

Recent Changes to the Physics Major

Updated April 2024

The Physics Department passed the following changes to its courses and its major. This document is to make students and advisors aware of the changes. Most of the changes below were submitted for college approval in Spring 2023 and are adopted starting in the 2023-2024 academic year. Exceptions are noted below. Junior and Senior declared majors should consult their physics faculty advisor if exceptions to these changes need to be made to accommodate them.

1. Schedule changes for some of our majors' courses

Starting in the 2023-24 school year, some of our majors' courses will be offered in different blocks than in years past. See attached grid for 2023-24. Affected courses are: PC 311, PC 353, PC 357, PC 358, PC 362, PC 354, PC 333, PC 441, PC 442.

The attached "paths through the major" document shows the intended sequences of courses.

2. Redesign of PC 311 Vector and PC 353 E&M Theory

In spring 2024, PC 311 Vector and PC 353 E&M Theory will be taught consecutively in Blocks 7 and 8. In spring 2025, PC 311 and PC 353 will be taught as a single two block course PC 352 (Vector+E&M Theory) over Blocks 7-8. The content will be similar to the old courses, but the math and physics will be taught in an integrated manner. Students will no longer be able to take a single block PC 311 or a single block PC 353 course.

It is intended that students will take the new two block course in the spring of their junior year.

This means that anyone taking PC 311 Vector in Block 8 2023 or Block 7 2024 and who wants to take PC 353 E&M Theory as a stand-alone course must do so in Block 8 2024.

3. Offering PC 354 every other year

PC 354 Optics will be offered every other year alternating with PC 333 Solid State in Block 4. PC 354 will be offered in Block 4 2023, PC 333 in Block 4 2024, PC 354 in Block 4 2025 and so on.

4. Changes to major requirements

Only courses PC 320 and higher will be allowed as an elective course in the physics major for any emphasis.

This means students should not take PC 311 Vector in Block 8 2023 or Block 7 2024 intending to count it as an elective in the major.

5. Changes to course pre-requisites

To accommodate our new emphasis on computation throughout the curriculum, the following pre-requisites will be changed.

- PC 251 Modern Physics is a pre-requisite for PC 261 Electronics.
- PC 261 Electronics is a pre-requisite for PC 341 Mechanics, PC 349 Thermal, PC 353 E&M Theory (and the new 2 block Vector+E&M Theory course), and PC 441 Quantum Mechanics
- PC 251 Modern Physics and PC 261 Electronics are pre-requisites for PC 263 Computational Physics.
- PC 251 Modern Physics and one physics course numbered PC 320 or higher are pre-requisites for PC 450 Senior Capstone Experience.

The implications of this are as follows: Immediately after taking PC 251 Modern Physics in Block 3, students should take PC 261 Electronics in Blocks 4 or 5. This sets up the student to take most upper division courses.

Ideally students should take PC 251 in their second year, but it is also possible for students to take it in their third year. See “paths through the major” document.

6. Changes to Astrophysics emphasis

The Astrophysics emphasis will no longer require PC 349 Thermal but will instead require PC 353 E&M Theory (and the 2 block Vector+E&M Theory course starting in 24-25). However, students intending graduate school in astronomy should really take both courses.

7. Changes to math course number for linear algebra.

The math department changed their course number for the appropriate linear algebra course from MA 220 to MA 120.

This means that through the end of Spring 2023 students should take MA 220. Starting in Fall 2023, students should take MA 120 Applied Linear Algebra.

8. The course number for the Computational Physics adjunct course is changed from PC 253 to PC 263.

9. The requirements for the Physics Minor are changed to

PC241: Physics for the Physical Sciences I: Mechanics

PC242: Physics for the Physical Sciences II: Electricity & Magnetism

PC251: Introductory Modern Physics

PC261: Electronics

One additional physics course level 320 or higher

Students must take a minimum of 5 courses in the Physics Department for the minor.

10. The computer science courses required for the Computational Emphasis are changed.

The required courses are now CP 115, CP 116, CP 122, CP 222.

The requirement change will technically start in 24-25. However, it is driven by pre-req changes and a new course in the math department that already began in 23-24. **Hence students are advised to follow the new requirement starting in 23-24.**

2023-2024 Class Schedule

1/23/2023

Professor	Block 1	Block 2	Block 3	Block 4	½ Blk	Block 5	Block 6	Block 7	Block 8
Burns	PC 133 Astronomy		PC 251 Modern Physics				PC 341 Mechanics		
Cervantes		PC 441 Quantum I	PC 442 Quantum II	PC 142 Physics for the Life Sciences 2		PC 241 Physics for the Physical Sciences I		PC 241 Physics for the Physical Sciences I	PC 242 Physics for the Physical Sciences 2
Gosnell	sabbatical	sabbatical	sabbatical	sabbatical		sabbatical	sabbatical	sabbatical	sabbatical
Krishnarao			PC 251 Modern Physics	PC 261 Electronics		PC 357 Astrophysics		PC 362 Observational Astronomy	PC 391 Investigations
Lang		PC 242 Physics for the Physical Sciences 2				PC 151 Biophysics			PC 353 E&M Theory
Light	PC 450 Senior Seminar		CC 120 Failure	PC 391 Investigations		PC 261 Electronics	PC 349 Thermal Physics	PC 361 Techniques	
	PC 253 Computational Physics Adj								
Purdue	PC 241 Physics for Physical Sciences I	PC 242 Physics for the Physical Sciences 2		PC 354 Optics		PC 391 Investigations		PC 311 Vector	PC 420 General Relativity
full year visitor	PC 133 Astronomy		PC 141 Physics for the Life Sciences I	PC 142 Physics for the Life Sciences 2			PC 141 Physics for the Life Sciences I	PC 241 Physics for the Physical Sciences I	PC 133 Astronomy
full year visitor	PC 241 Physics for Physical Sciences I		PC 141 Physics for the Life Sciences I	PC 320 Topics		PC 241 Physics for the Physical Sciences I	PC 141 Physics for the Life Sciences I		PC 242 Physics for the Physical Sciences 2
block visitor									PC 133 Astronomy
	PC 108 Introduction to Machining and Fabrication (Burt)				PC 210	PC 108 Introduction to Machining and Fabrication (Burt)			
	PC 132 Obs Astro for Amateurs Adjunct (Wetterer)				Investigations in Engineering:	PC 132 Obs Astro for Amateurs Adjunct (Wetterer)			

2024-2025 Class Schedule

Professor	Block 1	Block 2	Block 3	Block 4	½ Blk	Block 5	Block 6	Block 7	Block 8
Monahan		PC 242 Physics for the Physical Sciences 2	PC 442 Quantum 2	PC 320 Particle Physics		PC 241 Physics for the Physical Sciences I		PC 241 Physics for Physical Sciences I	
Gosnell	PC 241 Physics for Physical Sciences I	PC 242 Physics for the Physical Sciences 2						PC 352 E&M Theory and Vector Analysis	
Krishnarao	PC 133 Astronomy	PC 391 Investigations	PC 251 Modern Physics			PC 261 Electronics		PC 362 Observational Astronomy	PC 242 Physics for the Physical Sciences 2
	PC 263 Computational Physics Adjunct								
Lang	Sabbatical	Sabbatical	Sabbatical	Sabbatical		Sabbatical	Sabbatical	Sabbatical	Sabbatical
Light	PC 450 Senior Seminar		PC 391 Investigations	PC 261 Electronics		PC 451 Capstone Supervision	PC 349 Thermal Physics	PC 361 Techniques	
Purdue	Sabbatical	Sabbatical	Sabbatical	Sabbatical		Sabbatical	Sabbatical	Sabbatical	Sabbatical
Block Visitor		PC 441 Quantum Shane Burns			PC 210 Investigations in Engineering		PC 341 Mechanics Stephanie DiCenzo		PC 220
Block Visitor:			PC 141 Physics for the Life Sciences I Evelyn Schumer	PC 142 Physics for the Life Sciences 2 Evelyn Schumer				PC 241 Physics for Physical Sciences I Joseph Essman	PC 242 Physics for the Physical Sciences 2 Evelyn Schumer
Year Visitor: Catherine Witherspoon	PC 133 Astronomy		PC 141 Physics for the Life Sciences I	PC 142 Physics for the Life Sciences 2		PC 358 Extra Galactic	PC 141 Physics for the Life Sciences I		PC 133 Astronomy
Year Visitor: Jeff Iuliano	PC 241 Physics for Physical Sciences I		PC 251 Modern Physics	PC 320 Low-temperature physics and instrumentation		PC 241 Physics for the Physical Sciences I	PC 141 Physics for the Life Sciences I		PC 133 Astronomy
	PC 108 Introduction to Machining and Fabrication (Burt)					PC 108 Introduction to Machining and Fabrication (Burt)			
	PC 132 Obs Astro for Amateurs Adjunct (Wetterer)					PC 132 Obs Astro for Amateurs Adjunct (Wetterer)			
						PC 451 Capstone Adv			

Updated: 4/2/2024

Paths Through the Physics Major

Classes that moved starting in 23- 24 are in red

Required classes are blue

Updated: 11/2/2023

Everything								
Professor	Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 7	Block 8
First year					PC 241 Intro I		PC 241 Intro I	PC 242 Intro II
Second year	PC 241 Intro I	PC 242 Intro II	PC 251 Modern Physics	PC 261 Electronics	PC 261 Electronics	PC 341 Mechanics	PC 361 & PC 362 Techniques Observational	
Third year				PC 354/PC 333 Optics/Solid State	PC 357/358 Astro/Galactic	PC 349 Thermal	PC 311 Vector	PC 353 E&M
	PC 263 Computational Physics							
Fourth year	PC 450 Capstone	PC 441 Quantum I	PC 442 Quantum II	PC 320 Topics	PC 357/358 Astro/Galactic			PC 420 Topics

Start in first year. Comprehensive

Professor	Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 7	Block 8
First year				MA 126 Calc I	MA 129 Calc II		PC 241 Intro I	PC 242 Intro II
Second year		MA 204 Calc III	PC 251 Modern Physics	PC 261 Electronics	PC 261 Electronics	PC 341 Mechanics	PC 361 Techniques	
Third year		MA 120 Linear Algebra		PC 354/PC 333 Optics/Solid State		PC 349 Thermal	PC 311 Vector	PC 353 E&M
Fourth year	PC 450 Capstone	PC 441 Quantum I	PC 442 Quantum II	PC 320 Topics				PC 420 Topics

Start in second year. Comprehensive

Professor	Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 7	Block 8
Second year				MA 126 Calc I	MA 129 Calc II		PC 241 Intro I	PC 242 Intro II
Third year	MA 120 Linear Algebra	MA 204 Calc III	PC 251 Modern Physics	PC 261 Electronics	PC 261 Electronics	PC 341 Mechanics	PC 311 Vector	PC 353 E&M
Fourth year	PC 450 Capstone	PC 441 Quantum I	PC 442 Quantum II	PC 354/PC 333 Optics/Solid State		PC 349 Thermal	PC 361 Techniques	PC 420 Topics

Start in first year. Astrophysics

Professor	Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 7	Block 8
First year				MA 126 Calc I	MA 129 Calc II		PC 241 Intro I	PC 242 Intro II
Second year		MA 204 Calc III	PC 251 Modern Physics	PC 261 Electronics	PC 261 Electronics	PC 341 Mechanics	PC 362 Observational	
Third year		MA 120 Linear Algebra		PC 354 Optics	PC 357/358 Astrophysics/ Extragalactic	PC 349 Thermal	PC 311 Vector	PC 353 E&M
Fourth year	PC 450 Capstone	PC 441 Quantum I	PC 442 Quantum II	PC 320 Topics	PC 357/358 Astrophysics/ Extragalactic			PC 420 Topics

Start in second year. Astrophysics

Professor	Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 7	Block 8
Second year		MA126 Calc I	MA 129 Calc II		MA 204 Calc III		PC 241 Intro I	PC 242 Intro II
Third year	MA 120 Linear Algebra		PC 251 Modern Physics	PC 261 Electronics	PC 357/358 Astrophysics/ Extragalactic	PC 341 Mechanics	PC 311 Vector	PC 353 E&M
Fourth year	PC 450 Capstone	PC 441 Quantum I	PC 442 Quantum II	PC 354 Optics	PC 357/358 Astrophysics/ Extragalactic	PC 349 Thermal	PC 362 Observational	PC 420 Topics

Summary of Physics Major Emphases

Option	Physics Major	Comprehensive Emphasis	Astrophysics Emphasis	Environmental Physics Emphasis	Geophysics Emphasis	Chemical/ Materials Science Emphasis	Teaching Emphasis	Computational Physics Emphasis
REQUIRED	MA 126 & 129 MA 204	MA 126 & 129 MA 204 MA 120	MA 126 & 129 MA 204 MA 120	MA 126 & 129 MA 204	MA 126 & 129 MA 204	MA 126 & 129 MA 204	MA 126 & 129 MA 204	MA 126 & 129 MA 204
	PC 241 & 242 PC 251 PC 261 PC 361 or 362 PC 450 +3 physics electives (320 or higher)	PC 241 & 242 PC 251 PC 261 PC 361 or 362 PC 450 PC 311 PC 341 PC 349 PC 353 PC 441 +1 physics elective (320 or higher)	PC 241 & 242 PC 251 PC 261 PC 362 PC 450 PC 311 PC 341 PC 353 PC 357 PC 358 PC 441	PC 241 & 242 PC 251 PC 261 PC 361 or 362 PC 450 or EV 499 +2 physics electives (320 or higher; see recommended choices below) EV 128 EV 145 EV 333 EV science class (rec EV 212, EV315, EV 351, EV431) EV or SS class	PC 241 & 242 PC 251 PC 261 PC 361 or 362 PC 450 +3 physics electives (320 or higher; see recommended choices below)	PC 241 & 242 PC 251 PC 261 PC 361 or 362 PC 450 GY 130 or 140 GY 308 +2 of these 3: GY 240, GY 315, GY 320	PC 241 & 242 PC 251 PC 261 PC 361 or 362 PC 450 +3 physics electives (320 or higher; see recommended choices below)	PC 241 & 242 PC 251 PC 261 PC 361 or 362 PC 450 +3 physics electives (320 or higher) ED 100 ED 120 +2 lab-based intros in biology, chemistry, or geology

Option	Physics Major	Comprehensive Emphasis	Astrophysics Emphasis	Environmental Emphasis	Geophysics Emphasis	Chemical/ Materials Science Emphasis	Teaching Emphasis	Computational Physics Emphasis
RECOMMENDED	Additional advanced physics or math courses.	PC 354 PC 442 PC 420 PC 263 CP 122 One or more summer research programs	PC 442 PC 349 PC 354 PC 420 PC 263 One or more summer research programs	PC 333 PC 341 PC 349 PC 441 MA218/EV228 MA 120 MA 315 Intro courses in biology, chemistry, or geology One or more summer research programs	PC 333 PC 341 PC 349 PC 354 Additional advanced physics, geology, or math courses, esp. MA 313, MA 120, MA 316, MA 318 CP 122 CH 107 One or more summer research programs	PC 333 PC 349 PC 354 PC 441 PC 442 CH 241 CH 250 Additional advanced physics, chemistry, or math courses Additional lab work One or more summer research programs	PC 133 Additional education courses, such as ED 203 or 275 (ED 275 is particularly useful for those interested in Teach for America)	PC 341 PC 349 PC 353 PC 441 PC 442 CP 274 CP 275 CP 344 CP 360 CP 407 MA 201 MA 120 MA 251 One or more summer research programs

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