

MASTER OF SCIENCE IN PRODUCT DEVELOPMENT

Our MPD program provides real-world skills in multiple concentration areas: pharmaceutical, chemical, and food and beverage. The **Pharmaceutical** and **Chemical** concentration classes are centered on pharmacology, formulations and process development. The **Food and Beverage** concentration dives into the business of food and beverage development, from the development process in the marketplace, to package design, to marketing and management. In all concentrations, you may have the opportunity to partner with industry leaders on product development projects and to utilize state-of-the-art labs that are cGMP, Cleanroom 100, ISO 5, and USP 797 compliant.

Of course, a program like this would not be complete if we didn't teach you the entrepreneurial skills you will need to start your own company or innovate within a company. You will learn to build critical-thinking and teamwork skills through case-based teaching and labs, blending technical skills with business, legal, regulatory, and compliance knowledge. You will learn how to use analytics and demand projections to make management decisions, while using concepts—like Lean Six Sigma and sensitivity analysis—to solve operations and process-optimization challenges. And finally, you will learn about the Triple Bottom Line throughout the course of this program: people, profit, and planet, with a focus not only on sustainability, but on how to boost it.

You will learn a lot in this program—from conceptualization and design to development and marketing. Professionally, you will be prepared to fill an unmet need in the industry. That is, after all, what launching a new product is all about. Students typically take 24 credits per year for a total of 48-50 credits to graduate. This is a rigorous program where students also write, present and defend a Product Development Project based on research performed over the two year period. This research project is co-mentored by one CUW faculty member and an industry mentor who is actively involved in chemical, pharmaceutical or food and beverage product development. Projects can also be based on work that is relevant to where students are currently working, if they are currently employed in the industry. *Note: most classes are taught in mornings or evenings, to accommodate working students, many of whom have jobs or internships in regional pharmaceutical and chemical companies. The program is typically two years but timeline is flexible to accommodate working students.*

Program Learning Outcomes

Chemical and Pharmaceutical Concentrations

- The student will possess, articulate, and demonstrate knowledge and skills in the area of *chemistry and related sciences*, as it relates to pharmaceutical or chemical product development.
- The student will possess, articulate, and demonstrate knowledge and skills in the areas of *intellectual property*, as it relates to pharmaceutical and chemical product development.
- The student will possess, articulate, and demonstrate knowledge and skills in the areas of *business strategy*, as it relates to pharmaceutical or chemical product development.
- The student will possess and demonstrate skills in the use of equipment needed to manufacture and/or characterize pharmaceutical and/or chemical products, and will demonstrate ability to troubleshoot problems in a lab setting.
- The student will possess, articulate, and demonstrate knowledge and skills in “sustainability” – defined as maximizing positive social

impact and economic profit, while minimizing negative environmental impact, in pharmaceutical or chemical product development.

- The student will possess, articulate, and demonstrate knowledge and skills in the area of regulatory and quality control constraints on pharmaceutical or chemical product development.

Food and Beverage Concentration

- The student will possess, articulate, and demonstrate knowledge and skills in the area of *food and beverage safety and basic science*, as it relates to food and beverage product development.
- The student will possess, articulate, and demonstrate knowledge and skills in the areas of *intellectual property*, as it relates to food and beverage product development.
- The student will possess, articulate, and demonstrate knowledge and skills in the areas of *business strategy*, as it relates to food and beverage product development.
- The student will possess and demonstrate skills in the use of equipment needed to manufacture and/or characterize food and beverage products, and will demonstrate ability to troubleshoot problems in a lab setting.
- The student will possess, articulate, and demonstrate knowledge and skills in “sustainability” – defined as maximizing positive social impact and economic profit, while minimizing negative environmental impact, in food and beverage product development.
- The student will possess, articulate, and demonstrate knowledge and skills in the area of regulatory and quality control constraints on food and beverage product development.

Curriculum- Pharmaceutical Concentration

Code	Title	Hours
Core courses		25
STEM courses		16
Concentration courses		9
Total Hours		50

Code	Title	Hours
Core Courses		
MBA 569	Management Science and Analytics	3
MBA 686	Sustainability and Social Entrepreneurship	3
MBA 687	Intellectual Property and Regulatory Issues	3
MBA 688	New Venture Formation and Business Development	3
MIB 530	Global Production Systems	3
MPD 543	Industry Leader Seminar Series (Course must be completed four times for a total of 4 credits)	4
MPD 597	Product Development Project (Course must be completed 3 times for a total of 6 credits)	6
STEM Courses		
MPD 534	Principles of Drug Design and Development	3
MPD 595	Pharmaceutical Manufacturing and Process Chemistry	3
MPD 596	Advanced Pharmaceutical and Process Chemistry	3
MPD 598	Introduction to cGMP and Methods of Quality Control in Manufacturing	3
CHEM 555	Instrumental Analysis	4

Concentration Courses

PHAR 330	Pharmacology and Medicinal Chemistry I	3
MPD 524	Applied Pharmacokinetics/Therapeutic Drug Monitoring	3
MPD 599	Formulation & Delivery Forms	3

Curriculum- Chemical Concentration

Code	Title	Hours
Core courses		25
STEM courses		16
Concentration courses		7
Total Hours		48

Code	Title	Hours
Core Courses		
MBA 569	Management Science and Analytics	3
MBA 686	Sustainability and Social Entrepreneurship	3
MBA 687	Intellectual Property and Regulatory Issues	3
MBA 688	New Venture Formation and Business Development	3
MIB 530	Global Production Systems	3
MPD 543	Industry Leader Seminar Series (Course must be completed four times for a total of 4 credits)	4
MPD 597	Product Development Project (Course must be completed 3 times for a total of 6 credits)	6

STEM Courses

MPD 534	Principles of Drug Design and Development	3
MPD 595	Pharmaceutical Manufacturing and Process Chemistry	3
MPD 596	Advanced Pharmaceutical and Process Chemistry	3
MPD 598	Introduction to cGMP and Methods of Quality Control in Manufacturing	3
CHEM 555	Instrumental Analysis	4

Concentration Courses

CHEM 535	Advanced Organic Chemistry	4
MPD 593	Analytical Characterization of Drugs and Other Chemicals	3

Curriculum- Food and Beverage Concentration

Code	Title	Hours
Core courses		25
Concentration courses		18
Electives		5
Total Hours		48

Code	Title	Hours
Core Courses		
MBA 569	Management Science and Analytics	3
MBA 686	Sustainability and Social Entrepreneurship	3
MBA 687	Intellectual Property and Regulatory Issues	3
MBA 688	New Venture Formation and Business Development	3
MIB 530	Global Production Systems	3
MPD 543	Industry Leader Seminar Series (Course must be completed four times for a total of 4 credits)	4

MPD 597	Product Development Project (Course must be completed 3 times for a total of 6 credits)	6
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Concentration Courses

MPD 510	Food and Beverage Product Development and Launch I	3
MPD 515	Food and Beverage Product Development and Launch II	3
MBA 550	Strategic Marketing	3
MPD 516	Strategic Package Design	3
MPD 517	Sales and Category Management	3
MPD 518	Consumer Insights	3

Electives		5
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Admission Requirements

Applicants for the **Pharmaceutical or Chemical** track should have a Bachelor of Science degree in chemistry, biochemistry, pharmacology, or biology (other baccalaureate degrees might be accepted, as long as the student has successfully completed two semesters of organic chemistry, one semester of analytical chemistry (or equivalent experience), and one semester of instrumental analysis) with a minimum undergraduate GPA of 3.0 out of 4.0 for full acceptance. Additional program information for the **Pharmaceutical** and **Chemical** concentrations can be found at: <https://www.cuw.edu/academics/programs/product-development-chemical-masters/index.html> (<https://www.cuw.edu/academics/programs/product-development-chemical-masters/>) and <https://www.cuw.edu/academics/schools/pharmacy/prospective-students/admissions/mpd.html>.

Applicants for the **Food and Beverage** concentration should have a Bachelor's degree in any area of science or business with a minimum undergraduate GPA of 3.0 out of 4.0 for full acceptance. Additional program information for the **Food and Beverage** concentration can be found at: <https://www.cuw.edu/academics/programs/product-development-business-masters/index.html> (<https://www.cuw.edu/academics/programs/product-development-business-masters/>).