

# Physics

## at Benedictine University

### Why study physics at Benedictine?

Studying physics at Benedictine University offers the opportunity to learn from the knowledge and experience of a dedicated faculty and an established program. Opportunities exist within the department for employment as a laboratory assistant and a reader or instructional assistant in introductory courses. Internships are available off campus at Argonne National Laboratory, BP Amoco Research Center and Fermi National Accelerator Laboratory. All of these facilities are within 13 miles of campus.

Science and mathematics courses and departments are located in the Birck Hall of Science. One laboratory is equipped to study atomic and nuclear physics. It is used for coursework as well as research. In addition, there is a recently modernized laboratory reserved for the introductory physics courses and a laboratory dedicated to physical science education. A machine shop is available for fabricating special apparatus and fixtures that may be needed in independent research projects.

Students have access to more than 100 networked computers on campus where the Internet may be searched for supplementary course and research materials. Additional computer facilities, including dual-boot Windows/Linux workstations and a 16-node Beowulf parallel-processing cluster, are available through the Computer Science department's Computer Research Laboratory. The Benedictine Library in the Kindlon Hall of Learning contains a collection of physics journals and other materials pertinent to physics and students also have access to the Institute for the Study of Science and Values.

The campus chapter of the Society of Physics Students conducts a multi-faceted program to stimulate interest in science and engineering. Students also have the opportunity to attend lectures and presentations at nearby universities and research facilities.

Opportunities exist locally for students to make presentations about research or other independent projects. These include the annual student meetings hosted by Argonne and the Associated Colleges of the Chicago Area as well as various campus and local outreach activities.

### What does a degree in Physics at Benedictine offer?

As a Physics major or minor at Benedictine, you will combine acquired knowledge of the physical sciences with the broader background of a liberal education to gain scientific expertise, problem-solving and critical thinking skills, and an awareness of the impact of pure and applied science on social issues. Benedictine also offers teacher certification in secondary education for physics, which includes a minor in education.

*"The approach to knowledge and truth exemplified by the discipline of physics continually prompts one to seek a deeper understanding of physical phenomena. As is generally true in life, there is more to a situation than what at first may appear. In the process (scientific method) of continually seeking a deeper understanding of physical observations through the study of physics, one is able to develop analytical skills to a significantly higher degree than is likely in other academic disciplines. These skills and the approach to truth encouraged by the study of physics have incredibly wide application outside the field of physics. This is of singular importance and of inestimable value."*

*John Spokas, Professor Emeritus of Physics  
Benedictine University*

# Physics

## How does the program work?

As a Physics major, you must complete a minimum of 30 semester hours of physics courses, at least nine of which must be upper division (300-level) courses. You must also complete the three-course sequence of calculus with analytic geometry and a course in differential equations. The physics program allows much more freedom for the student to choose courses in consultation with a faculty advisor consistent with the goals and aspirations of the individual student. Those contemplating graduate studies in physics are advised to complete a course in electromagnetism and two courses in applied mathematics. Additional advanced physics and mathematics offerings should be considered when one's schedule permits.

A Physics major must also complete a Senior Research Project and give a presentation on this work to the faculty. The projects may be done in association with a faculty member in areas such as simulation techniques in molecular dynamics, particle physics experiments at Fermilab, and physical, chemical and biological detection using micromechanical sensors. Summer research projects off site, for example at Argonne National Laboratory, are also possible.

## What careers are available with a Physics degree?

A degree in Physics can be your first step to pursuing a career in a variety of exciting science and non-science fields. Surprisingly, a 1999 survey by the American Institute of Physics indicated that only 11 percent of physicists in the workforce (14,000 surveyed) are doing physics in the traditional sense. Typical career opportunities in physics include education and pure and applied research positions in industry and government. Some of the sub-fields in physics include:

- Astrophysics
- Biophysics
- Computational physics
- Engineering
- Environmental physics
- Fiber optics
- High-energy physics
- Hydrodynamics
- Industrial physics
- Medical physics
- Phototonics
- Plasma physics
- Quantum electronics
- Solid state physics

Whatever your interests, the physics faculty at Benedictine University will help you to explore your career options and market yourself effectively for an exciting, fulfilling career.

# Recommended Program

## Bachelor of Science in Physics Calculus I Math Placement

### FRESHMAN

Writing Colloquium	3
Calculus I and Lab	5
University Physics I and Lab	5
General Chemistry I and Lab	4
	<b>17</b>

Research Writing	3
Calculus II	4
University Physics II and Lab	5
General Chemistry II and Lab	4
	<b>16</b>

### JUNIOR

Analytical Mechanics	3
Advanced Physics* or elective	3
Cultural Heritage (HUMN 230)	3
Core electives	6
	<b>15</b>

Electronics	3
Advanced Physics* or elective	3
Core electives	6
Cultural Heritage (HUMN 240)	3
	<b>15</b>

### SOPHOMORE

Speech Communication	3
Calculus III	4
Modern Physics	3
Core elective	3
Introduction to Computer Science (and Lab)	4
	<b>17</b>

Modern Physics Lab	1
Differential Equations	4
Research Literature	1
Core electives	6
Cultural Heritage (HUMN 220)	3
	<b>15</b>

### SENIOR

Electricity and Magnetism I	3
Classical Thermodynamics	3
Research	2
Core elective	3
Cultural Heritage (HUMN 250)	3
	<b>14</b>

Quantum and Statical Mechanics	3
Research	2
Core elective	9
	<b>14</b>

*\*9 hours at the 300-level are required*

# Recommended Program

## Bachelor of Science in Physics

### Introduction to Calculus I Math Placement

#### FRESHMAN

Writing Colloquium	3
General Chemistry I and Lab	4
Introduction to Calculus and Lab	5
Core elective	3
	<b>15</b>

Research Writing	3
General Chemistry II and Lab	4
Applications of Calculus	4
Core electives	6
	<b>17</b>

#### JUNIOR

Analytical Mechanics	3
Modern Physics	3
Core electives	6
Cultural Heritage (HUMN 230)	3
	<b>15</b>

Electronics	3
Modern Physics Lab	1
Advanced Physics* or elective	3
Differential Equations	4
Cultural Heritage (HUMN 240)	3
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#### SOPHOMORE

Speech Communication	3
Calculus II	4
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