**Course Specification**

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| - Institution: King Saud Riyadh University |
| - College of Pharmacy /Department of Pharmaceutics |

# A. Course Identification and General Information

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| 1. Course title and code: Biopharmaceutics and pharmacokinetics (PHT 417) |
| 2. Credit hours: 3 (3+0) |
| 3. Program(s) in which the course is offered.  (If general elective available in many programs indicate this rather than list programs)  Doctor of Pharmacy |
| 4. Name of faculty member responsible for the course : |
| 5. Level/year at which this course is offered: Level 7 |
| 6. Pre-requisites for this course (if any) : PHT210, PHT221, PHT 311 |
| 7. Co-requisites for this course (if any): None |
| 8. Location if not on main campus: |
| 9. Coarse language : English |

B. Objectives

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| 1. Summary of the main learning outcomes for students enrolled in the course.  1- understanding the compartmental modeling and its significance   1. understanding drug absorption, distribution and elimination 2. understanding drug clearance including (total, renal and hepatic clearance) 3. understanding pharmacokinetics and biopharmaceutics after IV bolus, IV infusion, and oral administration of the drug 4. understanding protein binding and its effects   6 understanding bioavailability and bioequivalence 7- understanding multiple dosage regimen  8- have a knowledge on biopharmaceutics considerations in dosage form design |
| 2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. |

increased use of IT or web based refer ence material, changes in content as a result of new research in the field)

1- use of new technology

20 review of recent drug discoveries

# Course Description

This course is designed to provide students with a basic under resending of the principles of biophment and drug therapy > the course is devoted to the exploration and examination of the physical and physiological environments and their implication for pharmaceutical care. drug absorption processes , bioavailability, and bioequivalence will be heighted, pharmacokinetic and pharmacodynamics concepts, including absorption kinetics, distortion and elimination in the light of compartmental models will be introduced to the student particular emphasis will be placed on understanding prediction and utilizing terms such as clearance apparent volume of distribution , elimination , rate constant , and elimination half-life prediction of plasma and urine drug concentration based upon pharmacokinetic parameters after single and multiple intravenous and oral doses as well as after intravenous infusion well be addressed

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| 1 Topics to be Covered | | |
| Topic | No of Weeks | Contact hours |
| Introduction to pharmacokinetics | 0.67 | 2 |
| Compartment models | 1 | 3 |
| Absorption of oral dosage forms | 1 | 3 |
| Physiological factors | 1 | 3 |
| Factors affecting small bowel transit time | 0.67 | 2 |
| Physicochemical factors that influence absorption from GIT | 1 | 3 |
| Drug PKa and gastrointestinal pH | 0.67 | 2 |
| Gastrointestinal absorption Role of the dosage form | 0.67 | 2 |
| In-vivo- in-vitro correlation | 0.67 | 2 |
| Bioavailability | 0.67 | 2 |

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| Drug concentration and clinical response | 0.67 | 2 |
| Drug disposition | 0.67 | 2 |
| Drug elimination | 0.67 | 2 |
| Application of pharmacokinetics principles on some drugs | 1.33 | 4 |
| *Biopharmaceutical aspects of some dosage forms* | 3 | 9 |
| exams | 0.67 | 2 |
| Total | 15 | 45 |

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| 2 Course components (total contact hours per semester): | | | |
| Lecture: 43 | Tutorial: time does not allow  Solve problems and evaluation of home assignments | Practical/Fieldwork/Internship: | Other: 2hrs  Presentation and submission of reports. |

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| 3. Additional private study/learning hours expected for students per week. (This should be an average  :for the semester not a specific requirement in each week) : 4 hours / semester |
| 1. Development of Learning Outcomes in Domains of Learning   For each of the domains of learning shown below indicate:   * + A brief summary of the knowledge or skill the course is intended to develop;   + A description of the teaching strategies to be used in the course to develop that knowledge or skill;   + The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned. |
| a. Knowledge |
| (i) Description of the knowledge to be acquired  Biopharmaceutics and pharmacokinetics, non- compartmental pharmacokinetics, gastrointestinal absorption (physicochemical& biological consideration), |

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| gastrointestinal absorption (role of dosage forms), non-oral medication,  bioavailability, drug concentration and clinical response and drug disposition 9distribution& elimination). Prolonged release medications, pharmacokinetic variability due to different factors(body weight, age, sex, genetic factors, disease, drug interaction), and covers principles of individualization and optimization of drug dosing regimens, methods of assessing bioavailability (plasma, urine and clinical response) and bioequivalence studies. |
| 1. Teaching strategies to be used to develop that knowledge    1. “ Lectures”    2. Tutorial – solve problems    3. Reports, homework and use IT e.g. power point for presentation |
| 1. Methods of assessment of knowledge acquired    1. Written quizzes, midterms and final exams    2. Verbal discussions, and power point presentation. 3- Evaluation of home assignments.   4- Solve problems. |
| b. Cognitive Skills |
| (i) Cognitive skills to be developed  1- Critical thinking. 2-Problems solving  3-alertness about the doses, absorption, metabolism and excretion of drugs 4-Precision during directions given to patients. |
| 1. Teaching strategies to be used to develop these cognitive skills    1. Solving of problems.    2. Discussion about the doses, dispensing and instructions for use of medication. 3- Interpretation of prescriptions should be done by students.   4- Students would offer a summary of certain topics via power point, as well as reports. |
| 1. Methods of assessment of students’ cognitive skills    1. Discussion needs to be presented in groups of students    2. Evaluation of Case reports will be presented and will be evaluated accordingly 3- Presentation of selective topics using power points |
| c. Interpersonal Skills and Responsibility |
| (i) Description of the interpersonal skills and capacity to carry responsibility to be developed |

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| 1. Communications with instructions, tutors, staff, and patients. 2. Communications with different personalities and attitudes. 3- Giving indications to the patients in a professional way.   4-Engagement of the students should be engaged in higher responsibilities. |
| 1. Teaching strategies to be used to develop these skills and abilities    1. Training of students on simulating situations    2. Use of Video tapes will be used to show students the professional ways of Communications with patients and community.    3. Oral exams    4. Group discussion    5. Performance of Group projects will be carried out |
| 1. Methods of assessment of students’ interpersonal skills and capacity to carry responsibility    1. Monitoring of students’ attitudes in lectures.    2. Participation of students in the community activities 3- Assessment of home assignments and reports 2. Evaluation of the group projects 3. Monitoring the action/ reaction of students when entitled to higher responsibilities |
| d. Communication, Information Technology and Numerical Skills |
| (i) Description of the skills to be developed in this domain.   1. ability Search utilizing internet to cope with course demand 2. ability to grasp follow the update knowledge concerning the course demand 3-presentation using power point   4-self learning |
| 1. Teaching strategies to be used to develop these skills    1. Training on different software and special programs related to the course    2. Case presentation report utilizing the IT showing the latest information about certain topics |
| 1. Methods of assessment of students numerical and communication skills    1. Evaluation of the extent of comprehension of the students in problem solving    2. Assessment of home assignments    3. The positive role of the student in group projects    4. The effective participation of the student in the activities of her society |
| e. Psychomotor Skills (if applicable) |

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| (i) Description of the psychomotor skills to be developed and the level of performance required   1. Alertness of the student during presence in lectures 2. good management of the students in lectures 3. performance of proper treatment under stressful circumstances 4. level of performance required should meet the international standards |
| (ii) Teaching strategies to be used to develop these skills  1- present action of a case report in front of others "colleagues and staff" 2- Motivation and encouragement from staff  3- Audio visual demonstration of different pharmaceutical situations 4- Field visits to community hospitals  5- Responsibility about medication orders among the family 6- punctuality |
| 1. Methods of assessment of students’ psychomotor skills    1. oral exams    2. evaluation of students for different assignments |

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| 5. Schedule of Assessment Tasks for Students During the Semester | | | |
| Assess ment | Assessment task (e.g. essay, test, group project, examination  etc.) | Week due | Proportion  of Final  Assessment |
| 3 | Midterm I | 7 | 30 |
| 5 | Midterm II | 12 | 30 |
| 6 | Final exam | 15 | 40 |
| 7 | Total | ----------- | 100 |
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# Student Support

1. Arrangements for availability of faculty for individual student consultations and academic advice. (include amount of time faculty are available each week)

Each staff member should provide the students with 4 hours per week. In addition to availability of his or her web site.

*E. Learning Resources*

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| 1. Required Text(s) |
| 2. Essential References  -Biopharmaceutics and clinical pharmacokinetics, Ed., Milo Gibaldi- lea and Febiger ; latest edition   * applied biopharmaceutics and pharmacokinetics, Shargel,L Wu-Pong,S Yu,A, MoGraw-Hill Compaines, 2011 * Applied pharmacokinetics: principles of therapeutic drug monitoring(Applied pharmacokinetics) William E. Evans; latest edition |
| 1. Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)   -New England journal of medicine   * + International Journal of Pharmacy   + British Medical Journal (BMJ)   + Modern Medicine   + The pharmacist |
| 4-.Electronic Materials, Web Sites etc. [www.emedicine.com](http://www.emedicine.com/) [www.sciencedirect.com](http://www.sciencedirect.com/)  [www.blackwell.com](http://www.blackwell.com/)  [www.pubmed.com](http://www.pubmed.com/) [www.ovid.com](http://www.ovid.com/) |
| 5- Other learning material such as computer-based programs/CD, professional standards/regulations   * CD for British Pharmacopeia (B.P) * United states Pharmacopeia (U.S.P) * British pharmaceutical codex (B.P.C) * Martindale (extra Pharmacopeia) * The use of electronic medical dictionaries |

# F. Facilities Required

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| Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats  in classrooms and laboratories, extent of computer access etc.) |
| 1. Accommodation (Lecture rooms, laboratories, etc.)  Number of seats in each classroom enough for 100 students |
| 2. Computing resources  Computer access in each classroom for each student |

G Course Evaluation and Improvement Processes

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| 1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching   * Questionnaire is given to students to be filled about course content and teaching procedures * Evaluation of standers of the students in the quizzes, midterms, final exams, and   home assignments, reports, and presentations. |
| 2. Other Strategies for Evaluation of Teaching by the Instructor or by the Department   * Verbal discussion should be done by the staff member in presence of students about course content and teaching procedures, in order to express the extent of comprehension and understanding. * Discussion of the model answer of the written exams, quizzes& midterms- with the students to review their answers. * Listening to students' complaints. |
| 3. Processes for Improvement of Teaching  The department should have an access to training in hospitals to help students in understanding the courses that are related to pharmacy practice. |
| 4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of  assignments with a faculty member in another institution)  Check marking of a sample of student work, by the demonstrators and lecturers working in the same course |
| 5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.   * Establishing an academic committee in each department to control: * Periodical reviewing of the course content, midterms, final exams, students' complaints, time factor, discipline, attendance of students and tutors. |