

PHAR 7632 Chapter 1

Introduction to the Course

[return to the Course index](#)

Online Resources

[Exam Equations \(for PHAR 7632/7633\)](#), PDF format, provided after the first PHAR 7632 exam

Graph Paper Resources

Graph Paper in [PDF Format](#). If you have Adobe Reader (v5.0 or greater) installed (or Preview in Mac OS X) clicking on the links below will provide the graph paper indicated.

- [Linear 7 x 9 inches](#)
- [Linear 18 x 22 cm](#)

- [Semi-log One Cycle](#)
- [Semi-log Two Cycle](#)
- [Semi-log Three Cycle](#)
- [Semi-log Four Cycle](#)
- [Semi-log Five Cycle](#)

- [Mullen Plot](#), redrawn by Mullen, 1978
- [Vozech Plot](#) - redrawn from Vozech, 1981

Some Items to Consider

- Chapter 8 - Pharmacokinetics of Oral Administration
 - [A drug which undergoes extensive metabolism, with a high extraction ratio...](#)
 - [A drug which undergoes extensive metabolism, with a relatively high extraction ratio...](#)
 - [A drug with poor solubility has been marketed...](#)
 - [In this Chapter we have assumed that the absorption process...](#)
- Chapter 10 - Bioavailability Studies
 - [Sustained or extended release products such as topical patches...](#)
- Chapter 12 - Physical-Chemical Factors Affecting Oral Absorption
 - [A series of drugs, weak acids, have been developed...](#)
 - [A series of drugs, weak bases, have been developed...](#)
 - [In this Chapter we have assumed that the absorption process is uncomplicated...](#)
- Chapter 15 - Multiple Oral Dose Administration
 - [Changing the dosing interval and the dose in the same proportion should produce...](#)
 - [Metabolism can be subject to a number of factors, such as genetics, disease state and co-administration...](#)
 - [Theophylline has been studied extensively. It has been used commonly and has been the subject...](#)
- Chapter 17 - Metabolism
 - [It is generally considered that much of the analgesic activity of codeine...](#)
 - [Metabolism can be subject to a number of factors, such as genetics, disease state and co-administration...](#)
 - [Theophylline has been studied extensively. It has been used commonly...](#)

Java Applets Graphs

- Chapter 2 - Background Mathematical Material
 - [Linear plot of \$10^{-x}\$ or \$e^{-x}\$, versus \$x\$](#)

- [Plot of \$\log x\$ or \$\ln x\$ versus \$x\$](#)
- [Linear Plot of \$C_p\$ versus Time](#)
- [Linear Plot of \$\ln\(C_p\)\$ versus Time](#)
- [Semi-log Plot of \$C_p\$ versus Time](#)
- Chapter 4 - One Compartment IV Bolus
 - [Linear Plot of \$C_p\$ versus Time](#)
 - [Semi-log Plot of \$C_p\$ versus Time](#)
- Chapter 5 - Analysis of Urine Data
 - [Linear Plot of \$C_p\$ versus Time and \$U\$ versus Time](#)
 - [Semi-log Plot of \$C_p\$ versus Time and \$U\$ versus Time](#)
 - [Linear Plot of Rate of Excretion versus Time](#)
 - [Semi-log Plot of Rate of Excretion versus Time](#)
 - [Linear Plot of Rate of Excretion versus Time](#)
 - [Semi-log Plot of Rate of Excretion versus Time](#)
 - [Linear Plot of \$U\$ versus Time showing Approach to \$U^\infty\$ not equal to DOSE](#)
 - [Semi-log Plot of \$U\$ versus Time showing Approach to \$U^\infty\$ not equal to DOSE](#)
 - [Linear Plot of \$\Delta U/\Delta t\$ versus Time_{midpoint} Showing Slope = - \$kel\$](#)
 - [Semi-log Plot of \$\Delta U/\Delta t\$ versus Time_{midpoint} Showing Slope = - \$kel\$](#)
 - [Linear Plot of ARE versus time](#)
 - [Semi-log Plot of ARE versus time](#)
- Chapter 6 - Intravenous Infusion
 - [Linear Plot of \$C_p\$ versus Time During a Continuous Infusion](#)
 - [Semi-log Plot of \$C_p\$ versus Time During a Continuous Infusion](#)
 - [Linear Plot of \$C_p\$ versus Time Showing Bolus, Infusion, and Combined Curves](#)
 - [Semi-log Plot of \$C_p\$ versus Time Showing Bolus, Infusion, and Combined Curves](#)
 - [Linear Plot of \$C_p\$ versus Time showing Combined and Separate Curves for Both Infusions](#)
 - [Semi-log Plot of \$C_p\$ versus Time showing Combined and Separate Curves for Both Infusions](#)
 - [Linear Plot of \$C_p\$ versus Time for Interrupted Infusion. Showing Mono exponential Rise and Fall](#)
 - [Semi-log Plot of \$C_p\$ versus Time. NOTE: Intercept is not \$C_p^0\$](#)
- Chapter 8 - Pharmacokinetics of Oral Administration
 - [Linear Plot of \$C_p\$ versus Time after Oral Administration Showing Rise, Peak, and Fall in \$C_p\$](#)
 - [Semi-log Plot of \$C_p\$ versus Time after Oral Administration Showing Rise, Peak, and Fall in \$C_p\$](#)
- Chapter 14 - Multiple IV Bolus Dose Administration
 - [Linear Plot of \$C_p\$ versus Time Showing Doses Every Six Hours](#)
 - [Semi-log Plot of \$C_p\$ versus Time Showing Doses Every Six Hours](#)
- Chapter 15 - Multiple Oral Dose Administration
 - [Linear Plot of \$C_p\$ versus Time for Multiple Oral Doses showing \$C_{p_{max}}\$ and \$C_{p_{min}}\$](#)
 - [Semi-log Plot of \$C_p\$ versus Time for Multiple Oral Doses showing \$C_{p_{max}}\$ and \$C_{p_{min}}\$](#)
- Chapter 16 - Routes of Excretion
 - [Linear Plot of \$C_p\$ versus Time before, during and after Low Flux Hemodialysis](#)
 - [Semi-log Plot of \$C_p\$ versus Time before, during and after Low Flux Hemodialysis](#)
- Chapter 17 - Metabolism
 - [Linear Plot of Morphine Concentration versus Time after Codeine Administration](#)
 - [Linear Plot of \$C_p\$ versus Time and the effect of the induction of Carbamazepine metabolism](#)
- Chapter 19 - Multi-Compartment Pharmacokinetic Models
 - [Linear Plot of \$C_p\$ versus Time after an IV bolus - Two Compartment model using Macro Constants](#)
 - [Semi-log Plot of \$C_p\$ versus Time after an IV bolus - Two Compartment model using Macro Constants](#)
 - [Linear Plot of \$C_p\$ versus Time after an IV bolus - Two Compartment model using Micro Constants](#)
 - [Semi-log Plot of \$C_p\$ versus Time after an IV bolus - Two Compartment model using Micro Constants](#)
 - [Linear Plot of \$C_p\$ versus Time after an IV bolus and IV Infusion - Two Compartment model using Micro Constants](#)
 - [Semi-log Plot of \$C_p\$ versus Time after an IV bolus and IV Infusion - Two Compartment model using Micro Constants](#)
 - [Linear Plot of \$C_p\$ versus Time after Two IV bolus doses - Two Compartment model using Micro Constants](#)
 - [Linear Plot of \$C_p\$ versus Time after a Fast and Slow IV Infusion - Two Compartment model using Micro Constants](#)
 - [Semi-log Plot of \$C_p\$ versus Time after a Fast and Slow IV Infusion - Two Compartment model using Micro Constants](#)
- Chapter 21 - Non-Linear Pharmacokinetic Models
 - [Linear Plot of \$C_p\$ versus Time after an IV bolus - One Compartment model with Non-linear Elimination](#)
 - [Semi-log Plot of \$C_p\$ versus Time after an IV bolus - One Compartment model with Non-linear Elimination](#)
 - [Linear Plot of \$C_p\$ versus Dose for a Drug Following MM Kinetics](#)

Java Applets as [Mac OS 10.4 \('Tiger'\) Widgets](#)

Java Scripts Calculators

- Chapter 2 - Background Mathematical Material
 - [Calculate \$10^x\$ or \$e^x\$](#)
- Chapter 4 - One Compartment IV Bolus
 - [Calculate \$C_p^1\$ after an IV Bolus](#)
 - [Calculate Parameter Values from Two Data Points Collected after an IV Bolus](#)
 - [Calculate the Required IV Bolus Dose](#)
 - [Calculate Parameter Values from Two Data Points from a Line drawn through Data Collected after an IV Bolus](#)
- Chapter 5 - Analysis of Urine Data
 - [Estimate \$f_e\$ and \$f_m\$ using Equations 5.9.1 and 5.9.2](#)
 - [Calculate \$k_{el}\$ and \$t_{1/2}\$ in a patient with impaired renal function](#)
- Chapter 6 - Intravenous Infusion
 - [Calculate \$C_p\$ Given \$k_0\$, \$k_{el}\$ and \$V\$ at time \$t\$](#)
 - [Calculate \$k_0\$ required to give \$C_p\$ at time \$t\$](#)
 - [Calculate \$C_p^{ss}\$ Given \$k_0\$, \$k_{el}\$ and \$V\$](#)
 - [Calculate \$k_0\$ required to give \$C_p^{ss}\$](#)
 - [Calculate \$C_p\$ given \$k_0\$, Bolus Dose, \$k_{el}\$ and \$V\$ at time \$t\$](#)
 - [Calculate \$C_p\$ given fast and slow \$k_0\$, \$k_{el}\$ and \$V\$ at time \$t\$](#)
 - [Calculate \$k_{el}\$ and \$V\$ given post infusion \$C_p\$ versus time data](#)
- Chapter 8 - Pharmacokinetics of Oral Administration
 - [Estimate Time of Peak \$C_p\$ and the Peak \$C_p\$ after Oral Administration](#)
- Chapter 12 - Physical-Chemical Factors Affecting Oral Absorption
 - [Calculate the \$D\$ Value for a Weak Acid](#)
 - [Calculate the \$D\$ Value for a Weak Base](#)
- Chapter 14 - Multiple IV Bolus Dose Administration
 - [Calculate a suitable multiple IV bolus dosage regimen for specified \$C_{p_{min}}\$ and \$C_{p_{max}}\$](#)
 - [Calculate \$C_{p_{min}}\$ and \$C_{p_{max}}\$ after Multiple IV Bolus Doses](#)
- Chapter 16 - Routes of Excretion
 - [Calculations Using the \$C_{p_{average}}\$ Equation 16.8.2](#)
 - [Calculator Using \$C_{p_{max}}\$ and \$C_{p_{min}}\$ Criteria](#)
- Chapter 19 - Multi-Compartment Pharmacokinetic Models
 - [Calculate \$A\$, \$B\$, \$\alpha\$ and \$\beta\$](#)
 - [Calculate \$k_{10}\$, \$k_{12}\$, \$k_{21}\$ and \$V_1\$](#)
- Chapter 20 - Non-Linear Pharmacokinetic Models
 - [Calculate \$C_{p_{average}}\$ with Non-linear Elimination](#)
 - [Calculate \$V_m\$ and \$K_m\$ from Two Steady State \$C_{p_{average}}\$ Values](#)

On-line Course Material

- [PHAR 7632 and PHAR 7633](#)
- [PHAR 7632 and PHAR 7633 - as PDF slides images](#)
- [PHAR 4634 - course material to the graph paper/calculator stage](#)

Useful Search Sites

- Search for Pharmacokinetic or Biopharmaceutics Material On Line
 - [PHAR 7632/7633 Biopharmaceutics - Pharmacokinetics](#)
 - [PharmPK On Line Pharmacokinetic/Pharmacodynamics Resource](#)
 - [Boomer Manual - Non-Linear Regression Program](#)

Textbooks

- [Some Pharmacokinetic textbooks](#)

On-Line Textbooks or Courseware

- [Basic Pharmacokinetics PHA 443](#) by Michael Makoid, Creighton University
- [The complete guide to nonlinear regression](#) by Harvey Motulsky, GraphPad Software, Inc.
- [Pharmacokinetics](#) at College of Veterinary Medicine at Cornell University
- [Pharmacokinetics Tutorial](#) by Pat Neligan
- [Pharmacokinetics](#) by Dr. F. Jamali, Univ. of Alberta

Old Exams

- A student collection of formulas from 1999 ([Page 1](#) - [Page 2](#))

From PHAR 4634

Exams (1995)

- [First Exam](#)
- [Second Exam](#)
- [Final Exam](#)

From PHAR 7632

- [First semester exam 1999](#)
- [Second semester exam 1999](#)
- [Third semester exam 1999](#)

From PHAR 7633

First Semester Exam from 1999

- [Section 1 with answers](#)
- [Section 2 with answers](#)
- [Section 3 with answers](#)
- [Section 4 with answers](#)

Second Semester Exam from 1999

- [Section 1 with answers](#)
- [Section 2 with answers](#)
- [Section 3 with answers](#)
- [Section 4 with answers](#)

FINAL Exam from 1999

- [Final Exam from 1999](#) and [the key](#)

Old Homework

From PHAR 4634

Homework Sets (1995)

- [Chapter 4](#)

- [Chapter 5](#)
- [Chapter 6](#)
- [Chapter 8](#)
- [Chapter 15](#)
- [Chapter 20](#)

Homework Sets (1997)

- [Chapter 4](#)
- [Chapter 5](#)
- [Chapter 19](#)
- [Chapter 20](#)

From PHAR 7632/7633

Quizzes 2001 (PHAR 7633)

- [Quiz One with Answers - 24 August 2001](#)
- [Quiz Two with Answers - 31 August 2001](#)

Homework for Spring 2001 (PHAR 7632)

- [Homework #1](#)
- [Homework #2](#)
- [Homework #3](#)
- [Homework #4](#)
- [Homework #5 - 2000 homework example](#)
- No homework #6
- [Homework #7 - 1999 homework example](#)

Homework for Fall 1999 (PHAR 7633)

- [Homework #1](#)
- [Homework #2](#)
- [Homework #3](#)

References

- Mullen, P.W. 1978 Optimal phenytoin therapy: a new technique for individualizing dosage, *Clin. Pharmacol. Therap.*, **23**, 228-232
- Vozeh, S., Muir, K.T., Sheiner, L.B. and Follath, F. 1981 Predicting individual phenytoin dosage, *J. Pharmacokin. Biopharm.*, **9**(2), 131-146

[return to the Course index](#)

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