

Arctic Engineering (AE)

Courses

AE A681 Frozen Ground Engineering 3 Credits

Covers physical, thermal, and mechanical properties of frozen soils, frost action, heat flow in soils, thaw behavior of frozen ground, foundations in frozen ground, construction ground freezing, pavement design, earthwork, and field investigations.

Special Note: Requires knowledge in soil mechanics

Registration Restrictions: Graduate standing in the College of Engineering or instructor approval

Crosslisted With: CE A681

AE A682 Ice Engineering 3 Credits

Introduces factors governing design of engineering works contending with the presence of ice. Includes fundamental ice properties, ice processes, ice navigation and control of ice in channels, structural and non-structural ice control measures, ice jams, bearing capacity of floating ice sheets, and ice forces on riverine and ocean structures.

Registration Restrictions: Graduate standing with a baccalaureate degree in engineering or junior or senior standing in an accredited undergraduate program in engineering having completed a mechanics of materials course with a minimum grade of C

Crosslisted With: CE A682

AE A683 Arctic Hydrology and Hydraulic Engineering 3 Credits

Introduces aspects of hydrology and hydraulics unique to engineering problems of the Arctic and near Arctic with emphasis on Alaska conditions including information from Canada and other circumpolar countries.

Registration Restrictions: Graduate standing with a baccalaureate degree in engineering or physical science, or junior or senior standing in an accredited undergraduate program in engineering having completed a water resources course with a minimum grade of C

Crosslisted With: CE A683

AE A684 Arctic Utility Distribution 3 Credits

Introduces physical principles and current practices associated with the planning and design of safe, efficient and affordable water supply, fire protection, wastewater collection and disposal, and solid waste disposal works in cold regions with a view toward conditions in rural arctic Alaska.

Registration Restrictions: Graduate standing with a baccalaureate degree in engineering or physical science, or junior or senior standing in an accredited undergraduate program in engineering having completed a water resources course with a minimum grade of C

Crosslisted With: CE A684

AE A685 Arctic Applications of Heat and Mass Transfer 3 Credits

Introduces principles of heat and mass transfer with special emphasis on application to problems encountered in the Arctic such as ice and frost formation, permafrost, condensation and heat loss in structures.

Registration Restrictions: Graduate standing with a baccalaureate degree in engineering or upper class standing in an accredited undergraduate program in engineering having completed a thermodynamics course with a minimum grade of C.

AE A689 Cold Regions Pavement Design 3 Credits

Covers design, maintenance and rehabilitation of pavement structures in cold regions where frost, snow and ice threaten expected service life.

Registration Restrictions: Graduate standing with a baccalaureate degree in civil engineering.

AE A698 Arctic Engineering Project 3 Credits

Culminating project for MS Arctic Engineering students. The project is arranged among the advisor, graduate advisory committee and student to solve a practical cold regions engineering problem.

Registration Restrictions: Graduate standing in arctic engineering with completion of a minimum of 9 graduate AE credits.