OSMANIA UNIVERSITY
FACULTY OF PHARMACY
SCHEME OF INSTRUCTION, EXAMINATION AND EVALUATION
Effective for Batches Admitted from 2016 – 17 Academic Year Onwards As per CBCS
Program Code: 881 **B. Pharmacy First Year (I & II Semesters)**

SEMESTER - I

Course Code	Description	Course Title	Hours/ Week			Credits	Credits		Duration of exam
			L	T	P		-	End exam	
PY.05.881.1.1.T	PS, CORE	Pharmaceutical Inorganic Chemistry	4	0	-	4	30	70	3
PY.05.881.1.2.T	BS, FC	Basic Computer Applications-I	3	0	-	3	30	70	3
PY.05.881.1.3.T	PS, CORE	General Pharmacy	4	0	-	4	30	70	3
PY.05.881.1.4.T	BS, FC	Human Anatomy and Physiology-I	3	0	0	3	30	70	3
PY.05.881.1.5.T	BS, FC	Mathematics / Biology	4	0	0	4	30	70	3
PY.05.881.1.6.P	PS, CORE	Pharmaceutical Inorganic Chemistry-Practical	0	0	4	2	30	70	4
PY.05.881.1.7.P	BS, FC	Basic Computer Applications-I-Practical	0	0	4	2	30	70	4
PY.05.881.1.8.P.	BS, FC	Human Anatomy and Physiology-Practical	0	0	4	2	30	70	4
			18	0	12	24	240	560	

SEMESTER - II

Course Code	Description	Course Title	Hours/ Week			Credits	Credits		Duration of exam
			L	T	P		-	End exam	
PY.05.881.2.1.T	PS, CORE	Pharmaceutical organic Chemistry-I	4	0	-	4	30	70	3
PY.05.881.2.2.T	PS, CORE	Introduction to Dosage Forms	4	0	-	4	30	70	3
PY.05.881.2.3.T	PS, CORE	Human Anatomy and Physiology-II	4	0	-	4	30	70	3
PY.05.881.2.4.T	BS, FC	Basic computer Applications-II	3	0	0	3	30	70	3
PY.05.881.2.5.T	BS, FC	Communicative English	3	0	0	3	30	70	3
PY.05.881.2.6.P	PS, CORE	Pharmaceutical Organic chemistry-I-Practical	0	0	4	2	30	70	4
PY.05.881.2.7.P	BS, FC	Introduction to Dosage Forms-Practical	0	0	4	2	30	70	4
PY.05.881.2.8.P.	BS, FC	Basic Computer Applications-II and English Language Practical	0	0	4	2	30	70	4
			18	0	12	24	240	560	

Note: Marks are converted into Grade Points and Total is calculated for SGPA on a 10 Point Scale

PHARMACEUTICAL INORGANIC CHEMISTRY

Scheme of Instruction		**Scheme of Examination**	
Total Duration	: 50 hrs	Maximum Marks	: 100
Periods / Week	: 4	Internal Exam	: 30
Credits	: 4	End Semester	: 70
Instruction Mode	: Lecture	Exam Duration	: 3 Hrs
Subject Code	**:** PY.05.881.1.1.T		

Course Objectives

- To impart knowledge on various categories of inorganic medicinal compounds.
- To provide knowledge on significance of various inorganic impurities and methods to test such impurities.
- To make the students aware of Indian Pharmacopoeia and other pharmacopoeias with reference to various inorganic compounds official in those pharmacopoeias.

Course Outcomes

- The students will get the knowledge about various pharmaceutical inorganic compounds with reference to their Pharmaceutical category, method of their quality tests, Assay and uses
- The student gets the knowledge about various inorganic impurities which may enter the pharmaceutical inorganic compounds and their potential hazards.
- The student will become aware of the various pharmacopoeias and how to refer those books.

Unit – I

a) Classification of Inorganic Pharmaceuticals based on their applications, therapeutic classes and uses with examples.
b) Sources of impurities.
c) Limit test for Arsenic, heavy metals, lead, iron, chloride and sulphate.(as per the modified procedure of Indian Pharmacopeia 2014)

Note: Following units all the compounds are of official in Indian Pharmacopoeia.

Unit – II

Definition, Preparation, Properties, tests for purity & Assay of selected compounds(*) and Uses.

a) Gastro – intestinal agents:

(i) Antacids: Aluminum hydroxide gel*, Dried Aluminum hydroxide gel, Magnesium oxide, Magnesium-hydroxide mixture*.
(ii) Laxatives: Magnesium Sulphate.

b) Electrolytes: Sodium, Potassium and Calcium replenishers.

(i) Sodium and Potassium replenishers: Sodium chloride* (Ringer solution), Sodium chloride and dextrose injection, Potassium chloride and oral electrolytes.
(ii) Calcium Replenishers: Calcium gluconate*.

(c) Acid base Regulators: Ammonium chloride*, Potassium citrate.

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

Unit – III

Definition, Preparation, Properties, tests for purity & Assay of selected compounds(*) and Uses.

(a) Mineral Nutrients:

Haematinics: Ferrous Sulphate* Ferric ammonium citrate, Ferrous gluconate.

(b) Pharmaceutical aids:

(i). Adsorbents & Absorbents: Activated charcoal, Aluminium sulphate.

(ii). Antioxidants: Sodium bisulphite and sodium metabisulphite.
(iii). Desiccants: Silica gel.
(iv). Excipients: Magnesium stearate*, Talc.
(v). Suspending agents: Bentonite, colloidal silica.
(vi). Colourants: Titanium oxide, ferric oxide.

Unit – IV

Definition, Preparation, Properties, tests for purity & Assay of selected compounds(*) and Uses.

(a) (i). **Expectorants:** Potassium Iodide*.
(ii). **Emetics: C**opper Sulphate.
(iii). **Antidotes:** Sodium thiosulphate*, sodium nitrite.

(b) Topical agents:

(i). Astringents: Zinc sulphate, Calcium Hydroxide.
(ii). Topical protectants: Zinc oxide, Calamine.
(iii). Silicone polymers: Activated Dimethicone.
(iv). Anti infectives: Potassium permanganate*, Silver nitrate*, Iodine*, Iodine solutions, Povidone – iodine, boric acid*.

Unit – V

Definition, Preparation, Properties, tests for purity & Assay of selected compounds(*) and Uses

(a) Dental products:

(i). Fluorides: Sodium fluoride and stannous fluoride, sodium mono chloro phosphate.
(ii). Oral antiseptics and Astringents: Hydrogen peroxide, zinc peroxide.
(iii).Dentifrices: Calcium carbonate, calcium phosphate.
(iv). Cements and Fillers: Zinc oxide.

(b) Other Medicinal agents:

(i). Anti-thyroid agents: Potassium perchlorate.
(ii). Diagnostic agent: Barium Sulphate*.
(iii). Surgical aid: Plaster of Paris.

Examination: One question from each unit with internal choice.

Text Books

1. Pharmaceutical Chemistry, Inorganic G.R Chatwal volume-I Reprint 2010 , Himalaya publish House, Hyderabad.
2. Bentley & Driver's Text book of Pharmaceutical chemistry Ed: L. M. Atherden, 1983, Oxford University press, Delhi.
3. Pharmaceutical Inorganic chemistry, V. Alagarsamy, 2014, Pharmamed Press, Hyderabad.
4. Inorganic Medicinal & Pharmaceutical chemistry; J. H. Block, F. B. Roche, T.O. Soine, C.V. Wilson, 1986, Varghese publishing house, Bombay.
5. Inorganic Pharmaceutical chemistry; P. Gundu Rao, Vallabh Prakashan 1995, Delhi

Reference Books

1. Pharmacopoeia; (Indian, British, US and European)
2. Martindale: The Extra Pharmacopoeia; 31st Edn, 1996, The Royal Pharmaceutical Society.
3. Remington Pharmaceutical sciences; 20th Edition Lippincott Williams and Wilkins.
4. Hand Book of Pharmacy & Health care Ed: Robin. J. Haiwan 1990, The Pharm Press, UK.

BASIC COMPUTER APPLICATIONS-I

Scheme of Instruction		**Scheme of Examination**	
Total Duration	: 40 hrs	Maximum Marks	: 100
Periods / Week	: 3	Internal Exam	: 30
Credits	: 3	End Semester	: 70
Instruction Mode	: Lecture	Exam Duration	: 3 Hrs
Subject Code	**:** PY.05.881.1.2.T		

Course Objectives

- To Impart the basic knowledge about the concept of computers.
- To make the students to understand and acquire knowledge about various simple computer applications.

Course Outcomes

- The students will get basic concepts on working of a computer.
- The students will get thorough knowledge on simple computer applications like MS word, Excel, and Power Point.
- The student will be able to apply these applications in other subjects also.

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: 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 – III: 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 relation ships, Sorting and filtering, Queries, forms, form controls, Sub forms, reports, importing, exporting, linking.

UNIT – IV: 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; E-Mail.

UNIT – V: INTRODUCTION TO HTML:
Hyper Text Manuscript Language(HTML), Hypertext, Elements(Tags), Structure of HTML, Comments, Document body, Text formatting, Hyperlinks, lists, Tables, Colors, Images, Frames and Forms.

Examination : One question from each unit with internal choice.

Text Books:

1. Fundamentals of Computers by P.K. Sinha 2nd Edn, 1992, BPB Publications, New

Delhi.
2. Working in Microsoft Office By Ron Mansfield,TATA MC Graw Hill Edition, New Delhi.
3. HTML 5 Black Book, Covers CSS 3, JavaScript, XML, XHTML, AJAX, PHP and jQuery by DT Editorial Services, Kogent Learning Solutions Inc, Dreamtech. Press, New Delhi.

GENERAL PHARMACY

Scheme of Instruction		**Scheme of Examination**	
Total Duration	: 50 hrs	Maximum Marks	: 100
Periods / Week	: 4	Internal Exam	: 30
Credits	: 4	End Semester	: 70
Instruction Mode	: Lecture	Exam Duration	: 3 Hrs
Subject Code	**:** PY.05.881.1.3.T		

Course Objectives

- To give a basic understanding and a historical account on starting of pharmacy education in India and other countries.
- To make the students of aware of various pharmacopoeias.
- To make the students understand various types of simple calculations in preparation and dispensing of different types of dosage forms.

Course Outcome

- The students will get an exposure and a comprehensive knowledge on the history of pharmaceutical education.
- The students will become aware of various pharmacopoeias and how to refer those books.
- The student will gain knowledge on various simple calculations involved in the preparation and dispensing of dosage forms and the excipients used.

Unit – I

Pharmacy profession: Pharmacy as a career, Pharmaceutical Education (Courses and affiliating bodies (PCI and AICTE)), Development of Pharmaceutical Industry in India, Brief introduction to Evolution of Pharmacy, European and American Pharmacy. Pharmacopoeia (IP, BP, USP), BPC, Martindale, Merck Index. Pharmacopoeial monograph contents, API and formulation monograph. Explanation of each term.

Unit – II

SI and imperial systems, inter conversions. Weighing - selection and care of weights and balances, sensitivity, minimum weighable quantities and calibration of weights.

Pharmaceutical calculations: Enlarging and reducing recipes; Percentage solutions, alligation, alcohol dilutes, proof spirit, molarity, molality, Normality, millimoles, milliequivalents and isotonic solution.

Unit – III

Posology: Factors influencing dose, Calculations of doses for infants and children based on age, body weight and body surface area.

Prescription: Definition, Parts, sources of errors and care required in handling prescriptions, modern methods of prescribing, Responding to prescription, pricing of prescription.

Unit – IV

Containers and closures: Definition, Ideal properties, Types of containers and closures, Materials used in preparation of containers and closures, labeling: Preparation, Cautionary and advisory labels, modern unit dose packaging (blister, strip, bubble) and storage conditions for medicinal products.

Unit – V

Excipients: Colouring agents, flavouring agents, sweetning agents, antioxidantants, preservatives, diluting agents, vehicles, surfactants, hydrocolloids (with respect to FDA approvals, wherever applicable).

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

1. Bentley's Text book of Pharmaceutics, E.A. Rawlins, 8th Edition, 1996, Bailliere Tindall, London.
2. Cooper & Gunn's dispensing for Pharmaceutical students, S.J.Carter, CBS Publishers, New Delhi.
3. Pharmaceutical Education, Harikishan Singh (History of Pharmacy in India & Related aspects), Volume- II, Vallabh Prakashan, Delhi.
4. A Textbook of professional pharmacy, N. K. Jain, S.N. Sharma, 6th Edition, 2016, Vallabh prakashan, Delhi.
5. R. M. Mehta, Dispensing Pharmacy, 3rd Edition, 2008, Vallabh Prakashan, Delhi.

Reference Books

1. Pharmaceutical dosage forms & Drug delivery systems, H.C. Ansel, 8th Edition. 2008, Lippincott Williams &Wilkins, London.
2. Cooper & Gunn's Tutorial pharmacy, S.J.Carter, CBS Publishers, New Delhi.
3. Dispensing of Medication, Ed. E.W. Martin, Mach Publishing Co., Eastern PA.
4. Lachman Leon, "The Theory and Practice of Industrial Pharmacy, Special Indian 3rd Edition, 2009, Varghese Publishing House, Mumbai.
5. Indian Pharmacopeia (2014), British Pharmacopeia, United States Pharmacopeia & Merck Index.

HUMAN ANATOMY AND PHYSIOLOGY-I

Scheme of Instruction		**Scheme of Examination**	
Total Duration	: 40 hrs	Maximum Marks	: 100
Periods / Week	: 3	Internal Exam	: 30
Credits	: 3	End Semester	: 70
Instruction Mode	: Lecture	Exam Duration	: 3 Hrs
Subject Code	**:** PY.05.881.1.4.T		

Course Objectives

- To impart knowledge and understanding on the anatomy and physiology of various systems of human body.
- To impart the knowledge on the inter relationship of various organs and their functions in the human body.

Course Outcome

- The students will be gaining a thorough understanding on various physiological functions of the organs of human body.
- This knowledge will become the basic foundation for understanding of pharmacology in higher semesters.

Unit-I

Introduction: Scope of anatomy and physiology, basic terminologies (directional terms, plains, sections) and body cavities.

The cell: Definition, structure and functions of the cell and its components, transport of substances across cell membrane.

The Tissues: Definition, Classification, location, description, functions and properties of epithelial, connective, muscular and nervous tissues.

Unit-II

Osseous system: Definition, structure, composition, functions and types of bones. Anatomy of axial and appendicular skeletal system bones. Types and movements of joints.

Skeletal muscles: Gross anatomy of muscle and physiology of muscle contraction. Neuromuscular junction.

Unit-III

Haemopoietic system: Definition, composition and functions of blood. Haemopoiesis, blood groups and haemostasis.

Lymphatic system: Composition, formation, circulation and functions of lymph. Structure and functions of lymph node, spleen and thymus gland.

Unit-IV

Cardiovascular system: Anatomy of heart and blood vessels, conducting system of heart, action potential, cardiac cycle, heart sounds and ECG. Circulation of blood: Pulmonary, systemic coronary and portal circulation; blood pressure and its regulation.

Unit-V

Special senses: Anatomy and physiology of eye, ear, tongue, nose. Structure and functions of skin.

Text Books

1. Thakaore B, Gandhi P, Harit RD. Elements of human anatomy physiology and heath Education, 21st Edition B.S. Shah Publishers, Ahmadabad.
2. Principles of Anatomy and Physiology by Ross & Wilson, 10th Edition 2007, Churchill Living stone Publishers, New York.

Reference Books

1. Human Physiology by C.C. Chatterjee, 11th Edition 1992, Medical Allied Agency, Kolkata,India.
2. Text Book of Medicinal Physiology by A.C. Guyton, W.B. Prism Books Pvt. Ltd.Bangaluru.
3. Principles of anatomy and physiology by Tortora G.J., and S.R.Grabowski, Volume I & II , John Wiley and Sons Inc, Singapore..

MATHEMATICS

Scheme of Instruction		**Scheme of Examination**	
Total Duration	: 50 hrs	Maximum Marks	: 100
Periods / Week	: 4	Internal Exam	: 30
Credits	: 4	End Semester	: 70
Instruction Mode	: Lecture	Exam Duration	: 3 Hrs
Subject Code	**:** PY.05.881.1.5.T		

Course Objectives

- To provide the students with the knowledge on basic mathematical equations and their applications in pharmacy.

Course Outcome

- The students will become aware of various simple mathematical equations and their uses in pharmacy.
- The students will get a hands on practice in solving the problems.

UNIT – I:

Logarithms: Logarithm of a real number to an arbitary base, Napierion Base – Theorems on Logarithms – Use of Tables.

Trigonometry: Measurement of angles, Trigonometrical ratios and simple relations connecting the complimentary and supplementary angles, Negetive 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, Geometrical, Partial Differentiation.

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,. Methods of substitution (simple examples) integration by parts. Calculations of areas of standard bodies using integration.

UNIT – IV:

Matrices: Matrices, basic definitions, matrix operations, transpose, adjoint inverse of a matrix, solution of linear systems of equations.

UNIT – V:

Linear and non-linear graphs; Equation of line.

Differential Equations: Definitions , order, degree of equation , equations in seperable forms, Linear equations.

Examination : One question from each unit with internal choice.

Text Books:

1. A text book of Mathematics by N.Krishna Murthy, S .Chand series, Volume- I and II, 28th Edition 2006, S.Chand Publication, New Delhi.

2. Deferential calculus by Shanti Narayan, S.Chand Publication, New Delhi.

Reference Books:

1. Higher Engineering Mathematics by Grewal 43rd Edition 2014, Khanna Publication, New Delhi.

BIOLOGY

Scheme of Instruction		**Scheme of Examination**	
Total Duration	: 50 hrs	Maximum Marks	: 100
Periods / Week	: 4	Internal Exam	: 30
Credits	: 4	End Semester	: 70
Instruction Mode	: Lecture	Exam Duration	: 3 Hrs
Subject Code	**:** PY.05.881.1.5.T		

Course Objectives

- To provide the student with basic knowledge on classification of plants, morphology and histology of plant parts.
- To provide the student with basic knowledge on animal cell, tissue and organ systems which are related to human systems.

Course Outcome

- The student will get on exposure to basic understanding on plants and and their parts and this knowledge will be useful in understanding the pharmacognosy subject in higher semesters.
- The students will get an exposure and basic understanding on animal cell, tissue and organ systems which will have relation to human system.

Unit – I

Plant kingdom: classification

Plant cells: Its structure, living and non-living inclusions. Different types of plant tissues and their functions.

Histology: root, stem, barks, woods & leaf.

Unit-II

Morphology: root, stem ,leaf, inflorescence, flower and fruit.

Modifications: root, stem & leaf.

Unit – III

Plant Taxonomy: Classification, study of the following families with special references to medicinal and economically important plants: a) Apocynaceae b) Solanaceae c) Umbelliferae d) Leguminosae e) Scrophulariaceae.

Unit – IV

The study of animal cell: Cell division, difference between plant cell and animal cell, 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.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 class book of botany, by A.C. Dutta, 17th Edition 2000, Oxford University, New Kolkatta.
2. A text book of biology by Vikram series
3. Texonomy of Angiosperms by V.K Jain, 2nd Edn. 1992-93, Rastogi Publications. Meerut. India.

Reference books

1. Invertebrate zoology by E.L Jordan & P.S verma, 30the Edition 2002. S.Chand & Company Ltd, New Delhi.
2. Chordate Zoology by E.L Jordan & P.S Varma, 26th Edition 2003. S.Chand & company Ltd. New Delhi.

PHARMACEUTICAL INORGANIC CHEMISTRY - PRACTICAL

Scheme of Instruction		**Scheme of Examination**	
Total Duration	: 48 Hrs	Maximum Marks	: 100
Periods / Week	: 4	Internal Exam	: 30
Credits	: 2	End Semester	: 70
Instruction Mode	: Practical	Exam Duration	: 4 Hrs
Subject Code	**:** PY.05.881.1.6.P		

Course Objectives

- To give a practical training on the preparation and assay of some of the pharmaceutical compounds studied in theory.

Course Outcome

- The students will get hands on experience and knowledge about the methods of preparation and assay of the compounds.

List of Experiments

1. Systematic qualitative analysis for cations /anions (for any two inorganic mixtures)
2. Pharmacopoeial limit test for Chlorides
3. Pharmacopoeial limit test for Sulphates.
4. Pharmacopoeial limit test for iron.
5. Preparation of Boric acid.
6. Preparation of Sodium citrate.
7. Preparation of Potash alum.
8. Preparation of Ferrous sulphate.
9. Preparation of Ammonium chloride.

Reference Books

1. A.H Beckett and J.B Stenlake, **Practical Pharmaceutical Chemistry**, 4th Edition, CBS Publications, New Delhi, 2004.
2. G Svehla, **Vogel's Qualitative Inorganic Analysis**, 7th Edition, Pearson Education, New Delhi, 2003.
3. B. Subba Rao and V. Alagarsamy, **Practical Pharmaceutical Inorganic Chemistry,** Pharma med Press, 2009, Hyderabad.
4. G. Devala Rao, **Practical Pharmaceutical Inorganic Chemistry**, Birla Publications, New Delhi, 2006.
5. K. R. Mahadik and S.H Bhosale, **Hand book of Practical Chemistry (Inorganic & Organic)**, Nirali Prakashan, Pune, 2007.
6. **Indian Pharmacopoeia-2014**, Controller of Publications, Delhi.

BASIC COMPUTER APPLICATIONS -I PRACTICAL

Scheme of Instruction		**Scheme of Examination**	
Total Duration	: 48 Hrs	Maximum Marks	: 100
Periods / Week	: 4	Internal Exam	: 30
Credits	: 2	End Semester	: 70
Instruction Mode	: Practical	Exam Duration	: 4 Hrs
Subject Code	**:** PY.05.881.1.7.P		

Course Objectives

- To provide hands on practice on working on the computer system for various kinds applications studied in theory

Course Outcomes

- The students will gain hands on experience on the computer system for various kinds applications studied in theory
- The students will gain hands on experience on the computer system for writing simple programs.
-

List of Experiments

A minimum of 25 exercises are to be conducted, as per the list given below.

1. Exercised Based on DOS commands (6)
2. Exercises based MS Word (3)
3. Exercises based on MS Excel (3)
4. Exercises based on MS Access (2)
5. Exercises based on Power Point. (2)
6. Exercises based on Information search engines,
7. Exercises based on HTML

Reference Books

1. Sanjay Saxena, **A First Course Computers**, Vikas Publishing House Pvt Ltd, New Delhi, 2003.
2. Sanjay Saxena, **MS Office 2000 for Everyone**, Vikas Publishing House Pvt Ltd, New Delhi, 2003.

HUMAN ANATOMY AND PHYSIOLOGY-I PRACTICAL

Scheme of Instruction		**Scheme of Examination**	
Total Duration	: 48 Hrs	Maximum Marks	: 100
Periods / Week	: 4	Internal Exam	: 30
Credits	: 2	End Semester	: 70
Instruction Mode	: Practical	Exam Duration	: 4 Hrs
Subject Code	**:** PY.05.881.1.8.P		

Course Objectives

- To train the students to study various physiology / anatomy related measurements studied in theory.
- To get a personalized exposure and knowledge on those measurements.

Course Outcome

- The students will acquire certain skills to handle and use some basic equipment.
- The students will get practical and personal experience on various kinds of experiments.

1. Study of compound microscope.
2. Study of histological slides of different tissues/organs
3. Study of various models, specimens of bones/organs
4. Determination of blood groups.
5. Determination of Hemoglobin content of blood.
6. Estimation of Bleeding Time
7. Estimation of Clotting Time
8. Determination of Total RBC count of blood.
9. Determination of Total WBC count of blood.
10. Determination of differential WBC count
11. Measurement of Blood Pressure
12. Measurement of vital Capacity
13. Estimation of Erythrocyte Sedimentation Rate (ESR).
14. Recording of human Heart Rate and Pulse Rate.
15. Study of different Family Planning methods.

Note: Discuss the disorders of various systems.

Reference Books

1. S.R. Kale and R.R. Kale, **Practical Human Anatomy & Physiology**, Nirali Prakashan.
2. CL Ghai, **Text book of Practical Physiology**, Jay Pee, New Delhi.

SEMESTER - II

Course Code	Description	Course Title	Hours/ Week			Credits	Credits		Duration of exam
			L	T	P		-	End exam	
PY.05.881.2.1.T	PS, CORE	Pharmaceutical organic Chemistry-I	4	0	-	4	30	70	3
PY.05.881.2.2.T	PS, CORE	Introduction to Dosage Forms	4	0	-	4	30	70	3
PY.05.881.2.3.T	PS, CORE	Human Anatomy and Physiology-II	4	0	-	4	30	70	3
PY.05.881.2.4.T	BS, FC	Basic computer Applications-II	3	0	0	3	30	70	3
PY.05.881.2.5.T	BS, FC	Communicative English	3	0	0	3	30	70	3
PY.05.881.2.6.P	PS, CORE	Pharmaceutical Organic chemistry-I-Practical	0	0	4	2	30	70	4
PY.05.881.2.7.P	BS, FC	Introduction to Dosage Forms-Practical	0	0	4	2	30	70	4
PY.05.881.2.8.P.	BS, FC	Basic Computer Applications-II and English Language Practical	0	0	4	2	30	70	4
			18	0	12	24	240	560	

Note: Marks are converted into Grade Points and Total is calculated for SGPA on a 10 Point Scale

PHARMACEUTICAL ORGANIC CHEMISTRY – I

Scheme of Instruction

Total Duration : 50 hrs
Periods / Week : 4
Credits : 4
Instruction Mode : Lecture
Subject Code **:** PY.05.881.2.1.T

Scheme of Examination

Maximum Marks: 100
Internal Exam : 30
End Semester : 70
Exam Duration : 3 Hrs

Course Objectives

- To impart the students with basic knowledge of various classes organic compounds, their basic structure, preparation methods and physico chemical properties.
- To impart the students with knowledge on certain mechanisms of reactions and how they are applicable in synthesis of medicinal compounds.

Course Outcome

- The students will get the knowledge on various aspects of organic compounds.
- The students will get understanding on the various mechanism involved in synthesis of organic compounds.

Unit – I

Structure and Reactivity of Organic Molecules

Atomic and Molecular orbitals, Hybridization of Orbitals and Covalent bond, Bond angles, Heterolysis, Polarity of covalent bond, Polarity of Molecules, Dipole moments, Intermolecular forces, Hydrogen bond, Boiling Point, Melting Point, Solubility.

Electron displacements: Inductive effect, Electromeric effect, Mesomerism and Resonance.

General Nature of Organic Reactions: Transition state theory, Energy diagrams of reactions.

Unit – II

Aliphatic Hydrocarbons

Nomenclature, Physical properties, General Methods of Preparation and Characteristic reactions of Alkanes, Alkenes, Alkynes. Free radical reactions of Alkanes (Halogenation), Catalytic reduction and Electrophilic addition reactions: Markonikov's Addition, Anti Markonikov's Addition, Peroxide effect or Kharasch effect, Acidity of 1-Alkynes, Electrophilic addition reactions of alkynes, stability of conjugated dienes and their addition reactions.

Cycloalkanes: Nomenclature, General methods of preparation, ring size, stability, Bayer's strain theory, Sachse - Mohr theory, Puckered rings, Configuration and Conformations of Cycloalkanes.

Unit – III

Halogen and Hydroxy Compounds

Nomenclature, General Methods of preparation of Alkyl halides and Hydroxy Compounds, Relative reactivity of Alkyl halides; Nucleophilic substitution reactions (SN^1, SN^2) - Walden inversion, Elimination reactions (E^1 and E^2) - Sayetzeffs rule. Nucleophilic substitution Vs Elimination.

Reactions of alcohols; Oxidation of alcohols;

Ethers: Nomenclature, Properties and preparation methods. (Williamson's synthesis and Ziesel's Method).

Unit – IV

A) Carbonyl Compounds (Aldehydes and Ketones)

Nomenclature, General Methods of Preparation, relative reactivities of Carbonyl Compounds, Mechanism of Nucleophilic addition reactions-Aldol condensation, Reformatsky reaction, Wittig reactions. Oxidation, reduction and addition reactions of carbonyl compounds.

B) Amines:

Nomenclature, primary, secondary and tertiary amines, Relative Basicity of amines, Reactions of amines, (Hofmann elimination) Hinsberg's method of separation of amines.
Diazonium salts-coupling of diazonium salts.

Unit – V

B) Carboxylic Acids and Acid Derivatives
(Acid Halides, Anhydrides, Esters and Amides)

Nomenclature, General Methods of Preparation of Carboxylic acids, Relative acidity of Carboxylic acids, structure of Carboxylate ions, effect of substituents on acidity. Nucleophilic acyl substitution, Reactions of Carboxylic acids, methods of preparation of acid chlorides, esters, amides, alcohols from carboxylic acids. Synthesis and synthetic applications of malonic ester and aceto-acetic ester.

Examination: One question from each unit with internal choice.

Text books

1. 'Organic Chemistry' by T.T.Morrison & R.Boyd. , 6th Edition 2007, Prentice Hall of India Private Limited, New Delhi.
2. A Text book of Organic Chemistry 21st Edition by Arun Bahl, B.S Bahl , S.Chand & Company, New Delhi.
3. IL Finar, Oranic Chemistry vol-I The Fundamental Principles 6th Edition, Pearson Education(Singapore) Pvt. Ltd. New Delhi.

Reference Books

1. The Fundamental Principles of organic chemistry, by I.L.Finar, ELBS, London.
2. Organic chemistry by Cram & Hammond.
3. Text Books of Pharmaceutical Chemistry, by T.M.Atherden, Bentley and Drivers, Oxford University Press, London.

INTRODUCTION TO DOSAGE FORMS

Scheme of Instruction		**Scheme of Examination**	
Total Duration	: 50 hrs	Maximum Marks: 100	
Periods / Week	: 4	Internal Exam	: 30
Credits	: 4	End Semester	: 70
Instruction Mode	: Lecture	Exam Duration	: 3 Hrs
Subject Code	**:** PY.05.881.2.2.T		

Course Objectives

- To provide the students with a basic understanding and preliminary knowledge on various types of dosage forms.

Course Outcome

- The student will get first time exposure to general methods of preparation of various dosage forms.

Unit – I

Introduction to drug and Dosage form: Definition of drug, excipient and Dosage form, Classification of dosage forms on the basis of formulation and route of administration.

Liquid preparations: Introduction, General methods of preparation, labeling, and marketed products of Aromatic waters, spirits, syrups, elixirs, suspensions, emulsions, lotions, liniments, , inhalations, throat paints, gargles, glycerin and collodions.

Unit – II

Solid dosage forms:

Tablets: Types of tablet dosage forms, advantages, disadvantages, General methods of preparation.

Capsules: Types of capsules**, General** methods of preparation, Advantages and disadvantages of soft and hard gelatin capsules.

Other solid dosage forms: General introduction, methods of preparation and marketed products of Powders, insufflations, dusting powders, effervescent granules, Pastilles, Lozenges, tablet triturates, pills and eutectic mixtures.

Unit – III

Semisolids: Introduction, General methods of preparation and marketed products of Ointments and their bases, creams (vanishing cream and cold cream), pastes, jellies.

Suppositories and their bases, types of suppositories, Displacement values.

Unit IV

Sterile preparations:

Water: Purified water, Distilled water. Introduction to sterilization and sterility, Water for Injection (WFI), Sterile Water.

Parenteral products: Introduction, general methods of preparation and marketed products of Vials, Ampoules, Intravenous Fluids (Normal Saline, Dextrose Normal Saline, Ringer Lactate), Eye drops, Ear drops and Nasal drops.

Unit V

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

Examination: One question from each unit with internal choice.

Text Books

1. Bentley's Text book of Pharmaceutics, E.A. Rawlins, 8th Edition, 1996, Bailliere Tindall, London.
2. Cooper & Gunn's dispensing for Pharmaceutical students, S.J.Carter, CBS Publishers, New Delhi.
3. Pharmaceutical Education, Harikishan Singh (History of Pharmacy in India & Related aspects), Volume- II, Vallabh Prakashan, Delhi.
4. A Textbook of professional pharmacy, N. K. Jain, S.N. Sharma, 6th Edition, 2016, Vallabh prakashan, Delhi.
5. R. M. Mehta, Dispensing Pharmacy, 3rd Edition, 2008, Vallabh Prakashan, Delhi.

Reference Books

1. Pharmaceutical dosage forms & Drug delivery systems, H.C. Ansel, 8th Edition. 2008, Lippincott Williams &Wilkins, London.
2. Cooper & Gunn's Tutorial pharmacy, S.J.Carter, CBS Publishers, New Delhi.
3. Dispensing of Medication, Ed. E.W. Martin, Mach Publishing Co., Eastern PA.
4. Lachman Leon, "The Theory and Practice of Industrial Pharmacy, Special Indian 3rd Edition, 2009, Varghese Publishing House, Mumbai.
5. Indian Pharmacopeia (2014), British Pharmacopeia, United States Pharmacopeia & Merck Index.

HUMAN ANATOMY AND PHYSIOLOGY-II

Scheme of Instruction

Total Duration	: 50 hrs
Periods / Week	: 4
Credits	: 4
Instruction Mode	: Lecture
Subject Code	**:** PY.05.881.2.3.T

Scheme of Examination

Maximum Marks: 100	
Internal Exam	: 30
End Semester	: 70
Exam Duration	: 3 Hrs

Course Objectives

- To impart knowledge and understanding on the anatomy and physiology of various systems of human body.
- To impart the knowledge on the inter relationship of various organs and their functions in the human body.

Course Outcome

- The students will be gaining a thorough understanding on various physiological functions of the organs of human body.
- This knowledge will become the basic foundation for understanding of pharmacology in higher semesters.

Unit-I

Respiratory system: Anatomy of respiratory system, physiology of respiration, mechanisms of regulation of respiration. Lung volumes and capacities.

Unit-II

Nervous system: Introduction to neuron, synapse, ganglion and plexus. Physiology of nerve impulse, neurotransmission. Parts and functions of brain and spinal cord, reflex arc and cranial nerves. Autonomic nervous system.

Unit-III

Digestive system: Gross anatomy of alimentary canal. Physiology of digestion and process of absorption, Phases of Digestion.

Unit-IV

Endocrine system: Secretions, regulation and functions of Pituitary, thyroid, parathyroid, pancreas, gonads, pineal and adrenal glands.

Unit-V

Urinary system: Gross anatomy and functions of urinary system. Structure of nephron, physiology of urine formation and micturition.

Reproductive system: Gross anatomy and functions of male and female reproductive system. Spermatogenesis, oogenesis. Menstrual cycle, pregnancy and parturition, In-vitro Fertilization methods.

Text Books

1. Thakaore B, Gandhi P, Harit RD. Elements of human anatomy physiology and heath Education, 21st Edition B.S. Shah Publishers, Ahmadabad.
2. Principles of Anatomy and Physiology by Ross & Wilson, 10th Edition 2007, Churchill Living stone Publishers, New York.

Reference Books

1. Human Physiology by C.C. Chatterjee, 11th Edition 1992, Medical Allied Agency, Kolkata,India.
2. Text Book of Medicinal Physiology by A.C. Guyton, W.B. Prism Books Pvt. Ltd.Bangaluru.
3. Principles of anatomy and physiology by Tortora G.J., and S.R.Grabowski, Volume I & II , John Wiley and Sons Inc, Singapore.

BASIC COMPUTER APPLICATIONS- II

Scheme of Instruction		**Scheme of Examination**
Total Duration	: 40 hours	Maximum Marks : 100
Periods / Week	: 3	Internal Exam : 30
Credits	: 3	End Semester : 70
Instruction mode	: Lecture	Exam Duration : 3 Hrs
Subject Code	: PY.05.881.2.4.T	

Course Objectives

- To Impart the basic knowledge about the programming languages.
- To make the students to understand and acquire knowledge about various simple computer applications in those programming languages.

Course Outcomes

- The students will get basic understanding on writing simple programs using the C and SQL
- The student will be able to apply these simple programs in other subjects also.

Unit – I Programming In 'C' Language

Introduction, History, Importance of C-Language; Structure of 'C' program, writing and executing C-program, preprocessors in C; Keywords, Identifiers, Constants, Variables, Data Types, Storage classes, Type conversion, Input and output functions in C.

Unit- II Programming In 'C' Language

Types of operators and expressions: Introduction, Operators (Arthimetic, Logical, Assignment, Conditional and Special operators), Expressions;

Control Statements

IF, IF-ELSE statement and Nested IF statement. Break, Continue, Goto, Switch () case; Loop Control Statements – For loop, While loop , Do-while loop and nested loops.

Arrays: Definition, Initialization, One, Two dimensional Arrays, Working with Strings & Standard Functions.

Unit-III Introduction to Database

Basic Concepts – Data, Information, Records and files. Traditional file based Systems, Limitations of traditional File Based Approach, Database Approach-Characteristics of Database Approach, Database Management System (DBMS), Advantages and Disadvantages of DBMS. Database Development Life Cycle (DDLC), Conversion of E-R model to Table.

Data Models: E-R Model, Relational Model Concepts, Codd's Rules for Relational databases, Basic Concepts of Hierarchical and Network Data Model.

Unit-IV Structured Query Language (SQL)

SQL: Data Definition and data types, Specifying Constraints in SQL, SQL Commands (DDL, DML, DCL & TCL), Reserved Words; Comparison for Access and SQL Server;

Unit- V

Use of Computers in Education and Research:
Basics of Data analysis, Heterogeneous storage (I-Cloud, Google drive etc.,), cloud computing, big data, data mining and Inventory control;

Introduction to Chemsketch, Chemdraw, Chemical Database Design & their Tools

Examination: One question from each unit with internal choice.

Text Books

1. Fundamentals of Computers by P.K. Sinha, 2nd Edition 1992, BPB Publications, New Delhi.
2. Let Us C by Yashvanth Kanetkar, 4th Edition 2002, BPB Publications, New Delhi.
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 Gottfried- Schum series 2nd Edition, TATA Mc Graw Hill Publishing Company, New Delhi.
2. Computer programming in 'C' by Y. Raja Raman , Prentice-Hall Pvt. Ltd, New Delhi.

COMMUNICATIVE ENGLISH

Scheme of Instruction

Total Duration : 40 hrs
Periods / Week : 3
Credits : 3
Instruction Mode : Lecture
Subject Code **:** PY.05.881.2.5.T

Scheme of Examination

Maximum Marks: 100
Internal Exam : 30
End Semester : 70
Exam Duration : 3 Hrs

Course Objectives

- Understanding different ways of communication and basic grammar skills.

Course Outcomes

- The students will be able to know various types of communication skills
- The students will be able to write, speak good English with proper grammar.
- The students will be able to write good documents and other reports.

Unit – I

Role and Importance of Communication; Verbal and Non-Verbal Communication; Group Communication, Effective Communication; Barriers to communication; Communication Mediums; Participating in discussions, Conduct of Seminars, Conferences etc., Making Presentations through collection, evaluation, organizing the information; Interacting with learners and teachers; Role of Wit and Humor in Communication

Unit – II

Spoken English Vs Written English; Formal / Informal English (one way/two way); British/ American/Indian English; How to introduce one self and others; How to tender apology; How to thank in different ways; Greetings; Some Polite Expressions; Agreements and Disagreements; How to use a dictionary; How to use a Thesaurus; Vocabulary Development; Synonyms and antonyms; Single word substitutes; comprehensions;

Unit – III

Communication through Letters; Official and Personal Letters; Letters of complaint; Letters of Enquiries; and Responses; Writing Memos, Circulars and Notices; What to avoid while writing; Writing Paragraph, Document and Scientific/Technical Report; Drafting & Delivering a Speech;

Unit – IV

Grammar in English: Tenses; Voice; Articles; Direct and Indirect speech; Degrees of Comparison; Common errors in English made by Indian Learners of English

Concepts of Learning and Listening: Types and Methods of Learning and Listening; Learning and Listening of Knowledge, Attitudes, Skills and Practices.

Unit – V

The following Four Essays from "Selections from Modern English" prose Edited by Haladhar Panda are prescribed.

1. **"Our Own Civilization" - C.EM. Joad; 2. " Andrew Carnegie" - E.H Carter; 3. " The Secret of work" - Swami Vivekananda; 4. "The Generation Gap' - Benjamin Spock**

Examination : One question from each unit with internal choice.

Text Books

1. "Business Correspondence and report Writing" R.C.Sharma and Krishna Mohan, Tata McGraw Hill Publishers, New Delhi
2. "Communicative English" E. Suresh kumar, Raj Kamal Publications, Hyderabad
3. "Selections of Modern English Prose" Ed. By Haladhar Panda, Published by Universities Press 9India) Pvt. Ltd., Hyderabad

PHARMACEUTICAL ORGANIC CHEMISTRY – I PRACTICAL

Scheme of Instruction		**Scheme of Examination**	
Total Duration	: 48 hrs	Maximum Marks: 100	
Periods / Week	: 4	Internal Exam	: 30
Credits	: 2	End Semester	: 70
Instruction Mode	: Practical	Exam Duration	: 4 Hrs
Subject Code	**:** PY.05.881.2.6.P		

Course Objectives

- To give a practical training on the preparation of some of the pharmaceutical organic compounds studied in theory.

Course Outcome

- The students will get hands on experience and knowledge about the methods of preparation and various reaction mechanisms involved.

List of Experiments

1. Organic Chemistry laboratory techniques.
2. Experiments in simple qualitative analysis including preparation of derivatives.
3. Nitration : Preparation of Nitro phenol from Phenol.
4. Halogenation : Preparation of p-Bromo acetanilide from Acetanilide.
5. Oxidation : Preparation of Benzoic acid from toluene or Benzoylchloride
6. Reduction : Preparation of m-Nitroaniline from m-Dinitro Benzene.
7. Esterification : Preparation of n-Butyl acetate from n-Butyl alchol.
8. Acetylation : Preparation of Acetanilide from Aniline.
9. Etherification : Preparation of β-Naphthyl methyl ether from β-Napthol.
10. Hydrolysis (Saponification) : Preparation of Benzoic Acid from Methyl Benzoate OR Preparation of Benzoic acid from Benzamide.

Reference Books

1. B. S. Furniss, A. J. Hannaford, P. W. G. Smith and A. R. Tatchell, **Vogel's Text Book of Practical Organic Chemistry**, 5th Edition, Longman Singapore Publishers, Singapore, 1996.

2. R.K Bansel, **Laboratory Manual of Organic Chemistry**, 4th Edition, New Age International Publishers, New Delhi, 2005.

3. F.G Mann and B. C Saunders, **Practical Organic Chemistry**, 4th Edition, Orient Longman, Hyderabad, 2004.

4. Vogel A.I, **Elementary Practical Organic Chemistry Part – I, Small scale Preparations**, 2nd Edition, CBS Publishers & Distributors, New Delhi, 2004.

INTRODUCTION TO DOSAGE FORMS PRACTICAL

Scheme of Instruction

Total Duration : 48 hrs
Periods / Week : 4
Credits : 2
Instruction Mode : Practical
Subject Code **:** PY.05.881.2.7.P

Scheme of Examination

Maximum Marks: 100
Internal Exam : 30
End Semester : 70
Exam Duration : 4Hrs

Course Objectives

- To give a practical training on the preparation of various types of dosage forms studied in theory.

Course Outcome

- The students will get hands on experience and knowledge about principles and techniques involved in the preparation of various dosage forms.

List of Experiments

1. Incompatibility studies in few simple dosage forms.
2. Preparation of Aromatic waters
3. Preparation of spirits
4. Preparation of different types of iodine solution
5. Preparation of cresol soap solution
6. Preparation of Calamine lotion
7. Preparation of turpentine liniment
8. Preparation of gargles
9. Preparation of simple ointment
10. Preparation zinc oxide
11. Preparation of whitfield ointment
12. Preparation of non staining iodine ointment
13. Preparation of cold cream
14. Preparation of any glycerogelatine based suppository
15. Preparation of Tragacanth gel
16. Preparation of effervescent granules
17. Preparation of simple syrup
18. Preparation of ear / eye drops
19. Preparation emulsion and suspension.

Reference Books

1. C.V.S Subrahmanyam, J. Thimma Setty and G.C. Prabhu Shankar, **Laboratory Manual of Pharmaceutics**, Vallabh Publications, New Delhi, 2006.
2. R.S Gaud and G.D Gupta, Practical Pharmaceutics.

BASIC COMPUTER APPLICATIONS-II AND ENGLISH LANGUAGE PRACTICAL

Scheme of Instruction

Total Duration : 48 hrs
Periods / Week : 4
Credits : 2
Instruction Mode : Practical
Subject Code **:** PY.07.881.2.8.P

Scheme of Examination

Maximum Marks: 100
Internal Exam : 30
End Semester : 70
Exam Duration : 4 Hrs

Course Objectives

- To provide hands on practice on writing simple programs based on C and SQL
- To provide hand on experience on various search engines to retrieve the data.

Course Outcomes

- The students will gain hands on experience on writing simple programs based on C and SQL which will be useful in pharmaceutical applications.
- The students will gain hands on experience and practice on usage of better communication skills.

List of Experiments

Exercises: 1 -4 Based on 'C' programming
Exercises: 5-8 Based on SQL
Exercise--9 : Information Transfer- Using of Graphs, Tables and Figures for representing a data
Exercise – 10 : Basics of Web Page Design; Writing and Designing for World Wide Web;
Exercise – 11 : Document Authoring and Maintenance; HTML Language and Electronic Publishing;
Exercise – 12 : Designing and Writing for Multimedia
Exercise – 13 : Collaborations of Health care providers using Network Technologies; Intranets, Software used for remote collaboration and Tele medicine.

Text Books

1. Fundamentals of Computers by P.K. Sinha, 2nd Edition 1992, BPB Publications, New Delhi.
2. Let Us C by Yashvanth Kanetkar, 4th Edition 2002, BPB Publications, New Delhi.
3. Working in Microsoft Office By Ron Mansfield
4. SQL, PL/SQL The Programming Language of Oracle by Ivan Bayross
5. "Business Correspondence and report Writing" R.C.Sharma and Krishna Mohan, Tata McGraw Hill Publishers, New Delhi
6. "Communicative English" E. Suresh kumar, Raj Kamal Publications, Hyderabad
7. "Selections of Modern English Prose" Ed. By Haladhar Panda, Published by Universities Press 9India) Pvt. Ltd., Hyderabad

Reference Books

1. Programming with 'C' by Byron Gotttried- Schum series 2nd Edition, TATA Mc Graw Hill Publishing Company, New Delhi.
2. Computer programming in 'C' by Y. Raja Raman , Prentice-Hall Pvt. Ltd, New Delhi.