

ICE PHYSICS - GEOS/PHYS 614 (3 credits)

Prerequisites: Math 421, 422, graduate standing, and permission of instructor

Spring 2007, Tue, Th 9:45 - 11:15; NSCI, Rm 207

Instructor: Martin Truffer, Geophysical Institute 401 D, *5359
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office hours: by appointment

Text: Physics of Ice, Petrenko and Whitworth

Additional reading:

- Ice Physics (Hobbs)
- The Chemical Physics of Ice (Fletcher)
- Solid State Physics (Kittel)

Good online resources:

- <http://www.lsbu.ac.uk/water>
- <http://www.snowcrystals.com>

The course contains a survey of the physics of ice. Topics will include the crystal structure and properties of ice, high pressure phases, hydrogen bonding, mechanical properties, thermal properties, electrical and acoustic properties, nucleation and growth, optical properties, and surface properties (adhesion, friction).

The student is expected to become familiar with the basic physics of ice. We will develop an understanding of mechanical, thermal, electric, optical, and acoustic properties from basic physical principles.

Instructional methods: lectures and student presentations

Tentative outline:

- Introduction, why study ice?
- The H₂O molecule
- Ice Ih architecture, crystallography

- Phase diagram, different kinds of ice
- Defects
- Surface of ice
- Nucleation
- Clathrates
- Optical properties
- Electrical properties
- Thermal properties
- Mechanical properties
- Dislocations

Class attendance is mandatory and participation encouraged.

Grading:	Problem sets:	50%
	Student presentations:	25%
	Final Exam:	20%
	Participation:	5%

The Office of Disability Services implements the Americans with Disabilities Act (ADA), and insures that UAF students have equal access to the campus and course materials. Please let the instructor know if you need special accommodation.