2017-2018 PROGRAM REQUIREMENTS
Degree: Bachelor of Science
Major: Physics

About This Major . . .
Physics is the study of the universe: what it is made of and how it works, ranging from stars and galaxies to atoms and nuclei and everything in between. Physics forms the foundation of many technical fields including electronics and optics. Physics also features prominently in many of the hottest areas of current research and innovation, such as the multidisciplinary fields of nanotechnology and biophysics.

The physics program serves as a foundation for a wide array of careers. Physics majors from Colorado Mesa University have gone on to graduate programs in physics, astrophysics, chemistry, materials science, aerospace engineering, electrical engineering, and to medical school. They have also gone directly into jobs in engineering, business, and research. Over the last ten years Colorado Mesa physics majors have gone to graduate schools at the University of Colorado Boulder, University of Utah, Purdue University, and Washington State University.

For more information on what you can do with this major, go to http://www.coloradomesa.edu/career/whatmajor.html.

All CMU baccalaureate graduates are expected to demonstrate proficiency in critical thinking, communication fluency, quantitative fluency, and specialized knowledge/applied learning. In addition to these campus-wide student learning outcomes, graduates of this major will be able to:

1. Show fluency with the major fields of physics (classical mechanics, electromagnetism, statistical physics, and quantum theory). (Specialized Knowledge)
2. Use mathematical representations to analyze physical scenarios. (Quantitative Fluency)
3. Use laboratory techniques to investigate experimentally physical phenomena. (Applied Learning)
4. Communicate effectively about topics in physics. (Communication Fluency)
5. Execute a project which addresses a significant and complex issue in physics. This project will integrate knowledge and techniques from different areas of physics. (Specialized Knowledge/Applied Learning)

Advising Process and DegreeWorks
This document is intended for informational purposes to help determine what courses and associated requirements are needed to earn a degree. The suggested course sequencing outlines how students could finish degree requirements. Some courses are critical to complete in specific semesters, while others may be moved around. Meeting with an academic advisor is essential in planning courses and altering the suggested course sequencing. It is ultimately the student's responsibility to understand and fulfill the requirements for her/his intended degree(s).

DegreeWorks is an online degree audit tool available in MAVzone. It is the official record used by the Registrar's Office to evaluate progress towards a degree and determine eligibility for graduation. Students are responsible for reviewing their DegreeWorks audit on a regular basis and should discuss questions or concerns with their advisor or academic department head. Discrepancies in requirements should be reported to the Registrar's Office.

Graduation Process
Students must complete the following in the first two months of the semester prior to completing their degree requirements:

- Review their DegreeWorks audit and create a plan that outlines how unmet requirements will be met in the final semester.
- Meet with their advisor and modify their plan as needed. The advisor must approve the final plan.
- Submit the "Intent to Graduate" form to the Registrar's Office to officially declare the intended graduation date and commencement ceremony plans.
- Register for all needed courses and complete all requirements for each degree sought.

Submission deadlines and commencement details can be found at http://www.coloradomesa.edu/registrar/graduation.html.

If a student's petition for graduation is denied, it will be her/his responsibility to consult the Registrar's Office regarding next steps.

INSTITUTIONAL DEGREE REQUIREMENTS

The following institutional degree requirements apply to all CMU baccalaureate degrees. Specific programs may have different requirements that must be met in addition to institutional requirements.

- 120 semester hours minimum.
- Students must complete a minimum of 30 of the last 60 hours of credit at CMU, with at least 15 semester hours in major discipline courses numbered 300 or higher.
- 40 upper-division credits (an alternative credit limit applies to the Bachelor of Applied Science degree).
- 2.00 cumulative GPA or higher in all CMU coursework.
- A course may only be used to fulfill one requirement for each degree/certificate.
- No more than six semester hours of independent study courses can be used toward the degree.
- Non-traditional credit, such as advanced placement, credit by examination, credit for prior learning, cooperative education and internships, cannot exceed 30 semester credit hours for a baccalaureate degree; A maximum of 15 of the 30 credits may be for cooperative education, internships, and practica.
- Pre-collegiate courses (usually numbered below 100) cannot be used for graduation.
- Capstone exit assessment/projects (e.g., Major Field Achievement Test) requirements are identified under Program-Specific Degree Requirements.
- The Catalog Year determines which program sheet and degree requirements a student must fulfill in order to graduate. Visit with your advisor or academic department to determine which catalog year and program requirements you should follow.
- See “Requirements for Undergraduate Degrees and Certificates” in the catalog for a complete list of graduation requirements.

PROGRAM-SPECIFIC DEGREE REQUIREMENTS

- 2.00 cumulative GPA or higher in coursework toward the major content area.
- A “C” or higher is required in all foundation and major courses.

ESSENTIAL LEARNING REQUIREMENTS (31 semester hours)
See the current catalog for a list of courses that fulfill the requirements below. If a course is an Essential Learning option and a requirement for your major, you must use it to fulfill the major requirement and make a different selection for the Essential Learning requirement.

English (6 semester hours, must receive a grade of "C" or better and must be completed by the time the student has 60 semester hours.)

- ☐ ENGL 111 - English Composition (3)
- ☐ ENGL 112 - English Composition (3)

Mathematics (3 semester hours, must receive a grade of "C" or better, must be completed by the time the student has 60 semester hours.)

- ☐ MATH 151 - Calculus I (5)
  3 credits apply to the Essential Learning requirements and 2 credits apply to elective credit

Humanities (3 semester hours)

- ☐ Select one Humanities course (3)

Social and Behavioral Sciences (6 semester hours)

- ☐ Select one Social and Behavioral Sciences course (3)
- ☐ Select one Social and Behavioral Sciences course (3)

Natural Sciences (7 semester hours, one course must include a lab)

- ☐ Select one Natural Sciences course (3)
- ☐ Select one Natural Sciences course with a lab (4)

History (3 semester hours)

- ☐ Select one History course (3)

Fine Arts (3 semester hours)

- ☐ Select one Fine Arts course (3)

OTHER LOWER-DIVISION REQUIREMENTS

Wellness Requirement (2 semester hours)

- ☐ KINE 100 - Health and Wellness (1)
- ☐ Select one Activity course (1)

Essential Learning Capstone (4 semester hours)
Essential Learning Capstone must be taken after completion of the Essential Learning English and Mathematics requirements, and when a student has earned between 45 and 75 hours.

- ☐ ESSL 290 - Maverick Milestone (3)
- ☐ ESSL 200 - Essential Speech (1)

FOUNDATION COURSES (14 semester hours, must earn a grade of "C" or better in all courses)

- ☐ Select one of the following options:
  CSCI 111 - Foundations of Computer Science (4)
  CSCI 110 - Beginning Programming (3) and CSCI 110L - Beginning Programming Laboratory (1)
- ☐ PHYS 131 - Fundamental Mechanics (4)
- ☐ PHYS 131L - Fundamental Mechanics Laboratory (1)
- ☐ PHYS 132 - Electromagnetism and Optics (4)
- ☐ PHYS 132L - Electromagnetism and Optics Laboratory (1)

BS, PHYSICS REQUIREMENTS (50-51 semester hours, must pass all courses with a grade of "C" or higher)

Core (44-45 semester hours)

- ☐ PHYS 230 - Intermediate Dynamics (3)
- ☐ PHYS 231 - Modern Physics (3)
- ☐ PHYS 251 - Electronics for Scientists (3)
- ☐ PHYS 252 - Intermediate Laboratory (2)
- ☐ PHYS 311 - Electromagnetic Theory I (3)
- ☐ PHYS 321 - Quantum Theory (3)
- ☐ PHYS 331 - Advanced Laboratory I (2)
- ☐ PHYS 342 - Advanced Dynamics (3)
- ☐ PHYS 362 - Statistical and Thermal Physics (3)
- ☐ PHYS 482 - Senior Research (1)
- ☐ PHYS 482 - Senior Research (1)
- ☐ PHYS 494 - Physics Seminar (1)
- ☐ PHYS 494 - Physics Seminar (1)
- ☐ MATH 152 - Calculus II (5)
- ☐ MATH 253 - Calculus III (4)
- ☐ One of the following courses:
  MATH 260 - Differential Equations (3)
  MATH 236 - Differential Equations and Linear Algebra (4)
- ☐ MATH 360 - Methods of Applied Mathematics (3)

Restricted Electives (6 semester hours)

Select two courses from the following list. PHYS 396/496 may be taken more than once so long as the topic is not repeated.

PHYS 312 - Electromagnetic Theory II (3)
PHYS 396 - Topics (3)
PHYS 422 - Quantum Theory II (3)
PHYS 441 - Solid State Physics (3)
PHYS 471 - Computational Physics I (3)
PHYS 472 - Computational Physics II (3)
PHYS 473 - Modern Optics (3)
PHYS 496 - Topics (3)

- ☐ _____
- ☐ _____

GENERAL ELECTIVES (All college level courses appearing on your final transcript, not listed above that will bring your total semester hours to 120 hours. 18-19 semester hours; 13-14 hours of upper division may be needed.)

- ☐ MATH 151 - Calculus I (2)
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

SUGGESTED COURSE SEQUENCING

Freshman Year, Fall Semester: 16 credits

- PHYS 131 - Fundamental Mechanics (4) and PHYS 131L - Fundamental Mechanics Laboratory (1)
- MATH 151 - Calculus I (5)
- Essential Learning - Humanities (3)
- ENGL 111 - English Composition (3)

Freshman Year, Spring Semester: 16 credits

- PHYS 132 - Electromagnetism and Optics (4) and PHYS 132L - Electromagnetism and Optics Laboratory (1)
- MATH 152 - Calculus II (5)
- ENGL 112 - English Composition (3)
- Essential Learning - History (3)

Sophomore Year, Fall Semester: 15 credits

- PHYS 230 - Intermediate Dynamics (3)
- PHYS 251 - Electronics for Scientists (3)
- MATH 253 - Calculus III (4)
- KINA Activity (1)
- CSCI 111 - Foundations of Computer Science (4) or CSCI 110 and CSCI 110L - Beginning Programming (4)

Sophomore Year, Spring Semester: 15-16 credits

- PHYS 231 - Modern Physics (3)
- PHYS 252 - Intermediate Laboratory (2)
- MATH 260 - Differential Equations (3) or MATH 236 - Differential Equations and Linear Algebra (4)
- Essential Learning - Social and Behavioral Sciences (3)
- ESSL 290 - Maverick Milestone (3)
- ESSL 200 - Essential Speech (1)

Junior Year, Fall Semester: 14 credits

- PHYS 311 - Electromagnetic Theory I (3)
- PHYS 342 - Advanced Dynamics (3)
- PHYS 331 - Advanced Laboratory I (2)
- MATH 360 - Methods of Applied Mathematics (3)
- Essential Learning - Social and Behavioral Sciences (3)

Junior Year, Spring Semester: 16 credits

- PHYS 321 - Quantum Theory I (3)
- PHYS 362 - Statistical and Thermal Physics (3)
- Essential Learning - Natural Science with Lab (4)
- Essential Learning - Fine Arts (3)
- General Elective (3)

Senior Year, Fall Semester: 14 credits

- Restricted Elective (3)
- PHYS 482 - Senior Research (1)
- PHYS 494 - Physics Seminar (1)
- General Electives (9)

Senior Year, Spring Semester: 13-14 credits

- Restricted Elective (3)
- KINE 100 - Health and Wellness (1)
- Essential Learning - Natural Science (3)
- PHYS 482 - Senior Research (1)
- PHYS 494 - Physics Seminar (1)
- General Electives (4-5)