الجمهورية اليمنية

جامعة عدن

كلية الصيدلة

الخطة الدراسية

برنامج بكالوريوس في الصيدلة

Study plan - Bachelor in Pharmacy

Starting from 2018-2019

سبتمبر 2018 م

المقدمة:

كلية الصيدلة هي إحدى مكونات جامعة عدن حيث تم إنشاء تخصص الصيدلة ضمن تخصصات كلية الطب والعلوم الصحية في أكتوبر 1995 م, تم تحويل تخصص الصيدلة إلى كلية الصيدلة في تاريخ / 6 / 24 2009م. منذ إنشاء تخصص الصيدلة وحتى تاريخ تقديم هذا المشروع لم يتم أي تطوير في منهج كلية الصيدلة أي انه ظل كما هو على مدى 23 عاما, ومن اجل مواكبة التطورات المتسارعة في كل مجالات العلوم الصيدلانية ومواكبة مناهج بكالوريوس صيدلة في كليات الدول المتقدمة ولتحسين المخرجات ومتطلبات المهنة وسوق العمل وتعزيز دور خريجي الكلية في المجتمع فان تقديم هذه الخطة يعتبر ضرورة ملحة حاليا.

الرسالة والاهداف لكلية الصيدلة وبرنامج بكالوريوس في الصيدلة:

Vision of the Faculty of Pharmacy:

The Faculty of Pharmacy will be a national model for exceptional pharmacy education and health care in Yemen.

Mission of the Faculty of Pharmacy:

The mission of the Faculty of Pharmacy Aden University is to graduate pharmacists for the practice in pharmaceutical and other related pharmacy issues and to promote research and health related service to society needs.

Goals of the Faculty of Pharmacy:
The Faculty of Pharmacy aims at :

1. Educating students with a comprehensive curriculum that prepares competent graduates to function efficiently in any sitting
2. Ensuring quality of the program through continuous evaluation and development
3. Encouraging and supporting research resources and scholarly pursuits
4. Serving the needs of society through emphasis the importance of the pharmacists as a key member of an interdisciplinary team
5. Acquiring students the skills , abilities and ethics necessary for the provision of pharmacy practice in any setting
6. Establishing channels for collaboration with other related local and regional institutions

The mission of Pharmacy program

The mission of B.Sc. Pharmacy program is to educate the pharmacy students to work competently in different pharmaceutical and health care settings.

Aims of Pharmacy Program

The program aims at:

1. Providing students with necessary knowledge and understanding of pharmaceutical and related sciences.
2. Providing students with the necessary pharmaceutical professional skills.
3. Enabling students to solve health related problems based on critical thinking and rational drug use.
4. Developing the student's ability to communicate effectively and to function on multi-disciplinary teams.
5. Educating students to take responsibility for management and organization of their professional duties within the workplace.
6. Helping students to apply the legal and ethical requirements to practice pharmacy professionally.
7. Developing students capabilities as a medication therapy expert and competent pharmacist through lifelong learning

الخطة الدراسية وتوزيع المساقات:

Study plan - Bachelor in Pharmacy

Total credit hours 170

Starting from 2018-2019

FIRST YEAR

1st Semester				Second Semester			
Subject	**Theory**	**Practice**	**Total CH**	**Subject**	**Theory**	**Practice**	**Total CH**
1.General Chemistry	2	2	**3**	**1.** Organic chemistry	2	2	**3**
2. English	2	-	**2**	**2**. Botany	2	2	**3**
3. Biology	2	2	**3**	**3.** Anatomy	2	2	**3**
4. Physics	2	-	**2**	**4.** Physical Pharmacy	3	2	**4**
5 Histology	2	2	**3**	**5.** Pharmaceutical Organic chemistry II	3	2	**4**
6. Pharmaceutical Organic chemistry I	3	2	**4**	**6**.Analytic Chemistry II	3	2	**4**
7. Pharmaceutical calculation	3	2	**4**	**7**.Pharm. Inorganic chemistry	3	2	**4**
8.Analytic Chemistry I	3	2	**4**				
Total			**25**				**25**

SECOND YEAR

1st Semester				Second Semester			
Subject	**Theory**	**Practice**	**Total CH**	**Subject**	**Theory**	**Practice**	**Total CH**
1. Physical Chemistry	3	2	**4**	**1**. Pharmaceutical Chemistry I	3	2	**4**
2. Biochemistry I	3	2	**4**	**2.** Biochemistry II	3	2	**4**
3. Pharma cogency I	2	2	**3**	**3**.Pharma cogency II	2	2	**3**
4. Pharmaceutics' I	3	2	**4**	**4**. Pharmaceutics II	3	2	**4**
5. Physiology	2	2	**3**	**5**. Pathology	2	2	**3**
6. Microbiology	2	2	**3**				
Total			**21**				**18**

THIRD YEAR

1st Semester				Second Semester			
Subject	**Theory**	**Practice**	**Total CH**	**Subject**	**Theory**	**Practice**	**Total CH**
1. Pharmaceutical Chemistry II	3	2	**4**	**1**. Pharmaceutical Chemistry III	3	2	**4**
2.Pharmaceutics' III	3	2	**4**	**2.** Biopharmaceutics' & Pharmacokinetics	3	2	**4**
3. Parasitology	2	2	**3**	**3**. Pharmacology I	3	2	**4**
4. Phytochemistry I	3	2	**4**	**4**. Phytochemistry II	3	2	**4`**
Total			**15**				**16**

FOURTH YEAR

1st Semester				Second Semester			
Subject	**Theory**	**Practice**	**Total CH**	**Subject**	**Theory**	**Practice**	**Total CH**
1. Pharmaceutical Chemistry IV	3	2	**4**	**1**.Pharmaceutical administration	2	-	**2**
2.Industrial Pharmacy I	3	2	**4**	**2.** Industrial Pharmacy II	3	2	**4**
3. Pharmacology II	3	2	**4**	**3**. Pharmacology III	3	2	**4**
4.Public Health	3	2	**4**	**4**. Applied Pharma cogency	2	2	**3**
5. Psychology	2	2	**3**				
Total			**19**				**13**

FIFTH YEAR

1st Semester				Second Semester			
Subject	Theory	Practice	Total CH	Subject	Theory	Practice	Total CH
1. Advanced Quality Control	3	2	**4**	**1**. Research Project II		15	**5**
2.Clinical Pharmacy I	3	2	**2**	**2.** Clinical Pharmacy II	3	2	**4**
3. Toxicology	2	2	**2**				
4. Research Project I		3	**1**				
Total			**9**				**9**

توصيف المقررات

DESCRIPTION OF COURSES

FIRST YEAR المستوى الأول

BOTANY

COURSE DESCRIPTION :

This course provides students with basic knowledge of the plant taxonomy of important plant families. It also introduces the student to the morphology and anatomy of plant organs and the plant physiology

OBJECTIVES:

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

1. Understand the knowledge of plant taxonomy to identify the unknown plant according to taxonomical characters of the plant family and species.
2. Describe the morphological characters of different parts of medicinal plants (bark, leaves, flowers, seeds, fruits, roots and rhizomes, herb).
3. Explain the general concepts of plant anatomy (structure of the plant cell, different plant tissues, vascular bundle and secondary growth).
4. Apply macroscopical and microscopical examinations for identification of morphological groups (leaf, flower, seed fruit,…etc.).
5. Illustrate the different processes of plant physiology (plant water relation, transpiration, absorption and translocation of water, photosynthesis, respiration).

METHODS OF TEACHING

1- Lectures
2- Controls.
3- Quiz
4- Practical training[laboratory]
5- Internet research an d discussion

METHODS OF ASSESSMENT

1- Attendance and discussion in seminars.
2- Two Mid-semester written examination
3- Final written examination

TEXTBOOKS AND REFERENCES:

1- Gangulee HC, Das KS, and Duta C. College botany volume 1
2- Vasishta PC. Taxonomy of Angiosperms.
3- Lectures and practical notes prepared by instructors.
4- Devlin RM, and Witham FH. Plant physiology.
5- Kokate C.K.,Purohit A.P, Gokhale S.B., "Pharmacognosy" 17th edition , NiraliPrakashan, Pune.
6- Practical Pharmacognosy: C. K. Kokate and S. B. Gokhale; NiraliPrakashan, Pune.

Week	SUBJECT	L	S	p	TOTAL
1	**Plant Taxonomy**: Botany and its branches. Classification of plant kingdom. Plant taxonomy, terminology and nomenclature.	2			2
2	**Plant Families:** General taxonomic description of some monocot and dicot families with special reference to some medicinal plants such as apocynaceae, asteraceae, solanaceae, rutaceae, umbelliferae, leguminosae, rubiaceae, liliaceae, graminae, labiatae, cruciferae, papaveraceae and zingiberaceae.	4			4
3	**Plant Morphology**: Introduction. Seed and seedlings. Types, region and function of Seed and Root.	2			2
4	Types, region and function of shoot. regions of stem, kinds of stems, bud and its types, types of modification.	2			2
5	Types, region and function of the leaf, flower and fruit. Inflorescences.	4			4

6	**Plant Anatomy:** General structure of plant cell and cell contents.	2			2
7	Types of plant tissues and tissue systems.	4			4
8	Internal structure of stem, root, leaf.	4			4
9	**Plant Physiology:** Solution, plant water relation and Respiration	2			2
10	Photosynthesis and growth hormones.	2			2
TOTAL		**28**			**28**

BIOLOGY

COURSE DESCRIPTION :

The course is an important basic prerequisite for best understanding and further basic sciences in the program. Through this course, structure and function of the cell, different types of tissues and how the body is organized into systems, will be explored. The course provides students with basic principles regarding nutrition, digestion and how energy is harvested by metabolism.

OBJECTIVES:

On the completion of the course, the students will be able to:

1. Describe the structure and function of the cell and classify different body tissues.
2. Identify structural parts of digestive, circulatory, respiratory, urinary and nervous systems .
3. Discuss processes of digestion, respiration, circulation and urine formation.
4. Discuss the characteristics of nucleic acids and the process of translation of the genetic code.
5. Describe the mechanism of hormones actions, and the manifestation of deficiency and excess.

METHODS OF TEACHING

6- Lectures
7- Controls.
8- Quiz
9- Practical training[laboratory]
10- Internet research an d discussion

METHODS OF ASSESSMENT

1- Attendance and discussion in seminars.
2- Two Mid-semester written examination
3- Final written examination

TEXTBOOKS AND REFERENCES:

1- Galal M. Assakaf . Principles of Human Biology. 1st ed. University Of Aden 2009.
2- Sylvia S. Mader. Prospective of Human Biology. 4th ed. McGraw−Hill Companies 2004.
3- - Mader. Understanding Human Anatomy &Physiology, Fifth Edition; McGraw−Hill Companies , 2004

Week	SUBJECT	L	S	p	TOTAL
1	**The cell structure and function;** Discuss the cell membrane structure. Identify mechanisms of transport. Discuss organelles and nucleus structures and functions.	2			2
2	**The different tissues**; Discuss types and location and function. of body tissues.	2			2
3	**Nutrition and digestion** Describe types of nutrients. Identify parts of digestive system. Describe digestion and absorption	4			4
4	**Metabolism of the body** Discuss Cellular respiration. Glycolysis Aerobic respiration: Kreb's cycle. Describe the Electron transport chain Discuss the Metabolism of Fat: β-oxidation	4			4
5	**The Genetic code and protein synthesis** Describe structure of DNA & RNA Describe the process of Replication and transcription. Discuss the genetic code of Protein Synthesis.	2			2

6	**The Intercellular control** Describe the Cardiovascular system. Discuss the Cardiac cycle. Discuss the components of the blood Describe the breathing system..	2			2
7	The blood and lymph	2			2
8	The intercellular control II; Breathing & excretion	4			4
9	**The hormonal control** Identify endocrine glands. Discuss the hormone actions.	2			2
10	The nervous control ; The Nervous System	4			4
TOTAL		**28**			**28**

PHYSICS

COURSE DESCRIPTION :

The course is an important basic prerequisite for best understanding and further basic sciences in the program. Through this course, structure and function of the cell, different types of tissues and how the body is organized into systems, will be explored. The course provides students with basic principles regarding nutrition, digestion and how energy is harvested by metabolism.

OBJECTIVES:

Upon completion of the course the students will be able to:

1. describe the basic of physics, general principals of, bio-signals and its application.
2. Demonstrate the importance of reflection and refraction, use in clinical optics.
3. Identify the medical importance of x –rays, medical imaging system and concept electro surgery.

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4. Describe the **Properties of fluids** Haimo-dyalisis, the blood flow and filtering.
5. Identify the basic knowledge of systemic and skin temperature, the methods of measurements, and the temperature sensitive device.

METHODS OF TEACHING

11- Lectures
12- Controls.
13- Quiz
14- Practical training[laboratory]
15- Internet research an d discussion

METHODS OF ASSESSMENT

1- Attendance and discussion in seminars.
2- Two Mid-semester written examination
3- Final written examination

TEXTBOOKS AND REFERENCES:

1- 1978 – medical physics John R. Cameron, James G. SkofronickWiley
2- Medical physics, by: John R. Cameron & James G. Skofronick; Willy John.
3- Introduction to health physics, by: H. Cember, New York, 1982.

Week	SUBJECT	L	S	p	TOTAL
1	**physics of biological membrane, nervous system** **Bio-signals**	8			8
2	MEDICAL IMAGING Radiation SOUND M R I ENDOSCOPY HIGH FREQUENCY CURRENTS IN MEDICINE	8			8
3	Nature of light, applications on image formation, eye resolution and accommodation	6			6
4	Properties of fluids Haimo-dyalisis	4			4

5	Heat and heat flow in biological systems	2			2
TOTAL		**28**			**28**

ENGLISH

COURSE DESCRIPTION :

The students are expected to have a back ground about medical English. The current course is designed to meet needs of students in this stage, it aims to help leaners to keep up with requirements of the university studies particularly in the English language skills, vocabulary and grammar. English course of the pharmacy is supplemented by a course of grammar of medicines and health sciences.

OBJECTIVES:

Reading Outcomes

- distinguish between main ideas and supporting details (skimming) and locate specific information (scanning)
- distinguish between stated and implied ideas (making inferences)
- predict what to come next and guess meaning from context (guessing)
- think about personal experience or use previous knowledge
- recognize the structure and organization of the text
- understand sequence of events

Writing Outcomes

- write correct sentences
- avoid run-on sentences and fragments
- develop a topic sentence by supporting sentences
- use conjunctions and transition words correctly to build sentences and achieve coherence

Grammar Outcomes

- recognize and use differences tenses
- recognize the differences between verbs

Skill: Reading I

1. Reading Strategies in the Academic Sitting
2. Preventive Medicine
3. Infectious Diseases
4. How Body Fights Infection

Skill: Writing I

1. Punctuation Marks
2. Definition

Skill: Grammar I

1. Present Simple & Present Progressive (1)
2. Present Simple & Present Progressive (2)
3. Past Simple & Present Perfect (1)
4. Past Simple & Present Perfect (2)

METHODS OF TEACHING

1- Lectures
2- Controls.
3- Quiz
4- Practical training[laboratory]
5- Internet research an d discussion

METHODS OF ASSESSMENT

1- Attendance and discussion in seminars.
2- Two Mid-semester written examination
3- Final written examination

TEXTBOOKS AND REFERENCES:

Week	SUBJECT	L	S	p	TOTAL
1	Reading Strategies in the Academic Sitting	2			2
2	Preventive Medicine	2			2
3	Present Simple and Present Progressive (1)	4			4
4	Present Simple & Present Progressive (2)	4			4
5	Infectious Diseases	2			2
6	Past Simple & Present Perfect (1)	4			4
7	Past Simple & Present Perfect (2)	4			4
8	How Body Fights Infection Punctuation Marks	4			4

9	Description (1)	2			2
10	Description (2)	2			2
TOTAL		**28**			**28**

GENERAL CHEMISTRY

COURSE DESCRIPTION :

This course is I is basic science for organic chemistry and other pharmaceutical chemistry Where in this course a study of some Base unit of measurement Standards of measurement ,State and kinds of matter, Energy ,Molecular compounds covalence number ,the periodic table , polar molecules ,Electronegativity ,Reaction , molar concentration ,
stoichiometry in involving in balanced equations ,Quantitative Relationships in chemical reaction ,Molar concentration, Equivalents and mill equivalents of ions –Balancing equations involving changes of valency, a study of some of the gas laws , Equation of state , Kinetic theory of gase Characteristics of solids , general properties of crystals Characteristics of the liquid state ,classification of liquids into polar a nonpolar intermolecular forces and colligative properties of soluions.

OBJECTIVES:

By the end of this course, the student will be able to:
1- make aware of kinds of material which chemists work.
2- know How to think in chemical term about amount of substance that combine in chemical reaction.
3- describe the electronic structure of atom and relate it to atoms position in periodic table .
4- examine how ionic and covalent bonds are formed between atoms and the conditions that tend to lead to these kinds of bonds.
5- know how Lewis structures can be used to predict molecular shapes.
6-Calculate the molarity from mass and volume .
7-Balance simple oxidation –Reduction reactions by the half-reaction method.
8- Provide a qualitative description of gas law based on the kinetic theory.
9- identify the critical temperature and critical pressure.
10- Define intermolecular forces (dipole-dipole, London ,and hydrogen bonding).
11-describe the relation between the gas ,liquid and solid states.
12- define the colligative properties of solution

METHODS OF TEACHING

16- Lectures
17- Controls.
18- Quiz
19- Practical training[laboratory]
20- Internet research an d discussion

METHODS OF ASSESSMENT

1- Attendance and discussion in seminars.
2- Two Mid-semester written examination
3- Final written examination

TEXTBOOKS AND REFERENCES:

1- Darrell DEbbing - Steven D Gammon-2007-general chemistry -ninth Eddition-USA-Charles Hartford
2- Uno Kask ,J.David and Ronald A.Delorenzo ,General chemistry ,Wm.C.Brawn publishers
3- GAMES E BRADY-1990-General Chemistry principle and structure-Fifth Eddition-Canada

Week	SUBJECT	L	S	p	TOTAL
1	Introduction	3			3
2	Atomic Structure and periodic table	6			6
3	Chemical bonding , general concept	6			6
4	Molecular Structure	6			6
5	Chemical reactions in aqueous solution	3			3
6	Stoichiometry	3			3
7	The state of matter	3			3

8	Solids	3			3
9	Liquids	3			3
10	Solutions	6			6
TOTAL		**42**			**42**

PHARMACEUTICAL ORGANIC CHEMISTRY [I]

COURSE DESCRIPTION :

This course is a study of some fundamental concepts of organic chemistry ,the nomenclature and synthesis of organic compound and some organic pharmaceutical compounds.
Classification of these compounds, their physical and chemical properties, their method of preparation, reactivity and mechanisms of reactions . Basic concept in stereochemistry of some organic compound also will be studied.

OBJECTIVES:

At the end of this semester, the student should be able to:

6. To Recognize simple structure and functional group of each class of aliphatic hydrocarbon.
7. To understand the systematic manner and common nomenclature of aliphatic hydrocarbon
8. To be able to construct three-dimensional models of organic compounds.
9. To understand the following simple mechanisms of: electrophilic , nucleophilic, and free radical reactions.
10. To know about organic reactions that are useful in organic synthesis.
11. To detect the different classes and functional groups of organic compounds.
12. To handle the different chemical compound and glass ware safely.

METHODS OF TEACHING

21- Lectures
22- Controls.
23- Quiz
24- Practical training[laboratory]
25- Internet research an d discussion

METHODS OF ASSESSMENT

1- Attendance and discussion in seminars.
2- Two Mid-semester written examination
3- Final written examination

TEXTBOOKS AND REFERENCES:

1-B.S.BAHL-1996-Advance Organic Chemistry-New Delhi- S. Chand and Company LTD ,Ram Nagar.
2- Arthur I. Vogel. Elementary Practical Organic Chemistry part 2: Qualitative organic analysis 2 ed. Goyal Offset Press, Delhi 2001

Week	SUBJECT	L	S	p	TOTAL
1	Advance Introduction in organic compound	3	2		5
2	Alkanes (Nomenclature- preparation – chemical and physical properties- Stereochemistry)	3		2	5
3	Alkenes (Nomenclature- preparation – chemical and physical properties- Stereochemistry)	3		2	5
4	Alkynes(Nomenclature- preparation – chemical and physical properties- Stereochemistry)	3	2		5
5	Alkyl Halide(Nomenclature- preparation – chemical and physical properties- Stereochemistry)	3		2	5
6	Alcohols 1(Nomenclature- preparation – chemical and physical properties- Stereochemistry	3		2	5
7	Alcohols 2(Nomenclature- preparation – chemical and physical properties- Stereochemistry	3		2	5
8	Ethers(Nomenclature- preparation – chemical and physical properties- Stereochemistry	3		2	5
9	Aldehydes and Ketones 1 (Nomenclature- preparation –chemical and physical properties-Stereochemistry)	3		2	5
10	Aldehydes and Ketones 2 (Nomenclature- preparation –chemical and physical properties-Stereochemistry)	3		2	5

11	Carboxylic Acid(Nomenclature- preparation –chemical and physical properties- Stereochemistry)	**3**		**2**	**5**
12	Aliphatic Amines 1 (Nomenclature- preparation –chemical and physical properties-Stereochemistry)	**3**	**2**		**5**
13	Aliphatic Amines 1 (Nomenclature- preparation –chemical and physical properties-Stereochemistry)	**3**		**2**	**5**
14	Stereochemistry 1	**3**	**2**		**5**
TOTAL		**42**	**8**	**20**	**71**

PHARMACEUTICAL CALCULATION

COURSE DESCRIPTION :

This course studies the various types of calculations required for preparation and dispensing of medications. including percentage , ratio and proportion , conversions of units of measurements , interpretation of prescriptions and accurate dosage calculations.

OBJECTIVES:

At the end of this course the students will be able to :

1. describe the role pharmaceutical calculations have in the provision of pharmaceutical care.
2. Express knowledge to interpret abbreviations and professional nomenclature in prescriptions.
3. Calculate the proper dose and the correct flow rate of Intravenous admixtures for an adult or pediatric patient.
4. Apply the conversion factors between measurement systems , Roman – Arabic numerals.
5. Solve pharmaceutical calculations problems to minimize error and maximize accuracy in pharmaceutical compounding.
6. Organize a calculations setup in a clear fashion.

METHODS OF TEACHING

1. Lectures.
2. Seminars.
3. Group discussion.

METHODS OF ASSESSMENT

1. Formative assessment in seminars.
2. Mid-semester written examination
3. Final written examination

TEXTBOOKS ANDREFERENCES:

1. .Ansel HC. Pharmaceutical Calculations. 14th ed. Philadelphia, PA: Lippincott Williams & Wilkins, 2013.
2. M. Ramanathan , 2008, The Pharmacy Calculations Workbook , New York ,Pinnacle, Summit &Zenith Publishing.
3. http://pharmcal.tripod.com.
4. http://www.globalrph.com/calculators.htm

Week	SUBJECT	L	S	p	TOTAL
1	Course introduction and fundamentals of pharmaceutical measurement & calculations.	**3**			**3**
2	Common and metric systems and relation to IU and conversion	**3**	**2**		**5**
3	Construction of the balance weighing and measuring	**3**	**2**		**5**
4	Introduction to pharmaceutical dosage forms and Routes of drug administration	**3**	**2**		**5**
5-6	The prescription and interpretation of prescription and medication orders	**6**	**2**		**8**
7-8	Percentage, ratio strength, and expressions of concentrations	**6**	**2**		**8**
9-10	Calculation of doses	**6**	**2**		**8**
11	Reducing and Enlarging Formulae.	**3**	**2**		**5**
12-13	Strength Alterations, Stock Solutions, Alligation Alternate	**6**	**2**		**8**
14	Intravenous admixtures & calculations rate of flow.	**3**	**2**		**5**
Total		**42**	**18**		**60**

ANATOMY FOR PHARMACY

COURSE DESCRIPTION :

The Anatomy course for pharmacy students is designed to introduce the important basic knowledge about the gross anatomy and functions of the locomotor apparatus which includes description and identification of macroscopic structures of bones, joints and muscles; the student will investigate the general arrangement of the body's organ systems, in particular the respiratory, cardiovascular, lymphatic, digestive, urogenital, nervous and endocrine systems and recognition of structures by surface projection landmarks.

OBJECTIVES:

At the end of this semester, the student should be able to:

1- Explain fundamental principles of human body anatomy &physiology; including vital function of every system.
2- Provide a foundation in the anatomy of selected major human physiological systems.
3- Practice the personnel protective precautions in an efficient and effective manner.
4- Work in term of team**.**

METHODS OF TEACHING :-

1- Lectures including video show .
2- Seminars.
3. Presentation/ PowerPoint slides
4. Lab Work.

METHODS OF ASSESSMENT :-

1- Quizzes(written &oral).
2- Activities for students
3- Mid-semester written examination
4- Final Exam(practical)
5- Final written examination

TEXTBOOKS AND REFERENCES:

1. Romanes G. J: Cunningham's Textbook of Anatomy, Oxford University Press, Last Edition.
2- Gray's Anatomy: 39th ed, Elsevier Churchill Livingstone, London
3- Clinically oriented anatomy. Keith. L .Moore, Last edition
4- Elaine N. Marieb, John Mallat. Human Anatomy, 4th ed., 2005.BenjaminCummings Publishers
5.Netter Human Anatomy Atlas- CD software and 1 copy of the text based atlas.

Week	SUBJECT	L	S	p	TOTAL
1	Anatomical terms, positions, body parts & movements	2			

2	Locomotor apparatus I	**2**		**3**	**7**
3	Locomotor apparatus II	**2**		**3**	**5**
4	Locomotor apparatus III	**2**		**3**	**5**
5	Respiratory system	**2**		**3**	**5**
6	Cardiovascular system I	**2**		**3**	**5**
7	Cardiovascular system II	**2**		**3**	**5**
8	lymphatic system	**2**		**3**	**5**
9	Digestive system I	**2**		**3**	**5**
10	Digestive system II	**2**		**3**	**5**
11	Urogenital system I : -Urinary system	**2**		**3**	**5**
12	Urogenital system II: -Reproductive system	**2**		**3**	**5**
13	Nervous system	**2**		**3**	**5**
14	Endocrine system	**2**		**3**	**5**
TOTAL		**28**		**39**	**67**

HISTOLOGY

COURSE DESCRIPTION :

This course is designed to provide a complete, current and readable histological text for student. Information is organized according to the sequence used in many histology courses as follows: Introduction to histology and use the microscopes to view the prepared tissue sections, Recognize the basic knowledge of normal structure of the different tissues and organs of the body.
Integration of histology with other basic medical sciences such as human anatomy(Gross), physiology, biochemistry, cell biology, and pathology.

OBJECTIVES:

At the end of this semester, the student should be able to:

1- Demonstrate knowledge and understanding of pharmaceutical and related sciences relevant to pharmacy practice in any sitting.
2- Implement proper scientific method including research, analytic and critical thinking for the producing analyzing and quality assuring of pharmaceutical products.
3- Use their expertise to support patient medication and overall health.
4- Use communication techniques in pharmacy practice.

METHODS OF TEACHING :-

1- Lectures including video show.
2- Lab Experiments/Lab Guide (Small group work).
3- Discussion.

METHODS OF ASSESSMENT:-

1- Quizzes.
2- Practical Quizzes(Microscopically).
3- Practical Exam.
4- Final written examination

TEXTBOOKS AND REFERENCES:

1. Thomas S. Leeson, Roland Leeson& Anthony Paparo -1988- Text/Atlas of Histology.
2. Jose Carneiro & Luiz Junqueira . Basic Histology. Text &Atlas.
3. Inderbir Singh-2011- Text book of human histology: with color atlas & practical guide . Sixth Edition.
4. Jose Carneiro & LuizJunqueira. Basic Histology. Eleven Editions.
5. Ruth Wood & Joel Schechter – 2002- Histology "An interactive virtual microscope".

Week	SUBJECT	L	S	p	TOTAL
1	Introduction	4	-	2	8
2			-	2	
3	Epithelial tissue	2	-	2	4
4	Connective tissue Proper	2	-	2	4
5	Specialized Connective Tissue Cartilage, Bone and Blood	4	-	2	8
6			-	2	

7	Muscular Tissue	**2**	**-**	**2**	**4**
8	Nervous Tissue and Introduction to Central nervous system	**2**	**-**	**2**	**4**
9	The Circulatory System & Lymphatic organs	**2**	**-**	**2**	**4**
10	The Digestive System (Tract)	**2**	**-**	**2**	**4**
11	The Digestive System (Glands)	**2**	**-**	**2**	**4**
12	The Respiratory System	**2**	**-**	**2**	**4**
13	The Urinary System	**2**	**-**	**2**	**4**
14	The Endocrine System	**2**	**-**	**2**	**4**
15	The Female & Male Reproductive System	**2**	**-**	**2**	**4**
16	The Integument (Skin & its appendages)	**2**	**-**	**2**	**4**
TOTAL		**32**	**-**	**32**	**64**

ANALYTICAL CHEMISTRY [I]

COURSE DESCRIPTION :

The course includes study of the chemical equilibria of acids and bases , buffer solution preparation and action , solubility equilibria , salt hydrolysis , systematic identification of basic ions and acidic ions , solubility and distribution phenomena ,review about separation techniques used in practical work and experimental applications of these subjects

OBJECTIVES:

At the end of this semester, the student should be able to:

1) Calculate the pH and pOH of the acid and base solution.
2) prepare the buffer solutions.
3) Know the effect of common ion in solubility and ionic equilibria.
4) Know the effect of medium in ionic equilbria and distribution.
5) Define separation techniques used in practicalwork.
6) Determine the common acidic ions and basicions.
7) Describe the different types of salthydrolysis

METHODS OF TEACHING:

1) Lectures
2) Group discussion
3) Seminars
4) Laboratory practical sessions

METHODS OF ASSESSMENT:

1)seminars.
2) Mid-semester written test
3) practical quiz
4) practical examination
5) Final written examination

TEXTBOOKS AND REFERENCES:

1) General chemistry by Darrel D. Ebbing & Steven D. Gammon. Houghton Mifflin company
2) Modern analytical chemistry by David Harvey , McGraw- Hill company

Week	SUBJECT	L	S	p	TOTAL
1	Introduction : ionic product and ionic equilibria of strong and weak electrolyte	2		2	4
2	Buffer solutions: types and preparations	2		2	4
3	Buffer solutions functions and numerical applications	2		2	4
4	Solubility equilibria: Molar solubility and solubility product constant	2		2	4
5	Forming and dissolving of precipitates	2		2	4
6	Numerical applications and control	2		2	4
7	Types of salt hydrolysis and numerical calculations	2		2	4
8	systematic identification of basic radicals and acidic radicals	2		2	4
9	Role of the solubility product and buffer solution in the basic radicals identification	2		2	4
10	Control 2	2		2	4
11	Different separation techniques use used in practical work	2		2	4

12	experimental measurement of partition coefficient and extraction	**2**		**2**	**4**
13	Review	**2**		**2**	**4**
14	Control 3	**2**		**2**	**4**
	Total	**28**		**28**	**56**

ORGANIC CHEMISTRY [II]

COURSE DESCRIPTION :

This course is a basic science for other pharmaceutical science like a pharma-chemistry and pharmacognosy . where in this course a study of some fundamental concepts of aromatic organic chemistry ,the nomenclature of aromatic organic compound and some organic pharmaceutical Compounds, their physical and chemical properties, their method of preparation, reactivity and mechanisms of reactions. study of physical and chemical properties of some heterocyclic and alkaloid definition and classification will also be introduced.

OBJECTIVES:

At the end of this semester, the student should be able to:

1- To recognize fundamentals, structure, nomenclature of aromatic organic compound.
2- To recognize structure, nomenclature, and classification of heterocyclic and alkaloid compound.
3- To describe the aromatic organic reaction of different mechanism of it.
4- To prepare and purify some organic compounds.
5- To handling chemical compounds and glass ware safely.
6- To communicate effectively in writing and orally.
7- To conclude some properties of medicinal agents.

METHODS OF TEACHING :-

1- Lectures.
2- Quiz
3- Practical training[laboratory]
4- Internet research and discussion

METHODS OF ASSESSMENT:-

1- Attendance ,discussion and quiz.
2- Two Mid-semester written examination
3- Final written examination

TEXTBOOKS AND REFERENCES:

1-B.S.BAHL-1996-Advance Organic Chemistry-New Delhi- S. Chand and Company LTD ,Ram Nagar.
2- Arthur I. Vogel -1998-elementary practical organic chemistry part two : small scale preparation-2nd-New Delhi –CBF Publisher and distributors.

Week	SUBJECT	L	S	p	TOTAL
1	Introduction in aromatic organic compound	3	2		5
2	Benzene	3		2	5
3	alkyl substitution of benzene	3		2	5
4	Poly-nuclear (naphthalene anthracene, and phenanthrene) Derivatives of naphthalene	3	2		5
5	Aromatic halogen compound	3		2	5
6	Aromatic nitro compound	3		2	5
7	Aromatic sulfonilic acid and its derivatives	3		2	5
8	Aromatic phenol compound and aromatic alcohol	3		2	5
9	Aromatic aldehyde and ketone 1	3	2		5
10	Aromatic aldehyde and ketone 2	3		2	5
11	Aromatic Amines	3		2	5
12	Aromatic carboxylic acid	3		2	5
13	Types of heterocyclic compound 1	3		2	5
14	Alkaloids	3	2		5
TOTAL		42	8	20	70

PHARMACOGNOSY [I]

COURSE DESCRIPTION :

This course is concerned with the study of drugs from natural sources such as plants, animals, marines and micro-organisms. In addition the study of plant taxonomy, nomenclature, classification, production, adulteration, chemistry and evaluation methods of crude drugs. Also it focus on medicinal drugs from leaves, flowers, barks, roots and rhizomes with their active constituents, uses, contraindications.

OBJECTIVES:

At the end of this semester, the student should be able to:

1- demonstrate knowledge of basic concept of pharmacognosy, crude drugs, official drugs, source of natural drugs, nomenclature, classification of plant drugs for studying, different forms of plant drugs and the various types of adulteration.

2- demonstrate knowledge of the proper processes for preparing medicinal plants for commercial market (cultivation, collection , drying, packing, storage and preservation) and all factors affecting them in order to be able to apply this knowledge in marketing of medicinal plants.

3-illustrate the methods of the evaluation of medicinal plants and detection of adulteration.

4-use the microscope and describe the diagnostic characters of the powdered drug from different organs of medicinal plants such as bark, leaves, flowers, roots and rhizomes.

5-judge whatever the powdered drug is related to bark, leaves, flowers, roots and rhizomes.

6- give an account on the active constituents in each plant part (bark, leaves, flowers, roots and rhizomes) as well as their biological activities and medicinal uses.

METHODS OF TEACHING:

1-Lectures
2- Group discussion
3- Seminars
4- Laboratory practical sessions

METHODS OF ASSESSMENT:

1- -seminars.
2- Mid-semester written test
3- Practical quiz
4- Practical examination
5- Final written examination

TEXTBOOKS AND REFERENCES:

1- Trease, G.E.& Evans, W.C.; “Pharmacognosy”, W.B. Saunders Publishers, Ltd.
2- C.K. *Kokate.Pharmacognosy, NirailPrakashan,10th edition,1998.*
3- Tyler V. E. Brady L. R. Robbers J.E. 1988; “Pharmacognosy” Lea & Febiger. USA.
1- Shah Biren N. Seth A.K. Textbook of Pharmacognosy and Phytochemistry, First Edition, Elsevier, 2010
4- http:www.botanical.com

Week	SUBJECT	L	S	p	TOTAL
1	**Introduction to Pharmacognosy.** .Sources of natural drugs. Plant nomenclature and taxonomy.	2			2
2	General concepts of plant crude drugs: Crude drugs: definition, classification of crude drugs.	2		2	4
3	**Production of crude drugs**: **Preservation and drying**	2		2	4
4	**Methods of crude drug evaluation:** Types of adulteration, Pharmacognosic methods: Organoleptic methods.	2	2	2	6
5	Microscopic methods . Macro- and micro-morphological characters of plants and powdered drug,	2		2	4
6	Biologic, Chemical, Physical and Physicochemical methods Chromatographic methods	2		2	4
7	**Study of drugs of natural origin:** Introduction - Botanical source, geographical source Secondary metabolites of medicinal plants. chemical tests and uses of the plant drugs	2	2	2	6
8	**Medicinal barks:** Cascara - Frangula - Cinchona - Cinnamon - Hamamelis -Pomegranate - Quillaia - Wild cherry	2		2	4
9	**Medicinal leaves:** Digitalis - Senna - Jaborandi - Coca – Squill- Uva-ursi - Belladonna- Boldo.	2		2	4
10	**Medicinal leaves:** Stramonium- Hyoscyamus-Eucalyptus- Cherry laurel-Hamamelis-Henna- Tea.	2	2	2	6

11	**Medicinal flowers:** Cloves - Pyrethrum - Santonica –German chamomile –Roman chamomile-Saffron- Safflower- Calendula-Lavander. Arnica.	**2**		**2**	**4**
12	**Medicinal roots and rhizomes:** Rauwolfia - Liquorice - Ipecacuanha - Ginger - Senega -Male Fern - Podophyllum - Rhubarb - Aconite - Colchicum corm - Jalap – Ipomoea-	**2**		**2**	**4**
13	**Medicinal roots and rhizomes:** Veratrum - Ginseng - Valerian - Orris - Curcuma – Sarsaparilla, Hydrastis- Galengal- Calmus- Gentian.	**2**		**2**	**4**
14	Review	**2**			**2**
	Total	**28**	**6**	**24**	**58**

ANALYTICAL CHEMISTRY [II]

COURSE DESCRIPTION :

This course includes the fundamentals of volumetric analysis ,solution preparation, titration curves, selection of indicators , applications of neutralization ,precipitation ,complex , oxidation-reduction titrations , Miscellaneous analysis , Introduction about electroanalytical techniques , spectroscopy analysis and evaluating of analytical data

OBJECTIVES:

At the end of this semester, the student should be able to:

1- Define the define the terms used in the qualitative chemistry.
2- Describe the different methods of analytical chemistry.
3- To recognize the principles of each analysis method.
4- Express the concentration units.
5- Prepare the standard solutions.
6- Select the suitable method for sample to be estimated.
7- Select the suitable indicator for volumetric analysis.
8- write the experimental report.
9- Draw the titration curve of the titration.
10 – Use the calibration curve
11 - Evaluate the analytical result

METHODS OF TEACHING :

1)Lectures
2)Group discussion
3)Seminars.
4)Laboratory practical sessions

METHODS OF ASSESSMENT:

1) Seminars.
2) Mid-semester written test
3) Practical quiz.
4) practical examination
5) Final written examination

TEXTBOOKS AND REFERENCES:

1) James S. Fritz George H. Schenk, J Quantitative analytical chemistry Second edition Allyn and Bacon, Inc., Boston
2) R.A. Day, Jr. and A.L. Underwood, Quantitative analysis fifth edition, Prentice-Hall of India private limited
3) General chemistry by Darrel D. Ebbing & Steven D. Gammon. Houghton Mifflin company
4) Modern analytical chemistry by David Harvey , McGraw- Hill company
5) Analytical Chemistry for Technicians, by John Kenkel CRC Press LLC
6) Chemical analysis by Francis Rouessac & Annick Rouessac Willey company

Week	SUBJECT	L	S	p	TOTAL
1	Introduction to quantitative analytical chemistry	3			3
2	Gravimetric methods of analysis	3			3
3	Fundamentals of volumetric analysis	3		6	9
4	Acid-base titrations	3			3
5	Applications of acid - base titrations	3		4	7
6	Precipitation titration	3		4	7
7	Complex titration	3		4	7
8	Applications of Complex titration	3			3
9	Oxidation –reduction titrations	3		8	11
10	applications of Oxidation –reduction titrations	3			3
11	Miscellaneous analysis	3			3

12	Introduction of electroanalytical techniques	**3**			**3**
13	Introduction to spectroscopy	**3**			**3**
14	Evaluating of analytical data	**3**			**3**
	Total	**42**		**26**	**68**

PHYSICAL PHARMACY

COURSE DESCRIPTION :

This course deals with the basic background information on states of matter and physicochemical properties of materials including drugs and drug products. It provides students with a basic knowledge on the solutions and their properties, solubility and methods of enhancing drug solubility, complexation and chemical kinetics. It involves the study of interfacial tension and rheology of fluids.

OBJECTIVES:

At the end of this course the students will be able to :

1. Define the types of states of matter and solutions and their properties.
2. Understand the solubility principles of gases, liquids, and solids.
3. Explain the methods for improving drug solubility.
4. Describe the order of drug reaction and accelerated stability testing during drug manufacturing.
5. Identify the three classes of complexations and their effect on protein binding.
6. Discuss the applications of interfacial phenomena, rheology and polymers in the pharmaceutical industry.
7. Perform calculations that are related to pharmaceutical products such as pH, isotonicity, solubility, partition coefficient and shelf-life of drugs.

METHODS OF TEACHING

1. Lectures
2. Practical work
3. Group discussion
4. Group experimental work
5. Homework and reports

METHODS OF ASSESSMENT

1. Formative assessment in seminars.
2. Mid-semester written examination
3. Final written examination

TEXTBOOKS AN1DREFERENCES:

1. Sinko, P. & Singh, Y. (Eds.), 2011. Martin's Physical Pharmacy and Pharmaceutical Sciences. Sixth Ed. Philadelphia, Lippincott Williams &Wilkins.
2. Attwood, D. & Florence, A., 2008. Physical Pharmacy. First Ed. UK, Pharmaceutical Press.

Week	SUBJECT	L	S	p	TOTAL
1	Intermolecular forces & states of matter	**3**		**2**	**5**
2-3	Solutions, their properties and colligative properties	**6**	**4**		**10**
4	buffers and buffered isotonic solutions	**3**		**2**	**5**
5-6	Solubility and distribution phenomena	**6**		**2**	**8**
7	Complexation	**3**	**2**		**5**
8	Chemical kinetics	**3**	**2**		**5**
9	Interfacial phenomena	**3**		**2**	**5**
10-11	Rheology	**6**		**2**	**8**
12	Polymers	**3**	**2**		**5**
Total		**36**	**10**	**10**	**56**

PHARMACEUTICAL INORGANIC CHEMISTRY

COURSE DESCRIPTION :

This subject deals with the monographs of inorganic drugs and pharmaceuticals.

OBJECTIVES:

At the end of this semester, the student should be able to:

1- Understand the medicinal and pharmaceutical importance of inorganic compounds
2- Outline methods of preparation, tests of identification and special tests (if any), of the individually mentioned inorganic pharmaceuticals.
3- Describe the sstructures, properties and uses of studied inorganic compounds

METHODS OF TEACHING:

1)Lectures
2) Group discussion
3) Seminars.
4)Laboratory practical sessions

METHODS OF ASSESSMENT:

1) seminars.
2) Mid-semester written test
3) 3)practical quiz
4)practical examination
5)Final written examination

TEXTBOOKS AND REFERENCES:

1- A.H.Beckett and J.B.Stenlake, Practical pharmaceutical chemistry, Part-I. The Athtone press, University of London, London.
2. Advanced Inorganic Chemistry by Satya prakash, G.D.Tuli
3. Wal Ankita, Wal, Pranay, Rai, Awani Kumar, Inorganic Pharmaceutical Chemistry, New Age International Publishers.

Week	SUBJECT	L	S	p	TOTAL
1	Introduction to pharmaceutical inorganic chemistry Atomic and molecular structure/ Complexation. Sources of impurities, quality control and test for purity.	6		2	8
2					
3	. Essential and trace ions: Iron, copper, sulphur, iodine.	3		2	5
4	Non-essential ions: Fluoride, bromide, lithium, gold, silver and Mercury	3	2	2	7
5	Gastrointestinal agents: Acid-base regulators, Antacids.	3		2	5

6 7	Adsorbents, Astringents, Protectants. Anti-infective	**6**		**2**	**8**
8 9	Major extra and intracellular electrolytes	**6**	**2**	**2**	**10**
10	Dental agents. Dentifrices, role of fluoride in the treatment of dental caries, Desensitizing agents, Calcium carbonate, Sodium fluoride, and Zinc eugenol cement.	**6**		**2**	**8**
11 12	Miscellaneous compounds Expectorants, Emetics, Haematinics	**3**	**2**	**2**	**7**
13	Radiopharmaceutical preparations.	**3**			**3**
14	Radio opaque and contrast media.	**3**			**3**
TOTAL		**42**	**6**	**18**	**66**

SECOND YEAR المستوى الثاني

PHYSICAL CHEMISTRY

COURSE DESCRIPTION :

This course consist from two parts ,the first part covered the thermodynamics laws and thermochemistry and other related topics about the energy changes of the physical and chemical processes. the second part deals mainly with chemical kinetic , reaction mechanism ,catalysis ,adsorption and photochemistry reaction

OBJECTIVES:

At the end of this semester, the student should be able to:

1- Define the different thermodynamic terms.
2- Know the different types of energy forms .
3- Calculate the heat changes of the physical and chemical processes.
4- Predict the spontaneity of the thermodynamic process.
5- expect the effect of concentration ,temperature and catalyst on the rate of reaction.
6- determine the order of the reaction.
7- Calculate the activation energy and rate determining step of the reaction.
8- Describe the types of adsorption and photochemistryreactions.
9 - Differentiate between thermodynamic data and kinetic data.

METHODS OF TEACHING:

1)Lectures
2) Group discussion
3) Seminars.
4)Laboratory practical sessions

METHODS OF ASSESSMENT:

4)seminars.
5)Mid-semester written test
3)practical quiz
4)practical examination
5)Final written examination

TEXTBOOKS AND REFERENCES:

1) ARUNBAHL , B.S BAHL , ESSENTIAL OF PHYSICAL CHEMISTRY, S CHAND & CO LTD
2) K.K. SHARMA , L.K. SHARMA A TEXTBOOK OF PHYSICAL CHEMISTRY , FIFTH EDITION ,VIKAS PUBLISHING HOUSE PVT LIMITED
3) ANATOLMALIJEVSKY ,PHYSICAL CHEMISTRY IN BRIEF , CREATESPACE INDEPENDENT PUBLISHING PLATFORM

Week	SUBJECT	L	S	p	TOTAL
1	Introduction of thermodynamics	3		2	5
2	first law of thermodynamics	3		2	5
3	thermochemistry and its applications	3		2	5
4	enthalpy changes and bond energies	3		2	5
5	second and third law of thermodynamics	3		2	5

6	Gibbs free energy and spontaneity	**3**		**2**	**5**
7	Introduction of chemical kinetics	**3**		**2**	**5**
8	experimental techniques for measuring reaction kinetics	**3**		**2**	**5**
9	Methods to determine the order of reaction	**3**		**2**	**5**
10	Temperature dependence of the rate of chemical reaction	**3**		**2**	**5**
11	Order and molecularity of complex reaction	**3**		**2**	**5**
12	Types of catalysis	**3**		**2**	**5**
13	Types of adsorption	**3**		**2**	**5**
14	Principles of photochemistry	**3**		**2**	**5**
TOTAL		**42**		**28**	**70**

PHARMACEUTICS I

COURSE DESCRIPTION :

This course involves the study of different pharmaceutical liquid dosage forms and their routes of administration. The course also provides the student with detailed background about the types of pharmaceutical additives used, the formulation, the methods of preparation , packing , storage and stability evaluation of this dosage forms . In addition , the course contains the principle and methods of extraction and the preparation of this extracted products.

1. Describe the role of pharmaceutical excipients which are employed in manufacture of solution , suspensions and emulsions.
2. Use the various methods of extraction in order to produce extracted pharmaceutical dosage forms.
3. Formulate and compound safe and effective different types of liquid dosage forms of drugs.
4. Choose the proper package and storage conditions for final product.

OBJECTIVES:

At the end of this semester, the student should be able to:

5. Correlate the previous pharmaceutical knowledge that relevant to this course.
6. Compare and contrast advantages and dis advantages of solution , suspensions and emulsions .
7. Differentiate between liquid dosage forms (solutions, suspensions and emulsions)

METHODS OF TEACHING :-

1- Lectures.
2- Laboratory work.
3- Group experimental work.
4-Assignment.
5- Discussion throughout the course.

METHODS OF ASSESSMENT:-

1- Two written tests.
2- Two practical tests.
3- Final written examination

TEXTBOOKS AND REFERENCES:

1. M.E Aulton, 2007, Pharmaceutics,The Science Of Dosage Form Design, 3rded, Philadelphia, Churchill Livingston. H.C.
2. Ansel, L.V. Allen Jr and N.G. Papvich, 2000, Pharmaceutical Dosage Forms And Drug Delive Systems, 7th ed. New York-USA, Lippincott Williams and Wilkins.
3. A.R. Gennaro,2000, Remington: The Science And Practice Of Pharmacy , 20thed, Philadelphia, Philadelphia College of Pharmacy And Science.
4. Course Notes prepared by the teaching staff

Weeks	SUBJECT	L	S	P	TOTAL
	Pharmaceutical solution:				
1	Pharmaceutical solution , Advantage & disadvantage , types , solvents use	**3**			**3**
2	Excipient use in pharmaceutical solution	**3**		**2**	**5**
3-4	Aqueous pharm. Solutions	**6**		**4**	**10**
5-6	Non-aqueous pharm. Solutions : Elixir , spirits	**6**		**4**	**10**
7	Extractions & Extracted products	**3**		**2**	**5**
	Dispersed liquid dosage form:				
8-9	Colloids Dispersions , Surfactants ,	**6**		**2**	**8**
10-11	Suspensions	**6**		**2**	**8**
12-14	Emulsions	**9**		**2**	**11**
Total		**42**		**18**	**60**

PHARMACOGNOSY II

COURSE DESCRIPTION :

This course is concerned with the study of medicinal drugs from herbs, fruits, seeds and unorganized drugs with their active constituents, uses and contraindications. Also it focus on methods of extraction, separation and isolation of plant constituents. Furthermore an introduction to chromatographic methods.

OBJECTIVES:

At the end of this semester, the student should be able to:

1- demonstrate knowledge of the macroscopic characters of the studied plant parts (herbs and entire organisms, seeds, fruits and unorganized drugs).
2- use the microscope and describe the diagnostic characters of the powdered drug from herbs and entire organisms, seeds, fruits and unorganized drugs.
3- judge whatever the powdered drug is related to herbs, seeds, fruits or unorganized drugs.
4- give an account on the active constituents in each plant part (herbs and entire organisms, seeds, fruits and unorganized drugs) as well as their biological activities and medicinal uses.
4- demonstrate knowledge of the different methods of the extraction of plant materials and separation and isolation of the active constituents and apply the theories of these methods for preparing different extracts and analyzing and separating mixture of the active constituents by using the appropriate methods.
5- demonstrate knowledge of the principles of partition and adsorption chromatography.
7- know the basic concepts and application of the classical chromatographic methods (paper chromatography, thin layer chromatography and column chromatography.)
8- demonstrate knowledge of the basic concepts of the other chromatographic methods such as gas chromatography, HPLC, gel chromatography, Ion exchange chromatography, electro-chromatography and affinity chromatography.

METHODS OF TEACHING:

1-Lectures
2-Group discussion
3-Seminars
4-Laboratory practical sessions

METHODS OF ASSESSMENT:

1-seminars.
2-Mid-semester written test
3-practical quiz
4-practical examination
5-Final written examination

TEXTBOOKS AND REFERENCES:

1-Trease, G.E.& Evans, W.C.; "Pharmacognosy", W.B. Saunders Publishers, Ltd.
2-C.K. *Kokate.Pharmacognosy, NirailPrakashan,10th edition,1998.*
3-Shah Biren N. Seth A.K. Textbook of Pharmacognosy and Phytochemistry, First Edition, Elsevier, 2010.
4-Sherma J, Fried B (eds). Handbook of thin-layer chromatography
5-Jack Cazes, Raymond P. W Scott. Chromatography Theory. Marcel Dekker, lnc.New York, 2002,
6-WHO monographs on selected medicinal plants (Vol. 1-4) World Health Organization.
http:www.botanical.com

Week	SUBJECT	L	S	p	TOTAL
1	**Medicinal herbs and entire organisms**: Ergot - Cetraria - Stramonium –Hyoscyamus- Belladonna - Eqyptian Henbane - Catharanthus - Ephedra – Lobelia, Peppermint - Thyme	2		2	4
2	**Medicinal seeds**: Ordeal been - Strophanthus - Nux Vomica - Stramonium - Colchicum - Fenugreek - Black and white Mustard - Nutmeg - Castor - Cardamom - Linseed - Kola - Coffee.	2	2	2	6
3	**Medicinal fruits:** Poppy capsule – *Ammi visnaga - Ammimajus* - Anise - Hemlock – Fennel - Coriander-Caraway – Dill.	2		2	4
4	**Medicinal fruits:** Black pepper- - Cumin – juniper-Senna pod- Colocynth - Vanilla - Star-anise.- Capsicum – Peppers - Lemon Peel- Orange peel	2		2	4
5	**Unorganized drugs:** Opium - Aloes - Acacia - Tragacanth - Colophony - Dragon's Blood - Mastic - Tolu Balsam - Peru Balsam - Benzoins - Olibanum	2	2	2	6
6	**Unorganized drugs**: Myrrh – Agar- Gelatin- Cannabis resin- Guaiacum resin- Asafetida	2		2	4
7	**Extraction of plant material**: definition, character of the solvents. methods of extraction. Plant drug forms	2		2	4
8	**Separation and Isolation of plant constituents**: Distillation, fractional liberation, fractional crystallization, chromatography	2		2	4

9	**Chromatography**: Introduction, basic concepts, common separation mechanisms classification of chromatography. Principles and applications of Paper chromatography (PC)	**2**		**2**	**4**
10	Thin layer chromatography (TLC): Principles, separation mechanisms. Types of stationary and solvent phases. Development and detection of the TLC Plate. Applications of TLC	**2**	**2**	**2**	**6**
11	Basic concepts and applications of:. Preparative TLC, High performance TLC, Gas chromatography (GC), Instrumentations and Applications	**2**			**2**
12 **13**	Liquid-solid column chromatography: Simple method, High performance liquid chromatography (HPLC), Gel chromatography, Ion exchange chromatography; Basic concepts, Instrumentations and applications	**4**		**2**	**6**
14	Basic concepts, Instrumentations and applications of: Electro-chromatography and Affinity chromatography, Electrophoresis: Theory of Capillary Electrophoresis,	**2**			**2**
	Total	**28**	**6**	**22**	**56**

BIOCHEMISTRY [I]

COURSE DESCRIPTION :

Biochemistry I will include the main following items: chemistry of amino acids, proteins, carbohydrates, lipids, enzymes, free radicals and antioxidants, acid – base balance. And also provide the student with comprehensive knowledge in chemistry for the clinical interpretation the function of the human body components.

OBJECTIVES:

At the end of this semester, the student should be able to:

1. demonstrate the basic knowledge about the chemistry of the healthy man and as a fundamental basis in the acquisition on an adequate background of cell and tissue biology and their relationship.
2. contribute to a better understanding of the human pathology starting from the knowledge of

the normal process that produces and maintains life.
3. recognize the fundamental basis of other subjects of the medical career like genetics, immunology, cell and tissue biology, physiopathology, pharmacology, medicine, pediatrics and others.
4. Assimilate the new knowledge in medical sciences based in biochemistry and biological research.

METHODS OF TEACHING

1. Lectures.
2. Seminars.
3. Laboratory practical sessions.

METHODS OF ASSESSMENT

1. Formative assessment in lectures, seminars and practical sessions..
2. Mid-semester written examination
3. Final written examination

TEXTBOOKS AND REFERENCES:

1. Chatterjea M.N, ShindeRana. Textbok of Medical Biochemistry. JAYPEE. 8th edition 2012.
2. Harvey Richard A, Ferrier Denise R. Lippincott's Illustrated Reviews :Biochemistry. Lippincott Williams & Wilkins. 6th edition.2014

Week	SUBJECT	L	S	p	TOTAL
1	Introduction- Chemistry of amino acids & proteins	3			3
2	Chemistry of amino acids & proteins 1	3	2	2	7
3	Chemistry of amino acids & proteins 2	3	2		5
4	Chemistry of carbohydrates 1	3	2		5
5	Chemistry of carbohydrates 2	3		4	7
7	Chemistry of lipids 1	3	2		5
8	Chemistry of lipids 2	3	2		5
9	Chemistry of nucleic acids 1	3	2		5
10	Chemistry of nucleic acids 2	3			3

11	Enzymes 1	**3**	**2**		**5**
12	Enzymes 2	**3**	**2**	**2**	**7**
13	Free radicals & antioxidants-	**3**	**2**		**5**
14	Acid – Base balance	**3**	**2**	**2**	**7**
TOTAL		**42**	**22**	**10**	**74**

PHYSIOLOGY

COURSE DESCRIPTION:

This course is fundamental basis for the students for further disciplines in pharmaceutical sciences. It provides the students physiological functions of all systems in the body including cardiovascular, blood, respiratory, gastrointestinal, endocrine, nervous and renal system.

OBJECTIVES:

At the end of this semester, the student should be able to:

1- Describe the different biological system on view of physiological functions
2- Determine the regulation mechanisms of important physiological systems
3- Differentiate between normal and abnormal biological functions and related medical disorders
4-Use communication techniques in pharmacy practice in any sitting

METHODS OF TEACHING :-

1- Lectures.
2- Seminars.

METHODS OFASSESSMENT:-

1- Mid-semester written examination
2- Final written examination

TEXTBOOKS AND REFERENCES:

1- Gyton and Hall (Text book of medical physiology (12th edition)
2- Lecture notes (handout)

Week	SUBJECT	L	S	p	TOTAL
1	***Unit 1:*** *Introduction to medical physiology:* - Cell membrane and membrane transport - The excitable tissues. Nerve & muscles membrane potential and action potential. 4	**4**	**2**		**6**

2	- Mechanism of skeletal & smooth muscles contraction				
3 4	***Unit 2:*** *The cardiovascular system: The heart and circulation:* - Heart pumping and its regulation - Rhythmic excitation of the heart & its regulation 4 - The normal electrocardiogram 2 - Regulation of blood flow and resistance - The venous and lymphatic system - Regulation of blood pressure	**4**	**4**	**4**	**12**
5 6	***Unit 3:*** *The blood:* - Red blood cells, anemia, Blood groups - White blood cells and macrophage system, 4 2 Immunity and allergy - Hemostasis and blood coagulation	**4**	**2**	**2**	**8**
7	**Unit 4**: The respiratory system: - Pulmonary ventilation, - Diffusion of gases through the respiratory membrane - Transport of gases in the blood Regulation of respiration	**2**	**2**		**4**
8 9	**Unit 5:** The kidneys : - Formation of urine(filtration, absorption& secretion) - Regulation of osmolarity and acid base balance	**4**	**2**		**6**
10 11	**Unit 6**: GIT function - Basics of gastrointestinal motility and its regulation - Proplusion and mixing of food in alimentary tract Secretory functions of alimentary tract	**4**	**2**		**6**
12 13	**Unit 7:** The endocrine system - The pituitary gland and growth hormone - Thyroid hormones - Parathyroid hormone, vit. D & calcitonin, role in calcium metabolism - Adrenocortical hormones The endocrine pancreas and diabetes mellitus	**4**	**2**		**6**

14	**Unit 8**: the nervous system: - Organization of the nervous system - Physiology of pain The autonomic nervous system	**2**	**2**		**4**
TOTAL		**28**	**18**	**6**	**52**

PHARMACEUTICAL CHEMISTRY [I]

COURSE DESCRIPTION :

Pharmaceutical chemistry is a subject based on chemistry discipline and also involving biological and pharmaceutical sciences and aims to give students a wide and diverse scientific knowledge. This course will focus on the introduction to pharmaceutical chemistry and physic-chemical properties in relation to biological effect, drug metabolism, mechanism of action of different classes of drug, the principle of drug design, isosterism and pro-drug , drug interaction with receptor site.

OBJECTIVES:

At the end of this semester, the student should be able to:

1-Understand the relationship between different physio-chemical properties of the drug and biologic action.
2-Demonstrate Pro-drugs and their benefits.
3-Understand Many drug-drug interactions resulted from the drug- plasma albumin interactions.
4-Full understanding of metabolic reactions of the drugs and their products chemically& biologically.
5-Obtain a working knowledge of chemical structures and nomenclature.
6-Understand how changes in the chemical structure of drugs affect efficacy.
7-Have been introduce to a variety of drug classes and some pharmacological properties.
8- Develop an understanding of principles of analytical techniques

METHODS OF TEACHING

1- Lectures.
2- controls.
3- Quiz
4- Practical training laboratory.

METHODS OF ASSESSMENT

1- controls.
2- Attendance.
3- Practical part including :seminars, experiments and attendance.
4- Final examination.

TEXTBOOKS AND REFERENCES:

1- WILSON AND GISVOLD"S-1998- Textbook of organic medicinal and pharmaceutical chemistry-Tenth edition –Lippincott-Raven-philadelphia –New York.
2- William O. Foye, Thomas L. Lemke and David A. William- 1995-Principles of Madicinal Chemis Fourth Edition- lea &Febiger, Philadelphia- NewYork.
3- F.D. King-1994-Medicinal Chemistry Principles and Practice-The Royal Society of chemistry

Week	SUBJECT	L	S	p	TOTAL
1	Relation between physio-chemical properties and biologic action	3		2	5
2	acid strength , percent ionization	3			3
3	drug distribution and pka , partition coefficient	3		2	5
4	drug distribution , tissue depots	3			3
5	drug metabolism , excretion	3			3
6	Drug-plasma protein interactions	3		2	5
7	control	1			1
8	prodrugs	3			3
9	General Pathways of Drug Metabolism , Sites of Drug Biotransformation	3		2	5
10	Role of Cytochrome P450 Monooxygenases in Oxidative bio-transformations,	3			3
11	Oxidative Reactions , Reductive Reactions	3		2	5
12	Hydrolytic Reactions , Phase II or Conjugation Reactions	3			3
13	Factors Affecting Drug Metabolism	3		2	5
14	Control	1			1
TOTAL		38		12	50

BIOCHEMISTRY [II]

COURSE DESCRIPTION :

Biochemistry II is dedicated mainly to provide the basic knowledge about the biochemical process of the human body which will contribute to a better understanding of the human pathology starting from the knowledge of the normal process that produces and maintains life. This will include lectures on the biochemistry of the living matter, the vitamins and their relation with coenzymes, metabolism of carbohydrates, lipid, amino acids, hemoglobin, xenobiotics, and the integration of metabolism, mechanism of action of hormones, water & electrolyte balance & imbalance, cancer, and radioisotopes in medicine.

OBJECTIVES:

At the end of this semester, the student should be able to:

1. Understand the basic knowledge about the chemical and biochemical process of the healthy body (cell and tissue biology and the ir-relationship).
2. recognize the human pathology starting from the knowledge of the normal process that produces and maintains life.
3. identify the fundamental knowledge of other disciplines (clinical and para-clinical).
4. contribute in the scientific research and develop the capacity of assimilation of new knowledge in medical sciences based in biochemical and biological research.

METHODS OF TEACHING

1- Lectures.
2- Seminars.
3- Laboratory practical sessions.

METHODS OF ASSESSMENT

1- .Formative assessment in lectures, seminars and practical sessions.
2- Mid-semester written examination
3- Final written examination

TEXTBOOKS AND REFERENCES:

1. Chatterjea M.N, ShindeRana. Textbok of Medical Biochemistry. JAYPEE. 8th edition2012.
2. Harvey Richard A, Ferrier Denise R. Lippincott's Illustrated Reviews :Biochemistry. Lippincott Williams & Wilkins. 6th edition.2014.
3. Murray R.K, Granner D.K, Mayes P.A, Rodwell V.W. Harper's Biochemistry. London.Lana medical Book. 27th edition. 2006.

Week	SUBJECT	L	S	p	TOTAL
1	Metabolism of carbohydrates 1	3	2		5

2	Metabolism of carbohydrates 2	3	2	2	7
3	1- Biological oxidation 2- Mechanism of action of hormones	3	2		5
4	Metabolism of lipids 1	3	2	2	7
5	Metabolism of lipids 2	3	2		5
6	Metabolism of amino acids 1	3	2		5
7	Metabolism of amino acids 2	3	2		5
8	Integration of metabolism	3	2		5
9	Metabolism of Hemoglobin	3	2		5
10	Vitamins & coenzymes	3	2		5
11	Water & electrolyte balance & imbalance	3	2		5
12	Detoxification (Metabolism of Xenobiotics)	3	2		5
13	Cancer	3	2		5
14	Radioisotopes in Medicine	3	2		5
TOTAL		**42**	**28**	**4**	**74**

MICROBIOLOGY

COURSE DESCRIPTION :

Medical Microbiology covers a wide range of topics including basic bacteriology, basic virology, basic mycology and aspects of molecular biology. The course covers individual infectious agents and the diseases that they produce. The infectious agents include bacteria, fungi and viruses. The emphasis will constantly be on helping the student understand and be able to cope with the agents with which he or she may come in contact. Particular attention will be paid to the diagnosis, epidemiology, prevention and control of the infectious agents under discussion.

OBJECTIVES:

At the end of this semester, the student should be able to:

1- Understanding the role of microorganisms (including bacteria, fungi and viruses,)in pathogenic mechanisms.
2- Understanding the use of antimicrobial treatment.
3- Role of the immune system in combating infections and diseases, and also in developing hypersensitivity and autoimmune diseases.
4- Maintenance of infection control and safe working environment.
5- Let the students focus on understanding topics not memorizing only.
6- Encourage the student to solve different problems that usually encountered in pharmaceutical practice.
7- Manage, diagnose and decide the best way of treatment of some diseases (hypersensitivity, and autoimmune diseases
8- Manage pharmaceutical and medical emergencies which may occur in practice and perform basic life support measures.
9- Identify different types of microorganisms by using different laboratory techniques.
10- Perform a range of clinical procedures which are within the scope of general pharmacy, including applications of preventive procedures.
11- Apply current infection control guidelines.
12- Adopt the principles of life-long learning needs of the pharmaceutical profession (continuous professional development).
13- Use computers efficiently in reaching biomedical information to remain current with advances in knowledge and practice.
14- Present information clearly in written, electronic and verbal forms.
15- Apply English language as needed for appropriate learning and communication in relation to medicine.

METHODS OF TEACHING :-

1. Lectures.
2. Small group discussions/Seminars.
3. Practical laboratory procedures.
4. Micro assignments.

METHODS OF ASSESSMENT:-

1. Attendance
2. Seminars and quizzes.
3. Homework.
4. Inter- semester control.
5. Final practical Examination.
6. Final written examination

TEXTBOOKS AND REFERENCES:

1- Jawetz, Melnick, and Adelberg's Medical Microbiology 23rd edition.
2- McCracken and Cawson, Clinical and Oral Microbiology, McGraw Hill.
3- Sleigh and Timbury, Notes on Medical bacteriology, Churchill Livingstone.
4- Timbury, Notes on medical Virology, Churchill Livingstone.
5- Kimball Introduction to Immunology, Macmillan. 6-asmnews@asmusa.org
7- http://www.phage.org/black09.htm
8- http://www.microbe.org/microbes/virus_or_bacterium.asp
9- http://www.bact.wisc.edu/Bact330/330Lecturetopics
10- http://whyfiles.org/012mad_cow/7.html
11- http://www.microbelibrary.org/
12- http://www.hepnet.com/hepb.htm
13- http://www.tulane.edu/~dmsander/Big_Virology/BVHomePage.ht
14- http://www.mic.ki.se/Diseases/c2.html
15- http://www.med.sc.edu:85/book/welcome.htm
16- http://www.biology.arizona.edu/immunology/microbiology_immunology.html

Week	SUBJECT	L	S	p	TOTAL
1	Introduction and general overview about Microbiology	2	-	-	**2**
2	General Bacteriology: Bacterial Cell: Morphology, Physiology, and Metabolism	**2**	-	**2**	**4**
3	Bacterial variations: Genetic & Non-genetic variations	**2**	-	**2**	**4**
4	Pathogenesis of bacterial infection	**2**	-	**2**	**4**
5	Control of Microorganisms	**2**	-	**2**	**4**
6	Specialized Bacteriology: Pyogenic infection; Staphylococci, Streptococci and Neisseria	**2**	-	**2**	**4**
7	Corynebacteria and Clostridia	**2**	-		**2**

8	Mycobacteria, Actinomyces and Nocardia	**2**	-		**2**
9	Haemophils Bordetella and Brucella	**2**	-		**2**
10	Spirochaetes; Treponema, Borrelia	**2**	**2**		**4**
11	Enterics and other gram-negatives	**2**	**2**		**4**
12	Mycoplasma, Rickettsia, Chlamydia	**2**	**2**		**4**
13	General Mycology; Yeast and related fungi:	**2**	**-2**		**4**
14	General Virology	**2**	**2**		**4**
TOTAL		**28**	**10**	**10**	**48**

PHARMACEUTICS [II]

COURSE DESCRIPTION :

This course is designed to provide the student with detailed background about semisolids and solid pharmaceutical dosage forms, bases use, requirements in their formulation, methods of preparation, packaging and storage.

OBJECTIVES:

After the completion the course, the student will able:

1. Identify and classify the various types of semisolids, suppositories, pessaries, powders, granules and capsules as dosage forms use in pharmacy practice.
2. Discuss the advantages, limitations, uses and clinical applications of semisolid and solid dosage forms.
3. Explain the mechanisms of drug release as well as different parameters that determine the percutaneous and rectal permeability and absorption of drug from semisolids and suppositories
4. Understand and describe the bases and excipients that are used to formulate and prepare of semisolid and solid dosage forms.
5. Describe appropriate methods for stability testing, packaging, and storing of the final product.

METHODS OF TEACHING :

1. Lectures.
2. Group experimental work.
3. Discussion throughout the course.

METHODS OF ASSESSMENT:

1- controls.
2- Practical test.
3- final written examination.
4-assignment.

TEXTBOOKS AND REFERENCES:

1. Course Notes prepared by the teachingstaff.
2. M. E Aulton, 2007, Pharmaceutics, The Science of Dosage form Design, 3rd ed.,Philadelphia, Churchill Livingston. H.C.
3. Ansel, L. V. Allen Jr and N.G. Papvich, 2000, Pharmaceutical Dosage Forms and Drug Deliery Systems, 7th ed. New York-USA, Lippincott Williams andWilkins.
4. A. R. Gennaro, 2000, Remington: The Science and Practice of Pharmacy, 20th ed., Philadelphia,Philadeliphia College of Pharmacy and Science.

Week	SUBJECT	L	S	P	TOTAL
1-4	Semisolid dosage form	**12**		**8**	**20**
5-8	Suppositories (moulded dosage form)	**12**		**2**	**14**
	Solid dosage form:				
9-10	Powders and granules effervescent granules	**6**		**4**	**10**
11-12	Capsules: hard and soft gelatin capsules	**6**		**2**	**8**
Total		**36**		**16**	**52**

PATHOLOGY

COURSE DESCRIPTION :

This course is one of the basic science requirements for third level students in the faculty of Pharmacy. The course consists of two parts:. Theoretical study that interested in providing students the basic concepts and principles of general or basic pathology including: Cellular adaptations, injury, and cell death, inflammation and repair, hemodynamic derangements, metabolic disorders , genetic disorders, disorders of immune system and neoplasia. In addition to The practical study that interested to provide the students by the skills of macroscopic and microscopic studies of pathological changes at the level of both; cells and tissues.

OBJECTIVES:

At the end of this semester, the student should be able to:

1. Demonstrate knowledge and understanding pathology
2. Determinant of health and disease, basic concepts, principles and concept of pathology.
3. The branches of pathology, principles and criteria of pathological lab work.
4. The mechanism of disease development at the level of cells and tissues.
5. The nature and origin of cells or tissue in cytological smear or tissue section.
6. Implement appropriate scientific method and evidence-based medicine, Including research, analytical and critical thinking, for the diagnosis and management of health problems

METHODS OF TEACHING:

1. Lectures including video show .
2. Seminars.
3. Assignments.

METHODS OF ASSESSMENT:

1. Written tests.
2. Class Attendance.
3. Mid-semester written examination
4. Practicalexamination.
5. Final written examination

TEXTBOOKS AND REFERENCES:

Cotran, Kumar, Robbins :Robbins pathologic basis of diseases. – 7th edition (2004).

Week	SUBJECT	L	S	p	TOTAL
1	Introduction to Pathology .Pathological methods The histopathology laboratory.	**2**	**2**	-	**4**
2	Cell adaptation and causes of cell injury	**2**	**2**	-	**6**
3	Injured cell, cell death and necrosis	**2**		-	
4	Inflammation (Acute inflammation)	**2**	**2**	-	**6**
5	Inflammation (Chronic inflammation +Repair)	**2**		-	
6	Circulatory disorder I (Hemodynamic disorders Edema, hyperemia and congestion, hemorrhage]	**2**	**2**	-	**6**

7	Circulatory disorder II (Thrombosis, embolism and shock)	**2**		-	
8	Inter-semester examination	**2**		-	**2**
9	Neoplasia I	**2**	**2**	-	**6**
10	Neoplasia II	**2**		-	
11	Metabolic disorders	**2**	-	-	**2**
12	Genetic disorders	**2**	-	-	**2**
13	Immunity Disorders (Immunopathology)	**2**	**2**	-	**4**
TOTAL		**26**	**12**	-	**38**

THIRD YEAR المستوى الثالث

PHARMACEUTICAL CHEMISTRY [II]

COURSE DESCRIPTION :

Pharmaceutical chemistry is a subject based on chemistry discipline and also involving biological and pharmaceutical sciences and aims to give students a wide and diverse scientific knowledge. This course will cover the chemical structure and nomenclatures of different classes of drug and their respective mechanisms of action(Anti-infection agents, Anti-bacterial Antibiotics, Sulfonamides, Sulfones and Folate reductase inhibitors with antibacterial action,
Anti-fungus, Antiviral, Anti-malaria, Antineoplastic agents), synthesis, structure activity relationship certain classes of drug, metabolic changes of drugs and related organic compounds, drug interaction with receptor site.

OBJECTIVES:

At the end of this semester, the student should be able to:

1. Know different pharmacologic classes such as antibacterial sulfonamides ,antibioticsand anti-malarial.
2. Demonstrate many pharmaceutical products concerning the active ingredients ,their chemical structures and nomenclature, clinical uses ,side effects ..etc.
3. Understand basic structural requirements needed to produce certain biologic activityand how changes in the chemical structure of drugs affect efficacy(SAR).
4. understand preparation of some drug by organic synthesis.
5. Have been introduce to a variety of drug classes and some pharmacological properties.

6. Develop an understanding of principles of analytical techniques.

METHODS OF TEACHING :

1- Lectures.
2- controls.
3- Quiz
4- Practical training laboratory.

METHODS OF ASSESSMENT:

1- controls.
2- Attendance.
3- Practical part including :seminars, experiments and attendance.
4- Final examination.

TEXTBOOKS AND REFERENCES:

1-WILSON AND GISVOLD"S-1998- Textbook of organic medicinal and pharmaceutical chemistry-Tenth edition –Lippincott-Raven-philadelphia-NewYork
2- William O. Foye, Thomas L. Lemke and David A. William- 1995-Principles of MadicinalChemis Fourth Edition- lea &Febiger, Philadelphia- NewYork.
3-F.D. King -1994- Medicinal Chemistry Principles and Practice- The Royal Society of Chemistry.

Week	SUBJECT	L	S	P	TOTAL
1	Anti-infective agents	3		2	5
2	Halogen-Containing Compounds , Cationic Surfactants , Dyes, Mercury compounds ,Mercurials, Preservatives	3			3
3	Antifungal Agents, Synthetic Antibacterial Agents , Antiprotozoal Agents	3		2	5
4	Anthelmintics , Antiscabious and Antipedicular Agents	3			3
5	Antibacterial sulfonamides	3		2	5
6	Protein Binding, and Distribution, Toxicity and Side Effects	3			3
7	Anti-malarial	3			3
8	Development of Antimalarial Drugs , PLASMODIUM GENOME , Controlling the Vector ,the Anopheles Mosquito	3			3

9	Drugs Used to Prevent and Treat Malaria	**3**			**3**
10	Antibiotics	**3**		**2**	**5**
11	Lactam Antibiotics, Mechanism Of Action, The Penicillins, Commercial Production	**3**		**2**	**5**
12	, B-Lactamase Inhibitors , Carbapenems, Cephalosporins , Historical Background , Nomenclature , Semisynthetic Derivatives , Chemical Degradation.	**3**		**2**	**5**
13	aminoglycosides , chemistry , spectrum of activity , microbial resistance , mechanism of action , structure–activity relationships, products.	**3**			**3**
TOTAL		**41**		**12**	**53**

PHARMACEUTICS III

COURSE DESCRIPTION :

This course deals with the formulation, preparation, manufacture and excipients use tablets, sterile pharmaceuticals and aerosols. Also, it provide the knowledge about evaluation and packaging and storage of the final product.

OBJECTIVES:

After the completion the course, the student will able to:

1. Applying the knowledge in design, formulation and preparation of tablets.
2. Identify the role of each excipient use in production of safe, stable and effective pharmaceutical products.
3. Compare the various method for manufacturing of tablets.
4. Discuss the methods of preparation of sterile pharmaceutical products and aerosols.
5. Describe appropriate methods for stability testing, packaging, and storing of the final product.

METHODS OF TEACHING :

1. Lectures.
2. Group experimental work.
3. Discussion throughout the course.

METHODS OF ASSESSMENT:

1. controls.
2. practical test.
3. final written examination.

4-assignment.

TEXTBOOKS AND REFERENCES:

1. Course Notes prepared by the teaching staff.
2. M. E Aulton, 2007, Pharmaceutics, The Science of Dosage form Design, 3rd ed.,Philadelphia, Churchill Livingston. H.C.
3. Ansel, L. V. Allen Jr and N.G. Papvich, 2000, Pharmaceutical Dosage Forms and Drug Delivery Systems, 7th ed. New York-USA, Lippincott Williams and Wilkins.
4. A. R. Gennaro, 2000, Remington: The Science and Practice of Pharmacy, 20th ed., Philadelphia, Philadeliphia College of Pharmacy and Science.

Week	SUBJECT	L	S	P	TOTAL
1-4	Tablets	**12**	**4**		**16**
	Sterile pharmaceutical dosage form				
5-8	Parenteral products	**12**	**4**		**16**
9-10	Ophthalmic products	**6**	**1**		**7**
11-12	Aerosols	**6**	**1**		**7**
Total		**36**	**10**		**46**

PHYTOCHEMISTRY [I]

COURSE DESCRIPTION :

The course is concerned with the study of the chemistry of different classes of natural constituents including carbohydrates, different types of glycosides, tannins, triterpenoids, their structures, and methods of isolation, purification, detection and quantitative estimation, in addition to study the pharmacological actions and therapeutic uses of these natural constituents..

OBJECTIVES:

After the completion the course, the student will able to:

1-demonstrate knowledge of the basic pathways of the biogenesis of secondary metabolites.

3- illustrate all studied information emphasized in the course description of the natural

products (carbohydrates, glycosides, tannins, bitter principles, terpenoids, volatile oils, resin and resin combination, lipids and alkaloids) and apply this knowledge correctly in phytomedicine.

METHODS OF TEACHING:

1-Lectures
2- Group discussion
3- Seminars
4- Laboratory practical sessions

METHODS OF ASSESSMENT:

1- -seminars.
2- Mid-semester written test
3- practical quiz
4- practical examination
5- Final written examination

TEXTBOOKS AND REFERENCES:

1- Trease, G.E.& Evans, W.C.; "Pharmacognosy", W.B. Saunders Publishers, Ltd.
2- C.K. *Kokate.Pharmacognosy, NirailPrakashan,10th edition,1998.*
3- Tyler V. E. Brady L. R. Robbers J.E. 1988; "Pharmacognosy" Lea &Febiger. USA.
4- Shah Biren N. Seth A.K. Textbook of Pharmacognosy and Phytochemistry, First Edition, Elsevier, 2010
5- http:www.botanical.com

Week	SUBJECT	L	S	p	TOTAL
1	**Phytochemistry:** Introduction, Definition, nomenclature, classification General biosynthesis pathways of secondary metabolites	3			3
2 -4	**Carbohydrates:** Introduction, classification, biosynthesis, medicinal and pharmaceutical uses.	9	2	6	17
5-7	**Glycosides:** Biosynthesis, properties and medicinal uses of: Cardiac glycosides; anthraquinone glycosides; flavonoid glycosides; Cyanogenetic glycosides, Saponins.	9	2	6	17
8-10	**Glycosides:** Biosynthesis, properties and medicinal uses	9			

	of: Isothiocyanate glycosides; aldehyde glycosides; alcoholic glycosides; phenolic glycosides; lactone glycosides; coumarins and chromones.			6	15
11	**Tannins:** Chemistry and classification: (Hydrolysable tannins, Condensed tannins, Complex tannins, and pseudotannins,) with examples of drug containing them	3	2	2	7
12-13	**Terpenoids:** Occurrence, distribution, biosynthesis, properties, extraction and detection, classification (monoterpenes, sesquiterpenes diterpenes, triterpenes, tetraterpenes, polyterpenes)	6		2	8
14	Bitter principles as medicinal drugs: stomachic	3			3
TOTAL		**42**	**6**	**22**	**70**

PHARMACEUTICAL INSTRUMENTATION

COURSE DESCRIPTION :

This course is devoted to the exploration of the instrumental methods of analysis used in various pharmaceutical analysis; Spectroscopic methods (UV-Visible, IR, NMR), Mass spectrometry and Electroanalytical methods.

OBJECTIVES:

At the end of this semester, the student should be able to:

1. Describe the principles of different types of instrumental methods used in pharmaceuticals analysis including spectroscopy, electrochemistry.
2. Develop an understanding of the operation of modern analytical instrumentation and how it can be interfaced with computer hardware and software.
3. Understand the design of instruments and the application of these instruments to several pharmaceutical science.
4. Develop analytical problem –solving skills.

METHODS OF TEACHING :-

1- Lectures.
2- Seminars.

METHODS OFASSESSMENT:-

1- Formative assessment in seminars.
2- Mid-semester written examination
3- Final written examination

TEXTBOOKS AND REFERENCES:

1. Pharmaceutical Analysis, David Lee and Michael Webb, Blackwell Publishing, 2003.
2. Principles of Instrumental analysis, Douglas A. Skoog, F. James Holler, and Stanley R. Crouch; Brooks Cole; 6th edition, 2006.
3. Modern Instrumental Analysis, , Neil D. Jespersen and Satinder Ahuja, Elsevier, 2006.
4. Handbook of modern pharmaceutical analysis, S. Ahuja and S. Scypinski (Editors), Academic Press, Second edition, 2011.
5. D. Harvey, "Modern Analytical Chemistry", McGraw Hell, 2000.

Week	SUBJECT	L	S	p	TOTAL
1	**Introduction to Spectroscopy. Basic Components of Spectroscopic Instrumentation** Sources of Energy, Wavelength, Selection Detectors, Signal Processors	**2**		**2**	**3**
1	**Spectroscopy Based on Absorption:** Absorbance of Electromagnetic Radiation, Transmittance and Absorbance, Absorbance and Concentration: Beer's Law: Beer's Law and Multicomponent Samples Limitations to Beer's Law	**2**		**2**	**3**
2,3	**Ultraviolet-Visible and Infrared Spectrophotometry** Instrumentation, Quantitative and Qualitative Applications, Characterization Applications	**4**		**4**	**6**

4	**Atomic Absorption Spectroscopy** Instrumentation, Quantitative Applications	**2**		**2**	**3**
5	**Spectroscopy Based on Emission Molecular Photoluminescence Spectroscopy:** Molecular Fluorescence and Phosphorescence Spectra, Instrumentation, Quantitative Applications. Using Molecular Luminescence Evaluation	**2**		**2**	**3**
6,7	**NMR- Spectroscopy** Basic principles, instrumentation. proton-NMR and carbon-13 NMR. Applications of NMR to structure confirmation in some drug molecules	**4**		**4**	**6**
8	**Mass-Spectrometer** Basic principles, instrumentation, mass spectra, molecular fragmentation. Applications in pharmaceutical analysis and characterization of degradation products	**2**		**2**	**3**
9	**Electrochemical Methods of Analysis**: **Classification** Interfacial Electrochemical Methods, Controlling and Measuring Current and Potential	**2**		**2**	**3**
10	**Potentiometric Methods of Analysis:** Potentiometric Measurements Reference Electrodes, Metallic Indicator Electrodes, Membrane Electrodes, Quantitative Applications,	**2**		**2**	**3**

11	**Coulometric Methods of Analysis** Controlled-Potential Coulometry Controlled-Current Coulometry Quantitative Applications Characterization Applications	**2**		**2**	**3**
12	**Radiochemical Methods of Analysis** Theory and Practice Instrumentation, Quantitative Applications. Characterization Applications	**2**		**2**	**3**
Total		**24**		**26**	**39**

PARASITOLOGY

COURSE DESCRIPTION :

Parasitology is important for the students in order to easily understand other closely related scientific disciplines, such as: Hygiene, Epidemiology, Pathology, Medicine, pediatric, Dermatology & Urology. The course covers individual parasitic agents and the diseases that they produce. The emphasis will constantly be on helping the student understand and be able to cope with the agents with which he or she may come in contact. Particular attention will be paid to the diagnosis, epidemiology, prevention and control of the parasitic infections under discussion.

OBJECTIVES:

At the end of this semester, the student should be able to:

1. Understanding the role of parasites in pathogenic mechanisms.
2. Understanding the use of anti–parasitic treatment.
3. Role of the immune system in combating parasitic infections and diseases, and also in developing hypersensitivity and autoimmune diseases.
4. Maintenance of parasitic infection control and safe working environment.
5. Let the students focus on understanding topics not memorizing only.
6. Encourage the student to solve different problems that usually encountered in pharmaceutical practice.
7. Manage, diagnose and decide the best way of treatment of some parasitic infection (hypersensitivity, and autoimmune diseases
8. Manage pharmaceutical and medical emergencies which may occur in practiceand perform basic life support measures.
9. Identify different types of parasites by using different laboratory techniques.
10. Perform a range of clinical procedures which are within the scope of general pharmacy, including applications of preventive procedures.
11. Apply current infection control guidelines.
12. Adopt the principles of life-long learning needs of the medical profession(continuous

professional development).

13. Use computers efficiently in reaching biomedical information to remain current with advances in knowledge and practice.

14. Present information clearly in written, electronic and verbal forms.

15. Apply English language as needed for appropriate learning and communication in relation to medicine**.**

METHODS OF TEACHING :-

1-Lectures.
2- Small group discussions/Seminars .
3- Practical laboratory procedures
4- Micro assignments.

METHODS OF ASSESSMENT:-

1. Attendance
2. Seminars &quizzes.
3. HOME WORK
4. Mid-semester written examination.
5. Final writtenexamination.
6. Final Exam(practical)

TEXTBOOKS AND REFERENCES:

1. Basic Clinical Parasitology, Latest Edition by Franklin A.Neva.
2. Medical Parasitology, Latest Edition by **Markell**and **Voges**.
3. Foundations of Parasitology (Paperback edition**)** by Larry S. Roberts &JohnJanovy
4. Medical Diagnostic Parasitology,
5. Periodicals and websites:
6. Journal of Parasitology, Journal ofHelminthology
7. www.Pubmed.com
8. .www.**abebooks.com**

Week	SUBJECT	L	S	p	TOTAL
1	Introduction To Parasitology, History & Importance of Medical Parasitology & Tropical Medicine	**2**		**-**	**2**
2	Parasitism and Parasite–Host Relationship	**2**		**2**	**4**
3	Lumen Dwelling Protozoa. Biological & Morphological Characteristics of Parasitic Protozoas (Entamoebidae, Balantidium, Giardia, Trichomonas).	**4**		**2**	**6**
4					

5	Hemoflagellates (Malaria)	**2**		**2**	**4**
6	Blood and Tissue Dwelling Protozoa (Toxoplasma, Sarcocystis, Leishmaniasis & Trypanosomatidae)	**4**		**2**	**6**
7					
8	Trematodes Parasites of Human	**4**		**2**	**6**
9					
10	Cestodes: Whose Adult-form Infect Human and Whose Larvas Infect Human	**4**			**4**
11					
12	The Intestinal Nematodes	**2**	**2**		**4**
13	The blood and Tissue Dwelling Nematodes	**2**	**2**	**-**	**4**
14	Arthropods and Parasitic Human Diseseas Transmitted by mosquitoes	**2**	**2**	**-**	**4**
TOTAL		**28**	6	**10**	**44**

BIOPHARMACY AND PHARMACOKINETICS

COURSE DESCRIPTION :

It is a main specialized course of pharmacy and pharmaceutics. Biopharmaceutics is a subject that introduces the absorption, distribution, metabolism and excretion of medicine in the and illuminates the interrelationship among preparation, biology and drug treatment. According to dynamics and mathematical method, pharmacokinetics describes quantitatively the dynamic changes of drug in transfer processes such as absorption, distribution, metabolism and excretion. The course aims at enabling the students to acquire and understand the basic knowledge of pharmacokinetics and biopharmaceutics for designing , monitoring and modifying dosage regimen.

OBJECTIVES:

At the end of this semester, the student should be able to:

1- Understand the basic concepts of pharmacokinetics and biopharmaceutics.
2- Understand the principles of the ADME of a drug
3- Identify the physiological, physicochemical and dosage form-related factors that affects drug absorption from different dosage forms
4- apply the ADME to optimum utilization of a drug in a patient.
5- differentiates various terms related to bioavailability and bioequivalence.
6- Assess the absolute and relative bioavailability of drugs from different dosage forms using either plasma or urine data
7- Determine the basic pharmacokinetic parameters that describe drug absorption and disposition
8- design and adjust a patient's drug dosage regimen to keep the plasma/serum concentration of the drug within a desired therapeutic range

METHODS OF TEACHING

1- Lectures.
2- Seminars.

METHODS OF ASSESSMENT

1- controls
2- Final written examination
3-Research
4- Homework

TEXTBOOKS AND REFERENCES:

1. .Aulton, ME(2006),pharmaceutics: The Science of Dosage Form Design,2nd edition,UK,ChurchillLivingstonPuplications.
2. Shargel, L. and Yu, A.B.C.(2006),Applied biopharmaceutics andpharmacokinetics,3rd edition,Germany,McGraw-hills
3. gibaldi,M.,1984,Biopharmaceutics and ClinicalPharmacokinitics,3rd edition,lea&Febiger.
4. Block, L.H.(2000), the Science and practice of pharmacy, 20th ed. Philadelphia Lippincott Williams&Wilkins.

Week	SUBJECT	L	S	P	TOTAL
	Biopharmacy:				
1	introduction to biopharmaceutics and pharmacokinetics	**3**			**3**
2	Drug absorption from GIT	**3**	**2**		**5**
3	Physiological factors influencing drug absorption from GIT	**3**	**2**		**5**
4	Physic-chemical factors influencing drug absorption from GIT	**3**	**2**		**5**

5	Physic-chemical factors influencing drug absorption from GIT:	**3**	**2**		**5**
6-7	Dosage form factors influencing drug absorption from GIT :	**6**	**2**		**8**
8	Bioavailability and bioequivalence	**3**			**3**
	Pharmacokinetic:				
9	Pharmacokinetics: significance of plasma drug concentration measurement	**3**			**3**
10	Pharmacokinetics of drug absorption; zero and first order absorption rate constant	**3**	**2**		**5**
11	Compartment kinetics; one compartment and two compartment models	**3**	**2**		**5**
12	Determination of pharmacokinetic parameters from plasma and urine data after drug administration by intravascular and oral routes	**3**	**2**		**5**
13	Noncompartmental model; concept of mean residence time (MRT)	**3**			**3**
14	Nonlinear pharmacokinetic	**2**	**2**		**4**
	Multiple IV bolus injection	**1**	**2**		**3**
Total		**42**	**20**		**62**

PHYTOCHEMISTRY [II]

COURSE DESCRIPTION :

The course is concerned with the study of the chemistry of different classes of natural constituents including carbohydrates, different types of Volatile oils, Alkaloids, Lipids, Resins and resin combination; their structures, and methods of isolation, purification, detection and quantitative estimation, in addition to study the pharmacological actions and therapeutic uses of these natural constituents..

OBJECTIVES:

At the end of this semester, the student should be able to:

1- demonstrate knowledge of the basic pathways of the biogenesis of secondary metabolites.
2- Design a method for separation the biologically active principles from their extract
3- illustrate all studied information emphasized in the course description of the natural products (carbohydrates, glycosides, tannins, bitter principles, terpenoids, volatile oils, resin and resin combination, lipids and alkaloids) and apply this knowledge correctly in phytomedicine.
4- perform experiments for the detection of the biologically active secondary metabolites

METHODS OF TEACHING:

1-Lectures
2- Group discussion
3- Seminars
4- Laboratory practical sessions

METHODS OF ASSESSMENT:

1- seminars.
2- Mid-semester written test
3- practical quiz
4- practical examination
5- Final written examination

TEXTBOOKS AND REFERENCES:

1- Trease, G.E.& Evans, W.C.; "Pharmacognosy", W.B. Saunders Publishers, Ltd.
2- C.K. *Kokate.Pharmacognosy, NirailPrakashan,10th edition,1998.*
3- Tyler V. E. Brady L. R. Robbers J.E. 1988; "Pharmacognosy" Lea &Febiger. USA.
4- Shah Biren N. Seth A.K. Textbook of Pharmacognosy and Phytochemistry, First Edition, Elsevier, 2010
5- http:www.botanical.com

Week	SUBJECT	L	S	p	TOTAL
1 2 3	**Volatile oils:** Introduction; chemistry and evaluation of volatile oils. Biosynthesis, classification of volatile oils; hydrocarbons as volatile oils; alcohols as volatile oils; aldehydes as volatile oils. Ketones as volatile oils; Phenols as volatile oils; Oxides as volatile oils; Ester as volatile oils; Phenolic ethers as volatile oils. Application volatile oils.	9	2	4	15
4	**Alkaloids** Definition, distribution, physical and chemical properties, general methods of extraction, purification and isolation. General chemical tests,	3		2	5
5	Alkaloids Site of formation, storage and function of alkaloids in medicinal plants. Pharmacological activities and uses in medicine. Nomenclature, structure and classification of alkaloids.	3		2	5

6	Alkaloids Ornithine-derived alkaloids; Biosynthesis, properties, identification, and medicinal uses	**3**	**2**	**2**	**7**
7	Alkaloids Phenylalanine-derived alkaloids: Protoalkaloids; Biosynthesis, properties, identification, and medicinal uses	**3**		**2**	**5**
8	Alkaloids Benzylisoquinoline alkaloids: Opium and related alkaloids; Biosynthesis, properties, identification, and medicinal uses	**3**		**2**	**5**
9	Alkaloids: Tubocurarine-derived alkaloids, tetrahydroisoquinoline alkaloid, phenethylisoquinoline alkaloids; Biosynthesis, properties, identification, and medicinal uses	**3**		**2**	**5**
10	Alkaloids Tryptophan-derived alkaloids: Ergot, Simple Indole, Simple β-Carboline and TerpenoidIndole Alkaloids; Biosynthesis, properties, identification, and medicinal uses	**3**		**2**	**5**
11	Alkaloids Tryptophan-derived alkaloids: Quinoline and Pyrroloindole Alkaloids; Biosynthesis, properties, identification, and medicinal uses	**3**		**2**	**5**
12	Alkaloids Lysineand Histidine-derived alkaloids Purine alkaloids; Biosynthesis, properties, identification, and medicinal uses.	**3**	**2**	**2**	**7**
13	**Resinsand resin combination**: chemical composition, balsams and medical applications.	**3**			**3**
14	**Lipids and Fixed oils:** chemistry and medical applications: (fixed oils, fats and waxes)	**3**			**3**
TOTAL		**42**	**6**	**22**	**70**

PHARMACEUTICAL CHEMISTRY [III]

COURSE DESCRIPTION :

Pharmaceutical chemistry is a subject based on chemistry discipline and also involving biological and pharmaceutical sciences and aims to give students a wide and diverse scientific knowledge. This course will cover the chemical structure and nomenclatures of different classes of drug and their respective mechanisms of action: (Cholinergic drugs and related agents, Adrenergic agents, Central nerve system depressants, Central nerve system stimulants), Synthesis, structure activity relationship of certain classes of drug, metabolic changes of drugs related, drug interactions with receptor site.

OBJECTIVES:

At the end of this semester, the student should be able to:

1- Know different pharmacologic classes such as cholinergic drugs & related agents, adrenergic agents, Central nerve system depressants, Central nerve system stimulants

2-Demonstrate many pharmaceutical products concerning the active ingredients ,their chemical structures and nomenclature, clinical uses ,side effects ..etc .

3- Understand preparation of some drug by organic synthesis.

4.Understand basic structural requirements needed to produce certain biologic activity and how changes in the chemical structure of drugs affect efficacy(SAR).

5- Have been introduce to a variety of drug classes and some pharmacological properties.

6- Develop an understanding of principles of analytical techniques

METHODS OF TEACHING

1. Lectures.
2. controls.
3. Quiz
4. Practical training laboratory.

METHODS OF ASSESSMENT

1. controls.
2. Attendance.
3. Practical part including :seminars ,experiments
4. Final examination.

TEXTBOOKS AND REFERENCES:

1 -WILSON AND GISVOLD"S- Textbook of organic medicinal and pharmaceutical chemistry -Tenth edition –Lippincott-Raven-philadelphia-New York.

2- William O. Foye, Thomas L. Lemke and David A. William- 1995-Principles of Medicinal Chemistry-Fourth Edition- lea &Febiger, Philadelphia- New York.

3 -F.D. King -1994- Medicinal Chemistry Principles and Practice-The Royal Society of Chemistry.

Week	SUBJECT	L	S	P	TOTAL
1	Cholinergic and anti-cholinergic	3		2	5
2	cholinergic neurochemistry , cholinergic stereochemistry , structure–activity relationships	3			3
3	antagonists , products , cholinesterase inhibitors , reversible inhibitors , irreversible inhibitors , products	3			3
4	Neuromuscular Blocking Agents	3		2	5
5	Adrenergic & Nor- Adrenergic	3			3
6	adrenergic receptors , drugs affecting adrenergic neurotransmission , drugs affecting catecholamine biosynthesis	3		2	5
7	direct-acting sympathomimetics , parasympathomimetic agents ,α-adrenergic receptor agonists, α&βadrenergic receptor agonists	3			3
8	β adrenergic receptor agonist , adrenergic receptor antagonists (blockers) , αblockers , nonselective α- blockers , irreversible αblockers , selective α_2- blockers ,β blockers.	3		2	5
9	CNS depressants &stimulants	3		2	5
10	Anxiolytics	3			3
11	Sedative/hypnotics	3			3
12	Antipsychotics	3			3
13	Anticonvulsants	3		2	5
TOTAL		**39**		**16**	**55**

PHARMACOLOGY [I]

COURSE DESCRIPTION :

This course is fundamental for the students to study medication uses needed in other scientific disciplines. It allows the students to acquire a scientific conception of pharmacokinetics and pharmacodynamics of medications. It contains principles of drug selection, formulations of pharmaceutical preparations and their applications, drug actions on receptors and biological compo and their ability to modify functional mechanisms in the nervous system and innervated organs as guidelines for ordering treatments and prescribing drugs.

OBJECTIVES:

At the end of this semester, the student should be able to:

1. Describe the behavior of medications in human body, their cellular actions, principles of medication selections for treatment and prevention ,classes of untoward reactions and interactions.
2. Compare between advantages and disadvantages of the different routes of drug administration in different medical conditions including emergencies and the corresponding pharmaceutical preparations.
3. Classify the phases of drug development including the clinical phases and methods of prescription writing.
4. Distinguish between central and peripheral acting drugs, their therapeutic intervention and toxicities associated with their use.
5. Use computer facilities and communication approaches efficiently in a positive and productive manner.
6. Expose the general principles of using antimicrobial drugs in treatment or prevention of infections, poisonings and autacoids antagonists with examples.
7. Evaluate the relationship between the dose of the drug and its response and time needed to reach the steady state concentration of the drug depending on their half-lives

METHODS OF TEACHING

1. Lectures including video show.
2. Seminars.
3. Active participation (student presentation)
4. Class room discussion

METHODS OF ASSESSMENT

1. Formative assessment in seminars.
2. Mid-semester written examination
3. Final written examination

TEXTBOOKS AND REFERENCES:

1- TripathiKD. 2013 Essential of Medical Pharmacology7th ed. New Delhi ,Jaypee.
2- Laurence DR, Bennett PM. 2006 Clinical Pharmacology. Edinburgh: Churchill Livingstone 3-Katzung BG . 2012. Basic and clinical pharmacology 12th ed. MacGraw-Hill Companies. Inc
4- Hardman JG, Limbird LE, Molinoff PB, Ruddon RW, Gilman AG.2005 The Pharmacological Basicsof Therapeutics, 10th ed. New York: McGraw Hill
5-http://www.mednotes.net/notes/pharmacology/

Week	SUBJECT	L	S	p	TOTAL
1 2 3	Fundamental concepts of pharmacology	9	2	-	11
4 5	Pharmacokinetics	6	2	-	8
6	Receptor Theory	3		-	3
7 8	Pharmacology of autonomic NS	6	2	- -	11
9	Generalities about the central nervous system	3		-	
10	Untoward reactions	3		-	3
11	Drug interactions	3	2	-	5
12	Autacoids& Antagonists	3	2		5
13	Prescription order writing	3	-	-	2
14	Generalities about the usage of antimicrobial agents	3		-	2
TOTAL		42	10	-	52

FOURTH YEAR المستوى الرابع

PHARMACEUTICAL CHEMISTRY [IV]

COURSE DESCRIPTION :

Pharmaceutical chemistry is a subject based on chemistry discipline and also involving biological and pharmaceutical sciences and aims to give students a wide and diverse scientific knowledge. This course will cover the chemical structure and nomenclatures of different classes of drug and their respective mechanisms of action(Analgesic agents, Non steroid anti-inflammatory drug, Diuretics, Cardiovascular agents, Local anesthetics agents, Histamine And Anti-histamine agents, Steroids), synthesis, structure activity relationship of certain classes of drug, metabolic changes of drugs related, drug interactions with receptor site.

OBJECTIVES:

At the end of this semester, the student should be able to:

1- Know different pharmacologic classes such as Analgesic agents, Non steroid anti-inflammatory drug, Diuretics, Cardiovascular agents, Local anesthetics agents, Histamine And Anti-histamine agents, Steroids
2- Demonstrate many pharmaceutical products concerning the active ingredients, their chemical structures and nomenclature, clinical uses ,side effects ..etc.
3- understand preparation of some drug by organic synthesis
4- Understand basic structural requirements needed to produce certain biologic activity and how changes in the chemical structure of drugs affect efficacy(SAR).
5- Have been introduce to a variety of drug classes and some pharmacological properties. 6- Develop an understanding of principles of analytical techniques.

METHODS OF TEACHING

1. Lectures.
2. controls.
3. Quiz
4. Practical training laboratory.

METHODS OF ASSESSMENT

1. controls.
2. Attendance.
3. Practical part including :seminars, experiments and attendance.
4. Final examination.

TEXTBOOKS AND REFERENCES:

1-WILSON AND GISVOLD"S- Textbook of organic medicinal and pharmaceuticalchemistry -Tenth edition –Lippincott-Raven-philadelphia-New York.
2-William O. Foye, Thomas L. Lemke and David A. William- 1995-Principles of Medicinal Chemi Fourth Edition- lea &Febiger, Philadelphia- NewYork.
3-F.D. King -1994- Medicinal Chemistry Principles and Practice-The Royal Society of Chemistry.

Week	SUBJECT	L	S	P	TOTAL
1	Narcotic analgesic	3		2	5
2	Drug monographs , mixed agonist/antagonist	3			3
3	Opioid antagonists	3			3
4	Minor analgesic	3		2	5
5	Aspirin and salicylic acid derivatives , mechanism of action of salicylates , pharmacokinetics of salicylates	3			3
6	The analgesic antipyretics: acetaminophen (paracetamol) and related analogs,	3		2	5
7	Cardiovascular –agents	3		2	5
8	Ca-channel blockers	3			3
9	Anti-arrhythmic	3			3
10	Anti-hypertensive	3		2	5
11	Anticoagulants.	3			3
12	Antihistaminic agents	3		2	5
13	First-generation antihistamine classes ,second-generation antihistamines	3			3
14	Developments: the "dual-acting" antihistamines , histamine h2-antagonists	3			3
TOTAL		**42**		**12**	**54**

PHARMACOLOGY [II]

COURSE DESCRIPTION :

The course builds on the prior knowledge gained in pharmacology I and is crucial for the students to conduct further medical disciplines. It comprises antimicrobial agents, drugs acting on cardiovascular, renal and respiratory system. In addition, cancer chemotherapy, anti-hyperlipidemic and anti-parasitic drugs represent the final part of the course.

OBJECTIVES:

At the end of this semester, the student should be able to:

1. Describe the properties including preventive, curative and untoward effects of drugs thatact as antibacterial, antiviral (including anti-HIV), antifungal, antimycotic ,Antiparasites and of those acting on cardiovascular , renal and respiratory system.
2. Design appropriate management strategies for patients with acute and chronic diseases such as hypertension, heart failure, types of angina, hyperlipidemia, asthma, and infectious diseases.
3. Compare between the different classes of drugs and within the class including diuretics, anti-asthmatics, and cardiovascular drugs considering their mechanism of actions , rapidity of effects, safety margin, and treated health conditions.
4. Select the proper drug to the defined medical conditions considering doses , toxicities, health conditions and safety.
5. Solve medical conditions using appropriate routs of drug applications and recommended doses in disorders including injuries and critical situations.

METHODS OF TEACHING

1. Lectures including video show.
2. Seminars.
3. Active participation (student presentation)
4. Classroom discussion

METHODS OF ASSESSMENT

1. Formative assessment in seminars.
2. Mid-semester written examination
3. Final written examination

TEXTBOOKS AND REFERENCES:

1- TripathiKD. 2013 Essential of Medical Pharmacology7th ed. New Delhi ,Jaypee.
2- Laurence DR, Bennett PM. 2006 Clinical Pharmacology. Edinburgh: ChurchillLivingstone
3- KatzungBG . 2012. Basic and clinical pharmacology 12th ed. MacGraw-Hill Companies.Inc.
4- Hardman JG, Limbird LE, Molinoff PB, Ruddon RW, Gilman AG. 2005The Pharmacological Basisof Therapeutics, 10th ed. New York: McGrawHill
5- http://www.mednotes.net/notes/pharmacology/

Week	SUBJECT	L	S	p	TOTAL
1-4	Antibacterial agents	12	4	-	16
5	Antimycotic, Antiviral and anti-HIV drugs	3	-	-	3
6-7	Antiparasites and anthelminthic agents	6	2	-	8
8	Diuretics	3	-	-	3
9	Cardiotonics	3	-	-	3
10-11	Antihypertensive agents	6	2	-	8
12	Antiarrhythmic and Antianginal agents	3	-	-	3
13	Antiasthmatic drugs	3	2	-	5
14	Hypolipoproteinemic and Anticancer drugs	3	-	-	3
TOTAL		42	10	-	52

INDUSTRIALPHARMACY [I]

COURSE DESCRIPTION :

Industrial course are concerned with providing the students with experience in a drug manufacturing facility . Also , familiarizing them with some pharmaceutical operations used in pharmaceutical industry, such as mixing , drying and milling , etc.

OBJECTIVES:

At the end of this semester, the student should be able to:

1. Describe the flow of materials in manufacturing unit by studying the plant layout design.
2. Explain a technical knowhow of different operations in pharmaceutical manufacturing.
3. Identify factors and equipment that lead to enhanced filtration.
4. Elucidate the importance of particle size in pharmacy and suggest methods for size reduction of solids .
5. Describe the mechanisms of mixing , mixing equipment and suggest measures to overcome

failures during mixing operation.
6. Characterize powders in terms of their size distribution.
7. Handle different types of packs , materials of packaging available for liquid, powders, tablets and semisolid dosage forms.
8. Familiarize with good manufacturing practices
9. Correlate dosage form design with biological fate of drug by expressing the absorption, distribution , metabolism and excretion of drugs.
10. Explain the importance of bioavailability and bioequivalence of drugs.

METHODS OF TEACHING :-

1- Lectures.
2- Control of theoretical aspects.
3- Practical training.

METHODS OF ASSESSMENT:-

1- Seminars.
2- Attendance.
3- Two Mid-semester written examination
4- Final writtenexamination

TEXTBOOKS AND REFERENCES:

1. Pharmaceutics : The science of dosage form design-M.E.Aulton.
2.The Theory and practice of industrial pharmacy – Lachman L., Lieberman H.A. &Kanjig J.L., 3rd edition , 1990 Varghese publishing House ,Bombay.
3. Tutorial pharmacy by Cooper & Gunn, ed. S.J.Carter, CBS publishers &Distributors,Delhi, edition,2000.
4. Alfonso G, Remington : The science and practice of pharmacy . Vol. I &II.Lippincott, Willia& Wilkins Philadelphia.

Week	SUBJECT	L	S	p	TOTAL
1	Introduction and processing	3			3
2-3	Heat transfer: Introduction, theory, sources, mechanisms, applications and equipment Heat flow problem	6	2		8
4	Evaporation: Equipment - factors affecting rate of evaporation	3	2		5

5-6	Drying: Drying of wet solids Types of industrial oriers Driers for dilute solution and suspensions Freeze Drying process	**6**	**2**		**8**
7-8	Crystallization: Theory and factors affecting crystallization and Equipment	**6**	**2**		**8**
9-11	Filtration: Theory of filtration, factors affecting rate of filtration. Types of filter media. Industrial filters Microfiltration or ultrafiltration	**9**	**4**		**13**
12-14	Sterilization: Definition, methods of Sterilization Microbial death rate and kinetics Quality assurance	**9**	**4**		**13**
TOTAL		**42**	**16**	**-**	**58**

PUBLIC HEALTH

COURSE DESCRIPTION :

This course is important for the pharmaceutical research and health education. It comprises topics on health- disease process, disease eradication, epidemiology, methods of epidemiologic studies, health management, preventive medicine, research methodology and data processing.

OBJECTIVES:

At the end of this semester, the student should be able to:

1- Describe the difference between health and disease including prevention of diseases and promoting of health
2- Discuss issues in health education, management and development
3- Manifest the moral values of integrity honesty, critical thinking, empathy & value for life.
4- Apply research methodology in designing, performing and carrying out pharmaceutical Research
5- Communicate effectively using communication skills

METHODS OF TEACHING

1. Lectures
2. Seminars.
3. Active participation
4. Classroom discussion

METHODS OF ASSESSMENT

1. Formative assessment in seminars.
2. Mid-semester written examination
3. Final written examination

TEXTBOOKS AND REFERENCES:

1 –Hattab AS, Medrano TR, ELMJ. Introduction to social medicine and public health. 1999
2- Lecture notes
3- Lucas AO, Gilles HM. Short text book for public health medicine for the tropics. 4th ed. 2003, London Press Inc.

Week	SUBJECT	L	S	p	TOTAL
1	Historical Evolution of Medical Sciences	2	-	-	2
2	Health – Disease Process	2	-	-	2
3	Health Status of the Population	2	-	-	2
4	Health and Development	2	-	-	2
5	Preventive Medicine and Health Promotion	2	2	-	4
6	Health Education	2	-	-	2
7	Moral Values in the Professional Practice	2	-	-	2
8	Health Management(Basic concepts &Principles of Administration)	2	2	-	4
9	Function of Management &Management Process	2	-	-	2

10	Role of Statistics in medicine and public health.	**2**	**2**	-	**4**
11	Collection, Organization and classification of data	**2**	**2**	-	**2**
12	Procedures to summarize data	**2**	-	-	**2**
13	Presentation of data & Vital statistics	**2**	-	-	**2**
14	Research methodology	**2**	-	-	**2**
TOTAL		**28**	**8**	-	**36**

PSYCHOLOGY

COURSE DESCRIPTION :

Behavioral sciences applied to medical practices are a new trend in the curriculum of medical education . It integrates medicine with social sciences to develop integrated understanding of man as a Bio-psycho-social unit in health and disease process. The ability to apply health psychology to pharmacy practice will enhance the quality and effectiveness of patient care and will facilitate pharmacist-patient communication and the therapeutic relationship. The course will entail : definition , brief history and theories of psychology , psychological process, illness behavioral, pain , good inter-personal relationships in health care delivery.

OBJECTIVES:

At the end of this semester, the student should be able to:

1-Explain the components and influence of psychological factors in the health-disease process.

2-Identify the main sources dealing with study of human being especially behavioral sciences, their methods and their importance in relation to the health-disease process.

3-Apply the necessary communication techniques for the achievement of good doctor patient community relationship and better medical doctors.

METHODS OF TEACHING :-

3- Lectures.

4- Seminars.

METHODS OFASSESSMENT:-

1- Formative assessment in seminars.

2- Mid-semester written examination

3- Final writtenexamination

TEXTBOOKS AND REFERENCES:

6. Plotnik R ,Kouyoumdjian H.2011.Ninth Edition.Introduction to psychology.USA.Wadsworh.
7. Barbara Fadem.2004.Behavioral Sciences in Medicine.USA.Liooincott Williams &Wilkins.
8. Douglas A. Bernstein, Peggy W. Nash.2008 4th edition. Essentials of psychology. USA. George Hoffman.
9. Douglas S.Krull. 2014.Introduction to psychology. USA. Kona publishing and media Group.

Week	SUBJECT	L	S	p	TOTAL
1	Introduction : Man as a bio-psycho-social being	2	4	-	6
2	Sciences that study man. Psychology as a science	2	4	-	6
3	Biological aspects of human psyche	2	4	-	6
4	Social and cultural aspects of human psyche	2	4	-	6
5	Cognitive process : sensation , perception, attention and orientation , thinking , language and memory .	2	4	-	6
6	Affective process : Emotions , sentiments. Passion , frustration , conflicts and defense mechanisms.	2	4	-	6
7	Behavioral process : classical and instrumental conditioning ,observational learning in behavior change and therapy.	2	4	-	6
8	Individual differences in personality : abilities , capacities , temperament and its relation in health and disease .	2	4	-	6
9	Personality : concepts of personality ,theories of personality and clinical types of personality .	2	4	-	6
10	Psychology of pain : definition , factors influencing pain perception , behavioral strategies to control pain.	2	4	-	6
11	Psychology of the patient	2	4	-	6
12	Doctors patient relationship	2	4	-	6

13	Psycho pharmacy and drug abuse	**2**	**4**	-	**6**
14	Field research (Field – community practice) case (studies on drug abuse , addition & health)	**2**	**4**	-	**6**
TOTAL		**28**	**56**	-	**84**

PHARMACOLOGY [III]

COURSE DESCRIPTION :

This course is essential for ongoing medical study. It deals with drugs acting on the central nervous system : antianxiety, sedatives, hypnotics, antiepileptic, anti-depressive, anti-parkinsonism and anti-peptic ulcer . Hormones and drugs acting on blood are included as well. Pain as a major problem is also handled with local anesthetics, analgesic non-steroidal anti- inflammatory drugs, and eventually, opioids and antagonists.

OBJECTIVES:

At the end of this semester, the student should be able to:

1. Describe the pharmacological effects and clinical efficacy of different classes of drugs acting on endocrine and central nerves system, blood and coagulation disorders, pain mechanisms, gastrointestinal tract and mental diseases considering the seriousness and urgency of the medical conditions.
2. Plan for different treatment modalities in order to provide optimum drug therapy for patients and avoid therapeutic failure based on principles of therapy and patient's factors .
3. Distinguish adverse drug reactions and identify contra-indications of drugs from different pharmacological classes associated with common diseases.
4. Design appropriate management strategies for patients with acute and chronic diseases such as endocrine disorders, coagulation disturbances, anemia and diabetes.
5. Compare between the different classes of drugs acting in mental illnesses based on efficacy, side effects , selectivity and patient compliance.
6. Select the proper drug to the defined medical conditions including pain, anesthesia, peptic ulcer and blood disorders considering doses , toxicities, health conditions and safety.
7. Collect , analyze and display drug related patient's responses including side effects.

METHODS OF TEACHING

1. Lectures including video show.
2. Seminars.
3. Active participation (student presentation)
4. Classroom discussion.

METHODS OF ASSESSMENT

4. Formative assessment in seminars.
5. Mid-semester written examination
6. Final written examination

TEXTBOOKS AND REFERENCES:

1-TripathiKD. 2013 Essential of Medical Pharmacology 7th ed. New Delhi ,Jaypee.
2- Laurence DR, Bennett PM. 2006 Clinical Pharmacology. Edinburgh: ChurchillLivingstone
3-KatzungBG . 2012. Basic and clinical pharmacology 12th ed. MacGraw-Hill Companies.I
4 - Hardman JG, Limbird LE, Molinoff PB, Ruddon RW, Gilman AG. 2005 The Pharmacological Basisof Therapeutics, 10th ed. New York: McGrawHill
5-http://www.mednotes.net/notes/pharmacology/

Week	SUBJECT	L	S	p	TOTAL
1	Drugs acting on the endocrine system Insulin and anti-diabetic drugs	6	2	-	8
2					
3	Thyroid hormones, anti-thyroid drugs and sex hormones	3	-	-	3
4	Adrenocorticotrophin hormone (ACTH) , glucocorticoids and drugs affecting uterine motility	3	2	-	5
5	Drugs acting on pain perception, analgesics, antipyretic and anti-inflammatory (NSAIDs)	3	2	-	8
6	Opioids analgesics and antagonists	3		-	
7	Drugs acting in central nervous system drugs used in the treatment of Parkinson's diseases.	3	-	-	3
8	Hypnotics and sedatives	3	-	-	3
9	Antipsychotic & Antidepressant drugs	3	-	-	3
10	Antiepileptic drugs	3	-	-	3
11	Drugs acting on blood. Anti- anemic drugs.	3	-	-	3
12	Anticoagulants and Coagulants, Fibrinolytic and antifibrinolytic agents	3	2	-	5
13	Local anesthetics	3	-	-	3
14	Drugs acting on the digestive system, antidiarrheal. Drugs acting in peptic ulcer	3	2	-	5
TOTAL		**42**	**10**	**-**	**52**

INDUSTRIAL PHARMACY [II]

COURSE DESCRIPTION :

Industrial courses are concerned with providing the students with experience in a drug manufacturing facility. Also, familiarizing them with some pharmaceutical operations used in pharmaceutical industry.

OBJECTIVES:

At the end of this semester, the student should be able to:

1- Acquire the principles of pharmaceutical unit operations performed in pharmaceutical industry like filtration, drying, evaporation, crystallization and sedimentation.

2- Describe the equipment used in industrial pharmacy, their operation and applications.

3- Intellectual Skills:

The student should be able to select the most appropriate equipment used for certain unit operation**.**

METHODS OF TEACHING :-

1- Lectures.

2-Seminars .

3-Group discussion.

METHODS OF ASSESSMENT:-

1-Control.

2-Exam.

3-At the beginning of the semester , each student has to select a topic from the given pharmaceutical issues. Searching and making a summary for the topic contents should take three weeks. At the end of the fifth week of the semester the student should deliver a written summary sheet of the topic.

TEXTBOOKS AND REFERENCES:

1. Pharmaceutics : The science of dosage form design-M.E.Aulton.

2.The Theory and practice of industrial pharmacy – Lachman L., Lieberman H.A. &KanjigJ.L., 3rd edition , 1990 Varghese publishing House ,Bombay.

3. Tutorial pharmacy by Cooper & Gunn, ed. S.J.Carter, CBS publishers &Distributors,Delhi, edition,2000.

4. Alfonso G, Remington : The science and practice of pharmacy . Vol. I & II. Lippincott, Williams & Wilkins Philadelphia.

Week	SUBJECT	L	S	p	TOTAL
1-3	**Size separation and size reduction** Mechanisms،factors affecting size reduction and equipments Objective, effect of material	9	2		11

	properties on milling. size reduction methods selection of methods, flow properties. equipment's used				
4	**Size analysis** Mechanisms،theories،factors affecting size analysis and equipments	**3**	**2**		**5**
5-7	**Mixing** Type of mixing Mechanism of mixing Factors affect mixing Types of industrial mixers	**9**	**2**		**11**
8-9	**Emulsification and homogenization** applications،theory& mechanisms، equipment's	**6**	**2**		**8**
10	**Powder flow** Introduction, Methods for characterizing powder flowability	**3**	**2**		**5**
11-12	**Good manufacturing practices GMP** introduction،quality management in the drug industry،quality assurance and good manufacturing practices for pharmaceutical products (GIVIP).	**6**	**2**		**8**
Total		**36**	**12**	**-**	**48**

APPLIED PHARMACOGNOSY

COURSE DESCRIPTION :

This course is designed to provide the student with the basic knowledge of some applied branches of Pharmacognosy. The course covers the following topics: introduction to widespread systems of traditional medicine, medicinal plants and alternative medicines (homeopathy and aromatherapy);phytotherapy and pharmacology of plant drugs; plant tissue culture and -recombinant drugs techniquesin pharmacy. At the end of this course, student will be able to apply their knowledge inphytomedicnes.

OBJECTIVES:

At the end of this semester, the student should be able to:

1- demonstrate knowledge ofthe different traditional systems of medicines,the concept of traditional medicine, the methods used in traditional medicine , its scientific basis and their advantages and drawbacks, and explain the impact of the ecological factors on the biological activity of medicinal plants.
2- understand the overall pharmacological effect of the medicinal plant as a result of a synergism or antagonism between its constituents and the possible herb contraindication and interactions among the medicinal plants and with other chemical drugs as well as the concept of standardization of phytomedicines.
3- demonstrate knowledge of the different pharmacological activities and uses of medicinal plants(Phytotherapy).
4- acquire knowledge on the hallucinogensused by man in different cultures, and the common toxic plants.
5- deal with the methods recommended by WHO for the quality control of herbal drugs.
6- understand principles and applications of plant tissue culture and DNA-recombinant drugs techniques.
7- know the basic concepts and applications of IR, UV, Mass and NMR method for the characterization and elucidation of the isolated natural compounds.

METHODS OF TEACHING:-

1- Lectures.
2- Practical training.
3- Assignments.

METHODS OF ASSESSMENT:-

1- Seminars.
2- Laboratory Activity
3- Mid-semester written examination
4- Final practical seminar.
5- Final written examination

TEXTBOOKS AND REFERENCES:

1- Trease, G.E.& Evans, W.C. “Pharmacognosy”, 15th Edition (2002). W.B. Saunders Publishers, Ltd.
2- Michael Heinrich, et al. (2012). “Fundamentals of pharmacognosy and phytotherapy” Seconded printed in China, Elsevier Ltd.
3-.C.K. *Kokate. Pharmacognosy, NirailPrakashan,10th edition,1998.*
4- *MichaelR.DaveyandPaulAnthony(2010).PlantCellCulture*.EssentialMethods. Wiley-Blackwell. UK.
5- OliverKayserandWimJ.Quax(2007).MedicinalPlantBiotechnology,FromBasic Research to Industrial Applications; Volume I. Weinheim, Germany, Wiley-VCH.
6- Harborne, J.B. Phytochemical Methods: A Guide to Modern Techniques of Plant Analysis. 3rd Edn. Chapman and Hall: London, 1998.
7- WHO monographs on selected medicinal plants (Vol. 1-4) World Health Organization.
8- http://www.herbmed.com

Week	SUBJECT	L	S	p	TOTAL
1	**Traditional Medicine:** Definition and the topics of applied pharmacognosy. Introduction to widespread systems of traditional medicine (Chinese, Ayurveda, Unani – Arabic and African systems of traditional medicine).	2			2
2	**Herbal medicine:** Introduction to complementary/alternative medicine, homeopathy and aromatherapy. Importance of medicinal plants, advantages and disadvantages of the use of herbal medicine.	2		2	4
3	**Phytotherapy**: Introduction, contraindications of some herbal medicine, interactions of herbal drugs (pharmacokinetic and pharmacodynamic Interactions in the phytopharmacology).	2	2		4
4 5 6	**Phytotherapy**: Classification of herbal drugs according to the pharmacological action. Drugs acting on: the nervous system, heart, circulation and blood, gastrointestinal tract, nasal and respiratory systems, liver, urinary and reproductive systems, skin and mucous membranes, sugar metabolism, inflammation, infection, malignant diseases, allergies, and immune system.	6			6
7	Hallucinogens, and Common Poisonous Plants. Renewed interest in herbal remedies to find new drugs	2	2	2	6
8	**Evaluation of herbal drug:** Introduction, Standardization and quality control of herbal drug. Macroscopical and microscopical,.	6		16	22

9 10	Physicochemical methods. Determination of bitterness value, swelling index, pesticide residues, haemolytic activity. Determination of volatile oils and Microbiological methods.				
11	**Characterization and Structure Elucidation of Natural Products:** Application of Spectroscopic methods on natural compounds.	**2**			**2**
12 13 14	**Medicinal Plant Biotechnology:** Introduction to medicinal plant biotechnology. Production in microbial cells. Plant tissue culture: Secondary metabolites production in plant cell culture. Optimization of Plant tissue culture. DNA-recombinant drugs (genetic engineering). Introduction to transgenic medicinal plant technology.	**6**			**6**
TOTAL		**28**	**4**	**20**	**52**

PHARMACEUTICAL ADMINISTRATION

COURSE DESCRIPTION :

The Goal of This Course is to Acquaint Students With The Basic Principles and Concepts Which Represent The Framework and Applications of Management ,Accounting& Marketing. The Course Will Specifically Discuss The Meaning of 'Management' , 'Accounting,' &'Marketing' its Historical Development, Its Importance in Taking Economic Decisions and Its Basic Theories On Which Financial Principles and Procedures and Final Financial Operations are Based. This is Based on The Assumption of The Accuracy and The Validity of Financial Operations During The Year. And Discuss The Marketing Strategies, And Techniques In developing, implementing, Marketing and Evaluating Professional Pharmacy services. This Prepares Students To Their Future Practical Life, Helping Them To Understand, Identify Market Needs And Match Between Their Objectives & Capabilities To Select The Relevant Future Opportunities, Based Upon Knowledge And Skills Needed

OBJECTIVES:

At the end of this semester, the student should be able to:

1. Define The Concept of Management and Discuss The Role of a Manager , Elements of Decision Making, and Functions of Manager .
2. Describe The Principles and Method of Successful, Effective and Efficient Operation Management of Pharmacy
3. Discuss Purchasing , Distribution Channels, Inventory Control Procedures Including and Pricing Policies.
4. Discuss The Meaning of Accounting ,Basic Principles , Concepts The Framework of Accounting.
5. Discuss The Basic Financial Principles and Procedures and Final Financial Operations and Statements.
6. Discuss Sales & Marketing Management: Concepts, Behavior Of Doctors, Retailers And Customers;
7. Discuss The Marketing Plan Process/Marketing Mix &Marketing Research, Strategies,& Segmentation, Targeting.
8. Discuss Product Life Cycle & Tactical Marketing (4ps), The Pharmaceutical Marketing, Elements, Channels.
9. Discuss Application; How To Market Any Product?.
10. Discuss Selling Skills.

METHODS OF TEACHING :

1-Lectures.
2-quiz.
3-Group discussion.
4- Group work.
5-Practical training.

METHODS OF ASSESSMENT

1-Control 1 (Management Principals &Leadership)
2-Activates 10%, (EMC & Medical Supply Management)
3-Control 2 (Accounting and Financial Statement).
4-Semester work + Attendance
5-Final written exam

TEXTBOOKS AND REFERENCES:

1- Trease, G.E.& Evans, W.C. 2002; "Managing Drug Supply ",JONATHAN D. QUICK, HANS V. HOGERZEIL & 4 Others … , Second Edition KumarianPrecc, 1997.
2 - Managing Pharmacy Practice, Principles, Strategies, and Systems, Peterson,CRCPRESS.
3-Tyler V. E. Brady L. R. Robbers J.E. 1988; "The Basic Principals of Management"Arabic Language, Arab, Press Amman,Jordan.
4- Pharmacy Business Management, Steven Kayne, Glasgow,England.
5- David B. Troy 21 , 2006 " Remington- The Science and Practice of Pharmacy (Vol. 1-2) Lippincott William &WillKins.
6- PhylibKotler. *"Marketing Principals" , 10thedition,2012.*
7-http:www.msn.com
8-http:www.who.int/

Week	SUBJECT	L	S	p	TOTAL
1 2	Introduction: and Definition, Scope of Pharmacy Administration. History of Pharmacy .	4	-	-	4
3	The Management: Concept, Process, Skills , Schools, Fields and Principles.	2	-	-	2
4	Management Operations	2	-	-	2
5 6 7 8	Pharmaceutical Marketing: Marketing Management: Concepts, behavior of doctors, retailers and customers; Marketing research; Advertising and sales promotion: Pricing; Distribution; Selling; Sales, Retail And Product Management. The Marketing Strategy: Process, Segmentation, Mix. & Research. Product Life Cycle , Tactical Marketing (4ps), Sales Cycle. The Medical Seles Promotion: The Application of products, Selling Skills And Communication Module (7Cs).	8			8
9 10	Medical Supply Managements in Public Pharmacy: Forecasting &Purchasing Methods And Procedures. Inventory Management, Distribution Pharmacy Designing and Medicines Arrangements.	4	-	-	4
11 12 13	Accounting, Financial Management Accounting: Introduction and Basic Principles and Concepts . Financial Procedures: Accounting Cycle , Double Entry System Journalizing. Ledger , Posting, Balancing Trial Balance.	8	-	-	8

14	Financial Statements: Income Owner's Equity, Balance Sheet, Cash Flows. .				
TOTAL		**28**	**-**	**-**	**28**

FIFTH YEAR المستوى الخامس

Clinical Pharmacy I

COURSE DESCRIPTION :

The course acquires the students skills in solving and interpreting clinical cases towards patient oriented practice. The course comprises clinical and practical pharmacokinetics and therapeutics including gastrointestinal CNS disorders, and infections

OBJECTIVES:

After completion of the course the student will be able to:

1. Monitor Drug therapy for medication with narrow therapeutic index and can calculate the most important drug pharmacokinetic parameters
2. Recognize drug interaction due to pharmacokinetic and other mechanisms
3. Respond to question regarding drugs information and source an evidence base resources for drug information.
4. Predict adverse drug reactions and take action to reduce the events of adverse drug reaction occurring.
5. Take patient medical history and admission record
6. Interpret laboratory clinical data
7. Take part in treatment planning for the given clinical disorders

METHODS OF TEACHING

1.Lectures and seminars.
2. Hospital and Primary Health Care Unit(PHC)experiential
3.Group experimental work.
4.Assignment.

METHODS OF ASSESSMENT

1. Controls.
2 .Practical test.
3.Final written examination. & Assignment

TEXTBOOKS AND REFERENCES:

1. Roger Walker and Cate Whittlesea. Clinical Pharmacy and Therapeutics. 5th edition, New York, Churchill Livingstone2012
2. Philip Wiffen Marc Mitchell Melanie Snelling Oxford Handbook of Clinical Pharmacy. New York 2017.
3. Linda J Dofds Drugsin Ude 4th ed. Pharmaceutical Press UK 2010.

Week	SUBJECT	L	S	P	TOTAL
1	Introduction in clinical pharmacy Practical pharmacokinetics :general consideration, Therapeutic drug monitoring TDM, its parameters Vd, volume of distribution, elimination, dosing regimen, dosing adjustment	**3**			**3**
2	Clinical application of PK: Estimation of creatinine clearance with examples of prototype drugs (TDM), digoxin , theophylline, gentamicin with clinical cases	**3**	**2**		**5**
3	Drug interactions: epidemiology, mechanisms and types of drug interactions / Adverse drug reactions: concept , assessing of ADRs, definition, classifications ,factors affecting ADRs, immunological reactions with examples	**3**	**2**		**5**
4	Pharmacovigilance and epidemiological methods in ADR detection/ Laboratory and biochemical data: LFT, cardiac markers , immune globulin , other clinical tests for TDM and monitoring anticoagulant therapy	**3**	**2**		**5**
5	Parenteral nutrition , types and composition Neonates : major clinical disorders / Pediatrics and geriatrics	**3**			**3**
	Therapeutics : (in each topic: concept, epidemiology, risk factors, etiology, diagnosis, management of the patients, case study)	**3**	**2**		**5**

6	Peptic ulcer disease ,gastritis & gastroesophageal reflux.				
7	Infectious diseases: Lower/Upper respiratory tract infection, Urinary Tract Infections,	**3**			**3**
8	Superficial fungal infections/ Vulvovaginal candidiasis	**3**	**2**		**5**
9	Malaria & TB	**3**			**3**
10 – 11	CNS: Epilepsy Psychoses & Depression	**6**	**2**		**8**
12 - 14	Common clinical cases and interpretation Pharmacogenomics	**9**			**9**
TOTAL		**42**	**12**		**54**

TOXICOLOGY

COURSE DESCRIPTION :

This course is fundamental for the students to acquire scientific information on toxicology and related sciences . It provides them the organization of toxicants and poisons, their properties and mechanisms for toxic chemical interactions. Toxicokinetics, body target organs for toxicants and biological tests for evaluating chemical toxicity are included.

Emphasis is placed on clinical toxicology, showing the general guidelines to treat patients with acute intoxications and ways for prevention of intoxication. Animal, food and plants as well as metal and non-metal poisoning, teratogenic and carcinogenic chemicals are included.

OBJECTIVES:

At the end of this semester, the student should be able to:

1. Describe the basic terminologies of toxicology, the criteria modifying the reactions towards toxicants and the most organ seriously affected including underlying toxic mechanisms.
2. Classify toxicants , carcinogens, toxic reactions , toxicity tests and methods to manage intoxicated patients considering nonspecific and specific measures.
3. Recognize different toxic conditions with metallic and non-metallic toxicants with instituting proper measures including antidotes.
4. Demonstrate the common food , anima land plants poisonings , their toxic pictures, and methods of treatment and prevention .
5. Solve intoxication states by identifying the insult, planning and treating the conditions through general and specific measures.
6. Perform written, verbal, nonverbal communication within the group including computer Skills.

METHODS OF TEACHING

1. Lectures including video show.
2. Seminars.
3. Active participation (student presentation)
4. Classroomdiscussion

METHODS OF ASSESSMENT

1. Formative assessment in seminars.
2. Mid-semester written examination
3. Final written examination

TEXTBOOKS AND REFERENCES:

1- Samira A Mahmood, Hussein A Bakatteir, Robert L Rojas (2005) Toxicology a lecture based booklet for students of pharmacy and related sciences Aden, Aden University Printing and Publishing House.

2- Klassen CD, Watkins III JB (1999). Caster &Doulls Toxicology, the basic science of poisons 5th edition, McGraw-Hill companies, Inc,USA.

3- Ernst Hodgson Textbook of Modern Toxicology 3rd edition.

4-http://www.toxicology

Week	SUBJECT	L	S	P	TOTAL
1	General concepts of toxicology	4	2		6
2					
3	Toxicokinetics	2			2

4 5	Main body target organs for toxicants	**4**	**2**		**6**
6 7	General guidelines for managing intoxicated patients	**4**	**2**		**6**
8 9	Animals, food and plants poisoning	**4**	**2**		**6**
10	Carcinogens and teratogens	**2**			**2**
11 12	Non-metallic toxicants	**4**	**2**		**6**
13 14	Metallic toxicants and antagonists	**4**			**4**
TOTAL		**28**	**10**		**38**

ADVANCED QUALITY CONTROL

COURSE DESCRIPTION :

The course is designed to teach the student how to use the Pharmacopoeia (specially the most famous ones: USP, BP and EP). First, the student is entitled to know how to identify pharmaceutical compounds, either using chemical tests or instrumental methods. Second, to check the purity of these compounds and identifying the impurities, whether general impurities (applying limit tests) or related compounds. Third, how to assay pharmaceutical compounds, either per se or in pharmaceutical preparations. Special interest will be given to the most frequently adopted methods namely: potentiometric non-aqueous titration of the raw materials,
spectrophotometric analysis of the drugs in their dosage forms and finally HPLC for both checking the purity of the compounds and analysis of their dosage forms. The course also includes introduction to statistical evaluation of data

OBJECTIVES:

At the end of this semester, the student should be able to:

1- Identify pharmaceutical compounds through their physical or physicochemical properties
2- Check the purity of pharmaceutical compounds.
3- Assay pharmaceutical compounds in their pure form.
4- Determine the drugs in their different dosage forms.
5- Validate HPLC methods and evaluate chromatograms.
6- Analyze multi-component mixture adopting different spectrophotometric methods.
7- Statistically evaluate the data obtained on analysis of samples.
8- Calculate the proper dose and the correct flow rate of Intravenous admixtures for an adult or pediatric patient.

METHODS OF TEACHING:

1) Lectures
2)Quiz
3) Practical training[laboratory]
4) Internet research and discussion

METHODS OF ASSESSMENT:

1)1st assessment (control)
2) 2nd assessment (control)
3) Practical including seminars ,practical seminar andattendance
4)Attendance
5) Final exam

TEXTBOOKS AND REFERENCES:

1. United States Pharmacopoeia.
2. British Pharmacopoeia.
3. European Pharmacopoeia.
4. Japanese Pharmacopoeia.
5. Practical Pharmaceutical Chemistry, A.H. Beckell and J.B. Stenlake. The Athione Press, London
6. Analytical Chemistry, Douglas A. Skoog; Donald M. west, F James Holter, Standey R. Crouch, 7th ed, Harcourt college publisher,
7. Analytical Chemistry by Ashutosh kar, new age publications, new delhi.
8. Principle of quantitative chemical analysis Robert de levie, Mc Graw Hill, new York (1997)
9. Vogel's Textbook of quantitative analysis, 4th ed. J. Baisett, R. C. Denney, G. H. Jeffery and J. Mendhean longman Essex (1978). Additional suggested readings:

Week	SUBJECT	L	S	p	TOTAL
1	**Introduction to quality control and pharmacopoeia** (definition, abbreviation term and history of pharmacopoeia) Yemeni Regulations, Hospital pharmacopoeias Merck, Martindale Cross References.	**2**		**2**	**4**
2	**Methods of analysis**: **Refractive index**, principle, instrumentation, working, sampling, advantages & limitations, pharmacopoeial samples and, Reference Standards. **Polarimetry**: optical rotation, principle instrumentation, application, working sampling, advantages and limitations, pharmacopoeial samples and, reference standards	**2**		**2**	**4**
3	**Absorption Spectrophotometry**": Single & Double beam spectrophotometer, principle instrumentation, application, working sampling, advantages and limitations, pharmacopoeial samples and, reference standards. **Ultraviolet and visible Spectroscopy**: Beer lambert law, principle instrumentation, application, working sampling, advantages and limitations, pharmacopoeial samples and, reference standards	**2**		**2**	**4**
4,5	**Nuclear Magnetic Resonance Spectroscopy**: principle instrumentation, application, working sampling, advantages and limitations, pharmacopoeial samples and, reference standards, NMR Spectra & its interpretation. **Infrared Spectroscopy**: Principle, instrumentation, working sampling, advantages and limitations, pharmacopoeial samples and, reference standards	**4**		**4**	**8**

6,7	**Circular Dichroism**: principle instrumentation, application, working sampling, advantages and limitations, pharmacopoeial samples and, reference standards. **Chromatography**: principle instrumentation, application, working sampling, advantages and limitations, pharmacopoeial samples and, reference standards.	**4**		**4**	**8**
8,9	**Size exclusion chromatography**: Circular Dichroism principle instrumentation, application, working sampling, advantages and limitations, pharmacopoeial samples and, reference standards. **Super Critical Fluid Chromatography**: principle instrumentation, application, working sampling, advantages and limitations, pharmacopoeial samples and, reference standards. **HPLC** methods for identification and, determination of pharmacopoeial samples	**4**		**4**	**8**
10	**Density of Solids**. **Capillary Electrophoresis**: principle instrumentation, application, working sampling, advantages and limitations, pharmacopoeial samples and, reference standards.	**2**		**2**	**4**
11,12	**Limit Tests**: Anions-Chloride, sulfate, phosphate anions **Limit Test**: Cations-heavy metals, Iron, Calcium, Potassium, Ammonium, Aluminum cations, Limit test for Trace elemnets. **Potentiometric & amperometric** titration Titrations: Analysis of related compounds, HPLC for the determination of related compounds **Spectrophotometric methods** for the determination of related compounds. **Assay results** depending upon quantitative responses, Assay depending upon quantal response, combination of assay results	**4**		**4**	**8**

13	**Karl-Fischer** method for the determination of water content in pharmaceutical samples. **Oxygen-flask** method for the determination of organically-combined elements (Halogen, Sulfur, Phosphorous, Zinc, Mercury). **Kjeldal method** for the determination of organically-combined nitrogen in vaccines, diazometric determination of pharmaceutical compounds containing primary amino grouop, e.g., Sulfonamide.	**2**		**2**	**4**
14	**Statistical evaluation of data** (introduction, randomization and independence of individual treatment, assay depending upon quantitative responses, assay depending upon quantal responses, combination of assay results)	**2**		**2**	**4**
Total		**28**		**28**	**56**

CLINICAL PHARMACY II

COURSE DESCRIPTION :

The course acquires the students comprehensive skills in solving and interpreting clinical cases towards patient oriented practice. The course comprises therapeutics including cardiovascular and endocrine diseases , women health , drug information system and First aid.

OBJECTIVES:

At the end of this semester, the student should be able to:

1. differentiate between symptoms of cardiovascular disorders and related management.
2. Recognize drug induced disorders and responding to them.
3. Respond to question regarding drugs information and source an evidence base resources for drug information.
4. Take patient medical history and admission record Interpret clinical cases.
5. Practice first aid procedures according to the emergency

METHODS OF TEACHING :-

3. . Lectures and seminars.
4. Hospital and Primary Health Care Unit(PHC)experiential
5. Group experimental work.
6. Assignment

METHODS OF ASSESSMENT:-

1- Controls.
2 .Practical test.
3.Final written examination. & Assignment

TEXTBOOKS AND REFERENCES:

4. Roger Walker and Cate Whittlesea. Clinical Pharmacy and Therapeutics. 5th edition, New York, Churchill Livingstone2012
5. Philip Wiffen Marc Mitchell Melanie Snelling. Oxford Handbook of Clinical Pharmacy. New York 2017.
6. Linda J Dofds Drugsin Ude 4th ed. Pharmaceutical Press UK 2010..

Week	SUBJECT	L	S	P	TOTAL
1	cardiovascular system : Hypertension ,	**3**			**3**
2	Heart failure.	**3**			**3**
3	IHD: coronary arteries disease, angina MI	**3**	**2**		**5**
4	Liver diseases: hepatitis, types & chronic liver disease	**3**	**2**		**5**
5	Endocrine diseases: DM	**3**			**3**
6	Thyroid diseases	**3**	**2**		**5**
7-12	Women's health : Pregnancy & lactation: therapeutic considerations, PIH, Contraception ,Breast Cancer, menstrual disorders, Anemia	**8**			**8**
	Drug information systems: **1**-method of gathering and using medical pharmaceutical information. type of sources for drug and poisons (primary,secondary). **2**-retrievig analyzing and evulsions information. **3**-use of computer. understanding	**2**	**2**		**4**

	clinical trials				
	Research methodology in pharmacy practice.	**3**			**3**
	First Aid: Concept of first aid, historical view basic guidelines for handling emergency status	**5**	**2**		**7**
13	Trauma, types, principle of handling: MI/ burns, poisoning- , bleeding and Convulsion /Coma	**3**	**2**		**5**
14	Shock- Snake bites including insects and dogs Breathing difficulty, causes, artificial breathing (*in each topic: concept, epidemiology, risk factors, etiology, diagnosis, management of the patients*& case study)	**3**			**3**
	Total	**42**	**12**		**54**

RESEARCHPROJECT

COURSE DESCRIPTION :

This course will afford the students the fundamental concepts and methods in selecting, performing and analyzing scientific research data collected during the course. Emphasis is placed on building in firm scientific research skills.

OBJECTIVES:

At the end of this semester, the student should be able to:

1. To be able to determine and apply necessary technique for scientific research activities
2. To develop the students ability to communicate effectively and to function on multi-disciplinary team
3. To Acquire the necessary research performing skills

METHODS OF TEACHING :-

1. Discussion
2. Presentation

METHODS OF ASSESSMENT:-

1. Oral examination
2. Report
3. Practical

TEXTBOOKS AND REFERENCES:

According to the topics, the students can contact internet web sites and textbooks related to the subjects.

Week	SUBJECT	L	S	P	TOTAL
16	Theory	_	3	15	18