Syllabus

Medical Cannabis
Pharm 200
Spring 2018
T,R Time: 4:25-5:40
Location: Rowell 103

Directors:
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Course Description
Pharmacology 200, Medical Cannabis will be offered by the Department of Pharmacology in the Spring Semester 2018 as an introductory level Pharmacology course for undergraduate and graduate students. This course will use Cannabis as a springboard to introduce fundamental concepts in Pharmacology (the science of drug actions). The Cannabis plant has an interesting history, and recent policy changes have led to an explosion in Cannabis science. Lectures intersperse historical, political, and social background information with more advanced scientific concepts in pharmacology and medicine.

The course will divided into five areas of content: 1) plant biology, 2) biological effects on humans, 3) Cannabis analytic chemistry, 4) clinical research, and 5) business, law, and policy. We will also discuss current information about the Vermont experience with medical marijuana. This course will provide students with a foundation of up-to-date scientific knowledge in a complex and evolving area of medicine, while introducing key concepts in human physiology and pharmacology.
Course learning goals
This course is intended to be a unique experience for students to develop a broad understanding of *Cannabis* and its medicinal use, with more advanced concepts relevant to pharmacology and medicine in the context of the following specific objectives:

1. Discover the important milestones in the human use of *Cannabis*
2. Gain an understanding of how plants are classified and the implications this has on writing *Cannabis* policies.
3. Explore the chemical compounds found within *Cannabis* and different methods used to extract its specific psychoactive other neural effects
4. Examine the spectrum of medicines and toxins provided by natural products
5. Detail the basic pharmacological properties of cannabinoids including their absorption and metabolism as well as their mechanisms of action
6. Discuss the biology of addiction and compare *Cannabis* with other drugs of abuse
7. Develop knowledge of the physiology and pathology underlying neurological and inflammatory disorders including chronic pain, epilepsy, multiple sclerosis, and migraine
8. Catalog the evidence-based studies that detail the benefits of cannabis in the treatment of several neurological and inflammatory disorders
9. Utilize a balanced academic approach to dispel myths surrounding the benefits and toxicities associated with *Cannabis* use

Readings
Required:
There is no required textbook, but readings will be regularly distributed to students.

Recommended Texts and Readings:


Performance Goals
1. Participation: students will be expected to engage in lectures, readiness quizzes, assignments and exams.
2. Exam format: Exams will consist of a variety of short answer type questions (multiple choice, matching, true/false, short essay). Students taking the course for graduate credit will have additional essay questions on the exams, expanded case study assignments and will be required to write a 10-page paper on a course-related topic approved by the course director.
3. *Written Assignments: All students will be required to submit written assignments that will require outside research and scientific writing. See description below for more details.

Grading
We will use the following tentative grading scheme:

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<td>Exam 1</td>
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<td>Exam 3</td>
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<td>Final Exam</td>
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<td>Assignments</td>
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Academic honesty: You are expected to maintain a high standard of academic honesty. Please read about UVM’s Academic Honesty Policy at [http://www.uvm.edu/policies/student/acadintegrity.pdf](http://www.uvm.edu/policies/student/acadintegrity.pdf)
Be particularly careful to avoid plagiarism when working on written assignments.

Religious holidays: You have the right to practice the religion of your choice. Each semester, you should submit in writing to your instructors by the end of the second full week of classes your documented religious holiday schedule for the semester. Faculty must permit students who miss work for the purpose of religious observances to make up this work.

Illness: For your own health and that of others around you, if you are sick with a fever or other severe illness, please do not attend class. We will arrange for you to make up the material and/or extend deadlines and exams as deemed necessary.
Tentative Course Schedule  *Assignment Due
1/16  Course Introduction & Cannabis history  McHenry

Section 1. Plant Biology
1/18  Plant taxonomy – Hemp or marijuana?  McHenry
1/23  Plant genomics – Developments and innovations  McHenry
1/25*  Plant chemicals – Defense or incentive?  McHenry

Section 2. Cannabis Chemistry
1/30  Chemical phenotypes of cannabinoids  Dostmann
2/1  Introduction to Pharmacology and Pharmacognosy  Dostmann
2/6  Pharmacological actions of cannabinoids  Dostmann
2/8  EXAM 1 (Dostmann proctor)
2/13  Human Cannabinoid Pharmacokinetics  Dostmann
2/15  Analytical chemistry of cannabinoids in plants and humans  Dostmann
2/20  Cannabinoids as drug targets  Dostmann

Section 3. Biological Effects on Humans
2/22  Psychiatric responses to Cannabis  Lounsbury
*2/27  Biological basis of Cannabis addiction  Lounsbury
3/1  Effects of Cannabis on Pain and Nausea pathways  Lounsbury
3/6  BREAK - Town Meeting Day Recess
3/8  EXAM 2 (Dostmann proctor)
3/13  BREAK - Spring Recess
3/15  BREAK - Spring Recess

Section 4. Clinical Research
3/20  Cannabinoids and inflammation pathways  Lounsbury
3/22  Cannabis for seizure disorders  Freeman
*3/27  Cannabis for motor disorders  Lounsbury
3/29  Cannabis for inflammation and pain  Freeman
4/3  Cannabis for cancer and associated symptoms  Lounsbury
4/5  Cannabis and the Endocrine System  Carr
4/10  Cannabis and mental health  Lounsbury
4/12  EXAM 3 (Lounsbury proctor)

Section 5. Business, Law, and Policy
4/17  Public Health and Safety impacts  Freeman
*4/19  Cannabis—Social deviance and early/late adapters  Lounsbury
4/24  Metabolism of Cannabinoids  (Guest) Bress
4/26  Field Testing of Cannabinoids  Dostmann
5/1  Cannabis Business, law & policy  McHenry
5/3  Current & future challenges in Cannabis Science  McHenry

5/10  FINAL EXAM (McHenry proctor)  4:30pm-7:15pm

*Written Assignments: All students will be required to submit 4 written assignments related to the course materials. The assignments will be assigned according to student level as described below.
**Undergraduate**
Students will use the lecture material and at least one outside source to review and discuss course topics. Students will be asked for form evidence-based opinions on topics related to medical uses.

**Advanced Biology Credit**
Students will use the lecture material and outside sources to review a topic and form a thesis for discussion. One of the assignments will include either an outline of a basic research proposal or clinical trial.

**Graduate Student Credit**
Students taking the course for graduate credit will be required to focus on primary literature and to present 4 scientific papers that integrate class area topics into an in-depth literature review. One of the assignments will include a hypothesis-based research plan and one will include basic design of a clinical trial. Students will be able to choose from several area topics presented prior to the due date.

**Rubric:**
1) Papers should be 2 pages in length, double-spaced.
2) Advance Biology and Grad Student papers must have at least 2 references from primary basic science literature. The remaining can be from textbooks, reviews or websites. Other levels should list references used being careful to choose reliable sources.
3) Papers will outline the background of the topic and then use specific examples from the literature that helped to develop the current understanding of the topic.
4) The final 2 Grad student papers will present a research proposal that includes a hypothesis and experimental design for a new study in medical cannabis (one basic research, one clinical trial).

A discussion section will also be used on blackboard for online discussion of recently published research or legislative news. All students will be expected to read the discussion, and graduate students will be expected to comment within the discussion thread.