

# ARCTIC ENGINEERING

College of Engineering and Mines  
Department of Civil and Environmental Engineering  
907-474-7241  
[www.uaf.edu/cem/cee/](http://www.uaf.edu/cem/cee/)

## M.S. Degree

Minimum Requirements for Degree: 30 credits

The arctic engineering program trains graduate engineers to deal with the challenges of design, construction and operations in cold regions of the world. Climatic, geological and logistical conditions of the Arctic and subarctic create special problems and require knowledge and techniques not usually covered in engineering courses.

A thorough understanding of heat transfer processes is of primary importance, and the properties of frozen ground and water are basic to most engineering in the Arctic. Arctic conditions also uniquely affect hydraulics, hydrology and utility operations.

Core required courses in the arctic engineering program teach engineers to understand and adapt to cold region problems. Students round out the program with advanced elective courses in a particular field of interest. Arctic engineering research carried out by faculty can provide students with opportunities for theses or project papers dealing with the most current arctic knowledge.

Development of petroleum and other natural resources has accentuated the demand for engineers who understand northern operations. Skilled engineers are needed both in private industries involved in development and within government agencies that plan and regulate development activity.

## Graduate Program — M.S. Degree

1. Complete the general university requirements (page 198).
  2. Complete the master's degree requirements (page 202).
  3. Complete at least five of the following core courses:  
CE F681—Frozen Ground Engineering .....3  
CE F682—Ice Engineering (3) .....3  
or GEOS F615—Sea Ice (3) .....3  
CE F683—Arctic Hydrology and Hydraulic Engineering .....3  
CE F684—Arctic Utility Distribution.....3  
ME F685—Arctic Heat and Mass Transfer.....3  
ME F687—Arctic Materials Engineering.....3
  4. CE F698 or F699—Thesis or Project .....3
  5. Electives \* ..... 12 – 15
  6. Minimum credits required .....30
- \* All electives must be in areas related to or supportive of the student's degree program and approved by the student's graduate advisory committee.
- Note: CE F603—Arctic engineering is not an approved elective for the M.S. in arctic engineering.  
See Civil Engineering.  
See Engineering for Ph.D. program.  
See Engineering Management.  
See Environmental Engineering and Environmental Quality Science.  
See Science Management.