

# Advanced Pharmacokinetics and Toxicology

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## Author Information

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## Course Details

### Description

This course is focused on expanding prior basic pharmacokinetics to more advanced topics required for specialized work in research, clinical, and industrial settings. Through training of pharmacokinetic modeling/simulation software, SimBiology, students will become familiar with various analyses and modeling techniques including compartmental and physiologic models, pharmacokinetic-pharmacodynamic analyses and toxicokinetic-toxicodynamic assessments.

The course consists of four sections:

- The first section is dedicated to comprehensive understanding of fundamental concepts of pharmacokinetics and its applications in pharmaceutical sciences and preclinical and clinical pharmacology.
- The second section provides hands-on training for modeling/analysis of pharmacokinetics and pharmacodynamics using modeling-simulation software.
- The third section is devoted to paper presentations in journal club style along with toxicology lectures.
- The last section is given by guest lecturers to provide industrial perspective in pharmacokinetics and toxicology.

The courseware content provided here belongs to the first section of this course.

## Original Course Documents

[Source file URL](#)

# Course Contents

## Module 1

- [Lecture 1: Introduction and Building Mechanistic Models](#)
- [Exercise 1](#)
- [Reference Solution: Ex\\_1\\_IV\\_Bolus\\_CPT.sbproj](#)

## Module 2

- [Lecture 2: Simulation and Analysis](#)
- [Exercise 2](#)
- [Reference Solution: Ex\\_2\\_IV\\_Nonlinear.sbproj](#)

## Module 3

- [Lecture 3: Enterohepatic Recirculation](#)
- [Exercise 3](#)
- [Reference Solution: Ex\\_3\\_IV\\_EHC.sbproj](#)

## Module 4

- [Lecture 4: PK/PD and Indirect Response Models](#)
- [Exercise 4](#)
- Reference Solutions:
  - [Ex\\_4A\\_Warfarin\\_PK.sbproj](#)
  - [Ex\\_4B\\_Warfarin\\_PKPD.sbproj](#)

## Textbooks

- 1- Gabrielsson and Weiner, Pharmacokinetic and Pharmacodynamic Data Analysis: Concepts and Applications, 4th edition, Swedish Pharmaceutical Press, 2007.
- 2- Fanchi, Math Refresher for Scientists and Engineers, 3rd edition, Wiley, 2006.
- 3- Rowland and Tozer, Clinical Pharmacokinetics and Pharmacodynamics: Concepts and Applications, 4th edition, Lippincott Williams & Wilkins, 2010.

## Resources

- [Getting Started with SimBiology](#)
- [Building a Model in SimBiology](#)
- [Simulating a Model in SimBiology](#)
- [Working with Doses in SimBiology](#)
- [Tutorial: SimBiology for Pharmacokinetic and Mechanistic Modeling](#)

## Links

- [Course Authors](#)
- [Exercise Solution Summary](#)



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