

# PHYSICS COMPREHENSIVE - ENGINEERING EMPHASIS, BACHELOR OF SCIENCE

Offered by Department of Physics and Astronomy (<http://catalog.unk.edu/undergraduate/departments-programs/physics-astronomy/>)

| Code  | Title  | Credit Hours |
|---|--|--------------|
| <b>General Studies</b>  |  |              |
| <i>Foundational Requirements (LOPERs 1-4)</i>   |  | 14           |
| Including:  |  |              |
| LOPER 4: Mathematics, Statistics, and Quantitative Reasoning  |  |              |
| MATH 115  | Calculus I with Analytic Geometry <sup>1</sup> |              |
| <i>Broad Knowledge Requirements (LOPERs 5-8)</i>  |  | 11           |
| Including   |  |              |
| Take any one course in LOPER 5, LOPER 6, or LOPER 7 that satisfies a Dispositional Requirement (LOPER 9 or LOPER 10) and a Broad Knowledge Requirement. The courses that meet these criteria are listed at <a href="https://catalog.unk.edu/undergraduate/general-studies/courses-satisfy-broad-knowledge-dispositional">https://catalog.unk.edu/undergraduate/general-studies/courses-satisfy-broad-knowledge-dispositional</a> ( <a href="https://catalog.unk.edu/undergraduate/general-studies/courses-satisfy-broad-knowledge-dispositional/">https://catalog.unk.edu/undergraduate/general-studies/courses-satisfy-broad-knowledge-dispositional/</a> ). See advisor for assistance. |  |              |
| LOPER 8: Natural Science  |  |              |
| PHYS 275  | General Physics I (Calculus)                   |              |
| PHYS 275L   | General Physics I (Calculus) Laboratory        |              |
| <i>Dispositional Requirements (LOPERs 9-10)</i> <sup>2</sup>  |  | 6            |
| <i>Wellness (LOPER 11) Optional</i>   |  | 0            |
| <b>BS Science-related course requirements</b>   |  | 8            |
| MATH 202  | Calculus II with Analytic Geometry             |              |
| MATH 305  | Differential Equations                         |              |
| <b>Program Specific Requirements</b>  |  | 5            |
| PHYS 276  | General Physics II (Calculus)                  |              |
| PHYS 276L   | General Physics II (Calculus) Laboratory       |              |
| <b>Major Option</b>   |  |              |
| Complete all required courses   |  | 61           |
| <b>Unrestricted electives</b>   |  |              |
| Needed to reach 120 credit hour minimum   |  | 15           |
| <b>Total Credit Hours</b>   |  | 120          |

## Major Option

| Code   | Title                                | Credit Hours |
|--|--------------------------------------|--------------|
| <b>Physics Comprehensive (Engineering Emphasis) Requirements</b> |                                      |              |
| PHYS 346   | Modern Physics I                     | 4            |
| PHYS 410   | Mathematical Techniques in Physics I | 3            |
| <b>Physics Comprehensive (Engineering Emphasis) Electives</b>    |                                      |              |
| Select 9 credit hours of the following:                          |                                      | 9            |

|  |  |    |
|--|--|----|
| PHYS 402   | Analytic Mechanics                                 |    |
| PHYS 350   | Astrophysics I                                     |    |
| PHYS 351   | Astrophysics II                                    |    |
| PHYS 360   | Computational Methods in Physics and Astronomy     |    |
| PHYS 361   | Astronomy Methods II                               |    |
| PHYS 407   | Electricity & Magnetism                            |    |
| PHYS 419   | Quantum Mechanics                                  |    |
| PHYS 420   | Advanced Physics Laboratory                        |    |
| PHYS 430   | Optics   |    |
| PHYS 435   | Solid State Physics                                |    |
| PHYS 440   | Thermodynamics and Statistical Mechanics           |    |
| PHYS 495   | Research in Physics                                |    |
| <b>Physics Comprehensive (Engineering Emphasis) Math Requirements</b>  |  |    |
| MATH 260   | Calculus III                                       | 5  |
| <b>Physics Chemistry Requirements</b>  |  |    |
| CHEM 160   | General Chemistry                                  | 3  |
| CHEM 160L  | General Chemistry Laboratory                       | 1  |
| CHEM 161   | General Chemistry                                  | 3  |
| CHEM 161L  | General Chemistry Laboratory                       | 1  |
| <b>Physics Comprehensive (Engineering Emphasis) Engineering Requirements</b>   |  |    |
| ENGR 101   | Introduction to Engineering                        | 3  |
| Select 11 credit hours of the following:   |  | 11 |
| ENGR 130   | Computer Aided Drafting for Mechanical Engineering |    |
| ENGR 215   | Engineering Circuits I                             |    |
| ENGR 216   | Engineering Circuits II                            |    |
| ENGR 223   | Engineering Statics                                |    |
| ENGR 325   | Mechanics of Materials                             |    |
| ENGR 373   | Engineering Dynamics                               |    |
| Students must take 18 credit hours of engineering classes at 300 level or above from an ABET (Accreditation Board of Engineering and Technology) accredited university. Three of these hours must demonstrate experiential learning, e.g. Senior Engineering Design. |  | 18 |
| <b>Total Credit Hours</b>  |  | 61 |

1

Students without sufficient preparation will also need to take the following courses, increasing the total credit hours needed:

- MATH 102
- MATH 103

2

Designated courses with the appropriate content may be approved to satisfy one of the Broad Knowledge requirements plus LOPER 9 or Broad Knowledge plus LOPER 10. Courses may be approved to satisfy LOPER 9 or LOPER 10 alone. (Courses satisfying LOPER 9 or LOPER 10 alone must be 3 credit hours.) Students applying this option will need to take additional hours in other categories to meet the required GS hours.