

## Core courses of the PhD in the Pharmaceutical Sciences Program (PhD)

### Pharmaceutics and Drug Delivery Track

The Pharmaceutics and Drug Delivery track focuses on the design, development and optimization of dosage forms for small and large molecule drugs. Process development of Quality by Design (QbD) manufacturing procedures, combined with advanced Process Analytical Technologies (PAT) has become highly relevant to the pharmaceutical industry. Research will be carried out in materials sciences, nanotechnology, crystallization, and drug formulation. It also involves the application of physical and analytical chemistry, and engineering towards development of novel drug delivery systems. This track is directed towards students that are interested in modern manufacturing methods of active pharmaceutical ingredients and novel formulation approaches to final drug products.

#### First year

First Semester		Second Semester	
<i>Course</i>	<i>Credits</i>	<i>Course</i>	<i>Credits</i>
Basic Principles of Pharmaceutical Sciences I	3	Business, Quality, and Project Management	3
Applied Biostatistics	3	Advanced Instrumental Analysis	3
Principles of Drug Discovery and Drug Development	3	Seminar II	1
Seminar I	1	Ethics in Research	2
Lab Rotation	1	Research	3
Total	11	Total	12

#### Second year

First Semester		Second Semester	
<i>Course</i>	<i>Credits</i>	<i>Course</i>	<i>Credits</i>
Advanced Pharmaceutics and Pharmacokinetics	3	Elective	3
Pharmaceutical Engineering (Unit Operations)	3	Pharmaceutical Formulation and Drug Delivery	3
Seminar III	1	Seminar IV	1
Principles of Research Design	2	Regulatory and Manufacturing Practice	3
Research	3	Research	3
Total	12	Total	13