

**LEHMAN COLLEGE
OF THE
CITY UNIVERSITY OF NEW YORK**

DEPARTMENT OF MATHEMATICS

CURRICULUM CHANGE

Name of Program and Degree Award: Mathematics Minor
Effective Term: Fall 2024

1. **Type of Change**: Change in Degree requirements

2. **From**: Strikethrough the changes
Mathematics Minor (14-24 credits)

Required courses:

8-16 credits

	Credits
MAT 175* Calculus I	4
MAT 176* Calculus II	4
MAT 226 Vector Calculus	4
MAT 313 Elements of Linear Algebra	4

6-8 credits in two additional MAT courses of which at least 3 credits must be at the 300-level or higher. The following courses cannot be used towards the Math minor:

	Credits
MAT 231 Statistics for Biologists	4
MAT 300 Mathematical Models in the Social Sciences	3
MAT 301 Applied Statistics and Computer Analysis for Social Scientists	3
MAT 348 Mathematical Methods for Management	4

All grades must be C- or better.

*MAT 175 and MAT 176 are prerequisites to all advanced MAT courses. They do not count against the total number of credits a student must take independent of their major.

3. **To**: Underline the changes
Mathematics Minor (14-24 credits)

Required courses:

8-16 credits

	Credits
MAT 175* Calculus I	4
MAT 176* Calculus II	4
MAT 226 Vector Calculus	4
MAT 313 Elements of Linear Algebra	4

6-8 credits in two additional MAT courses of which 3 of these credits must be at the 200-level or higher and at least 3 credits must be at the 300-level or higher. The following courses cannot be used towards the Math minor:

	Credits
MAT 231 Statistics for Biologists	4
MAT 300 Mathematical Models in the Social Sciences	3
MAT 301 Applied Statistics and Computer Analysis for Social Scientists	3
MAT 348 Mathematical Methods for Management	4

All grades must be C- or better.

*MAT 175 and MAT 176 are prerequisites to all advanced MAT courses. They do not count against the total number of credits a student must take independent of their major.

4. **Rationale:** This corrects an oversight of the Department; 100-level classes (outside of MAT 175 and MAT 176) are not appropriate for a minor in pure mathematics as they are introductory gateway courses geared more for the liberal arts. After completing MAT 176, all math electives are at the 200-level or higher.

5. **Date of departmental approval:** February 26, 2024

**LEHMAN COLLEGE
OF THE
CITY UNIVERSITY OF NEW YORK
DEPARTMENT OF MATHEMATICS**

CURRICULUM CHANGE

1. **Type of change:** New Course

2.

Department(s)	Mathematics
Career	<input checked="" type="checkbox"/> Undergraduate <input type="checkbox"/> Graduate
Academic Level	<input checked="" type="checkbox"/> Regular <input type="checkbox"/> Compensatory <input type="checkbox"/> Developmental <input type="checkbox"/> Remedial
Subject Area	Mathematics
Course Prefix & Number	MAT 037
Course Title	Elementary Topics To Support Gateway Math Success
Description	Various elementary topics in mathematics to support student success in gateway mathematics courses. Consult with the department for specific topics and sections. (May be repeated up to five times.)
Pre/ Co Requisites	Departmental Permission
Credits	0
Hours	1
Liberal Arts	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Course Attribute (e.g. Writing Intensive, WAC, etc)	
General Education Component	<input checked="" type="checkbox"/> Not Applicable <input type="checkbox"/> Required <input type="checkbox"/> English Composition <input type="checkbox"/> Mathematics <input type="checkbox"/> Science <input type="checkbox"/> Flexible <input type="checkbox"/> World Cultures <input type="checkbox"/> US Experience in its Diversity <input type="checkbox"/> Creative Expression <input type="checkbox"/> Individual and Society <input type="checkbox"/> Scientific World

3. **Rationale:**

The Math Department regularly offers 1-hour, 0-credit elementary-level workshops to help students complete their gateway Mathematics course requirements. These workshops support student success by providing structured review and enrichment on targeted topics which, depending on the workshop, include arithmetic; algebra, quantitative reasoning, statistics, precalculus, and calculus. Having a formal course for these workshops is needed for logistical matters such as the payment of instructors, tracking of student success, and coordination of student schedules.

This class should be programmed to include the following attributes:

- 1 total contact hour
- 0 credits
- 0 academic progress units
- 0 financial aid units
- Can be repeated up to 5 times.
- Pass/Fail Grading Modality

4. **Learning Outcomes (By the end of the course students will be expected to):**

- a. Interpret and draw appropriate inferences from quantitative representations, such as formulas, graphs, or tables.
- b. Use algebraic, numerical, graphical, or statistical methods to draw accurate conclusions and solve mathematical problems.
- c. Represent quantitative problems expressed in natural language in suitable mathematical format.
- d. Effectively communicate quantitative analysis or solutions to mathematical problems in written or oral form.
- e. Evaluate solutions to problems for reasonableness using a variety of means, including informed estimation.
- f. Apply mathematical methods to problems in other fields of study.

5. **Date of Departmental Approval:** February 26, 2024

**LEHMAN COLLEGE
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DEPARTMENT OF MATHEMATICS**

CURRICULUM CHANGE

1. **Type of change:** New Course

2.

Department(s)	Mathematics
Career	<input checked="" type="checkbox"/> Undergraduate <input type="checkbox"/> Graduate
Academic Level	<input checked="" type="checkbox"/> Regular <input type="checkbox"/> Compensatory <input type="checkbox"/> Developmental <input type="checkbox"/> Remedial
Subject Area	Mathematics
Course Prefix & Number	MAT 038
Course Title	Foundational Topics To Support Gateway Math Success
Description	(May be repeated up to five times.) Various foundational topics in mathematics to support student success in gateway mathematics courses. Consult with the department for specific topics and sections.
Pre/ Co Requisites	Departmental Permission
Credits	0
Hours	2
Liberal Arts	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Course Attribute (e.g. Writing Intensive, WAC, etc)	
General Education Component	<input checked="" type="checkbox"/> Not Applicable <input type="checkbox"/> Required <input type="checkbox"/> English Composition <input type="checkbox"/> Mathematics <input type="checkbox"/> Science <input type="checkbox"/> Flexible <input type="checkbox"/> World Cultures <input type="checkbox"/> US Experience in its Diversity <input type="checkbox"/> Creative Expression <input type="checkbox"/> Individual and Society <input type="checkbox"/> Scientific World

3. **Rationale:**

The Math Department regularly offers 2-hour, 0-credit foundational-level workshops to help students complete their gateway Mathematics course requirements. These workshops support student success by providing structured review and enrichment on targeted topics which, depending on the workshop, include arithmetic; algebra, quantitative reasoning, statistics, precalculus, and calculus. Having a formal course for these workshops is needed for logistical matters such as the payment of instructors, tracking of student success, and coordination of student schedules.

This class should be programmed to include the following attributes:

- 2 total contact hours
- 0 credits
- 0 academic progress units
- 0 financial aid units
- Can be repeated up to 5 times.
- Pass/Fail Grading Modality

4. **Learning Outcomes (By the end of the course students will be expected to):**

- a. Interpret and draw appropriate inferences from quantitative representations, such as formulas, graphs, or tables.
- b. Use algebraic, numerical, graphical, or statistical methods to draw accurate conclusions and solve mathematical problems.
- c. Represent quantitative problems expressed in natural language in suitable mathematical format.
- d. Effectively communicate quantitative analysis or solutions to mathematical problems in written or oral form.
- e. Evaluate solutions to problems for reasonableness using a variety of means, including informed estimation.
- f. Apply mathematical methods to problems in other fields of study.

5. **Date of Departmental Approval:** February 26, 2024

**LEHMAN COLLEGE
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DEPARTMENT OF MATHEMATICS**

CURRICULUM CHANGE

1. **Type of change:** Experimental Course

2.

Department(s)	Mathematics
Career	<input checked="" type="checkbox"/> Undergraduate <input type="checkbox"/> Graduate
Academic Level	<input checked="" type="checkbox"/> Regular <input type="checkbox"/> Compensatory <input type="checkbox"/> Developmental <input type="checkbox"/> Remedial
Subject Area	Mathematics
Course Prefix & Number	MAT 039
Course Title	Topics For Intensive Support Of Gateway Math Success
Description	Various topics in mathematics to intensively support student success in gateway mathematics courses. Consult with the department for specific topics and sections. (May be repeated up to five times.)
Pre/ Co Requisites	Departmental Permission
Credits	0
Hours	3
Liberal Arts	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Course Attribute (e.g. Writing Intensive, WAC, etc)	
General Education Component	<input checked="" type="checkbox"/> Not Applicable <input type="checkbox"/> Required <input type="checkbox"/> English Composition <input type="checkbox"/> Mathematics <input type="checkbox"/> Science <input type="checkbox"/> Flexible <input type="checkbox"/> World Cultures <input type="checkbox"/> US Experience in its Diversity <input type="checkbox"/> Creative Expression <input type="checkbox"/> Individual and Society <input type="checkbox"/> Scientific World

3. **Rationale:**

The Math Department regularly offers 3-hour, 0-credit workshops to help students complete their gateway Mathematics course requirements. These intensive workshops support student success by providing structured review and enrichment on targeted topics which, depending on the workshop, include arithmetic; algebra, quantitative reasoning, statistics, precalculus, and calculus. Having a formal course for these workshops is needed for logistical matters such as the payment of instructors, tracking of student success, and coordination of student schedules.

This class should be programmed to include the following attributes:

- 3 total contact hours
- 0 credits
- 0 academic progress units
- 0 financial aid units
- Can be repeated up to 5 times.
- Pass/Fail Grading Modality
- Experimental Course

4. **Learning Outcomes (By the end of the course students will be expected to):**

- a. Interpret and draw appropriate inferences from quantitative representations, such as formulas, graphs, or tables.
- b. Use algebraic, numerical, graphical, or statistical methods to draw accurate conclusions and solve mathematical problems.
- c. Represent quantitative problems expressed in natural language in suitable mathematical format.
- d. Effectively communicate quantitative analysis or solutions to mathematical problems in written or oral form.
- e. Evaluate solutions to problems for reasonableness using a variety of means, including informed estimation.
- f. Apply mathematical methods to problems in other fields of study.

5. **Date of Departmental Approval:** February 26, 2024

**LEHMAN COLLEGE
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DEPARTMENT OF MATHEMATICS

CURRICULUM CHANGE

1. **Type of Change:** Change from experimental to permanent course.

2. **From:** ~~Strike through the changes~~

Department(s)	Mathematics
Career	<input checked="" type="checkbox"/> Undergraduate [] Graduate
Academic Level	<input checked="" type="checkbox"/> Regular [] Compensatory [] Developmental [] Remedial
Subject Area	MAT
Course Prefix & Number	MAT 179
Course Title	Mathematical Proofs
Description	An introduction to proof writing and quantitative reading comprehension in preparation for proof intensive math courses. Topics include direct proofs, set theory, induction, logic, contrapositive, contradiction, functions, and equivalence relations.
Pre/ Co Requisites	Prerequisite: MAT 176 or Department Permission
Credits	2
Hours	2
Liberal Arts	<input checked="" type="checkbox"/> Yes [] No
Course Attribute (e.g. Writing Intensive, WAC, etc)	Experimental Course
General Education Component	<input checked="" type="checkbox"/> Not Applicable <input type="checkbox"/> Required <input type="checkbox"/> English Composition <input type="checkbox"/> Mathematics <input type="checkbox"/> Science <input type="checkbox"/> Flexible <input type="checkbox"/> World Cultures <input type="checkbox"/> US Experience in its Diversity <input type="checkbox"/> Creative Expression <input type="checkbox"/> Individual and Society <input type="checkbox"/> Scientific World

3. **To:** Underline the changes

Department(s)	Mathematics
Career	<input checked="" type="checkbox"/> Undergraduate [] Graduate
Academic Level	<input checked="" type="checkbox"/> Regular [] Compensatory [] Developmental [] Remedial
Subject Area	MAT
Course Prefix & Number	MAT 179
Course Title	Mathematical Proofs
Description	An introduction to proof writing and quantitative reading comprehension in preparation for proof intensive math courses. Topics include direct proofs, set theory, induction, logic, contrapositive, contradiction, functions, and equivalence relations.
Pre/ Co Requisites	Prerequisite: MAT 176 or Department Permission
Credits	2
Hours	2
Liberal Arts	<input checked="" type="checkbox"/> Yes [] No
Course Attribute (e.g. Writing Intensive, WAC, etc)	
General Education Component	<input checked="" type="checkbox"/> Not Applicable <input type="checkbox"/> Required <input type="checkbox"/> English Composition <input type="checkbox"/> Mathematics <input type="checkbox"/> Science <input type="checkbox"/> Flexible <input type="checkbox"/> World Cultures <input type="checkbox"/> US Experience in its Diversity <input type="checkbox"/> Creative Expression <input type="checkbox"/> Individual and Society <input type="checkbox"/> Scientific World

4. **Rationale:**

Clear, effective communication of mathematical ideas is an essential, but challenging skill needed by students completing intermediate and advanced math courses.

Especially in the age of AI-generated outputs from websites like ChatGPT, all students can benefit from developing their mathematical and quantitative reading comprehension.

The purpose of this class is to expose students to the tools and techniques utilized in mathematical proof writing and reading at an early stage in their studies. Students taking this class will be better prepared for more advanced Math courses; they will also encounter general skills in logical deduction and reasoning that can be applied across STEM disciplines.

Note that this is currently an experimental course. Once approved, the experimental course attribute should be removed.

5. **Date of departmental approval:** February 26, 2024

**LEHMAN COLLEGE
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DEPARTMENT OF MATHEMATICS

CURRICULUM CHANGE

1. **Type of Change:** Prerequisite.

2. **From:** ~~Strike through~~ the changes

Department(s)	Mathematics
Career	<input checked="" type="checkbox"/> Undergraduate [] Graduate
Academic Level	<input checked="" type="checkbox"/> Regular [] Compensatory [] Developmental [] Remedial
Subject Area	MAT
Course Prefix & Number	MAT 432
Course Title	Differential Geometry
Description	Metric spaces, Curves in Euclidian 3 space (E3): Curvature, torsion, fundamental theorem of ordinary differential equations, fundamental existence theorem for space curves. Surfaces in E3: geometry on a surface, Inverse Function Theorem, Implicit Function Theorem, and Gauss curvature. Coordinate charts, Fubini's Theorem, orientation and an introduction to Riemannian Geometry.
Pre/ Co Requisites	Prerequisite: MAT 313 and MAT 320
Credits	4
Hours	4
Liberal Arts	<input checked="" type="checkbox"/> Yes [] No
Course Attribute (e.g. Writing Intensive, WAC, etc)	
General Education Component	<input checked="" type="checkbox"/> Not Applicable <input type="checkbox"/> Required <input type="checkbox"/> English Composition <input type="checkbox"/> Mathematics <input type="checkbox"/> Science <input type="checkbox"/> Flexible <input type="checkbox"/> World Cultures <input type="checkbox"/> US Experience in its Diversity <input type="checkbox"/> Creative Expression <input type="checkbox"/> Individual and Society <input type="checkbox"/> Scientific World

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3. **To:** Underline the changes

Department(s)	Mathematics
Career	<input checked="" type="checkbox"/> Undergraduate [] Graduate
Academic Level	<input checked="" type="checkbox"/> Regular [] Compensatory [] Developmental [] Remedial
Subject Area	MAT
Course Prefix & Number	MAT 432
Course Title	Differential Geometry
Description	Metric spaces, Curves in Euclidian 3 space (E3): Curvature, torsion, fundamental theorem of ordinary differential equations, fundamental existence theorem for space curves. Surfaces in E3: geometry on a surface, Inverse Function Theorem, Implicit Function Theorem, and Gauss curvature. Coordinate charts, Fubini's Theorem, orientation and an introduction to Riemannian Geometry.
Pre/ Co Requisites	Prerequisite: <u>MAT 226</u> , MAT 313, and MAT 320.
Credits	4
Hours	4
Liberal Arts	<input checked="" type="checkbox"/> Yes [] No
Course Attribute (e.g. Writing Intensive, WAC, etc)	
General Education Component	<input checked="" type="checkbox"/> Not Applicable <input type="checkbox"/> Required <input type="checkbox"/> English Composition <input type="checkbox"/> Mathematics <input type="checkbox"/> Science <input type="checkbox"/> Flexible <input type="checkbox"/> World Cultures <input type="checkbox"/> US Experience in its Diversity <input type="checkbox"/> Creative Expression <input type="checkbox"/> Individual and Society <input type="checkbox"/> Scientific World

4. **Rationale:**

MAT 226 is a “hidden prerequisite” for MAT 432 currently as MAT 226 is a prerequisite for MAT 320 at Lehman. However, some students who complete MAT 320 at other schools have not completed MAT 226 and are unaware that the content covered in MAT 226 (ie. partial derivatives and gradients) are necessary for MAT 432. Adding MAT 226

as a prerequisite makes it clearer that the content covered in MAT 226 is necessary for MAT 432.

5. **Date of departmental approval:** February 26, 2024