# The City University of New York

Articulation Agreement Between

Queensborough Community College

and

**Queens College** 

### A. Sending and Receiving Institutions

Sending Institution: Queensborough Community College Department: Physics Program: Liberal Arts and Sciences (Mathematics and Science) Degree: Associate of Science (A.S.)

Receiving Institution: Queens College Department: Physics Program: Physics Degree: Bachelor of Arts (B.A.)

#### **B.** Admission Requirements for Queens College Physics Program

Minimum GPA: 2.0

To take advantage of this articulation agreement, students must complete the A.S. in Liberal Arts and Sciences (Mathematics and Science) at Queensborough Community College prior to transfer to Queens College. Upon transfer, students must declare a major in Physics. All transfer courses credited toward the physics major must be completed with a grade of C- or better.

The equivalencies in this agreement assume that the student has completed their Associate's degree. Course equivalency information will be entered in both the *University Course Guide* database and the Website. When the receiving college awards transfer credit for either a block of courses or for an entire program rather than for individual courses, it may not be necessary to list individual course equivalencies.

Total transfer credits granted toward the baccalaureate degree: <u>60 credits</u>. Total additional credits required at the Queens College to complete the baccalaureate degree: <u>60 credits</u>

C. Course-to-Course Equivalencies and Transfer Credit Awarde
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Queensborough Community College		Queens College		
Course and Title	Credit	Course and Title	Credit	Transfer Credits Awarded
Common Core Requirements		Course Equivalency		
Required Core 1A:		English Composition 1 and 2:		
ENGL-101 English Composition I	3	ENGL 110 College Writing I	3	3
ENGL-102 English Composition II	3	ENGL 130 Writing about Literature in English	3	3
Required Core 1B:	4	Math and Quantitative Reasoning:	4	4
MA-440 Pre-Calculus Mathematics2		MATH 122 Precalculus		
PH-421 General Calculus Physics A <sub>3</sub>	5	PHYS 145 Principles of Physics I and Lab	5	5
Flexible Core 2A: One course in History or Social Sciences1 is recommended for either 2A or 2D	3	World Cultures and Global Issues	3	3
Flexible Core 2B: SP-211 Speech Communication1 recommended	3	US Experience in Its Diversity	3	3
Flexible Core 2C: Select one course	3	Creative Expression	3	3
Flexible Core 2D: One course in History or Social Sciences1 is recommended for either 2A or 2D	3	Individual and Society	3	3
Flexible Core 2E: PH-422 General Calculus Physics B <sub>3</sub>	5	PHYS 146 Principles of Physics II and Lab	5	5
Additional Flexible Core Course: MA-441 Analytic Geometry and Calculus I <sub>1.2</sub>	4	Additional Flexible Core Course: MATH 151 Calculus/Differentiation and Integration	4	4
Subtotal	36	Subtotal	36	36
Requirements for the Major₃		Course Equivalency		
QCC Major Electives <sub>3</sub> (recommended choices)				
<u>QCC Major Electives</u> (recommended choices) PH-440 Modern Physics	4	PHYS 260 Introduction to Modern Physics	4	4
QCC Major Electives         (recommended choices)           PH-440 Modern Physics         MA-442 Analytic Geometry and Calculus II3	4	PHYS 260 Introduction to Modern Physics MATH 152 Calculus/Integration and Infinite Series	4	4 4
QCC Major Electives3 (recommended choices)         PH-440 Modern Physics         MA-442 Analytic Geometry and Calculus II3         MA-443 Analytic Geometry and Calculus III	4 4 4	PHYS 260 Introduction to Modern Physics MATH 152 Calculus/Integration and Infinite Series MATH 201 Multivariable Calculus	4 4 4	4 4 4
QCC Major Electives <sub>3</sub> (recommended choices)         PH-440 Modern Physics         MA-442 Analytic Geometry and Calculus II <sub>3</sub> MA-443 Analytic Geometry and Calculus III         MA-451 Differential Equations	4 4 4 4	PHYS 260 Introduction to Modern Physics MATH 152 Calculus/Integration and Infinite Series MATH 201 Multivariable Calculus MATH 223 Differential Equations with Numerical Methods I	4 4 4 3	4 4 4 3
QCC Major Electives <sub>3</sub> (recommended choices)         PH-440 Modern Physics         MA-442 Analytic Geometry and Calculus II <sub>3</sub> MA-443 Analytic Geometry and Calculus III         MA-451 Differential Equations         MA-461 Linear Algebra	4 4 4 4 4	PHYS 260 Introduction to Modern Physics         MATH 152 Calculus/Integration and Infinite         Series         MATH 201 Multivariable Calculus         MATH 223 Differential Equations with         Numerical Methods I         MATH 231 Linear Algebra I	4 4 4 3 4	4 4 4 3 4
QCC Major Electives <sub>3</sub> (recommended choices)         PH-440 Modern Physics         MA-442 Analytic Geometry and Calculus II3         MA-443 Analytic Geometry and Calculus III         MA-4451 Differential Equations         MA-461 Linear Algebra         MA-481 Probability and Statistics	4 4 4 4 3	PHYS 260 Introduction to Modern Physics         MATH 152 Calculus/Integration and Infinite         Series         MATH 201 Multivariable Calculus         MATH 223 Differential Equations with         Numerical Methods I         MATH 231 Linear Algebra I         MATH 241 Introduction to Probability and         Mathematical Statistics	4 4 4 3 4 3	4 4 3 4 3
QCC Major Electives <sub>3</sub> (recommended choices)         PH-440 Modern Physics         MA-442 Analytic Geometry and Calculus II <sub>3</sub> MA-443 Analytic Geometry and Calculus III         MA-4451 Differential Equations         MA-461 Linear Algebra         MA-481 Probability and Statistics	4 4 4 4 4 3	PHYS 260 Introduction to Modern Physics         MATH 152 Calculus/Integration and Infinite         Series         MATH 201 Multivariable Calculus         MATH 223 Differential Equations with         Numerical Methods I         MATH 231 Linear Algebra I         MATH 241 Introduction to Probability and         Mathematical Statistics         Additional Elective Credit	4 4 3 4 3 -	4 4 3 4 3 0-1
QCC Major Electives3 (recommended choices)         PH-440 Modern Physics         MA-442 Analytic Geometry and Calculus II3         MA-443 Analytic Geometry and Calculus III         MA-4451 Differential Equations         MA-461 Linear Algebra         MA-481 Probability and Statistics         Subtotal	4 4 4 4 3 17-22	PHYS 260 Introduction to Modern Physics         MATH 152 Calculus/Integration and Infinite         Series         MATH 201 Multivariable Calculus         MATH 223 Differential Equations with         Numerical Methods I         MATH 231 Linear Algebra I         MATH 241 Introduction to Probability and         Mathematical Statistics         Additional Elective Credit	4 4 3 4 3 - Subtotal	4 4 3 4 3 0-1 17-22
QCC Major Electives3 (recommended choices)         PH-440 Modern Physics         MA-442 Analytic Geometry and Calculus II3         MA-443 Analytic Geometry and Calculus III         MA-441 Differential Equations         MA-461 Linear Algebra         MA-481 Probability and Statistics         Subtotal	4 4 4 4 3 17-22	PHYS 260 Introduction to Modern Physics         MATH 152 Calculus/Integration and Infinite         Series         MATH 201 Multivariable Calculus         MATH 223 Differential Equations with         Numerical Methods I         MATH 231 Linear Algebra I         MATH 241 Introduction to Probability and         Mathematical Statistics         Additional Elective Credit         Course Equivalency	4 4 3 4 3 - Subtotal	4 4 3 4 3 0-1 17-22
QCC Major Electives₃ (recommended choices)         PH-440 Modern Physics         MA-442 Analytic Geometry and Calculus II₃         MA-443 Analytic Geometry and Calculus II₃         MA-443 Analytic Geometry and Calculus III         MA-441 Differential Equations         MA-461 Linear Algebra         MA-481 Probability and Statistics         Subtotal         Additional Requirements         HE-101 Introduction to Health Education or         HE-102 Health, Behavior, and Society	4 4 4 4 3 <b>17-22</b> 1-2	PHYS 260 Introduction to Modern Physics         MATH 152 Calculus/Integration and Infinite         Series         MATH 201 Multivariable Calculus         MATH 223 Differential Equations with         Numerical Methods I         MATH 231 Linear Algebra I         MATH 241 Introduction to Probability and         Mathematical Statistics         Additional Elective Credit         Section Course Equivalency	4 4 3 4 3 - Subtotal	4 4 3 4 3 0-1 17-22
QCC Major Electives₃ (recommended choices)         PH-440 Modern Physics         MA-442 Analytic Geometry and Calculus II₃         MA-443 Analytic Geometry and Calculus II₃         MA-443 Analytic Geometry and Calculus III         MA-443 I Differential Equations         MA-461 Linear Algebra         MA-481 Probability and Statistics         Subtotal         Additional Requirements         HE-101 Introduction to Health Education or         HE-102 Health, Behavior, and Society         One credit in PE-400, PE-500, or DAN-100 series	4 4 4 4 3 <b>17-22</b> 1-2	PHYS 260 Introduction to Modern Physics         MATH 152 Calculus/Integration and Infinite         Series         MATH 201 Multivariable Calculus         MATH 223 Differential Equations with         Numerical Methods I         MATH 231 Linear Algebra I         MATH 241 Introduction to Probability and         Mathematical Statistics         Additional Elective Credit         Sective Credit	4 4 3 4 3 - Subtotal	4 4 3 4 3 0-1 17-22 1-2
QCC Major Electives₃ (recommended choices)         PH-440 Modern Physics         MA-442 Analytic Geometry and Calculus II₃         MA-443 Analytic Geometry and Calculus II₃         MA-443 Analytic Geometry and Calculus III         MA-443 I Differential Equations         MA-461 Linear Algebra         MA-481 Probability and Statistics         Subtotal         Additional Requirements         HE-101 Introduction to Health Education or         HE-102 Health, Behavior, and Society         One credit in PE-400, PE-500, or DAN-100 series (one credit courses only)	4 4 4 3 <b>17-22</b> 1-2 1	PHYS 260 Introduction to Modern Physics         MATH 152 Calculus/Integration and Infinite         Series         MATH 201 Multivariable Calculus         MATH 223 Differential Equations with         Numerical Methods I         MATH 231 Linear Algebra I         MATH 241 Introduction to Probability and         Mathematical Statistics         Additional Elective Credit         Elective Credit	4 4 3 4 3 - Subtotal - -	4 4 3 4 3 0-1 17-22 1-2 1
QCC Major Electives₃ (recommended choices)         PH-440 Modern Physics         MA-442 Analytic Geometry and Calculus II₃         MA-443 Analytic Geometry and Calculus II₃         MA-443 Analytic Geometry and Calculus III         MA-443 I Differential Equations         MA-461 Linear Algebra         MA-481 Probability and Statistics         Subtotal         Additional Requirements         HE-101 Introduction to Health Education or         HE-102 Health, Behavior, and Society         One credit in PE-400, PE-500, or DAN-100 series (one credit courses only)         MA-119 College Algebra2 (if required)	4 4 4 3 <b>17-22</b> 1-2 1 3	PHYS 260 Introduction to Modern Physics         MATH 152 Calculus/Integration and Infinite         Series         MATH 201 Multivariable Calculus         MATH 223 Differential Equations with         Numerical Methods I         MATH 231 Linear Algebra I         MATH 241 Introduction to Probability and         Mathematical Statistics         Additional Elective Credit         Elective Credit         Elective Credit	4 4 3 4 3 - Subtotal - - -	4 4 3 4 3 0-1 17-22 1-2 1 3
QCC Major Electives₃ (recommended choices)         PH-440 Modern Physics         MA-442 Analytic Geometry and Calculus II₃         MA-443 Analytic Geometry and Calculus II₃         MA-443 Analytic Geometry and Calculus III         MA-443 I Differential Equations         MA-461 Linear Algebra         MA-481 Probability and Statistics         Subtotal         Additional Requirements         HE-101 Introduction to Health Education or         HE-102 Health, Behavior, and Society         One credit in PE-400, PE-500, or DAN-100 series (one credit courses only)         MA-119 College Algebra2 (if required)         MA-121 Trigonometry2 (if required)	4 4 4 3 <b>17-22</b> 1-2 1 3 1	PHYS 260 Introduction to Modern Physics         MATH 152 Calculus/Integration and Infinite         Series         MATH 201 Multivariable Calculus         MATH 223 Differential Equations with         Numerical Methods I         MATH 231 Linear Algebra I         MATH 241 Introduction to Probability and         Mathematical Statistics         Additional Elective Credit         Elective Credit         Elective Credit         Elective Credit         Elective Credit	4 4 3 4 3 - Subtotal - - - - -	4 4 3 4 3 0-1 17-22 1-2 1 3 1
QCC Major Electives₃ (recommended choices)         PH-440 Modern Physics         MA-442 Analytic Geometry and Calculus II₃         MA-443 Analytic Geometry and Calculus II₃         MA-443 Analytic Geometry and Calculus III         MA-443 I Differential Equations         MA-461 Linear Algebra         MA-481 Probability and Statistics         Subtotal         Additional Requirements         HE-101 Introduction to Health Education or         HE-102 Health, Behavior, and Society         One credit in PE-400, PE-500, or DAN-100 series (one credit courses only)         MA-119 College Algebra₂ (if required)         MA-121 Trigonometry₂ (if required)	4 4 4 3 <b>17-22</b> 1-2 1 3 1 <b>2-7</b>	PHYS 260 Introduction to Modern Physics         MATH 152 Calculus/Integration and Infinite         Series         MATH 201 Multivariable Calculus         MATH 223 Differential Equations with         Numerical Methods I         MATH 231 Linear Algebra I         MATH 241 Introduction to Probability and         Mathematical Statistics         Additional Elective Credit         Elective Credit         Elective Credit         Elective Credit         Elective Credit	4 4 3 4 3 - Subtotal - - - - Subtotal	4 4 3 4 3 0-1 17-22 1-2 1-2 1 3 1 2-7

Notes:

- 1. Students are required to take particular courses in some areas of the Common Core that fulfill both general education and major requirements at QCC. If students do not take the required courses in the Common Core, they will have to take additional credits to complete their degree requirements.
- 2. Students must complete MA-441 and all prerequisites for that course.
- 3. Students must complete two-course sequences in at least two different subject areas (biology, chemistry, computer science, mathematics, and physics). For students following this agreement, one two course sequence in physics (PH-421/422) and one in mathematics (MA-442/443) are recommended.

All Queensborough Community College students must complete at least two writing intensive courses, designated as "WI" in the course schedule. Transfer students must take at least one writing intensive course at Queens College, designated W, but this can overlap with the College Option Literature requirement and does not add to the required number of credits.

#### D. Senior College Courses Remaining for Baccalaureate Degree

Students pursuing the B.A. in Physics much choose either a Physics Option or an Applied Physics Option. Tables for both options are included below. Transfer students should consult with the major advisor in the Queens College Physics Department (<u>info@physics.qc.cuny.edu</u>) prior to enrolling in classes at Queens College.

#### **Physics Option**

Course and Title	Credits
College Option General Education Courses	
One Literature Course (LIT)	3
One Language Course (LANG)	3
Major Courses	
PHYS 222 Optics	3
PHYS 233 Intermediate Methods of Math Physics I	3
PHYS 234 Intermediate Methods of Math Physics II	3
PHYS 235 Classical Physics Laboratory	2
PHYS 237 Mechanics	4
PHYS 242 Thermodynamics OR PHYS 243 Thermodynamics and Statistical Mechanics	3-4
PHYS 310 Electromagnetism I	4
PHYS 365 Principles of Quantum Mechanics	4
PHYS 377 Modern Physics Laboratory	2
One 3- or 4-credit physics course at the 200 level or above (excluding PHYS 204 and 207).	3-4
Subtotal	37-39
Additional course work to reach 120 credits	21-23
Total credits to be earned at Queens College	60

Note: The above table assumes students completed MA-442, MA-443, and PH-440 at QCC. If those courses were not completed at QCC, then the courses must be completed at Queens College.

# **Applied Physics Option**

Course and Title	Credits
College Option General Education Courses	
One Literature Course (LIT)	3
One Language Course (LANG)	3
Major Courses	
PHYS 225 Introduction to Solid State Electronics	4
PHYS 233 Intermediate Methods of Math Physics I	3
PHYS 235 Classical Physics Laboratory	2
PHYS 237 Mechanics	4
PHYS 242 Thermodynamics	3
PHYS 310 Electromagnetism I	4
PHYS 377 Modern Physics Laboratory	2
Three 3- or 4-credit physics course at the 200 level or above (excluding PHYS 204 and 207).	9-12
One science/mathematics course approved by the department	3-4
Subtotal	40-44
Additional course work to reach 120 credits	16-20
Total credits to be earned at Queens College	60

Note: The above table assumes students completed MA-442, MA-443, and PH-440 at QCC. If those courses were not completed at QCC, then the courses must be completed at Queens College.

# E. Summary of credits required

Total credits to be earned at Queensborough Community College	60
Total credits to be earned at Queens College	60
Total credits required for the B.S. degree	120

#### F. Articulation Agreement Follow-up Procedures

Procedures for reviewing, updating, modifying, or terminating the agreement:

This agreement will be valid for 3 academic years from the Effective Date (below). Each year, there will be a review of the agreement's effectiveness by the Academic Affairs Officers at each institution.

When any of the programs within this agreement undergo any changes relevant to this agreement, this agreement will be reviewed and revised as necessary by the Curriculum Committees of both the sending and receiving program.

Either party may independently cancel this agreement by notifying the other party no less than one academic year before the intended date of cancellation.

#### Procedures for evaluating agreement:

The academic department, advisement centers, and Offices of Institutional Effectiveness from each campus will keep data on the academic progress of the transfer students. Upon request, Queens College will provide Queensborough Community College with names and academic status of all recent transfer students from QCC pursuing the abovementioned bachelor's degree program.

#### Sending and receiving college procedures for publicizing agreement:

Queensborough Community College and Queens College will collaborate in publicizing this agreement on their websites and in their catalogs. They will share brochures and other marketing materials including web-based promotions. Transfer advisors will be made aware of this agreement and will have available all necessary materials to publicize the agreement to the students with whom they work.

Members of the Senior College Enrollment Management Division will have this agreement and attend recruitment events at the Sending Institution. They will be assisted by the Office of Academic Affairs and the Transfer Resource Center at Queensborough Community College.

#### Additional Information

This agreement is deemed to be consistent with the CUNY Pathways General Education curriculum, and will be updated whenever necessary in keeping with changes in the Pathways curriculum. Queens College requires 6-7 credits of additional Pathways classes as part of the College Option, which includes a literature and a language requirement, as well as two Writing Intensive (W) units, with a minimum of one in residency. Writing Units may overlap with other requirements. According to the specifics in this agreement, students will complete a minimum of 60 credits at each institution; however, students who transfer into Queens with more than 60 credits must complete at least 45 credits at Queens College to earn a Queens College degree.

# Effective Date: Fall 2020

Timothy G. Lynch Timothy G. Lynch, Ph.D. Timothy Lynch, Ph.D. Provost and Senior Vice-Preside for Academic Affairs	Sep 9, 2020 Date ent	Elizabeth Hendrey Elizabeth Hendrey, Ph.D. Provost and Senior Vice Presid Academic Affairs	Sep 10, 2020 Date dent for
Michael Pullin Michael Pullin (Sep 10, 2020 1029 EDT) Michael Pullin, Ph.D. Associate Dean of Academic Affairs	Sep 10, 2020 Date	Alicia Alvero, Ph.D. Associate Provost	Sep 9, 2020 Date
David Lieberman, Ph.D. Chair, Department of Physics	Sep 9, 2020 Date	Steven Schwarz (Sep 9, 2020 12:59 EDT) Dr. Steven A. Schwarz Chair, Physics Department	Sep 9, 2020 Date

For Queens College:

# The City University of New York

Articulation Agreement Between

Queensborough Community College

and

# Queens College

# A. Sending and Receiving Institutions

Sending Institution: Queensborough Community College Department: Physics Program: Liberal Arts and Sciences (Mathematics and Science) Degree: Associate of Science (A.S.)

Receiving Institution: Queens College Department: Physics Program: Physics Degree: Bachelor of Science (B.S.)

### **B.** Admission Requirements for Queens College Physics Program

### Minimum GPA: 2.0

To take advantage of this articulation agreement, students must complete the A.S. in Liberal Arts and Sciences (Mathematics and Science) at Queensborough Community College prior to transfer to Queens College. Upon transfer, students must declare a major in Physics. All transfer courses credited toward the physics major must be completed with a grade of C- or better.

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Queensborough Community College		Queens College		
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Common Core Requirements		Course Equivalency		
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ENGL-102 English Composition II	3	ENGL 130 Writing about Literature in English	3	3
Required Core 1B:	4	Math and Quantitative Reasoning:	4	4
MA-440 Pre-Calculus Mathematics <sub>2</sub>		MATH 122 Precalculus		
PH-421 General Calculus Physics A <sub>3</sub>	5	PHYS 145 Principles of Physics I and Lab	5	5
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Flexible Core 2C: Select one course	3	Creative Expression	3	3
Flexible Core 2D: One course in History or Social Sciences1 is recommended for either 2A or 2D	3	Individual and Society	3	3
Flexible Core 2E: PH-422 General Calculus Physics B <sub>3</sub>	5	PHYS 146 Principles of Physics II and Lab	5	5
Additional Flexible Core Course: MA-441 Analytic Geometry and Calculus I <sub>1,2</sub>	4	Additional Flexible Core Course: MATH 151 Calculus/Differentiation and Integration	4	4
Subtotal	36	Subtotal	36	36
Requirements for the Major₃		Course Equivalency		
QCC Major Electives <sub>3</sub> (recommended choices)				
PH-440 Modern Physics	4	PHYS 260 Introduction to Modern Physics	4	4
QCC Major Electives3 (recommended choices)           PH-440 Modern Physics           MA-442 Analytic Geometry and Calculus II3	4	PHYS 260 Introduction to Modern Physics MATH 152 Calculus/Integration and Infinite Series	4 4	4 4
QCC Major Electives3 (recommended choices)         PH-440 Modern Physics         MA-442 Analytic Geometry and Calculus II3         MA-443 Analytic Geometry and Calculus III	4 4 4	PHYS 260 Introduction to Modern Physics MATH 152 Calculus/Integration and Infinite Series MATH 201 Multivariable Calculus	4 4 4	4 4 4
QCC Major Electives3 (recommended choices)         PH-440 Modern Physics         MA-442 Analytic Geometry and Calculus II3         MA-443 Analytic Geometry and Calculus III         MA-451 Differential Equations	4 4 4 4	PHYS 260 Introduction to Modern Physics MATH 152 Calculus/Integration and Infinite Series MATH 201 Multivariable Calculus MATH 223 Differential Equations with Numerical Methods I	4 4 4 3	4 4 4 3
QCC Major Electives3 (recommended choices)         PH-440 Modern Physics         MA-442 Analytic Geometry and Calculus II3         MA-443 Analytic Geometry and Calculus III         MA-451 Differential Equations         MA-461 Linear Algebra	4 4 4 4 4	PHYS 260 Introduction to Modern Physics MATH 152 Calculus/Integration and Infinite Series MATH 201 Multivariable Calculus MATH 223 Differential Equations with Numerical Methods I MATH 231 Linear Algebra I	4 4 4 3 4	4 4 4 3 4
QCC Major Electives3 (recommended choices)         PH-440 Modern Physics         MA-442 Analytic Geometry and Calculus II3         MA-443 Analytic Geometry and Calculus III         MA-4451 Differential Equations         MA-461 Linear Algebra         MA-481 Probability and Statistics	4 4 4 4 3	PHYS 260 Introduction to Modern Physics         MATH 152 Calculus/Integration and Infinite         Series         MATH 201 Multivariable Calculus         MATH 223 Differential Equations with         Numerical Methods I         MATH 231 Linear Algebra I         MATH 241 Introduction to Probability and         Mathematical Statistics	4 4 4 3 4 3	4 4 4 3 4 3
QCC Major Electives3 (recommended choices)         PH-440 Modern Physics         MA-442 Analytic Geometry and Calculus II3         MA-443 Analytic Geometry and Calculus III         MA-4451 Differential Equations         MA-461 Linear Algebra         MA-481 Probability and Statistics	4 4 4 4 3	PHYS 260 Introduction to Modern Physics         MATH 152 Calculus/Integration and Infinite         Series         MATH 201 Multivariable Calculus         MATH 223 Differential Equations with         Numerical Methods I         MATH 231 Linear Algebra I         MATH 241 Introduction to Probability and         Mathematical Statistics         Additional Elective Credit	4 4 3 4 3 -	4 4 3 4 3 0-1
QCC Major Electives3 (recommended choices)         PH-440 Modern Physics         MA-442 Analytic Geometry and Calculus II3         MA-443 Analytic Geometry and Calculus III         MA-4451 Differential Equations         MA-461 Linear Algebra         MA-481 Probability and Statistics         Subtotal	4 4 4 4 3 17-22	PHYS 260 Introduction to Modern Physics         MATH 152 Calculus/Integration and Infinite         Series         MATH 201 Multivariable Calculus         MATH 223 Differential Equations with         Numerical Methods I         MATH 231 Linear Algebra I         MATH 241 Introduction to Probability and         Mathematical Statistics         Additional Elective Credit	4 4 3 4 3 - Subtotal	4 4 3 4 3 0-1 17-22
QCC Major Electives3 (recommended choices)         PH-440 Modern Physics         MA-442 Analytic Geometry and Calculus II3         MA-443 Analytic Geometry and Calculus III         MA-441 Differential Equations         MA-461 Linear Algebra         MA-481 Probability and Statistics         Subtotal	4 4 4 4 3 17-22	PHYS 260 Introduction to Modern Physics         MATH 152 Calculus/Integration and Infinite         Series         MATH 201 Multivariable Calculus         MATH 223 Differential Equations with         Numerical Methods I         MATH 231 Linear Algebra I         MATH 241 Introduction to Probability and         Mathematical Statistics         Additional Elective Credit         Course Equivalency	4 4 3 4 3 - Subtotal	4 4 3 4 3 0-1 17-22
QCC Major Electives3 (recommended choices)         PH-440 Modern Physics         MA-442 Analytic Geometry and Calculus II3         MA-443 Analytic Geometry and Calculus III         MA-443 Analytic Geometry and Calculus III         MA-441 Differential Equations         MA-461 Linear Algebra         MA-481 Probability and Statistics         Subtotal         Additional Requirements         HE-101 Introduction to Health Education or HE-102 Health, Behavior, and Society	4 4 4 4 3 <b>17-22</b> 1-2	PHYS 260 Introduction to Modern Physics         MATH 152 Calculus/Integration and Infinite         Series         MATH 201 Multivariable Calculus         MATH 223 Differential Equations with         Numerical Methods I         MATH 231 Linear Algebra I         MATH 241 Introduction to Probability and         Mathematical Statistics         Additional Elective Credit         Section Course Equivalency         Elective Credit	4 4 3 4 3 - Subtotal	4 4 3 4 3 0-1 17-22
QCC Major Electives₃ (recommended choices)         PH-440 Modern Physics         MA-442 Analytic Geometry and Calculus II₃         MA-443 Analytic Geometry and Calculus II₃         MA-443 Analytic Geometry and Calculus III         MA-443 I Differential Equations         MA-461 Linear Algebra         MA-481 Probability and Statistics         Subtotal         Additional Requirements         HE-101 Introduction to Health Education or         HE-102 Health, Behavior, and Society         One credit in PE-100, PE-500, or DAN-100 series	4 4 4 4 3 <b>17-22</b> 1-2	PHYS 260 Introduction to Modern Physics         MATH 152 Calculus/Integration and Infinite         Series         MATH 201 Multivariable Calculus         MATH 223 Differential Equations with         Numerical Methods I         MATH 231 Linear Algebra I         MATH 241 Introduction to Probability and         Mathematical Statistics         Additional Elective Credit         Sective Credit	4 4 3 4 3 - Subtotal	4 4 3 4 3 0-1 17-22 1-2
QCC Major Electives3 (recommended choices)         PH-440 Modern Physics         MA-442 Analytic Geometry and Calculus II3         MA-443 Analytic Geometry and Calculus III         MA-443 Analytic Geometry and Calculus III         MA-443 Indext Commended choices         MA-441 Linear Algebra         MA-481 Probability and Statistics         Subtotal         Additional Requirements         HE-101 Introduction to Health Education or         HE-102 Health, Behavior, and Society         One credit in PE-100, PE-500, or DAN-100 series (one credit courses only)	4 4 4 3 <b>17-22</b> 1-2 1	PHYS 260 Introduction to Modern Physics         MATH 152 Calculus/Integration and Infinite         Series         MATH 201 Multivariable Calculus         MATH 223 Differential Equations with         Numerical Methods I         MATH 231 Linear Algebra I         MATH 241 Introduction to Probability and         Mathematical Statistics         Additional Elective Credit         Course Equivalency         Elective Credit	4 4 3 4 3 - Subtotal - -	4 4 3 4 3 0-1 17-22 1-2 1
QCC Major Electives3 (recommended choices)         PH-440 Modern Physics         MA-442 Analytic Geometry and Calculus II3         MA-443 Analytic Geometry and Calculus III         MA-443 I Differential Equations         MA-461 Linear Algebra         MA-481 Probability and Statistics         Subtotal         Additional Requirements         HE-101 Introduction to Health Education or         HE-102 Health, Behavior, and Society         One credit in PE-100, PE-500, or DAN-100 series (one credit courses only)         MA-119 College Algebra2 (if required)	4 4 4 3 <b>17-22</b> 1-2 1 3	PHYS 260 Introduction to Modern Physics         MATH 152 Calculus/Integration and Infinite         Series         MATH 201 Multivariable Calculus         MATH 223 Differential Equations with         Numerical Methods I         MATH 231 Linear Algebra I         MATH 241 Introduction to Probability and         Mathematical Statistics         Additional Elective Credit         Course Equivalency         Elective Credit         Elective Credit	4 4 3 4 3 - Subtotal - - - -	4 4 3 4 3 0-1 17-22 1-2 1 3
QCC Major Electives3 (recommended choices)         PH-440 Modern Physics         MA-442 Analytic Geometry and Calculus II3         MA-443 Analytic Geometry and Calculus III         MA-443 I Differential Equations         MA-461 Linear Algebra         MA-481 Probability and Statistics         Subtotal         Additional Requirements         HE-101 Introduction to Health Education or         HE-102 Health, Behavior, and Society         One credit in PE-100, PE-500, or DAN-100 series (one credit courses only)         MA-119 College Algebra2 (if required)         MA-121 Trigonometry2 (if required)	4 4 4 3 <b>17-22</b> 1-2 1 3 1	PHYS 260 Introduction to Modern Physics         MATH 152 Calculus/Integration and Infinite         Series         MATH 201 Multivariable Calculus         MATH 223 Differential Equations with         Numerical Methods I         MATH 231 Linear Algebra I         MATH 241 Introduction to Probability and         Mathematical Statistics         Additional Elective Credit         Elective Credit         Elective Credit         Elective Credit         Elective Credit	4 4 3 4 3 - Subtotal - - - - -	4 4 3 4 3 0-1 17-22 1-2 1 3 1
QCC Major Electives3 (recommended choices)         PH-440 Modern Physics         MA-442 Analytic Geometry and Calculus II3         MA-443 Analytic Geometry and Calculus III         MA-443 Analytic Geometry and Calculus III         MA-441 Differential Equations         MA-461 Linear Algebra         MA-481 Probability and Statistics         Subtotal         Additional Requirements         HE-101 Introduction to Health Education or         HE-102 Health, Behavior, and Society         One credit in PE-100, PE-500, or DAN-100 series (one credit courses only)         MA-119 College Algebra2 (if required)         MA-121 Trigonometry2 (if required)	4 4 4 3 <b>17-22</b> 1-2 1 3 1 <b>2-7</b>	PHYS 260 Introduction to Modern Physics         MATH 152 Calculus/Integration and Infinite         Series         MATH 201 Multivariable Calculus         MATH 223 Differential Equations with         Numerical Methods I         MATH 231 Linear Algebra I         MATH 241 Introduction to Probability and         Mathematical Statistics         Additional Elective Credit         Elective Credit         Elective Credit         Elective Credit         Elective Credit	4 4 3 4 3 - Subtotal - - - - Subtotal	4 4 3 0-1 17-22 1-2 1 3 1 2-7

Notes:

- 1. Students are required to take particular courses in some areas of the Common Core that fulfill both general education and major requirements at QCC. If students do not take the required courses in the Common Core, they will have to take additional credits to complete their degree requirements.
- 2. Students must complete MA-441 and all prerequisites for that course.
- 3. Students must complete two-course sequences in at least two different subject areas (biology, chemistry, computer science, mathematics, and physics). For students following this agreement, one two course sequence in physics (PH-421/422) and one in mathematics (MA-442/443) are recommended.

All Queensborough Community College students must complete at least two writing intensive courses, designated as "WI" in the course schedule. Transfer students must take at least one writing intensive course at Queens College, designated W, but this can overlap with the College Option Literature requirement and does not add to the required number of credits.

## D. Senior College Courses Remaining for Baccalaureate Degree

Transfer students should consult with the major advisor in the Queens College Physics Department (info@physics.qc.cuny.edu) prior to enrolling in classes at Queens College.

Course and Title	Credits
College Option General Education Courses	
One Literature Course (LIT)	3
One Language Course (LANG)	3
Major Courses	
PHYS 222 Optics	3
PHYS 233 Intermediate Methods of Math Physics I	3
PHYS 234 Intermediate Methods of Math Physics II	3
PHYS 235 Classical Physics Laboratory	2
PHYS 237 Mechanics	4
PHYS 243 Thermodynamics and Statistical Mechanics	4
PHYS 310 Electromagnetism I	4
PHYS 311 Electromagnetism 2	4
PHYS 345 Solid State Physics	4
PHYS 365 Principles of Quantum Mechanics	4
PHYS 377 Modern Physics Laboratory	2
One 3- or 4-credit physics course at the 200 level or above (excluding PHYS 204 and 207).	3-4
One science/mathematics course approved by the department	3-4
Subtotal	49-51
Additional course work to reach 120 credits	9-11
Total credits to be earned at Queens College	60

Note: The above table assumes students completed MA-442, MA-443, and PH-440 at QCC. If those courses were not completed at QCC, then the courses must be completed at Queens College.

#### E. Summary of credits required

Total credits to be earned at Queensborough Community College	60
Total credits to be earned at Queens College	60
Total credits required for the B.S. degree	120

#### F. Articulation Agreement Follow-up Procedures

Procedures for reviewing, updating, modifying, or terminating the agreement:

This agreement will be valid for 3 academic years from the Effective Date (below). Each year, there will be a review of the agreement's effectiveness by the Academic Affairs Officers at each institution.

When any of the programs within this agreement undergo any changes relevant to this agreement, this agreement will be reviewed and revised as necessary by the Curriculum Committees of both the sending and receiving program.

Either party may independently cancel this agreement by notifying the other party no less than one academic year before the intended date of cancellation.

#### Procedures for evaluating agreement:

The academic department, advisement centers, and Offices of Institutional Effectiveness from each campus will keep data on the academic progress of the transfer students. Upon request, Queens College will provide Queensborough Community College with names and academic status of all recent transfer students from QCC pursuing the abovementioned bachelor's degree program.

#### Sending and receiving college procedures for publicizing agreement:

Queensborough Community College and Queens College will collaborate in publicizing this agreement on their websites and in their catalogs. They will share brochures and other marketing materials including web-based promotions. Transfer advisors will be made aware of this agreement and will have available all necessary materials to publicize the agreement to the students with whom they work.

Members of the Senior College Enrollment Management Division will have this agreement and attend recruitment events at the Sending Institution. They will be assisted by the Office of Academic Affairs and the Transfer Resource Center at Queensborough Community College.

#### Additional Information

This agreement is deemed to be consistent with the CUNY Pathways General Education curriculum, and will be updated whenever necessary in keeping with changes in the Pathways curriculum. Queens College requires 6-7 credits of additional Pathways classes as part of the College Option, which includes a literature and a language requirement, as well as two Writing Intensive (W) units, with a minimum of one in residency. Writing Units may overlap with other requirements. According to the specifics in this agreement, students will complete a minimum of 60 credits at each institution; however, students who transfer into Queens with more than 60 credits must complete at least 45 credits at Queens College to earn a Queens College degree.

# Effective Date: Fall 2020

For Queensborough Community College:

<u>Timothy G. Lynch</u> Timothy G. Lynch, Ph.D. Timothy Lynch, Ph.D. Provost and Senior Vice-Presid for Academic Affairs	Sep 9, 2020 Date ent	Elizabeth Hendrey Elizabeth Hendrey (Sep 10, 2020 05:43 EDT) Elizabeth Hendrey, Ph.D. Provost and Senior Vice Presid Academic Affairs	Sep 10, 2020 Date ent for
Michael Pullin Michael Pullin, Sep 10, 2020 10:29 EDT) Michael Pullin, Ph.D. Associate Dean of Academic Affairs	Sep 10, 2020 Date	Alicia Alvero, Ph.D. Associate Provost	Sep 9, 2020 Date
David Lieberman, Ph.D. Chair, Department of Physics	Sep 9, 2020 Date	Steven Schwarz (Sep 9, 2020 12:59 EDT) Dr. Steven A. Schwarz Chair, Physics Department	Sep 9, 2020 Date

For Queens College:

# QCC LAS to QC Physics Articulation Agreements 2020

**Final Audit Report** 

2020-09-10

Created:	2020-09-03
By:	Michael Pullin (mpullin@qcc.cuny.edu)
Status:	Signed
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