

Standardized Syllabus for the College of Engineering

BME 6644 Pharmacokinetics

1. Catalog Description (including credit hours) – Basic pharmacokinetic and pharmacodynamic concepts and models. Use of these concepts in the drug discovery process.
2. Pre-requisites and Co-requisites - PHA 5127 (Recommended)
3. Course Objectives

Upon completion of this course, a student should be able to:

- Describe the role of pharmacokinetic modeling in the drug discovery process
 - Formulate compartment models for pharmacokinetic and pharmacodynamics, and fit clinical data to the models.
 - Predict the plasma concentration and the drug effect for multiple dosings, and use the model to formulate suitable dosing protocols.
 - Formulate Physiologically based pharmacokinetic models, and obtain the parameters for the models by using suitable models
 - Understand the importance of circulatory system on PK modeling, and integrate blood flow physiology into the PK models.
 - Integrate metabolism and protein binding into PK and PD models
 - Develop PK models without assuming the tissues to be well-mixed.
 - Understand the basic concepts of Population PK modeling.
 - Report engineering calculations and problem solutions in a professional manner.
 - Work ethically with other students, both engaging in discussions and group reports and working independently.
4. Contribution of course to meeting the professional component – N/A
 5. Relationship of course to program outcomes: N/A
 6. Instructor
 - a. Office location- 421 CHE Building
 - b. Telephone – 2-2592
 - c. E-mail address – chauhan@che.ufl.edu
 - d. Class Web site - SAKAI
 - e. Office hours – Tuesday, Wednesday 2-3 PM
 7. Teaching Assistant – N/A
 - a. Office location
 - b. Telephone
 - c. E-mail address
 - d. Office hours
 8. Meeting Times - M, W, F 3:00-3:50PM
 9. Class/laboratory schedule, i.e., number of sessions each week and duration of each

session - M, W, F 3:00-3:50PM

10. Meeting Location CHE 0237

11. Material and Supply Fees - None

12. Textbooks and Software Required - None

13. Recommended Reading –

(1) Clinical Pharmacokinetics: Concepts and Applications by
by Malcolm Rowland and Thomas N Tozer.

(2) Pharmacokinetics: Processes, Mathematics, and Applications by Peter G. Welling

(3) Pharmacokinetics by M. Gibaldi and D. Perrier.

14. Course Outline

Wk	Topics
1	Introduction to Pharmacokinetics and the Drug Discovery Process; Review of basic concepts (1 and 2 compartment models, bolus vs. infusion, single vs. multiple dosing, oral vs. IV dosing)
2	Using MATLAB for fitting PK data to models
3	Metabolism Protein binding models Nonlinearities in PK models and inclusion of nonlinearities in PK models
4	Pharmacodynamic models Agonist and Antagonist drugs Drug-Drug Interactions Physiology of the circulatory system
5-6	Physiologically based pharmacokinetic models (i) Well mixed, flow limited (ii) Well mixed, membrane limited
7	Obtaining parameters for Physiologically based pharmacokinetic models
8-9	Mixing in tissues (i) Mixing due to path-length variations (ii) Taylor dispersion
10	Incorporation of dispersion in tissues in pharmacokinetic models
11-12	Case studies of PBPK models
13	Incorporation of control release strategies in PK models
14	Population PK models

15. Attendance and Expectations – Attendance is not required but highly recommended
16. Grading – methods of evaluation 33% Quizzes, 33% Final, 33% Project
17. Grading Scale – Grades will be curved

“Graduate students need an overall GPA of 3.00 truncated and a 3.00 truncated GPA in their major (and in the minor, if a minor is declared) at graduation.” For more information on grades and grading policies, please visit:

<http://gradcatalog.ufl.edu/content.php?catoid=4&navoid=907#grades>

18. Requirements for class attendance and make-up exams, assignments, and other work are consistent with university policies that can be found at:

<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

19. Honesty Policy – All students admitted to the University of Florida have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a UF student and to be honest in all work submitted and exams taken in this course and all others.

Note that failure to comply with this commitment will result in disciplinary action compliant with the UF Student Honor Code Procedures.

See <http://www.dso.ufl.edu/sccr/procedures/honorcode.php>

20. Accommodation for Students with Disabilities – Students Requesting classroom accommodation must first register with the Dean of Students Office. That office will provide the student with documentation that he/she must provide to the course instructor when requesting accommodation.
21. UF Counseling Services –Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:
 - UF Counseling & Wellness Center, 3190 Radio Rd, 392-1575, psychological and psychiatric services.
 - Career Resource Center, Reitz Union, 392-1601, career and job search services.
22. Software Use – All faculty, staff and student of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.