## **Physics** (Department, Major, Courses, Faculty)

As the most basic of the physical sciences, physics can serve as the building block for many different careers. Using their understanding of physical principles, physicists have been at the forefront of many of the most exciting discoveries of the twentieth century and will continue to lead the way to many exciting discoveries in the future. They have contributed to a wide range of areas, including, but not limited to, biology, chemistry, communication, computer science, electronics, engineering, finance, managerial consulting, geophysics, medical physics, and transportation.

The SIUC Physics department focuses on applied physics. Therefore the department seeks to provide undergraduate students with the skills necessary to apply their basic understanding of physics to real-world problems for which the solutions are of near-future concern. With this in mind, the physics department at SIUC offers a first-rate undergraduate program with four different specializations in applied physics -biomedical physics, computational physics, material science/nanophysics, and the traditional physics curriculum. These specializations are targeted to high-demand areas of science and take advantage of the expertise of our faculty. Members of the physics faculty are involved in a wide range of physics research projects, both theoretical and experimental, including low temperature physics, surface physics, materials physics, superconductivity, magnetism, synchrotron radiation, infrared spectroscopy, solid-state physics, quantum mechanics, quantum computation, computational physics, and statistical mechanics. Participation in faculty research projects by students is strongly encouraged and can be very useful to students since it provides them with faculty mentors, and experience applying learned skills to real-world physics problem-solving.

Physics is an exciting field; its graduates are in high demand and enjoy high salaries and job security. Employment opportunities in physics are varied and abundant, from industrial research and development to teaching. Physicists are employed by all sectors of society, including health care, various

corporations, government, and universities. Students who wish to learn more are encouraged to contact the physics department directly or visit the department web site at http://www.physics.siu.edu.

A minimum GPA of 2.0 in all physics and mathematics course work is needed in order for a student to receive a degree in Physics. In terms of credit hour requirements toward a degree in Physics, a course will be counted only once. A student may not repeat a course or its equivalent in which a grade of B or better was earned without the consent of the department.

**Bachelor of Science Degree in Physics, College of Science**

University Core Curriculum Requirements - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - 39

College of Science Academic Requirements - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - 9
Biological Sciences
(3 hours included in the UCC Life Science hours) - - - - - - - - - - - - - - - - -3
Mathematics – completed with the major
Physical Sciences – completed with the major
Supportive Skills – CS 201 or 202 or 280 or 300; ENGL 290 or 291 or 391;
MATH 282 or 483; 1 or 2 semesters of a foreign language- - - - - - - - - - - - -6

Physics Major Requirements - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - 72
CHEM 200 or 200H, 201, 202 or 202H
(3 hours included in the UCC Physical Science hours) - - - - - - - - - - - - - -2
MATH 150, 221, 250, 251, 305
(3 hours included in the UCC Mathematics hours) - - - - - - - - - - - - - - - - 14
MATH 405 or 406 or 407 or 409 or 450 or 455 or 475 - - - - - - - - - - - - - - -3
PHYS 100, 205A, 206A, 255A, 205B, 206B, 255B, 305, 355, 301,
310, 320, 420, 430, 440, 445, 450 - - - - - - - - - - - - - - - - - - - - - - - - - 39
Physics electives from one of the following groups: - - - - - - - - - - - - - - - -14

**General Physics Electives**
PHYS 390, 424, 425, 428, 431, 432, 458, 470, 476, 490
CS 215, 220, 475, 476

**Computational Physics**
PHYS 476C
CS 202, 215, 220 plus electives from the General Physics list above to total 14 hours
Not required: PHYS 450
(3 hours in lieu of PHYS 450)
(3 hours included in UCC Supportive Skills)

**Materials and Nanophysics**
PHYS 425, 476M plus electives from the General Physics list above to total 14 hours

**Biomedical Physics**
PHYS 476B
BIOL 211, 212, 213
Plus a minimum of 16 hours from the following Biomedical Physics Electives:
CHEM 210, 211, 212, 340, 341, 350, 351
MICR 301, 302
Not required: PHYS 440 and PHYS 450
(6 hours in lieu of PHYS 440 and PHYS 450)
(7 hours included in UCC and COS Biological/Life Sciences)

Total - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - 120

**Physics Suggested Curricular Guide**

| FIRST YEAR | FALL | SPRING |
|---|---|---|
| PHYS 100…….…… | 1 | - |
| PHYS 205A, 206A, 255A…….…… | - | 5 |
| MATH 150, 250…… | 4 | 4 |
| MATH 221…...……... | - | 3 |
| CHEM 200, 201, 202……... | 5 | - |
| ENGL 101, 102…… | 3 | 3 |
| UCOL 101.....……... | 1 | - |
| UCC Human Health……. | 2 | - |
| *Total*……..… | 16 | 15 |

| SECOND YEAR | FALL | SPRING |
|---|---|---|
| PHYS 205B, 206B, 255B..... | 5 | - |
| PHYS 305, 355..... | - | 4 |
| PHYS 301, 310..…….. | 3 | 3 |
| MATH 251, 305…....……...….. | 3 | 3 |
| CMST 101……..…….... | - | 3 |
| Supportive Skills……..... | - | 3 |
| UCC Humanities…….……... | 3 | - |
| *Total*…… | 14 | 16 |

| THIRD YEAR | FALL | SPRING |
|---|---|---|
| PHYS 320, 420..... | 3 | 3 |
| PHYS 390..... | 3 | - |
| PHYS 428 …..... | - | 3 |
| PHYS 430..... | - | 3 |
| PHYS Elective.....……..... | 3 | - |
| MATH 407..... | - | 3 |
| Biological Science …..... | 3 | 3 |
| Supportive Skills…...…….... | 3 | - |
| *Total*…….. | 15 | 15 |

| FOURTH YEAR | FALL | SPRING |
|---|---|---|
| PHYS 425.....…..... | 3 | - |
| PHYS 440.....…..... | 3 | - |
| PHYS 445…….... | 3 | - |
| PHYS 450 ……..... | - | 3 |
| PHYS 490 ...….....…..... | - | 2 |
| UCC Humanities……...…….... | - | 3 |
| UCC Social Science …..…….... | 3 | 3 |
| UCC Fine Arts, Multicultural…… | 3 | 3 |
| *Total*…….. | 15 | 14 |

**Computational Physics Suggested Curricular Guide**

| FIRST YEAR | FALL | SPRING |
|---|---|---|
| PHYS 100…… | 1 | - |
| PHYS 205A, 206A, 255A...…… | - | 5 |
| MATH 150, 250…….. | 4 | 4 |
| MATH 221…...……... | - | 3 |
| CHEM 200, 201, 202……... | 5 | - |
| ENGL 101, 102…… | 3 | 3 |
| UCOL 101.....…….……... | 1 | - |
| UCC Human Health…….. | 2 | - |
| *Total*…… | 16 | 15 |

| SECOND YEAR | FALL | SPRING |
|---|---|---|
| PHYS 205B, 206B, 255B..... | 5 | - |
| PHYS 305, 355..... | - | 4 |
| PHYS 301, 310....……..…..... | 3 | 3 |
| MATH 251, 305.....…….....…….... | 3 | 3 |
| CS 202..... | 4 | - |
| CMST 101……..... | - | 3 |
| Supportive Skills..... | - | 3 |
| *Total*……...…… | 15 | 16 |

| THIRD YEAR | FALL | SPRING |
|---|---|---|
| PHYS 320, 420..... | 3 | 3 |
| PHYS 430..... | - | 3 |
| CS 215, 220.....……..... | 4 | 4 |
| Biological Science..... | 3 | 3 |
| UCC Social Science..... | 3 | 3 |
| *Total*……...…….. | 13 | 16 |

| FOURTH YEAR | FALL | SPRING |
|---|---|---|
| PHYS 440.....…..... | 3 | - |
| PHYS 445.....…..... | 3 | - |
| PHYS 476C..... | - | 3 |
| PHYS 390, 490 ..... | 3 | 2 |
| MATH 407 ..... | - | 3 |
| UCC Humanities..... | 3 | 3 |
| UCC Fine Arts, Multicultural..... | 3 | 3 |
| *Total*……...…….. | 15 | 14 |

**Materials/Nanophysics Suggested Curricular Guide**

| FIRST YEAR | FALL | SPRING |
|---|---|---|
| PHYS 100…… | 1 | - |
| PHYS 205A, 206A, 255A..…..…… | - | 5 |
| MATH 150, 250……... | 4 | 4 |
| MATH 221 …...……... | - | 3 |
| CHEM 200, 201, 202....…….... | 5 | - |
| ENGL 101, 102…….…… | 3 | 3 |
| UCOL 101.....……... | 1 | - |
| UCC Human Health.……..…... | 2 | - |
| *Total*…… | 16 | 15 |

| SECOND YEAR | FALL | SPRING |
|---|---|---|
| PHYS 205B, 206B, 255B..... | 5 | - |
| PHYS 305, 355..... | - | 4 |
| PHYS 301, 310.....……..……..... | 3 | 3 |
| MATH 251, 305.....…..……..... | 3 | 3 |
| CMST 101……..……..... | - | 3 |
| Supportive Skills……..... | - | 3 |
| UCC Humanities…….……... | 3 | - |
| *Total*…… | 14 | 16 |

| THIRD YEAR | FALL | SPRING |
|---|---|---|
| PHYS 320, 420..... | 3 | 3 |
| PHYS 390..... | 2 | - |
| PHYS 430..... | - | 3 |
| MATH 407..... | - | 3 |
| UCC Social Science..... | 3 | 3 |
| Biological Science..... | 3 | 3 |
| Supportive Skills…...……..... | 3 | - |
| *Total*……..... | 14 | 15 |

| FOURTH YEAR | FALL | SPRING |
|---|---|---|
| PHYS 425, 428……..…... | 3 | 3 |
| PHYS 440..... | 3 | - |
| PHYS 445……..……..…..... | 3 | - |
| PHYS 450..... | - | 3 |
| PHYS 476M..... | - | 3 |
| PHYS Elective..... | - | 3 |
| UCC Fine Arts, Multicultural.....…... | 3 | 3 |
| UCC Humanities…….....…... | 3 | - |
| *Total*…….. | 15 | 15 |

**Biomedical Physics Suggested Curricular Guide**

| FIRST YEAR | FALL | SPRING |
|---|---|---|
| PHYS 100…….…… | 1 | - |
| PHYS 205A, 206A, 255A ……..… | - | 5 |
| MATH 150, 250..…...…..……... | 4 | 4 |
| MATH 221…….…….. | - | 3 |
| CHEM 200, 201, 202……... | 5 | - |
| ENGL 101, 102…….… | 3 | 3 |
| UCOL 101.....…….... | 1 | - |
| UCC Human Health……..…... | 2 | - |
| *Total*…… | 16 | 15 |

| SECOND YEAR | FALL | SPRING |
|---|---|---|
| PHYS 205B, 206B, 255B..... | 5 | - |
| PHYS 305, 355..... | - | 4 |
| PHYS 301, 310.....……..... | 3 | 3 |
| MATH 251, 305…… | 3 | 3 |
| CHEM 210, 211, 212..... | 5 | - |
| CMST 101…….…..... | - | 3 |
| Supportive Skills…….…..... | - | 3 |
| *Total*…….. | 16 | 16 |

| THIRD YEAR | FALL | SPRING |
|---|---|---|
| PHYS 320, 420……..…. | 3 | 3 |
| PHYS 430……. | - | 3 |
| Biomedical Elective....….....……... | - | 3 |
| CHEM 340, 341..…...….....….....… | 5 | - |
| BIOL 211 212.....…...…...……..…. | 4 | 4 |
| Supportive Skills……... | 3 | - |
| Total ……..…… | 15 | 13 |

| FOURTH YEAR | FALL | SPRING |
|---|---|---|
| PHYS 445, 476B.....…... | 3 | 3 |
| Biomedical Elective.....……..…. | 3 | 2 |
| UCC Fine Arts, Multicultural.…..…... | 3 | 3 |
| UCC Social Science..... | 3 | 3 |
| UCC Humanities ……..... | 3 | 3 |
| *Total* ...……...….. | 15 | 14 |