as an experimental course, then results of evaluation plan as developed with director of assessment. | N/A |
| **(Additional materials for** [**Curricular Experiments**](http://www.300jaystreet.com/college-council/curriculum_proposals/curricular-experiments)**)** |  |
| Plan and process for evaluation developed in consultation with the director of assessment. (Contact Director of Assessment for more information). | N/A |
| Established Timeline for Curricular Experiment | N/A |

**Rationale / Course Need:**

This course will be required of all Applied Mathematics majors. Based on current enrollment data, we expect about 20 students per semester. The course responds to a survey of alumni who indicate the difficult in learning advanced coursework in mathematics and computer applications. This freshmen level course should be taken in the first semester and should help students to be more successful in subsequent applied coursework.

This course specifies projects. No textbook is required. As technology changes, we will incorporate new technologies. We provide students with free documentation, and the department will update as needed.

The Mathematics Department has the faculty needed to teach this course, and no new resources are needed.

|  |  |
| --- | --- |
| **Course Description:** | |
|  |  |
| **DEPARTMENT:** | Mathematics |
| **COURSE:** | **MAT 1630** |
| **TITLE:** | **Introduction to Computational Science** |
| **DESCRIPTION:** | This is a project-based course that offers an introduction to problem solving using computing. It introduces students with little or no prior programming experience to computational thinking and problem solving, which is becoming a fundamental skill that can be used in every industry. This course will emphasize how to formulate a problem and find an algorithmic solution that can be carried out by a computer. This course covers a wide range of topics, including data visualization, statistical techniques, simulations of dynamical systems, computational techniques to understand data, using regression to fit models to data, as well as an introduction to some more advanced topics: Monte Carlo simulations, optimization, dynamic programming, image processing, natural language processing, geospatial data analysis, and current data science. |
|  |  |
| **RECOMMENDED TEXTS:** | 1. *A First Course in Statistical Programming with R*, by W. Braun, Duncan Murdoch, 2nd edition, Cambridge University Press, 2016. 2. *Introduction to Computation and Programming Using Python: with application to understanding data*, by John V. Guttag, 2nd edition, The MIT Press, 2016. |
|  |  |
| **CREDITS:** | 3 (2 class hours and 2 lab hours) |
| **PRE OR COREQUISITE:** | MAT 1475 or higher |
|  |  |
| **PREPERED BY:** | Prof. Kostadinov and Prof. Thiel, Fall 2017 |

1. **Testing Guidelines:**

The following exams should be scheduled:

1. Homework/Lab/Class Assignments 25%
2. Midterm 25%
3. Project 25%
4. Final Exam 25%

1. **Course Intended Learning Outcomes/Assessment Methods**

|  |  |
| --- | --- |
| **Learning Outcomes:** | **Assessment Methods** |
| Apply computational tools for storing, manipulating, simulating and visualizing data. | Classroom discussions, projects, homework and exams. |
| Design, code and test small computer programs written in high-level coding language. | Classroom discussions, projects, homework and exams. |
| Implement simulations to computationally solve problems involving randomness. | Classroom discussions, projects, homework and exams. |
| Fit models to data using regression and use the models to make predictions. | Classroom discussions, projects, homework and exams. |
| Write code to implement mathematical and statistical functions. | Classroom discussions, projects, homework and exams. |

1. **General Education Learning Outcomes/Assessment Methods**

|  |  |
| --- | --- |
| **Learning Outcomes:** | **Assessment Methods** |
| Gather, interpret, evaluate, and use information discerningly from a variety of sources. | Classroom discussions, projects, homework and exams. |
| Employ scientific reasoning and logical thinking to solve problems. | Classroom discussions, projects, homework and exams. |
| Communicate effectively using oral, written and visual means. | Classroom discussions, projects, homework and exams. |
| Make meaningful connections between mathematics and other areas of study. | Classroom discussions, projects, homework and exams. |
| Work productively and creatively in a team and build consensus. | Classroom discussions, assignments and team projects. |
| Acquire tools for lifelong learning. | Classroom discussions, projects, homework and exams. |

1. **New York City College of Technology Policy on Academic Integrity**

Students and all others who work with information, ideas, texts, images, music, inventions, and other intellectual property owe their audience and sources accuracy and honesty in using, crediting, and citing sources. As a community of intellectual and professional workers, the College recognizes its responsibility for providing instruction in information literacy and academic integrity, offering models of good practice, and responding vigilantly and appropriately to infractions of academic integrity. Accordingly, academic dishonesty is prohibited in The City University of New York and at New York City College of Technology and is punishable by penalties, including failing grades, suspension, and expulsion. The complete text of the College policy on Academic Integrity may be found in the catalog.

1. **MAT 1630 Introduction to Computational Science - Tentative list of projects and schedule. Projects and code will be provided on the OpenLab course site as a free pdf download.**

|  |  |  |
| --- | --- | --- |
| **Session** | **Introduction to Scientific Computing** | **Homework** |
| 1,2 | Programming foundations and IDE introduction. | Data structures, flow control, loops, functions. |
| 3 | Project 1: Basic graphics and mathematical visualizations. | Contours and heat maps. Parametric plots. |
| 4 | Project 2: Loan and mortgage computations and visualizations. | Extended loan and mortgage models. |
| 5,6 | Project 3: Recursion: Fibonacci numbers. Tower of Hanoi. | Finding pi. Recursive tiling. Iteration of linear maps. |
| 7,8 | Project 4: Functions: MetroCard calculator. | Bisection search. Newton-Raphson algorithm. |
| 9,10 | Project 5: Generating random samples from probability distributions. Estimating probabilities with Monte Carlo simulations. Random walks. | Estimating pi. How often does the better team win?  The hurried duelers. Gambler’s ruin. War targets. |
| 11 | Project 6: Applications of Monte Carlo simulations to finance and insurance. | Finance and Insurance options. Hotel overbooking. |
| 12,13 | Project 7: Benford's Law: Detecting fraud in bank accounts. Detecting binary sequences generated by a computer vs. a human. | Applications of Benford’s Law. |
| 14,15 | Project 8: Using linear and logistic regression to fit a model to data. | Predicting credit card fraud. |
| 16 | **Midterm** |  |
| 17,18 | Project 9: Dynamical System Simulation: Classical and Probabilistic SIR disease model simulation. Simulating heat distributions on a grid. | Spread of fire. Spread of pandemics. |
| 19,20 | Project 10: Dynamic Programming and Memorization. | Picking up coins. Fishing. American options. |
| 21,22 | Project 11: Image manipulations. Seam carving images. | Cleaning, blurring and seam carving images. |
| 23,24 | Project 12: Data Science: K-Means Clustering and K-nearest Neighbors. | Predictive analytics for business and sports. |
| 25,26 | Project 13: Natural Language Processing: Text Mining. | Sentiment Analysis. |
| 27,28 | Project 14: Geospatial Data Analysis and Visualizations. | Creating interactive maps from geospatial data. |
| 28 | **Project Presentations** |  |
| 29 | **Review** |  |
| 30 | **Final Exam** |  |

1. **New courses to be offered in the Mathematics department**

|  |  |
| --- | --- |
| **Department(s)** | Mathematics |
| **Academic Level** | **[X] Regular  [   ] Compensatory  [   ] Developmental  [   ] Remedial** |
| **Subject Area** | Mathematics |
| **Course Prefix** | MAT |
| **Course Number** | 4800 |
| **Course Title** | Topics in Applied Mathematics |
| **Catalog Description** | Topics are selected to reflect current industrial applications and may vary from semester to semester.  This project-based course will allow for an in-depth exploration of current and emerging trends. Students will synthesize mathematics from prior mathematics courses. The projects will be based on practical problems, and students will present solutions in verbal and written form, using modern presentation formats and practices. |
| **Prerequisite** |  |
| **Corequisite** |  |
| **Pre- or corequisite** | Pre or corequisite: MAT 3XXX or higher, or department approval |
| **Credits** | 3 |
| **Contact Hours** | 3 class hours |
| **Liberal Arts** | **[ ] Yes  [X] No** |
| **Course Attribute (e.g. Writing Intensive, etc.)** |  |
| **Course Applicability** | |  |  |  | | --- | --- | --- | | **[X] Major** |  | | | **[ ] Gen Ed Required** | **[ ] Gen Ed - Flexible** | **[ ] Gen Ed - College Option** | | **[ ] English Composition** | **[ ] World Cultures** | **[ ] Speech** | | **[ ] Mathematics** | **[ ] US Experience in its Diversity** | **[ ] Interdisciplinary** | | **[ ] Science** | **[ ] Creative Expression** | **[ ] Advanced Liberal Arts** | |  | **[ ] Individual and Society** |  | |  | **[ ] Scientific World** |  | |
| **Effective Term** | Spring 2019 |

**Rationale:** The modern tools of industry rapidly change. This topics course offers these tools to our students. In addition, in our 2017 Applied Mathematics Self-Study, students expressed a desire for a project-based course utilizing their skills. This proposed course would meet that need.

New York City College of Technology, CUNY

NEW COURSE PROPOSAL FORM

This form is used for all new course proposals. Attach this to the [Curriculum Modification Proposal Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/2013-10-10-Curriculum_Modification_Proposal_Form.docx) and submit as one package as per instructions. Use one New Course Proposal Form for each new course.

|  |  |
| --- | --- |
| **Course Title** | Topics in Applied Mathematics |
| **Proposal Date** | 11/30/17 |
| **Proposer’s Name** | Huseyin Yuce |
| **Course Number** | MAT 4800 |
| **Course Credits, Hours** | 3 credits: 3 class hours |
| **Course Pre / Co-Requisites** | Pre/Co Requisite MAT 3000 or higher, or department approval |
| **Catalog Course Description** | Topics are selected to reflect current industrial applications and may vary from semester to semester.  This project-based course will allow for an in-depth exploration of current and emerging trends. Students will synthesize mathematics from prior mathematics courses. The projects will be based on practical problems, and students will present solutions in verbal and written form, using modern presentation formats and practices. |
| **Brief Rationale**  Provide a concise summary of why this course is important to the department, school or college. | The modern tools of industry rapidly change. This topics course offers these tools to our students. In addition, in our 2017 Applied Mathematics Self-Study, students expressed a desire for a project-based course utilizing their skills. This proposed course would meet that need. |
| **CUNY – Course Equivalencies**  Provide information about equivalent courses within CUNY, if any. | The topics presented will vary, and so equivalency would need to be evaluated on an individual basis. |
| **Intent to Submit as Common Core**  If this course is intended to fulfill one of the requirements in the common core, then indicate which area. | No |
| **For Interdisciplinary Courses:**   * Date submitted to ID Committee for review * Date ID recommendation received   - Will all sections be offered as ID? Y/N | No |
|  |
|  |
| **Intent to Submit as a Writing Intensive Course** | No |

Please include all appropriate documentation as indicated in the NEW COURSE PROPOSAL Combine all information into a single document that is included in the Curriculum Modification Form.

**NEW COURSE PROPOSAL CHECK LIST**

Use this checklist to ensure that all required documentation has been included. You may wish to use this checklist as a table of contents within the new course proposal.

|  |  |
| --- | --- |
| **Completed NEW COURSE PROPOSAL FORM** |  |
| * Title, Number, Credits, Hours, Catalog course description | X |
| * Brief Rationale | X |
| * CUNY – Course Equivalencies | X |
| Completed [Library Resources and Information Literacy Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/curriculum_modification_library_form.doc) |  |
| **Course Outline**  Include within the outline the following. |  |
| Hours and Credits for Lecture and Labs  If hours exceed mandated Carnegie Hours, then rationale for this | X |
| Prerequisites/Co- requisites | X |
| Detailed Course Description | X |
| Course Specific Learning Outcome and Assessment Tables   * Discipline Specific * General Education Specific Learning Outcome and Assessment Tables | X |
| Example Weekly Course outline | X |
| Grade Policy and Procedure | X |
| Recommended Instructional Materials (Textbooks, lab supplies, etc.) | X |
| Library resources and bibliography | X |
| **Course Need Assessment.**  Describe the need for this course. Include in your statement the following information. |  |
| Target Students who will take this course. Which programs or departments, and how many anticipated?  Documentation of student views (if applicable, e.g. non-required elective). | X |
| Projected headcounts (fall/spring and day/evening) for each new or modified course. | X |
| If additional physical resources are required (new space, modifications, equipment), description of these requirements. If applicable, Memo or email from the VP for Finance and Administration with written comments regarding additional and/or new facilities, renovations or construction. | X |
| Where does this course overlap with other courses, both within and outside of the department? | X |
| Does the Department currently have full time faculty qualified to teach this course? If not, then what plans are there to cover this? | X |
| If needs assessment states that this course is required by an accrediting body, then provide documentation indicating that need. | X |
| **Course Design**  Describe how this course is designed. |  |
| Course Context (e.g. required, elective, capstone) | X |
| Course Structure: how the course will be offered (e.g. lecture, seminar, tutorial, fieldtrip)? | X |
| Anticipated pedagogical strategies and instructional design (e.g. Group Work, Case Study, Team Project, Lecture) | X |
| How does this course support Programmatic Learning Outcomes? | X |
| Is this course designed to be partially or fully online? If so, describe how this benefits students and/or program. | N/A |
| **Additional Forms for Specific Course Categories** |  |
| [Interdisciplinary Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/Application-for-Interdisciplinary-Course-Designation.docx) (if applicable) | N/A |
| Interdisciplinary Committee Recommendation (if applicable and if received)\*  \*Recommendation must be received before consideration by full Curriculum Committee | N/A |
| [Common Core (Liberal Arts) Intent to Submit](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/CommonCoreCourseSubmissionForm_4.2.12.doc) (if applicable) | N/A |
| Writing Intensive Form if course is intended to be a WIC (under development) | N/A |
| If course originated as an experimental course, then results of evaluation plan as developed with director of assessment. | N/A |
| **(Additional materials for** [**Curricular Experiments**](http://www.300jaystreet.com/college-council/curriculum_proposals/curricular-experiments)**)** |  |
| Plan and process for evaluation developed in consultation with the director of assessment. (Contact Director of Assessment for more information). | N/A |
| Established Timeline for Curricular Experiment | N/A |

**Rationale / Course Need:**

This course will be required of all Applied Mathematics majors. We expect about 20-25 students per semester. The course responds to a survey of alumni who suggest a course to help synthesize material from various courses. This senior level course will help keep our graduates competitive as they seek employment.

This course specifies projects. No textbook is required. As technology changes, we will incorporate new technologies. We provide students with free documentation, and the department will update as needed.

The Mathematics Department has the faculty needed to teach this course, and no new resources are needed.

|  |  |
| --- | --- |
| **Course Description:** | |
|  |  |
| **DEPARTMENT:** | **Mathematics** |
| **COURSE:** | **MAT 4800** |
| **TITLE:** | **Topics in Applied Mathematics** |
| **DESCRIPTION:** | Topics are selected to reflect current industrial applications and may vary from semester to semester.  This project-based course will allow for an in-depth exploration of current and emerging trends. Students will synthesize mathematics from prior mathematics courses. The projects will be based on practical problems, and students will present solutions in verbal and written form, using modern presentation formats and practices. |
|  |  |
| **RECOMMENDED TEXTS:** |  |
|  |  |
| **CREDITS:** | 3 credits (3 lecture hours, 0 lab hours) |
| **PRE OR COREQUISITE:** | MAT 3000 level or higher, or Departmental permission |
|  |  |
| **PREPERED BY:** | Professors Kostadinov, Natov and Yuce. Fall 2017 |

Testing Guidelines:

1. **Testing Guidelines:**

The following exams should be scheduled:

1. Homework/Class Assignments 25%
2. Midterm 25%
3. Project 25%
4. Final Project 25%
5. **Course Intended Learning Outcomes/Assessment Methods**

|  |  |
| --- | --- |
| **Learning Outcomes:** | **Assessment Methods** |
| Make an applied problem tractable. | Classroom discussions, projects, homework and exams. |
| Use appropriate mathematical tools to develop solutions. | Classroom discussions, projects, homework and exams. |
| Use appropriate technology to develop solutions. | Classroom discussions, projects, homework and exams. |
| Organize results and clearly present the finding in oral and written form. | Classroom discussions, projects, homework and exams. |

1. **General Education Learning Outcomes/Assessment Methods**

|  |  |
| --- | --- |
| **Learning Outcomes:** | **Assessment Methods** |
| Employ modern mathematical techniques to solve problems. | Classroom discussions, projects, homework and exams. |
| Communicate effectively using oral, written and visual means. | Classroom discussions, projects, homework and exams. |

1. **New York City College of Technology Policy on Academic Integrity**

Students and all others who work with information, ideas, texts, images, music, inventions, and other intellectual property owe their audience and sources accuracy and honesty in using, crediting, and citing sources. As a community of intellectual and professional workers, the College recognizes its responsibility for providing instruction in information literacy and academic integrity, offering models of good practice, and responding vigilantly and appropriately to infractions of academic integrity. Accordingly, academic dishonesty is prohibited in The City University of New York and at New York City College of Technology and is punishable by penalties, including failing grades, suspension, and expulsion. The complete text of the College policy on Academic Integrity may be found in the catalog.

1. **MAT 4800 Topics in Applied Mathematics – Few sample list of projects:**

The contents of this course will vary.  As of 2018 some possible projects might include:

1. Provide a statistical analysis to determine if the 2016 presidential election was rigged.
2. Using CDC data on the reported cases on influenza in the USA, determine a range for the likely number of actual cases for 2018.
3. Create a mathematical model to study the economic impact of moving from traditional hospitals to more numerous and smaller specialized centers such as: outpatient, emergency rooms, and overnight.
4. Provide statistical analysis of treatment patterns and outcomes among the major cancer types.
5. Perform a comparison analysis (cost and treatment effectiveness) between FlexPen injection versus syringe injection of insulin in diabetic patients.
6. Create mathematical model to study the diffusion of toxins in a water channel.
7. Create mathematical model to study the diffusion of air pollution emitted from a smokestack.
8. Create a simple model of an ecological system with three components: a plant, a small mammal called the Murat which eats the plant, and a carnivorous predator called the Vekton which eats the mammal. Use the model to test our belief that we can control this ecosystem by controlling the plant population. The goal is to maintain both species at healthy numbers.
9. Can one hear the shape of a drum? By Mark Kac, *The American Mathematical Monthly*, Vol. 73, No. 4, pp. 1-23, (1966).
10. In order to avoid resonance (when the frequency of rotation of the disc matches with the natural frequencies of vibration of the disc) in an annular disk design it in such a way so that the natural frequencies of vibration of the disk are increased considerably. Consequently, the permeable range of angular rotation of the disk will be much wider.

# LIBRARY RESOURCES & INFORMATION LITERACY: Major Curriculum Modification

Please complete for **all** major curriculum modifications. This information will assist the library in planning for new courses/programs.

Consult with your library faculty subject specialist (<http://cityte.ch/dir>) **3 weeks before the proposal deadline**.

**Course proposer:** please complete boxes 1-4. **Library faculty subject specialist:** please complete box 5.

|  |  |  |
| --- | --- | --- |
| **1** | **Title of proposal**  **New Applied Mathematics Degree Requirements** | **Department/Program**  Mathematics / Applied Mathematics Program |
|  | **Proposed by** (include email & phone)  Huseyin Yuce  [hyuce@citytech.cuny.edu](mailto:hyuce@citytech.cuny.edu)  718-254-8613 | **Expected date course(s) will be offered**  Fall 2018  **# of students 30** |

|  |  |
| --- | --- |
| **2** | **The library cannot purchase reserve textbooks for every course at the college, nor copies for all students. Consult our website (**[**http://cityte.ch/curriculum**](http://cityte.ch/curriculum)**) for articles and eBooks for your courses, or our open educational resources (OER) guide (**[**http://cityte.ch/oer**](http://cityte.ch/oer)**). Have you considered using a freely-available OER or an open textbook in this course?**  Free material will be provided to the students in two new courses that are part of this proposal. There are couple of recommended textbooks. However, instructors will develop the course materials for the new courses (MAT 1630 and MAT 4800) and will make it available as interactive electronic text. |

|  |  |
| --- | --- |
| **3** | **Beyond the required course materials, are City Tech library resources sufficient for course assignments? If additional resources are needed, please provide format details (e.g. eBook, journal, DVD, etc.), full citation (author, title, publisher, edition, date), price, and product link.**  The library has sufficient materials. |

|  |  |
| --- | --- |
| **4** | **Library faculty focus on strengthening students' information literacy skills in finding, critically evaluating, and ethically using information. We collaborate on developing assignments and customized instruction and research guides. When this course is offered, how do you plan to consult with the library faculty subject specialist for your area? Please elaborate.**  We will consult with the subject specialist to identify sources of reliable data. |

|  |  |
| --- | --- |
| **5** | **Library Faculty Subject Specialist:** (Cailean Cooney, Assistant Professor)  **Comments and Recommendations:** Zero-cost open course materials will provide students with reliable access to revisit concepts and test their knowledge independently and at the advisement of instructors. Prof. Cooney will keep the Math Department informed of potential funding opportunities to develop OERs and will provide a list of existing OERs to review for adoption and / or modification.  The Library provides resources relevant to the course topic, available both on-site and online, including print and electronic books, and journal subscriptions. Print books from other CUNY campuses are also available to request. The Library will consider additional resource requests based on budgetary means.  **Date:** 2/28/18 |

# Section AV: Changes to Existing Courses

1. **Changes to be offered in the Mathematics department**

**A1. New Prerequisites:** We update the prerequisites for MAT 2440, 2630, 3770 and MAT 4788 to reflect MAT 1630 as a suitable substitute for MAT 1476L, and MAT 3672 for MAT 4788.

**MAT 2440 Discrete Structures and Algorithms I**

|  |  |  |  |
| --- | --- | --- | --- |
| **CUNYFirst Course ID** | MAT 2440 Discrete Structures and Algorithms I |  |  |
| **FROM:** |  | **TO:** |  |
| **Department(s)** | Mathematics | **Department(s)** | Mathematics |
| **Course** | MAT 2440 | **Course** | MAT 2440 |
| **Prerequisite** | *(MAT 1375 or higher) and (CST 1201 or CST 2403)* | **Prerequisite** | *(MAT 1375 or higher) and (CST 1201 or CST 2403 or MAT 1630)* |
| **Corequisite** |  | **Corequisite** |  |
| **Pre- or corequisite** |  | **Pre- or corequisite** |  |
| **Hours** |  | **Hours** |  |
| **Credits** |  | **Credits** |  |
| **Description** |  | **Description** |  |
| **Requirement Designation** |  | **Requirement Designation** |  |
| **Liberal Arts** | [X] Yes [ ] No | **Liberal Arts** | [X ] Yes [ ] No |
| **Course Attribute (e.g. Writing Intensive, Honors, etc** |  | **Course Attribute (e.g. Writing Intensive, Honors, etc.** |  |
| **Course Applicability** | |  | | --- | | [X] Major | | [ ] Gen Ed Required | | [ ] English Composition | | [ ] Mathematics | | [ ] Science | | [ ] Gen Ed - Flexible | | [ ] World Cultures | | [ ] US Experience in its Diversity | | [ ] Creative Expression | | [ ] Individual and Society | | [ ] Scientific World | | [ ] Gen Ed - College Option | | [ ] Speech | | [ ] Interdisciplinary | | [ ] Advanced Liberal Arts | | **Course Applicability** | |  | | --- | | [X] Major | | [ ] Gen Ed Required | | [ ] English Composition | | [ ] Mathematics | | [ ] Science | | [ ] Gen Ed - Flexible | | [ ] World Cultures | | [ ] US Experience in its Diversity | | [ ] Creative Expression | | [ ] Individual and Society | | [ ] Scientific World | | [ ] Gen Ed - College Option | | [ ] Speech | | [ ] Interdisciplinary | | [ ] Advanced Liberal Arts | |
| **Effective Term** |  |  | **Spring 2019** |

**MAT 2630 Applied Math Technology – Numerical Methods**

|  |  |  |  |
| --- | --- | --- | --- |
| **CUNYFirst Course ID** | MAT 2630 Numerical Methods |  |  |
| **FROM:** |  | **TO:** |  |
| **Department(s)** | Mathematics | **Department(s)** | Mathematics |
| **Course** | MAT 2630 Applied Math Technology: Numerical Method | **Course** | MAT 2630 |
| **Prerequisite** | *MAT 1575, MAT 2580 and one of the following: CST 1101 or higher or MAT 1475H or MAT 1476L* | **Prerequisite** | *MAT 1575, MAT 2580 and one of the following: CST 1101 or higher or MAT 1475H, MAT 1476L or MAT 1630* |
| **Corequisite** |  | **Corequisite** |  |
| **Pre- or corequisite** |  | **Pre- or corequisite** |  |
| **Hours** |  | **Hours** |  |
| **Credits** |  | **Credits** |  |
| **Description** |  | **Description** |  |
| **Requirement Designation** |  | **Requirement Designation** |  |
| **Liberal Arts** | [] Yes [X ] No | **Liberal Arts** | [] Yes [X ] No |
| **Course Attribute (e.g. Writing Intensive, Honors, etc** |  | **Course Attribute (e.g. Writing Intensive, Honors, etc.** |  |
| **Course Applicability** | |  | | --- | | [X] Major | | [ ] Gen Ed Required | | [ ] English Composition | | [ ] Mathematics | | [ ] Science | | [ ] Gen Ed - Flexible | | [ ] World Cultures | | [ ] US Experience in its Diversity | | [ ] Creative Expression | | [ ] Individual and Society | | [ ] Scientific World | | [ ] Gen Ed - College Option | | [ ] Speech | | [ ] Interdisciplinary | | [ ] Advanced Liberal Arts | | **Course Applicability** | |  | | --- | | [X] Major | | [ ] Gen Ed Required | | [ ] English Composition | | [ ] Mathematics | | [ ] Science | | [ ] Gen Ed - Flexible | | [ ] World Cultures | | [ ] US Experience in its Diversity | | [ ] Creative Expression | | [ ] Individual and Society | | [ ] Scientific World | | [ ] Gen Ed - College Option | | [ ] Speech | | [ ] Interdisciplinary | | [ ] Advanced Liberal Arts | |
| **Effective Term** |  |  | **Spring 2019** |

**MAT 3770 Math Modeling I – Optimization:**

|  |  |  |  |
| --- | --- | --- | --- |
| **CUNYFirst Course ID** | MAT 3770 Mathematical Modeling I - Optimization |  |  |
| **FROM:** |  | **TO:** |  |
| **Department(s)** | Mathematics | **Department(s)** | Mathematics |
| **Course** | MAT 3770 Math Modeling I - Optimization | **Course** | MAT 3770 |
| **Prerequisite** | *(Prerequisites: MAT 2580, MAT 2675, CST 1101)* | **Prerequisite** | *Prerequisites: MAT 2580, MAT 2675, and (CST 1101 or MAT 1630)* |
| **Corequisite** |  | **Corequisite** |  |
| **Pre- or corequisite** |  | **Pre- or corequisite** |  |
| **Hours** |  | **Hours** |  |
| **Credits** |  | **Credits** |  |
| **Description** |  | **Description** |  |
| **Requirement Designation** |  | **Requirement Designation** |  |
| **Liberal Arts** | [X] Yes [ ] No | **Liberal Arts** | [X ] Yes [ ] No |
| **Course Attribute (e.g. Writing Intensive, Honors, etc** |  | **Course Attribute (e.g. Writing Intensive, Honors, etc.** |  |
| **Course Applicability** | |  | | --- | | [X] Major | | [ ] Gen Ed Required | | [ ] English Composition | | [ ] Mathematics | | [ ] Science | | [ ] Gen Ed - Flexible | | [ ] World Cultures | | [ ] US Experience in its Diversity | | [ ] Creative Expression | | [ ] Individual and Society | | [ ] Scientific World | | [ ] Gen Ed - College Option | | [ ] Speech | | [ ] Interdisciplinary | | [ ] Advanced Liberal Arts | | **Course Applicability** | |  | | --- | | [X] Major | | [ ] Gen Ed Required | | [ ] English Composition | | [ ] Mathematics | | [ ] Science | | [ ] Gen Ed - Flexible | | [ ] World Cultures | | [ ] US Experience in its Diversity | | [ ] Creative Expression | | [ ] Individual and Society | | [ ] Scientific World | | [ ] Gen Ed - College Option | | [ ] Speech | | [ ] Interdisciplinary | | [ ] Advanced Liberal Arts | |
| **Effective Term** |  |  | **Spring 2019** |

|  |  |  |  |
| --- | --- | --- | --- |
| **CUNYFirst Course ID** | MAT 4788 Financial Risk Modeling |  |  |
| **FROM:** |  | **TO:** |  |
| **Department(s)** | Mathematics | **Department(s)** | Mathematics |
| **Course** | MAT 4788 | **Course** | MAT 4788 |
| **Prerequisite** | MAT 3788 | **Prerequisite** | MAT 3672 |
| **Corequisite** |  | **Corequisite** |  |
| **Pre- or corequisite** |  | **Pre- or corequisite** |  |
| **Hours** | 3 | **Hours** | 3 |
| **Credits** | 3 | **Credits** | 3 |
| **Description** |  | **Description** |  |
| **Requirement Designation** | Degree | **Requirement Designation** | Degree |
| **Liberal Arts** | [ ] Yes [X] No | **Liberal Arts** | [ ] Yes [X] No |
| **Course Attribute** |  | **Course Attribute** |  |
| **Course Applicability** | |  | | --- | | [X] Major | | [ ] Gen Ed Required | | [ ] English Composition | | [ ] Mathematics | | [ ] Science | | [ ] Gen Ed - Flexible | | [ ] World Cultures | | [ ] US Experience in its Diversity | | [ ] Creative Expression | | [ ] Individual and Society | | [ ] Scientific World | | [ ] Gen Ed - College Option | | [ ] Speech | | [ ] Interdisciplinary | | [ ] Advanced Liberal Arts | | **Course Applicability** | |  | | --- | | [X] Major | | [ ] Gen Ed Required | | [ ] English Composition | | [ ] Mathematics | | [ ] Science | | [ ] Gen Ed - Flexible | | [ ] World Cultures | | [ ] US Experience in its Diversity | | [ ] Creative Expression | | [ ] Individual and Society | | [ ] Scientific World | | [ ] Gen Ed - College Option | | [ ] Speech | | [ ] Interdisciplinary | | [ ] Advanced Liberal Arts | |
| **Effective Term** |  |  | **Spring 2019** |

**Appendix:**

**E-mail correspondences.**

**Sunday, December 3, 2017 at 11:13:30 PM Eastern Standard Time**

**Subject:** Re: Curriculum Change for Applied Mathematics Program

**Date:** Saturday, December 2, 2017 at 9:39:13 PM Eastern Standard Time

**From:** Laina Karthikeyan

**To:** Huseyin Yuce

Dear Huseyin,

Sorry for the late response. I have been extremely busy. Thank you for the information. We have a suggestion to add 2 additional courses, which may be a good fit for your Science electives. These are Genetics- BIO 2450 and Molecular and Cellular Biology- BIO 3620. Thanks! Hope that you are having a good weekend.

Best,   
Laina

Laina Karthikeyan, Ph.D.

Associate Professor and Chair of Biological Sciences Department

New York City College of Technology

The City University of New York (CUNY)

Brooklyn, NY 11201

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

718-260-5088

**From:** Huseyin Yuce

**Sent:** Monday, November 20, 2017 2:47:58 PM

**To:** Huseyin Yuce

**Subject:** Curriculum Change for Applied Mathematics Program

Dear Chairperson,

On behalf of the Mathematics Department, I am writing to inform you of a major curriculum proposal for the Applied Mathematics major. We will be eliminating the three areas of concentration and have a unified set of degree requirements for all majors. The new curriculum will include a core of mathematics courses, the general education core, and free electives. This will give greater flexibility to our majors, allowing them to customize the degree to their needs. Please see the attached for details.

This proposal was motivated by the findings of our 2017 Self Study. Our advisory board supports our proposal.

If you have questions or would like to meet and discuss this proposal, please let me know.

Regards,

Huseyin

Huseyin Yuce, Ph.D.

Associate Professor

Department of Mathematics

New York City College of Technology – CUNY

300 Jay Street, Namm 826

Brooklyn, NY 11201

**Wednesday, November 29, 2017 at 1:13:32 AM Eastern Standard Time**

**Subject:** Re: Curriculum Change for Applied Mathematics Program

**Date:** Monday, November 20, 2017 at 7:06:02 PM Eastern Standard Time

**From:** Huseyin Yuce

**To:** Lucas Bernard

**CC:** Sandie Han, David Smith, Justin Vazquez-Poritz, Boyan Kostadinov, Bonne August **Attachments:** image001.png

Hi,

Thank you for the reply and suggestions. Perhaps my document was not clear enough.

1. I’m not trying to create all possible scenarios. That’s why it is called “create your own concentration”.
2. The table I have provided states “suggested” free electives and it is not exhaustive.
3. The courses you mentioned are great for our students concentrating in Finance, Pharmacoeconomics, and outcomes research.

Once again, our students can take any course as free electives as long as they meet the prerequisites of any department. I hope this clears it up.

Regards,   
Huseyin

Huseyin Yuce, Ph.D.

Associate Professor

Department of Mathematics

New York City College of Technology

The City University of New York

300 Jay Street, Namm 826

Brooklyn, NY 11201

**From:** Lucas Bernard <[LBernard@citytech.cuny.edu](mailto:LBernard@citytech.cuny.edu)>

**Date:** Monday, November 20, 2017 at 5:13 PM

**To:** Huseyin Yuce <[HYuce@citytech.cuny.edu](mailto:HYuce@citytech.cuny.edu)>

**Cc:** Sandie Han <[SHan@citytech.cuny.edu](mailto:SHan@citytech.cuny.edu)>, David Smith <[DSmith@citytech.cuny.edu](mailto:DSmith@citytech.cuny.edu)>, Justin Vazquez-

Poritz <[JVazquez-Poritz@citytech.cuny.edu](mailto:JVazquez-Poritz@citytech.cuny.edu)>, Boyan Kostadinov <[BKostadinov@citytech.cuny.edu](mailto:BKostadinov@citytech.cuny.edu)>,

Bonne August <[BAugust@citytech.cuny.edu](mailto:BAugust@citytech.cuny.edu)>

**Subject:** Re: Curriculum Change for Applied Mathematics Program

Hi,

I looked over your proposal and have a couple of suggestions. As someone who has worked in the pharmaceutical industry and has also done some financial consulting, I was surprised that none of your scenarios offer:

**Econometric Modeling**

**Time Series Modeling**

These two (consecutive) courses, which would roughly cover OLS, GLS, Logit/Probit/Tobit, Panel Data,

AR()/ARCH/GARCH, etc. would naturally follow after your Probability/Statistics sequence, would reinforce Linear Algebra (optionally), and would provide software experience in, e.g., R, STATA, SPSS, or (even) MS-Excel. These modeling techniques/packages are directly applicable in Outcomes Research (Pharma), Biostatistics (Pharma), Economics, Logistics, Big-Data, Finance, Marketing, etc. Such methods are also quite useful a variety of graduate programs that students might be interested in, e.g., MPH, Psychology, MBA-Finance, MBA-Marketing, etc.

I taught this sequence, more or less, to undergraduates at NYU for many years, and also to Pharmacy majors at LIU, to MBA students at LIU, etc. Thus, I am fairly familiar with the pedagogical issues.

IMHO, PDEs/Finite Element Methods (outside of engineering), Dynamical Systems, Proofs/Logic, and even Real Analysis are probably not so useful in the type of professions (data analysis, etc.) that our students are likely to enter. Econometrics/Time-Series Modeling are more accessible and immediately employable.

Happy to discuss further, if you wish.

You'll have my support, whatever you decide!   
My 2-cents

Lucas Bernard, PhD

Chairman & Associate Professor

Department of Business

The New York City College of Technology

The City University of New York

300 Jay Street, Namm-1012

Brooklyn, NY 11201-1909

[Email:](mailto:LBernard@citytech.cuny.edu) **LBernard@citytech.cuny.edu**

Phone: 718-260-5773

Fax: 718-260-5774

<http://www.citytech.cuny.edu/business/chairperson.aspx>

**Confidentiality Notice:** This email, including all attachments, is con2idential and intended solely for the use of the individual(s) or entity to which it is addressed. This communication may contain information that is protected from disclosure under State and/or Federal law. Please notify the sender immediately if you have received this communication in error and delete it from your system. If you are not the intended recipient, you are hereby noti2ied that disclosing, copying, distributing, or taking any action in reliance on the contents of this information is strictly prohibited.

**Wednesday, November 29, 2017 at 1:12:04 AM Eastern Standard Time**

**Subject:** FW: Curriculum Change for Applied Mathematics Program

**Date:** Monday, November 20, 2017 at 4:22:23 PM Eastern Standard Time

**From:** Hong Li

**To:** Huseyin Yuce, Ashwin Satyanarayana, Bader Oudjehane, Candido Cabo, David Bellehsen, Delores Archibald, Douglas Moody, Elena Filatova, Elizabeth Milonas, Fangyang Shen, Harry Simmons, Hong Li, Janusz Kusyk, Jean Boulet, Marcos Pinto, Ossama Elhadary, Sam Shahidullah, Tatiana Malyuta, Tony Holley, XiangDong Li, Yu-Wen Chen

**Attachments:** AM Program F17.pdf

Dear all,

Please see forwarded MATH department proposal.

Let me know if you have any comment/suggestion.

Thanks

Hong Li, Ph.D.

Associate Professor and Chair

Department of Computer Systems Technology

New York City College of Technology

City University of New York

300 Jay Street N914

Brooklyn, NY 11201

Phone: (718) 260-5170

[Email: hli@citytech.cuny.edu](mailto:hli@citytech.cuny.edu)

**From:** Huseyin Yuce <[HYuce@citytech.cuny.edu](mailto:HYuce@citytech.cuny.edu)>

**Date:** Monday, November 20, 2017 at 2:47 PM

**To:** Huseyin Yuce <[HYuce@citytech.cuny.edu](mailto:HYuce@citytech.cuny.edu)>

**Subject:** Curriculum Change for Applied Mathematics Program

Dear Chairperson,

On behalf of the Mathematics Department, I am writing to inform you of a major curriculum proposal for the Applied Mathematics major. We will be eliminating the three areas of concentration and have a unified set of degree requirements for all majors. The new curriculum will include a core of mathematics courses, the general education core, and free electives. This will give greater flexibility to our majors, allowing them to customize the degree to their needs. Please see the attached for details.

This proposal was motivated by the findings of our 2017 Self Study. Our advisory board supports our proposal.

If you have questions or would like to meet and discuss this proposal, please let me know.

Regards,

Huseyin

Huseyin Yuce, Ph.D.

Associate Professor

Department of Mathematics

New York City College of Technology – CUNY

300 Jay Street, Namm 826

Brooklyn, NY 11201

**Wednesday, November 29, 2017 at 1:17:57 AM Eastern Standard Time**

**Subject:** Re: Applied Math curriculum change

**Date:** Tuesday, November 21, 2017 at 10:11:26 PM Eastern Standard Time

**From:** Huseyin Yuce

**To:** Mohammad Razani, Sidi berri   
Dear Mohammad and Sidi,

AM students will take whatever course they can. They may be all 1000 level engineering courses. The courses I have listed does not create an engineering concentration. If an AM students wants to take an engineering course, he/she will take the course based on its prerequisites. If our students want to take an upper level engineering course they need to take all of its prerequisites.

As you mentioned in your email “they don’t have any options other than taking the first four EET courses”; then fine, first 4 it is.

Another option is that a student may not even want a concentration. He/She takes one engineering, moves to economics, then music etc. That’s fine too. When I say “free electives”, I mean it. We, as a department, do not impose any concentration anymore. They are free to choose any course they want from any department they want for 15 credits (or more).

I’m not trying to make our student take your upper level courses which require 5 to 7 prerequisites. I hope this clears it up. If not, I’m happy to stop by your office sometime next week to discuss.

Regards,   
Huseyin

**From:** Mohammad Razani <[MRazani@citytech.cuny.edu](mailto:MRazani@citytech.cuny.edu)>

**Date:** Tuesday, November 21, 2017 at 3:11 PM

**To:** Huseyin Yuce <[HYuce@citytech.cuny.edu](mailto:HYuce@citytech.cuny.edu)>

**Cc:** Sidi berri <[SBerri@citytech.cuny.edu](mailto:SBerri@citytech.cuny.edu)>

**Subject:** Re: Applied Math curriculum change

Dear Huseyin,

Thanks for your email and your concerns regarding the Math’s students graduation rates.

After looking at your first email, I noticed that the only option for Math students is to take the first four courses listed making up 15 credits. These four courses will require additional three pre-reqs courses of 7 credits (EET 1102, EET 1122, EET 1241) making it total of 22 credits which is over 50% of the EET-AAS core course requirement.

I think there are several draw backs to this concentration, the main one is that the EET-AAS will be undermined with 50% duplication.

In your second email (below) you said forget the tables in your first email and students will pick and choose their own courses.

This is not clear regarding Engineering Concentration because they don’t have any options other than taking the first four EET courses.

I think we (you, Sidi and I) need to have a meeting to discuss these issues and more so your proposal does not end up degrading other degrees and gets our support.

Regards,   
Mohammad

**From:** Huseyin Yuce

**Sent:** Monday, November 20, 2017 7:27:49 PM

**To:** Huseyin Yuce

**Subject:** Applied Math curriculum change

Dear Chairs,

It seems that last two tables in the document have been taken too literally. I have listed them to give an idea of few possible concentrations, please ignore them. Students are free to "create their own concentrations" by taking any "free electives" (15 credits or more) as long as they meet the prerequisites.

Also, please do not send me your prerequisites about the courses listed in the tables. If a student does not have the prerequisites he/she will not take your course as free elective.

Kind regards,   
Huseyin

**Wednesday, November 29, 2017 at 1:11:16 AM Eastern Standard Time**

**Subject:** Re: Curriculum Change for Applied Mathematics Program

**Date:** Monday, November 20, 2017 at 3:11:59 PM Eastern Standard Time

**From:** Ann Delilkan

**To:** Huseyin Yuce

Ah--got it. Thanks--and good luck with the proposal!

best,

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 A630

Brooklyn NY 11201

Tel: (718) 260-5018

**From:** Huseyin Yuce

**Sent:** Monday, November 20, 2017 3:05 PM

**To:** Ann Delilkan

**Subject:** Re: Curriculum Change for Applied Mathematics Program

Hi Anne,

Thank you very much for your quick response.

Humanities courses will not be impacted at all, contrary you may benefit from this. AM students may choose your courses as free electives. Though, I would advise them to create a concentration based on their career goals. The tables that show the free electives are few examples of concentration. An AM student may choose to create a concentration in “Mathematics in Humanities” (if there is a job opportunity).

Regards,   
Huseyin

**From:** Ann Delilkan <[ADelilkan@citytech.cuny.edu](mailto:ADelilkan@citytech.cuny.edu)>

**Date:** Monday, November 20, 2017 at 2:50 PM

**To:** Huseyin Yuce <[HYuce@citytech.cuny.edu](mailto:HYuce@citytech.cuny.edu)>

**Subject:** Re: Curriculum Change for Applied Mathematics Program

Hi Huseyin,

Good to see this degree in the works! Could you please let me know whether any Humanities courses

are impacted by this proposal. I realize not all details are represented.

Best,

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 A630

Brooklyn NY 11201

Tel: (718) 260-5018

**From:** Huseyin Yuce

**Sent:** Monday, November 20, 2017 2:47 PM

**To:** Huseyin Yuce

**Subject:** Curriculum Change for Applied Mathematics Program

Dear Chairperson,

On behalf of the Mathematics Department, I am writing to inform you of a major curriculum proposal for the Applied Mathematics major. We will be eliminating the three areas of concentration, and have a unified set of degree requirements for all majors. The new curriculum will include a core of mathematics courses, the general education core, and free electives. This will give greater flexibility to our majors, allowing them to customize the degree to their needs. Please see the attached for details.

This proposal was motivated by the findings of our 2017 Self Study. Our advisory board supports our proposal.

If you have questions or would like to meet and discuss this proposal, please let me know.

Regards,

Huseyin

Huseyin Yuce, Ph.D.

Associate Professor

Department of Mathematics

New York City College of Technology – CUNY

300 Jay Street, Namm 826

Brooklyn, NY 11201

**Wednesday, November 29, 2017 at 1:15:21 AM Eastern Standard Time**

**Subject:** RE: Curriculum Change for Applied Mathematics Program

**Date:** Wednesday, November 22, 2017 at 12:27:27 PM Eastern Standard Time

**From:** Maura Smale

**To:** Huseyin Yuce

Thank you Huseyin, this looks like a modification that will be very beneficial for our students. My colleagues and I in the Library are happy to support it.

Best,   
Maura

---

Maura A. Smale, Ph.D.

Chief Librarian and Professor

Ursula C. Schwerin Library

New York City College of Technology, CUNY

718.260.5497

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

hYp://library.citytech.cuny.edu/

preferred pronouns: she/her/hers

**From:** Huseyin Yuce

**Sent:** Monday, November 20, 2017 2:48 PM

**To:** Huseyin Yuce <[HYuce@citytech.cuny.edu](mailto:HYuce@citytech.cuny.edu)>

**Subject:** Curriculum Change for Applied Mathematics Program

Dear Chairperson,

On behalf of the Mathematics Department, I am writing to inform you of a major curriculum proposal for the Applied

Mathematics major. We will be eliminating the three areas of concentration and have a unified set of degree requirements for all majors. The new curriculum will include a core of mathematics courses, the general education core, and free electives. This will give greater flexibility to our majors, allowing them to customize the degree to their needs. Please see the attached for details.

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Regards,

Huseyin

Huseyin Yuce, Ph.D.

Associate Professor

Department of Mathematics

New York City College of Technology – CUNY

300 Jay Street, Namm 826

Brooklyn, NY 11201 **Page 1 of 1**

**Wednesday, November 29, 2017 at 1:14:54 AM Eastern Standard Time**

**Subject:** Re: Curriculum Change for Applied Mathematics Program

**Date:** Monday, November 20, 2017 at 10:33:27 PM Eastern Standard Time

**From:** Roman Kezerashvili

**To:** Huseyin Yuce   
Hi Huseyin,

Thanks for your reply. It seems to me that PHYS 1441 and 1442, which is **a General Physics**, should be a part of 42 Credits of General Education. This is how usually it works in other schools.

Best wishes,   
Roman

Roman Kezerashvili, Ph.D., D.Sc.

Professor of Physics

Chairman of Physics Department

City Tech and Graduate Center

The City University of New York

Director of the Center for Theoretical Physics at City Tech

300 Jay Street

Brooklyn NY, 11201

Phone: 718 260 5277

[Email:rkezerashvili@citytech.cuny.edu](mailto:rkezerashvili@citytech.cuny.edu%20)

**From:** Huseyin Yuce

**Sent:** Monday, November 20, 2017 10:23 PM

**To:** Roman Kezerashvili

**Subject:** Re: Curriculum Change for Applied Mathematics Program

Dear Roman,

Thank you for your message. While I totally agree with your comment below, after 42 credits Gen Ed and 63 credits core math requirements, students are free to choose any course they want. Those that want to do Applied Physics concentration need to take minimum of 15 credits of Physics courses.

Kind regards,   
Huseyin

**From:** Roman Kezerashvili <[RKezerashvili@citytech.cuny.edu](mailto:RKezerashvili@citytech.cuny.edu)>

**Date:** Monday, November 20, 2017 at 10:15 PM

**To:** Huseyin Yuce <[HYuce@citytech.cuny.edu](mailto:HYuce@citytech.cuny.edu)>

**Subject:** Re: Curriculum Change for Applied Mathematics Program

Dear Huseyin,

Thank you for your message. From the attached document I understood that PHYS 1441 and 1442 are elective courses. Is this correct?

It seems to me that these courses are most important for development of critical thinking skills. At least, this is the main trend in the most USA and European Universities and colleges. Mathematics was always the *language* of Physics! It seems to me that PHYS 1441 and 1442 must be a part of General Education for any Math Major student as well as Calculus I -Calculus III + Dif. Eq. for any Physics Major student

Best wishes,   
Roman

Roman Kezerashvili, Ph.D., D.Sc.

Professor of Physics

Chairman of Physics Department

City Tech and Graduate Center

The City University of New York

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Phone: 718 260 5277

[Email:rkezerashvili@citytech.cuny.edu](mailto:rkezerashvili@citytech.cuny.edu%20)

**From:** Huseyin Yuce

**Sent:** Monday, November 20, 2017 2:47 PM

**To:** Huseyin Yuce

**Subject:** Curriculum Change for Applied Mathematics Program

Dear Chairperson,

On behalf of the Mathematics Department, I am writing to inform you of a major curriculum proposal for the Applied Mathematics major. We will be eliminating the three areas of concentration and have a unified set of degree requirements for all majors. The new curriculum will include a core of mathematics courses, the general education core, and free electives. This will give greater flexibility to our majors, allowing them to customize the degree to their needs. Please see the attached for details.

This proposal was motivated by the findings of our 2017 Self Study. Our advisory board supports our proposal

If you have questions or would like to meet and discuss this proposal, please let me know.

Regards,

Huseyin

Huseyin Yuce, Ph.D.

Associate Professor

Department of Mathematics

New York City College of Technology – CUNY

300 Jay Street, Namm 826

Brooklyn, NY 11201

1. Letter of Support from our advisory board [↑](#footnote-ref-1)