COURSES OF STUDY FOR B.Sc.:

First Year

First Semester										
No.	Course	Weekly hours		Examination degree					Examin ation time	
		Lec.	Lab.	periodical	Practical	written	oral	Total		
1	Pharmaceutical dosage forms	3	3	15	45	70	20	150	3	
2	Pharmacognosy (1)	2	3	15	45	70	20	150	2	
3	Pharmaceutical Organic Chemistry (1)	3	3	15	45	70	20	150	3	
4	Pharmaceutical analytical Chemistry (1)	2	3	15	45	70	20	150	2	
5	Physiology	4	-	15	-	100	35	150	3	
	Total	14	12					750		

Second Semester											
No.	Course	Weekly hours		Examination degree					Examin ation time		
		Lec.	Lab.	periodical	Practical	written	oral	Total			
1	Physical pharmacy (1)	3	3	15	45	70	20	150	3		
2	Pharmacognosy (2)	2	3	15	45	70	20	150	2		
3	Pharmaceutical Organic Chemistry (2)	3	3	15	45	70	20	150	3		
4	Pharmaceutical analytical Chemistry (2)	2	3	15	45	70	20	150	2		
5	Pharmacy administration	2	1	-	-	100	-	100	2		
6	Human rights*	2	-	_	-	50	_	_	2		
	Total	14	12					700			

* Human rights does not be calculated from the total degrees

FIRST YEAR

First term:

1. <u>Introduction to pharmaceutical dosage</u> forms (3 hrs lect., 3 hrs pract.):

The prescription, Powders, Pharmaceutical calculations, pharmaceutical dosage forms, Route of administration, patient factors in dosage form design, incompatibilities.

2. General Pharmacognosy-1 (2 hrs lect. , 3 hrs pract.):

I- General (14 hrs):

- 1- General introduction: Scope of pharmacognosy, definition, classification and description.
- 2- Reserved food materials (starches and its types, proteins, fixed and volatile oils).
- 3- Biproducts, calcium oxalate, calcium carbonate.
- 4- Active constituents e.g. alkaloids, glycosides, bitter principles, volatile oils. Crude drugs occurring naturally: Lycopodium, kamala, diatoms, lupulin, talc and chalk.
- 5- Cultivation of medicinal plants, collection, drying, packing, preservation, protection and adulteration.

II - The leaves (14 hrs):

General introduction, datura stramonium, Atropa belladonna, Hyoscyamus muticus, Hyoscyamus niger, Bucho leaf, Senna leaf, digitaqlis leaf, uva ursi, eucalyptus, hamamelis, rosemary, jaborandi, sweet basilk, sweet marjoram, henna, boldo, peppermint, squill, tea and Witch-hazel leaves.

3. Pharmaceutical Organic Chemistry-1 (3 hrs lect., 3 hrs pract.):

Part 1: 16 hours

1- Alkyl halides

Nomenclature, synthesis, physical and chemical properties, chemical reactions.

a- Nucleophilic substitution reactions:

Mechanism of unimolecular substitution reaction (SN1) and bimolecular substitution reaction (SN2). The structure and relative stability of carbocation. Factors affecting the rates of SN1 and SN2.

b- Elimination reactions:

Mechanism of unimolecular elimination (E1) and bimolecular elimination (E2) reactions. Substitution versus elimination.

Halogen derivatives of unsaturated hydrocarbon 2- Conjugated dienes.

3- Alcohols, ethers and their sulphur analogues Alcohols:

Classification, nomenclature, synthesis, physical properties, chemical, properties, and chemical reactions. Distinction between primary, secondary and tertiary alcohols. Interconversion between different alcohols. Stepping up or down in the series of alcohols. Test of hydroxyl group. Polyhydroxy alcohols.

Ethers:

Nomenclature, synthesis, physical properties, chemical properties and chemical reactions.

Thiols, thioethers and thiophenols:

Nomenclature, synthesis, physical properties, chemical properties and chemical reactions.

Part II:(6 hours)

Organometallic compounds:

Synthesis, physical properties, chemical properties, and chemical reactions.

Part III: (20 hours)

Carbonyl compounds and amines:

1- Aldehydes and ketones

Nomenclature, preparation (from alcohols, from carboxylic acids via Rosenmund reduction and pyrolysis of metal salts from nitriles by Stephen's method and LiAlH4, from gem-dihalides, from olefins, hydration of alkynes). Physical properties, nature of carbonyl group.

Reactions, oxidation, reduction, nucleophilic addition reactions (addition of HCN, water, alcohols, sodium bisulphite, Grignard reagents, ammonia and its derivatives). Keto-enol tautomerism, reactions on ∞ carbon, haloform reaction, aldol condensation, Cannizzaro reaction, and polymerization reactions.

2- Carboxylic acids:

Nomenclature, preparation. Acid strength of carboxylic acids, physical properties, reactions, preparation of various substituted acids: halo acids, alpha hydroxy acids, alpha amino acids and dicarboxylic acids), decarboxylation, oxidation and reduction.

3- Carboxylic acid derivatives:

Acid chlorides, acid anhydrides, esters, amides and nitriles:

Nomenclature, preparation, physical properties, and chemical reactions.

4- Beta keto esters and beta diketones.

5- Amines:

Classification, nomenclature, physical properties, basicity, reductive amination, Gabriel synthesis, Hofmann degradation, Curtius reaction. Separation through Hinsberg's test, reactions.

Practical Pharmaceutical Organic Chemistry-1 for 1st Year Pharmacy (1st semester)

Laboratory safety measures. (one week)

Test for nitrogen. (2 weeks)

Test for sulphur. (one week)

Test for halogens. (2 weeks)

Test for halogen in presence of nitrogen or/and sulphur. (one week)

N.B This course, also, includes 7 tutorial classes.

4. Pharmaceutical analytical chemistry-1 (2 hrs lect., 3 hrs pract.):

I- Acid-base titrations:

Introduction, Acid-base titrations in aqueous medium, Buffer solutions, Neutralization indicators, Titration curves, applications on neutralization titrations, Titrations in non-aqueous solvents.

II - Precipitimetry:

Introduction, solubility & solubility product constant, factors affecting solubility of the precipitate, precipitimetric titration curves, detection of the end point (Mohr's, Volhard's, Fajan's, Leibeg's, and Denig's methods), applications on precipitimetry.

III. Gravimetry:

steps of gravimetric analysis, factors Introduction, affecting completeness of precipitation. thermogravimetry, selectivity & specificity of Von-Weimarn precipitating agents, equation, homogenous precipitation, organic precipitants, applications.

5. Physiology (4 hrs lect.):

Blood, muscles and nerves. Autonomic nervous system. Circulation. Respiration. Digestion. Central nervous system. Endocrine glands. Regulation of body temperature and general metabolism kidney.

Second term:

1-Physical pharmacy-1 (3 hrs lect. , 3 hrs pract.):

Subjects including: state of matter, Solutions of non electrolytes; Buffers and isotonic solutions. Solubility and Distribution phenomena. Interfacial phenomenon & adsorption. Surfactants. Colloids. Coarse dispersion, suspensions and emulsions. Rheology.

2. General Pharmacognosy-2 (2 hrs lect. , 3 hrs pract.):

I - Barks (14 hrs):

General introduction, cascara, frangula, cinchona, cinnamon, cassia, quillaia, cascarilla, canella, euonymus, pomegranate, Sassafrass, witch-hazel, and wild cherry barks.

<u>I - Galls (2 hrs):</u>

Blue galls, Chinese and English galls.

III - Flowers (14 hrs):

General introduction, Roman and German Chamomiles, clove, pyrethrum, chamomile, santonica, hibiscus, arnica. Saffron, Safflower, Arnrca, calendula, lavender, and Karkadeh.

3- Pharmaceutical Organic Chemistry-2 (3 hrs lect., 3 hrs pract.):

Course contents:

1- Isomerism and stereo chemistry (14 hours):

Introduction, classification (structural- , chain-, positional-, and functional-isomerism).

Stereoisomers, enantiomers, and diastereomers.

Elements of chirality, prochiral centers. Relative and absolute configuration, R and S designation, racemic modification, racemiz-ation, and meso compound.

Conformational analysis and stereochemistry of cyclalkanes. Dynamic stereochemistry; substitution, addition and elimination react-ions, stereoselective-, stereospecific-, and regioselective reactions.

2- Carbohydrates (10 hours):

Introduction, nomenclature, and classify-cation.

Monosaccharides; classification and nomen-clature. Mutarotation and glycoside formation. Reactions; reduction properties, effect of alkalies, ether, ester, and osazone formation. Ascending and descending the sugar series. Fischer's proof of structure of glucose.

Disaccharides, starch, glycogen, and cellulose. Cellulose derivatives, deoxy-and amino sugars.

4- Amino acids and proteins (6 hours):

Structure and nomenclature, properties of amino acids, preparation (form halo acids, phthalimide, and strecker synthesis from aldehydes, preparation of peptides and sequence analysis of peptides.

4- Polymers and polymerization reactions (6 hours):

Definition, natural and synthetic polymers. Linear and branched polymers. Polymerization reactions. Heteroatom-containing addition polymers. Industrial and medicinal uses of polymers.

5- Alicyclic compounds (6 hours):

Nomenclature, physical properties, preparation (Dielsalder, Ziegler-Thorpe, Dieckmann, pyrolysis, Freund, Perkin, Pinacol reduction, Grignard method and reduction of benzene or its derivatives). Relative stability of cycloalkanes,

Practical Pharmaceutical Organic Chemistry-2 for 1st Year Pharmacy (2nd semester)

1-Aliphatic carboxylic acids.

- 2-Aromatic carboxylic acids.
- 3-Phenols
- 4-Alcohols
- 5-Aldehydes
- 6-Ketones
- 7-Amines

N.B This course, also, includes 7 tutorial classes.

4. Pharmaceutical analytical chemistry-2 (2 hrs lect., 3 hrs pract.):

I - Statistics in Analytical Chemistry:

Types of errors, accuracy, precision, measures of precision, Q-test/ correlation and regression, significant figures, validation of analytical procedures.

II- Redox:

Introduction, electrical properties of redox systems, factors affecting oxidation potential, redox titration curves, detection of the end points, important properties of oxidizing agents (KMnO4, K2Cr2O7, Ce(SO4)2, KIO3), iodometry, iodimetry, bromometry, applications of redox titrations.

III. Complexometry:

Introduction, analytical importance of complexes, complexones, stability of complexes, titration curves, detection of the end point, applications (Direct EDTA titrations, Back titrations, displacement titrations & indirect titration of anions), masking and demasking, non- EDTA titrations.

Practical: Standard solutions; Determination of pH of tap water; Buffer solutions; Titration curves; Double indicator titrations; Non aqueous titrations; Determination of solubility product; Determination of halides by different methods. Determination of mercuric oxide and chloride. Determination of zinc salts., Direct EDTA titrations; Indirect EDTA titrations. Gravimetric determination of some elements.

5- Pharmacy Adminstration (2 hrs lect.):

Accounting principles (include nature and purpose of account and accounting records, recording financial transactions, preparing results of operation and and financial position statements).

Accounting information and its role in planning, organizing, directing and controlling.

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