

Course Name: Biochemistry-I	إسم المقرر: الكيمياء الحيوية-1
Course Code & No.: PHG 210	رقم المقرر دوى 210
Credits: 2(2 + 0 + 0)	عدد الساعات: 2(2 + 0 + 0)
Prerequisite: PHC 103	المتطلب: كمص 103
Level: 3	المستوى: 3

Course Description (AIM):

This course is concerned with the study of amino acids and proteins structures. Enzymes and isozyme activities in the diagnosis of clinical conditions. It is also deals with genetic code, protein synthesis and clinical conditions related to purine and pyrimidine nucleotides metabolism. An overview of the porphyrin biosynthesis and catabolism. Mitochondrial electron transport chain and oxidative phosphorylation will also be discussed.

Objectives: Upon successful completion of this course, the following objectives should be covered:

- 1- Amino acids and proteins, enzymes, biological oxidation, porphyrins and nucleic acids.
- 2- Clinical correlations and the action of certain therapeutic as well as toxic agents are explained whenever possible.

Learning outcomes: Upon successful completion of this course, the student will be able to:

a- Knowledge:

- 1- Recognize the structures of the 20 amino acids commonly found in proteins, the properties of their side chains and how these properties affect protein structure. Describe peptide bond and its properties influence protein folding.
- 2- List the four levels of protein structure and describe the forces that determine how protein folds. Outline the structure and function of antibody molecules.
- 3- List the course and fate of acetyl-COA and pyruvate. Describe role of the TCA cycle in metabolism. Name inhibitors and uncouplers of oxidative phosphorylation.
- 4- Outline the pathway for heme synthesis and catabolism as well as related diseases.
- 5- Recognize the pyrimidine and purine bases and their precursors. Outline nucleotide catabolism, urate formation, and purine salvage. Describe DNA and RNA structure and function. Outline the steps of protein synthesis.

b- Cognitive skills:

- 1- Explain the mechanisms by which enzymes catalyze reactions and how the activity of an enzyme can be regulated. Differentiate between competitive & noncompetitive, and uncompetitive inhibition and to explain the action of certain therapeutic agents. Interpret serum enzyme and isozyme activities in the diagnosis of clinical conditions.

- 2- Explain the mechanism by which hemoglobin and myoglobin reversibly bind oxygen and to interpret the oxygen-binding curves.
- 3- Summarize electron transfer from NADH and succinate to oxygen.

Course Contents:

- Amino acids and proteins.
- Chemistry of amino acids and their classification.
- Acid-base, physical and chemical properties of amino acids.
- Classification and function of proteins.
- Structure of peptide bond.
- Level of protein structure.
- Protein unfolding (denaturation).
- Hemoglobin and myoglobin.
- Plasma proteins and antibody molecules.
- Enzymes.
- Enzyme classification and their mechanism of action.
- Enzyme kinetics and inhibition of enzyme activity.
- Regulation of enzyme activity.
- Coenzymes.
- Serum enzyme and isozyme activities in the diagnosis of clinical conditions.
- Biological oxidation.
- ATP cycle.
- Source and fate of acetyl-COA and pyruvate.
- Tricarboxylic acid cycle.
- Mitochondrial electron transport chain and oxidative phosphorylation and their inhibitors.
- Porphyrins.
- Heme biosynthesis and its regulation.
- Heme catabolism and formation of bile pigments.
- Porphyrins and jaundice.
- Chemistry of nucleotides.
- Metabolism of purine and pyrimidine nucleotides.
- Gout, Lysch-Nyhan syndrome and orotic aciduria
- Chemistry of DNA and RNA.
- The genetic code and protein synthesis.

Text Book(s):

Devlin, T.M. Biochemistry with Clinical Correlations. Latest edition. John Wiley and Sons, Inc.

Additional suggested readings:

Marks, D.B. Biochemistry. Latest edition. Williams and Wilkins.

Champe, P.C., Harvey, RA. Biochemistry J.B. Latest edition. Lippincott Company.

Course Name: Biochemistry-II	إسم المقرر: الكيمياء الحيوية-2
Course Code & No.: PHG 220	رقم المقرر: دوى 220
Credits: 3(2+1+0)	عدد الساعات: 3(2+1+0)
Prerequisite: PHG 210	المتطلب: دوى 210
Level: 4	المستوى: 4

Course Description (AIM):

This course is concerned with the study of glycolysis, gluconeogenesis and other metabolic pathways of carbohydrates. Regulation of blood glucose level will also be discussed. It is also deals with lipids and proteins metabolism such as triglycerides and non-essential amino acids biosynthesis respectively. An overview of the inborn errors of amino acids metabolism and minerals found in humans.

Objectives: Upon successful completion of this course, the following objectives should be covered:

1. The metabolism of carbohydrates, lipids, proteins and minerals.
2. Clinical correlations and the action of certain therapeutic as well as toxic agents are explained, whenever possible.
3. Much of the laboratory is devoted to the determination of blood biochemical parameters.

Learning outcomes: Upon successful completion of this course, the student will be able to:

a- Knowledge:

1. Outline the process of digestion and absorption of carbohydrates, lipids and proteins. Describe the Embden-Myerhof glycolytic pathway, its regulation and the pathway of glycogen biosynthesis and degradation. State the main functions of the pentose phosphate pathway.
2. Describe the structures of fatty acids, fatty acid activation and β -oxidation, fatty acid biosynthesis by fatty acid synthase multienzyme complex and the pathways for triglyceride biosynthesis.
3. Recognize ketone body metabolism, the pathways for glycerolipid, sphingolipid, cholesterol and bile salt biosynthesis. Describe pathways for chylomicrons, VLDL, LDL and HDL metabolism.
4. List the five classes of steroid hormones, ten non-essential amino acid and describe their biosynthesis. Describe the reactions of urea cycle, the elements found in humans and their functions.

b- Cognitive skills:

1. Summarize the glycolytic bypass reactions of gluconeogenesis and its regulation, the enzyme defects that produce glycogen storage diseases.
2. Explain how blood glucose level is regulated.
3. Summarize the fate of carbon skeleton of amino acids. Interpret the inborn errors of amino acid metabolism.

c- Psychomotor and communication skills:

1. Examine blood biochemical parameters such as glucose, cholesterol and total protein levels.

Course Contents:

- Metabolism of carbohydrates.
- Glycolysis.
- Glycogen biosynthesis and degradation.
- Gluconeogenesis.
- Pentose phosphate pathway.
- Regulation of blood glucose level.
- Metabolism of lipids.
- Digestion and absorption of lipids.
- Fatty acid oxidation.
- Ketone body metabolism.
- Triglycerides biosynthesis.
- Complex lipid metabolism.
- Lipoprotein metabolism.
- Cholesterol metabolism.
- Metabolism of proteins.
- Digestion and absorption of proteins.
- Biosynthesis of non-essential amino acids.
- Urea cycle.
- Fate of carbon skeleton of amino acids.
- Inborn errors of amino acid metabolism.
- Minerals.
- Abundant minerals found in humans.
- Trace minerals found in humans.

Text Book(s):

Devlin, T.M. Biochemistry with Clinical Correlations. Latest edition. John Wiley and Sons, Inc.

Additional suggested readings:

Marks, D.B. Biochemistry. Latest edition. Williams and Wilkins.
Champe, P.C., Harvey, RA. Biochemistry J.B. Latest edition. Lippincott Company.



Course Name: Physiology-I	إسم المقرر: علم وظائف الأعضاء-1
Course Code & No.: 211 PHG	رقم المقرر ٢١١ دوي
Credits: 3(2+1+0)	عدد الساعات: 3(2+1+0)
Prerequisite: 106BIOL	المتطلب: ١٠٦ حين
Level: 5	المستوى: 5

Course Description:

The course describes the

1. Physiology of cell membrane, nerve and muscle,
2. Physiology of autonomic nervous system,
3. Physiology of blood and cardiovascular system with emphasis on the human body.

Objectives:

- Describe the importance and understanding of various physiological processes of the human body.
 - Describe the physiology of cell and various systems.
- Perform various experiments relating to the various body system.

Learning outcomes:

- Upon successful completion of this course, students will be able to:

Knowledge:

- Explain what is meant by active transport, Na^+/K^+ pumps and their role in maintenance of the resting membrane potential and explain how an equilibrium potential is produced.
- Define the term motor unit and explain how motor units are used to control muscle contraction.
- Discuss the structure and general functions of the sympathetic and parasympathetic divisions of the autonomic system.
- Interpret blood composition, function of its elements and general functions of circulatory system
- Explain the properties of action potentials and explain the significance of all-or-none law and the refractory periods.
- Explain the structure of smooth muscle and explain how its contraction is regulated.
- Discuss the general functions of heart, major components of circulatory system and regulation of these functions.

Cognition:

- Compare depolarization, repolarization and hyperpolarization.
 - Distinguish between isometric and isotonic contractions.
- phosphocreatine in muscles.
- Compare cardiac muscle and skeletal muscle.

Psychomotor:

- Perform various experiments relating to cardiovascular system, blood and respiratory system.

Course Contents:

- Transport through cell membrane.
- Membrane potential.
- Resting membrane potential.
- Action potentials.
- Peripheral neuron regeneration.
- Structure of skeletal muscles.
- Types of muscle contractions.
- Mechanism of contraction.
- Neural control of skeletal muscles.
- Energy requirements of skeletal muscles.
- Cardiac and smooth muscle.
- Autonomic nervous system, introduction.
- Somatic and autonomic motor reflex.
- Divisions, functions and control of the autonomic nervous system.
- Function of blood.
- Composition of blood.
- Plasma, erythrocytes, leukocytes and platelets.
- Regulation of erythropoiesis.
- Red blood cells antigens and blood typing.
- Blood clotting and dissolution of clots.
- Organization of cardiovascular system.
- Arteries and veins.
- Microcirculation.
- Cardiac electrophysiology and electrocardiogram.
- The heart as a pump.
- Regulation of arterial pressure and cardiac output. Special circulations.

Practical Schedule:

- Red blood cell count and hemoglobin determination.
- White blood cell count.
- White blood cell differential.
- Blood groups, erythrocyte sedimentation rate and osmotic fragility of red blood cells.
- Bleeding time, coagulation time.
- Effect stannous ligatures, temperature and drugs on frog's heart in situ.
- Effect of chemical mediators on isolated frog's heart.
- Characterization of receptors in isolated frog's heart.
- The electrocardiogram.
- Measurement of arterial blood pressure.
- Recording respiratory movements.
- Nerve muscle preparation.

Text Book(s):

Guyton, A.C. and Hall, J.E. Textbook of Medical Physiology. Latest edition. W.B. Saunders Company, Philadelphia.

Additional suggested readings:

Fox, 8.1. Human Physiology. W.C. Brown Publishers. Latest edition. Dubuque.

Ganong, W.F. Review of Medical Physiology. Latest edition. Appleton and Lange, Norwalk.



Course Name: Chemotherapy	إسم المقرر: العلاج الكيميائي
Course Code & No.: 315 PHG	رقم المقرر ٣١٥ دوي
Credits: 2(2+0+0)	عدد الساعات: 2(2+0+0)
Prerequisite: 224PHG	المتطلب: ٢٢٤ دوي
Level: 7	المستوى: 7

Course Description:

This course is designed to provide students - the general principles of antimicrobial and anti-parasitic therapy. It also deals with the study of anti-neoplastic drugs and pharmacological aspects of those chemotherapeutic agents that are produced naturally, synthetically or semi-synthetically. It also deals with their spectrum of activity, mechanisms, and side effects when used for treatment of bacterial, fungal or viral infections. Part of the course also deals with those chemotherapeutic agents that are currently used for treatment of malaria, schistosomiasis, amoebiasis, filariasis, ascariasis, and oxyuriasis.

Objectives:

The course aims to:

1. Develop knowledge and understanding of anti-microbial, anti-parasitic and anti-neoplastic drugs.
2. Develop pharmacological aspects of chemotherapeutic agents that are produced naturally, synthetically and semi-synthetically.

Learning outcomes:

Upon successful completion of this course, students will be able to:

Knowledge:

1. Describe the general principles of chemotherapy.
2. Discuss the various mechanisms, side effects and limitations of the available anticancer drugs.
3. State the differences in the spectrum of action of the synthetic, semi-synthetic and the natural antibacterial agents.

Cognitive skills:

1. Explain the major differences in the mechanisms of action of the naturally derived antibiotics and the synthetically produced antibacterial agents.
2. Compare the advantages and limitations of the various natural antibiotics and their semi-synthetic derivatives.

3. Judge the factors that influence the choice of a certain chemical in the treatment of certain infections that are caused by bacteria, fungi or viruses.
4. Assess the molecular mechanisms of the chemotherapeutic agents used in the treatment of various parasitic diseases.

Course Contents:

- Principles of antimicrobial therapy.
- Spectra, mechanisms of action, uses and side effects of the antibacterials sulphonamides, trimethoprim and fluoroquinolones.
- Spectra, mechanisms of action, uses and side effects of the natural and semi-synthetic antibiotics such as:
 - Penicillins
 - Cephalosporins
 - Aminoglycosides
 - Tetracyclines
 - Chloramphenicol
 - Systemic antifungal agents
 - Antivirals
 - Drugs for the treatment of Malaria
 - Drugs for the treatment of Schistosomiasis
 - Drugs for the treatment of Amebiasis
 - Drugs for the treatment of Filariasis
 - Drugs for the treatment of Ascariasis
 - Drugs for the treatment of Oxyuriasis
 - Drugs for the treatment of Tape worm infections.
 - Drugs for the treatment of Anti-neoplastics

Text Book(s):

- Meyers, Burt R.. Antimicrobial Therapy Guide. 2002 Barnes and Noble.
- Skeel, Roland, T. Handbook of Cancer Chemotherapy. 2003. Barnes and Noble.

Additional suggested readings:

- O'Grady, F. (ed.) Antibiotics and Chemotherapy: Anti-infective Agents and Their Use in Therapy, 1997. Barnes and Noble.
- Yakoub A. Abdi, Gustafsson, L.L., Erickson, O. Hellgren, U. Handbook of Drugs for Tropical Parasitic Infections. 2000. Barnes and Noble.
- Bogitsh, B.J, Cheng, T.C. Human Parasitology. 1999. Barnes and Noble.



Course Name: Physiology-II	إسم المقرر: علم وظائف الأعضاء-٢
Course Code & No.: 222 PHG	رقم المقرر ٢٢٢ دوي
Credits: 2(2+0+0)	عدد الساعات: 2(2+0+0)
Prerequisite: 211PHG	المتطلب: ٢١١ دوي
Level: 6	المستوى: 6

Course Description:

Objectives:

With an emphasis on the human body, this course describes

1. The physiology of respiratory,
2. The physiology of renal,
3. The physiology of digestive, and
4. The physiology of central nervous system.

Learning Outcomes:

Upon successful completion of this course, students will be able to:

Knowledge:

- Describe the functions of different organs of respiratory system and their regulation of function.
- Describe the functions of different organs of digestive system and regulation of its functions.
- Describe the functions of different organs of renal system and regulation of its functions.
- Describe the functions of different organs of nervous system and regulation of its functions.

Cognition:

- Differentiate the digestion and absorption of carbohydrates, lipids and proteins.
- Compare the location and functions of the sensory cortex and motor cortex.
- Describe the flow of blood in the liver and to explain the significance of the enterohepatic circulation.

Course Contents:

- The respiratory system (structure and function).
- Lung volumes and capacities.
- Mechanism of respiration.
- Regulation of respiration.
- Oxygen transport in the blood.
- Carbon dioxide transport in the blood.
- Hypoxia and cyanosis.
- The urinary system (structure and function).
- Mechanism of urine production and clearance.
- The renal glomeruli and glomerular filtration rate.
- The proximal convoluted tubules.

- The loops of Henle.
- Distal convoluted tubules and collecting ducts.
- Regulation of acid-base balance.
- Micturition.
- Clinical applications (use of diuretics, renal function tests and kidney disease).
- Introduction to the digestive system (functions, structure and innervations of the gastrointestinal tract).
- Mouth and esophagus.
- Stomach.
- Small intestine.
- Large intestine.
- The pancreas.
- Bile and gallbladder.
- The liver function.
- Neural and endocrine regulation of the digestive system.
- Digestion and absorption of carbohydrates, lipids and proteins.
- Structural organization of the brain.
- Cerebrum
- Diencephalon.
- Midbrain and hindbrain.
- Spinal cord tracts.
- Cranial and spinal nerves.

Text Book(s):

Guyton, A.C. and Hall, J.E. Textbook of Medical Physiology. Latest edition. W.B. Saunders Company. Philadelphia.



Course Name: Human Biology	إسم المقرر: علم الأحياء البشري
Course Code & No.: 106 BIOL	رقم المقرر ١٠٦ احين
Credits: 4(3+1+0)	عدد الساعات: 4(3+1+0)
Prerequisite: None	المتطلب: بدون
Level: 3	المستوى: 3

Course Description:

This course serves as an introduction to the basic principles of biology with emphasis on structure and function at the molecular and cellular levels. Practical lab sessions are devoted to brief study of histology, anatomy and physiology of body systems, for example, digestive, urogenital, urinary system. In addition, student will also be trained for experimental biology and lab animal handling.

Course Objectives:

This course aims to introduce students to:

- 1) Basic knowledge and understanding of the major integrating concepts of the biological systems such as chemical basis of life, cell structure, inheritance, anatomy and physiology.
- 2) Structure and function of the human body.

Learning Outcomes:

Upon successful completion of this course, students will be able to:

Knowledge

- Describe construction and list functions of different cellular components nucleus, cytoplasm, plasma membrane, ribosomes, mitochondria, lysosomes, centrioles etc.
- Explain how formation and function of molecules depend on chemical bonding between atoms.
- State the molecular as well as the chromosomal basis of inheritance.
- Define the roles of and differences between mitosis and meiosis.
- Describe the structure and processes of human respiratory system, digestive system, cardiovascular system, urinary system, mammalian reproduction along with integration of endocrine and nervous systems.

Communication, Information Technology, Numerical

- Write report assignments and submit them *via* email or as a handwritten copy.

Psychomotor

- Draw structures of various body systems and demonstrate the ability to examine histological slides under the microscope.

Course Contents:

- The Chemical Context of Life
- Cell Structure and Function
- Organization and Regulation of Body Systems
- Digestive system
- Cardiovascular System and Blood
- Respiratory System
- Urinary System
- Chromosomal basis of inheritance
- Molecular basis of inheritance
- Nervous System
- Lymphatic and Immune System
- Endocrine System
- Nervous system

Textbook:

Campbell N.A., Reece J. B. Biology. Latest edition, Benjamin Cummings Company Inc.

Recommended book(s):

- 1) Michael D. Johnson. Human Biology Concepts and Current Issues, 6th Edition, Pearson Inc.
- 2) Sylvia S. Mader and Michael Windelspecht. Human Biology, 12th Edition, Mc Graw Hill International Edition.

Course Name: General Immunology	إسم المقرر: علم المناعة العام
Course Code & No.: 218 PHG	رقم المقرر 218 دوي
Credits: 2 (2+0+0)	عدد الساعات: 2(2+0+0)
Prerequisite: 106BIOL	المتطلب: 106 حين
Level: 3	المستوى: 3

Objective

1. To provide knowledge based curriculum for understanding of immune system
2. To specify the role of immune system in infection and inflammation
3. To relate and apply knowledge gained for understanding selected immuno-pathological disorders

Course description

Prerequisite for this course is BIOL 106. This is an introductory course on basic principles of immunology, focusing on the cellular and molecular processes involved in innate (non-specific) immunity and adaptive (specific) immunity. It expands the descriptions of the main elements of immunity, immune responses, development of immune cells, interactions between humoral and cell mediated immunity, and pathology resulting from immune responses.

Learning Outcomes:

Knowledge (80%):

1. Gain perspective on immunology's historical foundations.
2. Understand the basic structural and functional components of the immune system
3. Acquire knowledge on the immunological role of vaccines
4. Gain the basic knowledge necessary to understand the three pathways of complement activation and MHC classes.
5. Understand the role of cytokines in immune response.
6. Identify different classes of immunoglobulins and its individual function.

Cognitive Skills (20%):

1. Apply basic principles of immune system for understanding of different immunological disorders; autoimmunity, hypersensitivity and immunodeficiency
2. Relate the role of immunoglobulins, complement system and cytokines in transplantation immunology and immunosuppression therapy.

Course Contents:

- Introduction and overview of the immune system
- Lymphoid system and cells of the immune system
- Innate and Adaptive Immunity
- Immune response and control mechanisms



- Immunoglobulin structure and function
- Antigen-Antibody interaction
- MHC classes and HLA System
- Complement System
- Cytokines
- Transplantation Immunology and Immunosuppression therapy
- Immunological disorders:
- Hypersensitivity
- Autoimmunity
- Immunodeficiency
- Immunity to Infection
- Vaccines (manipulation of the immune response)

Evaluation methods:

- 10-Periodicals
- 30-(2 Midterm exams)
- 60-Final Exam

Text Book(s):

- R.A. Goldsby, T. J. Kindt, BA. Osborne, Kuby Immunology, Fourth edition, 2003. W. H. Freeman & Co., New York.
- Janeway, C., Travers, P. Walport, M., and Capra, J., ImmunoBiology, Eight edition, 2012. Garland Publishing, Inc., NY.
- Coico, R., G. Sunshine and E. Benjamini. Immunology: A Short Course. Fifth edition. 2003. Wiley-Uss Pubs.
- Abul K. Abbas, Andrew H. Lichtman and Shiv Pillai, Cellular and Molecular Immunology, Seventh Edition, 2012. Elsevier Saunders.

Additional suggested readings:

- Morgan B.P. Complement Clinical Aspects and Relevance to Disease. 1991. Academic Press, London.
- Ravetch J.V. & Bolland S. IgG Fc receptors. Annual Review of Immunology 19, 275.2001.
- Amigorena S. & Bonnerot C. Fc receptor signaling and trafficking: a connection for antigen processing. Immunological Reviews 172, 279.1999.
- Hennecke J. & Wiley D.C. T-cell receptor-MHC interactions up close. Cell 104, 1.2001.
- Cyster J.G., Chemokines and cell migration in secondary lymphoid organs. Science 286, 2098.1999.
- Jenkins M.K., Khoruts A., Ingulli E. et al In-vivo activation of antigen-specific CD4 T-cells. Annual Review of Immunology 19, 23.2001.
- Buckley R.H. Advances in immunology: primary immunodeficiency diseases due to defects in lymphocytes. New England Journal of Medicine 343, 1313.2000.

Course Name: Pharmacogenomics	إسم المقرر: الصيدلة الجينية
Course Code & No.: 338 PHG	رقم المقرر ٨ دوي
Credits: 2 (2+0+0)	عدد الساعات: 2(2+0+0)
Prerequisite: 324PHG	المتطلب: ٤ دوي
Level: 7	المستوى: 7

Objectives

1. To explain the principles of pharmacogenomics ranging from genetic principles and the inheritance of complex traits to specific examples of pharmacogenomics in drug therapy.

Course Learning Outcomes

Upon successful completion of this course, students will be able to:

knowledge

2. **Describe** the principles and applications of human genetics and genomics in drug therapy optimization, patient care, and counseling.

Communication skills

3. **List and use, the many comprehensive genomic databases and resources on the Internet.**

Cognitive skills

4. **Predict** how alleles segregate and **analyze** different types of environmental and genetic factors that affect development of the allele phenotype, including drug response and **explain** the multifactorial nature of most human traits, including drug response
5. **Interpret** how human genetic variation affects drug metabolism, activation, and disposition and how polymorphisms and linkage are used to identify candidate genes.
6. **Predict and estimate** the advantages, limitations, and dangers of predictive testing for genetic disease and drug response **and analyze** legal and ethical issues in genetic testing and patient stratification in clinical trials.

Course Contents:

Introduction

- The case for Pharmacogenomics
- The history of genetics and Pharmacogenetics
- Information flow in biological systems
- Gene Expression – transcription and translation
- Genes in Pedigrees – Information Transmission/Inheritance
- Mendelian Transmission Patterns
- Dominance/Recessive expression patterns
- Sex-linkage
- Factors Affecting Gene Frequencies
- Selection
- Race/ethnicity and ancestral or geographic origin of alleles
- Population Genetics and Evolution
- Gene and allele frequencies
- Hardy-Weinberg Equilibrium
- Population Structure/admixture
- Genes in Pedigrees – Information Transmission/Inheritance
- Genetic Mapping



- Pedigree Analysis
- Locus and Allelic Heterogeneity
- Quantitative Genetics and Multifactorial Inheritance
- Polygenic traits and environmental factors
- Genetic markers and linkage mapping
- The Human Genome - the organization and structure of genomes
- Genetic Data and the Internet
- Navigating the National Center for Biotechnology Information (NCBI)
- Navigating the Pharmacogenetics and Pharmacogenomics Knowledge Base (PharmGKB)
- Genome Evolution
- Mechanisms of gene duplication and development of gene families
- Paralogs versus Orthologs
- The Human Genome - Organization and structure of genomes
- Genomes – Diversity, Size and Structure
- Genomic Technologies: Microarrays and Quantitative PCR
- Drug Target Pharmacogenomics
- Drug transporters
- Drug metabolizing enzymes
- Cellular signaling pathways
- Guest Lecture: Pharmacogenomics: Oncology and Hematology
- Guest Lecture: Pharmacogenetics: Cardiovascular Diseases
- Guest Lecture: Pharmacogenetics: Transplantation
- Guest Lecture: Pharmacogenetics: Central Nervous System and Psychiatry
- **Ethics and the Genome Revolution**

Evaluation methods:

- 10-Periodicals
- 30-(2 Midterm exams)
- 60-Final Exam

Text Book(s):

A list of articles and chapters from some texts including the following:

Motulsky AG. Drug reactions, enzymes, and biochemical genetics. JAMA. 1957; 165:835-7.

Sansgiry SS, Kulkarni AS. The Human Genome Project: assessing confidence in knowledge and

training requirements for community pharmacists. Am J Pharm Educ. 2003; 67(2): Article 39.

AACP Final Report of the 2001-02 Academic Affairs Committee. Pharmacogenomics: a scientific revolution in pharmaceutical sciences and pharmacy practice. Available at: http://www.aacp.org/Docs/AACPFunctions/Governance/6103_AcademicAffrsfinalreport.pdf

Latif DA, McKay AB. Pharmacogenetics and Pharmacogenomics Instruction in colleges and schools of Pharmacy in the United States. Am J Pharm Educ. 2005; 69(2): Article 23.

Wilson JF, Weale ME, Smith AC, et al. Population genetic structure of variable drug response. Nat Genetics. 2001; 29:265-29.

Pharmacogenomics. Applications to Patient Care. American College Clinical Pharmacy, Kansas City, MO. 2004.

Korf BR. Integration of genetics into clinical teaching in medical school education. Genet Med. 2002; 4:S33-38.

Wilson JF, Weale ME, Smith AC, et al. Population genetic structure of variable drug response. Nat Genetics. 2001; 29:265-29.

Pharmacogenomics. Applications to Patient Care. American College Clinical Pharmacy, Kansas



City, MO. 2004.

Course Name: Pharmacology-III	إسم المقرر: علم الأدوية-3
Course Code & No.: 324 PHG	رقم المقرر 324 دوي
Credits: 3(2+1+0)	عدد الساعات: 3(2+1+0)
Prerequisite: 314PHG	المتطلب: 314 دوي
Level: 8	المستوى: 8

Course Description (AIM):

This course is concerned with the study of drugs that primarily affect the central nervous system. An overview of the central nervous system and the functions of neurotransmitters will precede the introduction of drugs that are used to treat depression, psychosis, epilepsy, Parkinson's disease, Alzheimer's disease or as sedatives/ hypnotics. Drugs used as local and general anesthetics and skeletal muscle relaxants will also be covered in this course. Pharmacological profiles of analgesics, such as NSAIDs and opioids, drugs used for migraine headaches and CNS stimulants will also be discussed.

Objectives: Upon successful completion of this course, the following objectives should be covered:

- 1- The pharmacological profiles of the drugs that are used to treat different diseases affecting the central nervous system.
- 2- The pharmacology of the drugs used as local and general anesthetics and skeletal muscle relaxants.
- 3- Discussion of the pharmacological profiles of analgesics and CNS stimulants.

Learning outcomes:

a- **Knowledge:** Upon successful completion of this course, the student will be able to:

- 1- Describe the physiological roles of neurotransmitters in behavior and their relevance to specific neurological and psychiatric disorders.
- 2- Discuss pharmacology of anti-psychotic drugs, drugs used for the treatment of epilepsy, Parkinson's disease, Alzheimer's disease and migraine headaches
- 3- Describe various local and general anesthetics, analgesics and skeletal muscle relaxants.
- 4- Describe and understand the deleterious effects of CNS stimulants.

b- **Cognitive skills:**

- 1- Differentiate between the causes and symptoms of diseases affecting the central nervous system.
- 2- Compare between the mechanisms of actions and uses of barbiturates and benzodiazepines as sedative/hypnotics and their role in general anesthesia.
- 3- Differentiate between various classes of antidepressant drugs and justify their selective use under different circumstances.

c- **Psychomotor and communication skills:**

- 1- Demonstrate the effects of the drugs affecting CNS on experimental animals.

Learning outcomes:

Course Contents:



- CNS Overview
- Sedatives/Hypnotics: Benzodiazepines, Barbiturates, Atypicals
- Antidepressants: TCAs, SSRIs, MAOIs
- Antipsychotics: Phenothiazines, Thioxanthenes, Butyrophenones, Azepines, Miscellaneous
- Antiepileptics: Drugs for generalized tonic/clonic seizures, drugs for partial seizures, adjunct drugs
- Antiparkinsons drugs
- Anti-Alzheimer drugs
- Nonsteroidal anti-inflammatory drugs (NSAIDs)
- Opioid analgesics
- Drugs for migraine headaches
- CNS stimulants
- Local anesthetics
- General anesthetics
- Skeletal muscle relaxants

Text Book(s):

1. Katzung's Basic and Clinical Pharmacology, 12th edition, Lange Basic Science
2. Goodman and Gilman's Pharmacological basis of therapeutics, 12th edition, McGraw Hill

Additional suggested readings:

1. Rang & Dale's Pharmacology, 7th edition, Churchill Livingstone
2. Lippincott's illustrated pharmacology, 5th edition

Course Name: Pharmacology-IV	إسم المقرر: علم الأدوية-4
Course Code & No.: 334 PHG	رقم المقرر 334 دوي
Credits: 2(2+0+0)	عدد الساعات: 2(2+0+0)
Prerequisite: 324PHG	المتطلب: 324 دوي
Level: 9	المستوى: 9

Course Description (AIM):

This course is designed to teach about drugs related to endocrine hormonal system, including drugs for diabetes mellitus, pituitary, adrenal and thyroid hormone disorders. Various drugs involving gonads and benign prostate hyperplasia will be dealt in this course. This course will also educate about for various gastrointestinal disorders, such peptic ulcer disease, diarrhea, vomiting and constipation. Immune system modifying drugs will also be a part of this course. General pharmacological profiles of drugs used in common skin disorders will also be covered.

Objectives: The following objectives will be covered:

- 1- Drugs that are used to treat depression, psychosis, epilepsy, Parkinson's disease, Alzheimer's disease or as sedatives/ hypnotics. Drugs used as local and general anesthetics and skeletal muscle relaxants will also be covered in this course. Pharmacological profiles of analgesics, such as NSAIDs and opioids, drugs used for migraine headaches Discussion of pharmacology of drugs used for various gastrointestinal disorders and skin disorders
- 2- Discussion of Immune system modifying drugs

Learning outcomes:

a. **Knowledge: Upon successful completion of this course, students will be able to:.**

- 1- Describe the diseases resulting from disturbances of various endocrine hormones and their treatment.
- 2- Outline the rationale for hormone replacement therapy.
- 3- Describe various strategies available for treatment of diabetes mellitus common gastrointestinal disorders, such as peptic ulcer disease, diarrhea, constipation
- 4- Discuss the mechanisms through which drugs stimulate or suppress the immune system.
- 5- List the common skin diseases and name the drugs used for their treatment.

b. **Cognitive skills:**

- 1- Explain the regulatory control of hormonal actions
- 2- Explain the principles that underlie disorders, such as erectile dysfunction and benign prostate hyperplasia, and the drugs used to treat them.

Course Contents:

- Endocrine hormones: Hypothalamic hormones
 - Pituitary hormones
 - Adrenal hormones
 - Thyroid hormones
 - Parathyroid hormones: Calcium and Bone homeostasis



- Gonads
- Drugs used for benign prostate hyperplasia (BPH)
- Drugs used for erectile dysfunction (ED)
- Antidiabetic drugs
 - Insulins
 - Hypoglycemic drugs
 - Antihyperglycemic drugs
- G.I. Drugs:
 - Anti-ulcer: H2-receptor antagonists, Proton pump inhibitors (PPIs), Cytoprotective drugs, Antacids
 - Anti-emetics
 - Antidiarrheals
 - Laxatives
- Immune system modifying drugs
- Principles and scope of gene therapy
- Drugs used for dermatological conditions

Text Book(s):

Hadley, Mace E.: Endocrinology. 1999. Barnes and Noble.
 Brody, T.M.: Human Pharmacology: Molecular to Clinical 2003. Mosby - Year Book, Inc.
 Struck Medical Office Pharmacology. 2002. Pearson Professional Education, Prentice Hall, Blackwell Publishing Co.

Additional suggested readings:

Ruth, Wood row Essentials of Pharmacology for Health Occupations, 2002. Academic Press.
 Pelletier, Cath rifle. Pharmacology. 2003. McGraw-Hill, New York.

Course Name: Molecular Pharmacology	إسم المقرر: علم الأدوية الجزيئي
Course Code & No.: 225 PHG	رقم المقرر 225 دوي
Credits: 2 (2+0+0)	عدد الساعات: 2(2+0+0)
Prerequisite: 106BIOL	المتطلب: 106 حين
Level: 4	المستوى: 6

Course Description:

The course deals with the molecular aspects of biological membranes and mechanisms involved in material transport across it. It also involves the study of the pharmacological aspects of neurotransmitters and drugs, their interactions with specific receptors and its resultant downstream response.

Objectives:

- 1- To provide basic principles on the molecular assembly of biological membranes and passage of molecules and/or ions across them.
- 2- To explain the role of neurotransmitters and function of different classes of receptors.
- 3- To educate the molecular aspects involved after interaction of neurotransmitters and/or drugs to its specific receptor type.
- 4- To teach different classes of drugs used during specific disease state.

Learning outcomes:

Upon successful completion of this course, the student will be able to:

Knowledge:

1. Recognize the molecular aspects of biological membranes and enumerate its function in material transport across them.
2. Define the pharmacological aspects of neurotransmitters and other endogenous substances.
3. Describe the dynamic nature of receptors during health and disease.
4. Describe the effect of neurotransmitters and/or drugs on their targeted receptors.

Cognitive skills:

1. Indicate the resultant effect of neurotransmitter-receptor interaction.
2. Apply the knowledge of receptor biology in understanding the effect of drugs during disease conditions.

Course Contents:

- Introduction: General concepts of chemistry and functions of biological membranes.
- General concepts of receptors and their classifications.
- Cholinergic receptors, their natural ligands and their synthesis.
- Adrenergic receptors, their natural ligands and their synthesis.
- Dopaminergic receptors, their natural ligands and their synthesis.
- Serotonergic receptors, their natural ligands and their synthesis.
- Gamma Aminobutyric Acid receptors, their natural ligands and their synthesis
- Histamine receptors, their natural ligands and their synthesis.
- MAO enzymes, their natural substrates and their synthesis.
- Sodium ion channels and drugs affecting them, e.g. Local anesthetics, antiarrhythmics, diuretics, etc.

- Calcium ion channels and drugs affecting them, e.g. Antihypertensives, antianginals, etc.
- Chloride ion channels and Coupled sodium/chloride ion channels and drugs affecting them. Membrane-bound ATPases: Such as Na⁺,K⁺- ATPase (Cardiac glycosides), H⁺,K⁺- ATPase.

Text Book(s):

Williams and Lemke, Foye's Principles of Medicinal Chemistry 15th. Edition, 2002. Lippincott Williams & Wilkins.

Wilson and Gisvold's. Textbook Of Medicinal and Pharmaceutical Chemistry, Latest edition. Lippincott Company.

G. Thomas. Medicinal Chemistry: An Introduction, 2000. John Wiley & Sons Ltd., England.

Wingard, Brady, Lamer & Schwartz, Human Pharmacology: Molecular to Clinical, 1991 .Mosby Yearbook.

Graham L. Patrick. An Introduction to Medicinal Chemistry, 1995. Oxford University Press.

Rang and Dale. Pharmacology 7th edition. 2012. Elsevier.

Additional suggested readings:

Alex Gringauz. Introduction to Medicinal Chemistry: How Drug Act and Why, 1997, Wiley-VCH. Inc.

Mycek, Genner and Perper, Harvey and Champe, editors. Pharmacology. Latest edition. J.B Lippincott: Company.

Syllabus of the drugs of abuse course PHG 424

Course Name: Drugs of Abuse	إسم المقرر: الأدوية المدمنة
Course Code & No.: 424 PHG	رقم المقرر 424 دوي
Credits: 2(2+0+0)	عدد الساعات: 2(2+0+0)
Prerequisite: 334PHG	المتطلب: 334 دوي
Level: 12	المستوى: 12

Course Description

This course is intended to provide the student with knowledge regarding the different cases of drugs of abuse, whether they are used by legal or illegal methods. The major part of the course will be directed for discussion of the pharmacological action, mechanisms and adverse reactions of the drugs of abuse. Furthermore, the discussions will include the various methods available for treatment of addiction and prevention of precipitation of the withdrawal symptoms.

Objectives:

Purpose of this course is to introduce students to:

- **General principle of drugs of abuse.**
- **Pharmacology of drugs of abuse.**
- **Management of various types of the abused drugs.**

Learning Outcomes

Upon successful completion of this course, students will be able to:

A. Knowledge

1. List and define various medical terms in the field of drugs of abuse such as addiction, tolerance, dependence and abstinence syndrome.
2. Discuss the different types of tolerance and dependence.
3. State the various types of the abused drugs and their alternative names used in different countries.
4. Summarize the factors that predispose to the abuse of drugs.
5. Explain the different scientific strategies that can be followed for prophylactic youth from indulging in the habit of drug abuse.
6. Discuss the various pharmacological actions of the abused drugs, their mechanisms of action and adverse reactions.

B. Cognitive Skills

1. Differentiate between different types of tolerance and dependence.
2. Compare between pharmacological actions of the various drugs of abuse.
3. Distinguish between withdrawal symptoms of the various drugs of abuse.

Syllabus of the drugs of abuse course PHG 424

4. Choose the available and appropriate therapeutic regimen for treatment of addicts.

C. Interpersonal Skills & Responsibility

1. Pay attention to narcotic schedule
2. Recommend the appropriate treatment for drug dependence.

D. Communication, Information Technology, Numerical

1. Formulate a plan for prevention of youth from indulging in the habit of drug abuse.

Course Contents:

- Definition of the terms: abused drugs, habituation, tolerance, dependence, addiction and abstinence syndrome.
- Types of tolerance and dependence.
- Factors that predispose for drug abuse.
- Scientific strategies to prevent youth from indulging in the habit of drug abuse.
- The discussion of the pharmacological actions, mechanisms, adverse reactions and types of tolerances and dependence that accompany the abuse of the following drugs:
 - Alcohols
 - Tobacco
 - Cocaine
 - Khat
 - Amphetamines
 - Opioids e.g. Heroin
 - Cannabis (hashish - Marijuana)
 - Benzodiazepines
 - Barbiturates
 - The Hallucinogens: LSD, Psilocybin, Psilocin, mescaline, Phencyclidine
 - Inhalants: Benzene, toluene, gasoline
- Treatment of withdrawal symptoms and addiction

Text Books:

- Shannon MW, Borron SW, Burns MJ. Haddad and Winchester's Clinical Management of Poisoning and Drug Overdose. 4th ed. 2007. Elsevier's Health Sciences.

Syllabus of the drugs of abuse course PHG 424

- American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders: DSM-5. Washington, D.C: American Psychiatric Association.
- Brunton L L, Blumenthal D K, Murri N, Dandan R H, Knollmann B C. Goodman & Gilman's The Pharmacological Basis of Therapeutics. 12th ed. New York: McGraw-Hill, 2011
- Tasman A, Kay J, Lieberman JA, First MB, Maj M. Psychiatry, 3rd ed. USA. John Wiley & Sons, Ltd, 2008.

Additional suggested readings:

- ElTahir, Kamal E.H. Narcotics and Mind Manifesting Drugs. 2002. Dar AI-Iloom, Riyadh, Saudi Arabia.
- Hogan, J.A., Gabrielsen, K. and Luna, N. Substance Abuse Prevention: The Intersection of Science and Practice. 2002. Barnes and Noble
- Keltner, N.L. and Folkds, D.G. Psychotropic Drugs. 2001. Barnes and Noble.

Course Name: Pharmacology-I
Course Code & No.: 224 PHG
Credits: 4 (3+1+0)
Prerequisite: 210 PHG
Level: 4

١ -الأدوية علم:المقرر إسم
دوي ٢٢٤ المقرر رقم
٠ (:الساعات عدد +3+1)4
دوي ٢١٠ :المتطلب
٦ :المستوى

Course Description (AIM):

This course is designed to introduce the students to the general principles of pharmacology with regard to the general pharmacological terms, sources of drugs, routes of drugs' administration, process and stages of drug development, safety, pharmacokinetics (absorption, distribution, metabolism and excretion) and pharmacodynamics (drug interaction with receptors and the resulting effect). It also explains the autonomic nervous system (ANS), its divisions, neurotransmitters for each division, the agonists and antagonists affecting ANS. It introduces the concepts of efficacy, potency and dose-dependent responses of drugs. The practical part of the course exposes the students to visually observe what is taught in the theory, using isolated tissues and common laboratory animals, that reinforces the concept and understanding of a topic.

Objectives

The course aims to introduce students to:

- the basic principles of pharmacology, definition of drugs and sources of drugs
- the process of the development of drugs, from preclinical to clinical trials stages and the approval process by regulatory agencies
- various terminologies used in the development and uses of drugs, such as agonist and antagonist and how drugs act with macromolecules (receptors) in the body to produce effects
- the pharmacokinetic and pharmacodynamic aspects of drugs in the body
- introduce to the autonomic nervous system, its divisions, cholinergic and adrenergic receptors, cholinergic and adrenergic agonists and antagonists, and their uses in different diseases with hands-on experience in the lab to reinforce the theoretical concepts of the course

Commented [P1]: Please merge objective 5 and 6

Learning Outcomes

Upon successful completion of this course, students will be able to:

Knowledge

- discuss the scientific meanings of various pharmacological terms such as potency, efficacy, ED50, tachyphylaxis, tolerance, agonists, antagonists, idiosyncrasy... etc.
- state the factors that influence the variability of drugs actions.
- describe the medical uses of drugs that stimulate or inhibit various cholinceptors and adrenoceptors.

Cognition

- defend selective and judicious use of drugs in diseases involving muscarinic and nicotinic receptors
- infer the differences between drugs acting as competitive and non-competitive; reversible and irreversible autonomic receptors blockers.
- develop the clinical use of drugs acting as agonists and antagonists on cholinergic and adrenergic receptors to treat various diseases.

Interpersonal Skills

- Be able to interact amicably with peers, pay attention, participate and discuss the nuances of the experiments conducted in the lab

Psychomotor Skills

- Demonstrate skills to conduct an experiment on isolated tissues and intact animals, and be able to evaluate and interpret the results obtained from such experiments

Course Contents:

- Introduction to pharmacology
- Sources of drugs.
- Definitions of pharmacological terms.
- Drug development, Safety, Adverse Drug Reactions, ED50, LD50 and Therapeutic index
- Drug-drug interactions
- Pharmacokinetics: Absorption, Distribution, Metabolism and Excretion
- Pharmacodynamics: Drug-receptor interaction, Signal transduction, dose-response relationship, graded and quantal dose response, efficacy and potency
- Autonomic Nervous System (ANS)
- Cholinergic agonists (Cholinomimetic drugs)
- Cholinergic antagonists
- Adrenergic agonists
- Adrenergic antagonists

Text Book(s):

Laurence L. Brunton (eds.): Goodman and Gilman's Pharmacological Basis of Therapeutics, 12th. Edition, 2011, McGraw-Hill, New York. ISBN-13: 978-0071624428 ISBN-10: 0071624422

Bertram G. Katzung, Susan B. Masters and Anthony J. Trevor (eds). Basic and Clinical Pharmacology, 12th Edition, 2012, McGraw Hill Lang, New York.

Additional suggested readings:

Lippincott Illustrated Reviews: Pharmacology (Lippincott Illustrated Reviews Series). 6th Ed. 2014. Williams and Wilkins Publisher Co., N.Y. ISBN-13: 978-1451191776 ISBN-10: 1451191774

Pelletier, Catherine: Lange Smart Charts Pharmacology 2/E Paperback – August 5, 2015. ISBN-13: 978-0071774369 ISBN-10: 007177436X

Course Name: Pharmacology-II**Course Code & No.:** 314 PHG**Credits:** 4 (3+1+0)**Prerequisite:** 224PHG**Level:** 5

٢ -الأدوية علم :المقرر إسم

دوي ٣١٤ المقرر رقم

٠ (:الساعات عدد +1+3 4

دوي ٢٢٤ :المتطلب

٧ :لمستوى ١

Course Description (AIM):

This course is designed to educate students about the aspects related to cardiovascular system. This course covers the classes, mechanisms of action, adverse effects, etc. of the drugs that are used to treat hypertension, angina pectoris, cardiac arrhythmias and congestive heart failure. Anticoagulants, antiplatelets, thrombolytics and antihyperlipidemic drugs in relation to cardiovascular diseases are discussed and their pharmacological profiles elaborated. The course also covers the role and mechanism of diuretics in the management of hypertension and congestive heart failure. Anti-anemic and hematopoietic drugs, as related to the well being of the body in relation to cardiovascular system are discussed. This course also discusses drugs used for the treatment of bronchial asthma and COPD. In the practical part of the course the students perform experiments on isolated heart and in conscious animals (rodents) to verify the actions of the drugs they studied in the theoretical part of the course. Blood coagulation time, bleeding time and prothrombin time (PT) are also determined in the lab.

Objectives

This course is intended to achieve the following objectives:

- The students are introduced to drugs that are used to treat various diseases affecting the cardiovascular system, including the blood coagulation process
- The students should learn the mechanisms of action of drugs, and how they modify the pathophysiology of diseases like hypertension, congestive heart failure, angina pectoris cardiac arrhythmias, dyslipidemia and broncho-spastic diseases
- The students should understand the mechanisms of actions of drugs affecting haemopoetic system and blood coagulation system to understand their appropriate uses under different circumstances
- The students are also expected to comprehend the adverse effects of these drugs and any potential drug-drug interactions, as patients with cardiovascular diseases use several drugs simultaneously

Learning Outcomes

Upon successful completion of this course, students will be able to:

Knowledge

- State specific drugs and their mechanisms of action to treat hypertension, congestive heart failure, cardiac arrhythmias, angina pectoris and dyslipidemia
- Define the differences among the pharmacological profile of various anti-dyslipidemic drugs and the limitations of their uses
- Summarize the causes of thrombosis and atherosclerosis and the logical choices of drugs in the management of each of them.

Cognition

- Distinguish among specific drugs used to treat hypertension, angina pectoris and cardiac arrhythmias.
- Interpret the differences between the anticoagulants, anti-platelets and thrombolytic drugs and the use of appropriate drugs under various circumstances.
- Understand the mechanisms of action and other features of the drugs used to treat bronchial asthma and chronic obstructive pulmonary disease.

Interpersonal Skills

- Pay attention, participate and discuss the nuances of the experiments conducted in the lab

Psychomotor Skills

- Demonstrate skills to conduct an experiment on isolated tissues and intact animals, and be able to evaluate and interpret the results obtained from such experiments

Course Contents:

- Antihypertensive drugs
- Antianginal drugs
- Antiarrhythmic drugs
- Antihyperlipidemic drugs
- Anticoagulants, Antiplatelet and Thrombolytic drugs
- Drugs used for congestive heart failure
- Diuretics
- Drugs used for anemia and hematopoiesis
- Drugs used for bronchial asthma and COPD
- Autacoids: Antihistamines

Text Book(s):

Laurence L. Brunton (eds.): Goodman and Gilman's Pharmacological Basis of Therapeutics, 12th. Ed., 2011, McGraw-Hill, New York. ISBN-13: 978-0071624428, ISBN-10: 0071624422
Bertram G. Katzung, Susan B. Masters and Anthony J. Trevor (eds). Basic and Clinical Pharmacology, 12th Edition, 2012, McGraw Hill Lang, New York. ISBN-13: 978-0071764018
ISBN-10: 0071764011

Additional suggested readings:

Lippincott Illustrated Reviews: Pharmacology (Lippincott Illustrated Reviews Series). 6th Ed. 2014. Williams and Wilkins Publisher Co., N.Y. ISBN-13: 978-1451191776 ISBN-10: 1451191774
Paul Vanhoutte (Editor): Cardiovascular Pharmacology: Heart and circulation, Volume 59 (Advances in Pharmacology) Hardcover – November 4, 2010, ISBN-13: 978-0123849038
ISBN-10: 9780123849038

Syllabus of the toxicology course PHG 333

Course Name: Toxicology	علم السموم	إسم المقرر:
Course Code & No.: 333 PHG	333 دوي	رقم المقرر:
Credits: 2(2+0+0)	2(2+0+0)	عدد الساعات:
Prerequisite: 224PHG		المتطلب: 224 دوي
Level: 9		المستوى: 9

Course description:

This course is concerned with the basic principle of toxicology and different disciplines of toxicology, the mechanisms of toxicity and management of the common toxicities. Also, it concerned with serious consequences of exposure to drugs and chemicals with especial considerations with maternal, foetal and neonatal health.

Objectives

This course aims to introduce students to:

- General principles of toxicology
- Non-organ-directed toxicity (carcinogenicity, mutagenicity, and teratogenicity)
- The target organ toxicity
- The environmental toxicology

Learning outcomes:

By the end of the course, the students will able to:

A. Knowledge

1. State the general procedures for management of poisoning
2. Outline the general mechanisms of the common poisons
3. List the common drugs which have toxic effects on the heart, liver, kidneys, lungs and brain
4. Indicate the mechanism of toxicity of the common drugs on the heart, liver, kidneys, lungs and brain
5. Outline the toxicity of the environmental pollutants.
6. Outline the toxicity of the common heavy metals poisoning

B. Cognitive Skills

1. Explain the biochemical and cellular mechanisms that underlie the common toxicities of drugs and chemicals
2. Differentiate between the mechanisms involved in drug-induced teratogenicity, mutagenicity or carcinogenicity
3. Explain the drug-Drug, drug-food interactions of commonly used drugs
4. Describe the mechanism of drug-induced allergies

Syllabus of the toxicology course PHG 333

C. Interpersonal Skills & Responsibility

1. Write the toxicological history
2. Evaluate the intoxicated patient

Course Contents:

- General principles of management of poisoning.
- General mechanisms of toxicity.
- Roles of free radicals in induction of diseases.
- Environmental pollutants.
- Drug-Drug interactions.
- Drug-food interactions.
- Drug-induced allergies. Iatrogenic diseases.
- Heavy metals poisoning.
- Groups of drugs that are toxic to:
 - Heart
 - Liver
 - Kidneys
 - Lungs
 - Brain
- Teratogenic agents
- Mutagenic agents
- Carcinogenic agents

References:

- Klaassen CD (2013): Casarite and Doulls Toxicity, The Basic Science of Poisoning. 8 ed. McGraw-Hill.
- Shannon MW, Borron SW, Burns MJ (2007): Haddad and Winchester's Clinical Management of Poisoning and Drug Overdose. 4th ed. Elsevier's Health Sciences.
- Olson KR (2006): Poisoning and Drug Overdose. 5th ed. McGraw-Hill.
- Hodgson, E., Smart, Robert, C., Introduction to Biochemical Toxicology. 2001. Barnes and Noble.
- Greenberg, MI (2003): Occupational, Industrial and Environmental Toxicology. Elsevier Science.