Course Specification

College: **College of Pharmacy**

Institution: **King Saud University**

Department: **Pharmacology** Degree: **Pharm. D.**

A Course Identification and General Information

Course code	Course title	Credit Hours			
		Lecture	Lab.	Other	Credit
PHL 322	Pharmacology-2	2	1	-	3

Pre-requisites for this course: **PHL313**

Co-requisites for this course: -

Level/year at which this course is offered**: 6th semester**

Name of faculty member responsible for the course: **Dr. Mohamed M. Sayed-Ahmed**

Dr. Gouda K. Helal, Dr. Salim S. Al-Rejaie, Dr. Abdulaziz M. Aleisa

B Objectives

1. Summary of the main learning outcomes for students enrolled in the course.

- **To describe the concept of chemical language in cell-to-cell communication in the brain.**
- **To gain knowledge regarding the major neurotransmitters in the central nervous system and their biological activities.**
- **To understand and appreciate the physiological roles of neurotransmitters in behaviour and their relevance to specific neurological and psychiatric disorders.**
- **To differentiate between the causes and symptoms of various brain diseases.**
- **To gain awareness and understanding of the various mechanisms of the central diseases and the mechanisms underlying the effectiveness of the drugs used in their treatment.**
- **To outline the differences between the actions, mechanisms and uses of barbiturates and benzodiazepines.**
- **To pin-point the differences between the different groups of the available antidepressants.**
- **To know the advantages and disadvantages of the available antipsychotic drugs.**
- **To describe the current concepts of pain transmission.**
- **To define and acquire knowledge regarding the meanings of the various medical terms in the field of drugs such as habituation, tolerance, dependence, addiction and abstinence syndrome.**
- **To allow the student to differentiate between the different types of tolerance and dependence.**
- **To gain knowledge regarding the various types of the psychedelic drugs and their different abused slang names in the different countries.**
- **To recognize the factors that predispose to the use of psychedelic drugs**
- **To outline the different scientific strategies that can be followed to prophylact youth from indulging in the habit of drug intake.**
- **To enlighten the student with the various pharmacological actions of the psychedelic drugs, their mechanisms of action and their adverse reactions.**
- **To differentiate between the various withdrawal symptoms that accompanies the abrupt withdrawal of the drugs that show physical dependence.**
- **To gain knowledge regarding the available means for treatment of addicts.**

2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)

- **Reference to web material**

C. Course Description

This course is directed to provide the students with knowledge regarding the principles of neurochemical transmission in the brain and spinal cord together with the various neurotransmitters and their respective receptors. It provides the student with knowledge regarding the general actions, mechanisms and uses of general anaesthetics, central nervous system stimulants and depressants, analgesics, antipsychotics, antiepileptics, opioids and antitussives, antidepressants, antimanics, and antiparkinsonians. It also provides the information on the major side effects of the various drug classes. The drugs will be analysed to permit the choice of a certain agent for the treatment of a certain disease.

In the practical part of the course the students will perform experiments in animals (rodents) to verify the actions of the drugs they studied in the theoretical part of the course.

1. Topics to be Covered

Topic	Weeks	Contact hours
Introduction to the Pharmacology of CNS drugs	1.5	3
CNS Stimulants	0.5	1
Drugs in Parkinsonism and other movement disorders	1	2
Centrally acting spasmolytic drugs	0.5	1
Drugs used in treatment of addiction	0.5	1
Anti-psychotic drugs	1	2
Anti-alzheimer drugs	0.5	1
Sedatives, Hypnotics and Anxiolytics	1.5	3
General Anesthetics	1	2
Antiepileptics	1.5	3
Opioids and Antitussives	0.5	1
Anti-inflammatory and non-opioid analgesics	1	2
Antidepressants and antimania	2	4
Drugs used in attention deficit syndrome	0.5	1
Drugs used in memory disorders	0.5	1
Drugs used in autism and other neurological diseases	0.5	1
Drugs used in eating disorders	0.5	1

Laboratory Experiments

Lab 1. **Effect of CNS stimulants on rodents and frogs.**

Lab 2. **Effect of CNS depressants on rodents.**

Lab 3. **Effect of analgesics on rodents.**

Lab 4. **Effect of anti-epileptics in rodents.**

Lab 5. **Effect of local anesthetics in frogs**

Lab 6. **Effect of anti-inflammatory on rodents.**

Lab 7. **Final exam**

Tutorial and drug profile

Tutorial 1 **CNS stimulants**

Tutorial 2 **Drugs used in Parkinsonism and other movement disorders**

Tutorial 3 **Sedatives, Hypnotics and Anxiolytics**

Tutorial 4 **Anti-psychotic and Anti-alzheimer drugs**

Tutorial 5 **Anti-inflammatory and non-opioid analgesics**

Tutorial 6 **Antidepressants and antimania**

Tutorial 7 **Drugs used in Autism and other neurological diseases**

Tutorial 8 **Drugs used in Attention Deficit Syndrome and Eating disorders**

Course components (total contact hours per semester):			
Lecture:	**Tutorial**	**Practical**	**Other**
30	**8**	**7**	**-**
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) **45 hours**			

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

- **Knowledge of brain Neurotransmitters**
- **Knowledge of central diseases**
- **Causes and treatment of central diseases**

(ii) Teaching strategies to be used to develop that knowledge

- **Lectures**
- **Labs**
- **Drug profile**
- **Assignment**

(iii) Methods of assessment of knowledge acquired

- **Exams (Theoretical)**
- **Quizzes Exams (Practical)**
- **Student oral presentation**

b. Cognitive Skills

(i) Cognitive skills to be developed

- **Understanding of brain disorders and its treatment**

(ii) Teaching strategies to be used to develop these cognitive skills

- **Give students assignments that require collecting information from the internet.**

(iii) Methods of assessment of students cognitive skills

- **Exams**
- **Reports**
- **Faculty evaluation**

c. Interpersonal Skills and Responsibility

(i) Description of the interpersonal skills and capacity to carry responsibility to be developed

- **Ability to induce diseases and their treatments in animals**

(ii) Teaching strategies to be used to develop these skills and abilities

- **Performance of experiments in animals**

(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility

- **Practical Examination**

d. Communication, Information Technology and Numerical Skills

(i) Description of the skills to be developed in this domain.

- **Performance of Experiments in animals**

(ii) Teaching strategies to be used to develop these skills

- **Lectures**
- **Lab applications**

(iii) Methods of assessment of students numerical and communication skills

- **Exams**
- **Lab applications**

e. Psychomotor Skills (if applicable)

(i) Description of the psychomotor skills to be developed and the level of performance required

Not Applicable

(ii) Teaching strategies to be used to develop these skills

Not Applicable

(iii) Methods of assessment of students psychomotor skills

Not Applicable

5. Schedule of Assessment Tasks for Students During the Semester			
Assessment	**Assessment task (eg. essay, test, group project, examination etc.)**	**Week due**	**Proportion of Final Assessment**
1	**First midterm exam**	**7**	**15**
2	**Second midterm Exam**	**13**	**15**
4	**Tutorial**	**1-14**	**10**
5	**Final Practical Exam**	**15**	**20**
6	**Final Exam**	**16**	**40**

D. Student Support

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

- **Faculty web-page with communication tolls.**
- **Office hours: 2**
- **Lab assistance (Lab technician): 2**

E. Learning Resources

Required Text(s)

- Leonard B.E. (ed.) (2008). Fundamentals of Psychopharmacology 3rd edition. Chichester, John Wiley and Sons, N.Y.
- Hardman J.G. and Limbird L.E. (eds). (2008). Goodman and Gilman's Pharmacological Basis of Therapeutics. 10th edition. New York, McGraw-Hill.
- Alan F. Schatzberg, Cole, J.O. and Debattista, C. (2008). Manual of Clinical Psychopharmacology. Publisher: Barnes and Noble N.Y.

Essential Reference

- Stone, T.W. (2006). CNS Neurotransmitters and neuromodulators: Neuroactive steroids. Publisher: Barnes and Noble.
- Wells, B.G., Hamilton, C.W., Dipiro, J.T. (ed.) (2008) Pharmacotherapy Handbook. Publisher: Barnes and Noble.

Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)

- Pharmacological Reviews
- Brain Research

Electronic Materials, Web Sites etc

- www.BiomedNetspacebmn.com
- www.PubMed.com

F. Facilities Required
Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Lecture rooms, laboratories, etc.) • **Lecture room (30)** • **Laboratory instruments: Hot plate, Electroconvulsive machine, pleothysmography** • **Fine chemicals and drugs**
2. Computing resources • **Internet access** • **Projector** • **Smart board** • **Lab top** • **Printer** • **scanner**
3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list) • **Hot plate, Electroconvulsive machine, pleothysmography**

G Course Evaluation and Improvement Processes
1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching • **Students evaluation in each semester** • **Meeting with students** • **Open door policy**
2. Other Strategies for Evaluation of Teaching by the Instructor or by the Department • **Self evaluation**
3. Processes for Improvement of Teaching • **Studying reports** • **Training of faculty**
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) **Not Applicable**
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. • **Collecting all reports and evaluations at the end of the semester for a reviewing purpose.**