**Scheme of Examination**

Second Semester- Bachelor of Pharmacy

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| S.No. | Subject Code | Subject Name | Periods per week | | | Credits | Maximum Marks  (Theory Slot) | | Maximum Marks  (Practical Slot) | | Total  Marks |
|  |  |  | L | T | P |  | End  Sem.  Exam. | Mid Sem. | End Sem.  Practical &  Viva | Practical mid sem+ Viva+Practical Record |  |
| 1 | BPH201 | Advanced Mathematics | 4 | - | 0 | 4 | 70 | 30 | 00 | 00 | 100 |
| 2 | BPH202 | Pharmaceutics-II | 4 | - | 6 | 4+3=7 | 70 | 30 | 60 | 40 | 200 |
| 3 | BPH203 | Pharmaceutical Chemistry- III (Organic Chemistry-I) | 4 | - | 6 | 4+3=7 | 70 | 30 | 60 | 40 | 200 |
| 4 | BPH204 | Pharmacognosy -I | 4 | - | 6 | 4+3=7 | 70 | 30 | 60 | 40 | 200 |
| 5 | BPH205 | Anatomy and Physiology and Health Education (APHE-I) | 4 | - | 6 | 4+3=7 | 70 | 30 | 60 | 40 | 200 |
|  | | TOTAL | 20 | - | 24 | 32 | 350 | 150 | 240 | 160 | 900 |
| Note: - One Credit Refers to one hour Teaching in Theory and two Hours in Practical  **L: Lecture - T: Tutorial - P: Practical w.e.f-14-15** | | | | | | | | | | | |

**ADVANCED MATHEMATICS (BPH 201)**

1. **Differential equations and its Applications:** Revision of integral calculus,definition and formation of differential equations, equations of first order and firstdegree, variable separable, homogeneous and linear differential equations and equations reducible to such types, linear differential equations of order greater than one with constant coefficients, complementary function and particular Integral, Simultaneous linear differential equations, pharmaceutical applications.
2. **Laplace Transforms:** Definition, transforms of elementary functions, properties of linearity and shifting, inverse Laplace transforms, transforms of derivatives,solution of ordinary and simultaneous differential equations.
3. **Biometrics:** Significant digits and rounding of numbers, data collection, random and non-random sampling methods, sample size, data organization, diagrammatic representation of data, bar, pie, 2-D and 3-D diagrams, measures of central tendency, measures of dispersion, standard deviation, standard error of means, coefficient of variations, confidence (fiducial) limits.
4. **Probability:** probability and events, Bayes theorem, probability theorems, probability distributions, elements of binomal and poisson distribution, normal distribution curve and properties.
5. **Correlation and regression:** Method of least squares, statistical inference, Student’s and paired t-test, F-test and elements of ANOVA, kurtosis and skewness, Applications of statistical concepts in Pharmaceutical Sciences.

**PHARMACEUTICS II (BPH 202)**

1. General Principal of Solubility, Solubility and Distribution phenomenon General Principles, Solvent-Solute interactions, Solubility of gases in liquids, Solubility of liquids in liquids, Solubility of solids in liquids, distribution of solutes between immiscible solvents, Ideal and Real solutions.

2. **Micromeritics**: particle size and size distribution, method for determining particle size, particle shape and surface area, methods for determining surface area, pore size, derived properties of powders.

3. **Colloids**: Introduction, Types of colloidal systems, Optical properties of colloids, kinetic properties of colloids, Electrical properties of colloids, solubilization.

* Viscosity and Rheology:- Newtonian Systems, Newtonian law of Flow, kinetics Viscosity, Temprature Dependence and Theory of Viscosity, Non-Newtonian System : Plastic flow, PseudoPlastic and Dilant Flow,Thixotrophy,Determination of Rheology.

4. **Buffers**: Buffer equation and Buffer capacity in general, buffers in pharmaceutical systems, preparation, stability, buffered isotonic solutions, measurements of tonicity, calculations and methods of adjusting isotonicity.

5.**Kinetics and Drug Stability** : General considerations & concepts, half-life determination, influence of temperature, light, solvent, catalytic species, and other factors, Accelerated stability study, expiration dating.

**List of Practical’s (BPH 202)**

1. Determine the particle size and particle size distribution in the given sample of powder by optical microscopy.

2. Determine particle size distribution of the given granules by sieving method.

3. Determine the following derived properties of the given powdered sample Flow property, Bulk density, Granule density, True density

4. Determine the surface tension of the given sample by drop count and drop weight Method.

5. Determine the effect of salt on the solubility of given drug.

6. Determine the percent composition of an unknown solution of glycerin in water using Ostwald’s viscometer

7. Study the effect of shear rate on the flow of 1% methyl cellulose solution.

8. Formulate suspension of the given drug and evaluate it for sedimentation parameters.

9. Study the effect of thickening agent concentration on the sedimentation of the suspension of the given drug.

10. Prepare acetate buffer and compare theoretical pH value with the experimental value.

11. Determine the viscosity of the following Newtonian and Non-Newtonian system Water , Simple syrup I.P.

12. To observe the effect of hydrotropic agent sodium citrate on the solubility of salicylic acid.

**PHARMACEUTICAL CHEMISTRY III-(ORGANIC CHEMISTRY-I) (BPH 203)**

1. **Structure and Properties**: Atomic Structure, atomic orbital, molecular orbital, hybridization, sigma & Pi bond, covalent, electrovalent and co-ordinate bond, inductive effect, resonance,Classification & Nomenclature of organic compounds.

2.I**somerism**, geometrical isomerism, Stereochemistry including optical activity, specification of configuration and conformational analysis Miscellaneous Stereochemistry, Diastereomers; Racimic modification, Resolution of racimic mixtures.

3.**Important methods of preparation, reactions with special reference to mechanism of the:** following classes of compound Alkenes, alkenes, alkynes & conjugation reactivity of dienes, free radical substitutionreaction, alkyl halides, Alcohols,

4. **Aromatic Compounds**: aromatic character, structure of benzene, Mechanism of nucleophilic reaction of benzene resonance, orientation of aromatic substitution, arenes, amines (aliphatic & aromatic), phenols, aryl halides.

**5. Reactive Intermediates**: Stability and reactivity of Radicals, Cations, Anions,

Nitrene and Nitrenium ion

**List of practical (BPH 203)**

1. Purify the given organic compounds by recrystillazation

2. Introduction to the use of stereo models.

3. Synthesis, Purification, Characterization of organic compounds and percent yield

Calculations of the following compounds:

a) 2, 4, 6-tribromoaniline from aniline

b) 2, 4, 6-tribromo phenol from phenol c) 2, 4, 6-trinitro phenol (Picric acid) from phenol

d) Phenylbutazone from phenol

e) Benzanilide from aniline f) Phthalidimide from phthalic anhydride g) Iodoform from ethyl alcohol h) Methly orange

i) Methly red

j)Thiourea4. Purify the given organic compounds by distillation.

**PHARMACOGNOSY-I (BPH 204)**

1. Definition, historical background, presents status and future scope of Pharmacognosy.

2. Classification of crude drugs alphabetical morphological, pharmacological / toxological, chemical and biological, chemical and physical methods of evaluation.

3. Volatile Oils: General methods of obtaining volatile oils from plants. Study of volatile oils of Mentha, Coriander, Cinnamon, Cassia, Lemon peel, Orange peel, Lemon grass, Citronella, Caraway, Dill, Spearmint, Clove, Fennel, Nutmeg, Eucalyptus, Chenopodium, Cardamom, Valerian, Musk, Palamarosa Gaultheria, Sandal wood, Garlic.

4.Study of the biological sources, cultivation, collection, commercial varieties, chemical constituents, substitutes, adulterants, uses, diagnostic macroscopic and microscopic features and specific chemical tests of following groups of drugs containing glycosides: Saponins : Liquorice, ginseng, dioscorea, sarsaparilla, and senega,Senna and Aloe.

Cardiocative sterols: Digitalis, squill, strophanthus and thevetia.

5. Study of the sources, physical and chemical tests of identity and salient microscopic features of the following:

a. Cellulose and Cellulose derivatives.

b. Fibers used as Pharmaceuticals: Wool, Cotton, Glass wool, Jute, Silk, Nylon, Terylene and Polyester.

c. Inorganic pharmaceutical aids: Talc, Asbestos, Bentonite, Kaolin and Prepared chalk.

d. Quality of Control of Drugs.

e. Detailed Study of Cultivation, Collection, Processing and Storage of Crude Drugs, Drying Methods

Phytochemical Screening test of Carbohydrates, Lipid, Protines, Alkoloids, Terpenoids, Glycosides, Volatile Oils, Tannins, Resins, Phenolic Compound, Steroids and Flavonoids.

**PHARMACOGNOSY PRACTICALS (BPH 204)**

1. To study the different types of Microscopes and Camera Lucida.
2. To understand the technique of Section cutting, Staining, Mounting and Micro chemical Reagent.
3. Study the Morphological characteristics of Nutmeg, Cardamom, Lemon Grass.
4. Study the Morphological Characters of Fibers.
5. Study the Morphological characteristics of Liquorice and Squill.
6. Perform Morphological, Microscopic and Chemical Evaluations of Senna Leaf.
7. Perform Morphological, Microscopic and Chemical Evaluations of Clove Bud.
8. Perform Morphological, Microscopic and Chemical Evaluations of Fennel Fruit.
9. Perform Morphological, Microscopic and Chemical Evaluations of Criander Fruit.
10. Perform Morphological, Microscopic and Chemical Evaluations of Cinnamon Bark.
11. Perform Morphological, Microscopic and Chemical Evaluations of Liquorice.
12. Perform Morphological, Microscopic and Chemical Evaluations of Talc and Asbestos.
13. Perform Morphological, Microscopic and Chemical Evaluations of Wool Fat and Cotton.
14. Determination of Leaf Constants.
15. Perform Morphological Microscopic and Chemical Evaluation of Dill

**ANATOMY PHYSIOLOGY & HEALTH EDUCATION (BPH 205)**

**1**. Structure of cell, its components and their function:

**Elementary Tissues of the Human Body:** Epithelial, connective, muscular and nervous tissues; their sub-types and characteristics

Skeletal System: Structure, composition and functions of skeleton, Classification of joints, Types of movement at joint, disorders of joints. Their gross anatomy, physiology of muscle contraction, physiological properties of skeletal muscle and their disorders.

**2.Digestive System:** Gross anatomy of the gastro-intestinal tract, functions of its different parts including those of liver, pancreas and gall bladder, various gastrointestinal secretions and their role in the absorption and digestion of food. Disorders of digestive system.

**3. Cardiovascular System:** Basic anatomy of the heart, physiology of heart, blood vessels and circulation. Basic understanding of cardiac cycle, heart sounds and electrocardiogram. Blood pressure and its regulation. Brief outline of cardiovascular disorders like; hypertension, hypotension, arteriosclerosis, angina, myocardial infraction, congestive heart failure and cardiac arrhythmias.

**4.Health Call Concepts of health and disease:** Disease causing agents and prevention of disease. **Classification of food requirements:** Balanced diet, nutritional deficiency disorders, their treatment and prevention, specifications for drinking water. **Demography and family planning:** Medical termination of pregnancy.

**5.Communicable diseases:** Brief outline, their causative agents, modes of transmission and prevention (Chicken pox, measles, influenza, diphtheria, whooping cough, tuberculosis, poliomyelitis, helminthiasis, malaria, filariasis, rabies, trachoma, tetanus, leprosy, syphilis, gonorrhoea, and AIDS). **First Aid:** Emergency treatment of shock, snake bites, burns, poisoning, fractures and resuscitation methods.

**LIST OF PRACTICALS:**

(Student should perform all the following experiments)

1. Study human skeletal system with the help of chart, model and histological slides.
2. To study human digestive system with help of chart and models
3. To study histology of salivary glands, esophagus, stomach, Pancreas, liver, small intestine, large intestine.
4. To study of epithelial tissue using slide.
5. To study of connective tissue using slide.
6. To study of muscular tissue using slide.
7. To study of nervous tissue using slide.
8. To study of human cardiovascular system with the help of chart and model.
9. To study of human cardiovascular system with the help of histological slides.
10. Record of blood pressure.
11. To understand ECG, PQRST waves and their signifance.