**PHYSICS**

College of Natural Science and Mathematics  
Department of Physics  
907-474-7339  
www.uaf.edu/physics/

**MS, PhD Degrees**

Minimum Requirements for Degrees: MS: 30–33 credits;  
PhD: 18 thesis credits

Advanced study at the graduate level is offered in various areas of physics and  
applied physics, including many of the research specialties found at  
the UAF’s Geophysical Institute. Faculty and student research programs  
currently emphasize space physics, infrasonics, complex dynamics of  
nonlinear systems, ice physics and condensed matter physics.  

The MS degree with computational physics concentration provides  
expertise in advanced computing environments, in the relevant  
mathematical foundations and in the specific physics discipline. It is directed  
toward students with undergraduate academic backgrounds in physics or  
other closely associated fields, such as engineering, that have the appro-  
riate physics course work. This degree is relevant for students seeking  
careers in any areas that require expertise in computational modeling  
and simulation of physical systems.  

The MS degree with space physics concentration focuses on the physics  
of upper atmospheres, ionospheres, magnetospheres and the inter-  
planetary medium. It includes core physics courses and specialty courses  
in space physics, aeronomy, magnetospheric and auroral physics, and ad-  
vanced plasma physics. The specialty courses support graduate research  
with faculty members at UAF’s Geophysical Institute, and include ar-  
reas such as numerical simulations and time-series analysis. Additional  
courses such as radiative transfer and physics of fluids provide added  
breadth.

**MS Degree**

1. Complete the general university requirements (page 200).  
2. Complete the master’s degree requirements (page 204).  
3. Complete the following:  
   PHYS F611 — Mathematical Physics I ........................................... 3  
   PHYS F612 — Mathematical Physics II ........................................... 3  
   PHYS F621 — Classical Mechanics .............................................. 3  
   PHYS F622 — Statistical Mechanics ............................................. 3  
   PHYS F631 — Electromagnetic Theory ......................................... 3  
   PHYS F632 — Electromagnetic Theory ......................................... 3  
   PHYS F651 — Quantum Mechanics ............................................. 3  
   PHYS F652 — Quantum Mechanics ............................................. 3  
4. Complete the thesis or non-thesis requirements:  
   **Thesis**  
   a. Complete the following:  
      PHYS F699 — Thesis ................................................................. 6–12  
   b. Complete approved PHYS F600-level courses  
      Approved ATM F600-level courses  
   c. Minimum credits required* .................................................... 30  
      * At least 24 credits must be regular course work.  
   **Non-Thesis**  
   a. Complete the following:  
      PHYS F698 — Non-thesis Research/Project  
      Approved ATM F600-level courses  
   b. Minimum credits required* .................................................... 33  
      * At least 30 credits must be regular course work.

**PhD Degree**

1. Complete the general university requirements (page 200).  
2. Complete the PhD degree requirements (page 204).  
3. Complete the following:  
   PHYS F611 — Mathematical Physics I ........................................... 3  
   PHYS F612 — Mathematical Physics II ........................................... 3  
   PHYS F629 — Methods of Numerical Simulation in Fluids and Plasma ........................................... 3  
4. Complete at least 3 credits from the following:  
   Approved MATH F600-level courses (excluding MATH/PHYS F611 and F612) ........................................... 3  
   Approved CS F600-level courses ................................................. 3  
5. Complete the thesis or non-thesis requirements:  
   **Thesis**  
   a. Complete the following:  
      PHYS F699 — Thesis ................................................................. 6–12  
   b. Complete approved PHYS F600-level courses  
      Approved ATM F600-level courses  
   c. Minimum credits required ..................................................... 36  
   **Non-Thesis**  
   a. Complete the following:  
      PHYS F698 — Non-thesis Research/Project  
      Approved ATM F600-level courses  
   b. Minimum credits required* .................................................... 33  
      * At least 30 credits must be regular course work.

**Computational Physics Concentration**

1. Complete the general university requirements (page 200).  
2. Complete the master’s degree requirements (page 204).  
3. Complete the following:  
   PHYS F611 — Mathematical Physics I ........................................... 3  
   PHYS F612 — Mathematical Physics II ........................................... 3  
   PHYS F629 — Methods of Numerical Simulation in Fluids and Plasma ........................................... 3  
4. Complete at least 3 credits from the following:  
   Approved MATH F600-level courses (excluding MATH/PHYS F611 and F612) ........................................... 3  
   Approved CS F600-level courses ................................................. 3  
5. Complete the thesis or non-thesis requirements:  
   **Thesis**  
   a. Complete the following:  
      PHYS F699 — Thesis ................................................................. 6–12  
   b. Complete approved PHYS F600-level courses  
      Approved ATM F600-level courses  
   c. Minimum credits required ..................................................... 36  
   **Non-Thesis**  
   a. Complete the following:  
      PHYS F698 — Non-thesis Research/Project  
      Approved ATM F600-level courses  
   b. Minimum credits required* .................................................... 33  
      * At least 30 credits must be regular course work.

**Space Physics Concentration**

1. Complete the general university requirements (page 200).  
2. Complete the master’s degree requirements (page 204).  
3. Complete four of the following:  
   PHYS F626 — Fundamentals of Plasma Physics ........................................... 3  
   PHYS F627 — Advanced Plasma Physics ........................................... 3  
   PHYS F629 — Methods of Numerical Simulation in Fluids and Plasma ........................................... 3  
   PHYS F672 — Magnetospheric Physics ........................................... 3  
   PHYS F673 — Space Physics ......................................................... 3  
4. Complete the thesis or non-thesis requirements:  
   **Thesis**  
   a. Complete the following:  
      PHYS F699 — Thesis ................................................................. 6–12  
   b. Complete approved PHYS F600-level courses  
      Approved ATM F600-level courses  
   c. Minimum credits required ..................................................... 36  
   **Non-Thesis**  
   a. Complete the following:  
      PHYS F698 — Non-thesis Research/Project  
      Approved ATM F600-level courses  
   b. Minimum credits required* .................................................... 36  
      * At least 30 credits must be regular course work.