RULES AND REGULATIONS FOR B. PHARMACY COURSE  
(EFFECTIVE FROM ACADEMIC YEAR 2009 - 2010)

SCHEME OF INSTRUCTION AND EXAMINATION FOR  
B. PHARMACY I YEAR  
(Effective for the Batch admitted during the Academic Year 2009-10)

<table>
<thead>
<tr>
<th>Course No</th>
<th>Subject</th>
<th>Periods / week</th>
<th>Sess. Marks</th>
<th>Univ. Exam. Marks</th>
<th>Duration of Exam (HRS)</th>
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</thead>
<tbody>
<tr>
<td>PYT.1.101</td>
<td>Anatomy, Physiology and Health Education</td>
<td>3 Th. --</td>
<td>30</td>
<td>70</td>
<td>3</td>
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<tr>
<td>PYT.1.102</td>
<td>Pharmaceutical Inorganic Chemistry</td>
<td>3 --</td>
<td>30</td>
<td>70</td>
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<tr>
<td>PYT.1.103</td>
<td>Pharmaceutics-I (General and Dispensing Pharmacy)</td>
<td>3 --</td>
<td>30</td>
<td>70</td>
<td>3</td>
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<tr>
<td>PYT.1.104</td>
<td>Mathematics / Biology</td>
<td>4/4 Th. --</td>
<td>30</td>
<td>70</td>
<td>3</td>
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<tr>
<td>PYT.1.105</td>
<td>Basic Computer Applications</td>
<td>3 --</td>
<td>30</td>
<td>70</td>
<td>3</td>
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<tr>
<td>PYP.1.106</td>
<td>Anatomy, Physiology and Health Education Practicals</td>
<td>-- 3</td>
<td>25</td>
<td>50</td>
<td>4</td>
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<tr>
<td>PYP.1.107</td>
<td>Ph. Inorganic Chemistry Lab</td>
<td>-- 3</td>
<td>25</td>
<td>50</td>
<td>4</td>
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<td>PYP.1.108</td>
<td>Pharmaceutics-I (General &amp; Dispensing Pharmacy) Lab</td>
<td>-- 3</td>
<td>25</td>
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<td>4</td>
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<tr>
<td>PYP.1.109</td>
<td>Biology Lab</td>
<td>-- 3</td>
<td>25</td>
<td>50</td>
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</tr>
<tr>
<td>PYP.1.110</td>
<td>Computer Lab (Basic Comp. Applications)</td>
<td>-- 3</td>
<td>25</td>
<td>50</td>
<td>4</td>
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Unit – I
**Introduction:** Anatomical terms in relation to parts of the body, system and organs. Elementary knowledge of the human skeleton; Tissues of the body – properties and functions of epithelial, connective, muscular, nervous and osteous (bone) tissues; General principles of membrane permeability, diffusion, transport, membrane potentials and action potentials.

Unit – II
**Nervous Systems:** Neuron, Synapses, ganglion, plexus, physiology of nerve impulse, neurotransmission, reflex arc, central nervous system (parts and functions) and autonomic nervous system.

**Cardiovascular System and Blood:** Heart, blood vessels, cardiac cycle, circulation, blood pressure and its regulations. Blood (composition and function).

Unit – III
**Respiratory System:** Gross anatomy of respiratory passages, physiology of respiration, nervous control of respiration, vital capacity, respiratory volume, introduction to terms such as anoxia, hypoxia & dyspnoea.

**Digestive System:** Gross anatomy of alimentary canal, movements of alimentary canal, gastric secretions and the enzymes involved in digestion.

**Endocrine System:** Mechanisms of hormonal secretion, Physiological considerations of thyroid, pancreas, pituitary, parathyroid, adrenal glands & gonads; Disorders of hypo & hyper secretion.

Unit – IV
**Urinogential System:** Various parts, structure and functions of the kidney and urinary tract. Physiology of urine formation, output and factors controlling it.

**Physiology of Special Senses:** basic anatomy and physiology of the eye (vision), ear (hearing), taste buds (Tongue), nose (smell) and skin (touch and pain).

Unit – V
Health Education (Epidemiology) and Family Planning.
Elementary pathology – Diseased and pathological processes.
Inflammation and repair, Retrograde changes including disturbances of metabolism, circulation like haemorrhage, thrombosis and growth including various tumors (Neoplasms).
Embolism, infarction, Oedema and shock. Nutritional disorder (Vitamin deficiency)

**Examination:** One question from each unit with internal choice.

**Text Books**
1. Principles of anatomy and physiology by Tortora G.J., and N.P. Anagnokokos,

**Reference Books**
1. Human Physiology by C.C. Chatterjee, Medical Allied Agency, India.
2. Text Book of Medicinal Physiology by A.C. Guyton, W.B. Prism Books Pvt. Ltd.,
Unit – I
a) Classification of Inorganic Pharmaceuticals based on their applications, therapeutic classes with example and uses.
b) Quality control and tests for purity, qualitative tests for anions and cations.
c) Limit test for Arsenic, heavy metals, Mercury, lead, iron, chloride and Sulphate and Pharmacopoeial Standards.
Note: following units all the compounds are of IP except which are mentioned as BP.

Unit – II
**Definition, Preparation, Properties, Assay methods, Limit tests and Uses**

a) **Gastro – intestinal agents:**
   (i) Acidifiers and Antacids: IP: Dilute hydrochloric acid, sodium acid phosphate, sodium bicarbonate, sodium citrate, Potassium citrate, Aluminium hydroxide gel, Dried Aluminum hydroxide gel, Magnesium oxide (Magnesia), Magnesium-hydroxide mixture, Magnesium carbonate, Magnesium trisilicate, Calcium carbonate.
   (ii) Adsorbents and Related Drugs: Light kaolin, Heavy kaolin, Activated charcoal.
   (iii) Laxatives: Magnesium Sulphate and sodium phosphate.

b) **Electrolytes:** Sodium, Potassium and Calcium replenishers.
   (i) Sodium and Potassium replenishers: Sodium chloride (compound, injection and Ringer solution), Sodium chloride and dextrose injection, Potassium chloride and oral electrolytes.
   (ii) Calcium Replenishers: Calcium chloride, Calcium gluconate, Dibasic calcium phosphate.

(c) **Acid base Regulators:** Sodium bicarbonate, sodium lactate injection, sodium citrate / Potassium citrate, sodium acetate, Ammonium chloride, Ammonium chloride injection.

(d) **Dialysis fluids:** Haemodialysis fluids and intraperitoneal dialysis fluids.

Unit – III
**Definition, Preparation, Properties, Assay methods, Limit tests and Uses**

(a) **Mineral Nutrients:**
   i. Haematinics: Ferrous Sulphate, Ferrous fumarate, Ferrous gluconate, Ferric ammonium citrate, iron and dextrose injection.
   ii. Metallics: Copper, Manganese and Zinc compounds (zinc chloride);
   iii. Phosphates: Sodium acid phosphate and Sodium phosphate,
   iv. Halogens: Iodine and Iodides or fluorides.

(b) **Pharmaceutical aids:**
   i. Adsorbents & Absorbents: Activated charcoal, aluminium sulphate, aluminium phosphate.
   ii. Antioxidants: Sodium Sulphite, sodium bisulphate and sodium metabisulphite.
   iii. Desiccants: Silica gel.
   iv. Excipients: Dicalcium & Tricalcium Phosphate, Magnesium stearate, Talc & ppted chalk.
   v. Suspending agents: Bentonite, colloidal silica, aluminium stearate,.
   vi. Colourants: Titanium oxide, ferric oxide
   vii. Solvent and Vehicle: Purified water
Unit – IV

**Definition, Preparation, Properties, Assay methods, Limit tests and Uses**

i. **Expectorants**: Ammonium chloride, Potassium Iodide.

ii. **Emetics**: Potassium antimony tartarate, copper Sulphate, Zinc Sulphate.

iii. **Antidotes**: Sodium thiosulphate, sodium thiosulphate injection, sodium nitrite.

iv. **Inhalants**: Oxygen, Nitrous oxide, dilute solution of ammonia (BP), Ammonium carbonate (BP).

Unit – V

**Definition, Preparation, Properties, Assay methods, Limit tests and Uses**

(a) **Topical agents:**

i. Astringents: ZnSO₄, Zinc Oxide, Calcium Hydroxide, CuSO₄, and Bismuth subcarbonate.

ii. Topical protectants: Zinc oxide, Calamine, Zinc stearate, Talc, Titanium-dioxide, Heavy kaolin and Light kaolin.

iii. Silicone polymers: Activated Dimethicone.


(b) **Dental products:**

i. Fluorides: Sodium fluoride, Sodium Monofluorophosphate and stannous fluoride.

ii. Oral anti septics and Astringents: Hydrogen peroxide, Sodium peroxide (BP), Magnesium peroxide, Zinc peroxide and Mouth washes.

iii. Dentifrices: Calcium carbonate, dibasic calcium phosphate, calcium phosphate, sodium metaphosphate and strontium chloride.


(c) **Other Medicinal agents:**

i. Internal parasiticides: Sodium Antimony Gluconate

ii. Anti-neoplastic agents: Cisplatin.

iii. Sedative-hypnotics: Potassium bromide.

iv. Anti-depressants: Lithium carbonate.

v. Anti-rheumatic agents: Sodium aurothiomalate.

vi. Anti-thyroid agents: Potassium perchlorate.


**Examination**: One question from each unit with internal choice.

**Text Books**


**Reference Books**

1. Pharmacopoeia; (Indian, British, US and European)


PHARMACEUTICS – I
(GENERAL & DISPENSING PHARMACY)

Subject Code : PYT.1.103            Sessional : 30
Periods / Week: 3             Examination : 70
Nature of Exam: Theory     Exam Duration: 3 Hrs

Unit – I
Pharmacy profession: Pharmacy as a career, Pharmaceutical Education, Registration as a Pharmacist, Brief introduction to Evolution of Pharmacy, European and American Pharmacy. Pharmacopoeia (IP, BP, USP and International) and other sources, SI and imperial systems, inter conversions. Weighing - selection and care of weights and balances. Sensitivity and minimum weighable quantities.

Pharmaceutical calculations: Calculations of doses, enlarging and reducing recipes; Percentage solutions, alligation, alcohol dilutes and proof spirit.

Unit – II
Prescription: Definition, Parts, sources of errors and care required in dispensing prescriptions, General Dispensing procedures, types of dispensing products. Dispensing of proprietary medicine. Prescription containers, closures and labeling of dispensed products, colors, flavors and sweeteners used in prescription.

Dosage form: Definition, Advantages and limitations of dosage form.

Principles involved and procedures adopted in preparation, labeling and dispensing of typical products (Unit III-IV). Uses of official and other products in common use.

Unit – III
Liquid preparation: Aromatic waters, spirits, solutions, mixtures, syrups, elixirs, suspension, emulsion, lotions, liniments, eye, ear and nasal drops, inhalations, throat paints, gargles, glycerin and collodions.

Unit – IV
Semisolids: Ointments and their bases, creams, jellies, suppositories and their bases, effervescent granules, tablet triturates, pastilles, lozenges and pills.

Incompatibilities: Physical, Chemical and Therapeutic incompatibilities. Methods of overcoming and handling of incompatible prescriptions.

Unit – V
Tinctures and Extracts: Methods of preparation and uses of Tinctures & Extracts official in IP.

Medicinal Gases: Official medical gases and uses, containers and fitting, handling and storage.

Radio Pharmaceuticals: Preparation, Therapeutic and Diagnostic uses.

Examination : One question from each unit with internal choice.

Text Books
2. Cooper & Gunn’s dispensing for Pharmaceutical students, Carter CBS Publishers, Delhi.

Reference Books
BIOLOGY

Subject Code : PYT.1.104           Sessional : 30
Periods / Week: 4              Examination : 70
Nature of Exam: Theory      Exam Duration: 3 Hrs

Unit – I
Plant Kingdom: Definition and Classification
Plant cells: Its structure, living and non-living inclusions. Different types of plant tissues and their functions, Mitosis and Meiosis.
Morphology and Histology: Roots, Stems, Barks, Woods, Leaf, Flower, Fruit and Seed.
Modification: Root, Stem, Leaf and Infloresence.

Unit – II
Plant Taxonomy: Classification, study of the following families with special references to medicinal and economical important plants
a) Apocynaceae b) Solanaceae c) Umbelliferae
d) Leguminosae e) Scrophulariaceae f) Rubiaceae

Unit – III
Plant Physiology: Absorption, transpiration, respiration photosynthesis, basis in DNA replication.
Genetic code and Heredity: Polyploidy, hybridization and mutation.

Unit – IV
The study of animal cell: Animal tissue and cell division, difference between plant cell and animal cell, study of different systems of frog. Histology of liver, kidney, skeletal muscles, smooth muscles, pancrease, intestine and endocrine glands of rabbit.

Unit – V
Morphology and Life History of Human Parasites: Plasmodium, Entamoeba, tapewarm, ascaris, leishmania, anchylostoma and trypanosoma. Life history of Mosquitoes and housefly as agents for spreading diseases.

Examination : One question from each unit with internal choice.

Text books

1. A text book of botany, by A.C. Dutta
2. A text book of biology by Vikram series
Unit – I
Logarithms: Logarithm of a real number to an arbitrary base, Napierian Base - Theorems on Logarithms - Use of Tables.
Trigonometry: Measurement of angles, Trigonometrical ratios and simple relations connecting the complimentary and supplementary angles, Negative angles sum and difference of two angles, sine and cosine formulae for multiple angles and half angles.

Unit – II
Differential Calculus: Functions, Limits, Differential coefficient rules, Differentiation of a sum, product and quotient of functions, Differentiation from first principles, Differentiation of implicit, Geometrical, composite and inverse functions, Partial Differentiation, Maxima and Minima.

Unit – III
Integral Calculus: Integration considered as converse of differentiation, simple integrations, standard forms like $x \, dx$, $\sin (a \, x) \, dx$, $\cos (a \, x) \, dx$, $\sec (a \, x) \, dx$ etc. Methods of substitution, simple example integration by parts. Integration of rational, irrational, trigonometrical functions. Calculations of areas of standard bodies using integration.

Unit – IV
Matrices: Matrices, basic definitions, matrix operations, transpose, adjoint, rank, inverse of a matrix, solution of linear systems of equations, matrix inversion, Gaussian elimination.

Unit – V
Biomathematics: Basic Mathematical Principles that are commonly used in Biological testing, integers, linear and non-linear graphs; 2d Coordinate geometry, Equation of line, circle.

Examination: One question from each unit with internal choice.

Text Books

Reference Book
BASIC COMPUTER APPLICATIONS

Subject Code: PYT.1.105           Sessional: 30
Periods/Week: 3                  Examination: 70
Nature of Exam: Theory           Exam Duration: 3 Hrs

Unit – I  Computer Concepts
Evolution, Basic structure and Characteristics of computers; Types of memory chips; Study of various input-output devices like magnetic tapes, magnetic discs, MICR, OCR, CDROMS etc., Types of printers; Principles of flow charting; Importance of operating systems, detailed study of the operating systems MSDOS, UNIX and WINDOWS; Computer Viruses;

Unit – II Programming In 'C' Language
Operators, Expressions, Data input, Output, Control statements like - (IF-ELSE, WHILE DO, FOR, BREAK AND CONTINUE and GOTO) Functions, Library functions, Arrays.

Unit – III Introduction to Ms-Office (Word & Excel)
MS-Word: Basics, working with files, working with text, formatting paragraphs, styles, lists, tables, Graphics, spellings and grammar and page formatting macros, table of contents.
MS-Excel: Basics, Spreadsheets, data types, formulas, Formatting, charts, graphs.

Unit – IV  Introduction to Ms-Office (Power Point & Access)
MS-Power Point: Power point basics, Views, Slide control, Apply design, Page setup, Templates, Background, Control, Color Screens, Transitions and animations, working with texts and working with graphics.
MS-Access: Data base concepts, Screen layouts, Creating tables, Data sheet records, table relationship, Sorting and filtering, Queries, forms, form controls, Sub forms, reports, importing, exporting, linking.

Unit – V  Information Infrastructure
Internet and World Wide Web (WWW): Structure and Organization of the WWW, Browsers, Information search in WWW, search engines, Pharmaceutical resources in WWW Types of indexing tools & search strategies; Hyper Text Manuscript Language (HTML) and E-Mail.
Introduction to Structured Query Language (SQL): Overview of SQL Reserved Words; SQL Commands, Comparison for Access and SQL Server; Chemical Database Design & their Tools

Examination: One question from each unit with internal choice.

Text Books
1. Fundamentals of Computers by P.K. Sinha
2. Let Us C by Yashvanth Kanetkar
3. Working in Microsoft Office By Ron Mansfield
4. SQL, PL/SQL The Programming Language of Oracle by Ivan Bayross

Reference Books
1. Programming with ‘C’ by Byron Golftield- Schum series
2. Computer programming in ‘C’ by Y. Raja Raman
List of Experiments

1. Study of histological slides of different tissues / organs
2. Study of various models, specimens of bones / organs
3. Hematology - blood grouping
4. Hemoglobin content estimation
5. Estimation of bleeding time
6. Estimation of clotting time
7. Determination of RBC count
8. Determination of total WBC count
9. Measurement of blood pressure
10. Measurement of vital capacity
11. Estimation of ESR

Reference Books

PHARMACEUTICAL INORGANIC CHEMISTRY

Subject Code: PYP.1.107             Sessional : 25
Periods / Week: 3              Examination : 50
Nature of Examination: Practical       Exam Duration: 4 Hrs

List of Experiments

1. Systematic quantitative analysis for inorganic mixtures upto 4 radicals preferably by semi-micro methods.
2. Pharmacopoeial limit test for Chlorides
4. Pharmacopoeial limit test for lead.
5. Pharmacopoeial limit test for iron.
6. Preparation and purification of Boric acid
7. Preparation and purification of sodium citrate
8. Preparation and purification of potash alum.
9. Preparation and purification of yellow mercuric oxide
10. Preparation and purification of Ammoniated Mercury

Reference Books

5. Indian Pharmacopoeia, Controller of Publications, Delhi. 1996.
PHARMACEUTICS – I
(GENERAL & DISPENSING PHARMACY)

Subject Code: PYP.1.108  Sessional : 25
Periods / Week: 3  Examination : 50
Nature of Examination: Practical  Exam Duration: 4 Hrs

List of Experiments

1. Dispensing Procedures involving pharmaceutical calculation, dosage calculations for pediatric and geriatric patients
2. Incompatibility studies in few simple dosage forms.
3. Preparation of Aromatic waters
4. Preparation of spirits
5. Preparation of different types of iodine solution
6. Preparation of cresol soap solution
7. Preparation of compound Sulphur & Calamine lotion
8. Preparation of turpentine liniment
9. Preparation of gargles and throat paint
10. Preparation of sulphur ointment
11. Preparation simple ointment
12. Preparation of whitfield ointment
13. Preparation of non staining iodine ointment
14. Preparation of creams & pastes
15. Preparation of any glycerogelatine based suppository
16. Preparation of Tragacanth jelly
17. Preparation of effervescent granules
18. Preparation of simple syrup
19. Preparation of ear / eye drops

Reference Books

2. R.S Gaud and G.D Gupta, Practical Pharmaceutics,

BIOLOGY

Subject Code: PYP.1.109  Sessional : 25
Periods / Week: 3  Examination : 50
Nature of Examination: Practical  Exam Duration: 4 Hrs
List of Experiments

1. Study of plant parts and their modification
2. Study of representative of families – Apocynaceae, Solanaceae, Umbelliferae, Rubiaceae
3. Histology of following crude drugs – Cinchona, Clove, Coriander, Linseed
4. Histological study of different organs through permanent slides
5. Study of various tissues through permanent slides
6. Study of digestive system of frog
7. Study of arterial and venous system of frog
8. Study of male urinogenital system of frog
9. Study of female urinogenital system of frog
10. Study of renal portal system of frog
11. Study of skeletal system of frog
12. Study of spinal nerves system of frog

Reference Books


BASIC COMPUTER APPLICATIONS

Subject Code: PYP.1.110       Sessional : 25
Periods / Week: 3       Examination : 50
Nature of Examination: Practical       Exam Duration: 4 Hrs

LIST OF EXPERIMENTS:

01. Exercised Based on Dos commands
02. Programming in “C” Language.
03. Exercises on MS-Office.
04. Exercises based MS word
05. Exercises based on MS Excel
06. Exercises based on MS Access and Power Point.
07. Programming in SQL

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