|  |  |
| --- | --- |
| **Course Title:** | Basic Pharmacokinetics |
| **Course Code:** | **PHCP 453** |
| **Program:** | **Pharmaceutical Sciences** |
| **Department:** | **Clinical Pharmacy** |
| **College:** | **Pharmacy** |
| **Institution:** | **Najran University** |

Table of Contents

[A. Course Identification 3](#_Toc59015180)

[6. Mode of Instruction (mark all that apply) 3](#_Toc59015181)

[B. Course Objectives and Learning Outcomes 4](#_Toc59015182)

[1. Course Description 4](#_Toc59015183)

[2. Course Main Objective 4](#_Toc59015184)

[3. Course Learning Outcomes 4](#_Toc59015185)

[C. Course Content 5](#_Toc59015186)

[D. Teaching and Assessment 5](#_Toc59015187)

[1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods 5](#_Toc59015188)

[2. Assessment Tasks for Students 6](#_Toc59015189)

[E. Student Academic Counseling and Support 6](#_Toc59015190)

[F. Learning Resources and Facilities 6](#_Toc59015191)

[1.Learning Resources 6](#_Toc59015192)

[2. Facilities Required 7](#_Toc59015193)

[G. Course Quality Evaluation 7](#_Toc59015194)

[H. Specification Approval Data 7](#_Toc59015195)

# A. Course Identification

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1. Credit hours:** | | | | **3 (2+1)** | | | | | | | | | | | | |
| **2. Course type** | | | | | | | | | | | | | | | | |
| **a.** | University | |  | | College | | | **√** | Department | | | |  | Others |  |  |
| **b.** | | Required | | | | **√** | Elective | | |  |  | | | | | |
| **3. Level/year at which this course is offered:** | | | | | | | | | | | | **7th Level/ 4th year** | | | | |
| **4. Pre-requisites for this course** (if any)**:**  **None** | | | | | | | | | | | | | | | | |
| **5. Co-requisites for this course** (if any)**:** | | | | | | | | | | | | | | | | |
| **None** | | | | | | | | | | | | | | | | |

## 6. Mode of Instruction (mark all that apply)

|  |  |  |  |
| --- | --- | --- | --- |
| **No** | **Mode of Instruction** | **Contact Hours** | **Percentage** |
| **1** | **Traditional classroom** | 60 | 100 |
| **2** | **Blended** |  |  |
| **3** | **E-learning** |  |  |
| **4** | **Correspondence** |  |  |
| **5** | **Other** |  |  |

**7. Actual Learning Hours** (based on academic semester)

|  |  |  |
| --- | --- | --- |
| **No** | **Activity** | **Learning Hours** |
| **Contact Hours** | | |
| **1** | **Lecture** | 30 |
| **2** | **Laboratory/Studio** | 30 |
| **3** | **Tutorial** | 0 |
| **4** | **Others** (specify) | 0 |
|  | **Total** | 60 |
| **Other Learning Hours\*** | | |
| **1** | **Study** | 30 |
| **2** | **Assignments** | 20 |
| **3** | **Library** | 0 |
| **4** | **Projects/Research Essays/Theses** | 0 |
| **5** | **Others** (specify) | 0 |
|  | **Total** | 110 |

**\*** The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

# B. Course Objectives and Learning Outcomes

|  |
| --- |
| 1. Course Description |
| This course deals with teaching students the basic concepts of pharmacokinetics as drug absorption, distribution biotransformation and elimination. It also includes some concepts as the biological half-life, determination of blood, serum and urine drug concentration after single dose or multiple dosing through intravenous injection or infusion or through oral administration. Also, the course deals with studying some important concepts deal with renal or hepatic drug clearance, one and two compartment models of drug kinetics. |
| 2. Course Main Objective The Student will be able to:   * Understand the basic concepts of pharmacokinetics and their effects on the drug action and its therapeutic effects. * Understand the concept of half-life, dosing rate, loading dose, maintenance dose and therapeutic range. * Know pharmacokinetic terms and parameters and their significance to clinical pharmacokinetics. * Know the therapeutic drug monitoring. * Know dosing information, relevant pharmacokinetic equations, serum concentrations monitoring, steady-state times, sample times and interpretation of plasma drug levels for many narrow therapeutic drugs and pharmacovigilance. |
|  |

## 

## 3. Course Learning Outcomes

|  |  |  |
| --- | --- | --- |
| **CLOs** | | **Aligned****PLOs** |
| 1 | **Knowledge:** |  |
| 1.4 | Demonstrate the concepts and fact of clinical pharmacokinetics role in drug use and its effect on drug use and interaction as well as its toxicity. | K4 |
| **2** | **Skills :** |  |
| 2.1 | Evaluate possible therapeutic applications and interaction of drugs based on clinical pharmacokinetics prospective. | S1 |
| 2.2 | Plan strategies for problem solving in clinical settings. | S2 |
| 2.3 | Interpret the scientific data and informationrelated to the plasma drug concentration and its impact on drug efficacy. | S3 |
| 2... |  |  |
| **3** | **Competence:** |  |
| 3.1 | Work independentlyand professionally. | C1 |
| 3.2 |  |  |
| 3.3 | Use of advanced techniques in developing solutions to complex problems. | C3 |
| 3... |  |  |

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# C. Course Content

|  |  |  |
| --- | --- | --- |
| **No** | **List of Topics** | **Contact Hours** |
| **Theoretical** | | |
| 1 | Introduction to basic pharmacokinetics | 2 |
| 2 | Elimination half life | 4 |
| 3 | IV bolus pharmacokinetics | 2 |
| 4 | Oral pharmacokinetics | 3 |
| 5 | Pharmacokinetics relation (CL, VD, Dose) | 2 |
| 6 | Multiple dosing pharmacokinetics | 2 |
| 7 | Phase I and II metabolisms | 3 |
| 8 | Enzyme kinetics and transporters | 3 |
| 9 | Drug excretion | 3 |
| 10 | Clinical consideration of clearance | 3 |
| 11 | Two compartmental pharmacokinetics | 3 |
| **Total** | | 30 |
| **Practical** | | |
| 1 | Mathematical concepts review | 2 |
| 2 | Introduction to basic pharmacokinetics | 2 |
| 3 | Elimination half-life | 4 |
| 4 | IV bolus pharmacokinetics | 6 |
| 5 | Oral pharmacokinetics | 2 |
| 6 | Multiple dosing pharmacokinetics | 2 |
| 7 | Phase I and II metabolisms | 2 |
| 8 | Enzyme kinetics and transporters | 2 |
| 9 | Drug excretion | 2 |
| 10 | Clinical consideration of clearance | 2 |
| 11 | Two compartmental pharmacokinetics | 4 |
| **Total** | | 30 |

# 

# D. Teaching and Assessment

## 1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

|  |  |  |  |
| --- | --- | --- | --- |
| **Code** | **Course Learning Outcomes** | **Teaching Strategies** | **Assessment Methods** |
| **1.0** | **Knowledge** | | |
| 1.4 | Demonstrate the concepts and fact of clinical pharmacokinetics role in drug use and its effect on drug use and interaction as well as its toxicity. | 1. Lectures. 2. Discussion. 3. Assignments. | 1. Theoretical exam 2. Assignment |
| **2.0** | **Skills** | | |
| 2.1 | Evaluate possible therapeutic applications and interaction of drugs based on clinical pharmacokinetics prospective. | 1. Practical experiments 2. PBL. | 1. Written Exams 2. Practical Exam |
| 2.2 | Plan strategies for problem solving in clinical settings. | 1. Practical experiments 2. Problem solving exercises. 3. Case Study | 1. Written Exams 2. Practical Exam 3. Laboratory reports |
| 2.3 | Interpret the scientific data and informationrelated to the plasma drug concentration and its impact on drug efficacy. | 1. Practical experiments 2. Data interpretation. 3. Case study. | 1. Written Exams 2. Practical Exam 3. Laboratory reports |
| **3.0** | **Competence** | | |
| 3.1 | Work independentlyand professionally. | 1. Practical experiments 2. Laboratory report | 1. Practical Exam 2. Laboratory report 3. Observation Card |
| 3.3 | Use of advanced techniques in developing solutions to complex problems. | 1. Practical experiments | 1. Practical Exam 2. Observation Card |

## 

## 2. Assessment Tasks for Students

|  |  |  |  |
| --- | --- | --- | --- |
| **#** | **Assessment task\*** | **Week Due** | **Percentage of Total Assessment Score** |
| **1** | Midterm exam **1** | 4 | 15% |
| **2** | Assignment | 7 | 5% |
| **3** | Observation card | 10 | 5% |
| **4** | Midterm exam **2** | 8 | 15% |
| **5** | Lab. practical quiz | 14 | 5% |
| **6** | Final practical exam | 15 | 15% |
| **7** | Final exam | 16 | 40% |
|  | **Total** |  | **100%** |

**\*Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

# E. Student Academic Counseling and Support

|  |
| --- |
| **Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :** |
| * **Office hours (2 hours per week + appointments)** * **Help session (problem solving): as required per week** * **Students can send emails or use blackboard platform discussion for any inquires.** |

# F. Learning Resources and Facilities

## 1.Learning Resources

|  |  |
| --- | --- |
| **Required Textbooks** | * Applied Pharmacokinetics: Principles of Therapeutic Drug Monitoring (Applied Pharmacokinetics) , William E. Evans. * Biopharmaceutics and Pharmacokinetics- A Treatise, D.M. Brahmankar and Sunil B. Jaiswal. * Basic Clinical Pharmacokinetics, Michael E. Winter. |
| **Essential References Materials** | * Power points slides   <http://sdl.summon.serialssolutions.com/search?s.q=clinical+pharmacy#!/search?ho=t&l=en&q=basic%20pharmaco> |
| **Electronic Materials** |  |
| **Other Learning Materials** | Excel software for pharmacokinetic parameters calculations |

## 2. Facilities Required

|  |  |
| --- | --- |
| **Item** | **Resources** |
| **Accommodation**  (Classrooms, laboratories, demonstration rooms/labs, etc.) | 1. A classroom containing at least 30 seats 2. Computer lab to be teach student proper use of computer software for pharmacokinetics parameters. |
| **Technology Resources**  (AV, data show, Smart Board, software, etc.) | **Computer, proper projectors, internet access.** |
| **Other Resources**  (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list) | 1. Computer lab must include Windows Office software. |

# G. Course Quality Evaluation

| **Evaluation**  **Areas/Issues** | **Evaluators** | **Evaluation Methods** |
| --- | --- | --- |
| Effectiveness of teaching strategies | Head of departments  and students | Indirect  Questionnaires (indirect) |
| Effectiveness of student assessment | Faculty members  and students | Indirect  Questionnaires (indirect) |
| Achievement of CLOs | Student  peer reviewer | Direct  Indirect |
| Quality of learning resources | Students | Questionnaires (Indirect) |

**Evaluation areas** (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

**Evaluators** (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

**Assessment Methods** (Direct, Indirect)

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# H. Specification Approval Data

|  |  |
| --- | --- |
| **Council / Committee** | Clinical Pharmacy Department Council |
| **Reference No.** | 2-1-40-41 |
| **Date** | 24/12/1440 H |