

## **Proposed Interdisciplinary Major**

**Student:** Connor Jennings

**Student ID:** 573299

**Intended Date of Graduation:** 12/24

**Major Title:** Mathematical Physics

**Faculty sponsor #1:** Dr. Damon Spayde

**Faculty sponsor #2:** Professor Lars Seme

### **Justification for this major:**

I am currently in a situation where, to complete a full Physics major, I will have to either see if Classical Physics and Quantum Mechanics are courses I can take through a summer program of some kind or stay at Hendrix for a sixth year just to take Quantum Mechanics. This puts me in a tough spot as I would love to take those classes, but to do so would cost me much more time and financial burdens than is realistic for me.

Instead, I am proposing a slightly altered Physics major where Classical Physics and Quantum Mechanics are replaced by some other slightly advanced mathematics courses, specifically Multivariable Calculus and Linear Algebra. Upon completion of this major I will have learned valuable skills in both mathematics and physics that will pertain to careers that interest me, such as electrical engineering, that I would not have otherwise learned through a Physics degree as it is currently laid out. Quantum Mechanics and Classical Physics will not directly benefit me in terms of the career I want to pursue after graduating Hendrix, so I believe replacing them with courses that will further the type of education I want will be beneficial to me in my future as well as prevent the time and financial burdens as mentioned.

I believe that specifically Multivariable Calculus and Linear Algebra will enable me to apply mathematics to real life problems that I will face in my career after Hendrix in a much more advanced way than I could otherwise and use the knowledge gained by taking these courses to be a better problem solver and apply my skills in ways that would not be possible without them.

### **Learning Goals**

- The student will demonstrate the ability to integrate concepts and critical thinking approaches from two or more academic disciplines.
- The student will create written, oral, visual, or multimedia materials that demonstrate the ability to present and analyze evidence.
- The student will combine theoretical, analytical, computational, and experimental methods to solve problems involving complex physical systems.
- The student will apply the professional skills necessary to complete scientific work both independently and collaboratively.

### **Required Courses**

MATH 130 Calculus I

MATH 140 Calculus II

MATH 230 Multivariable Calculus

MATH 260 Differential Equations

MATH 270 Linear Algebra

PHYS 235 General Physics I (Workshop)

PHYS 245 General Physics II (Workshop)

PHYS 305 Vibrations and Waves

PHYS 315 Modern Physics (w/ lab) (W2) \*

PHYS 340 Electronics (w/ lab)

PHYS 420 Electrodynamics

PHYS 470 Thermal Physics

\*All of these courses are theory/methodology courses for this major.

### **Capstone**

The student will complete a capstone experience by engaging in an internship over the course of the 2024 Fall semester that incorporates elements that allow the student to apply knowledge and skills learned in the Physics and Mathematics courses outlined above. The capstone will be completed for course credit and will be graded by satisfactory completion of weekly journals and a summative paper about the experience and how it relates to both the overarching theme of the interdisciplinary study and the learning goals for the major outlined above.