Course Outline - The Chemistry of Sex

A. Introduction:

Course Number:	202-DAB-03	Semester:	Winter 2021
Domain:	Domain I: Science & Technology, Ensemble 1	Instructor:	Andrew Brown
Competency Code:	000X	Office:	AME-412
Ponderation:	3-0-3	Telephone:	514-457-6610 Ext. 5881
Credits:	2	Office Hours:	M, T: 11:00 – 12:00
Classroom:	Online		W, F: 11:00 – 12:00
Day and Time:	M, W 13:00 – 14:30		T, F: 14:30 – 15:30
	M, W 14:30 – 16:00		
Prerequisites:	None	Email:	MIO – Messaging in Omnivox

B. Introduction

The Chemistry of Sex course is intended to introduce non-science students to the chemicals and chemical processes involved in sexual reproduction. This chemistry is ultimately responsible for human existence. It has served to create, shape and influence each individual and will continue to do so throughout his or her lifetime.

The role of molecules known as sex hormones will be explored in the context of the sexual development of human beings. The understanding of how the male and female reproductive cycles are controlled by these hormones will be studied. Furthermore, the effects of these hormones, as well as others, on such varied topics as physical development, behaviour, attraction and love will be explored.

One of the significant achievements of chemistry has been the isolation and elucidation of the molecular structure of the naturally occurring hormones. This has led to development of synthetic drugs that allow control and manipulation of the human reproductive system. The consequences of this ability will be explored in areas such as contraception, fertility treatments and hormone therapies.

The course concludes with an examination of we may be influenced by external sources of chemicals. Examples include the effect of pheromones in sex attraction and endocrine disrupting chemicals that may be altering human reproductive systems. The role of chemistry in the treatment and prevention of sexually transmitted infections will be explored.

The Chemistry of Sex is a complementary course in the science domain as a part of General Education and is intended to develop a critical assessment of scientific literature.

This course meets the requirements for the Women's Studies and Gender Relations certificate.

C. Objectives

Statement of the competency

Science and Technology Set 1. To explain the general nature of sex hormones, their medical importance and examine issues arising from their use.

Achievement context

- Assessing the individual's understanding of the role played by sex hormones in the lives of men and women by multiple-choice testing.
- Submitting assignments based on recent developments pertinent to the chemistry of sex.
- Preparing and submitting a 750-word essay involving library and on-line research on a topic of recent special significance in sex hormone chemistry.

Elements of the Competency	Performance Criteria
1. To describe the structure of the major sex hormones and to show the synthetic modifications necessary in order to make them useful in medicine.	1.1 Brief explanation of the structural differences between testosterone, estradiol and progesterone. (Lectures 1, 2) 1.2 Explanation of why and how modification of the carbon-l7 position of estradiol and progesterone is necessary for their use in hormone replacement therapy and oral contraceptives respectively. (Lecture 11) 1.3 Explanation of why ovulation is inhibited in pregnant women and how this led to the development of the contraceptive pill. (Lecture 12) 1.4 Brief discussion of the major and minor side-effects of the contraceptive pill. (Lecture 12) 1.5 Description of ways of protecting against osteoporosis and the pros and cons of hormone replacement therapy. (Lectures 8, 14) 1.6 Comments on obstacles to overcome in developing a male contraceptive pill. (Lecture 13)
2. To describe the role played by sex hormones in physical development and reproduction in males and females.	2.1 Brief description of the role of testosterone and estradiol in the sexual maturation of males and females respectively. (Lectures 3, 4, 5) 2.2 Explanation of the role of human chorionic gonadotropin in pregnancy testing. (Lecture 7) 2.3 Explanation of how the drug mifepristone prevents the implantation of a fetus. (Lecture 16) 2.4 Examination of how the following hormones: testosterone, estradiol, dopamine, norepinephrine, serotonin, oxytocin, and vasopressin are involved in lust, attraction and bonding in mammals. (Lectures 9, 10)
3. To discuss the causes of male and female infertility and the various ways of treating it.	3.1 Explanation of the origin of estrogen mimickers and their link to sexual abnormalities. (Lecture 20) 3.2 Brief explanation of why the lack of gonadotropic hormone secretion results in infertility. (Lecture 17) 3.3 Discussion on attempts at treating female infertility using hormones or invitro fertilization. (Lecture 18)

4. To discuss the link between sex chromosomes, sex hormones and gender development.	4.1 Description of ways the sex hormones influence behaviours and characteristics using animal and human examples. (Lectures 4, 15, 19) 4.2 Brief explanation of how the lack of 5-alphareductase enzyme causes the all-purpose gonad to malfunction. (Lectures 3, 4) 4.3 Brief examination of the chemical factors that could influence the ratio of boys to girls at birth. (Lecture 21)
5. To discuss insect and human pheromones and their roles in sexual attraction.	5.1 Brief description of pest management strategies using insect sex pheromones and their advantages over the usual chemical insecticides. (Lecture 22) 5.2 Explanation of how pheromones can play a role in orchestrating sex in humans and mammals in general. (Lecture 23)

D. Evaluation Plan

There will be three (3) Unit Tests to be given during the semester, the highest score will count as 30%, the next highest as 20% and the lowest score as 10%. There will be three (3) assignments (worth 4% each). There will be quizzes (worth 8% in total). Students will be required to submit written essay (750 words minimum – worth 20%).

All five (5) Elements of the Compentency will be assessed in each test, the assignments, the quizzes and the essay. The final evaluation for this course is comprised of the Unit Tests (60%) and the Essay (20%).

Unit Tests	60%	Weeks: 6, 10 and 15.
Assignments	12%	Weeks: 3, 6, 9.
Quizzes	8%	Daily.
Essay	20%	Week 13.
Total	100%	

E. Course Content

The course will be divided into three units incorporating the above competencies and performance criteria. They are:

Unit 1: The sex hormones: structure and properties; uncovering the role of sex hormones in human sexuality.

Unit 2: The use of sex hormones and their synthetic analogues in medicine.

Unit 3: The influence of external chemicals: the chemistry of physical attraction; the chemistry of pheromones and effects on reproductive systems.

F. Required Texts

There is no textbook for this course. Students will have access to course material through Léa: The Omnivox Classroom.

G. Course Costs

None.

H. Teaching Methods

The course consists of two 1½ hour lectures per week for a total of 45 contact hours.

I. Departmental Policies

a) **Attendance policy:** (Policy 6) Students are expected to attend all lecture and laboratory sessions. Students are responsible for all assigned work, lecture material and other course related material announced or assigned during class. Attendance for laboratory periods is mandatory. Missing a lab period without a valid reason will result in a grade of zero being assigned to any work assigned during that period.

b) **Policy relating to late submission:** (Policy 7) All assigned work is to be submitted on time. Late submission may be accepted, with or without penalty, at the discretion of individual instructors.

c) **Policy dealing with the use of cell phones, laptops and other technology:** (Policy 13) Use of personal cell phones and/or computers and/or other electronic devices are not permitted in the classroom or laboratory. However, individual Chemistry teachers may have other policies, rules, or regulations and may allow the use of certain electronic devices in the classroom if they are used for pedagogical purposes.

J. College Policies

Policy No. 7- IPESA, Institutional Policy on the Evaluation of Student Achievement

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a) **Changes to Evaluation Plan in Course Outline** (Article 5.3) Changes require documented unanimous consent from regularly attending students and approval by the department and the Program Dean.

b) **Evaluation** (Article 6) Teachers should evaluate and enter grades for a sufficient number of assessments in Gradebook in order that the College may advise DEC students of their progress by mid semester as per the ACADEMIC PROCEDURE: Academic Progress by Mid Semester.

c) **Religious Holidays** (Articles 3.2.13 and 4.1.6) Students who wish to miss classes in order to observe religious holidays must inform their teacher of their intent in writing within the first two weeks of the semester.

d) **Student Rights and Responsibilities:** (Article 3.2.18 and Article 3.3.6) It is the responsibility of students to keep all assessed material returned to them and/or all digital work submitted to the teacher in the event of a grade review. (The deadline for a Grade Review is 4 weeks after the start of the next regular semester.)

Students have the right to receive graded evaluations, for regular day division courses, within two weeks after the due date or exam/test date, except in extenuating circumstances. A maximum of three (3) weeks may apply in certain circumstances (e.g. major essays) if approved by the department and stated on the course outline. For evaluations at the end of the semester/course, the results must be given to the student by the grade submission deadline (see current Academic Calendar). For intensive courses (i.e., intersession, abridged courses) and AEC courses, timely feedback must be adjusted accordingly.

e) **Cheating and Plagiarism** (Article 9)

Cheating and plagiarism are unacceptable at John Abbott College. They represent infractions against academic integrity. Students are expected to conduct themselves accordingly and must be responsible for all of their actions.

College definition of Cheating:

Cheating means any dishonest or deceptive practice relative to examinations, tests, quizzes, lab assignments, research papers or other forms of evaluation tasks. Cheating includes, but is not restricted to, making use of or being in possession of unauthorized material or devices and/or obtaining or providing unauthorized assistance in writing examinations, papers or any other evaluation task and submitting the same work in more than one course without the teacher's permission. It is incumbent upon the department through the teacher to ensure students are forewarned about unauthorized material, devices or practices that are not permitted.

College definition of Plagiarism:

Plagiarism is a form of cheating. It includes copying or paraphrasing (expressing the ideas of someone else in one's own words), of another person's work or the use of another person's work or ideas without acknowledgement of its source. Plagiarism can be from any source including books, magazines, electronic or photographic media or another student's paper or work.

For a PowerPoint presentation on cheating and plagiarism, refer to the JAC Portal: My JAC Communities / Academic Council / Curriculum Validation Committee (CVC) / Course Outlines – Reference Documents / Academic Integrity.

For a link to an interactive tutorial on how to cite sources correctly: http://citeit.ccdmd.qc.ca

K. Proviso

a) Due to the COVID-19 health crisis, attendance policies may need to be adjusted by your teacher. The normal attendance expectations are outlined above and your teacher will inform you of any modifications as needed. Please note that attendance continues to be extremely important for your learning, but your teacher may need to define it in different terms based on the way your course is delivered during the semester.
b) Please note that course outlines may be modified if health authorities change the access allowed on-site.
c) In addition to LEA, Teams and Moodle, additional software may be used for the submission of essays or projects or for testing. Further details will be provided if applicable.
d) Classes on Teams may be recorded by your teacher and subsequently posted on Teams to help for study purposes only. If you do not wish to be part of the recording, please let your teacher know that you wish to not make use of your camera, microphone or chat during recorded segments. Any material produced as part of this course, including, but not limited to, any pre-recorded or live video is protected by copyright, intellectual property rights and image rights, regardless of the medium used. It is strictly forbidden to copy, redistribute, reproduce, republish, store in any way, retransmit or modify this material. Any contravention of these conditions of use may be subject to sanction(s) by John Abbott College.