<table>
<thead>
<tr>
<th>S. No.</th>
<th>Subject Code</th>
<th>Subject Name</th>
<th>Maximum Marks Allotted</th>
<th>Hours/Week</th>
<th>Total Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>L</td>
<td>T</td>
</tr>
<tr>
<td>1</td>
<td>MA112</td>
<td>Mathematics</td>
<td>60 30 10 0 0 0</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>PY114</td>
<td>Pharmaceutical Chemistry-II (Organic Chemistry-I)</td>
<td>60 30 10 10 20 20</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>PY115</td>
<td>Pharmaceutical Dosage Form</td>
<td>60 30 10 10 20 20</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>PY116</td>
<td>Human Anatomy and Physiology-I</td>
<td>60 30 10 10 20 20</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>PY117</td>
<td>Pharmacognosy-I</td>
<td>60 30 10 10 20 20</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>HU112</td>
<td>Rural Outreach</td>
<td>0 0 0 0 0 150</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Total Marks:** 850

Note: * For HU112 there will be no examination and credits will be awarded only on the basis of internal assessment.
PY 114: PHARMACEUTICAL CHEMISTRY-II (ORGANIC CHEMISTRY-I)


Free Radical Reactions: Stability and structure generation and fate of free radicals, free radical substitution reaction.

Reaction involving Carbenes: Carbenes, its stability and structure generation and fate of carbenes.

Reaction involving Nitrenes: Nitrenes, its stability and structure generation and fate of nitrenes.

Stereochemistry:

Optical activity, Cause of optical activity, Enantiomers, Racemic modifications, Configuration: D and L System (carbohydrate and amino acids), Cahn Ingold Prelog system, diastereoisomers, asymmetric synthesis, method of resolution and optical purity, cis-trans isomerism resulting from double bond.

Chemistry of Aliphatic Compounds:

(Carbonyl compounds, alcohols, phenol, ethers, esters and amides)

Reaction involving Carbocations: Structure generation and stability and fate of carbocation, SN1, SN2

Reaction involving Carbanions: Stability and structure generation and fate of carbanions,

Elimination Reactions: 1,2 Elimination reactions, dehydrohalogenation of alkyl halides, E1, E2

PRACTICALS: Minimum 15 experiments based on following
- Qualitative analysis of organic compounds and preparation of their derivatives
- Synthesis of organic compounds
- Characterization of synthesized compounds
- Use of stereo models.

BOOKS & REFERENCES RECOMMENDED

Text books
Reference books

Internet references
Introduction to dosage forms: Classification, significance of classification, classification of dosage forms based on: physical state, method of preparation, sterile and non-sterile preparations, classification as per mode of application, classification according to drug release pattern, pharmacological classification.

Routes of drug administration: types, criteria for selection and their merits and demerits.

Pharmaceutical Calculation: Different systems of weights and measures, Interconversion of different measuring units, Dilution and concentration of solutions, Percentage solutions, Calculation by alligation method. Dose calculation.

Liquid Formulation Additives: Types and properties of additives- Vehicles, Solvents & Co-solvents, Preservatives, Antioxidants, Suspending agents, Emulsifying agents, Solubilizers, Colours, Flavours and sweeteners.

Liquid Dosage Forms: Definition, general formulation, principles and method of preparation, storage and official products of the following categories of dosage forms:

Solutions, Syrups, Elixirs, Spirits, Linetuses, Gargles, Mouth washes, Suspension, Emulsions, Lotions, Liniments, Milks and Magmas, Jellies.

Packaging of pharmaceutical dosage forms: Introduction, objective and functions of packaging, packaging components, containers and closures, blister and strip packaging.

List of Practical

01 Prepare and submit Aqueous Iodine Solution
02 Prepare and submit Weak Iodine Solution
03 Prepare and submit Strong Iodine Solution
04 Prepare and submit Strong Ammonium Acetate Solution
05 Prepare and submit Cresol with Soap Solution
06 Prepare and submit Chloroxylenol solution
07 Prepare and submit Simple Syrup IP
08 Prepare and submit Simple Syrup USP
09 Prepare and submit Compound Ferrous Phosphate Syrup
10 Prepare and submit Simple Elixir
11 Prepare and submit Piperazine Citrate Elixir
12 Prepare and submit Chloroform Spirit
13 Prepare and submit Aromatic Spirit of Ammonia
14 Prepare and submit Simple Linctus
15 Prepare and submit Phenol Gargle
16 Prepare and submit Compound Sodium Chloride Mouth Wash
17 Prepare and submit Calamine Lotion
18 Prepare and submit Soap Liniment
19 Prepare and submit Turpentine Liniment
20 Prepare and submit Milk of Magnesia
21 Prepare and submit Aluminium Hydroxide Gel
22 Prepare and submit Bentonite Magma.
23 Prepare and submit Liquid Paraffin Emulsion
24 Prepare and submit Turpentine oil Emulsion
25 Prepare and submit Paracetamol Oral Suspension
26 Prepare and submit dilute hydrochloric acid solution from concentrated Hydrochloric acid
27 Prepare and submit 50 % v/v alcohol from 90 % v/v alcohol after calculating by Alligation method

BOOKS & REFERENCES RECOMMENDED

Textbooks:

1. Ansel H.C., Ansel's Pharmaceutical Dosage Forms & Drug Delivery Systems, 8th Ed., Lippincot Williams & Wilkins

Reference books:

2. Ansel H.C., Pharmaceutical calculations, 14th ed., 2015, Lippincott Williams & Wilkins, India
1. Introduction to anatomy and physiology: Scope and basic terminology, introduction to human body. Cellular organization: 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.


3. Skeletal Muscles: Their gross anatomy, physiology of muscle contraction, physiological properties of skeletal muscle, Myasthenia gravis.


5. Lymph and lymphatic system: Structure and function of lymphatic vessels and lymph circulation, lymphatic organs and tissues, general principles of immunity.

6. Respiratory System: Anatomy of respiratory organs, mechanism and regulation of respiration, Respiratory volumes and vital capacity, Asthma, tuberculosis, COPD.

List of Practical:
- Determine RBC count of the given blood sample
- Determine WBC count of the given blood sample
- Determine differential WBC count of the given blood sample
- Determine hemoglobin count of the given blood sample
- Determine clotting and bleeding time of the given blood sample.
- Determine blood group.
- Study of epithelial, connective, muscular and nervous tissue using slide.
- Study human skeletal system with the help of chart, model and histological slides.
• Study of human cardiovascular system with the help of chart, model and histological slides.
• Record of blood pressure.
• Study of human respiratory system with the help of chart, model and histological slides.
• Study of lymphatic system with the help of chart, model and histological slides

Books Recommended
• Gerard J. Tortora and Byran Derrickson, Principles of Anatomy and physiology.
  International student version Vol-I and II, John Wiley and Sons (Asia)
• Kathleen J.W., Wilson Ross and Wilson: Anatomy and Physiology in Health and Illness
• Arthur C. Guyton: Textbook of Medical Physiology.
• Chatterjee, C.C, Human Physiology, Medical allied agency, Calcutta.
• Ross and Wilson, Human anatomy and Physiology, Churchill Livingstone London.
PY 117: Pharmacognosy-I

Definition, history, scope and development of the Pharmacognosy: Sources of crude drugs and methods of their classification with examples

Exogenous and endogenous factors affecting production of crude drugs
a. Environmental conditions
b. Cultivation, collection, drying and storage
c. Natural pest control agents

Quality control of crude drugs
Organoleptic, physical, chemical, microscopic and biological evaluation

Quantitative Microscopy: Vein islet no. stomatal Index, palisade ratio, vein termination no.

Deterioration of stored crude drugs
Primary factors
Control of infestation

Carbohydrates and related drugs: Definition, properties, classification, chemical constituents, chemical test and uses
Tragacanth, Acacia, Honey, Agar, Pectin, Plantago and Starch

Tannins & resins and related drugs: definition, properties, classification, chemical constituents, chemical tests and uses
Ashoka, Amla, Arjuna, Myrobalan, Bahera
Ginger, turmeric, Asafoetida, Tolu balsam, benzoin

Traditional system of medicine: Introduction, basic concept, formulations used in Ayurvedic system of medicine, Asava, Arista, Churna, Bhasma

Biological sources, active constituents and uses of the following traditional drugs
Neem, Apamarga, Methi, Guduchi, Bramhi, satavari

List of Practical
1. Perform morphological and chemical evaluation of Honey, Agar and Isabgol husk
2. Perform morphological Evaluation of Ashoka bark, Amla fruit, Arjuna bark, Myrobalan fruit and Bahera fruit
3. Perform morphological and chemical Evaluation of Asafoetida, Tolu Balsam and Benzoin
4. Perform morphological Evaluation of Neem leaves, Apamarga root, and Shatavari root
5. Perform morphological and chemical evaluation of Tragacanth gum, Agar and Acacia gum
6. Perform the Morphological Evaluation of Ginger rhizome
7. Perform the Morphological and Chemical Evaluation of Turmeric rhizome
8. Perform the Morphological Evaluation of Methi seed and Brahmi leaves
9. Isolate starch from potato/rice/maize/wheat and perform its powder microscopy.
10. Perform standardization of Asava/Arishta on basis of Organoleptic, Physical and Chemical parameters
11. Perform standardization of Churnas on basis of Organoleptic, Physical and Chemical parameters

References

1. Text Book of Pharmacognosy – T.E. Wallis
2. Pharmacognosy – Trease & Evans
3. Pharmacognosy – Brady & Taylor