

Degree Pathway

A.S. in Liberal Arts and Sciences (Mathematics and Sciences) - Catalog Year 2021-22

The A.S. degree in Liberal Arts and Sciences (Mathematics and Sciences) is intended for students who plan to transfer to a 4-year college and university and pursue a bachelor's degree in a field of science or mathematics. This degree plan is designed for students who are undecided about which field of math or science to pursue after transfer. Other degree plans are available for students who plan to pursue biology, chemistry, computer science, mathematics, or physics. This Degree Pathway is also designed for students who place into developmental mathematics. Additional Degree Pathways are available for students who place into other levels of mathematics. Please see the degree website or your advisor for more information.

Courses in **Bold Text** are prerequisites for later courses or only offered in the Fall or Spring semester and should be taken where indicated in the sequence.

Fall Semester #1

Courses	Credits	Prerequisites and Corequisites ¹
ENGL-101 English Composition I (ALP section)	2	Pre/corequisite: Must satisfy developmental requirement in English
(Required Core 1A - English Composition)	3	or be co-enrolled in BE-102
ENGL-99 Developing Competence in College Reading, Writing, & Study Skills	0 (4 eq.)	Corequisite: ENGL-101
MA-119 College Algebra	2	Pre/corequisite: Must satisfy developmental requirement in math or
(Required Core 1B: Mathematical and Quantitative Reasoning)	3	be co-enrolled in MA-10 ALP
MA-10 ALP Elementary Algebra	0 (2 eq.)	Corequisite: MA-119
MA-121 Trigonometry (Required for Major)	1	Corequisite: MA-119
HE-101 Personal Health and Wellness or HE-102 Health, Behavior and Society	1-2	Prerequisite: None
Total credits for the term	8-9 + 6 eq.	



Spring Semester #1

Courses	Credits	Prerequisites and Corequisites ¹
ENGL-102 English Composition II (Required Core 1A: English Composition)	3	Prerequisite: ENGL-101 or placement
MA-440 Pre-Calculus Mathematics	4	Prerequisite: MA-119 and MA-121 (C or better in both) or MA-114 (C or better)
Required Core 1C ² – Life & Physical Sciences – take one of the following: BI-201 General Biology I CH-151 General Chemistry I PH-301 College Physics I PH-311 College Physics A PH-421 General Calculus Physics A	4-5	Prerequisite for BI-201: Complete developmental English Prerequisite for CH-151: MA-119 and MA-121 or placement Prerequisite for PH-301: MA-114 OR MA-119 and MA-121 Prerequisite for PH-311: MA-441 or permission of Department Corequisite for PH-421: MA-441
One course from Flexible Core 2A, 2C, or 2D ³	3	Check individual courses for prerequisites and corequisites
One credit course in PE-400, PE-500, or DAN100 series	1	Check individual courses for prerequisites and corequisites
Total credits for the term	15-16	

Summer Session

Courses	Credits	Prerequisites and Corequisites ¹
SP-211 Speech Communication ^{2,3}	3	None
(Flexible Core 2B: U.S. Experience & Its Diversity)	3	None
One course from Flexible Core 2A, 2C, or 2D ³	3	Check individual courses for prerequisites and corequisites
(Recommended: History or Social Sciences course from 2A or 2D)		
Total credits for the session	6	

Fall Semester #2

Courses	Credits	Prerequisites and Corequisites ¹
MA-441 Analytic Geometry and Calculus I (Required for Major)	4	Prerequisite: MA-440 (C or better)
Additional Flexible Core Course ^{2,3} Take one course from the list below marked with an asterisk (*)	4	Check individual courses for prerequisites and corequisites
Flexible Core 2E ² – Scientific World Take one course from the list below marked with an asterisk (*)	3-5	Check individual courses for prerequisites and corequisites
Major Elective Course - Take one course from the list below	3-5	Check individual courses for prerequisites and corequisites
Total credits for the term	14-16	



Spring Semester #2

Courses	Credits	Prerequisites and Corequisites ¹
Major Elective Courses ⁴ - Take two courses from the list below	8-11	Check individual courses for prerequisites and corequisites
History or Social Science Course (Required for Major) (If taken in the Common Core, select another Major Elective)	3	Check individual courses for prerequisites and corequisites
One course from Flexible Core 2A, 2C, or 2D ³	3	Check individual courses for prerequisites and corequisites
Total credits for the term	14-17	
Total credits required for the degree	60	

Notes:

- 1. Prerequisites for a course must be passed before taking the course. Corequisites must be passed before taking the course or taken in the same term as the course.
- 2. Students are required to take particular courses in some areas of the Common Core that fulfill both general education and major requirements. If students do not take the required courses in the Common Core, they will have to take additional credits to complete their degree requirements.
- 3. Students must complete one course from each of the Flexible Core categories (2A, 2B, 2C, 2D, and 2E) and one additional course from any one of the categories. SP-211 will satisfy area 2B. The course for area 2E and the one additional flexible core course must be selected from the courses in the list below marked with an asterisk (*).
- 4. Students must take 9-18 credits of major elective courses to reach 60 credits. See the list below for approved major elective courses. Students must complete two-course sequences in at least two different subject areas (biology, chemistry, computer science, mathematics, and physics, for example: BI-201 and BI-202, or CH-151 and CH-152, or CS-101 and CS-201, or MA-441 and MA-442, or PH-301 and PH-302, or PH-311 and PH-312, or PH-421 and PH-422).

All students must complete two (2) WI designated classes to fulfill degree requirements



Major Elective Courses

Major Elective Courses	,		
Bi-202 General Biology	Major Elective Courses	Credits	Prerequisites and Corequisites
Bi-356 Principles of Genetics	BI-201 General Biology I*	4	Complete developmental requirements in English
Bi-357 Bioinformatics/Computational Biology 3 Bi-201 (or better)	BI-202 General Biology II	4	BI-201
BI-453 Biotechnology	BI-356 Principles of Genetics	4	BI-201 (Cor better)
CH-151 General Chemistry * 4.5 MA-119 and MA-121 or placement	BI-357 Bioinformatics/Computational Biology	3	BI-201 (Corbetter)
CH-152 General Chemistry 1" 5	BI-453 Biotechnology	5	BI-201 and permission of instructor
CH-251 Organic Chemistry I* CH-252 Organic Chemistry II* CH-252 Organic Chemistry II* CH-252 Organic Chemistry II* CH-252 Organic Chemistry II* CH-253 Organic Chemistry II* CH-254 Organic Chemistry II* CH-255 Organic Chemistry II* CH-256 Organic Chemistry II* CH-257 Organic Chemistry II* CH-258 Organic Chemistry II* CH-259 Organic Chemistry II* CH-259 Organic Chemistry II* CH-251 Organic Chemistry II* CH-251 Organic Chemistry II* CH-251 Organic Chemistry II* CH-252 Organic Chemistry II* CH-253 Organic Chemistry II* CH-254 Organization and Research II CH-253 Organization and Research II CH-253 Organization and Assembly Language * CH-252 Organization And Assembly Language Assembly	CH-151 General Chemistry I*	4.5	MA-119 and MA-121 or placement
CH-522 Organic Chemistry II* 5	CH-152 General Chemistry II*	4.5	Prerequisite: CH-151
CH-900, 901 Cooperative Education in Chemical Instrumental Analysis 1 Prerequisite: CH-152 CH-911, 912 Independent Study and Research 1 1 Corequisite for CH-913: CH-151 and CH-912; Prerequisite for CH-912: CH-911 CH-913, 914 Independent Study and Research 1 1 Prerequisite for CH-913: CH-151 and CH-912; Prerequisite for CH-912: CH-913 CH-913, 914 Independent Study and Research 1 Prerequisite for CH-913: CH-151 and CH-913; Prerequisite for CH-914: CH-151 and CH-913 CS-101 Algorithmic Problem Solving 1 Prerequisite MA-441 CS-201 Corequisite: MA-441 CS-201 Corequisite: MA-441 CS-201 Secrete Structures 3 Prerequisite: SC-310 (Core better) and MA-441 CS-202 Discrete Structures 3 Prerequisite: MA-441 Prerequisite: MA-441 Prerequisite: MA-441 Prerequisite: MA-441 Coreptor MA-441 MA-442 Analytic Geometry and Calculus 1 Prerequisite: MA-441 Prerequisite: MA-443 Coreptor MA-451 Differential Equations 4 Prerequisite: MA-443 Coreptor MA-451 Differential Equations 4 Prerequisite: MA-443 Coreptor MA-451 Differential Equations 4 Prerequisite: MA-442 Coreptor MA-451 Prerequisite: MA-451 Coreptor MA-451 Differential Equations 4 Prerequisite: MA-442 Coreptor MA-451 Differential Equations MA-451 Differential	CH-251 Organic Chemistry I*	5	Corequisite: CH-152 or permission of the department
CH-911, 912 Independent Study and Research I 1 Corequisite for CH-911: CH-120 or CH-127 or CH-151; Prerequisite for CH-912: CH-913 CH-913, 914 Independent Study and Research II 1 Preregs for CH-913: CH-151 and CH-912; Preregs for CH-914: CH-151 and CH-913 CS-101 Algorithmic Problem Solving II* 4 Corequisite: MA-441 CS-202 Computer Organization and Assembly Language* 4 Prerequisites: CS-101 (Cor better) and MA-441 CS-203 Algorithmic Problem Solving II in C++* 4 Prerequisites: MA-471 MA-442 Analytic Geometry and Calculus II* 4 Prerequisite: MA-471 MA-443 Analytic Geometry and Calculus III* 4 Prerequisite: MA-442 (Cor better) MA-43 Differential Equations* 4 Prerequisite: MA-443 (Cor better) MA-451 Differential Equations* 4 Prerequisite: MA-442 (Cor better) MA-451 Introduction to Discrete Mathematics 3 Prerequisite: MA-443 (Cor better) MA-481 Probability and Statistics 3 Corequisite: MA-442 PH-301 College Physics II* 4 Prerequisite: MA-442 PH-302 College Physics II* 4 Prerequisite: MA-441 PH-303 Scientific Use of Computers 2 Prerequisite: MA-441 or permission of Depa	CH-252 Organic Chemistry II*	5	Prerequisite: CH-251
CH-913, 914 Independent Study and Research II	CH-900, 901 Cooperative Education in Chemical Instrumental Analysis	1	Prerequisite: CH-152
CS-101 Algorithmic Problem Solving I* CS-201 Computer Organization and Assembly Language* 4 Prerequisites: MA-441 CS-203 Algorithmic Problem Solving II in C++* 4 Prerequisites: MA-471 CS-203 Discrete Structures 3 Prerequisite: MA-471 MA-442 Analytic Geometry and Calculus III* MA-443 Analytic Geometry and Calculus IIII* MA-443 Analytic Geometry and Calculus IIII* MA-451 Differential Equations* 4 Prerequisite: MA-441 (Cor better) MA-451 Linear Algebra* 4 Prerequisite: MA-442 (Cor better) MA-451 Linear Algebra* 4 Prerequisite: MA-442 (Cor better) MA-471 Introduction to Discrete Mathematics 3 Prerequisite: MA-442 (Cor better) MA-471 Introduction to Discrete Mathematics 3 Corequisite: MA-442 PH-240 Computerized Physical Measurement Using Graphical Programming* 3 See catalog PH-301 College Physics II* PH-302 College Physics II* PH-303 Scientific Use of Computers 4 Prerequisite: MA-114 OR MA-119 and MA-121 PH-303 College Physics II* PH-312 College Physics A* 4 Prerequisite: MA-411 or permission of Department PH-312 College Physics B* 4 Prerequisite: PH-312 PH-414 Analytical Mechanics 4 Prerequisite: PH-411 Corequisite: MA-443 PH-415 Electricity and Magnetism 4 Prerequisite: PH-411 Corequisite: MA-443 PH-416 Thermodynamics* 4 Prerequisite: PH-411 Corequisite: MA-444 PH-422 General Calculus Physics B* 5 Prerequisite: PH-412 and MA-443 PH-422 General Calculus Physics B* 5 Prerequisite: PH-412 And MA-444 PH-425 General Calculus Physics B* 7 Prerequisite: PH-412 and MA-444 PH-425 General Calculus Physics B* 7 Prerequisite: PH-412 and PH-421 (Cor better): Corequisite: PH-321 and MA-442 PH-445 Corequisite: PH-422 PH-440 Modern Physics* 9 Prerequisite: PH-422 PH-440 Modern Physics Research 9 None	CH-911, 912 Independent Study and Research I	1	Corequisite for CH-911: CH-120 or CH-127 or CH-151; Prerequisite for CH-912: CH-911
CS-201 Computer Organization and Assembly Language* 4 Prerequisites: CS-101 (Cor better) and MA-441 CS-203 Algorithmic Problem Solving II in C++* 4 Prerequisites: CS-101 (Cor better) and MA-441 CS-202 Discrete Structures 3 Prerequisite: MA-471 MA-442 Analytic Geometry and Calculus II* 4 Prerequisite: MA-441 (Cor better) MA-443 Analytic Geometry and Calculus III* 4 Prerequisite: MA-442 (Cor better) MA-451 Differential Equations* 4 Prerequisite: MA-442 (Cor better) MA-451 Differential Equations* 4 Prerequisite: MA-442 (Cor better) MA-451 Linear Algebra* 4 Prerequisite: MA-442 (Cor better) MA-451 Linear Algebra* 4 Prerequisite: MA-442 (Cor better) MA-451 Linear Algebra* 4 Prerequisite: MA-442 (Cor better) MA-451 Probability and Statistics 3 Prerequisite: MA-442 (Dor better) MA-451 Probability and Statistics 4 Prerequisite: MA-442 PH-301 College Physics I* PH-302 College Physics I* PH-302 College Physics I* PH-303 Scientific Use of Computers 2 Prerequisite: MA-114 OR MA-114 OR MA-119 and MA-121 PH-301 College Physics B* 4 Prerequisite: Complete developmental requirements in math PH-311 College Physics B* 4 Prerequisite: PH-301 (Cor better) PH-302 College Physics B* 4 Prerequisite: PH-312 PH-414 Analytical Mechanics 4 Prerequisite: PH-312 PH-416 Thermodynamics* 4 Prerequisite: PH-411 Corequisite: MA-443 PH-416 Thermodynamics* 5 Prerequisite: PH-412 and MA-443 PH-412 General Calculus Physics A* 5 Corequisite: PH-412 (Cor better); Corequisite: MA-442 PH-422 General Calculus Physics B* 5 Prerequisite: PH-410 or PH-411, MA-441; Corequisite: PH-231 and MA-442 PH-435 Corlor Physics PH-435 (Dredustite: PH-231 and MA-442 PH-435 Corequisite: PH-430 or PH-441, MA-441; Corequisite: PH-231 and MA-442 PH-435 Corequisite: PH-435 (Dredustite: PH-435) and MA-442 Prerequisite: PH-435 (Dredustite: PH-431) (Dredustite: PH-231 and MA-442 Prerequisite: PH-431 (Dredustite: PH-431) (Dredustite: PH-231) and MA-442 Prerequisite: PH-431 (Dredustite: PH-431) (Dredustite: PH-431) (Dredustite: PH-231) and MA-442 Prerequisite: PH-435 (Dredustite	CH-913, 914 Independent Study and Research II	1	Preregs for CH-913: CH-151 and CH-912; Preregs for CH-914: CH-151 and CH-913
CS-203 Algorithmic Problem Solving	CS-101 Algorithmic Problem Solving I*	4	Corequisite: MA-441
CS-220 Discrete Structures MA-442 Analytic Geometry and Calculus II* MA-443 Analytic Geometry and Calculus III* MA-443 Analytic Geometry and Calculus III* MA-443 Analytic Geometry and Calculus III* MA-451 Differential Equations* 4 Prerequisite: MA-442 (Cor better) MA-451 Linear Algebra* 4 Prerequisite: MA-442 (Cor better) MA-471 Introduction to Discrete Mathematics 3 Prerequisite: MA-440 MA-481 Probability and Statistics 3 Corequisite: MA-440 MA-481 Probability and Statistics 4 Prerequisite: MA-442 PH-301 College Physical Measurement Using Graphical Programming* 3 See catalog PH-301 College Physics II* 4 Prerequisite: MA-114 OR MA-119 and MA-121 PH-302 College Physics II* 4 Prerequisite: PH-301 (Cor better) PH-303 Scientific Use of Computers 2 Prerequisite: Omplete developmental requirements in math PH-311 College Physics A* 4 Prerequisite: PH-312 PH-414 Analytical Mechanics 4 Prerequisite: PH-312 PH-414 Analytical Mechanics 4 Prerequisite: PH-411 Corequisite: MA-443 PH-415 Electricity and Magnetism 4 Prerequisite: PH-412 Corequisite: MA-443 PH-416 Enernal Calculus Physics A* 5 Corequisite: PH-412 Cor better); Corequisite: MA-442 PH-422 General Calculus Physics B* 5 Prerequisite: PH-411 (Cor better); Corequisite: PH-231 and MA-442 PH-431 Calculus Optics PH-430 College Physics B* Prerequisite: PH-421 or PH-411, MA-441; Core quisite: PH-231 and MA-442 PH-445 (India And PH-421) or PH-411, MA-441; Corequisite: PH-231 and MA-442 PH-440 Modern Physics* 4 Prerequisite: PH-420 PH-450 Introduction to Physics Research 3 None	CS-201 Computer Organization and Assembly Language *	4	Prerequisites: CS-101 (Corbetter) and MA-441
MA-442 Analytic Geometry and Calculus III* MA-443 Analytic Geometry and Calculus III* MA-443 Analytic Geometry and Calculus III* MA-451 Differential Equations* MA-461 Linear Algebra* MA-471 Introduction to Discrete Mathematics MA-481 Probability and Statistics MA-481 Probability and Ma-482 PH-301 College Physical Measurement Using Graphical Programming* MA-481 Prepaisite: MA-442 MA-481 Prepaisite: MA-491 MA-491 Corequisite: MA-491 MA-491 Corequisite: MA-491 MA-491 Corequisite: MA-491 MA-491 Corequisite: MA-493 MA-491 Corequisite: MA-491 MA-491 Corequisite: MA-491 MA-491 Corequisite: MA-491 MA-491 Corequisite: MA-491 MA-491 Corequisite: MA-493 MA-491 Corequisite:	CS-203 Algorithmic Problem Solving II in C++*	4	Prerequisites: CS-101 (Cor better) and MA-441
MA-443 Analytic Geometry and Calculus III*4Prerequisite: MA-442 (Cor better)MA-451 Differential Equations*4Prerequisite: MA-443 (Cor better)MA-461 Linear Algebra*4Prerequisite: MA-442 (Cor better)MA-471 Introduction to Discrete Mathematics3Prerequisite: MA-440MA-481 Probability and Statistics3Corequisite: MA-442PH-240 Computerized Physical Measurement Using Graphical Programming*3See catalogPH-301 College Physics I*4Prerequisite: MA-114 OR MA-119 and MA-121PH-302 College Physics II*4Prerequisite: PH-301 (Cor better)PH-303 Scientific Use of Computers2Prerequisite: MA-441 or permission of DepartmentPH-311 College Physics A*4Prerequisite: MA-441 or permission of DepartmentPH-312 College Physics B*4Prerequisite: PH-312PH-414 Analytical Mechanics4Prerequisite: PH-411 Corequisite: MA-443PH-415 Electricity and Magnetism4Prerequisite: PH-411 Corequisite: MA-443PH-416 Thermodynamics*4Prerequisite: PH-412 Corequisite: MA-443PH-421 General Calculus Physics A*5Corequisite: MA-441PH-422 General Calculus Physics B*5Prerequisite: MA-441 (Or better); Corequisite: MA-442PH-431 Calculus Optics2Prerequisite: PH-201 or PH-411, MA-441; Core quisite: PH-231 and MA-442PH-440 Modern Physics*4Prerequisite: PH-202PH-450 Introduction to Physics Research3None	CS-220 Discrete Structures	3	Prerequisite: MA-471
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MA-471 Introduction to Discrete Mathematics3Prerequisite: MA-440MA-481 Probability and Statistics3Corequisite: MA-442PH-240 Computerized Physical Measurement Using Graphical Programming*3See catalogPH-301 College Physics I*4Prerequisite: MA-114 OR MA-119 and MA-121PH-302 College Physics II*4Prerequisite: PH-301 (Cor better)PH-303 Scientific Use of Computers2Prerequisite: Complete developmental requirements in mathPH-311 College Physics A*4Prerequisite: MA-441 or permission of DepartmentPH-312 College Physics B*4Prerequisite: PH-312PH-414 Analytical Mechanics4Prerequisite: PH-411 Corequisite: MA-443PH-415 Electricity and Magnetism4Prerequisite: PH-412 and MA-443PH-416 Thermodynamics*4Prerequisite: PH-412 and MA-443PH-421 General Calculus Physics A*5Corequisite: MA-441 and PH-421 (Cor better); Corequisite: MA-442PH-422 General Calculus Physics B*5Prerequisite: PH-421 (Cor better); Corequisite: MA-442PH-431 Calculus Optics2Prerequisite: PH-201 or PH-411, MA-441; Corequisite: PH-231 and MA-442PH-440 Modern Physics*4Prerequisite: PH-422PH-450 Introduction to Physics Research3None	MA-451 Differential Equations*	4	Prerequisite: MA-443 (Cor better)
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PH-302 College Physics II* PH-303 Scientific Use of Computers PH-311 College Physics A* PH-312 College Physics B* PH-414 Analytical Mechanics PH-415 Electricity and Magnetism PH-416 Thermodynamics* PH-422 General Calculus Physics A* PH-431 Calculus Optics PH-431 Calculus Optics PH-430 None PH-450 Introduction to Physics Research PRerequisite: PH-301 (C or better) Prerequisite: MA-441 or permission of Department Prerequisite: PH-312 Prerequisite: PH-411 Corequisite: MA-443 Prerequisite: PH-411 Corequisite: MA-443 Prerequisite: PH-413 Corequisite: MA-443 Prerequisite: PH-412 and MA-443 Prerequisite: PH-421 (C or better); Corequisite: MA-442 PH-431 Calculus Optics PH-440 Modern Physics* PH-450 Introduction to Physics Research 3 None	PH-240 Computerized Physical Measurement Using Graphical Programming*	3	See catalog
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PH-311 College Physics A* PH-312 College Physics B* 4 Prerequisite: MA-441 or permission of Department PH-312 College Physics B* 4 Prerequisite: PH-312 PH-414 Analytical Mechanics 4 Prerequisite: PH-411 Corequisite: MA-443 PH-415 Electricity and Magnetism 4 Prerequisite: PH-413 Corequisite: MA-443. PH-416 Thermodynamics* 4 Prerequisite: PH-412 and MA-443 PH-421 General Calculus Physics A* 5 Corequisite: MA-441 PH-422 General Calculus Physics B* 5 Prerequisite: MA-441 and PH-421 (Cor better); Corequisite: MA-442 PH-431 Calculus Optics 2 Prerequisite: PH-201 or PH-411, MA-441; Corequisite: PH-231 and MA-442 PH-440 Modern Physics* 4 Prerequisite: PH-422 PH-450 Introduction to Physics Research 3 None	PH-302 College Physics II*	4	Prerequisite: PH-301 (Cor better)
PH-312 College Physics B*4Pre/corequisite: PH-312PH-414 Analytical Mechanics4Prerequisite: PH-411 Corequisite: MA-443PH-415 Electricity and Magnetism4Prerequisite: PH-413 Corequisite: MA-443.PH-416 Thermodynamics*4Prerequisite: PH-412 and MA-443PH-421 General Calculus Physics A*5Corequisite: MA-441PH-422 General Calculus Physics B*5Prerequisite: MA-441 and PH-421 (Cor better); Corequisite: MA-442PH-431 Calculus Optics2Prerequisite: PH-201 or PH-411, MA-441; Corequisite: PH-231 and MA-442PH-440 Modern Physics*4Prerequisite: PH-422PH-450 Introduction to Physics Research3None	PH-303 Scientific Use of Computers	2	Prerequisite: Complete developmental requirements in math
PH-414 Analytical Mechanics4Prerequisite: PH-411 Corequisite: MA-443PH-415 Electricity and Magnetism4Prerequisite: PH-413 Corequisite: MA-443.PH-416 Thermodynamics*4Prerequisite: PH-412 and MA-443PH-421 General Calculus Physics A*5Corequisite: MA-441PH-422 General Calculus Physics B*5Prerequisites: MA-441 and PH-421 (Cor better); Corequisite: MA-442PH-431 Calculus Optics2Prerequisite: PH-201 or PH-411, MA-441; Corequisite: PH-231 and MA-442PH-440 Modern Physics*4Prerequisite: PH-422PH-450 Introduction to Physics Research3None	PH-311 College Physics A*	4	Prerequisite: MA-441 or permission of Department
PH-415 Electricity and Magnetism 4 Prerequisite: PH-413 Corequisite: MA-443. PH-416 Thermodynamics* 4 Prerequisite: PH-412 and MA-443 PH-421 General Calculus Physics A* 5 Corequisite: MA-441 PH-422 General Calculus Physics B* 5 Prerequisites: MA-441 and PH-421 (Cor better); Corequisite: MA-442 PH-431 Calculus Optics 2 Prerequisite: PH-201 or PH-411, MA-441; Corequisite: PH-231 and MA-442 PH-440 Modern Physics* 4 Prerequisite: PH-422 PH-450 Introduction to Physics Research 3 None	PH-312 College Physics B*	4	Pre/corequisite: PH-312
PH-416 Thermodynamics*4Prerequisite: PH-412 and MA-443PH-421 General Calculus Physics A*5Corequisite: MA-441PH-422 General Calculus Physics B*5Prerequisites: MA-441 and PH-421 (Cor better); Corequisite: MA-442PH-431 Calculus Optics2Prerequisite: PH-201 or PH-411, MA-441; Corequisite: PH-231 and MA-442PH-440 Modern Physics*4Prerequisite: PH-422PH-450 Introduction to Physics Research3None	PH-414 Analytical Mechanics	4	Prerequisite: PH-411 Corequisite: MA-443
PH-421 General Calculus Physics A* 5 Corequisite: MA-441 PH-422 General Calculus Physics B* 5 Prerequisites: MA-441 and PH-421 (Cor better); Corequisite: MA-442 PH-431 Calculus Optics 2 Prerequisite: PH-201 or PH-411, MA-441; Corequisite: PH-231 and MA-442 PH-440 Modern Physics* 4 Prerequisite: PH-422 PH-450 Introduction to Physics Research 3 None	PH-415 Electricity and Magnetism	4	Prerequisite: PH-413 Corequisite: MA-443.
PH-422 General Calculus Physics B* 5 Prerequisites: MA-441 and PH-421 (Cor better); Corequisite: MA-442 PH-431 Calculus Optics 2 Prerequisite: PH-201 or PH-411, MA-441; Corequisite: PH-231 and MA-442 PH-440 Modern Physics* 4 Prerequisite: PH-422 PH-450 Introduction to Physics Research 3 None	PH-416 Thermodynamics*	4	Prerequisite: PH-412 and MA-443
PH-431 Calculus Optics 2 Prerequisite: PH-201 or PH-411, MA-441; Corequisite: PH-231 and MA-442 PH-440 Modern Physics* 4 Prerequisite: PH-422 PH-450 Introduction to Physics Research 3 None	PH-421 General Calculus Physics A*	5	Corequisite: MA-441
PH-440 Modern Physics* 4 Prerequisite: PH-422 PH-450 Introduction to Physics Research 3 None	PH-422 General Calculus Physics B*	5	Prerequisites: MA-441 and PH-421 (Cor better); Corequisite: MA-442
PH-450 Introduction to Physics Research 3 None	PH-431 Calculus Optics	2	Prerequisite: PH-201 or PH-411, MA-441; Corequisite: PH-231 and MA-442
	PH-440 Modern Physics*	4	Prerequisite: PH-422
PH-900 Research Projects 2 Prerequisites: PH-201, PH-301, or PH-411; Corequisites: PH-202, PH-302, PH-412, or PH-412	PH-450 Introduction to Physics Research	3	None
	PH-900 Research Projects	2	Prerequisites: PH-201, PH-301, or PH-411; Corequisites: PH-202, PH-302, PH-412, or PH-413

Courses marked with an asterisk (*) can be used to satisfy the Flexible Core requirement.