SYLLABUS

Bachelor of Pharmacy (AYURVEDA)

Programme

HIMACHAL PRADESH TECHNICAL UNIVERSITY, HAMIRPUR, DISTRICT HAMIRPUR (H.P.)

B. Pharm. Semester I & II Examination Scheme

Course Code	Subject	Examination Hours		Maximum Marks for Theory		Maximum Marks for Practical	
SEMESTER-I		**Theory**	**Practical**	**External**	**Internal**	**External**	**Internal**
BPA-111	Fundamentals of Ayurveda, including Swasthavritta	3	-	70	30	-	-
BPA-122	Fundamentals of Physiology	3	-	70	30	-	-
BPA-123	Fundamentals of Anatomy	3	3	70	30	50	50
BPA-114	Fundamentals of Bhaishajya kalpana-I	3	3	70	30	50	50
BPA-115	Fundamentals of Dravyaguna Vigyan-I	3	3	70	30	50	50
BPA-136	English	3	-	70	30	-	-
BPA-137	Computer & its applications in pharmaceutical Sciences	3	3	70	30	50	50

Course Code	Subject	Examination Hours		Maximum Marks for Theory		Maximum Marks for Practical	
SEMESTER-II		**Theory**	**Practical**	**External**	**Internal**	**External**	**Internal**
BPA-221	Pharmaceutical Biology	3	3	70	30	50	50
BPA-222	Pharmaceutical chemistry (Inorganic)	3	3	70	30	50	50
BPA-223	Pharmaceutical chemistry (Organic)	3	3	70	30	50	50
BPA-224	Pharmacognosy-I	3	-	70	30	-	-
BPA-225	Pharmaceutics. (General and Dispensing pharmacy)	3	-	70	30	-	-
BPA-216	Rasa Shastra-I	3	3	70	30	50	50
BPA-217	Sanskrit	3	-	70	30	-	-

B.Pharm. Semester III & IV Examination Scheme

Course Code	Subject	Examination Hours		Maximum Marks for Theory		Maximum Marks for Practical	
SEMESTER-III		**Theory**	**Practical**	**External**	**Internal**	**External**	**Internal**
BPA-311	Dravyaguna Vigyan -II	3	3	70	30	50	50
BPA-322	Pharmacognosy of Ayurvedic Drugs-I	3	3	70	30	50	50
BPA-323	Pharmaceutics (Physical pharmacy	3	3	70	30	50	50
BPA-324	Pharmacology-I	3	-	70	30	-	-
BPA-335	Pharmaceutical Statistics	3	-	70	30	-	-
BPA-316	Ras Shastra-II	3	3	70	30	50	50
BPA-337	Human values and Professional Ethics	3	3	70	30	50	50

Course Code	Subject	Examination Hours		Maximum Marks for Theory		Maximum Marks for Practical	
SEMESTER-IV		**Theory**	**Practical**	**External**	**Internal**	**External**	**Internal**
BPA-421	Pharmaceutical analysis of Ayurvedic Drugs-I	3	3	70	30	50	50
BPA-422	Applied Physiology	3	3	70	30	50	50
BPA-423	Pharmacognosy of Ayurvedic Drugs-II	3	3	70	30	50	50
BPA-424	Pharmaceutics (Principles of Pharmaceutical operations)	3	-	70	30	-	-
BPA-415	Ras Shastra-III	3	3	70	30	50	50
BPA-416	Dravyaguna Vigyan - III	3	3	70	30	50	50

B.Pharm. Semester V & VI Examination Scheme

Course Code	Subject	Examination Hours		Maximum Marks for Theory		Maximum Marks for Practical	
SEMESTER-V		**Theory**	**Practical**	**External**	**Internal**	**External**	**Internal**
BPA-521	Pharmacognosy –III	3	3	70	30	50	50
BPA-522	Pharmaceutical Analysis of Ayurvedic Drugs-II	3	3	70	30	50	50
BPA-523	Pharmaceutical Technology for Ayurvedic drugs-I	3	3	70	30	50	50
BPA-514	Dravyaguna Vigyana-IV	3	3	70	30	50	50
BPA-515	Ras Shastra –IV	3	3	70	30	50	50

Course Code	Subject	Examination Hours		Maximum Marks for Theory		Maximum Marks for Practical	
SEMESTER-VI		**Theory**	**Practical**	**External**	**Internal**	**External**	**Internal**
BPA-621	Pharmaceutical Engineering	3	-	70	30	-	-
BPA-622	Pharmacology & Toxicology of Ayurvedic Drugs-I	3	-	70	30	-	-
BPA-613	Bhaishajya kalpana-II	3	3	70	30	50	50
BPA-624	Pharmaceutical Microbiology	3	3	70	30	50	50
BPA-650	Pharmacognosy –IV	3	3	70	30	50	50
BPA-626	Pharmacology-II	3	-	70	30	-	-

B.Pharm. Semester VII & VIII Examination Scheme

Course code.	Subject	Examination Hours		Maximum Marks for Theory		Maximum Marks for Practical	
SEMESTER-VII		**Theory**	**Practical**	**External**	**Internal**	**External**	**Internal**
BPA-721	Pharmacies Acts, Rules, Regulations, and Pharmaceutical Management	3	-	70	30	-	-
BPA-722	Pharmaceutical Technology for Ayurvedic Drugs-II	3	3	70	30	50	50
BPA-723	Pharmacology & Toxicology of Ayurvedic Drugs-II	3	-	70	30	-	-
BPA-724	Pharmaceutical analysis of Ayurvedic Drugs-III	3	3	70	30	50	50
BPA-715	Bhaishajya kalpana-III	3	3	70	30	50	50

Course code	Subject	Examination Hours		Maximum Marks for Theory		Maximum Marks for Practical	
SEMESTER-VIII		**Theory**	**Practical**	**External**	**Internal**	**External**	**Internal**
BPA-821	Medicinal Chemistry	3	3	70	30	50	50
BPA-822	Pharmaceutical Analysis	3	3	70	30	50	50
BPA-813	Bhaishajya kalpana-IV	3	3	70	30	50	50
BPA-824	Pharmacokinetics and bio pharmaceutics	3	-	70	30	-	-
BPA-850	Clinical Pharmacy	3	-	70	30	-	-

SEMESTER –I

FUNDAMENTALS OF AYURVEDA INCLUDING SWASTHAVRITTA

Name of Course	Fundamentals of Ayurveda Including Swasthavritta			
Course Code	BPA-111		Contact hours/week	L-3,T-0, P-0
Lectures to be Delivered	**39 (L-39, for each semester)**			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University	Internal Assessment
Maximum Marks	70	30	-	-
Minimum Pass Marks	35	-	-	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-111 Theory

1. Definition aims and contents of Ayurveda.
2. Theory of evolution according to Ayurveda.
3. Ten points for examination i.e. Kaarana, karana, karya, karyayoni, karya phala, Anubandha, Desha,
4. kala, Prakriti and Upaya and their utility and application in Pharmacy.
5. Definition and type of Shad Padartha.
6. Concepts of Pramana for examination.
7. Definition and importance of Swasthya,
8. Dinacharya and ratricharya.
9. Ritucharya.
10. Importance of aahar, nidra and brahmacharya.
11. Importance of shuddh vayu, jala, desha and kala.
12. Communicable disease and immunization, immunization schedule.

FUNDAMENTALS OF PHYSIOLOGY

Name of Course	Fundamentals of Physiology			
Course Code	BPA-122	Contact hours/week	L-3, T-0, P-0	
Lectures to be Delivered	**39 (L-39 for each semester)**			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University	Internal Assessment
Maximum Marks	70	30	-	-
Minimum Pass Marks	35	-	-	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-122 Theory

1. **Cellular Physiology, membrane transport processes cell division.**

2. **Basic Tissues**
Function of epithelial, connective, muscular and nervous, muscle contraction and properties. Nerve impulse generation and transmission. Skin, Skeleton.

3. **Respiratory system**
Respiratory volumes and capacities, ventilation, compliance and resistance, gaseous exchange and transport in blood, nervous and chemical regulations of respirations, acid base balance, pathophysiology of respiratory diseases.

4. **Renal system**
Kidney and urinary tracts, nephron transport processes, concentration and dilution of urine, renal control of body fluids, plasma clearances. Micturition.

5. **Digestive system**
Nutritional and Vitamin requirements, vitamin deficiencies, structure of alimentary canal, its motility and secretions digestion and absorption: structure and functions of liver.

6. **Nervous System**
6.1Reception and transmission of sensory information: special senses (vision, hearing, equilibrium, smell, taste, pain).
6.2 Control of locomotion by spinal reflexes, reticular formation, basal ganglia and motor cortex: arrangement and functions of autonomic nervous system: role of reticular activating system, hypothalamus and limbic system and cerebral cortex: sleep, electroencephalogram.

7. **Endocrine and reproductive system**

7.1 Role of pituitary: Functions of growth hormone, thyroxine, insulin and glucagons, parathormone and calcitonin, glucocorticoids and mineralocorticoids.

7.2 Structure and functions of ovary, tests: menstrual cycle, pregnancy: family planning.

8. **Blood and cardiovascular systems**

8.1 Body fluids, roles of blood cellular components and plasma proteins, coagulation, blood groups, blood disorders.

8.2 "Circulation"cardiac cycle, impulse generation and transmission, electrocardiogram; haemodynamics; capillary circulation; regulation of cardiac output, blood flow and pressure.

9. Lymphatics, function of Lymphatic system and Lymph nodes.

15. Detail concepts of Doshas, Dhatu, and mal,prakriti prikshan,and dhatu poshan nyaya.

Books Recommended:

Physiology:

1. A.C. Guyton & J.E. Hall, Text book of Medical Physiology published in India by Prism Books Ltd. on arrangement with W.B. Saunders Company, U.S.A., U.S.A., Ninth Edition, 1996.

2. C.A. Keele, E. Neil and N. Joels, Samson Wright's Applied physiology, Thirteenth Edition, published by Oxford University Press, 1982.

3. W.F. Ganong, Review of Medical Physiology, Thirteenth Edition, published by Appleton & Lange, U.S.A., 1987.

4. A.J. Vander, J.H. Sherman and D.S. Luciano, Human Physiology.

FUNDAMENTALS OF ANATOMY

Name of Course	Fundamentals of Anatomy			
Course Code	BPA-123		Contact hours/week	L-3, T-0, P-3
Lectures to be Delivered	78 (39-L, 39-P for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University (3 Hrs.)	Internal Assessment
Maximum Marks	70	30	50	50
Minimum Pass Marks	35	-	25	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-123 Theory

1. Introductory knowledge of Anatomy.
2. Scope of Anatomy.
3. Terminology of Anatomy.
4. Elementary cell and tissues of the Body- Epithelial Tissues, Muscular Tissues, Nervous Tissue.
5. Skeletal System.
6. Skeletal muscles of the body. Nine regions of the abdomen and organs situated in these regions & basic anatomy of the organs e.g. liver, kidney, lungs, heart. pancreas, stomach, intestines, brain, nose, ear, eye, tongue.

Books Recommended:

1. Gray's Anatomy, edited by P.L. Williams & R. Warwick, 38th Edition, published by Churchill livingstone, 1995.
2. Cunningham's Textbook of Anatomy, edited by G.J. Romanes, Eleventh Edition, published by Oxford
University Press, 1972.

BPA-123 Practicals

Charts, models and soft parts.
Minimum ten days training in the anatomy department to demonstrate on dead bodies and organs.Osteology, surface anatomy.

FUNDAMENTAL OF BHAISHJYA KALPANA-1

Name of Course	Fundamentals of Bhaishjya Kalpna-1			
Course Code	BPA-114		Contact hours/week	L-3, T-0, P-3
Lectures to be Delivered	78 (39-L, 39-P for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University (3 Hrs.)	Internal Assessment
Maximum Marks	70	30	50	50
Minimum Pass Marks	35	-	25	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-114 Theory

1½ Hk'kT; dYiuk d eyHkr fl)kUrA
2½ vk;onh; Hk'kT; dYiuk dk Øfed fodkl ØeA
3½ vk;onh; n0;k d lxg] lj{k.k] HkMkj.k ,o vU; ifØ;kvk dk KkuA

4½ lkekU; ikfjHkkf"kd vk'kf/k leg ;Fkk prtkr foopuA
5½ vk;ofnd fpfdRlk Hk'kT; dYiuk dk egRo ,o mi;kfxrkA

BPA-114 Practical

1½ fofo/k ouk"kf/k n0;k dh igpku ,o lkekU; ijh{k.k fof/k;k dk KkuA
2½ fofo/k ouk"kf/k;k dk lxg ,o ikflr LFkku lEcU/kh KkuA
3½ fofHkUu ouk"kf/k;k d HkMkj.k ,o lj{k.k dk KkuA
4½ Model, Chart & Compilation of different processes/apparatuses used in the bhaishjya kalpna.
5) Introduction of pharmaceutical machinery and equipments used in the ayurvedic drug manufacturing.

FUNDAMENTALS OF DRAVYAGUNA VIGYANA – I

Name of Course	Fundamentals of Dravyaguna Vigyana-1			
Course Code	BPA-115		Contact hours/week	L-3, T-0, P-3
Lectures to be Delivered	78 (39-L, 39-P for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University (3 Hrs.)	Internal Assessment
Maximum Marks	70	30	50	50
Minimum Pass Marks	35	-	25	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-115 Theory

n0;x.k foKku dh ifjHkk'kk ,o egRoA
n0; dh ifjHkk'kk ,o egRo] ipHkkfrd lxBu ,o HknA
jl ldh ifjHkk'kk] Hkn ,o ipHkkfrd lxBuA
x.k dh ifjHkk'kk ,o Hkn] x.k dk nk'k] /kkr ,o ey ij iHkkoA
foikd dh ifjHkk'kk ,o HknA oh; d v/;;u gr i;kxkRed i.kkyhA
iHkko dk egRo ,o mi;kfxrkA
f=Qyk] e/kj f=Qyk] lxU/kf=Qyk] LoYif=Qyk] f=tkr] prtkr] f=dV] ipdky] ipiYyo] ipoYydy] f=d.Vd] prHkn] f=dkf'kd] y?kipey] ogripey] r.kipey] 'kM'k.k] pr:'k.k] d.Vdipey] prcht] ip{khjho{k] e/;vipey] prcht] ip{khjho{k] e/;eipey] thouipey] e/kj=;] vEyipd] egkipfo'k] mifo'k] v'Vox] ipiYyoA
dN ie[k rFkk lkekU; dek dk foopuA
nhiu] ikpu] xkgh] LrEHku] Hknu] jpu] vuykeu] llu] l"kk/ku] jlk;u] okthdj.k] 0;ok;h] endkjh] fodklhA

BPA-115 Practicals

25 ouk'kf/k n0; dh Herbarium sheets dk fuek.kA
ouk'kf/k n0;k d igpku dh fof/k;kA
Theory e of.kr ie[k ouk'kf/k n0;k dh 0;k[;k ,o igpkuA
viu {k= e ik; tku oky n0;k dh igpkuA

ENGLISH

Name of Course	English			
Course Code	BPA-136	Contact hours/week	L-3, T-0, P-0	
Lectures to be Delivered	39 (39-L for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University	Internal Assessment
Maximum Marks	70	30	-	-
Minimum Pass Marks	35	-	-	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-136 Theory

Unit 1: Personality
Chapter-1: Personality and its types
Chapter-2: components of personality development
Chapter-3: Essential personality development tips
Unit 2: Time management
Chapter-1: Time management
Chapter-2: Time management tips
Unit 3: Self confidence
Chapter-1: what is Self Confidence?
Chapter-2: Building Self Confidence
Unit 4: Body language
Chapter-1: What is Body Language?
Chapter-2: Tips to improve Body language
Unit 5: Interview
Chapter 1: Art of facing Interview
Chapter 2: Gearing up for Interview
Unit 6: Communication
Chapter 1: Communication
Chapter 2: Tips for successful Communication
Unit 7: Use of English
Chapter 1: Vocabulary and punctuation
Chapter 2: Components of letter and letter drafting
Unit 8: Final brush up
Chapter 1: Group discussion skills
Chapter 2: Resume writing skills
Chapter 3: Frequently asked questions
Chapter 4: Important points in self assessment

COMPUTER AND ITS APPLICATIONS IN PHARMACEUTICAL SCIENCES

Name of Course	Computer and their Applications in Pharmaceutical Sciences			
Course Code	BPA-137	Contact hours/week	L-3, T-0, P-3	
Lectures to be Delivered	78 (39-L, 39-P for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University (3 Hrs.)	Internal Assessment
Maximum Marks	70	30	50	50
Minimum Pass Marks	35	-	25	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-137 Theory

1. Applications of MS Office
2. Use of internet and E-mail
3. Use of search Engines.
4. Applications in Pharmaceutical Sciences.
5. Preparing project work & statically analysis of data on computer.
6. Working on the computer on different software's of data entry.

BPA-137 Practical

Basic introduction on working of MS Word, Excel, Internet.

SEMESTER-II
PHARMACEUTICAL BIOLOGY

Name of Course	Pharmaceutical Biology			
Course Code	BPA-221		Contact hours/week	L-3, T-0, P-3
Lectures to be Delivered	78 (39-L, 39-P for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University (3 Hrs.)	Internal Assessment
Maximum Marks	70	30	50	50
Minimum Pass Marks	35	-	25	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-221 Theory

1. Structure of typical plant cell and its important inclusions. Structure and functions of some important plant tissues like parenchyma, xylem, sclerenchyma, phloem etc.
2. General morphology of plants with special reference to flowers and fruits.
3. Principles of classification of plants with special reference to the plants of the following families. Studies of the diagnostic characteristics, with emphasis on plants of medicinal and economic values. Preparation and preservation of Herbarium sheets.
(1) Rutaceae
(2) Leguminosae
(3) Umbelliferae
(4) Apocynaceae
(5) Solanaceae
(6) Convolvanceae
(7) Euphorbiaceae
(8) Lilaceae
(9) Zingiberaceae.
4. Introduction, histological background of some medicinal plants. Definition of the crude, organized and unorganized drugs.
5. Classification of the crude drugs.
6. Methods of systematic studies of the crude drugs.
7. Cultivation, collection and storage of crude drugs.

BPA-221 Practical

1. Morphology of flowers and fruits.
2. Plant tissues like Parenchyma, collenchyma, sclerenchyma, xylem, phloem etc.
3. Cell contents like starch grains, calcium oxalate, calcium carbonate crystals.
4. Epidermal structure of leaf with special reference to stomata and trichomes.

PHARMACEUTICAL CHEMISTRY- INORGANIC CHEMISTRY

Name of Course	Pharmaceutical Chemistry- Inorganic chemistry			
Course Code	BPA-222	Contact hours/week	L-3, T-0, P-3	
Lectures to be Delivered	78 (39-L, 39-P for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University (3 Hrs.)	Internal Assessment
Maximum Marks	70	30	50	50
Minimum Pass Marks	35	-	25	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-222 Theory

1. Introduction of periodic table and atomic configuration.
2. Occurrence, properties, reactions and important compounds of iron, calcium, aluminium, copper, gold,
   sodium and potassium.
4. Ammonium chloride – preparation and uses.
5. Borax – properties and uses.
6. Reactivity of metal (periodic table).
7. General introduction of different methods for quantitation of heavy metals in Ayurvedic preparation.
8. General introduction of Titrametric analysis.
9. General introduction of Gravimetric methods of analysis.

BPA-222 Practicals (Inorganic)

1. Qualitative & quantitative analysis of metal ions presents in Ayurvedic metallic preparations.
2. Different methods of volumetric analysis.
3. Simple gravimetric analysis.

PHARMACEUTICAL CHEMISTRY- ORGANIC CHEMISTRY

Name of Course	Pharmaceutical Chemistry- Organic chemistry			
Course Code	BPA-223		Contact hours/week	L-3, T-0, P-3
Lectures to be Delivered	78 (39-L, 39-P for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University (3 Hrs.)	Internal Assessment
Maximum Marks	70	30	50	50
Minimum Pass Marks	35	-	25	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-223 Theory

1. The concept of resonance and general introduction of the simple Organic reactions.
2. Emperical formula, inductive and electromeric effects, hydrogen bonding, atomic and molecular orbitals, valance bond theory, dipole moment.
3. Brief introduction of important aliphatic and aromatic compounds,
   Structure, nomenclature and chemical and physical properties of following classes.
   a. Aliphatic hydrocarbons.
   b. Olefins and acetylenes.
   c. Alcohols.
   d. Aromatic hydrocarbons.
   e. Aliphatic and aromatic halogen compounds.
   f. Aliphatic and aromatic ethers.
   g. Aliphatic and aromatic aldehydes and ketones.
   h. Aromatic alcohols.
   i. Aliphatic and aromatic acids.
4. Stereochemistry: - Elements of symmetry, optical and geometrical isomerism, optical activity, conventions used in stereochemistry, enantiomerism, recemic modifications, configurations. Brief introduction to macro molecules.

BPA-223 Practicals

1. To prepare idoform from ethanol.
2. To prepare Schiff's base from benzaldehyde and aniline.
3. To prepare benzoic acid from benzamide.
4. To prepare dinitro benzene to nitrobenzene.
5. To prepare glucosazone from glucose.
6. To prepare benzoglycine to glycine.
7. To prepare aspirin from salicylic acid

PHARMACOGNOSY-I

Name of Course	Pharmacognosy-1			
Course Code	BPA-224		Contact hours/week	L-3, T-0, P-0
Lectures to be Delivered	39 (39-L for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University	Internal Assessment
Maximum Marks	70	30	-	-
Minimum Pass Marks	35	-	-	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.

candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-224 Theory

1. Introduction, development, present status and future scope of pharmacognosy.

2. Introduction to following groups of plant constituents: Carbohydrates, glycosides, tannins, lipids, volatile oils, terpenes, resins combinations, steroids, alkaloids, flavonoids, anthraquinones, coumarins, saponins gums & mucilages: Definitions of selected botanical terms.

3. Sources of drugs: Terrestrial Marine and Microbial.

4. A brief introduction to principles of classification of plants, and salient taxonomic characters of following groups with biological source, chemical constituents and uses of the drugs listed:
4.1Thallophytes:
(a)Algae-Diatoms, Agar and Alginic Acid.
(b)Fungi-Ergot, Yeast and Mushrooms.
4.2 Pteridophytes : Male fern
4.3 Spermatophytes :
(a) Gymnosperms – Distinguishing characters and medicinal importance of families Pinaceae and Gnetaceae.
(b)Angiosperms– Distinguishing characters of the following families covering important medicinal plants with special reference to their biological source, major chemical constituents and uses: Apocynaceae, Compositae, Labiatae, Convolvulaceae, Lilaceae, Leguminosae, Papaveraceae, Rubiaceae, Rutaceae Solanaceae, Scrophulariaceae and Umbelliferae.

5. Techniques in microscopy covering use of mountants, clearing agents, chemomicroscopic reagents, micrometer, quantitative microscopy and a brief introduction to electron microscope.

Study of plant tissues and ergastic cell inclusions with a view to identify and authenticate powdered crude drugs.

Books recommended

1. Kokate CK, Gokhale SB, Purohit AP: *Parmacognosy* 36th edn. Nirali Prakashan, Pune, India.
2. Khandelwal KR (3006): *Practical Pharmacognosy* Techniques and Experiments 16th edn. Nirali Prakashan, Pune, India
3. Arya V, Kaur R. *Kangrian Medicinal Flora*. Ist edn. Pranav Prakashan, Kangra, H.P., India.
4. Evans WC (3002): *Trease and Evan's Pharmacognosy*. 15th edn., Saunder' Elsevier Pvt Ltd. New Delhi-24, India.

PHARMACEUTICS (GENERAL AND DISPENSING PHARMACY)

Name of Course	Pharmaceutics (General and Dispensing Pharmacy)			
Course Code	BPA-225	Contact hours/week	L-3, T-0, P-0	
Lectures to be Delivered	39 (39-L for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University	Internal Assessment
Maximum Marks	70	30	-	-
Minimum Pass Marks	35	-	-	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-225 Theory

General and Dispensing Pharmacy

1. Orientation and Historical Background of the Profession Orientation, introduction and scope of pharmacy profession, official compendia, important historical events which led to the development of this profession from middle ages to the current era.

2. Liquid orals and solutions :

Method of purifying water.

Formulation considerations, manufacturing considerations, organoleptic characteristics, compounding problems including preservation and evaluation. Official pharmaceutical solutions, products for oral, ENT and topical use including syrups, elixirs, glycerin's, mouth washes, gargles, spirits, nasal drops, throat paints, aromatic waters, lotions and liniments,

3. Powder dosage forms: - Standards for powders, sieves and their usage in grading, bulk powders for internal and external use. Dusting powders and insufflations, single dose powders, effervescent powders and granules.

4. Metrology:-Introduction to units of weights and volume in both metric systems and imperial systems. Simple calculation involved in preparing solutions of solids in liquids, liquids in liquids, Method of allegation.

5. Extraction and Extractive:-Various method of extraction: infusion, decoction, maceration, percolation and digestion with reference to official extractives.

6. Prescription :- Description and parts of a prescription, handling the prescription, reading the prescription, checking the written prescription, consulting the prescriber, other methods of receiving prescription, refusal to accept the prescription: compounding the prescription, pricing the prescription, delivering the prescription.

7. Pharmaceutical Incompatibilities:-Physical and Chemical Incompatibilities: Types and methods to overcome them, inorganic incompatibilities including incompatibilities of metals and their salts, non- metals acids and alkalis.

Therapeutic Incompatibilities and Drug Interactions: Food and other factor, interference in clinical laboratory tests. Physical and chemical factors influencing drugs interactions, pharmacodynamic and pharmacokinetic drug interactions.

Books Recommended:-

1. Remington, The Science and Practice of Pharmacy, Mack Publishing Co., U.S.A. (Latest Edition).
2. J.W. Cooper and G. Gunn, Tutorial Pharmacy, 1st edition, 1956, Pitman Books Ltd., London, U.K.
3. S.J. Carter, Dispensing for Pharmaceutical Students, 11th and 12th edition, 1967 and 1975, Pitman Books Ltd., London, U.K.
4. E.W. Martin, Dispensing of Medication, 7th and 8th edition, 1971 and 1982, Marck Publishing Co., Pennsylvania, U.S.A.
5. L. Lachman, H.A. Lieberman and J.L. Kanig, The Theory and Practice of Industrial Pharmacy, Lea and Febiger, Philadelphia, U.S.A. (Latest Edition).
6.H.S. Ansel and N.G. Popvich, Pharmaceutical Dosage forms and Drug Delivery Systems, Baltimore, Md: Lippincott Williams & Wilking (Latest Ediditon).
7. E.A. Rowlins, Bentley's Textbook of Pharmaceutics, Bailliere Tindall and Cox, London, Latest Edition.
8. J.B. Sprowls, Prescription Pharmacy, J.B. Lippincott Company, Philadelphia (Latest Edition)

RASASHASTRA-I

Name of Course	Rasashastra			
Course Code	BPA-216	Contact hours/week		L-3, T-0, P-3
Lectures to be Delivered	78 (39-L, 39-P for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University (3 Hrs.)	Internal Assessment
Maximum Marks	70	30	50	50
Minimum Pass Marks	35	-	25	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-216 Theory

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BPA-216 Practical

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SANSKRIT

Name of Course	Sanskrit			
Course Code	BPA-217		Contact hours/week	L-3, T-0, P-0
Lectures to be Delivered	39 (39-L for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University	Internal Assessment
Maximum Marks	70	30	-	-
Minimum Pass Marks	35	-	-	-

Instructions

For paper setters:

(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.

(ii) Question one should cover the maximum part of the syllabus.

For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

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nn	ifr";k;	enkof}	vfHk';Un	dkeyk	nUr"ky
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SEMESTER- III

DRAVYA GUNA VIGYAN II

Name of Course	Dravya guna vigyana II			
Course Code	BPA-311		Contact hours/week	L-3, T-0, P-3
Lectures to be Delivered	78 (39-L, 39-P for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University (3 Hrs.)	Internal Assessment
Maximum Marks	70	30	50	50
Minimum Pass Marks	35	-	25	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-311 Theory

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vkjXo/k vikekx vtu v"oxU/kk vd vkEkydh vfXueUFk cyk fcYo Hkxjkt /krjk ,yk Xkk{kj xMph xXxy gjhrdh gfjnk T;kfr'erh djchj dfidPN dVt djt dekjh ly{k cãh e.Mdi.kh ikBk ikVyk ogrh pUnu dVdh d.Vdkjh yrkdjt okjkghdUn [kfn fux.Mh fuEc efjp eft"Bk ikjh'k iuuok filiyh jkfgrd lkfjok f"kjh'k "krkojh lixU/kk "k.Mh "k[ki'ih ln"ku ryl h f=or mnEcj o"k opk foHkhrdh fot;lkj foMx ;f'Ve/k fonkjh v"oRFk pUnu eLrd if"ui.kh pØ pkjd /kkrdh oV

BPA-311 Practicals

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PHARMACOGNOSY OF AYURVEDIC DRUGS – I

Name of Course	Pharmacognosy of Ayurvedic Drugs-I			
Course Code	BPA-322	Contact hours/week	L-3, T-0, P-3	
Lectures to be Delivered	78 (39-L, 39-P for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University (3 Hrs.)	Internal Assessment
Maximum Marks	70	30	50	50
Minimum Pass Marks	35	-	25	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-322 Theory

1. Definition; History, Classification and Systematic study of Crude drugs. Cultivation, Collection, Storage, Extraction and Isolation of active constituents of crude drugs.
2. Drugs containing Carbohydrates-
   Starch – Maize, Amrita Satwa, Honey. Gums – Babul niryas, Shalmali niryas. Mucliages – Isabgola, Brihat gokshura, Bilvaphal, Svetamusli.
3. Drugs containing glycosides.
   Anthraquinones – Svarnapatri, Kumari, Manjishta, Aragvadha, Chakramarda. Cardiac – Karavira, Arka, Vanapalandu, Digitalis.
   Saponins – Yashtimadhu, Brahmi, Mandukparni, Varahikhand, Laghugokshura, Apamarga, Arishtaka, Shikakai, Kantakari, Duralabha, Ingudi, Shatavari, Kakmachi. Cyanogenetic- Atasi, Padmakashata.
   Flavonoids – Yashtimadhu, Bhallataka, Karanja, Kalmegh, Palash.
   Coumarians – Bakuchi, Ajamoda.
   Bitters – Kiratikta, Katuki, Guduchi.
4. Drugs containing Volatile Oils
   Umbelliferous fruits – (Dhanyaka, Misreya, Krishna jeerka, Sveta jiraka, Ajamoda, Satahva, Yavani) Lavanga, Jaiphal, Twak, Talisapatra, Tamalpatra, Vastuka, Svetachandana, Vacha, Devadaru, Jatamansi. Nilgiri.
5. Drugs containing Tannis Ashoka Twak, Arjuna, Khadir twak, Karkatasringi, Mayaphal, Haritaki, Bhaibhitak, Amalaki. Khadir niryas.

BPA-322 Practicals

1. Morphological study of the selected drugs mentioned in the syllabus.
2. Microscopically study of the drugs which are underlined.
3. Powder study of the drugs mentioned in theory.
4. Plant cells contents starch, calcium oxalate and calcium carbonate crystals.
5. Leaf trichomes and stomata.

PHARMACEUTICS – PHYSICAL PHARMACY

Name of Course	Pharmaceutics-Physical Pharmacy			
Course Code	BPA-323	Contact hours/week	L-3, T-0, P-3	
Lectures to be Delivered	78 (39-L, 39-P for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University (3 Hrs.)	Internal Assessment
Maximum Marks	70	30	50	50
Minimum Pass Marks	35	-	25	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-323 Theory

Brief introduction to following Topics :

1. Matter- state and selected properties to limited topics.
2. Introduction to different properties of various Ayurvedic preparations e.g. density, viscosity, consistency, homogeneity, refractive index, sugar content.
3. Surface phenomena.
4. Viscosity and rheology.
5. Colloidal dispersion and gells.
6. Coarse dispersion, suspension and emulsions.
7. Solutions.
8. Adsorption,
9. Thermodynamics.
10. Thermo chemistry.
11. Catalysis.
12. Introduction to chemical equilibrium. Refractive index determination, density determination, viscosity determination; use of screw gauge, vernier caliper, hardness and disintegration of tablets.

BPA-323 Practical

1. Refractive index determination.
2. Density determination
3. Viscosity determination
4. Use of screw gauge, vernire caliper.
5. Hardness & disintegration of tablets and pills

Book Recommended

1. Tutorial Pharmacy – Cooper and Gunn.
2. Physical Pharmaceutics – Shotton and Ridgway.
3. Physical Pharmacy – Mertin and others.
4. Remington's Pharmaceutical Sciences.
5. Text book of Physical Pharmaceutics – C.V.S. Subrahmanyam.

PHARMACOLOGY-1

Name of Course	Pharmacology-I			
Course Code	BPA-324		Contact hours/week	L-3, T-0, P-0
Lectures to be Delivered	39 (39-L for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University	Internal Assessment
Maximum Marks	70	30	-	-
Minimum Pass Marks	35	-	-	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-324 Theory

1. Introduction: Definition, scope and development of pharmacological thought (historical development).
ADME : Drug absorption, bioavailability, bioequivalence, route of drug administration, Plasma protein binding, half life of drug, biotransformation and cytochrome P450 monooxygenase system and excretion of drug.
2. Molecular Pharmacology: Molecular mechanisms of drug action, receptors, theory of receptors, dose response relationship. Affinity constants, potentiation, antagonism phenomenon.
3. Pharmacology of Autonomic Nervous System: Autonomic neurotransmission, parasympathomimetics, parasympatholytics, sympathomimetics, sympatholytics ganglion transmission and blocker, neuromuscular blocking agents and antispasticity drugs.
4. Pharmacology of Central Nervous System : Synaptic transmission in the CNS, general anaesthetics, hypnosedatives, analgesics, antipyretics, anti- inflammatory agents and drugs used in gout, anti epileptics, anti-parkinsonian drugs, psychopharmacological agents (antipsychotics, antianxiety and antidepressant agents), CNS stimulants and hallucinogens.
5. Local anaesthetics.
6. Histamine and antihistamine

Books Recommended
1. C.R. Craig and R.E. Sttizal, Modern Pharmacology, Little Brown and Company, 6th Ed. (3003).
2. Goodman & Gilman's "The Pharmacological Basis of Therapeutics", Ninth Edition, Eds. A.G. Gilman, 3. J.G. Hardman, L.E. Limbird, P.B. Molinoff, R.W. Ruddon, Macmillian Publishing Co. Inc. (3001).
4. B.G. Katzung, Basic and Clinical Pharmacology, Lange Medical Publications, 8th Ed. (3000).

PHARMACEUTICAL STATISTICS

Name of Course	Pharmaceutical Statistics			
Course Code	BPA-335		Contact hours/week	L-3, T-0, P-0
Lectures to be Delivered	78 (39-L, 39-P for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University (3 Hrs.)	Internal Assessment
Maximum Marks	70	30	-	-
Minimum Pass Marks	35	-		-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-335 Theory

1. The concepts, mathematical computation (wherever applicable) and pharmaceutical applications (wherever possible) on :
Significant digits and rounding of numbers, collection of primary and secondary data through experiments on surveys, sampling and complete enumeration survey, merits and limitations of various random and non random sampling methods, data organization including frequency distributions and tabulation, diagrammatic representation of data, simple, multiple, sub divided and floating bar diagrams, pie diagrams, 2-D and 3-D pictographic representation, graphs of frequency and cumulative frequency distributions.

2. Measures of central tendency, ideal characteristics, mean, median, mode, GM, HM and weighted arithmetic mean from discrete and continuous, frequency distributions, quartiles, deciles and percentiles, measures of dispersion, range, quartile, deviation, mean deviation, standard deviation, calculation of standard deviation from discrete and continuous frequency distribution, standard error of means, coefficient of variation.

3. Probability and events, Baye's theorem, probability theorems, elements of binomial and Poisson distribution, normal distribution, normal distribution curve and properties, calculation of areas under normal curve and standard normal variate (Z statistic), confidence limits, deviations from normality, kurtosis and skewness, elements of central limit theorem.

4. Linear correlation and regression analysis scatter plots, method of least squares, Pearsonian coefficients of correlation and determination, definitions of amount of explained variance, standard error of estimate and significances of regression (F)

5. Statistical inference, Type-I and II errors, Student's t-test (paired and unpaired), F-test one way and two way ANOVA. Nonparametric tests, Sign test, Chi square test, Wilcoxon signed rank test, Mann Whiteny test, Spearman's rank correlation.

Books Recommended
1. S. Bolton, Pharmaceutical Statistics, Practical and Clinical Applications, Marcel Dekker, N.Y., 1990.
2. S.P. Gupta, Statistical Methods, Sultan Chand & Co., New Delhi, 1990.
3. W.W. Daniel, Biostatics: A Foundation for Analysis in Health Science, John Wiley, N.Y., 1983.

RASASHASTRA-II

Name of Course	Rasashastra-II			
Course Code	BPA-316	Contact hours/week		L-3, T-0, P-3
Lectures to be Delivered	78 (39-L, 39-P for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University (3 Hrs.)	Internal Assessment
Maximum Marks	70	30	50	50
Minimum Pass Marks	35	-	25	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-316 Theory

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BPA-316 Practical

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HUMAN VALUES AND PROFESSIONAL ETHICS

Name of Course	Human values and Professional Ethics			
Course Code	BPA-337	Contact hours/week	L-3, T-0, P-3	
Lectures to be Delivered	78 (39-L, 39-P for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University (3 Hrs.)	Internal Assessment
Maximum Marks	70	30	50	50
Minimum Pass Marks	35	-	25	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-337 Theory

Module 1: Course Introduction - Need, Basic Guidelines, Content and Process for Value Education.

1. Understanding the need, basic guidelines, content and process for Value Education
2. Self Exploration-what is it?- its content and process;* Natural Acceptance* and Experiential Validation- as the mechanism for self exploration.
3. Continuous Happiness and Prosperity- A look at basic Human Aspirations
4. Right understanding. Relationship and Physical Facilities- the basic Requirements for fulillment of aspirations of every human being with their correct priority
5. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario.
6. Method to fulill the above human aspirations: understanding and living in harmony at various levels.

Module 2: Understanding Harmony in the Human Being - Harmony in Myself!

7. Understanding human being as a co-existence of the sentient T and the Material 'Body'
8. Understanding the needs of Self (T) and 'Body* - Sukh and Suvidha
9. Understanding the Body as an instrument of T (I being the doer, seer and enjoyer)
10. Understanding the characteristics and activities of T and harmony in T
11. Understanding the harmony of I with the Body: Sanyam and Swasthya: Correct appraisal of Physical needs, meaning of Prosperity in detail.
12. Programs to ensure Sanyam and Swasthya - Practice Rxercises and Case Studies will be taken up in Practice Sessions.

Module 3: Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship

13. Understanding harmony in the Family- the basic unit of human interaction

14. Understanding values in human-human relationship: meaning of Nyaya and Program for its fulillment to ensure Uhhay-tripfi: Trust (Vishwas) and Respect {Sammanj as thefoundational values of relationship
15. Understanding the meaning of Vishwas; Difference between intention and competence
16. Understanding the meaning of Samman. Difference between respect and differentiation; the other salient values in relationship
17. Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi. Abhay. Sah-asfitva as comprehensive Human Goals
18. Visualizing a universal harmonious order in socieh- Undivided Society{Akhand Samaj). Universal Order (Sarvabhawn Vyawastha)- from family to world family!

Module 4: Understanding Harmony in the Nature and Existence-Whole existence as Co-existence

19. Understanding the harmony in the Nature
20. Interconncctcdness and mutual fulillment among the four orders of nature – recyclability and self- regulation in nature.
21. Understanding Existence as Co-existence (Sah-asfitva) of mutually interacting units in all pervasive space
22. Holistic perception of harmony at all levels of existence Practice Exercises and Case Studies will be taken up in Practice Sessions.

Module 5: Implications of the above Holistic Understanding of Harmony on Professional Ethics

23. Natural acceptance of human values
24. Deinitiveness of Ethical Human Conduct
25. Basis for Humanistic Education. Humanistic Constitution and Humanistic Universal Order
26. Competence in professional ethics:
a) Ability to utilize the professional competence for augmenting universal human order.
b) Ability to identify the scope and characteristics of people-friendly and ecofriendly production systems.
c) Ability to identify and develop appropriate technologies and management patterns for above production systems.
27. Case studies of typical holistic technologies, management models and production systems
28. Strategy for transition from the present state to Universal I luman Order:
a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers
b) At the level of society: as mutually enriching institutions and organizations

BPA-337 Practical

Module 1: Course Introduction - Need, Basic Guidelines, Content and Process for Value Education

Module 2: Understanding Harmony in the Human Being - Harmony in Myself!

Module 3: Understanding Harmony in the Family and Society- Harmony in HumanHuman Relationship

Module 4: Understanding Harmony in the Nature and Existence - Whole existence as Co-existence

Module 5: Implications of the above Holistic Understanding of Harmony at all Levels of Existence

Text Book and Reference Material:

1. The text book: R R Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics, Excel Books Private Limited, New Delhi.

2. Teacher's manual: R R Gaur. R Sangal, G P Bagaria. 2009, Teacher's Manual: A Foundation Course in Human Values and Professional Ethics. Excel Books Private Limited. New Delhi.

Video CD of Teacher Orientation Workshop will be made available on website.

Reference Books

1. Ivan Illich,1974, Energy & Equity. The Tinity Press, Worcester, and HarperCollins, USA

2. E.F. Schumacher, 1973, Small is Beautful: a study of economics as fpeople mattered. Blond & Briggs, Britain.

3. Sussan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986, 1991

4. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Bchrens III. 1972, Limits to Growth - Club of Rome's report. Universe Books.

5. A Nagraj, 1998, Jeevan Vidya ek Parichay, Divya Path Sansthan, Amarkantak.

6. P L Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Purblishers.

7.A N Tripathy, 2003, Human Values. New Age International Publishers.

8. Subhas Palekar, 2000, How to practice Natural Farming. Pracheen(Vaidik) Krishi Tantra Shodh, Amravati.

9.E G Seebauer & Robert L. Berry, 2000, Fundamentals of Ethics or Scientists & Engineers, Oxford University Press

10. M Govindrajran, S Natrajan & V.S. Senthil Kumar, Engineering Ethichs (including Human Values). Eastern Economy Edition, Prentice Hall of India Ltd.

11.B P Banerjee, 2005, Foundations of Ethics and Management. Excel Books.

12.B L Bajpai. 2004, Indian Ethos and Modern Management, New Royal Book Co. Lucknow. Repinted 2008.

Relevant websites, CDs, Movies and Documentaries:

1. Value Education website, http://www.uptu.ac.in
2. Story of Stuff, http://www.storyofsiuf.com
3. Al Gore, An Inconvenient Truth. Paramount Classics, USA
4. Charlie Chaplin, Modern Times. United Artists, USA
5. IIT Delhi. Modern Technology - the Untold Story
6. Anand Gandhi, Right here right now. Cyclewala production

SEMESTER- IV

PHARMACEUTICAL BIOCHEMICAL ANALYSIS OF AYURVEDIC DRUGS-I

Name of Course	Pharmaceutical Biochemical Analysis of Ayurvedic Drugs-I			
Course Code	BPA-421	Contact hours/week	L-3, T-0, P-3	
Lectures to be Delivered	78 (39-L, 39-P for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University (3 Hrs.)	Internal Assessment
Maximum Marks	70	30	50	50
Minimum Pass Marks	35	-	25	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-421 Theory

Biochemical Analysis
1. Introduction of different methods of chromatographic technique.
2. Determination of different physico-chemical parameters like foreign matter, loss on drying, total ash content, acid insoluble ash, extractive values, particle consistency, total solid content, fluorescence analysis.
3. Determination of volatile oil content.
4. Determination of alcohol content.
5. Refractive index and its determination.
6. Analysis of sugar contents
7. Estimation of oil and fats. Analysis of different Ayurvedic formulations like tablets, pills, asavas, aristhas, avaleha, oils ghritas, etc.
8. Methods for analysis of raw materials and single Ayurvedic drugs.
9. Introduction of Bioassay of drugs by using animals.
10. Methodology to study toxicity of Ayurvedic drugs.
11. Concept of heavy metal toxicity.

BPA-421 Practical

1. Determination of different physico-chemical parameters like foreign matter, loss on drying, total ash content, acid insoluble ash, extractive values, particle consistency, total solid content, fluorescence analysis, foaming index, swelling index.
2. Determination of volatile oil content.

Books Recommended
1. The Ayurvedic Pharmacopoeia of India, Govt. of India Publication.
2. Different Pharmacopoeias like I.P., B.P. etc.
3. A.O.A.C.

APPLIED PHYSIOLOGY

Name of Course	Applied			
Course Code	BPA-422		Contact hours/week	L-3, T-0, P-3
Lectures to be Delivered	78 (39-L, 39-P for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University (3 Hrs.)	Internal Assessment
Maximum Marks	70	30	50	50
Minimum Pass Marks	35	-	25	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-422 Theory

Applied Physiology
1. General Physiology: Cell, Membrane Potential, Molecular Biology, Diffusion, Osmosis. Blood: Blood Composition, immunity, Homeostasis, Coagulation of Blood, Bleeding disorders, Blood Transfusion.
2. Respiratory system: Control of ventilation, Carriage of O2 and CO2 by blood and their exchange at tissue level, Applied Physiology and Non- Respiratory function of lung.
3. C.V.S. : Investigational Technics Physiological Basis, Physiological Adjustment, Pathological conditions (Circulatory Shock), Postural Hypotension, Arteriosclerosis, Angina cardiac
4. C.N.S. : Extrapyramidal tracts, Reticular activating system, Epilepsy, Mental Depression, Schizophrenia.
5. Endocrines : Hypo and Hyper function of Endocrine glands
6. Metabolism: BMR, LFT, Diet and Nutrition, Vitamins.
7. Excretory system : Regulation of Plasma, Serum Electrolyte, Acid Base Balance, Endocrinal Influence on Renal function, Acidosis, Alkalosis.
8. Muscles and Exercise Physiology: Characteristics and properties of skeletal Muscles. Nerve Muscles 9.Physiology .Physiology of exercise (Work Physiology).
15.Thermoregulation and other Behaviors, C.S.F. and Blood Brain Barrier.

BPA-422 Practical

1. Urine Analysis
2. Blood Biochemistry
3. E.C.G., E.F.G., E.M.C.

PHARMACOGNOSY OF AYURVEDIC DRUGS – II

Name of Course	Pharmacognosy of Ayurvedic Dugs-II			
Course Code	BPA-423	Contact hours/week	L-3, T-0, P-3	
Lectures to be Delivered	78 (39-L, 39-P for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University (3 Hrs.)	Internal Assessment
Maximum Marks	70	30	50	50
Minimum Pass Marks	35	-	25	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-423 Theory

1. Knowledge of Alkaoids present in : Vasaka, Datura, Indrayava, Parasikayavani, Arkapatri, Kutaja, Kupilu (Karaskara), Soma (Ephedra), Patha Puga, Maricha, Vatsanabha, Ativisha, Ahiphena, Punarnava, Shankhapuspi, Sarpagandha, and Daruharidra.
2. Knowledge of Volatile oils aromatic oils/Resin/Resin Combinations Present in – Musta, Kulanjana, Kushtha, Ardraka, Haridra, Trivrit, Vijaya, Indravaruni, Vidanga, Kampillaka, Nagakesara, Guggulu, Shallaki, Sarala, Sarjarasa, Hingu.
3. Fixed oils and Waxes
Present in – Eranda, Tila, Karanja, Nimba, Jyotishmati, Madhucchishta (beeswax).
Miscellaneous– Atmagupta, Gunja.
4.Factors affecting drug Constituents.
5. Evaluation of the crude drugs
6.Quantitative microscopy – Veinislet number, Palisade ratio, Stomatal index, Measurement of elements like Trichomes, Crystals, Xylem vessel, Fiber, Stone cell etc.
7.Rasayana, Anticancer and Adaptogenic drugs.
8. Natural Pesticides and Allergens.

BPA-423 Practical

1. Systematic morphological and microscopic study underlined from the list mentioned above.
2. Powder study of the drugs mentioned in theory.
3. Plant cells contents starch, calcium oxalate and calcium carbonate crystals.
4. Leaf trichomes and stomata.
5. Determination of Vein islet number and Vein termination number.
6. Determination of Stomotal index and Palisade ratio.

Books recommended

1. Kokate CK, Gokhale SB, Purohit AP: *Parmacognosy* 36th edn. Nirali Prakashan, Pune, India.
2. Khandelwal KR (3006): *Practical Pharmacognosy* Techniques and Experiments 16th edn. Nirali Prakashan, Pune, India
3. Arya V, Kaur R. *Kangrian Medicinal Flora*. Ist edn. Pranav Prakashan, Kangra, H.P., India.
4. Evans WC (3002): *Trease and Evan's Pharmacognosy*. 15th edn., Saunder' Elsevier Pvt Ltd. New Delhi-24, India.

PHARMACEUTICS - PRINCIPLES OF PHARMACEUTICAL OPERATIONS.

Name of Course	Phrmaceutics-Principles of Pharmaceutical Operations			
Course Code	BPA-424	Contact hours/week		L-3, T-0, P-0
Lectures to be Delivered	39 (39-L for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University	Internal Assessment
Maximum Marks	70	30	-	-
Minimum Pass Marks	35	-	-	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-424 Theory

1. Introduction: Fundamental principles/laws, simple cases of material and energy balances applied on single units, unit conversions.
2. Fluid Flow: Manometers, (U-tube, differential and inclined tube), concept of boundary layer, basic equations of fluid flow, valves, pumps-gear, reciprocating and centrifugal, flow meters.
3. Mixing: Theories of mixing devices (propellers, turbines and paddles), power estimations, selection of a mixing device, mixing of solids.
4. Centrifugation: Principles of centrifugation, industrial centrifuges.
5. Filtration : Theory of filtration, filter aids, filtering media and various filters, plate and frame filter press, rotary drum filters, metafilters, filter candles, ultrafiltration, nanofiltration.
6. Comminution: Laws governing energy and power requirements, types of mills, factors governing the selection of a mill type.
7. Phase equilibria for gas liquid systems: Experimental measurement, estimation using simple laws like Raoult's law, Henry's law, and representation of this data graphically in various forms. Theory of distillation of mixtures, plate, continuous contact system, differential distillation, vacuum distillation, flash distillation, fractional distillation, azeotropic and extraction distillation, molecular distillation, basic concepts.
8. Basic laws of heat transfer: Conduction, convection and radiation, concept of fluid film resistances, simple problems based on these laws, double pipe heat exchanger, shell tube heat exchanger, finned tube heat exchanger.
9. Evaporation: Principles, elevation in boiling points, single and multiple effect evaporation principle, steam economy and evaporator capacity, evaporation still, forced circulation, climbing and falling film agitated film evaporators.
10. Drying : Concept of moisture content, bound and unbound moisture, critical and equilibrium moisture content, drying a batch of solid under constant drying conditions and simple problems

based on this, spray dryer, drum dryer, rotating drum dryer, fluidized bed dryer and tray dryer, sublimation and freeze drying.
11. Psychrometry: Definition humidification and dehumidification, operations, use of psychometric of humidity charts, spray chamber for conditioning air for the storage of pharmaceutical materials.
12. Extraction: Extractors, flow sheet of an extraction plant, liquid- extraction towers, solid-solid extraction, counter current multistage extractors.
13.Refrigeration: Principle of refrigeration and air conditioning, equipment and applications in pharmacy.
Materials for pharmaceutical plant construction: Factors affecting the choice for selection of material, metals, ferrous and nonferrous metals including alloys, nonmetals including plastics, glass, rubber wood, etc.

Books Recommended:-

1. McCabe and Smith, Unit Operation for Chemical Engineering, 6th edition, McGraw Hill, N.Y.
2. G. Gunn and S.J. Carter and Gunn's Tutorial Pharmacy, Pitman Medical Publishing Co., London, 1972.
3. L.A. Lachman, H.A. Liberman and J.L. Kanig, the theory and practice of industrial Pharmacy, 3rd edition, Lea and Febiger, Philadelphia, U.S.A.
4. Badger, Introduction to Chemical Engineering, McGraw Hill Co. International Student edition (Latest edition).
5. E.A. Rowlins, Bentley' Text Book of Pharmaceutics, Bailliere Tindall and Cox, London (Latest Edition).
6. K. Sambamurthy, Pharmaceutical Engineering, New age Int. Publishers, New Delhi, 3003.

RASASHASTRA – III

Name of Course	Rasashastra-III			
Course Code	BPA-415		Contact hours/week	L-3, T-0, P-3
Lectures to be Delivered	78 (39-L, 39-P for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University (3 Hrs.)	Internal Assessment
Maximum Marks	70	30	50	50
Minimum Pass Marks	35	-	25	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-415 Theory

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BPA-355 Practical

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2. Project work –regarding ayurvedic drug strandardisation
3. And educational tour to any drug research lab outside the state.

DRAVYA GUNA VIGYAN – III

Name of Course	Dravya guna Vigyan-III			
Course Code	BPA-416	Contact hours/week	L-3, T-0, P-3	
Lectures to be Delivered	78 (39-L, 39-P for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University (3 Hrs.)	Internal Assessment
Maximum Marks	70	30	50	50
Minimum Pass Marks	35	-	25	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

Theory

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BPA-416

Practicals

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Semester- Vth

PHARMACOGNOSY-III

Name of Course	Pharmacognosy-III			
Course Code	BPA-521		Contact hours/week	L-3, T-0, P-3
Lectures to be Delivered	78 (39-L, 39-P for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University (3 Hrs.)	Internal Assessment
Maximum Marks	70	30	50	50
Minimum Pass Marks	35	-	25	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-521 Theory

1. Study of the biological sources, chemical constituents and uses of drugs given under 1.1 and 1.2 and study of cultivation, collection, substitutes, adulterants, diagnostic macroscopic and microscopic features and chemical tests for identity of drugs printed in bold and in brackets.
2. Glycoside Containing Drugs.
3. Saponin containing drugs : Senega, Dioscorea and (Glycyrrhiza).
4. Cardioactive drugs : Squill, Strophanthus, Thevetia and (Digitalis).
5. Anthraquinone cathartics : Rhubarb and Cascara, (Aloe and Senna).
6. Alkaloid Containing Drugs.
 a. Pyridine- piperidine group : Tabacco, Areca and Lobelia.
 b. Tropane group : Belladonna, Hyoscyamus, Coca and (Datura).
 c. Quinoline, isoquinoline group : Ipecac, (Cinchona and Opium).
 d. Indole group: Pilocarpus.
 e. Imidazole group: Pilocarpus.
 f. Steroidal group: Veratrum Kurchi Bark and Guggulu.
 g. Alkaloidal amine group : Ephedra and (Cilchicum).
7. Volatile Oils: Biological sources, chemical constituents, substitutes, allied drugs, Adulterants and uses of the following drugs : Orange peel, cinnamon, nutmeg, eucalyptus, cardamom, fennel, dill and clove.
8. Biological sources, chemical constituents and uses of the following volatile oils used in perfumery: Rose oil, lavender oil, patchouli oil, sandalwood oil, lemongrass oil, orange oil, jasmine oil, geranium oil.

9. Study of botanical sources including alternative, controversial sources, chemical constituents and therapeutic uses of the following indigenous traditional Drugs: Amla, Behera, Harad, Ashwagandha, Babchi, Brahmi] Vasaka, Bach, Tulsi, Shatavar, Shankhpushpi, Kutaki, Kalmegh, Gokhru, Chirata, Ashoka, Jatamansi, Kuth and Gilo.

Books Recommended

1. V.E. Tyler, L.R. Brady & J.E. Robbers, Pharmacognosy (9th Edition) K.M. Varghese Company, Bombay, India, 1988.
2. W.C. Evans, Trease and Evans' Pharmacognosy (15th Ed.), W.B. Saunders Limited, 3002.
3. T.E. Wallis, Text Book of Pharmacognosy, J & A Churchill Ltd, London, 1967.
4. C.K.Atal and B.M. Kapur, Cultivation and Utilization of Aromatic Plants, CSIR, India, 1982.
5.Kokate CK, Gokhale SB, Purohit AP: *Parmacognosy* 36th edn. Nirali Prakashan, Pune, India.
6.Khandelwal KR (3006): *Practical Pharmacognosy* Techniques and Experiments 16th edn. Nirali Prakashan, Pune, India
7.Arya V, Kaur R. *Kangrian Medicinal Flora*. Ist edn. Pranav Prakashan, Kangra, H.P., India.

PHARMACEUTICAL ANALYSIS OF AYURVEDIC DRUGS – II

Name of Course	Pharmaceutical Analysis of Ayurvedic Drugs-II			
Course Code	BPA-522	Contact hours/week	L-3, T-0, P-3	
Lectures to be Delivered	78 (39-L, 39-P for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University (3 Hrs.)	Internal Assessment
Maximum Marks	70	30	50	50
Minimum Pass Marks	35	-	25	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-522 Theory

1. Introduction of instrumental Analysis
2. Introduction of U.V. Visible spectrophotometry.
3. Introduction to I.R., N.M.R. & Mass Spectrophotometry.
4. Introduction of pH metry, Potentiometry Fuorimetry.
5. Introduction of Flame Photometry, phosporimetry, turbidimetry, nephelometry.
6. Chromatography- Liquid Chromatography, T.L.C., Paper Chromatography, Gas Chromatography, Ion-exchange Chromatography.
7. Introduction of Polarography.
8. Use of Chromatographic & Spectrophotometric methods for Standardization and evaluating quality of Ayurvedic Drugs.

BPA-522 Practical

Use of Chromatographic technique for Standardization and evaluating quality of Ayurvedic Drugs.

Books Recommended
1. Instrumental methods of analysis- Willard, Merrit, Dean.
2. Practical Pharmaceutical Chemistry – Part-II – Beckett and Stenlake.
3. Instrumental methods of Chemical Analysis – Ewing.
4. A Text- book of Pharmaceutical Analysis- Connors.
5. Pharmaceutical Analysis – Dr. S. Ravishankar.
6. Pharmaceutical Analysis – Dr. A.V. Kasture.

PHARMACEUTICAL TECHNOLOGY FOR AYURVEDIC DRUGS-I

Name of Course	Pharmaceutical Technology for Ayurvedic Drugs-I			
Course Code	BPA523	Contact hours/week	L-3, T-0, P-3	
Lectures to be Delivered	78 (39-L, 39-P for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University (3 Hrs.)	Internal Assessment
Maximum Marks	70	30	50	50
Minimum Pass Marks	35	-	25	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-523 Theory

1. Pharmaceutical aerosols : Definitions, propellants, manufacturing and packaging methods.
2. Ophthalmic preparations and ENT preparations: Requirements, methods of preparations, containers.
3. Cosmetic formulations: Creams, powders, moisturizers.
4. Suppositories and Preservatives
5. Packing materials.
6. Tablet and tablet coating
6. Capsules: Hard gelatin, Soft gelatin, filling technique etc.

BPA-523 Practical

1. Preparation of Creams,
2. Preparation of shampoo,
3. Preparation of tablets.
4. Official tests for tablets and capsules

Book Recommended

1. Remington's Pharmaceutical Sciences.
2. Industrial Pharmacy – Lachman and others.
3. Physical Pharmaceutics – Shotton and Ridgway.
4. American pharmacy – Sprowis and Beal.

DRAVYAGUNA VIGYANA – IV

Name of Course	Dravya guna Vigyana-IV			
Course Code	BPA 514		Contact hours/week	L-3, T-0, P-3
Lectures to be Delivered	78 (39-L, 39-P for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University (3 Hrs.)	Internal Assessment
Maximum Marks	70	30	50	50
Minimum Pass Marks	35	-	25	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

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BPA-514 **Practicals**

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RASASHASTRA –IV

Name of Course	Rasashastra-IV			
Course Code	BPA 515		Contact hours/week	L-3, T-0, P-3
Lectures to be Delivered	78 (39-L, 39-P for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University (3 Hrs.)	Internal Assessment
Maximum Marks	70	30	50	50
Minimum Pass Marks	35	-	25	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-515 Theory

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BPA-515 Practical

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SEMESTER – VI
PHARMACEUTICAL ENGINEERING

Name of Course	Pharmaceutical Engineering			
Course Code	BPA 621		Contact hours/week	L-3, T-0, P-0
Lectures to be Delivered	78 (39-L, 39-P for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University	Internal Assessment
Maximum Marks	70	30	-	-
Minimum Pass Marks	35	-	-	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-621 Theory

1. Size reduction – objectives, factors affecting, energy requirement, mechanism, methods-cutting-roller, mill hamour, mill-ball, mill-fluid energy, mill-colloid mill edge runner mill, selection of equipments, selection of degree of size reduction.
2.Size separation.
3. Leaching and extraction.
4. Evaporation.
5. Distillation and condensation.
6. Crystallization.
7. Small scale emulsifiers.

Books Recommended

1. Tutorial Pharmacy – Carter,
2. Industrial Pharmacy – Lachman and others.
3. Elementary Chemical Engineering – Peters (for mathematical problems).
4. Hand-book of Chemical Engineering – Parry.
5. Unit operations of Chemical Engineering – Mccabe and Smith.

PHARMACOLOGY & TOXICOLOGY OF AYURVEDIC DRUGS-1

Name of Course	Pharmacology & Toxicology of Ayurvedic Drugs-I			
Course Code	BPA 622	Contact hours/week	L-3, T-0, P-0	
Lectures to be Delivered	39 (39-L for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University	Internal Assessment
Maximum Marks	70	30	-	-
Minimum Pass Marks	35	-	-	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-622 Theory

1. General introduction to pharmacology and its role in the field of Ayurveda.
2. Definitions.
3. Nature and source of drugs
4. Routes of drug administration.
5. Drug transport and storage.
6. Biotransformation (drug metabolism) – different types and factors modifying it.
7. Drug excretion.
8. Site and mechanism of drug action including study of drug receptors.
9. Factors modifying effect of drugs.
10. Drug interactions
11. Type of drugs for the treatment of GI tract diseases.
    Appetizers, Digestants, carminatives, Emetics, anti-emetics. Laxative & anti-diarrhoea, Pharmacotherapy of peptic ulcer.

BHAISHAJYA KALPNA – II

Name of Course	Bhaishjaya Kalpna-II			
Course Code	BPA 613		Contact hours/week	L-3, T-0, P-3
Lectures to be Delivered	78 (39-L, 39-P for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University (3 Hrs.)	Internal Assessment
Maximum Marks	70	30	50	50
Minimum Pass Marks	35	-	25	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-613 Theory

½1½ ipfo/k d'kk; dYiuk & ifjHkk"kk] cuku dh fofo/k fof/k;k] ek=k] mi;kx ,o egRoA
½2½ eku ifjHkk"kk] fofHkUu eku] vk/kfud ekuk l vU; ekuk dk ryukRed v/;;uA
½3½ fofo/k ;kxk dh loh;rk vof/k lEcU/kh KkuA
½4½ fofo/k Hk'kT; dYiukvk dk ifjp;] ifjHkk'kk] fuek.k fof/k] x.k] ek=k] mi;kx ,o loh;rk vof/k dk KkuA
½5½ vk;onh; lj{kd n0; ,o lj{k.k fof/k;k dk KkuA

BPA-613 Practical

Lojl] DokFk] dYd] fge] QkUV] "kMxikuh;] m".knd] r.Mykn] yk{kkjl] ekljl] eFk] vk"k/k fl)ikuh;] vk"k/kfl) ;"k] vd ikud] 'kdjk] {khj] ieF;k] jlfØ;k] Qkf.kr] ?ku] lRo] p.k] xM] ikd dk fuek.k lc/kh KkuA

PHARMACEUTICAL MICROBIOLOGY

Name of Course	Pharmaceutical Microbiology			
Course Code	BPA 624	Contact hours/week	L-3, T-0, P-3	
Lectures to be Delivered	78 (39-L, 39-P for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University (3 Hrs.)	Internal Assessment
Maximum Marks	70	30	50	50
Minimum Pass Marks	35	-	25	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-624 Theory

1. Introduction to the science of Microbiology.
2. Microscopy: - Microscopies, their magnification, resolution, illumination and filters, working of different types of microscopes, micrometry.
3. Classification of microbes and their taxonomy – Protozoa, fungi, actinomycetes, bacteria, ricketssia spirochaetes and viruses.
4. Nutrition, cultivation, isolation and identification of bacteria, actnomycets, fungi, viruses.
5. Bacterial enzymes.
6. Control of microbes by physical and chemical methods.
7. Disinfection, factors influencing disinfection, dynamics of disinfection, disinfectants and antiseptic and their evaluation.
8. Sterilization, different methods, evaluation of sterilization methods.
9. Sterility testing of Pharmaceutical products.
10. Microbial attach and host defence, virulence and pathogenicity, primary and specific defensive mechanisms of body, infection and its transmission, interferon's.

BPA-624 Practicals

Experience devised to prepare various types of culture media, sub-culturing of common aerobic and anaerobic bacteria, fungus and yeast, various staining methods of isolation and identification of microbes, sterilizing techniques and evaluation of sterilizing techniques, evaluation of antiseptics and disinfectants, testing the sterility of Pharmaceutical products, evaluation of potency of antibiotics.

Books Recommended
1. Text-book of Microbiology – Frobisher.
2. Laboratory Manual of Bacteriology – Salle.
3. Tutorial Pharmacy – Carter.

PHARMACOGNOSY –IV

Name of Course	Pharmacognosy-IV			
Course Code	BPA 650	Contact hours/week	L-3, T-0, P-3	
Lectures to be Delivered	78 (39-L, 39-P for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University (3 Hrs.)	Internal Assessment
Maximum Marks	70	30	50	50
Minimum Pass Marks	35	-	25	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-650 Theory

1. Study of mevalonic and shikimic acid pathways with special reference to the biosynthesis of : Cinchona and tropane alkaloids, digitalis glycosides, flavonoids and terpenoids.
2. Biological sources, preparation, identification tests and uses of the following enzymes: Papain, pepsin, papcreatin.
3. Plant derived insecticides.
4. Introduction to plant tissue culture techniques.
5. Introduction to different classes of plant growth regulators and their physiological role.
6. Study and applications of following chromatography, paper chromatography and droplet counter current chromatography.
7. Role of organoleptic and microscopic characters, ash values and extractive values in standardization of crude drugs.
8. Plant adaptogens.

BPA-650

Pharmacognosy practicals
1. Pharmacognostic study of some important drugs covered in theory.
2. Microscopic study of mixture of powdered crude drugs for identification.
3. Gross identification of crude drugs.
4. Exercises on chromatography techniques.

Books Recommended
1. V.E. Tyler, L.R. Brady & J.E. Robbers, Pharmacognosy (9th Edition), K.M. Varghese Company, Bombay, India, 1988.
2. T.E. Wallis, Text Book of Pharmacognosy, J & A Churchill Ltd., London, 1967
3. W.C. Evans, Trease and Evans, Pharmacognosy (14th Ed.) Gopsons Papers Limited, Noida, India, 1997.,
4. Egon Stahl, Thin-Layer Chromatography, 2nd Ed., Springer Verlag, New York, 1969

PHARMACOLOGY –II

Name of Course	Pharmacology-II			
Course Code	BPA 626	Contact hours/week	L-3, T-0, P-0	
Lectures to be Delivered	39 (39-L for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University	Internal Assessment
Maximum Marks	70	30	-	-
Minimum Pass Marks	35	-	-	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-626 Theory

1. Drugs Acting on Blood & Blood Forming Agents :
Coagulants and anticoagulants, Antiplatelet and fibrinolytic drugs, haematinics (iron,Vit. B12 folic acid, Vit. C)

2.Pharmacology of Endocrine System :
Introduction to endocrine Pharmacology, thyroid and antithyroid agents, hormones of pancreas and oral hypoglycemics, adrenocorticosteroids and adrenocortical antagonist, pituitary hormones, gonadal hormones and their inhibitors, oral contraceptives and hormones regulating calcium homeostasis.
3. Chemotherapy:
Chemotherapy of Microbial Diseases: General principle of chemotherapy, Sulphonamides, quinolones, pencillins, cephalosporins, aminoglycosides, protein synthesis inhibitors (tetracyclines), antimalarial drug, drugs for amoebiasis, helminthiasis. Chemotherapy of tuberculosis, leprosy and chemotherapy of antiviral agent including drugs for HIV infection, anticancer drugs, multidrug resistance (MDR).

Books Recommended
1. B.G. Katzung, Basic and clinical Pharmacology, Lange Medical Publications, 3000
2. Goodman & Gilman's, The Pharmacological basis of Therapeutics, Ninth edition, Eds. A.G. Gilman, 3.J.G. Hardman, L.E. Limbird, P.B.Molinoff, R.W. Ruddor, Macmillan Publishing Co.,Inc., (3000).
4.C.R. Craig and R.E. Stitzel, Modern Pharmacology, Little Brown & Co., (1994).

SEMESTER-VII

PHARMACY ACT RULES & REGULATIONS & PHARMACEUTICAL MANAGEMENT

Name of Course	Pharmacy Act & Regulations & Pharmaceutical Management			
Course Code	BPA 721	Contact hours/week	L-3, T-0, P-0	
Lectures to be Delivered	39 (39-L for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University	Internal Assessment
Maximum Marks	70	30	-	-
Minimum Pass Marks	35	-	-	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-721 Theory

Forensic Pharmacy - Acts, Rules & Regulations –

1. Pharmaceutical legislation – history and background.
2. The Pharmacy Act- objectives and contents.
3. Narcotic drug legislation.
4. Drugs and Cosmetics Act and rules there under : implementation machinery.
5. Shops & Establishment Act.
6. Poisonous drugs Act.
7. Code of Pharmaceutical ethics.
8. Prevention of cruelty to Animals Act.
9. Drug & Magic remedies.

Pharmaceutical Management

10. Plant location & lay-out of an industry-various affecting location aspect, layout of building and equipments. Product layout v/s. process layout.
11. Introduction planning & control – scientific purchasing, quality control, problems of productivity stores organization, location of store, receiving and issues from the store and control of stores and stocks.
12. Personnel management – selection, appointment, training, transfer, promotion, demotion policies, remuneration, job evaluation.
13. Sales organization – market definition – different approaches to the study of marketing, Institutional approach; manufacture's methods of marketing, wholesalers, retailer, functional approach various functions of marketing – cost & efficiency in marketing, commodity approach.
14. Distribution policies – selective & exclusive distribution, pricing & discount policies, credit policies, trade identification marks, patent policies.
15. Sales promotion policies – advertisement, detailing, sampling, window and interior display, advertisement to physicians, professional persons, consumers.
16. Budgets and budgetary controls

PHARMACEUTICAL TECHNOLOGY FOR AYURVEDIC DRUGS- II

Name of Course	Pharmaceutical Technology for Ayurvedic Drugs-II			
Course Code	BPA 722		Contact hours/week	L-3, T-0, P-3
Lectures to be Delivered	78 (39-L, 39-P for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University (3 Hrs.)	Internal Assessment
Maximum Marks	70	30	50	50
Minimum Pass Marks	35	-	25	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-722 Theory

1. Parentrals – Product requiring sterile packing. Definition type advantage & limitation. General formulation, vehicle, production procedure, production facilities, control tests.
2. Sustained release formulation.
3. Microencapsulation.
4. Noval Drug Delivery system.
5. Pilot plan scale up.
6. Reformulation.

BPA-722 Practical

Practicals related with preparation of Microsphere, Gel beads.
Preparation of sustained release, formulation in lab
Preparation of. gastro-retentive , formulation in lab

PHARMACOLOGY & TOXICOLOGY OF AYURVEDIC DRUGS –II

Name of Course	Pharmacology & Toxiclogy for Ayurvedic Drugs-II			
Course Code	BPA 723	Contact hours/week	L-3, T-0, P-0	
Lectures to be Delivered	78 (39-L, 39-P for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University	Internal Assessment
Maximum Marks	70	30	-	-
Minimum Pass Marks	35	-	-	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-723 Theory

1. Drugs used in the treatment of Respiratory tract disorders.
2. Pharmacotherapy of cough.
3. Pharmacotherapy of bronchial asthma and related air way inflammations.
4. Drugs used in the treatment of cardiovascular system
5. Pharmacotherapy of hypertension.
6. Pharmacotherapy of arrhythmia.
7. Pharmacotherapy of cardiac failure.
8. Pharmacotherapy of angina pectoris.
9. Immunomodulation.
10. Anti-inflammatory and anti-rheumatic drugs.

Books Recommended
1. Screening methods in pharmacology I & II R.A. Turner.

PHARMACEUTICAL ANALYSIS OF AYURVEDIC DRUGS-III

Name of Course	Pharmaceutical Analysis of Ayurvedic Drugs-III			
Course Code	BPA 724	Contact hours/week	L-3, T-0, P-3	
Lectures to be Delivered	78 (39-L, 39-P for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University (3 Hrs.)	Internal Assessment
Maximum Marks	70	30	50	50
Minimum Pass Marks	35	-	25	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-724 Theory

1. Standardization and quality control of Ayurvedic drugs, Introduction and background.
2. Parameters include in Ayurvedic Pharmacopoeia of India in Part-I
3. Standardization of raw materials, finished products and packaging materials.
4. Process standardization.
5. In process control
6. Introduction of Good laboratory practices.
7. Introduction of Good manufacturing practice.
8. Introduction of U.V. visible spectrophotometry, I.R., N.M.R. & Mass spectrophometry as applicable to Ayurvedic drugs.
9. Introduction of Atomic absorption spectroscopy.
10. Introduction of HPTLC, Gas chromatography.

BPA-724 Practical

Analysis of different types of Ayurvedic formulations.

Books Recommended

1. The Indian Pharmaceutical Codex, Vol. I-B. Mukherji.
2. The Ayurvedic Formulary of India Part-I & II, Govt. of India Publication.
3. Thin layer Chromatography – A Laboratory hand book, Bpriger International student's edition Japan by E. Sthal.
4. Textbook of Pharmaceutical Analysis – Dr. S. Ravishankar.
5. A text of quantitative inorganic analysis by A.I. Vogel.
6. The quantitative analysis of drugs, by D.C. Garrett.
7. Pharmacopoeia of India, Government of India Publication.
8. The Ayurvedic pharmacopoeia of India Vol-I, Govt. of India Publication.

BHAISHAJYA KALPNA –III

Name of Course	Bhaishjya kalpna-III			
Course Code	BPA-715		Contact hours/week	L-3, T-0, P-3
Lectures to be Delivered	78 (39-L, 39-P for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University (3 Hrs.)	Internal Assessment
Maximum Marks	70	30	50	50
Minimum Pass Marks	35	-	25	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-715 Theory

½1½ iF; dYiuk & eM] i;k] foyihk] ;okx] d”kjk] o”kokj] rØ] efFkr dh fuek.kfof/k ,o mi;kx dk KkuA

½2½ xMikd] voyg] [k.M] ik”k] oVh] ½xfVdk½] ofr] xXxy& dYi] yo.k] elh] v;Ldfr] {kkj l=] {kkj] eyge] ikd dh fuek.k fof/k ,o mi;kx dk KkuA

½3½ e[k jkx lcU/kh fofo/k dYik dk fuek.k ,o mi;kx dk KkuA

BPA-715 Practical

mijkDr fofo/k ;kxk dk fuek.k lc/kh KkuA

VIII – SEMESTER

MEDICINAL CHEMISTRY

Name of Course	Medicinal Chemistry			
Course Code	BPA 821	Contact hours/week	L-3, T-0, P-3	
Lectures to be Delivered	78 (39-L, 39-P for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University (3 Hrs.)	Internal Assessment
Maximum Marks	70	30	50	50
Minimum Pass Marks	35	-	25	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-821 Theory

1. Drug Metabolism
Introduction: general pathways of drugs metabolism; Phase-I (Functionalization) and Phase-II (Conjugation).

a. Phase –I
Oxidative reactions, cytochrome P-450 and Flavin monoxygenases electron transport system; Reductive Reactions.

b. Phase-II
Glucuronic acid conjugation, sulphate conjugation, amino acid conjugation, glutathione conjugation, acetyl conjugation and methyl conjugation.
The following topics shall be treated covering chemical naming, structure activity relationship, physicochemical and stero aspects, mode of action (where are applicable) and uses. The emphasis would be only on B.P. and I.P. compounds. Synthesis of only those drugs given in parentheses under each topic would be covered.

Sulphonamides; development nomenculature and classification, antimicrobial spectrum, drug resistance, synergism with dihydrofolate reductaste inhibitors, toxicity and side effects, sulphamides and trimethoprim combination (Sulphanilamide, sulphacetamide, sulphadiazine, sulphadimethoxine, sulphamethazole and sulphamethoxazole).
Antibiotics: Classification, chloramphenicol, pericillins, cephalosporins, aminoglycosides, tetracyclines, polypeptides (Chloramphenicol).
Antimycobacterial agents: Introduction to mycobacterium, development of antimycobacterium agents and their use in therapeutics (dapsone Sulfoxone sodium and solasone; Isonicotinic acid hydrazide, para aminosalicy acid, Pyrazinamide and Ethionamide).

Antimalarials quinoline and analogues, 8-amino quinolines, 9-amino acridines, 4-amino quinolines, diamino pryimidine, and biguanides (Primaquin, Mepacrine and pyrimethamine).
Antiamoebic agents
Drugs used for trypanosomiasis and other protozoal diseases.
Anthelminitics drugs (Niclosamide, Hexylresorcinol, Diethylcarbamazine citrate, thiabendazole).
Antifungal agents; antibiotics, griseofulvin, amphotericin, candicidine, Nystatin, Synthetic antifungal agents, salicyclic acid, miconazole Elconazole, Tolanflate, Flucotosine, Dithranol and Chlorphenesin.
Urinary antiseptics quinolones, Nalidixic acid, Nitroofurantion (Nalidixic acid, Nitrofurantan).
Disinfectants and antiseptics.
Antineoplastic agent
Antiviral agents: Introduction to DNA, RNA and retroviruses, viral replication, amantidine hydrochloride, interferone, acyclovir.

BPA-821 Practicals

1. To prepare aspirin from salicylic acid.
2. To prepare phenyl benzoate from phenol.
3. To prepare picric acid from phenol.
4. To prepare p-nitroaniline from acetanilide.
5. To prepare benzoic acid.
6. To perform two step chemical reaction.

Books Recommended

1. M.E. Wolff, Ed., Burger's Medicinal Chemistry, John Wiley and Sons, New York (Latest Edition).
2. J.N Delgado and W.A. Remers, Eds., Wilson and Gisvold's Textbook of Organic Medicinal and 3.Pharmaceutical Chemsitry, J. Lippincott Co., Philadelphia (Latest Edition).
4. W.C. Foye, Principles of Medicinal Chemistry, Lea and Febiger, Philadelphia (Latest Edition).

PHARMACEUTICAL ANALYSIS

Name of Course	Pharmaceutical Analysis			
Course Code	BPA 822	Contact hours/week	L-3, T-0, P-3	
Lectures to be Delivered	78 (39-L, 39-P for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University (3 Hrs.)	Internal Assessment
Maximum Marks	70	30	50	50
Minimum Pass Marks	35	-	25	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-822 Theory

1. Electromagnetic Radiations
Nature of electromagnetic radiations, the interaction between energy and matter, application of quantum mechanic theory, the absorption of energy by atoms and molecules, the emission of radiant energy by atoms and molecules; refraction and diffraction.

2. Ultraviolet and visible spectrophotometry :
Electronic excitation, quantitative laws, deviations from Beer's law, graphical presentation of data, chromophores, photometric error, instrumentation (light sources, prism and grating monochromators, photomissive and photomultiplier tubes), single and double beam instruments, steps in spectrophotometric measurements (sample handling; amplifications and radiation of detectors, selection of wavelength and band width), concentration and optimum absorbance value, applications (direct and indirect methods, analysis of mixture).

3. Fluorometric Analysis :
Theory, quantitative description, experimental factors affecting fluorescence intensity, relationship of fluorescence structure, instrumentation (cell, light sources, wavelength selection, detectors), correction of spectra, pharmaceutical applications.

4. Infrared spectrophotometry :
Theory, characteristic absorption bands of organic functional groups, interpretation of infrared absorption Spectra; Frequency range, bandwidth and scan speed, concentration range and absorbance value, preparation of sample, sample cell, IR instrumentation, (light sources, monochromatic detector), qualitative and quantitative applications in pharmaceutical analysis, analytical shortcomings.

5. X-Ray spectroscopy :
An introduction to the theory of x-ray spectroscopy (Miller indices, space lattice and unit cell, Bravais lattices). Interplanar spacing in crystal system. Diffraction of x-ray by brystals, Bragg's equation, powder method, x-ray diffraction pattern of cubic system) NaCl), applications in pharmaceutical analysis.

6. Nuclear Magnetic Resonance Spectroscopy :
An introduction to the theory of NMR, magnetic properties of the nucleim nuclear magnetic moments, absorption of energy, chemical shift, shielding and deshielding, spin-spin coupling, NMR instrumentation, typical spectra, analytical application in pharmaceutical analysis.

7. Mass Spectrometry :
Instrumentation, Basic principle determination of the molecular formula, recognition of the molecularion peak, fragmentation, mass spectra of simple compounds (saturated hydrocarbons).
8. Flame Photometry :
Origin of spectra, atomization and ionization, instrumentation (nebuliser, mirrors, burners, slits, monochromator, detector, background emission, interferences, qualitative and quantitative applications in pharmaceutical analysis).
9. Atomic Absorption Spectroscopy :
Theory of absorption of radiant energy by atoms, equipment, analytical applications.
10. Polarimetry, its Principles and Applications :
Plane of Polarization, types of molecules analysed, optical rotation, optical rotatory dispersion, circular dichroism, the effect of concentration, wavelength, solvent temperature on optically active substances, determination of an optically active impurity in an optically active drug.

BPA-822 Practicals

pH determination of various compounds as quantitative and qualitative analysis . preparation of various buffers solutions in chemistry. Analysis of various compounds by using different analytical techniques.

Books Recommended
1. L.G. Chatten, Pharmaceutical Chemistry, Vol.-1 and 2, Marcel Dekker, NY (Latest Edition).
2. A.H. Beckett and J.B. Stenlake, Practical Pharmaceutical Chemistry, Vol.1 and 2, Athlone Press of the University of London (Latest Edition).
4. H. Willard, L.L., Marriott; Jr., J.A. Dean, Instrumental Method of Analysis, Van Nostrand Reinhold, N.Y. (Latest Edition).
5. J.W. Robinson, Undergraduate Instrumental Analysis, Marcel and Dekker Inc., NY, 1970 (Latest Edition).
6. V.M. Parikh, Absorption Spectroscopy of Organic Molecules, Addison – Wesley Publishing C0., London, 1974 (Latest Edition).
7. D.A. Skoog, E.J. Holler and T.A. Nieman, Principles of Instrumental Analysis, Saunders Golden 8.Sunburst Series, Saunders College Publishing Harcourt Brace College Philadelphia, Fort Worth, Chicago (Latest Edition).

BHAISHAJYA KALPNA –IV

Name of Course	Bhaishjya kalpna			
Course Code	BPA 813	Contact hours/week	L-3, T-0, P-3	
Lectures to be Delivered	78 (39-L, 39-P for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University (3 Hrs.)	Internal Assessment
Maximum Marks	70	30	50	50
Minimum Pass Marks	35	-	25	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-813 Theory

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¼2½ l/kku dYiuk&ifjHkk"kk egRo] Hkn] fuek.kfof/k] ek=] mi;kx dk KkuA
¼3½ vk[k] dku] ukl ,o u= lcU/kh dYiukvk dk KkuA
¼4½ ofLrdYiuk&fofo/k ofLrdYiukvk dk Kku ,o mudh mi;kfxrk dk KkuA

BPA-813 Practical

mijkDr fofo/k ;kxk dk fuek.k lc/kh KkuA
Prepration of different ayurvedic formulations e.g. ghrita,taila,ashva,arishta

PHARMACEUTICS- PHARMACOKINETICS AND BIOPHARMACEUTICS

Name of Course	Pharmaceutics-Pharmacokinetics and Biopharmaceutics			
Course Code	BPA 824		Contact hours/week	L-3, T-0, P-0
Lectures to be Delivered	39 (39-L for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University	Internal Assessment
Maximum Marks	70	30	-	-
Minimum Pass Marks	35	-	-	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-824 Theory

1. Introduction to pharmacokinetics and biopharmaceutics including history and their role in related disciplines.

2. Pharmacokinetics Compartment models:-
Modelina, basics of compartmental modeling including numeric applications (wherever possible) of: One comnggfrnent open body model, pharmacokinetics of single dose administration following intravenous (rapid), oral and intravenous transfusion administration, Wagner Nelson method and method of residuals as applied to plasma concentration profiles following oral intake, multiple dose kinetics following intravenous (rapid) and oral administration, superposition principle, steady state kinetics.
Urinary excretion merits and shortcomings, Sigma- minus plot, method of residuals as applied to cumulative and rate of excretion curves.
Two compartment open body model, pharmacokinetics of single dose administration as applied to intravenous (rapid), oral and intravenous transfusion administration, method of residuals as applied to plasma concentration profiles following intravenous (rapid) administration.

3. Biopharmaceutics
Physicochemical factors affecting biopharmaceutical performance of drugs, with special emphasis on pH- partition hypothesis, adsorption of ionic drugs in light of unstirred water layer, dissolution rate, drug stability in gut, adsorption, complexation, etc.
Physiological considerations affecting biopharmaceutical performance of drugs including membrane and G.I. physiology, effects of food, gastric emptying, G.I. motility etc.
Bioavailability and equivalence concepts, significance, methods of determination of bioavailability using blood level and urinary excretion data, protocol, federal requirements.

4. Recent trends in pharmacokinetics and biopharmaceutics, pharmacokinetic basis of sustained release and controlled release formulations.

Books Recommended:-

1. W.A. Ritschel, Handbook of Basic Pharmacokinetics, Drug intelligence, 4th Ed., Hamilton III, 1992.
2. J.G. Wanger, Fundamentals of Chemical Pharmacokinetics, Drug Intelligence, Hamilton, 1975.
3. A. Gennaro (ed.), Remington: The Science and Practice of Pharmacy, Mack Publishing Company, Pennsylvania, 3005.
4. Shargel, L. and Yu, A., Applied Biopharmaceutics and Pharmacokinetics, Appleton and Large, Norwalk, (CT, 1993).
5. M. Gibaldi, Biopharmaceutics and Clinical Pharmacokinetics, 4th Ed., Lea & Febiger, 1990 M. Gibaldi and D. Perrier, Pharmacokinetics, J. Swarbrick ed., Marcel Dekker, NY.

CLINICAL PHARMACY

Name of Course	Clinical Pharmacy			
Course Code	BPA 850	Contact hours/week	L-3, T-0, P-0	
Lectures to be Delivered	39 (39-L for each semester)			
Examination	Theory		Practical	
	University (3 Hrs.)	Internal Assessment	University	Internal Assessment
Maximum Marks	70	30	-	-
Minimum Pass Marks	35	-	-	-

Instructions

For paper setters:
(i) The question paper will consist of six questions. Question 1 will be consisting of 10 parts carrying 20 marks. Other five questions will carry 10 marks each.
(ii) Question one should cover the maximum part of the syllabus.
For candidates: Question 1 is compulsory and candidates are required to attempt any five questions out of remaining six.

BPA-850 Theory

1.Clinical Pharmacokinetics, dosage regimens and utilization of drag-therapy
1.1Basic pharmacokinetics: An introduction to clinical pharmacokinetics, definition, basic considerations and its applications. Drug concentration versus time profile, introduction to the concept of volume of distribution, half life and clearance and their importance in clinical pharmacokinetics.
1.2Elimination: - Concept of clearance, hepatic clearance, renal clearance, dependence of elimination kinetics on clearance and distribution.
1.3 Dosage regimens :
1.3.1 An introduction to dosage regimens and the concept of response and concentration
1.3.2 Multiple dose regimens: - Drug accumulation, relationship between initial and maintenance doses, maintenance of the drug in the therapeutic range, practical aspects of multiple dose administration, and design of dosage regimens from plasma concentrations.
1.4 Individualization of therapy
1.4.1 Variability- Reasons for variability, Accounting for variability
1.4.2. Influence of Age and Weight
1.4.3 Disease State- Drug therapy in Hepatic and Renal disease
1.4.4 Concentration monitoring- Target concentration strategy, target concentration, pertinent information, evaluation procedures, dosing scenario
1.4.5 Therapeutic drug monitoring
Clinical laboratory tests for Liver function and Kidney function.Drug Interactions Factors- Drag determinants, Host determinants, Multiple drug therapy,Methods of investigating drug interactions,Clinical investigation of specific drug interactions,Pharmacokinetic aspects of drug interaction- Drug elimination, distribution and absorption
Prevention of drug interactions in general practice

2. Drug information services, documentation and counseling of patients

Ambulatory patient care: Pharmacist's responsibility, proper use of medication, patient counselling, drug utilization review, medication profiles, non-prescription drug usage, health education, new and expanded dimensions, health care delivery systems.

Patient compliance-Non compliance, factors associated with non compliance, improving compliance.

3. Procurement and distribution of drugs in an Institution (Hospital Pharmacy)

4. Hospital - Definition of hospital pharmacy, organization, facilities provided- pharmacist's responsibility - technical responsibilities (procurement, storage, dispensing, control, stock and inventory control, manufacturing sterile products, investigational drugs, I.V. admixtures, radiopharmaceuticals, assay and quality control, bioavailability), administrative and academic responsibilities.

5. Intravenous admixtures, Intravenous fluids-packaging systems, administrative sets, administration procedures including volume control method, piggyback method, patient controlled analgesia, final-filter devices, intravenous admixtures—additives, parenteral incompatibility, total parenteral nutrition.

Books Recommended

1. M. Rowland and T.N. Tozer, Clinical Pharmacokinetics: Concepts and Applications, Lea and Febiger, Philadelphia. 2nd edition, 3989.

2. M.C. Alhvood and J.T. Fell, Textbook of Hospital Pharmacy, Biackweli Scientific Publications, Oxford. London, 1970.

3. R.emington, The Science and Practice of Pharmacy, 19th edition, 1995, Mack Publishing Co., U.S.A.

4. E.V. Klejin and J.R. Jonders, Clinical Pharmacy, Elsevier/North Holland Biomedical Press, NY 1977.

5. E.T. Herfindal, D.R. Gourley and L.L. Hart, Clinical Pharmacy and Therapeutics,

6. Williams anc Wilkins, 4th edition, London, 1988.

7. D. Lawson and R.M.E. Richards, Clinical Pharmacy and Hospital Drug Management, Chapmaru and Hall, London, 1982.

8. L.E. Guff and J.C. Petrie, Clinical Aspects of Interaction between Drugs, American Elsevie Publishing Co., NY, 1974.

9. R.J. Greene and N.D. Harris, Pathology and Therapeutics for Pharmacists, The Pharmaceutical Press, 1st edition, 1988. 14.A-31