ATM335 Geophysics of Snow and Ice (2020-2023)

HUOM! OPINTOJAKSOJEN TIETOJEN TÄYTTÄMISTÄ KOORDINOIVAT KOULUTUSSUUNNITTELIJAT HANNA-MARI PEURALA JA TIINA HASARI

1. Course title

Lumen ja jään geofysiikka
Geofysik av snö och is
Geophysics of Snow and Ice

2. Course code

ATM335

Aikaisemmat leikkaavat opintojaksot 53568 Lumen ja jään geofysiikka, 5 op

3. Course status: compulsory

-Which degree programme is responsible for the course?
Master's Programme in Atmospheric Sciences

-Which module does the course belong to?
ATM300 Advanced Studies in Atmospheric Sciences (compulsory for Study Track in Geophysics of the Hydrosphere)

-Is the course available to students from other degree programmes?
Yes

4. Course level (first-, second-, third-cycle/EQF levels 6, 7 and 8)

Master's level, degree programmes in medicine, dentistry and veterinary medicine = secondcycle degree/EQF level 7
Doctoral level = third-cycle (doctoral) degree/EQF level 8

-Does the course belong to basic, intermediate or advanced studies (cf. Government Decree on University Degrees)?
Advanced studies

5. Recommended time/stage of studies for completion

-The recommended time for completion may be, e.g., after certain relevant courses have been completed. 2nd or 3rd year, no specific course requirements in advance

6. Term/teaching period when the course will be offered

-The course may be offered in the autumn or spring term or both. Spring term in general, (but 2017-2018 autumn)
-If the course is not offered every year, this must be indicated here. Every 2n year, Autumn 2017, Spring 2019, Spring 2021....
-Specification of the teaching period when the course will be offered. III (in 2017 autumn it is II)

7. Scope of the course in credits

5 cr

8. Teacher coordinating the course

9. Course learning outcomes

After the course students are able to:

1. Explain the general characteristics of snow and ice, their similarities and differences.
2. Resolve mathematically physical problems related to snow and ice.
3. Describe how snow and ice interact with the other components of hydrosphere, amosphere, and with the entire climate system.
4. Address questions such as: how important are snow and ice to ecosystems and society; what is the future of snow and ice?

10. Course completion methods

The course consists of lectures, mathematical exercises and field exercise. At least 1/3 of the exercises must be completed. The field exercise can be compensated by laboratory work and report. Written exam is organised after the course.

11. Prerequisites

Advanced undergraduate studies or BSc in natural sciences.

12. Recommended optional studies

The first course in hydrology is recommended.

13. Course content

1. Ice
2. Snow
3. Lake and river ice
4. Sea ice
5. Frozen ground
6. Glaciers

14. Recommended and required literature

Required literature: Lecture notes

Recommended literature:

Leppäranta M. (2015) Freezing of lakes and the evolution of their ice cover.

Thomas D.N. (2017) Sea ice.

Leppäranta M. (2011) The drift of sea ice.

Cuffey K. & Paterson W.S.B. (2010) The physics of glaciers.

15. Activities and teaching methods in support of learning

Lectures, exercises, laboratory work and a field trip. Students will have mathematical exercises and write a report based on fieldwork.

16. Assessment practices and criteria, grading scale

Exam, report and exercises. Grading 1-5.

17. Teaching language.