The Master of Science (MS) in Medical Cannabis Science and Therapeutics program provides students with the knowledge they need to support patients and the medical cannabis industry, add to existing research, and develop well-informed medical cannabis policy.

The two-year program based at the Universities at Shady Grove in Rockville, Md., blends online instruction with face-to-face experiences to prepare graduates to respond to the increasing demand for medical cannabis with an understanding of the basic science and clinical uses of the cannabis plant.

The MS in Medical Cannabis Science and Therapeutics is the first graduate program in the United States that is dedicated to the study of medical cannabis. Students will have the opportunity to meet and interact with experts in the science, therapeutics, and policy of medical cannabis at live symposia, while online coursework will allow them flexibility when completing assignments.

About the MS in Medical Cannabis Science and Therapeutics

This two-minute video provides a brief overview of the MS in Medical Cannabis Science and Therapeutics at the School of Pharmacy, including details about who the program is designed for, the admissions process, and what students can expect to learn.

The MS in Medical Cannabis Science and Therapeutics is designed for students who are interested in a career in the medical cannabis industry, whether in a clinical, scientific, or policy role.

The program provides education in following areas:

- Basic science (pharmacology, chemistry, and medical cannabis delivery systems)
- Clinical uses (pathophysiology, assessment, and management of conditions that may be treated by medical cannabis)
- Adverse effects and public health considerations
- Federal and state laws and policies

Students will take four required foundational courses in medical cannabis science, therapeutics, and policy. Students will also be able to choose four elective courses based on their interests. After completing elective courses, all students will take a course in research methods as well as a capstone course comprised of expert seminars, case studies, and discussions.

Coursework is designed to accommodate students with and without a background in science or medicine, and faculty are dedicated to making courses interesting and accessible to all students, regardless of academic background.

Upon completion of the program, graduates will be able to:

- Apply knowledge of basic and clinical sciences to identify appropriate candidates for medical cannabis therapy and determine appropriate dosing and administration.
- Apply knowledge of basic science and drug development to assure safe and effective design, development, and manufacture of medical cannabis products.
- Identify areas for future research related to science, health effects, and policy of medical cannabis, and describe the challenges associated with such research.
- Identify, analyze, and advocate for emerging issues related to medical cannabis and health.
- Participate in health-policy decision making processes related to medical cannabis

Are you a prospective student who is interested in learning more about the MS in Medical Cannabis Science and Therapeutics?

Prospective students who have questions about the MS in Medical Cannabis Science and Therapeutics at the School of Pharmacy should contact **msmedicalcannabis@rx.umaryland.edu** for more information.

CURRICULAR REQUIREMENTS

All semesters are eight weeks long: two eight-week semesters in the "Fall Semester," two eight-week semesters in the "Spring Semester," and one eight-week semester in the "Summer Semester."

The MS in Medical Cannabis Science and Therapeutics program blends online instruction with face-to-face experiences at the Universities at Shady Grove, located in Rockville, Md. The program is designed to be completed in **two years**.

Students will take four required foundational courses in medical cannabis science, therapeutics, and policy. Students will also be able to choose four elective courses based on their interests. After completing elective courses, all students will take a course in research methods as well as a capstone course comprised of expert seminars, case studies, and discussions.

Suggested Plan of Study:

Year	Semester	Credits	Course
1	**Fall A**	3	MCST 601: Introduction to Medical Cannabis History, Culture, and Policy
1	**Fall B**	3	MCST 602: Principles of Drug Action and Cannabinoid Pharmacology
1	**Spring A**	3	MCST 603: Basic Cannabinoid Chemistry and Drug Delivery
1	**Spring B**	3	MCST 604: The Clinical Effects of Medical Cannabis
1	**Summer**	3	MCST 607: Negative Physical, Psychiatric, and Social Effects of Cannabis
2	**Fall A**	3	**Choose One:** MCST 605: Advanced Cannabis Therapeutics I MCST 609: Cannabis Genomics and Pharmacognosy
2	**Fall B**	3	**Choose One:** MCST 606: Advanced Cannabis Therapeutics II MCST 608: Advanced Cannabinoid Chemistry and Analytic Testing Methodology

2	**Spring A**	3	[MCST 610: State and Federal Cannabis Laws and Policies](#)
2	**Spring B**	3	[MCST 611: Research Design and Medical Cannabis](#)
2	**Longitudinal**	3	[MCST 612: Expert Seminars and Case Studies](#)

COURSE DESCRIPTIONS

Courses in the MS in Medical Cannabis Science and Therapeutics program are designed to accommodate students with and without a background in science or medicine. Faculty are dedicated to making courses interesting and accessible to all students regardless of academic background.

MCST 601: Introduction to Medical Cannabis History, Culture, and Policy

In this introductory course, participants will learn about the cultural history of medical cannabis use, explore how federal law and policy relating to medical and non-medical use of cannabis has evolved in the United States, and discuss ethical issues related to medical cannabis. Additionally, students will learn how to identify credible sources of information related to medical cannabis, and educate patients and other professionals.

MCST 602: Principles of Drug Action and Cannabinoid Pharmacology

This course introduces students to the factors influencing drug action in the body. Students will learn about receptor theory, pharmacokinetics, pharmacodynamics, dose-response relationships, and drug tolerance and dependence. This course will develop participants' skills to evaluate cannabis (and its components) from a mechanistic and pharmacologic perspective with the ultimate goal of providing the most appropriate cannabis regimen for individual patients.

MCST 603: Basic Cannabinoid Chemistry and Drug Delivery

This course introduces students to the chemical characteristics of cannabis components. The course will describe the classification system for cannabinoids, cannabinoid compound ratios in plant materials, cannabis-derived products and their constituents, oils, terpenoids, flavenoids, hydrocarbons and nitrogen containing compounds. This course also introduces students to the science of designing dosage forms. Topics include the formulation, development, evaluation, selection and administration of safe, effective, reliable, drug delivery systems, with a focus on development of medical cannabis products. The wide variety of cannabis delivery systems and routes of delivery and the impact of those delivery systems have on the bioavailability of cannabis will be evaluated in this course.

MCST 604: The Clinical Effects of Medical Cannabis

This introductory course provides an overview of the most common uses of medical cannabis, including pain, anorexia/cachexia, and nausea/vomiting. Students will learn how to assess these conditions and determine when medical cannabis could be a therapeutic option. Side effects, drug interactions, and precautions are also discussed.

MCST 605: Advanced Cannabis Therapeutics I

In this advanced level course, students will learn in-depth about the physiology, pathophysiology, and treatment strategies of selected conditions, including pain, muscle spasm, nausea/vomiting, and anorexia/cachexia. Students will evaluate available evidence, complete case studies, and explore dosing strategies and formulations. Side effects, drug interactions, and precautions are also discussed. (**Pre-requisite:** MCST 604 – Clinical Effects of Cannabis).

MCST 606: Advanced Cannabis Therapeutics II

In this course, students will learn about the physiology, pathophysiology, and treatment strategies of selected conditions, including epilepsy, sleep disorders, anxiety, and post-traumatic stress disorder, among others. Students will evaluate available evidence, complete case studies, and explore dosing strategies and formulations. Side effects, drug interactions, and precautions are also discussed. (**Pre-requisite:** MCST 604 – Clinical Effects of Cannabis).

MCST 607: Negative Physical, Psychiatric, and Social Effects of Cannabis

In this course, students will explore the consequences of cannabis use, including adverse effects and misuse or addiction. Students will evaluate available evidence, analyze case studies, and participate in group discussions. This course explores the effects of cannabis on populations, including effects on the workplace, public spaces, impaired driving, adolescent use, and unintentional poisoning, among others. (**Pre-requisite:** MCST 604 – Clinical Effects of Cannabis).

MCST 608: Advanced Cannabinoid Chemistry and Analytic Testing Methodology

This course relates chemical characteristics of cannabis components to their pharmacological activity. The course covers a variety of cannabis targets, methods for improving drug activity, and the principles of rational drug design and characteristics such as solubility, stability and metabolism. Additionally, this course will explore methodologies for concentration, extraction, and purification of plant constituents, along with scope and limitations of analytical techniques for the identification and quantification of plant and synthetic cannabinoids, contaminants, and adulterants in cannabis products. (**Pre-requisite:** MCST 603 - Basic Cannabinoid Chemistry and Delivery).

MCST 609: Cannabis Genomics and Pharmacognosy

This course introduces students to the components of the cannabis plant and the resultant biosynthetic pathways that form active and inactive agents. Students will learn the genetic basis for the differences in components between different strains and the subsequent impact on medicinal efficacy, as well as the role that plant components have on the entourage effect. (**Pre-requisite:** MCST 602 - Principles of Drug Action and Cannabinoid Pharmacology).

MCST 610: State and Federal Cannabis Laws and Policies

In this course, students will be exposed to the federal controlled substances act and state counterparts. This will include a review of schedules I through V and the rules for prescribing and dispensing C-II though C-V. DEA and state inspections, Prescription Drug Monitoring Programs, and registration with state authorities will also be addressed. The course will then move into treatment of Schedule I substances and the differences between marijuana and other controlled substances. Physician recommendations, as opposed to prescriptions, will be addressed in light of the First Amendment. Medical Board actions against physicians will also be included. Since the Controlled Substances Act prohibits the prescribing and dispensing of Schedule I substances, the course will explore, compare, and contrast state laws and regulations regarding medical cannabis and focus on how marijuana was singled out for exemptions at the state level and why the federal government has refrained from prosecutions in the states that have decriminalized it for medical use. The course will also focus on those states that have decriminalized marijuana for recreational use and the likely consequences, if any, in those states. Other topics include but are not limited to authorized caregivers, licensed dispensaries, involvement of pharmacists and other licensed health care professionals in dispensaries, public testing facilities, regulations, state administration, authorized conditions, patients' requirements and restrictions, advertising, location of dispensaries, caregiver requirements, quantity limits, and other regulations. (**Pre-requisite:** MSPC 601 - Introduction to Medical Cannabis History, Culture, and Policy)

MCST 611: Research Design and Medical Cannabis

Participants in this course envision and plan a pilot project designed to assess clinical, scientific, economic, or public health outcomes related to medical cannabis. Students will learn how to establish a research question, establishing appropriate methods, and select outcomes to assess. Deliverable will be a proposal that is suitable for submission to an institutional review board. Students will also learn how to critically evaluate medical and scientific evidence.

MCST 612: Expert Seminars and Case Studies

In this course, students will attend expert seminars and webinars discussing current scientific, clinical, and legal issues related to medical cannabis. Additionally, students will work with peers and an industry client to identify a practice improvement project, to be completed longitudinally over the course of the master's program.

TUITION AND FEES

Tuition costs associated with the MS in Medical Cannabis Science and Therapeutics are provided below for the convenience of prospective students

Tuition costs for the 2019-2020 academic year are as follows:

In-State Tuition (Per Credit Hour)	$631.70
Out-of-State Tuition (Per Credit Hour)	$792.90
Technology Fee (Per Credit Hour)	$10.00
Auxiliary Fee (Per Credit Hour)	$21.84
Facilities Fee (Per Semester)	$10.50
Student Government Fee (Per Semester)	$11.00
UMB Off-Campus Fee (Per Credit Hour)	$25.00

Total tuition and fees for the entire program are expected to be $20,785.20 for in-state students, and $25,621.20 for out-of-state students.

Financial Aid:

The MS in Medical Cannabis Science and Therapeutics program does not offer scholarships, assistantships, or grants to incoming students.

Students who are U.S. citizens or permanent residents and are interested in receiving federal or state aid must complete the **Free Application for Federal Student Aid (FAFSA)**. This form can be completed as early as October 1. Applicants are encouraged to complete the form before March 1. Graduate students enrolled as degree seeking with at least six (6) credit hours can be considered for the federal direct unsubsidized Stafford loan and the graduate PLUS loan.

When completing Section H in the FAFSA, indicate school code 002104-00 (University of Maryland, Baltimore) and select the housing code of 3 (off campus) or 1 (with parents).

Applicants who have completed the residency application and are deemed Maryland residents should also contact **Maryland Higher Education Commission, Office of Student Financial Assistance** for information on legislative scholarships.

Prospective students who have questions about financing their education should contact **University Student Financial Assistance**.

The deadline for the receipt of applications and required supplemental materials as outlined below is August 15, 2019, for classes beginning on August 26, 2019.

Applicant Qualifications:

Prospective students interested in applying to the MS in Medical Cannabis Science and Therapeutics program should possess the following:

- Interest in a career in the medical cannabis industry.
- Bachelor's degree from an accredited college or university.
- Ability to travel to the Universities at Shady Grove in Rockville, Md., once per semester (Fall and Spring) for required symposia. *The Fall Symposium will be held on September 5, 2019.
- Preferred minimum 3.0 Grade Point Average (GPA) and overall quality of academic transcripts.

Admissions Process:
Applications for admission to the MS in Medical Cannabis Science and Therapeutics program are evaluated on the basis of the following:

Online Application

- Completion of the **online application**. Please follow the instructions for completing the application and providing supplemental items **here**.

Supporting Materials

Supporting materials are required as part of your application review. *Please **submit the online application**before sending your supporting materials or supplemental items.*

- **Transcripts** – An official transcript from each college or university that you are currently attending or you previously attended must be provided in a sealed envelope by the sending institution. Electronic transcripts from University System of Maryland institutions are accepted in lieu of sealed, paper transcripts. You may include an unofficial, scanned copy of your college transcripts with your online application for early review purposes if you'd like, but official versions are still required for the review process.

  Transcripts (U.S. only) may also be provided through one of the following transcrip clearinghouse services:

Please have your transcripts sent to:

ATTN: Admissions
University of Maryland, Baltimore
The Graduate School
620 W. Lexington St., Suite 5110
Baltimore, MD 21201

Official electronic transcripts may be sent directly from your degree-granting institution to **gradapply@umaryland.edu**.

- **Recommendations** – Please provide three (3) recommendations from professors or others who can attest to the quality of your academic performance, scholastic potential and other non-cognitive factors. Your recommendations are managed by the online application; you will need the email addresses of your recommenders for this process.

- **Resume or Curriculum Vitae (CV)** – Your resume or CV may be uploaded as part of your online application (please make sure you 'submit' the online application form first).

- **Essay** – Your essay may scanned and uploaded as a supplemental item to the online application (please make sure you 'submit' the online application form first). The statement should be between 300 to 500 words and should indicate why you intend to enroll in this program and what you expect to get out of this program. Please indicate in your Statement that you are applying for the Master of Science (MS) in Medical Cannabis Science and Therapeutics.

- **English Language Proficiency** – International applicants must take the TOEFL or IELTS and achieve a minimum, total score of 100 on the internet-based test (or 600, pbt) on the TOEFL; or, a minimum, total score of 8 on the IELTS. ****PLEASE BE ADVISED that all students are required to travel to the Universities at Shady Grove in Rockville, Md., once per semester (Fall and Spring)****

- The Graduate Record Examination (GRE) general test is not required.

To apply for the MS in Medical Cannabis Science and Therapeutics program, students must submit a **completed application form**, official test scores (not copies), official transcripts, and other supporting documentation, as outlined below:

- Official transcripts

- Resume or CV
- TOEFL or IELTS scores for international applicants
- Three Recommendations
- Essay/Statement of Interests and Goals in Medical Cannabis Science and Therapeutics

Questions or More Information:

For more information regarding the online application process and submission of your supplemental materials, please contact the University of Maryland Graduate School Admissions Office at **gradapply@umaryland.edu** or (410) 706-7131.