

# Professional Certificate in Cannabis Plant Biology

Syllabus  
***Cannabis* Plant  
Biology Certificate  
Program Sample**

## Faculty

### Program Director

**Monique A. McHenry, PhD**  
Assistant Professor of Pharmacology

### Content Experts

**Heather Darby, PhD**  
Extension Associate Professor of Plant Soil  
Science

**Scott Lewins, PhD**  
Adjunct Lecturer of Plant Soil Science  
University of Vermont

**John McPartland, DO**  
Family Medicine  
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**Kalev Freeman, MD, PhD**  
Assistant Professor of Surgery and  
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**Wolfgang Dostmann, PhD**  
Professor of Pharmacology

**Willy Cats-Baril, PhD**  
Associate Professor of Business  
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**John MacKay, PhD**  
Senior Director, Strategic Technologies  
Waters Technologies

**Linda Klumpers, PhD**

**Vinnie Zachary**

### **Program Description**

The *Cannabis* plant has an interesting history, and recent policy changes have led to an explosion in *Cannabis* science. Modules intersperse historical, political, and social background information with more advanced scientific concepts in plant biology, agriculture, and pharmacology.

We developed this program to provide students with a foundation of the scientific and technical background to understand how cannabis is grown and made into therapeutic products today. The course will be divided into six areas of content: 1) history, law, policy, and business 2) plant biology, 3) plant chemicals, 4) horticulture, 5) post-harvest processing, and 6) cannabis effect on humans. The 7th week will be a summary of the entire program content with student presentations. The 8<sup>th</sup> week will be a career development module designed to help students leverage their certificate for future career goals. This program will provide students with a foundation of up-to-date knowledge in a complex and evolving area of science, while introducing key concepts in business, plant biology, pest management, and pharmacology.

### **Program learning goals**

This program is intended to be a unique experience for students to develop a broad understanding of *Cannabis*, with more advanced concepts relevant to plant biology, agriculture, and pharmacology in the context of the following specific objectives:

1. Identify the key legal issues around industrial hemp agriculture and *Cannabis* for therapeutic use.
2. Understand *Cannabis* as a diversifying plant, including the taxonomic confusion, human influence, and natural evolution.
3. Utilize a balanced academic approach to dispel myths surrounding the factors that affect *Cannabis* growth and its chemical composition.
4. Discuss the best practices employed in *Cannabis* agriculture.
5. Critically review and assess the current evidence for safety and efficacy of *Cannabis* and cannabis-based products.
6. Describe the pharmacology of *Cannabis* and cannabis-based products.

### **Materials**

Required:

There is no required textbook, but readings will be distributed online to students.

Recommended Texts and Readings:

Hanson, Bryan Abbot. 2005. *Understanding Medicinal Plants: Their chemistry and therapeutic action*. MI: Haworth Herbal Press. Print.

Holland, Julie, Ed. 2010. *The pot book: A complete guide to Cannabis*. ME: Park Street Press.

McPartland, John, R.C. Clarke, and D.P. Watson. 2000. *Hemp Diseases and Pests: Management and Biological Control*. NY: CABI Publishing.

National Academies of Science. 2017. *The Health Effects of Cannabis and Cannabinoids: The Current State of Evidence and Recommendations for Research*. Washington D.C.: National Academies Press.

Pertwee, Roger, Ed. 2014. *Handbook of Cannabis*. Oxford University Press.

### **Online Class Space:**

As part of your enrollment in the Program, we will provide you login information to our online learning management system, Blackboard. Blackboard will house all of the curriculum materials, presentations, readings and resources for the Program. Blackboard will also be used for communication and networking, including the expected comments and responses required as part of assignments. Additionally, as part of your enrollment in the Program, we will provide you login information to our online meeting space, Zoom. We will hold our live seminars at the following room in [Zoom](https://zoom.us/j/265765437) (<https://zoom.us/j/265765437>).

### **Course Work**

We estimate that students will be engaged in around 10 hours a week of course instruction. This will be a combination of readings, viewings, class discussions, live seminars, assignments, and research.

### **Performance Goals:**

This is a noncredit, certificate-based course. At the conclusion students will receive a certificate of completion instead of a letter grade. To receive the certificate, students must earn a 70%, or greater, based on the following criteria:

1. Attendance and Participation
  - Students can miss a week without any penalty but will be required to make up the assignments at a *prior* date.
  - Timely completion and participation in class discussions online.
  - Participation in the live seminars by submitting a question for the speaker prior to the seminar. Students do not have to be actively logged in to participate.
2. Compilation of a nomenclature review
3. Completion of a safety-testing report.
4. Completion of Final Presentation.

All students will be required to submit written assignments that will require outside research. Students will use the program material and at least one outside source to review and to form evidence-based projects.

We will use the following tentative evaluation scheme:

Successful completion of module quizzes	5%
Participation in Discussions and Seminars	35%
Nomenclature Review	15%
Safety-Testing Report	15%
Final Presentation	30%

### **Discussion Boards and Peer Review:**

Our class discussion forum is an important part of our learning experience. We will utilize peer review as a way to share your current expertise and apply our learning objectives. By participating in discussions, you will broaden your understanding of the course content and enhance your ability to think critically. Topics for class discussion and corresponding questions will be suggested for class discussion during weeks 1, 3, 5 and 8.

Here is how it will work. You need to earn a total of 210 points for discussion for the course. We have 7 required postings on YellowDig:

1. Introduction (Week 1)
2. Class Discussion (Week 1)
3. Class Discussion (Week 3)
4. Final Presentation Selection (Week 4)
5. Class Discussion (Week 5)
6. Final Presentation Submission (Week 7)
7. Career Exploration (Week 8)

The collection of points begins Monday at 12:01am and runs until the following Sunday by midnight. You need to earn 30 points by posting, commenting, and interacting with your classmates for each assignment in Yellowdig. You can *only* earn a maximum of 30 points for each assignment in YellowDig. It is up to you to earn your points for each assignment by replying to the prompts provide in the modules. You can mix and match posts and replies to receive your max of 30 points/assignment. Your earned assignment points in Yellowdig will automatically be transferred into Blackboard. Each action is worth certain points as follows:

- A new post of at least 50 words earns 15 points
- A comment of at least 20 words on an existing post earns 10 points
- If your post generates comments, you receive 2 points for each of them
- Receiving a reaction from another user earns 1 point

These ONLINE interactions help foster discussions, as well as allow us to get to know one another in a course where we have no in-person interactions. We expect your posts to be professional and courteous. Please keep the following in mind as you post in terms of the quality expected for posts:

- You respond to the assignment in depth, with concise posts (of 250 words or less) and responses (of 50 words or less) while making connections between evidence-based data and insights using multiple examples.

- You own and facilitate the conversation following your original post.

When you post to the discussion board, please keep the following in mind:

- Please review the document and references on Netiquette before submitting your first post.
- Keep your post focused on the topic, relate class materials from the current module in your post.
- Proofread and review before you submit your thoughtful and evidence-based response.
- Participate regularly. Improve your learning by being an active and engaged student. Successful students post early in the week, and then follow and participate in the assigned discussion throughout the module. You will be expected to log on at least three times a week while reading and participating in discussion.

**Quizzes:**

In Modules 1-6 there will be a five-question quiz to test your learning of the key concepts presented in each module. The quiz questions will be objective (true/false, multiple choice) and you will have three opportunities to take each quiz. The quizzes are accessible via the assignments page.

**Live Seminars:**

There will be three live seminars; these seminars will be used to present material, discuss key concepts related to the modules, to ask questions of faculty, and to share peer-to-peer knowledge on the topic. **Live seminars will meet in Zoom at the time assigned in the module (please note all times are EST).** Please plan to try using Zoom before the start time. Live participation in the seminar is not required, but encouraged; however, it is required that each student submits one question for the speaker to get participation credit prior to the seminar, **by the assigned deadline found in the Module.** Additionally, if you cannot participate in the live seminar, you will be expected to watch the recorded session at a different time.

Grading of the live seminar will be based on the following rubric.

	<b>Mastery (3)</b>	<b>Adept (2)</b>	<b>Proficient (1)</b>	<b>Needs Improvement</b>
<b>Participation in live seminar</b>  * please note live participation is not mandatory, please contact	posts question involving several aspects of the material and makes connections between evidence-based data with insights about the topics using	posts question that demonstrates adequate development citing specific examples for each question <b>prior</b> to the live session	posts question that demonstrates adequate development <b>prior</b> to the live session	No post prior to the live session

if you cannot attend	multiple examples <b>prior</b> to the live session			
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**Citations:**

We require students to use MLA format to list your citations. What does this mean? MLA stands for Modern Language Association. Perdue's library gives a great explanation. "MLA format follows the author-page method of in-text citation. This means that the author's last name and the page number(s) from which the quotation or paraphrase is taken must appear in the text, and a complete reference should appear on your Works Cited page."

The University of Maryland has a great online guide on how to use MLA citations.

One example of citing an in print academic journal as shown in the University of Maryland online guide:

Jordan, Stephanie. "Mark Morris Marks Purcell: 'Dido and Aeneas' as Danced Opera." Dance Research, vol. 29, no. 2, 2011, pp. 167-213.

**Course Schedule:** Please note each module students must pass the post-assessment quiz

Online Session	DATE	Materials and <b>Assignments</b>	Subject Matter Experts
<b>Program introduction; Cannabis History, Law &amp; Policy, Business, and Knowledge Gaps</b>	M1:	<ol style="list-style-type: none"> <li>1. Review the materials in the Getting Started section in Blackboard</li> <li>2. Presentations (4): History; Law &amp; Policy; Business; Knowledge Gaps</li> <li><b>3. Introduce yourself in YellowDig</b></li> <li><b>4. Class Discussion in YellowDig</b></li> <li><b>5. Quiz #1</b></li> </ol>	Monique McHenry, Willy Cats-Baril
<b>Cannabis Plant Biology</b>	M2:	<ol style="list-style-type: none"> <li>1. Presentations (3): Taxonomy; Omics; Ecology and Evolution</li> <li><b>2. Live Seminar</b></li> <li><b>3. Submit Nomenclature Review</b></li> <li><b>4. Quiz #2</b></li> </ol>	Monique McHenry, John McPartland
<b>Cannabis Chemicals</b>	M3:	<ol style="list-style-type: none"> <li>1. Presentations (3): Plant Chemicals I: Terpenes; Plant Chemicals II: Cannabinoids; Plant Chemical Production</li> <li><b>2. Review Final Presentation guidelines</b></li> <li><b>3. Class Discussion in YellowDig</b></li> <li><b>4. Quiz #3</b></li> </ol>	Wolfgang Dostmann, Monique McHenry
<b>Cannabis Agriculture</b>	M4:	<ol style="list-style-type: none"> <li>1. Presentations (4): Pests and Diseases; CEA; Outdoor Hemp Agriculture; IPM</li> <li><b>2. Final Presentation selection: post to YellowDig</b></li> <li><b>3. Live Seminar</b></li> <li><b>4. Quiz #4</b></li> </ol>	John McPartland, Taylor Readyhough, Heather Darby, Scott Lewins
<b>Cannabis Post-Harvest Processing</b>	M5:	<ol style="list-style-type: none"> <li>1. Presentations (3): Post-Production; Extraction and Analytical Testing; Extraction and Manufacturing</li> <li><b>2. Create Safety Testing Report</b></li> <li><b>3. Quiz #5</b></li> </ol>	Monique McHenry, Vinnie Zachary, John MacKay
<b>Cannabis &amp; Humans</b>	M6:	<ol style="list-style-type: none"> <li>1. Presentations (3): Endocannabinoid System; Modes of Administration; Basic Pharmacology</li> <li><b>2. Live Seminar i</b></li> <li><b>3. Quiz #6</b></li> </ol>	John McPartland, Kaley Freeman, Linda Klumpers

<b>Program Summary</b>	M7:	<b>Final Presentation!</b>	You
<b>Career Development</b>	M8:	<ol style="list-style-type: none"> <li>1. Presentations covering job search, resume targets and interview strategies</li> <li>2. <b>Live Seminar</b></li> </ol>	Industry professionals

**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>

Be particularly careful to avoid plagiarism when working on written assignments.

**Religious holidays:** You have the right to practice the religion of your choice. Please submit in writing to your instructors by the beginning of the first week of the program 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.

#### **Disclaimer and Disclosure**

- We will discuss investigational drugs not approved for use in the United States during this program.
- Materials presented here represent faculty's own findings, views and opinions and should not be taken as a statement, position, opinion, or endorsement by the University of Vermont.
- Potential conflicts of interest exist between course faculty and multiple industry partners.
- All potential conflicts of interest have been resolved prior to the start of this program.