

## Altitude and Aerospace Physiology

Biomedical Physio and Kines 484

Section: D100

Term: 2014 Spring

Instructor: Dr. Andrew Blaber (Office: K9646, Telephone (778) 782-3276)

Discussion Topics: COURSE FORMAT: 1 hour lecture, 3 hours of laboratory per week

### OUTLINE

A laboratory based examination of human physiological systems during exposure to aerospace related conditions of altered atmospheric content and G-forces. Developments of breathing apparatus, pressurized flight suits and anti-G-suits for high performance aircraft will be examined as they relate to solving the physiological problems of exposure to these environments. The effects of weightlessness during spaceflight will also be explored through lecture, literature review and current research data. An investigation of the biomedical monitoring of pilots and astronauts will be explored as they relate to health and safety.

### LEARNING OBJECTIVES:

This course is designed to give students practical experience in the measurement of the human physiological parameters associated with the aviation and space environment and to provide an appreciation of the difficulties and importance of the quantification of the physiological responses due to exposure to these extreme conditions on the human body. Students will review fundamental mechanical and physiological concepts and will learn how to carry out dynamics analysis using an integrated model of the body.

### LABORATORY TOPICS:

Vestibular I: Vestibular-ocular reflex (Neck rotation, Visual induced motion)

Vestibular II: Vestibular-ocular reflex (Whole body rotation)

Hypoxia I: Hypoxic ventilatory response to CO<sub>2</sub>

Hypoxia II: Hypoxic ventilatory decline (poikilocapnea)

Hypoxia III: Cardiovascular responses to hypoxia

Orthostatic reflexes I: Head-down tilt, head-up tilt (skeletal muscle pump)

Orthostatic reflexes II: Lower body negative pressure (LBNP)

Hypoxia IV: High Altitude Physiological Training (not marked: Altitude chamber, Optional)

Grading: Laboratory Reports (7 Labs)	56%
Lecture Midterm	14%
Final Exam	30%

All lectures will be condensed into the first month of the course with the midterm in week 5. Labs will range from 3-4 hours. Laboratory reports are due at the beginning of the following week's lab period. Each report counts 8% toward the final grade. There will be a late penalty for reports. For each day, one-tenth of the maximum grade will be deducted. BPK

## **Altitude and Aerospace Physiology**

majors will focus on physiology and adaptation to extreme environments whereas ENSC students will have a more intense focus on medical monitoring devices and on signal analysis with Matlab. Cross disciplinary learning is encouraged.

Required Texts: TEXTBOOKS: Selected papers & readings: List provided in class.  
LAB MANUAL: Kin 484 Laboratory Manual Distributed in class

Recommended Texts:

Materials/Supplies:

Prerequisite/Corequisite: Kin 305 or Kin 308 (ENSC students welcome)

Notes: Failure to attend an examination

Students who miss examinations due to exceptional circumstances (such as serious illness or compassionate reasons) are required to obtain a physician's certificate, whereby the physician states that you were unable to write your midterm or final on the set date due to a medical condition beyond your control, or other supporting documents in order to obtain consideration in the course. Such documents must be filed with the Dept. Chair (via the Biomedical Physiology and Kinesiology office) or Registrar within four calendar days of the date on which the examination was to have been written. Exceptional circumstances must be approved by the Undergraduate Program Committee in order for a student to receive consideration.

Students must check the exam schedule when making course selections. Students are reminded that final examinations may be scheduled at any time during the examination period and that students should avoid making travel or employment arrangements for this period.

### Academic honesty and student conduct

Academic honesty is a condition of continued membership in the University community. Academic dishonesty, including plagiarism or any other form of cheating is subject to serious academic penalty, i.e. failure on an assignment, failure in a course, suspension or expulsion from the University.

The University codes of student conduct and academic honesty are contained in policies T10.01 and T10.02 which are available in the Course Timetable and on the Web via <http://www.reg.sfu.ca>.

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