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<th>S.No.</th>
<th>Board of Study</th>
<th>Subject Code (New)</th>
<th>Nomenclature and Name of the Subject</th>
<th>Periods Per Week</th>
<th>Scheme of Exam</th>
<th>Credits</th>
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**Minimum Pass Marks:**

- **A) Theory and Sessional (combined): 50 Percent**
- **B) Practical and Sessional (combined): 50 Percent**

**Duration of Theory Papers:** 3 Hours.
Unit Operation-
Unit operations and processes, Material and energy balances, Dimensionless equations; formulas and groups.

Materials of Pharmaceutical Plant Construction-
Factors affecting the material selection for pharmaceutical plants, Physical; Chemical; Mechanical properties and use of the important materials of construction with special reference to Ferrous metals, Copper, Aluminium, Nickel, Glass, Plastics and their alloys, Heat and Corrosion resistant alloys.

Corrosion and its Prevention -
General considerations, Types of Corrosion, Methods of reducing Corrosion, Simple mathematical problems.

Industrial Hazards and Safety Measures -
Mechanical, Chemical, Electrical, Fire and Dust Hazards, Safety requirements, Legal requirements, Industrial dermatitis.

Fluid Flow -
Fluid static, Manometers, Types of flow, Reynold’s Number and its significance, Concept of boundary layers, Bernoulli’s theorem and its applications, Measurement of flow of fluids, Valves.

Material Handling Systems -
a) Liquid handling: Different types of pumps.
b) Solid handling: Conveyors.

Heat Transfer -
Heat transfer mechanisms, Heat transfer by conduction, Fourier’s law, Natural and forced convection, Surface and overall heat transfer coefficients, Heat transfer by radiation, Heaters and heat exchangers.

Humidity, Air-Conditioning and Refrigeration -

Automated Process Control Systems:
Process variables, Temperature, Pressure, Flow, Level and Vacuum and their measurements.
Elements of computer aided manufacturing (CAM).

Reference / Recommend Books:
1. Khanna NK - Pharmacy Practicals – (CBS, ND)
2. Paradkar - T.B. of Pharma Engg. (Nirali Prakashan)
3. Brown - Unit operations in Chemistry Engg. (TMH)
4. Badger/ Banchow - Chemical Engineering (TMH)
5. GHOSHLK - HB of pharmaceutical Technology (CBS, New Delhi)
6. Sambamurthy - Pharmaceutical Engg. (Vallabh)
7. Subrahmanayam - Pharma Engg. (Vallabh)
8. Paradkar - Practical Pharma Engg. (Nirali)
Prescription:
  Prescription, Handling of prescription, Source of errors in prescription, Care required in dispensing prescriptions. Brief introduction of commonly used Latin terms in prescription.

General Dispensing Procedures including labelling of dispensed products.
  Principles involved and procedures adopted in dispensing of typical prescriptions-Solutions, Mixtures, Emulsions, Lotions, Liniments, Powders, Capsules, Tablet triturates, Ointments, Creams, Pastes, Suppositories and Ophthalmics.

Incompatibilities:
  Physical, Chemical and Therapeutic incompatibilities, Incompatibility of common occurrence and their correction.

Pharmaceutical Calculations –
  Basis of posology, Detection of over doses in prescription, knowledge of prophylactic and therapeutic doses with route of administration.
  Calculation of doses, Enlarging and reducing receipes, Isotonic solutions, Displacement value.

Community Pharmacy -
  Organization and structure of retail and wholesale drug stores, Legal requirements for establishment and maintenance. Dispensing of proprietary products, Maintenance of records of retail and wholesaler, Patient counseling, Role of Pharmacist in community health care and education, Hazards of medication, Life-saving practices.
  A brief study of proprietary products available in the market belonging to Chemotherapeutics, Vitamins; Anti-histaminics, expectorants and NSAID’S category.
  A brief study of Hospital formulary.

Drug Information Services -
  Sources of information on drug, diseases, treatment schedules; procurement of informations including computer services. Drug profile, Cases on drug interaction and adverse reactions, Retrieval of information Documentation and prevention.

Reference / Recommend Books:

1. Khanna NK - Pharmacy Practical (CBS NT)
2. Cooper & Gunn - Dispersing for Pharmacy Students (CBS)
3. Nanda- Khar - Practical Dispensing Pharmacy (CBS)
4. N.K. Jain - Pharmaceutical Artimatic (CBS)
5. Jain & Sharma - TB of Professional Pharmacy (Vallabh)
6. Parmar NS - Health Edu & Community Pharmacy (CBS)
7. RM Mehta - Dispersing Pharmacy (Vallabh)
CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,
BHILAI

Semester: 3rd Branch: B. Pharm
Subject: Pharmaceutics- Pharmaceutical Chemistry - IV (Organic – II) Code: 341313(41)
Total Theory Periods: 40 Total Tut. Periods: 1
Total Marks in End Semester Exam: 70
Minimum no. of class tests to be conducted: 2

Heterocyclic Compounds:

Nomenclature, structure and reaction of Imidazole, Indole, Pyrrole, Furan,
Pyrimidine, Quinoline and Isoquinoline

Chemistry of: Lipids, Carbohydrates, Proteins and Nucleic acids.

Catalytic hydrogenation and dehydrogenation, Metal hydride reduction, Reduction with hydride and

Selected reaction and mechanism of synthetic importance:

Mannich reaction, Beckmann reaction, Fitting reaction, Michael addition, Di alder
reaction, Witting rearrangement.

Polymer:

Polymers and Polymerization and their importance in pharmacy

Nucleophillic aromatic substitutions, Electrophilic aromatic substitutions. Organic reagents used in
drug synthesis.

Reference / Recommend Books:

1. Morrison & Boyd - Organic Chemistry (TMH)
2. Morrison & Boyd - Problems in Organic Chemistry (TMH)
3. Harkishan Singh - Org. Pharma Chemistry (Vollabh)
4. R.K. Bansal - A TB of org Chemistry (New Age)
5. P.S. Kalsi - Stereo Chemistry - conformation & Mechanism (New Age)
6. AK Srivastava - Organic Chemistry made Simple (New Age)
7. R K Bansal - Org Chemistry - Problem & Solution (New Age)
8. Bansal & Bansal - Org Chemistry - Problems & Solution (New Age)
9. PS Kalsi - Organic Reaction & their Mechanism (New Age)
CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Semester: 3rd Branch: B. Pharm
Subject: Anatomy, Physiology and Health Education - II Code: 341314(41)
Total Theory Periods: 40 Total Tut. Periods: 1
Total Marks in End Semester Exam: 70
Minimum no. of class tests to be conducted: 2

Digestive System -
Gross anatomy of the gastrointestinal 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.

Respiratory System -
Anatomy of respiratory organs, Functions of respiration, Mechanism and regulation of respiration, Respiratory volumes and vital capacity.

Central Nervous System -
Function of different parts of brain and spinal cord, Neurohumoral transmission in the central nervous system, Reflex action, Electroencephalogram, Specialized functions of the brain, cranial nerves and their functions.

Autonomic Nervous System -
Physiology and functions of the autonomic nervous system. Mechanism of neurohumoral transmission in the A.N.S.

Urinary System -
Various parts, Structures and functions of the Kidney and Urinary tract. Physiology of urine formation and acid-base balance. Diseases of urinary system.

Reproductive System -
Male and female reproductive systems and their hormones, Physiology of menstruation, coitus and fertilization, Sex differentiation, spermatogenesis and oogenesis, Pregnancy - its maintenance an parturition.

Endocrine System -
Basic anatomy and physiology of the Pituitary, Thyroid, Parathyroid, Adrenals, Pancreas, Testis and Ovary, their hormones and functions.

Sense Organs -
Basic anatomy and physiology of the of the eye (vision), ear (hearing) taste buds, nose (smell) and skin (superficial receptors).

Health Education -
Brief outline of communicable diseases, Their causative agents, Mode of transmission and Prevention - Chicken pox, Measles, Influenza, Diphtheria, Whooping, cough, Tuberculosis, Poliomyelitis, Hepatitis, Cholera, Typhoid, Food poisoning, Helminthiasis, Malaria, Filariasis, Rabies, Trachoma, Tetanus, Syphilis, Gonorrhoea and AIDS.

Reference / Recommend Books:
1. CC. Chatterjee - Human Physiolgy (Vol I+II) Central Scientific Boon co.
Systematic pharmacognostic study of drug like:
Liquorice, Ginseng, Dioscorea, Sarasaparilla, Senega, Digitalis, Squill, Rhubarb, Cascara, Aloe, Senna, Psorelea, Gentian, Saffron, Chirata, Quassia. Dill Fennel, Caraway, Clove, Cinnamon, Nutmeg, Musk, Palmarosa, Gaultheria, Valerian.

Glycosides and Volatile oils:
General methods of classification, isolation, chemical properties and uses.

Biological sources, preparation, identification tests and uses of enzymes:
Diastase, Papain, Pepsin, Trypsin pancreatin. Plant bitters and sweetners.

Studies of traditional drugs like:

The holistic concept of drug administration in Ayurvedic and Traditional system of medicine.

Introduction to preparations of:
Asava, Arishta, Tailas, Churnas, Lepas, Lehyas and Bhasmas and their evaluation schemes.

Reference / Recommend Books:
1. Shah/Qadry – Pharmacognosy (B S Sahah, Ahmedabad)
2. T E Wallis – TB of Pharmacognosy (CBS New Delhi)
3. Trease/Evans – Pharmacognosy (Jay Perl, ND)
4. Kokate – Purohit – Pharmacognosy (Nirali/Pragati)
5. Handa-Kapoor – Pharmacognosy (Vallabh, ND)
CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,
BHILAI

Semester: 3rd
Branch: B. Pharm
Subject: Pharmaceuticals- III (Pharmaceutical Engineering-I) Practical
341321(41)
Practical Code: 3

Total Practical Periods: 3
Total Marks in End Semester Exam: 60

Exp.1 - Study of psychometric charts.
Exp.2 - Measurement of pressure by using manometer.
Exp.3 - Measurement of Reynold’s number.
Exp.4 - Study of different types of valves.
Exp.5 - Measurement of humidity.
Exp.6 - Measurement of corrosion.
Exp.7 - Study of different types of conveyers.
Exp.8 - Determination of Radiation Constant.
Exp.9 - Study of the various elements of Computer Aided Manufacturing.
Exp.10 - Measurement of flow of fluid and their pressure.
Exp.11 - Study of various types of pumps.
Exp.12 - Determination of Overall Heat Transfer Coefficient

Reference / Recommend Books:

2. K. Sambhamurty, Pharmaceutical Engineering.
3. Caretr. S. J., Cooper, and Gunn’s, Tutorial Pharmacy, CBS Publisher, New Delhi.
4. Perry’s Chemical Engineer’s hand Book.
5. Bentley’s Text Book of Pharmaceutics, ELBS London.
CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,
BHILAI

Semester: 3rd
Branch: B. Pharm
Subject: Pharmaceutics- IV (Dispensing And Community Pharmacy)
Practical Code: 341322(41)

Total Practical Periods: 3
Total Marks in End Semester Exam: 60

Exp.1 - To prepare & submit Emulsions.
Exp.2 - To prepare & submit Suspensions.
Exp.3 - To prepare & supply sodium chloride solution.
Exp.4 - To prepare & supply aqueous iodine solution.
Exp.5 - To prepare & supply strong ammonium acetate solution.
Exp.6 - To prepare & supply a carminative mixture.
Exp.7 - To prepare & supply an expectorant mixture.
Exp.8 - To prepare & supply a diuretic mixture.
Exp.9 - To prepare & supply a mixture containing diffusible solid.
Exp.10- To prepare & supply calamine lotion.
Exp.11- To prepare & supply salicylic acid & mercuric chloride lotion.
Exp.12- To prepare & supply camphor liniments.
Exp.13- To prepare & supply soap liniments.
Exp.14- To prepare & submit dusting powders for antiseptic.
Exp.15- To prepare & submit compound powder used as suspending agent.
Exp.16- To prepare & submit tooth powders (Dentifrices).
Exp.17- To prepare & supply capsules of acetyl salicylic acid.
Exp.18- To prepare granules for tablets of compound sodium bicarbonate.
Exp.19- To prepare & submit emulsifying ointments.
Exp.20- To prepare & supply cold cream.
Exp.21- To prepare & supply toothpaste.
Exp.22- To prepare & submit boric acid suppositories.

Reference / Recommend Books:

1. Caretr. S. J., Cooper, and Gunn’s, Dispensing Pharmacy, CBS Publisher, New Delhi.
3. The concise Pharmaceutical Dispensing: Jain & Sharma.
Exp.1  - Identification test for organic compounds.
Exp.2  - Determination of physical constants of organic compound.
Exp.3  - Perform the detection of elements.
Exp.4  - Determine the solubility of organic compounds.
Exp.5  - Determine the melting & boiling point of the different compounds.
Exp.6  - Identification test for sulphonamides.
Exp.7  - Identification test for phenothiazines.
Exp.8  - Identification test for Amoxycilline.
Exp.9  - Preparation & submit Aspirin.
Exp.10 - Preparation & submit Oxalic acid.
Exp.11 - Preparation & submit Benzoic acid.
Exp.12 - Determine Saponification value of the given oil or fat.
Exp.13 - Preparation & submit Benzamide.
Exp.14 - Perform the estimation of glucose.
Exp.15 - Perform the estimation of protein.
Exp.16 - Determine the strength of the given glycerine.

Reference / Recommend Books:

7. Indian Pharmacopoeia.
Exp.1 - Study of digestive system by the help of charts & models.
Exp.2 - Study of Respiratory system by the help of charts & models.
Exp.3 - Study of Central Nervous System by the help of charts & models.
Exp.4 - Study of Autonomic Nervous System by the help of charts & models.
Exp.5 - Study of Urinary System by the help of charts & models.
Exp.6 - Study of Reproductive System by the help of charts & models.
Exp.7 - Study of Endocrine System by the help of charts & models.
Exp.8 - Study of Sense Organs by the help of charts & models.
Exp.9 - Study of the Clinical Features, mode of transmission & prevention of selected communicable diseases from the course contents.
Exp.10 - Microscopic studies of different tissues of various systems mentioned in the course.
Exp.11 - Analysis of Normal & Abnormal urine.
Exp.12 - Estimation of Red Blood Cells count.
Exp.14 - Determination of Erythrocyte Sedimentation rate.
Exp.15 - To study the experiments on spirometer.

Reference / Recommend Books:

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, Bhilai

Semester: 3rd Branch: B. Pharm
Subject: Pharmacognosy - II Practical Practical Code: 341325(41)
Total Practical Periods: 3
Total Marks in End Semester Exam: 60

Exp.1 - Study the Macroscopic & Microscopic Characters of Liquorice.
Exp.2 - Study the Macroscopic & Microscopic Characters of Digitalis.
Exp.3 - Study the Macroscopic & Microscopic Characters of Aloe
Exp.4 - Study the Macroscopic & Microscopic Characters of Senna
Exp.5 - Study the Macroscopic & Microscopic Characters of Chirata
Exp.6 - Study the Macroscopic & Microscopic Characters of Dill
Exp.7 - Study the Macroscopic & Microscopic Characters of Fennel
Exp.8 - Study the Macroscopic & Microscopic Characters of Clove.
Exp.9 - Study the Macroscopic & Microscopic Characters of Cinnamon.
Exp.10 - Study the Macroscopic & Microscopic Characters of Caraway.
Exp.11 - Study the Macroscopic & Microscopic Characters of Gokhru.
Exp.12 - Study the Macroscopic & Microscopic Characters of Arjuna
Exp.13 - Study the Macroscopic & Microscopic Characters of Ashoka.
Exp.14 - Study the Macroscopic & Microscopic Characters of Neem.
Exp.15 - Extraction of volatile oils from given drugs.
Exp.16 - Perform the identification tests of glycosides.

Reference / Recommend Books:

1. Evans, W.C., Trease and Evans Pharmacognosy, ELBS/Balliere London.