New York City College of Technology - CUNY

Mathematics Education 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 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 the Mathematics Education Program**
Date	**04/22/2018**
Major or Minor	**Major**
Proposer's Name	**Nadia S Kennedy**
Department	**Mathematics**
Date of Departmental Meeting in which proposal was approved	
Department Chair Name	**Professor Sandie Han**
Department Chair Signature and Date	
Academic Dean Name	**Dean Justin Vasquez**
Academic Dean Signature and Date	
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.	The proposal is based on a recent self-study, which indicated the need for more focus on the Secondary School Mathematics Curriculum, and more in-depth school-based practicum. Additionally, this proposal is a response to the new draft regulations regarding Clinical Experiences and Practice by the New York State Department of Education for an increase in the number of hours of clinical experience from 100 to 150 clock hours, and student teaching days from 40 to 70. The new proposal removes courses, combines two existing courses into one, proposes two new courses, and modification in existing courses and prerequisites to courses.
Brief Rationale for Proposal (Provide a concise summary of why this proposed change is important to the department. More detailed content will be provided in the proposal body).	The new curriculum proposal is necessitated by the following: 1) the need to add 100 additional school-based intermediate experience clock hours and 30 additional days of student teaching soon to be required by the state (based on new New York State Department of Education regulations regarding clinical experiences expected to take hold in Fall 2018); 2) the need for a better match between the math content coverage and standards so that we can meet the accreditation requirements (based on

	recent self-studies); 3) the need for students to work in depth with high school math content topics, in order to be better prepared to student teach, to pass the CST exam, and to become better teachers (based on recent self-studies and results from licensure exams); 4) the need to make our program more appealing in order to attract more students (a dual certification in teaching Mathematics 7-12 grade and Computer Science might serve this purpose; hence a proposal to include additional computer science courses.
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.	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:

The new curriculum proposal is necessitated by the following:

5) the need to add 100 additional school-based intermediate experience clock hours and 30 additional days of student teaching soon to be required by the state (based on new New York State Department of Education regulations regarding clinical experiences expected to take hold in Fall 2018);
6) the need for a better match between the math content coverage and standards so that we can meet the accreditation requirements (based on recent self-studies);
7) the need for students to work in depth with high school math content topics, in order to be better prepared to student teach, to pass the CST exam, and to become better teachers (based on recent self-studies and results from licensure exams);
8) the need to make our program more appealing in order to attract more students (a dual certification in teaching Mathematics 7-12 grade and Computer Science might serve this purpose; hence a proposal to include additional computer science courses)

The Mathematics Education Program has had problems in recent semesters with recruitment of new students, under-enrolment of courses and the inability to offer the high-level mathematics content courses that are only offered to mathematics education students such as: MAT 3021, MAT 3075, MAT 3080, MAT 3050 and MAT 4050. As a response we propose to remove MAT 4050, combine MAT 2071 and MAT 3021, and offer only one of the following courses once a semester on a rotating basis: MAT 3050, MAT 3080, MAT 3075 and MAT 4030. As such, these courses will be offered once every two years.

The rationale for this proposal is also based on a recent self-study for purposes of gaining national recognition by the specialized professional association NCTM, as well as a college self-study report for CAEP (Council for the Accreditation of Educational Providers), which indicated the need for more focus on the Secondary School Mathematics Curriculum, and more in-depth school-based practicum. Our Mathematics Education students passing rate on the CST (Content Specialty Test)-- one of the licensure exams for obtaining a certificate in teaching mathematics K 7-12--is only 75%, which is deemed insufficient by NCTM. Such reasons warrant the proposal of a new course MEDU 3000: *Mathematical Foundations of the Secondary School Curriculum* and the inclusion of MAT 2675: Calculus III as a required course.

Additionally, this proposal is a response to the new draft regulations regarding Clinical Experiences and Practice suggested by the Work Group convened by the New York State Department of Education to examine and revise the current regulations related to clinical experiences. The draft is currently waiting to be signed by the Board of Regents. These regulations stipulate an increase in the number of hours of clinical experience from 100 to 150 clock hours, of which at least 100 hours must be spent in the form of intermediate clinical experience, which involves shadowing teachers, tutoring students, grading exams, working with groups of students, and teaching small portions of lessons. Additionally, 20 hours of the intermediate experience hours have to be spent working with ELL (English language learners), and 20 hours with students with special needs.

Such demands would require a special course to accommodate these additional hours and to guide the work of the teacher candidates. Furthermore, the new draft regulations stipulate an increase in the number of student teaching days from 40 to 70, which requires modification in the number of credits that math education students are currently granted for student teaching. All this warrants a new course, MEDU 3030, which focuses on integrating the more in-depth school-based practicum with the preparation of our math ed students in lesson and unit planning, assessment, and instructional delivery.

Finally, we consider the opportunities that the new teaching certificate in Computer Science, recently announced by NY State, offers in making our mathematics education program more attractive for incoming students, and our graduates more competitive on the job market, by including computer science courses and by giving program graduates an option to apply for dual certification—teaching computer science *and* mathematics K 7-12 instead of only teaching the latter.

The new Mathematics Education Program curriculum proposal includes the following changes:

1) It combines MAT 2071: Language, Proofs and Logic and MAT 3021: Number theory into a revised course MAT 2071, in order to remove content overlap.
2) It includes modified MAT 3080 syllabus.
3) It removes MAT 4050 in order to streamline the content math courses, and redirects some content to the new course MEDU 3000.
3) It changes prerequisites:
   MAT 3050: The only prerequisite will be MAT 2071 (drop pre-/co-requisite of MAT 3080);
   MAT 4030: The only prerequisite will be MAT 2071 (drop pre-/co-requisite of MAT 2071)
4) It replaces MAT 2772 with MAT 1372, which is considered to represents a better match with the required content standards.
5) It includes a new course MEDU 3000: *Mathematical Foundations of the Secondary School Curriculum;*
6) It includes a new course MEDU 3030: *Micro-Teaching,* which includes 100 clock hours of intermediate school-based clinical experience;
7) It removes MEDU 2010 and distributes the learning of technology for teaching to the new courses MEDU 3000, MEDU 3030.
8) It removes MAT 1476L as very few students are able to take it before they take 1575.
9) It includes MAT 2675: Calculus III as a required course based on results from the self-study and required content topics coverage.
10) It divides MEDU 4040: Student Teaching in The Middle and High School and Student Teaching Seminar (9 credits) into 3 separate courses: MEDU 4001: Student Teaching in the Middle School (4 credits), MEDU 4002: Student Teaching in the High School (4 credits), MEDU 4003: Student Teaching Seminar (4 credits) in order to achieve greater flexibility in offering them, and to allow students to take them in different semesters if necessary.
11) It includes MAT 1630 and MAT 2440 as required courses, thereby offering students the option of taking another CS course as a math application elective,

and MAT 2540 as an Advanced Liberal Arts course and accumulate 12 CS credits and, as a result, qualifying for a CS teaching certificate.

This curriculum modification proposal considers both the need to respond to the results of the self-studies cited above, and to strengthen the program in light of the revised New York State requirements for clinical practice. It provides new opportunities in the form of a dual certification program that responds to the current emphasis in schools on teaching computer science, and the future demand for certified teachers to teach in that area. In short, it aims at making the program both more competitive and more attractive to students, while better preparing them to become licensed mathematics teachers of high quality. The proposal effectively makes the mathematics education program a dual certification program for students, who chose this option.

DEGREE REQUIREMENTS:

I. General Education Component

General Education			**Credits**
Required			
English I	ENG	1101	3
English II	ENG	1121	3
Life/Physical Science			3-5
Flexible Core			
World Cultures and Global Issues			3
US Experience in its Diversity			3
Creative Expression			3
Individual and Society			3
College Option			
Speech/Oral Communication			3
Interdisciplinary			3
Advanced Liberal Arts			3
Subtotal			30-32

II. Content Mathematics Component

Mathematics	**MAT**	**Credits**
Introduction to Computational Science*	1630	3
Calculus I	1475	4
Calculus II	1575	4
Discrete Structures and Algorithms I	2440	3
Statistics and Probability and Mathematical Statistics I	1372	3

Logic, Proofs, and Number Theory	2071	4
Linear Algebra	2580	3
Calculus III	2675	4
Geometry	3050	4
Introduction to Real Analysis	3075	4
Abstract Algebra	3080	4
History of Mathematics	4030	3
Mathematical Applications Elective[i]		3
Subtotal		46

i Students planning to apply for CS teaching certificate should take a CS elective.

III. **General Pedagogy Component**

General Pedagogy	**EDU**	**Credits**
Human Learning and Instruction	EDU 3610	3
Methods of Literacy Instruction	EDU 3670	3
Methods and Materials for Special Needs Students	EDU 2455	3
Professional Development Seminar	EDU 4600	2
Subtotal		11

IV. **Mathematics Education Component**

Mathematics Education	**MEDU**	**Credits**
Foundations of Mathematics Education	MEDU 1010	3
Teaching and Learning Strategies for Math. Teachers	MEDU 1021	3
Methods of Teaching Middle School Mathematics	MEDU 3011	4
Methods of Teaching High School Mathematics	MEDU 3020	4
Micro-Teaching	MEDU 3030	3
Mathematical Foundations of the Secondary School Curriculum	MEDU 3000	4
Student Teaching in Middle School	MEDU 4001	4
Student Teaching in High School	MEDU 4002	4
Student Teaching Seminar	MEDU 4003	4
Subtotal		33

TOTAL REQUIRED CREDITS: 120-122

A Suggested sequence of courses is shown below:

Semester 1	
MAT 1475 Calculus I	4
MAT 1630 Scientific Computing	3
ENG 1101	3
Life Sciences	3-5
	13 – 15

Semester 2	
MAT 1575 Calculus II	4
MAT 2440 Discrete Math I	3
ENG 1121	3
PSY 1101	3
Foreign Language	3
	16

Semester 3	
MAT 2675 Calculus III	4
Proofs & Logic and Number Theory	4
MEDU 1010	3
COMM 1330	3
MAT 2540 Discrete Math II	3
	17

Semester 4	
MAT 2580 Linear Algebra	3
MAT 3075 Real Analysis	4
MEDU 1021	3
EDU 3610	3
Creative Expression	3
	16

Semester 5	
MAT 1372 Statistics	3
MAT 3050 Geometry	4
MEDU 3011	4
MEDU xxx foundations of secondary school math	4
	15

Semester 6	
MAT 3080 Modern Algebra	4
MEDU 3020	4
EDU 2455	3
Interdisciplinary	3
	14

Semester 7	
MAT 4030 History of Math	3
MEDU xxx Micro-teaching	3
EDU 3670	3
Computer Science Elective	3
US Experience	3
	15

Semester 8	
MEDU 4040	12
EDU 4600	2
	14

TOTAL = 120 credits

Possible Transfer for Students from the CS Associate Degree Program
It would be possible for students from the CS program to transfer to the Mathematics Education Program. The table below shows how credits would transfer from the CS to the new degree requirements for Mathematics Education. With the curriculum change, 55 credits will transfer, and CSC students can complete the BS degree within 2 more years of coursework.

Transfer CS-Math Education	*Sample Sequence 120 Credits*
FALL Year 1 15 credits	**SPRING Year 1 16 credits**
Calculus I MAT 1475 (4 cr) *Physics I PHYS 1441+lab (5)* *MAT 1630 Intro to Computation (Recommended)* *English Composition ENG 1101*	*Calculus II MAT 1575 (4cr)* *World Cultures & Global Issues* *(Foreign Language recommended)* *Individual and Society* (PSY 1101 recommended) *English Composition II ENG 1121* *Discrete Structures I MAT 2440*
FALL Year 2 15 credits	**SPRING Year 2 15 credits**
Linear Algebra MAT 2580 *CSC Elective-MAT 2675 Calc III recommended* *CST elective* *US Experience and its Diversity* *Creative Expression*	*CST elective* *Probability and Statistics I MAT 1372 recommended (3cr)* *CST elective* *Discrete Structures II MAT 2540* *CST elective*
FALL Year 3 16 credits	**SPRING Year 3 18 credits**
MAT 2017 Proofs & Logic, Number Theory MEDU 1010 Found. of Math Ed MEDU 1021 COMM 1330 Interdisciplinary Course	MAT 3075 Real Analysis (4) MAT 3080 Modern Algebra (4) MEDU 3011: Teaching in the Middle School (4) MAT 4030 History of Math (3) EDU 3610 (3)
FALL Year 4 18 credits	**SPRING Year 4 17 credits**
MAT 3050 Geometry (4) MEDU 3020: Teaching in the High School (4) MEDU xxx Secondary school Math curriculum (4) EDU 2455 (3)	MEDU 4001: Student Teaching in the Middle School (4), MEDU 4002: Student Teaching in the High School (4), MEDU 4003: Student Teaching Seminar (4) EDU 4600: Professional Development Seminar (2) EDU 3670 (3)

All CSC required courses indicated in blue.

CHANCELLOR'S REPORT

Section A. III: Changes in Degree Programs

The following revisions are proposed for the Bachelor of Science in Mathematics Education
Program: BS in Mathematics Education
Program Code: xxxx
Effective Date: Fall 2020

Mathematics Education

FROM:		TO:	
REQUIRED COURSES IN THE MAJOR		**REQUIRED COURSES IN THE MAJOR**	
Mathematics Content Credits		**Mathematics Content Credits**	
MAT 1475 Calculus I	4	MAT 1475 Calculus I	4
		MAT 1630 Intro to Computational Science	3
MAT 1575 Calculus II	4	MAT 1575 Calculus II	4
		MAT 2440 Discrete Structures & Algorithms I	3
~~MAT 2572 Probability & Statistics I~~	~~4~~	MAT 1372 Statistics &Probability	3
MAT 2071: Intro. to Proofs and Logic	4	MAT 2071: Proofs, Logic, and Number Theory	4
MAT 2580 Linear Algebra	3	MAT 2580 Linear Algebra	3
~~MAT 2630 – Numerical Methods~~	~~3~~	MAT 2675 Calculus III	4
~~MAT 3021 Number Theory~~	~~4~~		
MAT 3075; Introduction to Real			

Analysis 4 MAT 3050: Geometry I 4 MAT 3080: Abstract Algebra 4 ~~MAT 4050: Geometry II 4~~ MAT 4030: History of Math 3 ~~Math Electives 6~~ **Subtotal 51** **Mathematics Education Credits** MEDU 1010: Foundation of Math Education 3 MEDU1021 Teaching and Learning Strategies for Math. Teachers 3 MEDU3011 Methods of Teaching Middle School Mathematics 4 MEDU3020 Methods of Teaching Secondary School Mathematics 4 ~~MEDU2010 Pedagogy of Math. Applications and Technology 2~~ ~~MEDU 4040 Student Teaching in the Middle and High School and Student Teaching Seminar 9~~ **Subtotal 25** **General Pedagogy Credits** ~~EDU 2610 Child and Adolescent development~~ 3 EDU 3610 Human Learning and	MAT 3075; Introduction to Real Analysis 4 MAT 3050: Geometry 4 MAT 3080: Abstract Algebra 4 (modified) MAT 4030: History of Math 3 Math elective 3 **Subtotal 46** **Mathematics Education Credits** MEDU:1010: Foundation of Math Education 3 MEDU1021 Teaching and Learning Strategies for Math. Teachers 3 MEDU3011 Methods of Teaching Middle School Mathematics 4 MEDU3020 Methods of Teaching Secondary School Mathematics 4 MEDU3000 Foundations of Secondary School Curriculum 4 MEDU 3030 Micro-teaching 3 MEDU 4001 Student Teaching in the Middle School 4 MEDU 4002 Student Teaching in the High School 4 MEDU 4040 Student Teaching Seminar 4 **Subtotal 33** **General Pedagogy Credits** EDU 3610 Human Learning and

Instruction	3	Instruction	3
EDU 2455 Methods and Materials for Special Needs	3	EDU 2455 Methods and Materials for Special Needs	3
EDU 3670 Methods of Literacy Instruction	3	EDU 3670 Methods of Literacy Instruction	3
EDU 4600 Prof. Development	2	EDU 4600 Prof. Development	2
Subtotal	**14**	**Subtotal**	**12**
General Education Common Core: (30-32 Credits)		**General Education Common Core: (30-32 Credits)**	
I – Required Core (3 courses, 9-11 credits)	Credits	I – Required Core (3 courses, 9-11 credits)	Credits
English (2 courses, 6 credits)		English (2 courses, 6 credits)	
ENG 1101 English Composition I	3	ENG 1101 English Composition I	3
ENG 1121 English Composition II	3	ENG 1121 English Composition II	3
Life/Physical Science	3-5	Life/Physical Science	3-5
II – Flexible Core (4 courses, 12 credits)		II – Flexible Core (4 courses, 12 credits)	
World Cultures and Global Issues	3	World Cultures and Global Issues	3
US Experience in its Diversity	3	US Experience in its Diversity	3
Creative Expression	3	Creative Expression	3
Individual and Society	3	Individual and Society	3
III - College Option requirement (12 credits):		III - College Option requirement (12 credits):	
• One course in speech/ oral communication		• One course in speech/ oral communication	
Speech Elective	3	Speech Elective	3
• One interdisciplinary liberal arts and sciences course		• One interdisciplinary liberal arts and sciences course	
Choose from approved list	3	Choose from approved list	3
• One advanced liberal arts course or two sequential courses in a foreign language.	3	• One advanced liberal arts course or two sequential courses in a foreign language.	3
Degree Total 120 credits		**Degree Total 120 credits**	

Section A. IV: New Courses

A. 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	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.
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** **[ ] 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	Fall 2020

Rationale: We consider the opportunities that the new teaching certificate in Computer Science, recently announced by NY State, offers in making our mathematics education program more attractive for incoming students, and our graduates more competitive on the job market, by including computer science courses and by giving program graduates an option to apply for dual certification—teaching computer science *and* mathematics K 7-12. The course will develop the computational, problem solving, and programming skills to help students acquire the basis for the accumulation of more sophisticated computers science knowledge and skills.

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 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	Nadia S Kennedy
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.	We consider the opportunities that the new teaching certificate in Computer Science, recently announced by NY State, offers in making our mathematics education program more attractive for incoming students, and our graduates more competitive on the job market, by including computer science courses and by giving program graduates an option to apply for dual certification—teaching computer science *and* mathematics K 7-12. The course will develop the computational, problem solving, and programming skills to help students acquire the basis for the accumulation of more sophisticated computers science knowledge and skills.
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	
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 (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 (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)	
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:

We consider the opportunities that the new teaching certificate in Computer Science, recently announced by NY State, offers in making our mathematics education program more attractive for incoming students, and our graduates more competitive on the job market, by including computer science courses and by giving program graduates an option to apply for dual certification—teaching computer science *and* mathematics K 7-12. The course will develop the computational, problem solving, and programming skills to help students acquire the basis for the accumulation of more sophisticated computers science knowledge and skills.

This course will be required of all Mathematics Education majors. Based on current enrollment data, we expect about 15 students per semester. This freshmen level course should be taken in the first semester. This course is focused on projects. No textbook is required. Students with provided with free resources documentation, and the department will update them 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 scientific 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, as it allows you 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 modern 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

A. Testing Guidelines:

The following exams should be scheduled:

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

B. 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.

C. 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.

D. 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.

E. 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**	

B. New courses to be offered in the Mathematics department

I.

Department(s)	Mathematics
Academic Level	**[X] Regular [ ] Compensatory [ ] Developmental [ ] Remedial**
Subject Area	Mathematics Education
Course Prefix	MEDU
Course Number	3000
Course Title	*Mathematics of the Secondary School Curriculum*
Catalog Description	The course examines the content of the secondary school mathematics curriculum from an advanced perspective. Pedagogical content knowledge will be examined in discussions of mathematical concept representations, student errors, and the design of activities.
Prerequisite	
Corequisite	
Pre- or corequisite	Pre/Co Requisite MAT 2071
Credits	4
Contact Hours	4 class hours
Liberal Arts	**[ ] Yes [X] No**
Course Attribute (e.g. Writing Intensive, 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**
Effective Term	Fall 2018

Rationale: The rationale for this proposal is based on a recent self-study for purposes of gaining national recognition by the specialized professional association NCTM, as well as a college self-study report for CAEP (Council for the Accreditation of Educational Providers), which indicated the need for more focus on the Secondary School Mathematics Curriculum. Our Mathematics Education students passing rate on the CST (Content Specialty Test)-- one of the licensure exams for obtaining a certificate in teaching mathematics K 7-12--is only 75%, which is deemed insufficient by NCTM. Such reasons warrant the proposal of a new course MEDU 3000: *Mathematics of the Secondary School Curriculum.*

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 and submit as one package as per instructions. Use one New Course Proposal Form for each new course.

Course Title	*Mathematics of the Secondary School Curriculum*
Proposal Date	04/22/2018
Proposer's Name	Nadia S Kennedy
Course Number	MEDU 3000:
Course Credits, Hours	4 credits: 4 class hours
Course Pre / Co-Requisites	Pre/Co Requisite MAT 2071
Catalog Course Description	The course examines the content of the secondary school mathematics curriculum from an advanced perspective. Pedagogical content knowledge will be examined in discussions of mathematical concept representations, student errors, and the design of activities.
Brief Rationale Provide a concise summary of why this course is important to the department, school or college.	The rationale for this proposal is based on a recent self-study for purposes of gaining national recognition by the specialized professional association NCTM, as well as a college self-study report for CAEP (Council for the Accreditation of Educational Providers), which indicated the need for more focus on the Secondary School Mathematics Curriculum. This proposed course would meet that need.
CUNY – Course Equivalencies Provide information about equivalent courses within CUNY, if any.	M385W: Mathematical Foundations of the Secondary School Curriculum (4 credits) Queens College EDS 317: The Secondary School Curriculum In Mathematics (4 credits) College of Staten Island
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	No

- Will all sections be offered as ID? Y/N	
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	
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 (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 (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)	
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 Mathematics Education majors. We expect about 10-15 students per semester. The rationale for this proposal is based on a recent self-study for purposes of gaining national recognition by the specialized professional association NCTM, as well as a college self-study report for CAEP (Council for the Accreditation of Educational Providers), which indicated the need for more focus on the Secondary School Mathematics Curriculum. This proposed course would meet that need.

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

Course Description:

DEPARTMENT:	**Mathematics**
COURSE:	**MEDU 3000**
TITLE:	*Mathematics of the Secondary School Curriculum*
DESCRIPTION:	The course examines the content of the secondary school mathematics curriculum from an advanced perspective. Pedagogical content knowledge will be examined in discussions of mathematical concept representations, student errors, and the design of activities.
TEXTS:	Wu, H. (2015). *Mathematics of the Secondary School Curriculum. UC, Berkeley.*
RESOURCES:	*https://www.engageny.org/common-core-curriculum* https://www.illustrativemathematics.org/ http://ime.math.arizona.edu/progressions/ http://map.mathshell.org/
CREDITS:	4 credits (4 lecture hours, 0 lab hours)
PRE OR COREQUISITE:	MAT 2071
PREPARED BY:	Prof. Andrew Douglas and Prof. Nadia Kennedy, Spring 2018

A. Course Intended Learning Outcomes/Assessment Methods

Learning Outcomes:	Assessment Methods
Students know, understand, and apply the processes of mathematical problem solving	Classroom discussions, classwork, homework and exams.
Students demonstrate a deep understanding of concepts and topics within the secondary mathematics curriculum.	Classroom discussions, classwork, homework and exams.
Students reason, construct, and evaluate mathematical arguments and develop appreciation for mathematical inquiry and rigor.	Classroom discussions, class work, homework and exams.
Students communicate their mathematical ideas orally and in writing to peers, faculty, and others.	Classroom discussions, homework exams, and presentations.
Students recognize, use and make connections among mathematical ideas	Classroom discussions, classwork, homework and exams.

Students utilize various representations of mathematical concepts in order to develop and communicate mathematical understanding	Classroom discussions, homework exams, and presentations.
Students select and use appropriate mathematics-specific technological tools: TI-85, GeoGebra, Desmos, etc.	Classroom discussions, homework exams, and presentations.

B. General Education Learning Outcomes/Assessment Methods

Learning Outcomes:	Assessment Methods
Gather, interpret, evaluate, and apply information discerningly from a variety of sources.	Classroom discussions, projects, homework and exams.
Acquire inquiry skills, dialogical skills, skills for facilitation of group discussions.	Classroom discussions, projects, homework and exams.

C. 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.

GRADING PROCEDURE:

The following exams should be scheduled:

1. Homework Assignments 20%
2. Class Participation/Work- 10%
3. Exam 1 - 10%
4. Midterm 25%
5. Final Exam 35%

Exam 1 will consist of problems selected from the New York State Regents exam. It will tentatively be scheduled for the third week of classes. Students who do not achieve at least 85% on the exam will have two opportunities to pass a make up exam. A student, who do not pass the exam with a minimum score of 85% will not receive above C – for the course.

TEACHING AND LEARNING METHODS:

Guided whole-class discussions
Problem solving
Group Work (including hands-on activities)
Technology use (mastery of GeoGebra, Desmos and TI-86 is required

COURSE OUTLINE:

SESSIONS	UNIT	REFERENCES
Week 1	Fractions and Rational Numbers	Chapter 1&2
Week 2	The Euclidean Algorithm Exam 1	Chapter 3
Week 3	Basic Isometries and Congruence Dilation and Similarity	Chapter 4 Chapter 5
Week 4	Symbolic Notation and Linear Equations Linear Functions	Chapter 6 Chapter 7
Week 5	Quadratic Functions and Equations	Chapter 8
Week 6	Polynomial and Rational Functions	Chapter 9
Week 7	Exponential and Logarithmic Functions Midterm Exam	Chapter 10
Week 8	Polynomial Forms and Complex Numbers	Chapter 11
Week 9	Basic Theorems of Plane Geometry	Chapter 12
Week 10	Ruler and Compass Constructions	Chapter 13
Week 11	Trigonometry	Chapter 15
Week 12	Length and Area	Chapter 18
Week 13	3-Dimensional Geometry and Volume	Chapter 19
Week 14	Combinatorics	
Week 15	Probability	
Week 15: Final session	Final Exam	

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 Mathematics Education Degree Requirements**	**Department/Program** Mathematics / Mathematics Education Program
	Proposed by (include email & phone) Nadia S Kennedy nkennedy@citytech.cuny.edu 718-260-5490	**Expected date course(s) will be offered** Fall 2010 **# of students 10-15**

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) for articles and eBooks for your courses, or our open educational resources (OER) guide (http://cityte.ch/oer). Have you considered using a freely-available OER or an open textbook in this course?** Although instructors will develop the course materials MEDU 3000 will have a requited textbook.

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** _____ **Comments and Recommendations** **Date**

C. II.

Department(s)	Mathematics
Academic Level	**[X] Regular [ ] Compensatory [ ] Developmental [ ] Remedial**
Subject Area	Mathematics Education
Course Prefix	MEDU
Course Number	3030
Course Title	*Microteaching*
Catalog Description	Microteaching focuses on intermediate field school-based experience and the preparation for lesson and unit planning, student assessment and delivery of instruction. It includes 100 clock hours of twice-weekly supervised classroom experience, tutoring, grading and working with small groups of students, 20 hours of which are spent working with ELL (English language learners), and 20 with students with special needs.
Prerequisite	MEDU 3011 or MEDU 3020
Corequisite	
Pre- or corequisite	
Credits	3
Contact hours	3 class hours
Liberal Arts	**[ ] Yes [X] No**
Course Attribute (e.g. Writing Intensive, etc.)	No
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	Fall 2020

Rationale: This is a response to the new draft regulations regarding Clinical Experiences and Practice suggested by the Work Group convened by the New York State Department of Education to examine and revise the current regulations related to clinical experiences. These regulations stipulate an increase in the number of hours of clinical experience from 100 to 150 clock hours, of which at least 100 hours must be spent in the form of intermediate clinical experience, which involves shadowing teachers, tutoring students, grading exams, working with groups of students, and teaching small portions of lessons. Additionally, 20 hours of the intermediate experience hours have to be spent working with ELL (English language learners), and 20 hours with students with special needs.

This course will accommodate these additional hours and guide the work of the teacher candidates.

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 and submit as one package as per instructions. Use one New Course Proposal Form for each new course.

Course Title	*Microteaching*
Proposal Date	04/22/2018
Proposer's Name	Nadia S Kennedy
Course Number	MEDU 3030:
Course Credits, Hours	3 credits: 3 class hours
Course Pre / Co-Requisites	Pre- Requisite MEDU 3011 or MEDU 3020
Catalog Course Description	Microteaching focuses on intermediate field school-based experience and the preparation for lesson and unit planning, student assessment and delivery of instruction. It includes 100 clock hours of twice-weekly supervised classroom experience, tutoring, grading and working with small groups of students, 20 hours of which are spent working with ELL (English language learners), and 20 with students with special needs.
Brief Rationale Provide a concise summary of why this course is important to the department, school or college.	This is a response to the new draft regulations regarding Clinical Experiences and Practice suggested by the Work Group convened by the New York State Department of Education to examine and revise the current regulations related to clinical experiences. These regulations stipulate an increase in the number of hours of clinical experience from 100 to 150 clock hours, of which at least 100 hours must be spent in the form of intermediate clinical experience, which involves shadowing teachers, tutoring students, grading exams, working with groups of students, and teaching small portions of lessons. This proposed course would meet that need.
CUNY – Course Equivalencies Provide information about equivalent courses within CUNY, if any.	SEYS 371.2 Initial Clinical Experience in Mathematics (includes 100 hours of clinical practice) Queens College
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	
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,	X

then provide documentation indicating that need.	
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 (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 (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)	
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 Mathematics Education majors. We expect about 10-15 students per semester.
The rationale for this proposal is based on changing requirements in clinical practice, the need to accommodate the increased number of hours and prepare the teaching candidates for their student teaching semester. This proposed course would meet that need. The Mathematics Department has the faculty needed to teach this course, and no new resources are needed.

Course Description:

DEPARTMENT:	**Mathematics**
COURSE:	**MEDU 3030**
TITLE:	*Microteaching*
DESCRIPTION:	Microteaching focuses on intermediate field school-based experience and the preparation for lesson and unit planning, student assessment and delivery of instruction. It includes 100 clock hours of twice-weekly supervised classroom experience, tutoring, grading and working with small groups of students, 20 hours of which are spent working with ELL (English language learners), and 20 with students with special needs.
TEXTS:	Lemov, D. (2010). *Teach like a champion*. San Francisco, CA: Jossey-Bass Publishing. Smith, M., Kay Stein, M. (2011). *Five practices for orchestrating productive mathematics discussions*. Reston, VA: NCTM. Additional readings will be distributed by the instructor a week prior to the specific session or posted on Blackboard.
RECOMMENDED TEXTS	Clarke, D. (1997). *Constructive assessment in mathematics: Practical Steps for Classroom Teachers*. Emeryville, CA: Key Curriculum Press.
RESOURCES:	*https://www.engageny.org/common-core-curriculum* https://www.illustrativemathematics.org/ http://ime.math.arizona.edu/progressions/ http://map.mathshell.org/
CREDITS:	3 credits (3 lecture hours, 0 lab hours)
PRE OR COREQUISITE:	MEDU 3011 or MEDU 3020
PREPARED BY:	Prof. Nadia Kennedy and Prof. Estela Rojas, Spring 2018

LEARNING OUTCOMES:

Learning Outcomes:	Assessment Methods
Teacher candidates apply MKT (mathematical knowledge for teaching) to design activities, lesson and unit plans, and assessments	Classroom discussions, homework and exams.
Teacher candidates engage their students in mathematical discussions	Classroom discussions, classwork, homework and exams.
Teacher candidates elicit students' ideas and involve the entire class in reflecting on their peer's contributions and in evaluating their arguments.	Classroom discussions, class work, homework and exams.
Teacher candidates effectively communicate their mathematical ideas orally and in writing to peers, faculty, and others.	Classroom discussions, homework, exams, and presentations.
Teacher candidates recognize, use and make connections among mathematical ideas	Classroom discussions, classwork, homework and exams.
Teacher candidates utilize various representations of mathematical concepts in order to develop and communicate mathematical understanding	Classroom discussions, homework, exams, and presentations.
Teacher candidates select and use appropriate mathematics-specific technological tools: TI-85, GeoGebra, Desmos, etc.	Classroom discussions, homework, exams, and presentations.
Teacher candidates critically reflect on their work and teaching and use feedback to improve them.	Classroom discussions, homework exams, and presentations.

D. General Education Learning Outcomes/Assessment Methods

Learning Outcomes:	Assessment Methods
Gather, interpret, evaluate, and apply information discerningly from a variety of sources.	Classroom discussions, projects, homework and exams.
Acquire inquiry skills, dialogical skills, skills for facilitation of group discussions.	Classroom discussions, projects, homework and exams.

E. 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.

GRADING PROCEDURE:

5. Clinical Experience (Based on the mentor's evaluation) 30%
6. Homework Assignments 20%
7. Class Participation/Work- 10%
8. Lesson plans - 20%
9. Presentations -10%
6. Reflection logs 10%

TEACHING AND LEARNING METHODS:

Guided whole-class discussions
Workshop methodology
Group Work (including hands-on activities)
Technology use (mastery of GeoGebra, Desmos and TI-86 is required)
Presentations

REQUIREMENTS

1. COMPLETE THE REQUIRED SCHOOL-BASED CLINICAL PRACTICE: You are expected to complete 100 clock hours of intermediate field experience: 50 hours in a middle school placement and 50 in a high school placement. Of these, 20 hours will be spent working with ELL (English language learners), and 20 with students with special needs. Students will be required to submit a time sheet at the end of the semester and will keep a reflection log.

2. ATTEND CLASS. This course is designed to be interactive and collaborative, and requires each member's presence and participation for complete success. More than three absences constitute grounds for grade reduction.

2. COMPLETE READINGS prior to the session for which they are assigned. Bring them to class, as we will be using the texts and referring to them regularly.

3. ACTIVELY PARTICIPATE IN THE GROUP DISCUSSIONS. Sharing your ideas and questions with the group, as well as responding to those of your classmates, are crucial to our work together. You will be asked to work/plan in groups of two, and discuss issues in a whole-class format, and your active participation in these discussions is essential. .

4. COMPLETE ASSIGNMENTS: There will be several individual assignments.

A. LESSON PLANS

The purpose of the development of lesson plans is to support teacher candidates in their professional growth by engaging them in instructional design based on their knowledge of content, theory, research, and knowledge of their students. Further details will be discussed in class.

B. ASSESSMENT OF STUDENT LEARNING: Teacher candidates will be required to choose 2 students and assess their learning of a currently studied mathematical topic/concept. Candidates will use a formal assessment and a clinical interview. Details will be discussed in class.

C. HOMEWORK ASSIGNMENTS: Homework assignments will be assigned and collected. Additional assignments may be completed and collected during class.

Late submission of assignments will not be accepted. All written work should be typewritten, double-spaced (1" margins, 12 font), and saved on disk.

COURSE OUTLINE:

SESSIONS	UNIT	REFERENCES
Week 1	Setting High Expectations Introducing the Five Practices	*Teach Like a Champion*; Chapter 1 *Five practices for productive mathematics discussions, Chapter 1*
Week 2	Planning that Ensures Academic Achievement Laying the Groundwork: Setting Goals and Selecting Tasks	*Teach Like a Champion*; Chapter 2 *Five practices for productive mathematics discussions, Chapter 2*
Week 3	Structuring and Delivering your Lessons Investigating the Five Practices in Action	*Teach Like a Champion*; Chapter 3 *Five practices for productive mathematics discussions, Chapter 3*
Week 4	Engaging Students in Your Lessons Getting Started: Anticipating Students' Responses and Monitoring Their Work	*Teach Like a Champion*; Chapter 4 *Five practices for productive mathematics discussions, Chapter 4*
Week 5	Creating a Strong Classroom Culture Determining the Direction of the Discussion; Selecting, Sequencing, and Connecting Students' Responses	*Teach Like a Champion*; Chapter 5 *Five practices for productive mathematics discussions, Chapter 5*
Week 6	Setting and Maintaining High Behavioral Expectations Ensuring Active Thinking and Participation: Asking Good Questions and Holding Students Accountable	*Teach Like a Champion*; Chapter 6 *Five practices for productive mathematics discussions, Chapter 6*
Week 7	Building Character and Trust Putting the Five Practices in a Broader Context of Lesson Planning	*Teach Like a Champion*; Chapter 7 *Five practices for productive mathematics discussions, Chapter 7*
Week 8	Improving Your Pacing Working in the School Environment to Improve Classroom Discussions	*Teach Like a Champion*; Chapter 8 *Five practices for productive mathematics discussions, Chapter 8*
Week 9	Challenging Students to think Critically High-Leverage Practices	*Teach Like a Champion*; Chapter 9
Week 10	How Can All Teachers be Reading Teachers	*Teach Like a Champion*; Chapter 10
Week 11	Teaching Decoding, Vocabulary	*Teach Like a Champion*; Chapter 11

	Development, and Fluency	
Week 12	Teaching Students to Understand What They Read	*Teach Like a Champion*; Chapter 12
Week 13	Assessing Student Learning and Rubrics	
Week 14	Reports on Assessing Students Learning	
Week 15	Presentations	

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 Mathematics Education Degree Requirements**	**Department/Program** Mathematics / Mathematics Education Program
	Proposed by (include email & phone) Nadia S Kennedy nkennedy@citytech.cuny.edu 718-260-5490	**Expected date course(s) will be offered** Fall 2010 **# of students 10-15**

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) for articles and eBooks for your courses, or our open educational resources (OER) guide (http://cityte.ch/oer). Have you considered using a freely-available OER or an open textbook in this course?** Although instructors will develop the course materials MEDU 3030 will have a requited texts.

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 _____** **Comments and Recommendations** **Date**

Section AV: Changes to Existing Courses

A. Changes to be offered in the Mathematics department

CUNYFirst Course ID			
FROM:	~~Introduction to Proofs and Logic~~	**TO:**	Logic, Proofs, and Number Theory
Department(s)	Mathematics	**Department(s)**	Mathematics
Course	MAT 2071	**Course**	MAT 2071
Prerequisite	MAT 1575	**Prerequisite**	MAT 1575
Corequisite		**Corequisite**	
Pre- or corequisite		**Pre- or**	
Hours		**Hours**	
Credits	4	**Credits**	4
Description	The course is designed to prepare students for an advanced mathematics curriculum by providing a transition from Calculus to abstract mathematics. The course focuses on the processes of mathematical reasoning, argument, and discovery. Topics include	**Description**	Topics include
Requirement		**Requirement**	
Liberal Arts	[ ] Yes [X] No	**Liberal Arts**	[ ] Yes [X] No
Course Attribute (e.g. Writing Intensive, Honors, etc		**Course Attribute**	
Course Applicability	[X] Major [ ] Gen Ed Required [ ] English Composition [ ] Mathematics [ ] Science [ ] Gen Ed - Flexible [ ] World Cultures [ ] US Experience in its [ ] 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			**Fall 2020**

NEW YORK CITY COLLEGE OF TECHNOLOGY
The City University of New York

DEPARTMENT:	Mathematics
COURSE:	MAT 2071
TITLE:	Introduction to Proofs with an emphasis in Number Theory.
DESCRIPTION:	Topics include mathematical reasoning, learning proofs, with a main emphasis of examples from number theory.
TEXTS:	1. Book of Proof. Edition 1.3, Creative attribution -No Derivative Works 3.0, by R. Hammack. 2. An Introduction to Number Theory with Cryptography, CRC Press, 2014, by J. S. Kraft and L. C. Washington.
CREDITS:	4 (4 class hours)
PRE/COREQUISITES:	MAT 1575 or by placement.
	Revised by Professors A. Masuda and S. Singh (2018)

A. Testing Guidelines:
The following exams should be scheduled:

1. A one session exam at the end of the First Quarter.
2. A one session exam at the end of the Second Quarter.
3. A one session exam at the end of the Third Quarter.
4. A one session Final Examination.

Course Intended Learning Outcomes/Assessment Methods

Learning Outcomes	Assessment Methods
1. Evaluate truth of statements in propositional and first-order logic.	Classroom activities and discussion, homework, exams.
2. Reason in accordance with laws of propositional and first-order logic	Classroom activities and discussion, homework, exams.
3. Use the axiomatic method in establishing the truth of mathematical statements	Classroom activities and discussion, homework, exams.
4. Analyze and prove elementary statements with an emphasis on group theory, number theory and set theory.	Classroom activities and discussion, homework, exams.

General Education Learning Outcomes/Assessment Methods

Learning Outcomes	Assessment Methods
1. Understand and employ both quantitative and qualitative analysis to solve problems.	Classroom activities and discussion, homework, exams.
2. Employ scientific reasoning and logical thinking.	Classroom activities and discussion, homework, exams.
3. Communicate effectively using written and oral means.	Classroom activities and discussion, homework, exams.
4. Use creativity to solve problems.	Classroom activities and discussion, homework, exams.

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.

MAT 2071 **Texts**: T1. Book of Proof, R. Hammack
T2. An Introduction to Number Theory with Cryptography, CRC Press, 2014, by J. S. Kraft and L. C. Washington.

Week	Topic	Chapters/Sections
1	Sets, T1	sets, cartesian products, subsets
2	Sets, T1	Sets, operations, collections of sets
3	Logic, T1	Propositional logic, statements, logical connectives, truth tables, logical equivalence
4	Logic, T1, Exam 1	First order logic, quantifiers, inference, lists, factorials
5	Proof, T1	Counting subsets, binomial theorem, direct proof, examples from number theory
6	Proof, T1	Contrapositive proof, proof by contradiction
7	Proof, T1, Midterm	if and only if proofs, existence proofs, proofs involving sets
8	Proof, T1,	disproof, counterexamples, proof by induction
9	Proof, T1	strong induction, minimal counterexamples, relations and their properties
10	Primes, Unique Factorization, T2	chapters 0, 1
11	Unique Factorization, T2, Exam 3	chapter 2
12	Applications of Unique Factorization, T2	chapter 3
13	Congruences, T2	chapter 4
14	Congruences, T2	chapter 4
29	Review	
30	Final Examination	

CUNYFirst Course ID			
FROM:		**TO:**	
Department(s)	Mathematics	**Department(s)**	Mathematics
Course	MAT 3080	**Course**	MAT 3080
Prerequisite	~~MAT 2580~~, MAT 2071	**Prerequisite**	MAT 2071
Corequisite		**Corequisite**	
Pre- or corequisite		**Pre- or**	
Hours		**Hours**	
Credits	4	**Credits**	4
Description		**Description**	
Requirement		**Requirement**	
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 [ ] 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			**Fall 2020**

DEPARTMENT: Mathematics

PREPARED BY: Andrew Douglas

COURSE: MAT 3080

TITLE: Abstract Algebra

DESCRIPTION: An introductory course in abstract algebra covering groups, rings and fields. Connections of abstract algebra to secondary school algebra and geometry will be examined.

TEXTS

[1] Judson, Thomas W., *Abstract Algebra: Theory and Applications*. Virginia Commonwealth University, Richmond, VA 23284, 2017 Edition.

[2] Wu, H., *Mathematics of the Secondary School Curriculum*. April 11, 2015.

CREDITS HOURS: 4 cl hrs, 0 lab hrs, 4 cr

PREREQUISITE: MAT 2071

LEARNING OBJECTIVES

For successful completion of the course, students should be able to:

1. Apply concepts, terminology, and theorems to solve problems and prove propositions of abstract algebra.
2. Explain concepts verbally and in writing, using correct terminology from abstract algebra.
3. Describe applications and relationships of abstract algebra to secondary school algebra and geometry.

GRADING PROCEDURE: Homework assignments; tests; group work; projects; presentations.

TEACHING/LEARNING METHODS:

- Interactive lecture and guided discussion
- Group work

- Technology: A computer algebra system such as MAPLE or GAP may be used to facilitate the exploration of mathematical concepts. Geometry software, such as GeoGebra, may aslo be used to examine connections of algebra with geometry.

WEEKLY COURSE OUTLINE:

WEEK	TOPIC	REFERENCE
1	Preliminaries and review: Proofs; sets and equivalence relations; mathematical induction; the division algorithm.	[1] Chapter 1, 2
2	Groups: Integer equivalence classes and symmetries; definitions and examples; subgroups.	[1] Chapter 3
3	Cyclic groups; the complex numbers; the multiplicative group of complex numbers; DeMoivre's Theorem; the circle group and roots of unity; the method of repeated squares.	[1] Chapter 4 [2] Chapter 11
4	Permutation groups; dihedral groups and symmetry of regular polygons.	[1] Chapter 5
5	Group homomorphisms and isomorphisms. Isomorphism theorems.	[1] Chapter 9, 11
6, 7, 8	Matrix groups (general linear groups, special linear groups, orthogonal groups, Euclidean groups), symmetry groups, frieze groups, wallpaper groups, isometries, and congruence.	[1] Chapter 12 [2] Chapter 4
9, 10	Introduction to rings; Integral domains and fields; Ring homomorphisms and ideals.	[1] Chapter 16
11, 12, 13	Polynomials: Polynomial rings; the division algorithm; irreducible polynomial; Descartes' rule of signs; Rational roots theorem; Fundamental theorem of Algebra; complex numbers; solving and graphing cubic and quartic polynomials; rational functions.	[1] Chapter 12 [2] Chapter 9, 11
14	Student presentations	
15	Review and final exam	

Version: April 22, 2018

B: MAT 3050

Changes to be offered in the Mathematics department

CUNYFirst Course ID			
FROM:	**~~Geometry I~~**	**TO:**	**Axiomatic Geometry**
Department(s)		**Department(s)**	
Course		**Course**	
Prerequisite		**Prerequisite**	
Corequisite		**Corequisite**	
Pre- or corequisite	**~~MAT 3080~~**	**Pre- or corequisite**	**none**
Hours		**Hours**	
Credits	**~~4~~**	**Credits**	**4**
Description	~~This course will cover Euclidean geometry in two dimensions from a synthetic point of view. It will cover classical theorems as well as groups of transformations.~~	**Description**	**This course will cover Euclidean and Hyperbolic geometry in two and three dimensions from an an axiomatic point of view. It will cover classical theorems as well as groups of transformations.**
Requirement Designation		**Requirement Designation**	
Liberal Arts	[ ] Yes [ ] No	**Liberal Arts**	[ ] Yes [ ] No
Course Attribute (e.g. Writing Intensive, Honors, etc		**Course Attribute (e.g. Writing Intensive, Honors, etc**	
Course Applicability	[ ] 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	[ ] 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**		

Rationale: Prerequisites are being removed to streamline the mathematics content courses in the mathematics education program.

MAT 4030 History of Mathematics

Changes to be offered in the Mathematics department

CUNYFirst Course ID			
FROM:		**TO:**	
Department(s)		**Department(s)**	
Course		**Course**	
Prerequisite	~~MAT 2071 and MAT 3021~~	**Prerequisite**	**MAT 2071**
Corequisite		**Corequisite**	
Pre- or corequisite		**Pre- or corequisite**	
Hours		**Hours**	
Credits	~~3~~	**Credits**	**3**
Description	~~MAT 3772~~	**Description**	
Requirement Designation		**Requirement Designation**	
Liberal Arts	[ ] Yes [ ] No	**Liberal Arts**	[ ] Yes [ ] No
Course Attribute (e.g. Writing Intensive, Honors, etc		**Course Attribute (e.g. Writing Intensive, Honors, etc**	
Course Applicability	[ ] 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	[ ] 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**		

Rationale: The pre-requisite of number theory is needlessly restrictive. Students who take MAT 2071 are well prepared for MAT 4030.

MEDU 4040 Student Teaching in Middle and High School and Student Teaching Seminar

From:	MEDU 4040	To:	MEDU 4001: Student Teaching in Middle School (4 credits) MEDU 4002: Student Teaching in High School (4 credits) MEDU 4003: Student teaching seminar (4 credits)
Description	The course consists of a field-based, student teaching experience and a seminar component. The field-based experience involves 20 days or 120 hours of supervised student teaching in grades 7 through 9. Under the guidance and supervision of an experienced teacher and a faculty member, students will implement and refine pedagogical strategies, classroom management techniques, and assessment approaches. The seminar component provides a discussion forum for students, guided by a faculty member, to refine pedagogical strategies, and to address and resolve pedagogical issues that students face during the concurrent field placement.	**Description**	MEDU 4001: This culminating field-based experience involves 35 days of supervised student teaching in grades 7-9. **MEDU 4002:** This culminating field-based experience involves 35 days of supervised student teaching in grades 10 -12. MEDU 4003: The seminar provides a discussion forum for students, guided by a faculty member, to address and resolve pedagogical issues that students face during the concurrent field placement and to prepare their edTPA portfolio.
Credits	9 credits	**Credits**	4 credits + 4 credits + 4 credits
Lab Hours	0	**Lab Hours**	0
Prerequisite:	MEDU 3011 and MEDU 3020 and depart. persmission	**Prerequisite:**	**MEDU 3011 and MEDU 3020 and program coordinator permission**
Corequisite:		**Corequisite:**	
Pre/Corequisite:		**Pre/Corequisite:**	

Section A.VI: Courses Withdrawn

Mathematics

MAT 1476L Calculus Lab
MAT 2630 Numerical Methods
MAT 4050 Geometry II
MAT 2572 Probability and Statistics I
MEDU 2010 Pedagogy of Math. Applications and Technology

Rationale: MAT 1476L is taken by few students as most of them transfer with Calculus I and Calculus II. We have not been able to offer MAT 4050 for a long time, due to low enrolment and stringent prerequisites. MAT 2672 has been replaced by MAT 1372, which is deemed to be more adequate for mathematics education students. The content of MEDU 2010 has been distributed to MEDU 3000 and MEDU 3030 and other methodology courses.