UMass Dartmouth
COLLEGE OF ENGINEERING

# Bachelor of Science PHYSICS
## Concentration in Astronomy/Astrophysics
### Curriculum Requirements
### Catalog Year 2012-13 (Class of 2016) to present

**FRESHMAN YEAR**

| Fall Semester | | | R | L | C | Spring Semester | | | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ENL | 101 | Critical Writing & Reading I | 3 | 0 | 3 | ENL | 102 | Critical Writing & Reading II | 3 | 0 | 3 |
| PHY | 113 | Classical Physics I [1] | 4 | 2 | 4 | PHY | 114 | Classical Physics II [1, 5] | 4 | 2 | 4 |
| PHY | 109 | Freshman Seminar [2] | 3 | 0 | 3 | MTH | 152 | Calculus II [4] | 4 | 0 | 4 |
| MTH | 151 | Calculus I [4] | 4 | 0 | 4 | | | University Studies [3] | 3 | 0 | 3 |
| | | University Studies [3] | 3 | 0 | 3 | | | Free Elective | 3 | 0 | 3 |
| | | | | | **17** | | | | | | **17** |

**SOPHOMORE YEAR**

| Fall Semester | | | R | L | C | Spring Semester | | | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PHY | 115 | Intro to Classical Physics [6] | 4 | 0 | 3 | PHY | 213 | Applied Modern Physics | 4 | 0 | 3 |
| PHY | 225 | Introductory Experiment. Physics I [7] | 2 | 3 | 3 | PHY | 227 | Introductory Experiment. Physics II [8] | 0 | 3 | 1 |
| MTH | 211 | Analytic Geometry & Calculus III [4] | 4 | 0 | 4 | PHY | 234 | Interm. Mathematical Physics | 3 | 0 | 3 |
| | | University Studies [3] | 3 | 0 | 3 | MTH | 212 | Differential Equations | 3 | 0 | 3 |
| | | | | | | MTH | 280 | Introduction to Scientific Program. | 3 | 0 | 3 |
| | | | | | **13** | | | | | | **13** |

**JUNIOR YEAR**

| Fall Semester | | | R | L | C | Spring Semester | | | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PHY | 300 | Undergraduate Seminar I [8] | 3 | 0 | 3 | PHY | 341 | Quantum Mechanics I | 3 | 0 | 3 |
| PHY | 313 | Mechanics | 3 | 0 | 3 | PHY | 411 | Electric & Magnetic Fields I | 3 | 0 | 3 |
| PHY | 322 | Electronic Devices & Circuits II [9] | 2 | 2 | 3 | PHY | 441 | Statistical Thermodynamics [8] | 3 | 0 | 3 |
| | | Free Elective | 3 | 0 | 3 | PHY | 252 | Elem. Astrophysics[10] | 3 | 0 | 3 |
| | | University Studies [3] | 3 | 0 | 3 | | | University Studies [3] | 3 | 0 | 3 |
| | | | | | **15** | | | | | | **15** |

**SENIOR YEAR**

| Fall Semester | | | R | L | C | Spring Semester | | | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PHY | 342 | Quantum Mechanics II | 3 | 0 | 3 | PHY | 442 | Elements of Solid State Physics [8] | 3 | 0 | 3 |
| PHY | 421 | Advanced Laboratory [9] | 0 | 6 | 3 | PHY | | Physics Capstone (400 level) [8] | 3 | 0 | 3 |
| PHY | 412 | Electric & Magnetic Fields II [8] | 3 | 0 | 3 | PHY | | Physics Elective (300+ level) [8] | 3 | 0 | 3 |
| PHY | | Free Elective[8] | 3 | 0 | 3 | PHY | | Astrophysics Elective (300+ level) | 3 | 0 | 3 |
| PHY | 363 | Intermed. Astrophysics[10] | 3 | 0 | 3 | | | Free Elective | 3 | 0 | 3 |
| | | | | | **15** | | | | | | **15** |

**Total Credits = 120** R = Recitation & Lecture (hours) L = Laboratory (hours) C = Number of Credits

To graduate with a Bachelor of Science degree in Physics, a minimum of 120 university credits are required. Of these, 45 credits must be approved Physics courses, and 30 credits must be at the 300-level or higher. A 2.000 cumulative GPA for all courses as well as a 2.000 cumulative GPA for approved Physics courses is required to graduate. Approved Physics courses include all PHY courses at the 300-level or higher, together with PHY courses 111, 112, 113, 114, 115, 213, 225, 227, 234, 252, and 271.

[1]PHY 111 and PHY 112 can substitute for PHY 113 and PHY 114, respectively.
[2]PHY 109 satisfies University Studies Cluster 1E.
[3]See University Studies requirements for Clusters 3 and 4.
[4]MTH 153, MTH 154, and MTH 213 can substitute for MTH 151, MTH 152 and MTH 211, respectively.
[5]PHY 114 satisfies University Studies Cluster 2A.
[6]PHY 115 satisfies University Studies Cluster 2B.
[7]This course satisfies the University Studies Cluster 1C: Intermediate Writing requirement.
[8]Taken as a Physics Elective. Course selection should be discussed with the faculty advisor.
[9]A minimum of 6 credits of advanced lab courses is required. Other courses may be substituted with approval of the faculty advisor.
[10]PHY 252 and PHY 363 satisfy the second science requirement for the major.