MASTER OF SCIENCE IN NATURAL PRODUCTS SCIENCE

The MS in Natural Products Sciences (MS-NPS) program provides students with the scientific fundamentals of natural medicines, how they are discovered, and how they work. Students may focus their studies in two concentrations: nutraceuticals or cannabis. In the Nutraceuticals Concentration, students learn about the discovery and development of natural products that are used as a part of complementary and integrative health and medicine. Topics include classification and regulation of nutraceuticals and herbal supplements, nutrition, drug and herb safety, formulation and herbal drug delivery, product processing and good laboratory practices, and marketing and business aspects of the nutraceutical industry. In the Cannabis Concentration, students focus on the science behind the global cannabis industry. Topics include the history of cannabis cultivation and use across cultures; the chemistry and biology of the cannabis plant and its constituents; the endocannabinoid system and influence of herb formulation on patient experience; the clinical safety, efficacy, and toxicity of cannabis products in healthcare contexts; cannabis products in an interprofessional context.

Program Learning Outcomes:

Pharmacologic action and effect (**PAE**): Students will have a foundational understanding of the chemical nature of natural materials

- **PAE 1** Students will explain the history of natural products, including how they are used by various peoples throughout the world.
- **PAE 2** Students will evaluate the biologic origin of natural compounds: the mechanisms by which natural products are produced and the underlying hypotheses surrounding their generation.
- **PAE 3** Students will apply discovery and isolation methods that are used to develop new treatments.

Treatment Efficacy (**TE**): Students will apply the available literature to the ethical use of natural products.

- **TE 1** Students will apply evidence-based knowledge toward the ethical use of natural products.
- **TE 2** Students will summarize drug interactions, side effects, and contraindications for natural agents in current medicinal use.
- **TE 3** The student will recognize the interconnectedness of a divinely created natural world, in which God has provided products to improve human existence

Product Development (**PD**): Students will understand how new drugs and formulations of natural products are created.

- **PD 2** Students will recognize the major research protocols and how they have been used to advance natural products science.
- **PD 3** Students will recognize the common compounding techniques and delivery methods for natural products.
- **PD 4** Students will describe the process by which natural products are formulated into commercial products.

Communication (**COM**): Students will communicate effectively with individuals from across broad disciplines.

- **COM 1** Students will interpret the relevant literature and build interprofessional competencies involving natural products
- **COM 2** Students will demonstrate effective speaking and writing skills in conveying information in the topic area.

Curriculum

Code	Title	Hours
MS-NPS Core Courses (9 credits)		*9*
NPS 500	Pharmacognosy	3
NPS 501	Plant Biochemistry	3
NPS 597	Natural Products Seminar I	1
NPS 598	Natural Products Seminar II	1
NPS 599	Natural Products Seminar III	1
Medical Cannabis Concentration (choose this OR Nutraceuticals Concentration)		*12*
NPS 600	Medical Cannabis I - History of Medical Cannabis in the World	3
NPS 602	Medical Cannabis II - Cannabis Science	3
NPS 604	Medical Cannabis III - Clinical Efficacy of Cannabis	3
NPS 606	Medical Cannabis IV - Cannabis in the Interprofessional Setting	3
Nutraceuticals Concentration (choose this OR Medical Cannabis Concentration)		*12*
NPS 620	Nutraceuticals I	3
NPS 622	Nutraceuticals II	3
NPS 624	Nutraceuticals III	3
NPS 626	Nutraceuticals IV	3
Electives (minimum 9 credits from these or other approved CUW courses)		*9*
NPS 700	Toxic Natural Products	3
NPS 702	A Historical Perspective on Natural Products in the Marketplace	3
NPS 704	Natural Products from Microorganisms: Bacteria, Fungi, Algae	3
NPS 706	Research Design, Methods, and Ethics	3
Total		*30*

Program Admission

Applicants should follow the standard graduate admissions process.