1. COURSE INFORMATION

COURSE: Dentistry 115 Oral Physiology
COURSE MEETS: Winter term
Tuesdays 11:30 AM to 12:20 PM in room M148
Thursdays 12:30 PM to 1:20 PM in room M148

COURSE DIRECTOR: Dr. S. J. Dixon, Room 0075 DSB, Email jeff.dixon@schulich.uwo.ca
OTHER INSTRUCTORS:
Dr. L. S. Leung Email sleung@uwo.ca
Dr. P. Soros Email peter.soros@gmail.com
Dr. B. L. Tepperman Email barry.tepperman@schulich.uwo.ca

2. COURSE DESCRIPTION

The course given in first year Dentistry is composed of lectures, group discussions, and assigned studies which complement material presented in Dental Biochemistry and Oral Histology. The objective of the course is to develop a basic knowledge of oral physiology. The course of study involves: sensory physiology and pain; motor neurophysiology and the control of mandibular movement; salivary physiology; bone turnover and tooth movement; and the growth, development and healing of oral structures.

The Department of Physiology and Pharmacology has adopted the policy that no advanced standing will be granted for this course. Attendance at all tests, examinations and seminars is mandatory.

"Dental treatment and treatment planning hinge upon a thorough understanding of the underlying physiological processes and principles . . . with the changing patterns of dental practice consequent upon the declining prevalence of dental caries, the more complex needs and expectations of the patient will hinge upon a much greater knowledge of oral physiology."

C.L.B. Lavelle

3. COURSE OBJECTIVES

There are **three** main objectives of the course:

- To ensure that the student understands the basic physiological functions of orofacial systems.
- To encourage the habit of relating physiological principles to clinical dentistry. Understanding the signs, symptoms, pathology and treatment of dental disease is based upon a thorough knowledge of oral physiology.
- To provide students with the appropriate knowledge of oral physiology that is required for subsequent courses in the dental curriculum, including anesthesia, oral medicine, oral pathology, oral surgery, and pharmacology & therapeutics.

4. COURSE SCHEDULE Winter term 2008

Date	Time	Room	Lecturer	Topic
Jan. 8	11:30	M148	Dixon	Introduction to Oral Physiology
Jan. 10	12:30	TBA	Faculty	Seminar orientation
Jan. 15	11:30	M148	Soros	Function of orofacial muscles
Jan. 17	12:30	M148	Soros	Neural control of jaw and orofacial muscles
Jan. 22	11:30	M148	Soros	Orofacial reflexes
Jan. 24	12:30	M148	Soros	Mastication/deglutition I
Jan. 29	11:30	M148	Soros	Mastication/deglutition II
Jan. 31	12:30	M148	Soros	Speech
Feb. 5	11:30	M148	Leung	Introduction to sensory systems
Feb. 7	12:30	M148	Leung	Mechano- and thermal reception
Feb. 12	11:30	M148	Leung	Nociceptors and pain transmission
Feb. 14	12:30	M148	Leung	Pain modulation
Feb. 19	11:30	M148	Leung	Tooth pulp pain
Feb. 21	12:30	M148	Leung	Taste
Feb. 26	11:30	M148	Leung	Smell
Feb. 28	12:30	M148	Tepperman	Vomiting
Mar. 4	No lecture			Individual study time
Mar. 6	12:30	M148	Soros /Leung/Tepperman	Midterm test
Mar. 10-14	Study Week (School of Dentistry)			No lectures
Mar. 18	11:30	M148	Tepperman	Salivary secretion I
Mar. 20	12:30	M148	Tepperman	Salivary secretion II
Mar. 25	11:30	TBA	Faculty	Seminars
Mar. 27	12:30	TBA	Faculty	Seminars
Apr. 1	11:30	TBA	Faculty	Seminars
Apr. 3	12:30	M148	Dixon	Skeletal development & growth I
Apr. 8	11:30	M148	Dixon	Skeletal development & growth II
Apr. 10	12:30	M148	Dixon	Endocrinology of bone & Ca^{2+} homeostasis
Apr. 15	11:30	M148	Dixon	Bone remodeling
Apr. 17	12:30	M148	Dixon	Physiological tooth movement
Apr. 22	11:30	M148	Dixon	Orthodontic tooth movement

Apr. 24	12:30	M148	Dixon	Principles of healing
Apr. 29	11:30	M148	Dixon	Healing of oral tissues and implants
May 1	No lecture			Individual study time
May 5-23	TBA	TBA	All instructors	Final examination

5. COURSE FORMAT, REQUIREMENTS, AND STUDY MATERIALS

You are advised to make your own file of study material during the progress of the course. This should be composed of lecture notes, handout material, and notes on assigned readings.

Handout material Your instructors will have material pertaining to their lectures for distribution at various times throughout the term. Handouts are more likely to be guides than treatises.

Lecture notes It is advisable to make some personal jottings of class material as it is presented. Some lecturers may advise not to take notes, thereby indicating that the material is best found in the handouts or in the prescribed readings. Ideally, a student should prepare ahead by reading the available material, and then entering the class with some knowledge of the subject. Remember that your class is composed of people with various backgrounds – some will be confronted with material of which they have a high level of prior knowledge, others will find that the same material is entirely new to them. Thus be tolerant, and allow the lecturers to take some sort of middle road.

Textbooks There is no assigned textbook for this course. A textbook of human physiology would be a useful reference. Recent editions of the following texts are suitable and are available on 2-hour loan at the library:

- Guyton, A. C. *Textbook of Medical Physiology*, Saunders.

- Vander, Sherman & Luciano *Human Physiology: The Mechanisms of Body Function*, McGraw-Hill.

- Silverthorn, D. U. *Human Physiology: An Integrated Approach*, Prentice Hall.

The following are useful references for oral physiology:

- Miles, T.S., Nauntofte, B. and Svensson, P. *Clinical Oral Physiology*, Quintessence Publishing Co. Ltd., Copenhagen, 2004.

- Junge, D. *Oral Sensorimotor Function*, Medico Dental Media International, John S. Swift Company, St. Louis, 1998.

- Bradley, R.M. *Essentials of Oral Physiology*, Mosby, Toronto, 1995.

- Lavelle, C.L.B. *Applied Oral Physiology*, 2nd edition, Wright, Toronto, 1988.

- Osborn, J.W., Armstrong, W.G. and Speirs, R.L. (editors) *Anatomy, Biochemistry and Physiology*, A Companion to Dental Studies, Volume 1, Book 1 (Editors in Chief/A.H.R. Rowe & A.R.B. Johns), Blackwell Scientific Publications.

Seminars

Part of relating your learning to clinical dentistry involves being able to discuss it. Seminars provide this opportunity. To do so, the system has to be flexible and its format and time should be agreed upon by the students and tutors. There are four hours assigned formally to these activities.

Hour 1 - Orientation

Hours 2 to 4 - Student Presentations
Please consult the course schedule for the dates and times of these activities.

Groups of 6 students will be assigned to tutorial groups, whose leaders are members of the Department of Physiology and Pharmacology. During the first period, the groups should discuss the objectives and format of the seminar presentations. It is suggested that one or two main themes be selected, and a mini-symposium organized in which students present topics related to the theme. Each student is expected to meet with the tutorial leader to discuss the progress of preparation for the seminar. The theme of the seminar must be toward the discipline of oral physiology. Use of library reference material is expected. Seminars will be presented during the time indicated on the course outline unless other arrangements have been made with tutorial leaders. Students must attend all seminar presentations by members of their group. A student who does not present a seminar cannot receive a mark for the course.

1. <u>Purpose and objectives of the seminar</u>
The student should become acquainted with the library resources available for finding literature related to a specific topic. If you are not familiar with the use of the library, your group may wish to ask the tutorial leader to arrange a "tour" of the library and instruction on doing a computer search using "PubMed" http://www.ncbi.nlm.nih.gov/sites/entrez?holding=icauwomlib

After selecting several research papers related to a specific topic, you should discuss your topic with the tutorial leader. The student will pursue a specific topic to a depth not normally covered in class, i.e. laboratory techniques, presentation of data, and discussion of data. The student will gain at least a minimal experience with the experimental nature of physiology and become aware of controversies that exist. The student will gain some experience with discussion of data among

peers, and be exposed to traditional methods of scientific communication, including questions following the presentation.

2. Format of the seminar

Having selected a topic the student will prepare a 15-20 minute talk to the tutorial group, and be prepared to answer questions related to the talk (5-10 minutes). You are advised to practice your talk among your peers before presenting it to the tutorial group.

The student is expected to identify the problems being investigated, to present the results, to summarize the conclusions, and to make critical comments about the paper being presented.

3. Grading of the Seminar

The seminar grade will count for 20% toward the final grade for the course. Each student must present a seminar to receive a final grade for the course.

Components of the Seminar grade:

- Organization and Content (40%) – Were problems identified, results presented, conclusions summarized and comments made about the papers?
- Knowledge of the topic and related areas (30%) – How well did the student handle questions directly or indirectly related to the topic? Did the student understand the information presented?
- Delivery (15%) – Were visual aids* used, and if so, were they understandable? Was the presentation 15-20 minutes long? Was the talk clearly organized to enable a logical presentation of the data and conclusions?
- Participation (15%) – All students are expected to take an active role in the discussion of papers being presented by other members of their group.

* Each seminar room is equipped with an overhead projector. Transparencies of methods and conclusions are helpful to the audience. Keep visual presentation of results (e.g. graphs, tables) simple and avoid presenting detailed tables, if possible.

6. COURSE GRADING

The components of the final grade are:

- Midterm test. This test is scheduled for 50 minutes, and is composed of multiple-choice and/or short answer questions covering the first sections of the course. Please consult the course schedule for the date of this test. Percentage of final grade = 30%

- Seminar presentation. Percentage of final grade = 20%

- Final examination. This exam is scheduled for two hours, and will be composed of multiple-choice and/or short answer questions. The date and time of this exam will be announced. The final examination will cover the entire course. Percentage of final grade = 50%

Examination Format

The tests are designed to measure comprehensive knowledge and its application to clinical situations, although no prior knowledge of clinical terms or pathological conditions is necessary. Many of the questions are designed to make the student "think" in physiological terms to arrive at an answer; therefore, the most appropriate preparation for an examination is a well-planned personal and thorough review, rather than last minute cramming. Anyone suitably prepared should not have undue difficulty with the examinations.
There are a number of basic types of multiple-choice questions, which are commonly used by examiners. In the examination itself, the questions or test items are usually grouped according to question type and each group is preceded by a set of directions for that type. The following types of question formats are used.

Type 1 – Five Choice Completion

DIRECTIONS: Each of the questions or incomplete statements below is followed by five suggested answers or completions. Select the one that is BEST in each case and blacken the appropriate space on the answer card.

1. In the human heart, the fastest frequency of spontaneous depolarization is the

(A) sinoatrial node

(B) atrial muscle

(C) atrioventricular node

(D) bundle of His

(E) ventricular muscle

Type 2 – Five Choice Completion – Situations

DIRECTIONS: This section of the test consists of situations each followed by a series of questions. Study each situation and select the one BEST answer to each question following it, and blacken the appropriate space on the answer card.

Questions 2-3

A 30-year-old man was studied in the cardiovascular laboratory and the following data were collected.

Hematocrit 25 percent

Plasma Volume (by dye dilution) 6.0 liters

Arterial Oxygen Content 12 mls per 100 mls of blood

Mixed Venous Oxygen Content 8 mls per 100 ml of blood

Oxygen Consumption 320 mls per minute

Answer the following two questions relating to the information provided

2. The cardiac output of the man is approximately

(A) 6 liters per minute

(B) 7 liters per minute

(C) 8 liters per minute

(D) 9 liters per minute

(E) 10 liters per minute

3. The total circulating blood volume of the man is approximately

(A) 7.5 liters

(B) 8.0 liters

(C) 9.0 liters

(D) 10.0 liters

(E) 12.0 liters

Type 3 - Matching Type

DIRECTIONS: Each group of questions below consists of five lettered headings or a diagram or table with five lettered statements. For each numbered word, phrase or statement, select the one lettered heading or lettered component that is most closely associated with it. Each lettered heading or lettered component may be selected once, more than once, or not at all.

Questions 4 – 6 (A) Inulin

(B) Para-aminohippuric acid

(C) Phlorhizin

(D) Urea

(E) Glucose

4. Used to measure glomerular filtration rate.

5. Both filtered in the glomerulus and secreted by the renal tubules.

6. Used to measure approximate renal plasma flow.

Type 4 – Quantitative Relationships

DIRECTIONS: The following paired statements describe two entities that are to be compared in a quantitative sense. Answer

(A) if (a) is GREATER than (b)

(B) if (b) is GREATER than (a)

(C) if the two are EQUAL or VERY NEARLY EQUAL

7. (a) Intracellular potassium ion concentration

(b) Extracellular potassium ion concentration

8. (a) Velocity of blood flow in the aorta

(b) Velocity of blood flow in the capillaries

Type 5 – Functional Relationships

DIRECTIONS: Each of the following pairs of phrases describes conditions or quantities that may or may not be related. Answer

(A) if INCREASE in the first is accompanied by INCREASE in the second or if DECREASE in the first is accompanied by DECREASE in the second

(B) if INCREASE in the first is accompanied by DECREASE in the second or if DECREASE in the first is accompanied by INCREASE in the second

(C) if changes in the first are not NECESSARILY accompanied by changes in the second

9. (1) Extracellular potassium ion concentration

(2) Resting membrane potential

Type 6 – Multiple Completion Type

DIRECTIONS: For each of the incomplete statements below, ONE or MORE of the completions given is correct. Answer

(A) if only 1, 2, and 3 are correct

(B) if only 1 and 3 are correct

(C) if only 2 and 4 are correct

(D) if only 4 is correct

(E) if all are correct

MARK ONLY ONE SPACE ON YOUR ANSWER SHEET FOR EACH QUESTION

10. The two muscles in the middle ear of man function to

1.increase the range of frequencies that can be appreciated

2.dampen the movements of the ossicles

3.offer protection against explosive sounds

4.offer protection against prolonged intense sounds

****

PLEASE NOTE

- **The schedule and procedures outlined above are subject to change in the event of extenuating circumstances.**
- **Plagiarism – Students must present their seminar in their own words. Whenever students take an idea, or a passage from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing. Plagiarism is a major academic offence.**

- **For computer-marked multiple-choice tests and exams, software may be used to check for unusual coincidences in answer patterns that may indicate cheating.**
- **In the event that deferred or supplemental examinations are permitted, these examinations may not necessarily be of the multiple-choice/short answer type.**

****