

KINGSBOROUGH COMMUNITY COLLEGE
The City University of New York

CURRICULUM TRANSMITTAL COVER PAGE

Department: Math and Computer Science

Date: 01/14/2019

Title Of Course/Degree/Concentration/Certificate: Analytic Geometry & Precalculus (MAT 1400)

Change(s) Initiated: (Please check)

- | | |
|---|--|
| <input type="checkbox"/> Closing of Degree | <input type="checkbox"/> Change in Degree or Certificate |
| <input type="checkbox"/> Closing of Certificate | <input type="checkbox"/> Change in Degree: Adding Concentration |
| <input type="checkbox"/> New Certificate Proposal | <input type="checkbox"/> Change in Degree: Deleting Concentration |
| <input type="checkbox"/> New Degree Proposal | <input checked="" type="checkbox"/> Change in Prerequisite, Corequisite, and/or Pre/Co-requisite |
| <input type="checkbox"/> New Course | <input type="checkbox"/> Change in Course Designation |
| <input type="checkbox"/> New 82 Course (Pilot Course) | <input type="checkbox"/> Change in Course Description |
| <input type="checkbox"/> Deletion of Course(s) | <input checked="" type="checkbox"/> Change in Course Title, Number, Credits and/or Hours |
| | <input type="checkbox"/> Change in Academic Policy |
| | <input type="checkbox"/> Pathways Submission: |
| | <input type="checkbox"/> Life and Physical Science |
| | <input type="checkbox"/> Math and Quantitative Reasoning |
| | <input type="checkbox"/> A. World Cultures and Global Issues |
| | <input type="checkbox"/> B. U.S. Experience in its Diversity |
| | <input type="checkbox"/> C. Creative Expression |
| | <input type="checkbox"/> D. Individual and Society |
| | <input type="checkbox"/> E. Scientific World |

Change in Program Learning Outcomes

Other (please describe): _____

PLEASE ATTACH MATERIAL TO ILLUSTRATE AND EXPLAIN ALL CHANGES

DEPARTMENTAL ACTION

Action by Department and/or Departmental Committee, if required:

Date Approved: _____ Signature, Committee Chairperson: _____

If submitted Curriculum Action affects another Department, signature of the affected Department(s) is required:

Date Approved: 2/4/19 I am aware of this proposal
Signature, Department Chairperson: _____

Date Approved: 2/13/19 Signature, Department Chairperson: Mary E Da

I have reviewed the attached material/proposal

Signature, Department Chairperson: Rina Yauze



TO: Spring 2019 Curriculum Committee

FROM: Department of Mathematics & Computer Science

DATE: 01/14/2019

RE: Change in Number of Course Credits for Analytic Geometry and Pre-Calculus
Mathematics (MAT 1400)

The Department of Mathematics & Computer Science is proposing a change in number of course credits for Analytic Geometry and Pre-Calculus Mathematics (MAT 1400):

FROM:

4 credits, 4 hrs.

TO:

3 credits, 4 hrs. (2 lecture hrs., 2 hr. lab)

Rationale for Change: The change in number of credits reflects curricular adjustments to allow for 2 lab hours and 2 lecture hours, as reflected in the course syllabus.



TO: Spring 2019 Curriculum Committee

FROM: Department of Mathematics & Computer Science

DATE: 01/14/2019

RE: Change in prerequisite for Analytic Geometry and Pre-Calculus Mathematics
(MAT 1400)

The Department of Mathematics & Computer Science is proposing a change in prerequisite for Analytic Geometry and Pre-Calculus Mathematics (MAT 1400):

FROM:

MAT 900

TO:

MAT 900 or MAT 9A0

Rationale for Change: Allowing for the option of taking MAT 9A0.

Kingsborough Community College
The City University of New York

Modifications in Credits/Hours for an Existing Course Form

1. Course Number and Title:
Mathematics and Computer Science
Math 1400 – Analytic Geometry and Pre-Calculus Mathematics

2. This Course is **currently** listed as:

 4 Credits 4 Hours (include break-down of lecture, lab, or gym)
4 Lecture Hours

3. **Proposed** Change in Credits/Hours (Please check **ONE** appropriate box below based on credits):

It is recommended that you refer to the “College Credits Assigned for Instructional Hours” PDF at
<http://kingsborough.edu/aa/Pages/forms.aspx>

Hours are hours per week in a typical 12-week semester

1-credit:	<input type="checkbox"/> 1 hour lecture <input type="checkbox"/> 2 hours lab/field/gym
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2-credits:	<input type="checkbox"/> 2 hours lecture <input type="checkbox"/> 1 hour lecture, 2 hours lab/field <input type="checkbox"/> 4 hours lab/field
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3-credits:	<input type="checkbox"/> 3 hours lecture <input checked="" type="checkbox"/> 2 hours lecture, 2 hours lab/field <input type="checkbox"/> 1 hour lecture, 4 hours lab/field <input type="checkbox"/> 6 hours lab/field
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4-credits:	<input type="checkbox"/> 4 hours lecture <input type="checkbox"/> 3 hours lecture, 2 hours lab/field <input type="checkbox"/> 2 hours lecture, 4 hours lab/field <input type="checkbox"/> 1 hour lecture, 6 hours lab/field <input type="checkbox"/> 8 hours lab/field
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More than 4-credits:	<input type="checkbox"/> Number of credits: <u> </u> (explain mix lecture/lab below) <u> </u> Lecture <u> </u> Lab Explanation: _____
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4. Rationale/Justification for the change in credits/hours for this course:
The change in number of credits reflects curricular adjustments to allow for 2 lab hours and 2 lecture hours, as reflected in the course syllabus.

5. Include the **Current** Syllabus/Topical Course Outline and the **Proposed** Syllabus/Topical Course Outline for the course. **Highlight** areas that have been modified and serve as the justification for the proposed change in credits/hours for the course.
See attachments.

Department of Mathematics & Computer Science

1. **Department, Course Number and Title**
Department of Mathematics & Computer Science, Math 14 – Analytic Geometry and Pre-Calculus Mathematics
2. **Distribution Requirements for Groups I-V**
Fulfills Group V requirements
3. **Demonstration of Course Transferability**
Lehman College: MAT 172 Course Title: pre-Calculus
Credits: 4.0
Comments: Students receive only the 4.0 credits attached to Lehman College's course.

City College: MAT 10000 Course Title: Pre-Calculus
Credits: 3.0
Comments: Students receive only the 3.0 credits attached to City College's course; the remaining credit may transfer as an elective.

College of Staten Island: MTH 130 Course Title: Pre-Calculus Mathematics
Credits: 3.0
Comments: 1) Students receive only the 3.0 credits attached to City College's course; the remaining credit may transfer as an elective.
2) Meets College of Staten Island's General Education category Scientific
Analysis: Mathematics
3) For all undergraduate degrees

NYC Technical College: MA 375 Course Title: Mathematical Analysis
Credits: 4.0
Comments:
1) Meets College of NYC Technical College's General Education
Category: Mathematics
2) For all undergraduate degrees

John Jay College of Criminal Justice: MAT 141 Course Title: Pre-Calculus
Credits: 3.0
Comments: 1) Students receive only the 3.0 credits attached to John Jay College of Criminal Justice's course; the remaining credit may transfer as an elective.
2) Meets John Jay College of Criminal Justice's General Education
Category: Mathematics
3) For all undergraduate degrees

Baruch College: MTH 2000 Course Title: Pre-Calculus College Algebra and Trigonometry

Credits: 4.0

Comments:

- 1) Meets College of Baruch College's General Education Category: Group IV: Mathematics or Statistics, Mathematics (Public Affairs)
- 2) For degrees in B.A. (Bachelor of Arts), B.S. (Bachelor of Science)

Hunter College: MATH 120 Course Title: Functions and Graphs

Credits: 3.0

Comments: Students receive only the 3.0 credits attached to Hunter College's course; the remaining credit may transfer as an elective.

Brooklyn College: MATH 2.9 Course Title: Pre-Calculus Mathematics

Credits: 3.0

Comments: Students receive only the 3.0 credits attached to Brooklyn College's course; the remaining credit may transfer as an elective.

York College: Elective Credit

Medgar Evers College: Elective Credit

4. Bulletin Description of Course

This pre-calculus course stresses function theory, analytic geometry, polynomial and rational functions, exponential and logarithmic functions, trigonometric functions and the use of a scientific calculator. The course is recommended for students planning to continue with calculus and/or mathematics electives.

5. Number of Weekly Class Hours

4

6. Number of Credits

4

7. Prerequisites

MAT 9 or a placement code of 5 or higher on the Compass Exam.

8. Justification for Course and Expected Enrollment

Mathematics 14 is designed to provide students with an understanding of elementary and advanced algebraic concepts, as well as a background for more advanced mathematics courses in which functions play a key role. It allows the student to explore the various mathematical functions from both an algebraic and a geometric point of view. By practicing the manipulations and graphs presented in the course, the student will obtain a background that is essential for later mastery of a wide variety of courses in mathematics, computer studies, the sciences, and other areas.

9. **Course Withdrawals**
N/A
10. **CPI Requirements**
Fulfills one CPI requirement for mathematics
11. **Field Work, Internship or Independent Study**
N/A
12. **Textbooks**
Precalculus, Ratti and McWaters, Addison-Wesley, Scientific Calculator (Texas Instrument Model: TI-30Xii)
13. **Required Course for Majors**
For mathematics, computer science, CIS and a number of other outside majors.
14. **Specify If Course Is Open to Only Selected Students**
N/A
15. **What Students Will Know and Be Able To Do Upon Completion of Course**
Upon completion of course, students will be able to:
0. Solve linear, quadratic, polynomial, quadratic-like, absolute value, radical and rational equations.
 1. Solve linear, quadratic, polynomial, absolute value, and rational inequalities.
 2. Perform simple and complex computations using a scientific calculator.
 3. Use the Cartesian plane to solve problems in analytic geometry by applying the distance, midpoint and slope formulas.
 4. Sketch graphs of numerous functions and equations in two variables, including linear, square, cube, square root, absolute value, reciprocal, polynomial, rational, exponential, logarithmic functions; apply shifting techniques to obtain graphs of functions similar to those mentioned above.
 5. Understand the geometric and algebraic relationships among these functions.
 6. Construct functions by addition, subtraction, multiplication, division and composition; find the inverse of a one-to-one function and relate the graphs of a one-to-one and onto function and its inverse.
 7. Obtain information about a function by analyzing its graph, including the domain, range, intercepts, symmetries, extent, positive and negative analysis.
 8. Conic Sections; i.e., the parabola, ellipse and hyperbola.

16. Method of Teaching

Class room lecture and demonstration of specific algebraic and graphical concepts. Homework is given daily and is designed to improve and solidify student understanding and mastery of these concepts.

17. Assignments to Students

Exercises from textbook;

18. Method of Evaluating Learning

Classroom examinations and a comprehensive departmental final exam

19. Topical Course Outline

<u>Day</u>	<u>Topic</u>	<u>Sections</u>
1	Review: Factoring polynomials and Rational expressions	P.4, P.5
2	Review: Linear Equations in one variable	1.1
3	Complex numbers	1.3
4,5	Quadratic Equations, equations in quadratic form	1.4,1.5
6	Linear and Compound inequalities	1.6,1.7
7-8	Equations and Inequalities involving absolute value	1.7
9-10	Review and Exam 1	
11	Graphs and Equations of Circles	2.1,2.2
12-13	Linear Equations in two variables	2.3
14-18	Relations and Functions, properties of functions, transformation of functions, algebra of functions, invertible functions	2.4-2.9
19-20	Review and Exam 2	
21-23	Polynomial, quadratic functions and their graphs	3.1-3.2
24-25	Zeroes of polynomial functions	3.3-3.4
26-28	Rational Functions and their graphs, vertical and horizontal asymptotes,	3.6
29-31	Polynomial and Rational inequalities	3.7
32-33	Review and Exam 3	

34-39	Exponential and logarithmic functions and equations	4.1-4.5
40-45	Conic Sections: Parabola, ellipse, (hyperbola)	10.2-10.4
46-47	Review and Exam 4	
48	Review for Final Exam	

**KINGSBOROUGH COMMUNITY COLLEGE
THE CITY UNIVERSITY OF NEW YORK**

Proposed

COURSE SYLLABUS: MAT 1400

1. DEPARTMENT, COURSE NUMBER, AND TITLE (SPEAK TO ACADEMIC SCHEDULING FOR NEW COURSE NUMBER ASSIGNMENT):

Department of Mathematics & Computer Science,
MAT 1400 – Analytic Geometry and Pre-Calculus Mathematics

2. DOES THIS COURSE MEET A GENERAL EDUCATION/CUNY CORE CATEGORY?

- Life and Physical Science
- Math and Quantitative Reasoning
- A. World Cultures and Global Issues
- B. U.S. Experience in its Diversity
- C. Creative Expression
- D. Individual and Society
- E. Scientific World

IF YES, COMPLETE AND SUBMIT WITH THIS PROPOSAL A CUNY COMMON CORE SUBMISSION FORM.

3. DESCRIBE HOW THIS COURSE TRANSFERS (REQUIRED FOR A.S. DEGREE COURSE). IF A.A.S. DEGREE COURSE AND DOES NOT TRANSFER, JUSTIFY ROLE OF COURSE, E.G. DESCRIBE OTHER LEARNING OBJECTIVES MET:

Lehman College: MAT 172 Course Title: pre-Calculus

Credits: 4.0

Comments: Students receive only the 4.0 credits attached to Lehman College's course.

City College: MAT 10000 Course Title: Pre-Calculus

Credits: 3.0

Comments: Students receive only the 3.0 credits attached to City College's course; the remaining credit may transfer as an elective.

College of Staten Island: MTH 130 Course Title: Pre-Calculus Mathematics

Credits: 3.0

Comments: 1) Students receive only the 3.0 credits attached to City College's course; the remaining credit may transfer as an elective.

2) Meets College of Staten Island's General Education category Scientific

Analysis: Mathematics

3) For all undergraduate degrees

NYC Technical College: MA 375 Course Title: Mathematical Analysis

Credits: 4.0

Comments:

- 1) Meets College of NYC Technical College's General Education
Category: Mathematics
- 2) For all undergraduate degrees

John Jay College of Criminal Justice: MAT 141 Course Title: Pre-Calculus
Credits: 3.0

Comments: 1) Students receive only the 3.0 credits attached to John Jay College of Criminal Justice's course; the remaining credit may transfer as an elective.

- 2) Meets John Jay College of Criminal Justice's General Education
Category: Mathematics
- 3) For all undergraduate degrees

Baruch College: MTH 2000 Course Title: Pre-Calculus College Algebra and
Trigonometry

Credits: 4.0

Comments:

- 1) Meets College of Baruch College's General Education Category: Group
IV: Mathematics or Statistics, Mathematics (Public Affairs)
- 2) For degrees in B.A. (Bachelor of Arts), B.S. (Bachelor of Science)

Hunter College: MATH 120 Course Title: Functions and Graphs
Credits: 3.0

Comments: Students receive only the 3.0 credits attached to Hunter College's
course; the remaining credit may transfer as an elective.

Brooklyn College: MATH 1011 Course Title: Pre-Calculus Mathematics
Credits: 3.0

Comments: Students receive only the 3.0 credits attached to Brooklyn College's
course; the remaining credit may transfer as an elective.

York College: Elective Credit

Medgar Evers College: Elective Credit

4. BULLETIN DESCRIPTION OF COURSE:

This pre-calculus course stresses function theory, analytic geometry, polynomial and rational functions, exponential and logarithmic functions, trigonometric functions and the use of a scientific calculator. The course is recommended for students planning to continue with calculus and/or mathematics electives.

5. CREDITS AND HOURS* (PLEASE CHECK ONE APPROPRIATE BOX BELOW BASED ON CREDITS):

1-credit:	<input type="checkbox"/> 1 hour lecture
	<input type="checkbox"/> 2 hours lab/field/gym

2-credits:	<input type="checkbox"/> 2 hours lecture <input type="checkbox"/> 1 hour lecture, 2 hours lab/field <input type="checkbox"/> 4 hours lab/field
3-credits:	<input type="checkbox"/> 3 hours lecture <input checked="" type="checkbox"/> 2 hours lecture, 2 hours lab/field <input type="checkbox"/> 1 hour lecture, 4 hours lab/field <input type="checkbox"/> 6 hours lab/field
4-credits:	<input type="checkbox"/> 4 hours lecture <input type="checkbox"/> 3 hours lecture, 2 hours lab/field <input type="checkbox"/> 2 hours lecture, 4 hours lab/field <input type="checkbox"/> 1 hour lecture, 6 hours lab/field <input type="checkbox"/> 8 hours lab/field
More than 4-credits:	<input type="checkbox"/> Number of credits: ____ (explain mix lecture/lab below) <div style="display: flex; justify-content: space-around; width: 100%;"> ____ Lecture ____ Lab </div>
Explanation: _____	

***Hours are hours per week in a typical 12-week semester**

6. **NUMBER OF EQUATED CREDITS IN ITEM #5:** N/A

7. **COURSE PREREQUISITES AND COREQUISITES (IF NONE PLEASE INDICATE FOR EACH)**
 - A. **PREREQUISITE(S):** MAT 900 or MAT 9A0
 - B. **COREQUISITE(S):** N/A
 - C. **PRE/COREQUISITE(S):** N/A

8. **BRIEF RATIONALE TO JUSTIFY PROPOSED COURSE TO INCLUDE:**
 - A. **ENROLLMENT SUMMARY IF PREVIOUSLY OFFERED AS AN 82 (INCLUDE COMPLETE 4-DIGIT 82 COURSE NUMBER):** N/A
 - B. **PROJECTED ENROLLMENT:** Will have an expected enrollment of approximately 280 students
 - C. **SUGGESTED CLASS LIMITS:** 28
 - D. **FREQUENCY COURSE IS LIKELY TO BE OFFERED:** Every semester
 - E. **ROLE OF COURSE IN DEPARTMENT'S CURRICULUM AND COLLEGE'S MISSION**

MAT 1400 is designed to provide students with an understanding of elementary and advanced algebraic concepts, as well as a background for more advanced mathematics courses in which functions play a key role. It allows the student to explore the various mathematical functions from both an algebraic and a geometric point of view. By practicing the manipulations and graphs presented in the course, the student will obtain a background that is essential for later mastery of a wide variety of courses in mathematics, computer studies, the sciences, and other areas.

9. **LIST COURSE(S), IF ANY, TO BE WITHDRAWN WHEN COURSE IS ADOPTED (NOTE THIS IS NOT THE SAME AS DELETING A COURSE):** N/A

10. IF COURSE IS AN INTERNSHIP, INDEPENDENT STUDY, OR THE LIKE, PROVIDE AN EXPLANATION AS TO HOW THE STUDENT WILL EARN THE CREDITS AWARDED. THE CREDITS AWARDED SHOULD BE CONSISTENT WITH STUDENT EFFORTS REQUIRED IN A TRADITIONAL CLASSROOM SETTING: N/A

11. PROPOSED TEXT BOOK(S) AND/OR OTHER REQUIRED INSTRUCTIONAL MATERIAL(S):

Precalculus, Ratti and McWaters, Addison-Wesley, Scientific Calculator (Texas Instrument Model: TI-30Xii) , Second Kingsborough edition

12. REQUIRED COURSE FOR MAJOR OR AREA OF CONCENTRATION?

For Computer Information Systems and Biology.

13. IF OPEN ONLY TO SELECTED STUDENTS SPECIFY POPULATION: N/A

14. EXPLAIN WHAT STUDENTS WILL KNOW AND BE ABLE TO DO UPON COMPLETION OF COURSE:

0. Solve linear, quadratic, polynomial, quadratic-like, absolute value, radical and rational equations.
1. Solve linear, quadratic, polynomial, absolute value, and rational inequalities.
2. Perform simple and complex computations using a scientific calculator.
3. Use the Cartesian plane to solve problems in analytic geometry by applying the distance, midpoint and slope formulas.
4. Sketch graphs of numerous functions and equations in two variables, including linear, square, cube, square root, absolute value, reciprocal, polynomial, rational, exponential, logarithmic functions; apply shifting techniques to obtain graphs of functions similar to those mentioned above.
5. Understand the geometric and algebraic relationships among these functions.
6. Construct functions by addition, subtraction, multiplication, division and composition; find the inverse of a one-to-one function and relate the graphs of a one-to-one and onto function and its inverse.
7. Obtain information about a function by analyzing its graph, including the domain, range, intercepts, symmetries, extent, positive and negative analysis.
8. Conic Sections; i.e., the parabola, ellipse and hyperbola.

15. METHODS OF TEACHING –E.G. LECTURES, LABORATORIES, AND OTHER ASSIGNMENTS FOR STUDENTS, INCLUDING ANY OF THE FOLLOWING: DEMONSTRATIONS, GROUP WORK, WEBSITE OR E-MAIL INTERACTIONS AND/OR ASSIGNMENTS, PRACTICE IN APPLICATION OF SKILLS, ETC.:

Class room lecture and labs. In the labs students will practice performing relevant skills described in question #14. Demonstration of specific algebraic and graphical concepts. Homework is given daily and is designed to improve and solidify student understanding and mastery of these concepts.

16. ASSIGNMENTS TO STUDENTS: Exercises from textbook.

17. DESCRIBE METHOD OF EVALUATING LEARNING SPECIFIED IN #15 - INCLUDE PERCENTAGE BREAKDOWN FOR GRADING. IF A DEVELOPMENTAL COURSE INCLUDE

HOW THE NEXT LEVEL COURSE IS DETERMINED AS WELL AS NEXT LEVEL PLACEMENT.
Classroom examinations and a comprehensive departmental final exam

18. TOPICAL COURSE OUTLINE FOR THE 12 WEEK SEMESTER (WHICH SHOULD BE SPECIFIC REGARDING TOPICS COVERED, LEARNING ACTIVITIES, AND ASSIGNMENTS):

A lesson number preceded by an L indicates a lab

<u>Day</u>	<u>Topic</u>	<u>Sections</u>
1	Review: Factoring polynomials and Rational expressions	P.4, P.5
L2	Review: Linear Equations in one variable	1.1
3	Complex numbers	1.3
L4,5	Quadratic Equations, equations in quadratic form	1.4,1.5
L6	Linear and Compound inequalities	1.6,1.7
L7-8	Equations and Inequalities involving absolute value	1.7
L9	Review	
10	Exam 1	
11	Graphs and Equations of Circles	2.1,2.2
L12-13	Linear Equations in two variables	2.3
14-18	Relations and Functions, properties of functions, transformation of functions, algebra of functions, invertible functions	2.4-2.9
L19	Review	
20	Exam 2	
L21-23	Polynomial, quadratic functions and their graphs	3.1-3.2
L24-25	Zeroes of polynomial functions	3.3-3.4
26-28	Rational Functions and their graphs, vertical and horizontal asymptotes,	3.6
L29-31	Polynomial and Rational inequalities	3.7
L32	Review	
33	Exam 3	
34-39	Exponential and logarithmic functions and equations	4.1-4.5
40-45	Conic Sections: Parabola, ellipse, (hyperbola)	10.2-10.4

L46-47	Review
47	Exam 4

L48	Review for Final Exam
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19. SELECTED BIBLIOGRAPHY AND SOURCE MATERIALS:

Stewart, *Precalculus: Mathematics for Calculus, 7th Edition*, Cengage Learning, 2015

Lial, Hornsby, Schneider, and Daniels, *Precalculus*, 6th Edition, Pearson, 2016

Sullivan, *Precalculus*, 10th Edition, Pearson, 2015.

Stewart, Redlin, , Watson, *Precalculus: Mathematics for Calculus (Standalone Book) 7th Edition*, Cengage Learning, 2015.

Abramson, *Precalculus*, OpenStax, 2014.

Sullivan, *Precalculus*, Pearson, 2015.

Simmons, *Precalculus Mathematics in a Nutshell: Geometry, Algebra, Trigonometry*, Wipf & Stock Publishers, 2003.

Larson, *Precalculus, 9th Edition*, Cengage Learning, 2013.

Blitzer, *Precalculus 5th Edition*, Pearson, 2013.

Larson, *Precalculus With Limits A Graphing Approach 5th Edition*, Houghton Mifflin College Div, 2007.

Revised/January 2019/SF