



FHL3003 Environmental Physiology I, Basic and Theory 7.5 credits

Omgivningsfysiologi I, teoretisk kurs

This is a translation of the Swedish, legally binding, course syllabus.

Establishment

Course syllabus for FHL3003 valid from Autumn 2012

Grading scale

G

Education cycle

Third cycle

Specific prerequisites

Admitted to post-graduate studies at technological or medical faculty.

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

The comprehensive aim of the course is to provide the participants with basic knowledge regarding the four main areas of environmental physiology: acceleration physiology, barophysiology (diving and altitude physiology), and thermophysiology

The student shall, after having completed the course, have knowledge and understanding of:

- Physical laws and relationships, including terminology and nomenclature, used in environmental physiology.
- Effects of continuous exposure to increased gravitational force (G-load) on heart and peripheral blood vessels, lungs, skeleton, the vestibular organ, and the central nervous system.
- Techniques that are used by pilots to help them tolerate high G-loads.
- Mechanisms of spatial disorientation during flying
- Effects of reduced gravitational force (micro gravitation) on heart and peripheral blood vessels, lungs, skeleton, the vestibular organ, and the central nervous system.
- Methods to counteract the functional and structural changes caused by long space flights on heart/blood vessels, muscles, and skeleton. Symptoms of hypoxia and physiological responses during acute (hours/days) altitude exposures.
- Adaptive mechanisms during long term (days/weeks) and chronic altitude exposures.
- Symptoms, underlying mechanisms and treatment of "acute mountain sickness" (AMS), "high altitude pulmonary edema", "high altitude cerebral edema" (HACE) and "chronic mountain sickness".
- Adjustment of circulation and respiration during immersion in water.
- Physiological effects of large hydrostatic pressures and gas pressures with special emphasis on "high pressure neurological syndrome", oxygen toxicity, and nitrogen narcosis.
- Problems of decompression in the form of barotrauma and decompression sickness.
- The structure and function of the thermoregulatory system in man.
- Thermoregulation in connection with heat stress/physical exercise, and symptoms and mechanisms of heat exhaustion and heat stroke.
- Thermoregulation in connection with cold stress, and symptoms and mechanisms of local cold injury and general hypothermia.

Course contents

Lectures, seminars, practical demonstrations and literature studies.

Course literature

Förutom sammanfattning av föreläsningar ("handouts"):

Burton R.R. & J.E. Whinnerey. (2002) **Biodynamics: Sustained Acceleration. In: Fundamentals of Aerospace Medicine** (eds: R.L. Dehart & J.R. Davis). Sid 122-153.
Daniels S, Y. Grossman, P.B. Bennet, J.C. Rostain, J.M. V. Clark & S.R. Thom. (2003) **Pressure effects. In: Bennet and Elliot's Physiology and Medicine of Diving.** Elsevier, Oxford (eds: A.O. Brubakk & T.S. Neuman. Sid: 265-418.
Mekjavic I.B., M.J. Tipton & O. Eiken. (2003). **Thermal Considerations in Diving. In:**

Bennet and Elliot's Physiology and Medicine of Diving. Elsevier, Oxford (eds: A.O. Brubakk & T.S. Neuman). Sid: 115-152.

Parment A.J. & K.K Gillingham. (2002) **Spatial Orientation in Flight. In: Fundamentals of Aerospace Medicine** (Eds: R.L. Dehart & J.R. Davis). Sid 184-244.

Taylor. N.A.S., N. Kondo, W.L. Kenney. (2008). **The physiology of acute heat exposure, with implications for human performance in the heat. In: Physiological Basis of Human Performance During work and Exercise.** Elsevier, Oxford, (eds: N.G.A. Taylor & H. Groeller). Sid: 341-358.

West, J.B., R.B. Schoene and J.S. Milledge. (2007) High altitude Medicine and Physiology (4th edition), Hodder Arnold, London. Sid: 39-130 och 251-310.

Examination

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

If the course is discontinued, students may request to be examined during the following two academic years.

Oral and written examination.

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.