

H.P. TECHNICAL UNIVERSITY HAMIRPUR (HP)



Syllabus

[Effective from the Session: 2015-16]

B.Pharm. (1st & 2nd Semesters)

HIMACHAL PRADESH TECHNICAL UNIVERSITY, HAMIRPUR

COURSE: B. PHARMACY

TEACHING AND EVALUATION SCHEME - SEMESTER- I

| S. N. | Category | Paper Code | Subject | L | T | P/D | Credits | Evaluation Scheme | | | | |
|----------------|----------|------------|---|-----------|-----------|-----------|-----------|---------------------|----|-------|-----|---------------|
| | | | | | | | | Internal Assessment | | | ESE | Subject Total |
| | | | | | | | | CT | TA | Total | | |
| Theory: | | | | | | | | | | | | |
| 1 | HS | HS 104 | English Communication Skills | 2 | - | - | 2 | 20 | 20 | 40 | 60 | 100 |
| 2 | PC | BP 101 | Pharmaceutical Chemistry-I (Inorganic Chemistry) | 3 | - | - | 3 | 20 | 20 | 40 | 60 | 100 |
| 3 | PC | BP 102 | Pharmaceutics - I (Introduction to Pharmaceutics & Dispensing Pharmacy) | 3 | - | - | 3 | 20 | 20 | 40 | 60 | 100 |
| 4 | PC | BP 103 | Anatomy, Physiology and Health Education - I | 3 | - | - | 3 | 20 | 20 | 40 | 60 | 100 |
| 5 | PC | BP 104 | Computer Fundamentals | 3 | - | - | 3 | 20 | 20 | 40 | 60 | 100 |
| 6 | HS | HS 102 | Environmental Science | 2 | - | - | 2 | 20 | 20 | 40 | 60 | 100 |
| Labs: | | | | | | | | | | | | |
| 1 | PC | BP 111 | Pharmaceutical Chemistry - I Laboratory | | | 3 | 1 | 10 | 15 | 25 | 25 | 50 |
| 2 | P C | BP 112 | Pharmaceutics - I Laboratory | | | 3 | 1 | 10 | 15 | 25 | 25 | 50 |
| 3 | P C | BP 113 | Anatomy, Physiology and Health education - I Laboratory | | | 3 | 1 | 10 | 15 | 25 | 25 | 50 |
| 4 | PF | BP 114 | Computer Fundamentals - Laboratory | | | 2 | 1 | 10 | 15 | 25 | 25 | 50 |
| Total | | | | 16 | -- | 11 | 20 | | | | | |

Legend: L - Lecture
T - Tutorial
P - Practical

TA- Teacher's Assessment
ESE- End Semester Examination
CT- Class Test



DETAILED SYLLABUS

HS-101 ENGLISH COMMUNICATION SKILLS

L T P Credits

2 0 0 2

Sessional: 40 Marks

Exam: 60 Marks

Total: 100 Marks

Duration of exam: 3 Hrs

Note: The paper setter will set two questions from each Section/Unit and one question (Q. No. 9) covering all Sections/Units which is compulsory and of short answer type of one mark each. A candidate is required to attempt 5 questions selecting one question from each section. All questions carry equal marks.

Unit-I

Communication: Need for effective communication, process of communication, The Seven Cs of Effective Communication - Completeness, Conciseness, Consideration, Concreteness, Clarity, Courtesy, Correctness; **Barriers to communication** - miscommunication, physical noise; Overcoming measures.

Unit-II

Essentials of Grammar: Sentence structure; Sentence formation, Use of appropriate diction, Tenses, articles and prepositions; English Phonetics: International phonetic alphabets - Production of sounds, Classification of consonant and vowel sounds.

Unit-III

Writing Skills: **Letter writing** - Formal, informal and demi-official letters; Business letters - quotations, supply orders, complaints, sales, adjustment letters, etc.; **Resume writing:** Difference between bio-data, CV and resume, Cover letter, Application for job.

Unit-IV

Soft skills: Classification of soft skills, soft skills for personality development & career growth; Capturing audience, Tone, Behavior and telephone etiquette - Good practice when making and receiving a call; Becoming a good leader and team-player, Personal SWOT analysis.

Text Books:

1. Herta A. Murphy, et al., *Effective Business Communication*, Tata Mc-Graw Hill: New Delhi
2. Krishna Mohan and Meenakshi Raman, *Effective English Communication*, TMH
3. B. K. Mitra, *Personality and Soft Skills*, Oxford press.



Reference Books:

1. R.W. Lesikar and John.D. Pettit, *Business Communication: Theory and Application*, All India Traveller Bookseller.
2. Francis Soundaraj, *Speaking and Writing for Effective Business Communication*, Macmillan.
3. Ronald B. Adler and George Rodman, *Understanding Human Communication*, Oxford University Press: New York.



BP 101 - PHARMACEUTICAL CHEMISTRY- I (INORGANIC CHEMISTRY)

L T P Credits

3 0 0 3

Sessional: 40 Marks

Exam: 60 Marks

Total: 100 Marks

Duration of exam: 3 Hrs

Note: The paper setter will set two questions from each Section/Unit and one question (Q. No. 9) covering all Sections/Units which is compulsory and of short answer type of one mark each. A candidate is required to attempt 5 questions selecting one question from each section. All questions carry equal marks.

UNIT-I

Limit Tests: Introduction to Limit test; Limit tests for iron, arsenic, lead, heavy metals, chloride, sulphate. **(4 hrs.)**

Essential and Trace Elements: An outline of methods of preparation, uses, sources of impurities, tests for purity and identity of Transition elements and their compounds of pharmaceutical importance, Iron and haematinics, Mineral supplements. **(4 hrs.)**

Complexing and Chelating Agents: Introduction, Preparations, properties and assay of EDTA. **(2 hrs.)**

UNIT-II

Intra- and Extra-cellular Electrolytes: A brief Introduction to methods of preparation, uses, sources of impurities, tests for purity and identity of Physiological ions, Electrolytes (Sodium chloride, Potassium chloride, Calcium gluconate, Calcium lactate, Magnesium chloride) used for replacement therapy, Electrolytes combination therapy including ORS. **(4hrs.)**

Gastrointestinal Agents: An outline of methods of preparation, uses, sources of impurities, tests for purity and identity the Acidifying agents (Dilute hydrochloric acid), Antacids (Aluminium hydroxide, Calcium carbonate, Magnesium carbonate (Light and Heavy), Sodium Bicarbonate, Magaldrate, algin tablets), Protective's and Adsorbents (Bismuth subcarbonate). Brief Introduction to Cathartics, emetics, poisons and antidotes, sedatives etc. **(5 hrs.)**

UNIT-III

Topical Agents: An outline of methods of preparation, uses, sources of impurities, tests for purity and identity of Protectives, Astringents and Anti-infectives. **(4hrs.)**

Dental Products: An outline of methods of preparation, uses, sources of impurities, tests for purity and identity of Dentifrices, Anti-caries agents. **(3 hrs.)**



UNIT-IV

Gases and Vapours: An outline of methods of preparation, uses, sources of impurities, tests for purity and identity of Oxygen, Anesthetics and Respiratory stimulants. **(4hrs.)**

Miscellaneous Agents: A Brief introduction and uses of Sclerosing agents, expectorants, emetics, poisons and antidotes, sedatives etc. **(5 hrs.)**

Pharmaceutical Aids: A Brief introduction and uses of Anti-oxidants, preservatives, filter aids, adsorbents, diluents, excipient, suspending agents, colorants etc. **(5 hrs.)**

Text Books

Note: Recent editions of the following books to be referred

1. Block JH, Roche E, Soine TO, Wilson CO. Inorganic Medicinal and Pharmaceutical Chemistry. Philadelphia: Lea and Febiger.
2. Vogel. Vogel's Textbook of Micro and Semi micro Qualitative Inorganic Analysis. Hyderabad: Orient Longman.

Reference Book

1. Atherden LM. Bentley and Driver's Textbook of Pharmaceutical Chemistry. New Delhi: Oxford University Press.



BP 102- PHARMACEUTICS-I (INTRODUCTION TO PHARMACEUTICS & DISPENSING PHARMACY)

L T P Credits

3 0 0 3

Sessional: 40 Marks

Exam: 60 Marks

Total: 100 Marks

Duration of exam: 3 Hrs

Note: The paper setter will set two questions from each Section/Unit and one question (Q. No. 9) covering all Sections/Units which is compulsory and of short answer type of one mark each. A candidate is required to attempt 5 questions selecting one question from each section. All questions carry equal marks.

UNIT-I

History of Pharmacy: History of pharmacy profession in India and the world, Pharmacy as a career, Pharmaceutical education in India and abroad, Pharmacopoeia of India and other Pharmacopoeias, Other official books. **(5Hrs)**

Dosage Forms: Introduction to different dosage forms, their classification and applications with examples **(5Hrs)**

UNIT-II

Typical prescriptions: Introduction to mixtures, Aromatic waters, solutions, tablet, capsules emulsions, creams, ointments, powders, capsules, pastes, jellies, suppositories, ophthalmic, pastilles, lozenges, pills, lotions, liniments, inhalations, paints, sprays. **(10 Hrs)**

UNIT-III

Prescription: Definition, various parts of prescription, Handling of prescription, sources of errors in prescription, General dispensing procedures including labelling of dispensing products. **(2 Hrs)**

Pharmaceutical Calculations: Posology, calculation of doses for infants, adults and elderly patients; Enlarging and reducing recipes percentage solutions, alligation, alcohol dilution, proof spirit, isotonic solutions and displacement value. **(5 Hrs)**

Incompatibilities: Physical, Therapeutic and Chemical incompatibilities; inorganic incompatibilities, Organic incompatibilities, Correction of incompatibilities. **(3 Hrs)**



UNIT-IV

Extemporaneous Preparations: Definitions, general formulation, manufacturing procedures and official products of syrups, spirits, elixirs, gargles, mouth washes, douches, draught. Infusion, decoction, tincture and extracts, methods of preparation of dry, soft and liquid extracts of IP. **(10 Hrs)**

Text Books

1. Indian Pharmacopoeia 1962. New Delhi: Indian Pharmacopoeia Commission.
2. Gaud RS, Gupta GD. Practical Pharmaceutics. New Delhi: CBS Publishers.

Reference Books

1. Carter SJ. Cooper and Gunn's Tutorial Pharmacy. New Delhi: CBS Publishers.
2. Carter SJ. Cooper and Gunn's Dispensing Pharmacy. New Delhi: CBS Publishers.



BP-103 ANATOMY, PHYSIOLOGY AND HEALTH EDUCATION - I

L T P Credits

3 0 0 3

Sessional: 40 Marks

Exam: 60 Marks

Total: 100 Marks

Duration of exam: 3 Hrs

Note: The paper setter will set two questions from each Section/Unit and one question (Q. No. 9) covering all Sections/Units which is compulsory and of short answer type of one mark each. A candidate is required to attempt 5 questions selecting one question from each section. All questions carry equal marks.

UNIT-I

Introduction: Scope of anatomy and physiology and basic terminology used, Structure of cell, its components and their functions. **(4 Hrs)**

Elementary Tissues of the Human Body: Epithelial, connective, muscular and nervous tissues, their sub-types and their characteristics. **(4 Hrs)**

UNIT-II

Osseous System: Structure, composition and functions of skeleton Classification of joints, types of movements of joints, Disorders of joints. **(4 Hrs)**

Skeletal Muscles: Gross anatomy; physiology of muscle contraction, physiological properties of skeletal muscles and their disorders. **(4 Hrs)**

UNIT-III

Haemopoietic System: Composition and functions of blood and its elements, their disorders, blood groups and their significance, mechanism of coagulation, disorders of platelets and coagulation. **(7 Hrs)**

Lymph and Lymphatic System: Composition, formation and circulation of lymph; disorders of lymph and lymphatic system. Basic physiology and functions of spleen. **(5 Hrs)**

UNIT-IV

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 disorder like hypertension, hypotension, arteriosclerosis, angina, myocardial infarction, congestive heart failure and cardiac arrhythmias. **(16 Hrs)**



Text Book

1. Chatterjee CC. Human Physiology, Calcutta: Medical Allied Agency.
2. Ghai CL. Textbook of Practical Physiology. New Delhi: Jay Pee Brothers.
3. Vander AJ, Sherman JH, Lucians DS. Human Physiology. New Delhi: Tata McGraw Hill.

Reference Book

1. Tortora GJ, Derrickson B. Principles of Anatomy and Physiology. New York: John Wiley & Sons.
2. Ross and Wilson. Anatomy and Physiology in Health and Illness. Sydney: Churchill Livingstone.
3. Guyton AC, Hall JE. Textbook of Medical Physiology. New York: WB Sanders Co.
4. Difore SH. Atlas of Normal Histology. Philadelphia: Lea and Febiger.



BP 104 - COMPUTER FUNDAMENTALS

L T P Credits

3 0 0 3

Sessional: 40 Marks

Exam: 60 Marks

Total: 100 Marks

Duration of exam: 3 Hrs

Note: The paper setter will set two questions from each Section/Unit and one question (Q. No. 9) covering all Sections/Units which is compulsory and of short answer type of one mark each. A candidate is required to attempt 5 questions selecting one question from each section. All questions carry equal marks.

UNIT-I

Fundamentals of Computer: Introduction to computers, Characteristics of computers, Historical perspective of computers, Computer generations, Types of computers and uses, Software and Hardware, Basic organization of a computer system and functions performed by each unit. Various Input devices and output devices. Memory storage: Memory Cells, Semiconductor and Magnetic core memory, ROM and its types, RAM, Cache and Virtual Memory. Secondary Storage devices and their organization (Hard disk, Floppy disk, CD and DVD). **(10 Hrs)**

UNIT-II

Operating System: Definition, Need and organization of OS, Functions performed by operating system. Mobile Phone OS. **(2 Hrs)**

Data Communication and Networks: Basic elements of a communication system, Data transmission mode, Network Topologies (ring, star, fully connected and Bus), LAN and WAN, Bounded and unbounded communication media. **(4 Hrs)**

UNIT-III

Internet Technology: Internet, Services provided by internet, Potential uses and abuses of internet, Working of search engine, Effective use of social media sites. Concept and implementation of E-Services (Digital India). **(5 Hrs)**

Role of Computers in Pharmacy: Use of computer in various pharmaceutical and clinical applications like drug information services hospital and community pharmacy, drug design, pharmacokinetics and data analysis. **(2 Hrs)**



UNIT-IV

Word Processing: Features and uses of MS -Word processing, File handling(opening, creating, saving printing and editing), Formatting, Printing setups, Table Handling, Mail Marge, Spell check, file protection etc. in MS-Word. **(3 Hrs)**

Spreadsheet: Basics of spreadsheet, feature and uses of Excel, Worksheet, formatting Sheets, Data (Sort and Filter), Calculation and graphing using formulae and function, Goal seek, scenario etc. **(3 Hrs)**

Presentation Package: Introduction to power point, features and uses of PowerPoint, creating a new presentation, editing and formatting, working with slides in different views, Animation, Transitions, Action buttons, Macros, Insert (text, slide, picture). **(3 Hrs)**

Text Book

1. Rajaraman V. Fundamental of Computers. New Delhi: Prentice Hall (India).

Reference Book

1. Sinha PK, Sinha P. Computer Fundamentals. New Delhi: BPB Publications.



HS 102 - ENVIRONMENTAL SCIENCE

L T P Credits

2 0 0 2

Sessional: 40 Marks

Exam: 60 Marks

Total: 100 Marks

Duration of exam: 3 Hrs

Note: The paper setter will set two questions from each Section/Unit and one question (Q. No. 9) covering all Sections/Units which is compulsory and of short answer type of one mark each. A candidate is required to attempt 5 questions selecting one question from each section. All questions carry equal marks.

UNIT-I

Introduction to Environment: Definition; Natural and manmade environments and inter-relationships amongst and between them, components of environment and relationship between different components, Relationship between man and environment, impact of technology on environment, environmental degradation. **(5 Hrs)**

Ecosystems: Introduction, Biotic components, abiotic components, Function of ecosystems (food chain and food web, Energy flow), Types of ecosystems. **(4 Hrs)**

Biodiversity: Introduction, genetic, species and ecosystem diversity, bio-geographic classification of India, value and importance of biodiversity, threats to biodiversity, endangered and endemic species in India, conservation of biodiversity. **(4 Hrs)**

UNIT-II

Environmental Pollution: **Air Pollution:** Composition of air, structure of atmosphere, ambient air quality standards, classification of air pollutants, sources of common air pollutants like SPM, SO₂, NOX, natural and anthropogenic sources, effects of common air pollutants, carbon credit. **Noise Pollution:** Introduction, sources of noise pollution, ambient noise levels, effects of noise pollution on human being and wildlife, noise pollution controls, noise standards. **Water Pollution:** Introduction, water quality standards, sources of water pollution, classification of water pollutants, effects of water pollutants, eutrophication, measures to control water pollution. **(6 Hrs)**

UNIT-III

Energy Resources: Understanding natural resources, renewable and non-renewable resources, sustainable energy resources, destruction versus conservation, forest resources, water resources, food resources, energy resources and land resources, conventional energy sources and their problems, advantages and limitations non-conventional energy sources, problems due to overexploitation of energy resources. **(5 Hrs)**



UNIT-IV

Social Issues and Environment: Sustainable development and practices of improving environment, laws and acts for environmental protection, waste management. **(6 Hrs)**

Text Books:

1. Botkin DB, Keller EA. Environmental science. New York: John Wiley & Sons.

Reference Books:

1. Nebel BJ, Wright RT. Environmental science – the way the world works. New Jersey: Prentice Hall.



BP 111- PHARMACEUTICAL CHEMISTRY-I (INORGANIC CHEMISTRY) LABORATORY

L T P Credits

0 0 3 1

Sessional: 25 Marks

Exam: 25 Marks

Total: 50 Marks

Duration of exam: 3 Hrs

INSTRUCTIONS

Laboratory examination will consist of three parts:

- Performing practicals assigned by the examiner
- Viva-voce examination
- Writing synopsis regarding principles / theory behind the experiments

Viva-voce examination will be related to the practicals performed / project undertaken by the candidate related to the subject during the semester. Following is the suggested list of experiments out of which 8-10 experiments must be performed by the candidate during the semester:

List of Experiments (3 Hrs/ Week)

- To carry out the limit test for chloride in the given sample.
- To carry out the limit test for sulphate in the given sample.
- To carry out the limit test for iron in the given sample.
- To carry out the limit test for heavy metals in the given sample.
- To identify the given inorganic pharmaceutical compound.(Sodium bicarbonate/ Mag. Sulphate)
- To carry out qualitative analysis of given inorganic mixture(Sodium Chloride/ Sodium acetate)
- To carry out qualitative analysis of given inorganic mixture(Sodium bicarbonate/ Potassium chloride)
- To carry out qualitative analysis of given inorganic mixture (Barium Sulphate/ Lead acetate)
- To carry out qualitative analysis of given inorganic mixture (Zinc Sulphate/ Lead acetate)
- To carry out qualitative analysis of given Unknown inorganic mixture.
- Preparation of Inorganic Pharmaceuticals (Boric Acid/ Magnesium Sulphate /Potash Alum).
- To Perform assay of Inorganic Pharmaceutical (EDTA)



BP 112 - PHARMACEUTICS - I LABORATORY

L T P Credits

0 0 3 1

Sessional: 25 Marks

Exam: 25 Marks

Total: 50 Marks

Duration of exam: 3 Hrs

Laboratory examination will consist of three parts:

- a. Performing practicals assigned by the examiner
- b. Viva-voce examination
- c. Writing synopsis regarding principles / theory behind the experiments

Viva-voce examination will be related to the practicals performed / project undertaken by the candidate related to the subject during the semester. Following is the suggested list of experiments out of which 8-10 experiments must be performed by the candidate during the semester:

List of Experiments (3 Hrs/ Week)

1. To Prepare and submit Chloroform water BP
2. To Prepare and submit Concentrated Peppermint Water BP
3. To Prepare and submit Mixtures of Light Magnesium Carbonate and Kaolin.
4. To Dispensing and Submit ORS and Effervescent Compound Powder BPC.
5. To Prepare and dispense 20 g of Eutectic mixture (Menthol & camphor)
6. To Prepare and dispense 20 mL of Turpentine liniment.
7. To Prepare and dispense 20 g of Zinc & Salicylic acid dusting powder.
8. To Prepare and dispense 20 g of Simple ointment.
9. To Prepare and dispense 20 mL of Liquid paraffin emulsion.
10. To Prepare and dispense 20 mL of castor oil emulsion.
11. To Prepare and dispense 8 Glycero-gelatin suppositories.
12. Chemical incompatibility- Ferric chloride & potassium Iodide.
13. To prepare and dispense 20 gm Unna's Paste.



BP 113 - Anatomy, Physiology and Health Education -I Laboratory

L T P Credits

0 0 3 1

Sessional: 25 Marks

Exam: 25 Marks

Total: 50 Marks

Duration of exam: 3 Hrs

Laboratory examination will consist of three parts:

- a. Performing practicals assigned by the examiner
- b. Viva-voce examination
- c. Writing synopsis regarding principles / theory behind the experiments

Viva-voce examination will be related to the practicals performed / project undertaken by the candidate related to the subject during the semester. Following is the suggested list of experiments out of which 8-10 experiments must be performed by the candidate during the semester:

List of Experiments (3Hrs / Week)

1. To study the Microscopic structure of Elementary tissues
2. To Study the human skeleton with respect to Anatomy and Physiology.
3. To Study the different systems with the help of charts and models.
4. To Estimate the haemoglobin content of blood sample.
5. To find out the Blood group of blood sample.
6. To Determine the bleeding time, clotting time of sampled blood.
7. To determine the total RBC Count from blood sample.
8. To determine the Total leucocyte count, Differential leucocyte count of given blood sample(2).
9. To Estimate the Erythrocyte sedimentation rate. .
10. To Record the body temperature, pulse rate and blood pressure, basic understanding of Electrocardiogram-PQRST waves and their significance.
11. To carry out the Body Mass Index.



BP114-- COMPUTER FUNDAMENTALS - LABORATORY

L T P Credits

0 0 2 1

Sessional: 25 Marks

Exam: 25 Marks

Total: 50 Marks

Duration of exam: 3 Hrs

Laboratory examination will consist of three parts:

- a. Performing practicals assigned by the examiner
- b. Viva-voce examination
- c. Writing synopsis regarding principles / theory behind the experiments

Viva-voce examination will be related to the practicals performed / project undertaken by the candidate related to the subject during the semester. Following is the suggested list of experiments out of which 8-10 experiments must be performed by the candidate during the semester:

List of Experiments (2 Hrs / Week)

1. To perform character, paragraph and page formatting in M S-Word.
2. To perform Mail merge and write the steps for performing the mail merge.
3. To create a personal Resume in MS-word.
4. To create a Chart and Pivotal table in M.S. Excel for statistical data.
5. To perform the various type of functions in Ms-Excel.
6. To perform the different Animation and Transitions in MS PowerPoint.
7. To perform Macro in MS PowerPoint.
8. To create email ID, sending and managing mail account.
9. To perform the steps for online submission of form.
10. To perform the OS Installation and write the Steps.

SCHEME OF EXAMINATION SEMESTER – II

| S. N. | Category | Paper Code | Subject | L | T | P/D | Credits | Evaluation Scheme | | | | |
|--------------------------------|----------|------------|--|------------------------|----------|-----------|-----------|---------------------|----|-------|-----|---------------|
| | | | | | | | | Internal Assessment | | | ESE | Subject Total |
| | | | | | | | | CT | TA | Total | | |
| Theory: | | | | | | | | | | | | |
| 1 | AC | HS 204 | Business Communication | 2 | - | - | 2 | 20 | 20 | 40 | 60 | 100 |
| 2 | PC | BP 201 | Pharmaceutical Chemistry- II (Organic Chemistry) | 3 | 1 | - | 4 | 20 | 20 | 40 | 60 | 100 |
| 3 | PC | BP202 | Physical Pharmacy -I | 3 | - | - | 3 | 20 | 20 | 40 | 60 | 100 |
| 4 | PC | BP 203 | Anatomy, Physiology and Pathophysiology -II | 3 | - | - | 3 | 20 | 20 | 40 | 60 | 100 |
| 5 | PC | BP 204 | Pharmacognosy-I | 3 | - | - | 3 | 20 | 20 | 40 | 60 | 100 |
| 6 | PC | BP 205 | Mathematics & Biostatistics | 3 | - | - | 3 | 20 | 20 | 40 | 60 | 100 |
| 7 | AC | HS 103 | Disaster Management | 2 | - | - | - | 20 | 20 | 40 | 60 | 100 |
| Labs: | | | | | | | | | | | | |
| 1 | PC | BP 211 | Pharmaceutical Chemistry II-Laboratory | - | - | 4 | 2 | 10 | 15 | 25 | 25 | 50 |
| 2 | PC | BP 212 | Physical Pharmacy- I- Laboratory | - | - | 3 | 1 | 10 | 15 | 25 | 25 | 50 |
| 3 | PC | BP 213 | Anatomy, Physiology and Pathophysiology -II Laboratory | - | - | 3 | 1 | 10 | 15 | 25 | 25 | 50 |
| 4 | PC | BP214 | Pharmacognosy-I Laboratory | - | - | 3 | 1 | 10 | 15 | 25 | 25 | 50 |
| Total | | | | 19 | - | 13 | 23 | | | | | |
| Total Work Load 32/Week | | | | Total Credit 23 | | | | | | | | |

Legend: L - Lecture
T - Tutorial
P - Practical
CT- Class Test

TA- Teacher's Assessment
ESE- End Semester Examination



DETAILED SYLLABUS

HS-204 BUSINESS COMMUNICATIONS

L T P Credits

2 0 0 2

Sessional: 40 Marks

Exam: 60 Marks

Total: 100 Marks

Duration of exam: 3 Hrs

Note: The paper setter will set two questions from each Section/Unit and one question (Q. No. 9) covering all Sections/Units which is compulsory and of short answer type of one mark each. A candidate is required to attempt 5 questions selecting one question from each section. All questions carry equal marks.

UNIT - I

Introduction to Business Communication: Importance of communication in business, process and models of communication, Types of information- order, advise, suggestion, motivation, persuasion, warning and education.

UNIT- II

Business Communication: Letters, Cover Letter, Differences between bio-data, CV and Resume, Letter for Job Application, Thank You Letter, Letter of Complaint, Memos, Memorandum drafting; E. Communication: Email and Social Media.

Oral Communication: Types of oral communication, Barriers to oral communication, Mass Communication – Nature & Scope of Mass Communication, function of mass communication – Media of mass communication.

UNIT-III

Business Report Writing: Report Writing: Types, Structure of a report, Methods and Models of Report Writing, Technical Proposal - Concept, Layout, and Examples of Technical Proposals.

Types of reports: Progress and Annual reports – format and Analysis of sample reports from industry – Synopsis and thesis writing.

UNIT IV

Spoken and Presentation Skills: Impromptu speech – tackling hesitation, shyness and nervousness in speaking –Public speaking; Academic and professional presentations – Group discussions, Planning, preparing and delivering a presentation, essentials of presentation - etiquette, clarity, lively delivery – speech rhythm, speech initiators body language – voice, posture & gesture, eye contact, dress codes; Interviewing, Negotiating a job offer.



Text Books:

1. Essentials of Business Communication by R. Pal and JS Korlahhi, Sultan Chand & Sons, New Delhi.
2. Basic Communication Skills for Technology by Andre J. Rutherford, Pearson Education Asia, Patparganj, New Delhi 92.

Reference Books:

1. Business Communication by Meenakshi Raman and Prakash Singh (Oxford)
2. Advanced Communication Skills, V. Prasad, Atma Ram Publications, New Delhi.



BP 201- Pharmaceutical Chemistry-II (Organic Chemistry)

L T P Credits

3 1 0 4

Sessional: 40 Marks

Exam: 60 Marks

Total: 100 Marks

Duration of exam: 3 Hrs

Note: The paper setter will set two questions from each Section/Unit and one question (Q. No. 9) covering all Sections/Units which is compulsory and of short answer type of one mark each. A candidate is required to attempt 5 questions selecting one question from each section. All questions carry equal marks.

UNIT-I

8. Theory of resonance: Allyl radical as a resonance hybrid, stability, and orbital picture. Resonance stabilization of Allyl cations: hyper conjugation. **(2 Hrs)**

Reactive Intermediates: Carbocations, carbanions, carbenes, nitrene . **(3 Hrs)**

Aliphatic Compounds: Structure, nomenclature, preparation and reactions of alkanes, alkenes, dienes and alkynes. **(6 Hrs)**

UNIT-II

Alicyclic Compounds: Structure, nomenclature, preparation and reactions of cycloalkanes. **(2 Hrs)**

Aromatic Compounds: Structure, nomenclature, preparation and reactions of benzene, polynuclear aromatic compounds, arenes. **(4 Hrs)**

Alkyl Halides: Structure, nomenclature, preparation and reactions of aliphatic and aromatic alkyl halides. **(4 Hrs)**

UNIT-III

Alcohols: Structure, nomenclature, preparation and reactions of aliphatic alcohols, aromatic alcohols and phenols. **(4 Hrs)**

Ethers, Esters and Epoxides: Structure, nomenclature, preparation and reactions of alcohols, ethers, esters and epoxides. **(4 Hrs)**

Amines: Structure, nomenclature, preparation and reactions of aliphatic and aromatic amines. **(3 Hrs)**

UNIT-IV

Aldehydes and Ketones: Structure, nomenclature, preparation and reactions of Aldehydes and ketones. **(4 Hrs)**



Carboxylic Acids: Structure, nomenclature, preparation and reactions of carboxylic acids. Functional derivatives of carboxylic acids. **(4 Hrs)**

Text Books

1. Roberts JD, Caserio MC. Basic Principles of Organic Chemistry. New York: WA. BenjaminInc.
2. Furniss NS, Hannaford AJ, Smith PWG, Tatehell AR. Vogel's Textbook of Practical Organic Chemistry. London: ELBS/Longman.
3. Sykes PA. A Guidebook to Mechanisms in Organic Chemistry. Hyderabad: Orient Longman.

Reference Books

1. Mann FC, Saunders BC. Practical Organic Chemistry. London: ELBS/ Longman.
2. Morrison TR, Boyd RN. Organic Chemistry. New Delhi: Prentice Hall India.



BP - 202: PHYSICAL PHARMACY- I

L T P Credits

3 0 0 3

Sessional: 40 Marks

Exam: 60 Marks

Total: 100 Marks

Duration of exam: 3 Hrs

Note: The paper setter will set two questions from each Section/Unit and one question (Q. No. 9) covering all Sections/Units which is compulsory and of short answer type of one mark each. A candidate is required to attempt 5 questions selecting one question from each section. All questions carry equal marks.

UNIT - I

Matter and Properties of Matter: States of matter, change in the state of matter, latent heats and vapor pressure, sublimation-critical point, Eutectic mixtures, gases, aerosol-inhalers, relative humidity, liquid complexes, liquid crystals, glassy state, crystalline and amorphous solids, polymorphism. (10 Hrs)

UNIT-II

Liquid State and solutions: Physical properties (surface tension, parachor, viscosity, refractive index, optical rotation, dipole moments and chemical constituents), Ideal and real solutions, solutions of gases in liquids, colligative properties, partition coefficient, conductance and its measurement, Debye Huckel theory. (10 Hrs)

UNIT-III

Thermodynamics: First law, thermochemistry, second law, Entropy and disorder, third law, free energy functions and applications, absolute temperature scale, thermochemical equations (8 Hrs) .

Buffers: Buffer equations and buffer capacity in general, buffers in pharmaceutical systems, preparation, stability, buffered isotonic solutions, measurements of tonicity, calculations and methods of adjusting isotonicity. (5 Hrs)

UNIT-IV.

Kinetics: General considerations and concepts, law of mass action, rate and order of reaction, molecularity of reaction, study of zero, pseudo zero and first order kinetics, half-life determination, determination of order of reaction. (3 Hrs).

Drug Stability: Physical degradation of drugs, chemical decomposition of drugs – modes and preventive measures, influence of temperature, light, solvent, catalytic species and other factors on reaction rate. Stability testing of dosage forms by conventional Arrhenius approach. (4 Hrs)



Books Recommended:

1. Martin A, Bustamante P, Chun AHC. Physical Pharmacy. New Delhi: B. I. Waverly Pvt. Ltd.
2. Brey WS. Physical Chemistry and Biological Applications. London: Academic Press.
3. Shoemaker DP, Garland CW. Experiments in Physical Chemistry. New York: McGraw Hill.
4. Subramanyam CVS. Principles of Physical Pharmacy. New Delhi: Vallabh Prakashan.
5. Subramanyam CVS. Text book of Physical Pharmacy. New Delhi: Vallabh Prakashan.



BP- 203: ANATOMY, PHYSIOLOGY AND PATHOPHYSIOLOGY - II

L T P Credits

3 0 0 3

Sessional: 40 Marks

Exam: 60 Marks

Total: 100 Marks

Duration of exam: 3 Hrs

Note: The paper setter will set two questions from each Section/Unit and one question (Q. No. 9) covering all Sections/Units which is compulsory and of short answer type of one mark each. A candidate is required to attempt 5 questions selecting one question from each section. All questions carry equal marks.

UNIT-I

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. **(6 Hrs)**

Respiratory System: Anatomy of respiratory organs and its functions, respiration, mechanism and regulation of respiration, respiratory volumes and vital capacity. **(4 Hrs)**

UNIT-II

Central Nervous System: Functions 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. **(4 Hrs)**

Autonomic Nervous System: Physiology and functions of the autonomic nervous system. Mechanism of neurohumoral transmission in the ANS. **(3 Hrs)**

Sense Organs: Basic anatomy and physiology of the eye (vision), ear (hearing), taste buds, nose (smell) and skin (superficial receptors). **(4 Hrs)**

UNIT-III

Urinary System: Various parts, structures and functions of the kidney and urinary tract, Physiology of urine formation and acid-base balance, Diseases of the urinary system. **(4 Hrs)**

Reproductive System: Male and female reproductive systems and their hormones, physiology of menstruation, coitus and fertilization, Spermatogenesis and oogenesis, Pregnancy, its maintenance and parturition. **(4 Hrs)**

Endocrine System: Basic anatomy and physiology of Pituitary, Thyroid, Parathyroid. Adrenals, Pancreas, Testes and ovary, their hormones and functions. **(4 Hrs)**



UNIT-IV

Health Education: *Classification of food requirements:* Balanced diet, nutritional deficiency disorders, their treatment and prevention, specifications for drinking water.

Family planning: Medical termination of pregnancy.

Communicable diseases: Brief outline, causative agents, modes of transmission and prevention of Chicken pox, diphtheria, tuberculosis, poliomyelitis, malaria, filariasis, rabies, tetanus, leprosy, syphilis, gonorrhoea, and AIDS.

First aid: Emergency treatment of shock, snake bites, burns, poisoning, and resuscitation methods. **(7 Hrs)**

Reference Book

1. Tortora GJ, Derrickson B. Principles of Anatomy and Physiology. New York: John Wiley & Sons.
2. Ross and Wilson. Anatomy and Physiology in Health and Illness. Sydney: Churchill Livingstone.
3. Guyton AC, Hall JE. Textbook of Medical Physiology. New York: WB Sanders Co.
4. Difore SH. Atlas of Normal Histology. Philadelphia: Lea and Febiger.

Text Book

1. Chatterjee CC. Human Physiology, Calcutta: Medical Allied Agency.
2. Ghai CL. Textbook of Practical Physiology. New Delhi: Jay Pee Brothers.
3. Vander AJ, Sherman JH, Lucians DS. Human Physiology. New Delhi: Tata McGraw Hill.



BP 204: Pharmacognosy - I

L T P Credits

3 0 0 3

Sessional: 40 Marks

Exam: 60 Marks

Total: 100 Marks

Duration of exam: 3 Hrs

Note: The paper setter will set two questions from each Section/Unit and one question (Q. No. 9) covering all Sections/Units which is compulsory and of short answer type of one mark each. A candidate is required to attempt 5 questions selecting one question from each section. All questions carry equal marks.

UNIT-I

Introduction: Definition, history, scope and development of Pharmacognosy. (2 Hrs)

Introduction to plant parts and tissue: Definition and function of leaf, stem, root, flower, fruits and seed, modification of leaf, stem and root. (5Hrs)

Definition, classification and function of plant tissues. (3Hrs)

UNIT-II

Microscopy: Study of Plant cell and its components, various tools used in microscopy (microscopes, micrometers, camera lucida, microphotography), Details of mountants, clearing agents, chemo-microscopic reagents. (4 Hrs)

Microscopic difference between Monocot and Dicot leaf, stem and root. (3 Hrs)

Sources of Drugs: Biological, marine, mineral and plant tissue culture as source of drugs. (3 Hrs)

UNIT-III

Classification of Drugs: Alphabetical, morphological, taxonomical, chemical and pharmacological classification of crude drugs. (3 Hrs)

Cultivation, Collection, Processing and Storage of Crude Drugs: Factors influencing cultivation of medicinal plants. Pest management and natural pest control agents. Plant hormones and their applications. Polyploidy, mutation and hybridization with reference to medicinal plants. (7Hrs)

UNIT-IV

Plant Taxonomy: Study of the following families of plants, with examples of medicinally or economically important plants, Apocynaceae (Vinca, Kurchi) Solanaceae (Datura, Withania), Rutaceae (Orange peel, Lemon peel) Umbellifereae (Coriander, Fennel), Liliaceae (Aloevera, Lahsun), Zingiberaceae (Curcuma, Ginger). (10 hrs)



Text Book:

1. Indian Herbal Pharmacopoeia. Vol. I & II. New Delhi: ICMR & RRL.
2. Quality Standards of Indian Medicinal Plants. New Delhi: ICMR.

Reference Book

1. Trease GE, Evans WC. Pharmacognosy. UK: Baillier & Tindall.
2. Wallis TE. Analytical Microscopy. London: J and A Churchill Ltd.
3. Handa SS and K. K. Kapoor,, Textbook of Pharmacognosy, New Delhi, Vallabh Prakashan.
4. Medicinal Plants of India. New Delhi: ICMR



BP - 205: MATHEMATICS & BIOSTATISTICS

L T P Credits

3 0 0 3

Sessional: 40 Marks

Exam: 60 Marks

Total: 100 Marks

Duration of exam: 3 Hrs

Note: The paper setter will set two questions from each Section/Unit and one question (Q. No. 9) covering all Sections/Units which is compulsory and of short answer type of one mark each. A candidate is required to attempt 5 questions selecting one question from each section. All questions carry equal marks.

UNIT-I

Matrices: Matrices, Types of matrices, Addition of matrices, Subtraction and multiplication of matrices, Transpose of matrix, Adjoint of matrix, Inverse of matrix, Unit matrix, solution of systems of linear equations by matrix method. **(4 Hrs)**

Functions, Limit and Continuity: Type of functions, domain and range of a function, limit of a function, properties of limits, evaluation of limit of a function, continuity of a function at a point, Types of Discontinuity. **(5 Hrs)**

UNIT-II

Differentiation: Definition of Derivatives, formation of Derivatives, Law of derivatives, Delta method, chain rule, repeated derivatives, derivative of implicit functions and explicit functions. **(5Hrs)**

Biometrics: Data collection, Random and non-random sampling methods, significant digits and rounding of numbers; Measures of central tendency (mean, mode, median), Histograms. **(5Hrs)**

UNIT-III

Measures of Dispersion: Methods of studying variation (range, quadratic deviation, mean deviation, standard deviation), Coefficient of variation, confidence limits. **(5Hrs)**

Measurement of Skewness: Karl Pearson's coefficient of skewness, Bowley's coefficient of skewness, Kelly's coefficient of skewness. **(6 Hrs)**

UNIT-IV

Correlation Analysis: Types of correlation, Methods of studying correlation. **(2 Hrs)**

Regression Analysis: Regression lines, regression equations. **(2 Hrs)**



Test of Hypothesis: Setting of hypotheses (test for successes) Test for hypothesis, standard error and sampling distribution estimation, test of significance for large and small samples. Chi square test, t-test, F- test and analysis of variance. **(6 Hrs)**

Text Book

1. Gupta SP. Statistical Methods. New Delhi: Sultan Publications.
2. Walia R. "Spectrum; Statistical Analysis Methods". Sharma Publication, Jalandhar Punjab.

Reference Book

1. Bolton S. Pharmaceutical Statistics: Practical and Clinical Applications. New York: Informa Healthcare.
2. Meier PC, Zund RE. Statistical Methods in Analytical Chemistry. Wiley-Interscience.
3. Sundar Rao PSS, Richard J. An Introduction to Biostatistics: A Manual for Students in Health Sciences. New Delhi: Prentice-Hall.



HS - 103: DISASTER MANAGEMENT

L T P Credits

2 0 0 -

Sessional: 40 Marks

Exam: 60 Marks

Total: 100 Marks

Duration of exam: 3 Hrs

Note: The paper setter will set two questions from each Section/Unit and one question (Q. No. 9) covering all Sections/Units which is compulsory and of short answer type of one mark each. A candidate is required to attempt 5 questions selecting one question from each section. All questions carry equal marks.

UNIT I

Introduction: Principles of Disaster Management. Natural Disasters such as Earthquake, Floods, Fire, Landslides, Tornado, Cyclones, Tsunamis, Nuclear, Chemical. Assessment of Disaster Vulnerability of a location and vulnerable groups, National policy on disaster Management. (6 Hrs)

UNIT II

Prevention, Preparedness and Mitigation measures for various Disasters, Post Disaster Relief & Logistics Management, Emergency Support Functions and their coordination mechanism, Resource & Material Management, Management of Relief Camp, Information systems & decision making tools. (6 Hrs)

UNIT III

Renewable and non-renewable resources, Role of individual in conservation of natural resources for sustainable life styles. Use and over exploitation of Forest resources, Deforestation, Timber extraction, Mining, Dams and their effects on forest and tribal people. (6 Hrs)

UNIT IV

Global Environmental crisis, Current global environment issues, Global Warming, Greenhouse Effect, role of Carbon Dioxide and Methane, Ozone Problem, CFC's and Alternatives, Causes of Climate Change Energy Use: Past, present and future, Role of Engineers. (6 Hrs)

TEXT BOOKS:

1. Disaster Management By G. K. Ghosh A. P. H. Publishing Corporation.
2. Environmental Studies, R Rajgopalan, Oxford University Press



REFERENCE BOOKS:

1. Disaster Management By B Narayan A. P. H. Publishing Corporation.
2. Environmental Studies, Basak, Pearson Publication.
3. Satish M. Citizen's guide to disaster management. New Delhi: Macmillan Publishers.
4. Duggal KN. Elements of public health engineering. New Delhi: S Chand & Co.
5. Trivedi RK, Goel PK. Introduction to air pollution. Hyderabad: BS Publications.
6. Rao CS. Environmental pollution control engineering. New Delhi: Wiley Eastern.



BP 211 - Pharmaceutical Chemistry-II Laboratory

L T P Credits

0 0 4 2

Sessional: 25 Marks

Exam: 25 Marks

Total: 50 Marks

Duration of exam: 3 Hrs

Laboratory examination will consist of three parts:

- d. Performing practicals assigned by the examiner
- e. Viva-voce examination
- f. Writing synopsis regarding principles / theory behind the experiments

Viva-voce examination will be related to the practicals performed / project undertaken by the candidate related to the subject during the semester. Following is the suggested list of experiments out of which 8-10 experiments must be performed by the candidate during the semester:

List of Experiments (3 Hrs / Week)

1. To carry out the synthesis of Benzoin and calculate its percentage yield and melting point.
2. To carry out the synthesis of Anthraquinone and calculate its percentage yield and melting point.
3. To carry out the synthesis of β - naphthyl benzoate and calculate its percentage yield and melting point.
4. To carry out the synthesis of Benzyl alcohol and Benzoic acid and calculate its percentage yield and melting point.
5. To identify the given organic compound (a carbohydrate).
6. To identify the given organic compound (an aldehyde).
7. To identify the given organic compound (a ketone).
8. To identify the given organic compound (an alcohol).
9. To identify the given organic compound (an amine).
10. To identify the given organic compound (a phenol).



BP-212: PHYSICAL PHARMACY- I LABORATORY

L T P Credits

0 0 3 1

Sessional: 25 Marks

Exam: 25 Marks

Total: 50 Marks

Duration of exam: 3 Hrs

Laboratory examination will consist of three parts:

- a. Performing practicals assigned by the examiner
- b. Viva-voce examination
- c. Writing synopsis regarding principles / theory behind the experiments

Viva-voce examination will be related to the practicals performed / project undertaken by the candidate related to the subject during the semester. Following is the suggested list of experiments out of which 8-10 experiments must be performed by the candidate during the semester:

List of Experiments (3 Hrs/ Week)

1. Determination surface tension of liquid by drop weight method
2. Determination of viscosity of liquids using Ostwald's viscometer.
3. To prepare various concentrations of acetate buffer and compare theoretical pH values (using Henderson Hasselbalch equation) with experimental values (using pH meter).
4. To determine the solubility of benzoic acid at different temperature and report molar heat of fusion.
5. To determine solubilities of three liquids co-existing together (Co-solvency Effect).
6. Determination of refractive index of liquid and also to study the variation of refractive index with the variation in the composition of a binary mix (Benzene in carbon tetra chloride)
7. Determination of specific rotation of a given sugar solution and also report the percent w/v composition of given solution using polarimeter.
8. Determination of partition coefficient of benzoic acid between benzene and water
9. Determination of shelf life using accelerated stability studies
10. Determination of rate constant for first order reactions.
11. Determination of rate constant for second order reactions
12. Determination of Critical solution temperature of Phenol water system and to determine effect of addition of electrolyte on CST of phenol- water system.



BP 213 Anatomy, Physiology and Pathophysiology - II Laboratory

L T P Credits

0 0 3 1

Sessional: 25 Marks

Exam: 25 Marks

Total: 50 Marks

Duration of exam: 3 Hrs

Laboratory examination will consist of three parts:

- a. Performing practicals assigned by the examiner
- b. Viva-voce examination
- c. Writing synopsis regarding principles / theory behind the experiments

Viva-voce examination will be related to the practicals performed / project undertaken by the candidate related to the subject during the semester. Following is the suggested list of experiments out of which 8-10 experiments must be performed by the candidate during the semester:

List of Experiments (3 Hrs / Week)

1. To carry out physical examination of urine sample
2. To carry out qualitative analysis of urine sample for the normal constituents.
3. To carry out qualitative analysis of urine sample for the abnormal constituents
4. To study the anatomy and physiology of human digestive system
5. To study the anatomy and physiology of human central nervous system
6. To study the anatomy and physiology of human urinary system
7. To study the anatomy and physiology of human reproductive system
8. To study the anatomy and physiology of human endocrine system
9. To study the Histology of various normal and abnormal tissue
10. To determine the vital capacity of human body by using spirometer



BP- 214: PHARMACOGNOSY - I LABORATORY

L T P Credits

0 0 2 1

Sessional: 25 Marks

Exam: 25 Marks

Total: 50 Marks

Duration of exam: 3 Hrs

Laboratory examination will consist of three parts:

- d. Performing practicals assigned by the examiner
- e. Viva-voce examination
- f. Writing synopsis regarding principles / theory behind the experiments

Viva-voce examination will be related to the practicals performed / project undertaken by the candidate related to the subject during the semester. Following is the suggested list of experiments out of which 8-10 experiments must be performed by the candidate during the semester:

List of Experiments (2 Hrs/ Week)

1. Types, care and use of microscopes.
2. To study microscopy of Monocot and Dicot Stem.
3. To study microscopy of Monocot and Dicot Leaf.
4. To study microscopy of Monocot and Dicot Root.
5. To study the various parts of flower.
6. Microscopic measurements of Starch grains.
7. Microscopic measurements of Phloem fibre.
8. To perform Quantitative microscopy (lycopodium spore method).
9. To Study Morphological characteristics of following plant families mentioned in theory:
 1. Coriander and fennel
 2. Vinca and Kurchi
 3. Lahsun and aloe
 4. Orange peel and lemon peel
 5. Curcuma and ginger
10. Determination of leaf constants such as stomatal index and stomatal number.
11. Determination of leaf constants such as s vein-islet number and vein-termination number.

