

INTRODUCTORY HUMAN PHYSIOLOGY – BIOL 2030 (Kinesiology students only)

HUMAN PHYSIOLOGY SURVEY – 2035 (Non-Kinesiology and non-biology majors)

COURSE SYLLABUS

WINTER, 2017

INSTRUCTOR: DR PHILIP HICKS

PROFESSOR'S OFFICE: Centennial Building, Room 4051
OFFICE HOURS: 3:00-4:00 Tues & Thursday (only by pre-arrangement)
OFFICE PHONE: 343-8106 (leave a message if there's no answer; please speak loudly,
slowly and clearly enough for your message to be understood)
E-MAIL ADDRESS: phicks@lakeheadu.ca (school e-mail address)
WEB PAGE: <https://www.lakeheadu.ca/academics/departments/biology/directory/faculty>
CLASS HOURS: 4:00-5:30, Tuesday & Thursday
CLASS LOCATION: AT2001
LAB HOURS: various (see timetable in calendar, university website)

A. DESCRIPTION

This course is a survey approach to the field of study of physiology for non-biology majors (i.e., kinesiology undergraduates who register in 2030). As physiology is a subdiscipline within the science of biology, there is a laboratory component that is a required element (but not for the 2035 students). The instructor for the lab portion of the course is Mr. Michael Moore (mnmoore@lakeheadu.ca).

Since there are a multiplicity of specialised subfields within physiology, emphasis in lectures will be placed on only the major areas relevant to an introductory survey course. Students who wish to have a deeper appreciation of homeostasis as a central principle of biology will value this course, as will students who are thinking of pursuing a post-graduate specialisation in one of the life sciences. Many students looking to pursue a career in a medical, dental, or a veterinary specialty, or some other life sciences discipline such as of course, kinesiology, will also wish to take this course. It is an exploratory, first course in animal physiology that focuses entirely on humans. The course is not concerned with any plant or zoological fields of study: the content is restricted entirely to human (& mammalian) physiology. Owing to limited class time, and normal university constraints on scheduling, all areas planned to be covered may not receive full treatment in class. You will be told in advance of any tests or midterm what areas will be covered for examination purposes.

Offering: 0-0; 3-3

Note: Students who achieve academic credit in Biology 2030 may not subsequently (or concurrently) take Biology 3250 or 3251 or 3253 for credit. An additional fee may be required for this course.

B. ORGANIZATION

This is a lecture-lab course (when taken as 2030); topics are presented by the instructor in sequence according to subject area but where possible common themes will emerge and at those times will be so identified. You will not be required to possess in-depth mathematical knowledge beyond elementary statistics or high school-level math. Lab sessions are offered at regular intervals within the semester. The grading system is outlined below. Biol 2030/2035 students generally are expected to come to class already possessing knowledge at the introductory (high school) level of human/animal tissues and cell structures, membranes, and basic (high school-level) chemistry.

C. COURSE OBJECTIVES

To introduce students to:

1. issues central to various sub-fields comprising human physiology.
2. various concepts involving homeostasis and response to environmental stimulation.
3. experimental technique in a laboratory setting pertinent to a life sciences/medical/health field.
4. ...and, if possible in the lab, to provide students with opportunities to observe physiological responses to external stimulation.

D. COURSE TOPICS

The course will cover the following topics, time and weather permitting:

- . History; development of field; relation to other science; unifying principles (e.g., homeostasis)
- . Cellular basis of physiology; compartmentation; membranes; skin; energy & its transfer
- . Chemistry, biochemistry and cytology of intra- and intercellular communication; thermodynamics
- . Neuronal signaling, conduction and operation of synapses
- . Electrical and pharmacological operations of neurons
- . Sensory systems at all synaptic levels (from receptor to neocortex)
- . Organisation of the two nervous systems and their subsystems; glia and relations with neurons.
- . Learning and memory systems of the brain; neural development; more brain subsystems
- . Motor patterning; spinal forms & functions; meninges; cerebral motor cortex
- . Neuromuscular junction anatomy and muscle function; motor (e.g., stretch) reflex(es)
- . Actin and myosin; sliding filaments, regulation of contraction and muscle diversity
- . Muscle fibre types, neuro- and myogenic properties; energy metabolism, muscle perfusion; bone
- . Locomotion, skeletal systems; translating contraction into movement; moving in the environment
- . Endocrinology, hormones and regulated behaviours; pituitary systems; steroids; amines, others
- . Body fluid systems; circulatory and respiratory systems; stress; lymph and immunology
- . Function and control of cardiac systems; cardiac output; factors influencing rate, volume, MAP
- . Vascular system and respiratory pigments; heart-lung interfacing; gas laws; ventilation
- . Respiratory diversity in water and air (surfactants); alveoli;
- . Gas transport in tissues; hemoglobins; equilibrium curves; CO₂ excretion and pH

- . GI form, organisation, function; secretion, digestion, absorption; linked organs (liver, pancreas)
- . GI regulation; reflexes, neural/endocrine controls; small and large intestinal handling of ions
- . Renal system; form, function, relationship with heart, behavior, pH homeostasis, waste handling
- . Nephrons, glomerulus, Bowman's capsule, filtration, portal system, countercurrent flow
- . Renal reabsorption & secretion, urea, glucose and protein handling; micturition
- . Fluid & electrolyte balance, diuresis, endocrinological range; Na⁺ & K⁺ balance, ECF volume
- . Temperature regulation strategies
- . Physiology of exercise

E. TEXT AND REQUIRED SUPPLIES

1. Required text: *Human Physiology. An Integrated Approach*, by Dee Unglaub Silverthorn
2. Supplies: Laboratory Manual available as a PDF or by purchase from the Bookstore (lab portion of the class should work through Michael Moore for this)

F'. GRADING PLAN: Lecture Portion

There will be two examinations for course assessment: one mid-term exam and one final exam

Midterm exam 33.33% of total grade given

Final exam (comprehensive) 66.66%

The date of your mid-term assessment exam will be 02 February, using the regular classroom location and class time. All testing and examinations will be of the type gradable by computer scoring ("Scantron" type). The final exam in April will be comprehensive; that is, it will cover material already tested by the mid-term.

F''. GRADING PLAN, [With (BIOL 2030)/Without (BIOL 2035) Laboratory]

Students registered in 2030 also participate in the laboratory. Those students will have the laboratory component graded as 25% of their final mark. The two exams dealing with the lecture portion in those cases will be calculated at 75% of the final grade.

Other students (e.g. those registered in 2035) who are not participating in the laboratory will have their final grade determined as indicated above (see F').