DAWSON COLLEGE

PHYSICS
Physical Rehabilitation
Physics for Physical Rehabilitation

203-945-DW (all sections)
Fall 2013

Teacher **Nadim Boukhira** 7A.20, local 1753, nboukhira@dawsoncollege.qc.ca

Pre-requisites Secondary IV Mathematics 563-404, Secondary V Physics 553-504

Co-requisites None

Ponderation 2-3-3 (2 hours of lecture, 3 hours of labs, and 3 hours of work outside class per week)

Course objectives This course will cover some of the basic concepts of biomechanics. Students will learn the laws governing motion, forces and their interactions, work, energy and rotation. These notions will be applied to problems involving equilibrium, movement, and the limits of the human body. Fundamental concepts of waves and electricity will also be covered as an introduction to therapeutic electrotherapy techniques.

Course competencies This course will allow the student to fully achieve the competency:
OO2Z: To analyze the position and movements of the human body.

1. To analyze the mechanical forces and constraints placed on anatomical structures in a static position and during movements.
2. To analyze how joint and muscle structures help maintain positions and perform movements. *(Covered in Human Biomechanics)*
3. To analyze position of joint and muscle structures in static and dynamic situations. *(Covered in Human Biomechanics)*

OO3H: To provide electrotherapy treatments.

1. To create a favorable environment for the intervention. *(Covered in Electrotherapy)*
2. To explain how electrotherapy apparatuses are used
3. To use low-, medium-, and high-frequency current for antalgic, trophic and tissue repair purposes. *(Covered in Electrotherapy)*
4. To use ultrasound for antalgic, trophic and tissue repair purposes. *(Covered in Electrotherapy)*
5. To use radiation for antalgic, trophic and tissue repair purposes. *(Covered in Electrotherapy)*
6. To use electrical stimulation and biofeedback for motor rehabilitation purposes. *(Covered in Electrotherapy)*
7. To use direct current for iontophoretic purposes. *(Covered in Electrotherapy)*

Evaluation The Institutional Student Evaluation Policy (ISEP) is designed to promote equitable and effective evaluation of student learning and is therefore a crucial policy to read and understand. The policy describes the rights and obligations of students, faculty, departments, programs, and the College administration with regard to evaluation in all your courses, including grade reviews and resolution of academic grievance. ISEP is available on the Dawson website.

Class tests and quizzes	50%
Laboratory activities	30%
Final examination	20%

Your teacher will provide a tentative test schedule during the first week of class. To help you prepare for the final exam, old exam questions and solutions will be made available.

Students must show a basic understanding of the course material at the level covered in the lectures and laboratory in order to pass the course. This is achieved by attaining at least an average grade of 60%, calculated according to the evaluation scheme above. **Course work not submitted by the due date may be penalized at the teachers discretion.**

Important note: To pass, the student must obtain a final grade of at least 60% in both the lab and theory components.

Reference materials

1. **Physics for the Life Sciences**, by Alan H. Cromer, McGraw-Hill.

Teaching methods

The material will be presented using a mix of active learning activities, lectures, in-class problem solving, laboratory experiments and demonstrations. Laboratory periods will be used for experiments as well as class tests and lectures.

Attendance & participation

Although class attendance is not compulsory, students should make every effort to attend all classes. In the event that a class is missed, the student is responsible for all material covered or assigned during that class. **Attendance at laboratory experiments and tests is compulsory.** Students must write the tests at the scheduled times except for unforeseen emergencies confirmed by proper documents. For additional information students should refer to the Institutional Student Evaluation Policy (ISEP section III-C) regarding attendance.

Literacy standards

It is expected that students will be able to comprehend the course material and express themselves appropriately as a normal part of their academic performance in the course. Marks may be deducted for inadequate communication skills.

Laboratory work

Experimentation is an essential part of science. Students will be expected to perform experiments and report on their results. Your teacher will provide you with instructions for lab experiments and activities (there is no manual to purchase). Information about lab report formats is available in the Science Student Handbook which is available on FirstClass (see folder in 'student info' conference). **Students must be present during the entire lab activity to receive credit.**

Student conduct

Everyone has the right to a safe and non-violent environment. Students are obliged to conduct themselves as stated in the Student Code of Conduct and in the ISEP section on the roles and responsibilities of students (ISEP section II-D). Disruptions or excessive noise will not be tolerated. Students who do not comply with these rules will be asked to leave the class and may be referred to Student's Services for disciplinary action. **Mutual respect is the key to a harmonious learning environment.**

Academic integrity

Cheating, copying, or any other form of academic dishonesty will not be tolerated. Students should acquaint themselves with the policy of the College on plagiarism and cheating. According to ISEP, the teacher is required to report to the Sector Dean all cases of cheating and plagiarism affecting a students grade (ISEP section IV-C). The usual penalty for the first instance of cheating will be a grade of zero for the piece of work in question to all parties involved (under certain circumstances, even a first offence may be penalized by failure in the course). A second offence may result in the failure of the course. Students should note that using someone elses laboratory data without authorization from the student and the teacher is cheating.

Intensive course conflicts

If a student is attending an intensive course, the student must inform the teacher, within the first two weeks of class, of the specific dates of any anticipated absences.

Policy on religious observance

Students who intend to observe religious holidays must inform their teachers in writing as prescribed in the ISEP Policy on Religious Observance (ISEP Section III-D), within the first two weeks of the semester. Forms for this purpose are available from your teacher. Your teacher will inform you of any modifications to planned course activities resulting from the teacher's own religious commitments.

Course content

The material to be covered is contained in the following chapters of the text.

Weeks	Topics	Chapters
0–1	Units and measurements, math review	1
1	Vectors	–
2–4	Forces, static equilibrium, applications to physical rehab	2
4–6	Torque, equilibrium, more advanced applications	3
7	Energy	5
7–8	Physics of solids	10
8–11	Waves and sound: Properties of waves, propagation, superposition, resonance, ultrasound therapy, *etc.*	12–13
12–15	Electricity: Current, voltage, circuits, safety, AC/DC, electrotherapy	17

Note: The above schedule is tentative.

Questions outside class

- All teachers will be available in their respective offices to their students during posted office hours. In the first week, your teacher will inform you of their schedule and will post it outside their office.
- Room 7A.1 is a physics study room. At scheduled times, a teacher or peer tutor will be on duty there to answer your questions. The schedule of teachers and peer tutors will be posted outside of 7A.1 in the 2nd or 3rd week of term.
- Many teachers in the Science Program – including those from the Physics Department – will communicate with their students via FirstClass. This software allows teachers and students to share information, use email and much more. You can download the necessary (free) software at the following website:

  `http://www.place.dawsoncollege.qc.ca`

  An instruction manual is available at this website that details how to install and use the software.