

H.P. TECHNICAL UNIVERSITY HAMIRPUR (HP)



Syllabus

[Effective from the Session: 2015-16]

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



**TEACHING AND EVALUATION
SEMESTER I (B.Pharmacy Ayurveda)**

S.No.	Category of Paper	Paper code	Title of Subject	L	T	P/D	Credits	Evaluation scheme				
								Internal Assessment			ESE	Subject total
								CT	TA	Total		
Theory:												
1	PC	BPA-101	Fundamentals of Ayurveda including Swasthavritta	3	-	-	3	20	20	40	60	100
2	PC	BPA-102	Fundamentals of Anatomy and Physiology	3	-	-	3	20	20	40	60	100
4	PC	BPA-103	Fundamentals of Bhaishajya kalpana-I	2	-	-	2	20	20	40	60	100
5	PC	BPA-104	Fundamentals of Dravyaguna Vigyan-I	2	-	-	2	20	20	40	60	100
6	AC	BPA-105	Computer & its applications in pharmaceutical Sciences	2	-	-	2	20	20	40	60	100
7	HS	HS 102	Environmental science	2	1	-	3	20	20	40	60	100
8		HS-102	English Communication skills	2	1	-	3	20	20	40	60	100
Labs:												
1	PC	BPA-111P	Fundamentals of Anatomy and Physiology	-	-	3	1	10	15	25	25	50
2	PC	BPA-112 P	Fundamentals of Bhaishajya kalpana-I	-	-	3	1	10	15	25	25	50
3	PC	BPA-113P	Fundamentals of Dravyaguna Vigyan-I	-	-	3	1	10	15	25	25	50
4	AC	BPA-114 P	Computer & its applications in pharmaceutical Sciences	-	-	3	1	10	15	25	25	50
Total =				16	2	12	22					
Total marks											900	
Total Work load=30						Total credit= 22						

Legend:

L	-	Lecture	ESE	-	End semester examination
T	-	Tutorial	PC	-	Program core
P	-	Practical	AC	-	Additional core
CT	-	Class test	HS	-	Humanities and social sciences
TA	-	Teachers assessment			



SEMESTER II (B.Pharmacy Ayurveda)

S.No.	Category of Paper	Paper code	Title of Subject	L	T	P/D	Credits	Evaluation scheme				
								Internal Assessment			ESE	Subject total
								CT	TA	Total		
Theory:												
1	PC	BPA-201	Pharmaceutical Biology	3	-	-	3	20	20	40	60	100
2	PC	BPA-202	Pharmaceutical chemistry (Organic & Inorganic)	3	-	-	3	20	20	40	60	100
3	PC	BPA-203	Pharmacognosy-I	3	-	-	3	20	20	40	60	100
4	PC	BPA-204	Pharmaceutics- (General and Dispensing Pharmacy)	3	-	-	3	20	20	40	60	100
5	PC	BPA-205	Rasa Shastra-I	3	-	-	3	20	20	40	60	100
6	AC	HS 204	Business communication	2	-	-	2	20	20	40	60	100
7	HS	HS 104	Disaster management	2	1	-	3	20	20	40	60	100
LABS:												
1	PC	BPA-211 P	Pharmaceutical Biology	-	-	3	1	10	15	25	25	50
2	PC	BPA-212 P	Pharmaceutical chemistry (Organic & Inorganic)	-	-	3	1	10	15	25	25	50
4	PC	BPA-213 P	Rasa Shastra-I	-	-	3	1	10	15	25	25	50
Total =				19	1	9	23					
Total marks											850	
Total work load =29							Total credit=23					

Legend:

L	-	Lecture	ESE	-	End semester examination
T	-	Tutorial	PC	-	Program core
P	-	Practical	AC	-	Additional core
CT	-	Class test	HS	-	Humanities and social sciences
TA	-	Teachers assessment			



L	T	P	Credits
3	0	0	3

Sessional: 40 Marks

Exam: 60 Marks

Total: 100 Marks

Duration of Exam: 3 hrs

Note: Examiner will set 9 questions in total, with two questions from each section/unit and one question covering all units will be Q.9. This Q.9 will be compulsory and of short answer type. Each question carries equal marks (12 marks). Students have to attempt 5 questions in total including question No. 9.

Unit I- Introduction to Ayurveda

Ayurveda Nirupana Lakshana of Ayu, composition of Ayu Lakshana of Ayurveda. Lakshana and classification of Siddhanta. Introduction to basic principles of Ayurveda and their significance.

Ayurveda Darshana Nirupana Philosophical background of fundamentals of Ayurveda. Etymological derivation of the word "Darshana". Nyaya, Vaisheshika, Sankhya and Yoga. Ayurveda as unique and independent school of thought Padartha: Lakshana, enumeration and classification, Bhava and Abhava padartha, Padartha according to Charaka (Karana-Padartha).

Unit II

Dravya Vigyaniam Dravya: Lakshana, classification and enumeration.

Panchabhuta Brief introduction of panch mahabhoot and lakshan and qualities of each bhoota.

Kaala: Etymological derivation, Lakshana and division / units, significance in Ayurveda.

Dik: Lakshana and division, significance in Ayurveda.

Atma: Lakshana, classification, seat, Gunas, Linga according to Charaka, the method / process of knowledge formation.

Purusha: as mentioned in Ayurveda- Ativahikapurusha/ Sukshmasharira/ Rashipurusha/ Chikitsapurusha/ Karmapurusha/ Shaddhatvatmakapurusha.

Manas: Lakshana, synonyms, qualities, objects, functions, dual nature of mind (*ubhayaatmakatvam*), as a substratum of diseases, penta-elemental nature (*panchabhutatmakatvam*). Role of Panchamahabhuta and Triguna in Dehaprakriti and Manasaprakriti respectively.

Examination

Ten points for examination i.e. Kaarana, karana, karya, karyayoni, karya phala, Anubandha, Desha, kala, Prakriti and Upaya and their utility and application in Pharmacy.

Unit III- Basic Ayurvedic concepts

Swasthviritta prayojna, swastha lakshana, swasthviritta, dincharya, dhumpana, vyayama, kshorkarma, abhyanga, sharira parimarjana, sanan, anulepanadi, vastra dharna, paduka, padatra, chattra, dandadharna, traupastambha, ratrichrya, swapna nidra, bhramcharya, rituchrya, sanchya, prakopa, prashamna of dosha according to ritu, ritusandhi. Importance of aahar, nidra and brahmacharya. Importance of shuddh vayu, jala, desha and kala.

Unit IV- Preventive social medicine and diseases

Mansik sadviritta, samajika swasthviritta, dharmik swasthviritta, dharniya adharniya vega, sanshodhan and sanshamna, Rasayana and vajikarna. Communicable diseases, respiratory diseases such as tuberculosis, whooping cough, influenza, mumps etc. Intestinal infection such as Cholera, hepatitis, Typhoid etc. arthropod, borne diseases such as Dengue, malaria etc. Immunization: National immunization schedule and WHO EPI immunization schedule.

Text Books:

1. Dr. Ram Harsh Singh. Swasthviritta Vigyan Chaukhamba Prakashan, New Delhi, Varanasi.
2. Dr. Kashinath Samgandhi Swasthviritta Suddha Chaukhamba Prakashan, New Delhi, Varanasi.

Reference Books:

1. Charak Sahimta, Chaukhamba Prakashan, New Delhi, Varanasi.
2. Sushrat Sahimta, Meharchand Lakshamandas Prakashan, New Delhi.



L	T	P	Credits
3	0	0	3

Sessional: 40 Marks

Exam: 60 Marks

Total: 100 Marks

Duration of Exam: 3 hrs

Note: Examiner will set 9 questions in total, with two questions from each section/unit and one question covering all units will be Q.9. This Q.9 will be compulsory and of short answer type. Each question carries equal marks (12 marks). Students have to attempt 5 questions in total including question No. 9.

FUNDAMENTALS OF PHYSIOLOGY

Unit I

a.) Basic Tissues

Function of epithelial, connective, muscular and nervous, muscle contraction and properties. Nerve impulse generation and transmission including introductory knowledge of Dosha, Dhatu and Mal with their types and properties.

b.) Body systems

Respiratory system: Respiratory volumes and capacities, ventilation, compliance and resistance, gaseous exchange and transport in blood, nervous and chemical regulations of respirations.

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

Digestive system: Nutritional and Vitamin requirements, vitamin deficiencies, structure of alimentary canal, structure and functions of liver.

Unit II- Blood and cardiovascular systems: Body fluids, roles of blood cellular components and plasma proteins, coagulation, blood groups, blood disorders. "Circulation" cardiac cycle, impulse generation and transmission, electrocardiogram; haemodynamics; capillary circulation;

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

FUNDAMENTALS OF ANATOMY

Unit III-Introduction and Scope

Introductory knowledge of Anatomy.

Scope & Terminology of Anatomy

Elementary cell and tissues of the Body- Epithelial Tissues, Muscular Tissues, Nervous Tissue.

Unit IV- 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. Introductory knowledge of Ayurvedic description of Asthi sandhi, Sanayu and Kandra.

Text Books:

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. Cunningham's Textbook of Anatomy, edited by G.J. Romanes, Eleventh Edition, published by Oxford University Press, 1972.

Reference Books:

1. W.F. Ganong, Review of Medical Physiology, Thirteenth Edition, published by Appleton & Lange, U.S.A., 1987.
2. A.J. Vander, J.H. Sherman and D.S. Luciano, Human Physiology.
3. Ross and Wilson. Anatomy and Physiology in Health and Illness. Sydney: Churchill Livingstone.
4. Relative portions of Sushruta Samhita.
5. Sharir Kriya Vigyan by Dr. R.R Desai.



L	T	P	Credits
0	0	3	2

Internal: 25 Marks

External: 25 Marks

Total: 50 Marks

Note:

Practical's as per topics in the syllabus for the course will be conducted in the laboratory class.

List of experiments:

1. Introductory study of human skeleton.
2. Study of humerus, tibia fibula, scapula, vertebra.
3. Study of different systems with the help of charts and models.
4. Study of preserved human organs.
5. Recording of body temperature, pulse rate and blood pressure.
6. HB estimation, BTCT, ESR recording.
7. Physico-chemical parameters of Urine.

Text Books:

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 and published by Oxford University Press, 1972.

Reference Books:

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



L	T	P	Credits
2	0	0	2

Sessional: 40 Marks

Exam: 60 Marks

Total: 100 Marks

Duration of Exam: 3 hrs

Note: Examiner will set 9 questions in total, with two questions from each section/unit and one question covering all units will be Q.9. This Q.9 will be compulsory and of short answer type. Each question carries equal marks (12 marks). Students have to attempt 5 questions in total including question No. 9.

Unit I History of Bhaishajya Kalpana and its gradual development

Bhaishajya kalpana utpatti, Bhaishajya, Aushadham, Kalpana, Qualitative and quantitative aspects of Aushadha Kalpana, Basic fundamentals of processing techniques, Yogas (compound formulation) and benefits of drug combination, Synergism, Potentiation, Pharmaceutical processes of Ayurveda, Bhaishajya Kalpana sankshipta itihasa and Kramika Vikasa.

Unit II Adharabhuta siddhanta of Bhaishajya Kalpana-A

Paribhasha Glossary of Technical Terms: Lavanapanchaka, Lavana traya, Triphala, Trikatu, Ksharadravya, Ksharatraya, Ksharapanchaka, Ksharaashataka, Mutrastaka, Amlavarga Amlapanchaka, Panchtikta, Panchmrittika, Madhuratraya, Panchamrita, Panchgavya, Kshiratraya, Dudghavarga, Tailavarga.

Unit III Adharabhuta siddhanta of Bhaishajya Kalpana-B

Anuktadravyagrahana, selection of drugs, drugs to be used in wet-form, general rule, vishesokta dravya grahana, form of ausadha kalpana, naming a recipe, importance of Rasa, Guna, Virya, Vipaka, Karma and Prabhava, bhaishajya marga, matra, posology, anupana, aushadha sevena kala (time of drug administration), kalpana and their saviryataavadhi (formulae and their expiry dates), aushadha samrakshana vidhi (guidelines for the storage of medicines), antioxidants and preservatives.

Unit IV Ausadhanirmanashala (Rasashala) and brief introduction of Yantra

Rasashala, plan of pharmacy, section wise description of yantra (machines) mentioned in different prescribed sections in GMP, dolayantra, patalayantara, khalvayantra, saravasamputa importance of size reduction, mechanisms of grinding machines, disintegrator, cutter mill, roller mill, hammer mill, end runner mill, capsule filling machine, automatic capsule filling machine, rotary tablet machine, coating pan, Monsanto hardness tester, tablet disintegration test apparatus, simple distillation apparatus, hot-air oven.

Concept of aushadhi nirmanshala with respect of GMP in accordance to schedule T.

Text Books:

1. Text book of Bhaishajya Kalpana Vigyana (A Science of Indian Pharmacy) by Dr. K.Ramachandra Reddy, Chaukhamba.
2. Text Book of Bhaishajya Kalpana Vigyana by Dr. Siddhinandana Mishra, Chaukhamba Sanskrit Bhawan, Varanasi.
3. Text book of Bhaishajya Kalpana Vigyana by Dr. Santosh Kumar Mishra, Chakhambha Orientalia, Varanasi.

Reference Books:

1. The Drugs & Cosmetics Act 1940.
2. The Ayurvedic Formulary of India, Part-I&II Govt. of India Publication.
3. The Ayurvedic Pharmacopoeia of India Part-II, Govt. of India Publication.
4. Ayurved Sara Sangraha.
5. Rasa Tantra Sara avum Siddha Prayog Sangraha, Sri Krishan Gopal Bhawan Kaleda, Rajasthan.



L	T	P	Credits
0	0	3	2

Internal: 25 Marks

External: 25 Marks

Total: 50Marks

Note:

Practical's as per topics in the syllabus for the course will be conducted in the laboratory class. Following is suggested a list of exercises out of which a minimum of 8/10 experiments must be performed by a student during the semester.

List of experiments:

1. To study the working principle, mechanism and uses of Dola yantra.
2. To study the working principle, mechanism and uses of Patala yantra.
3. To study the working principle, mechanism and uses of Damru yantra.
4. To study the working principle, mechanism and uses of Khalva yantra.
5. To study the working principle, mechanism and uses of Vidyadhara yantra.
6. To study the working principle, mechanism and uses of Puta yantra.
7. To study the working principle, mechanism and uses of Patana yantra.
8. To study the working principle, mechanism and uses of Disintegrator.
9. To study the working principle, mechanism and uses of Hammer mill.
10. To study the working principle, mechanism and uses of End runner mill.
11. To study the working principle, mechanism and uses of Roller mill.
12. To study the working principle, mechanism and uses of Capsule filling machine.
13. To study the working principle, mechanism and uses of Grinding machine.
14. To study the working principle, mechanism and uses of Tablet making machine.
15. To study the working principle, mechanism and uses of Tablet hardness and disintegration test apparatus.

Text Books:

1. Text book of Bhaishajya Kalpana Vigyana (A Science of Indian Pharmacy) by Dr. K.Ramachandra Reddy, Chaukhamba.
2. Text Book of Bhaishajya Kalpana Vigyana by Dr. Siddhinandana Mishra, Chaukhamba Sanskrit Bhawan, Varanasi.
3. Text book of Bhaishajya Kalpana Vigyana by Dr. Santosh Kumar Mishra, Chakhambha Orientalia, Varanasi.

Reference Books:

1. The Drugs & Cosmetics Act 1940.
2. The Ayurvedic Formulary of India, Part-I&II Govt. of India Publication.
3. The Ayurvedic Pharmacopoeia of India Part-II, Govt. of India Publication.
4. Ayurved Sara Sangraha.
5. Rasa Tantra Sara avum Siddha Prayog Sangraha, Sri Krishan Gopal Bhawan Kaleda, Rajasthan.



L	T	P	Credits
2	0	0	2

Sessional: 40 Marks

Exam: 60 Marks

Total: 100 Marks

Duration of Exam: 3 hrs

Note: Examiner will set 9 questions in total, with two questions from each section/unit and one question covering all units will be Q.9. This Q.9 will be compulsory and of short answer type. Each question carries equal marks (12 marks). Students have to attempt 5 questions in total including question No. 9.

Unit I- Dravya avum dravya guna shastra

द्रव्यगुण विज्ञान की परिभाषा, महत्व, प्रयोजन और विभाग।

द्रव्यगुण विज्ञान के सात पदार्थ –द्रव्य, गुण, रस, विपाक, वीर्य, प्रभाव एवं कर्म।

द्रव्य की परिभाषा एवं महत्व, पंचभौतिक संगठन एवं द्रव्यों का वर्गीकरण.–चेतन.अचेतनभेद से, कार्य.कारणभेद से, निष्पत्ति भेद से, योनि भेद से, प्रयोग भेद से, रसभेद से, वीर्य भेद से दोषकर्म भेद से।

द्रव्यों का नामकरण एवं विभाग का आधार- स्वरूपबोधक, अवयवबोधक, गुणबोधक, कर्मबोधक, देशबोधक एवं कालबोधक

Unit II- Rasa,Guna,Veerya,Vipak aur Prabhava ka varnana

रस की परिभाषा, भेद एवं पंचभौतिक संगठन।

गुण की परिभाषा एवं भेद, गुर्वादी गुणों का चिकित्सा में महत्व का विस्तार में वर्णन करे।

विपाक की परिभाषा एवं भेद।

वीर्य के अध्ययन हेतु प्रयोगात्मक प्रणाली।

प्रभाव का महत्व एवं उपयोगिता।

Unit III-Vividh Gana vivechan

त्रिफला, मधुर त्रिफला, सुगन्धत्रिफला, स्वल्पत्रिफला, त्रिजात, चतुर्जात, त्रिकटु, पंचकोल, पंचपल्लव, पंचवल्लकल, त्रिकण्टक, चतुर्भद्र, त्रिकाण्डिक, लघुपंचमूल, वृहत्पंचमूल, तृणपंचमूल, षड्रूषण, चतुररूषण, कण्टकपंचमूल, चर्तुबीज, पंचक्षीरीवृक्ष, मध्यपंचमूल, चतुर्बीज, पंचक्षीरीवृक्ष, मध्यमपंचमूल, जीवनपंचमूल, मधुरत्रय, अम्लपंचक, महापंचविष, उपविष, अष्टवर्ग, पंचपल्लव।

Unit IV-Karma -कुछ प्रमुख तथा सामान्य कर्मों का विवेचन

दीपन, पाचन, ग्राही, स्तम्भन, भेदन, रेचन, अनुलोमन, सञ्जन, संशोधन, रसायन, वाजीकरण, व्यवायी, मदकारी, विकासी।

स्वेदन, स्वेदनोपग, स्नेहन, स्नेहनोपग, वमन, वमनोपग, विरेचन, विरेचनोपग।

Text Books:

1. Dravyaguna vijana; by Dr. Mansi Deshpandey, Chaukhamba Sanskrit Pratisnthana, New Delhi.
2. Dravyaguna vijana Vol 1-5 by Prof.Sharma P.V; published by Chaukhambha Bharti Academy, Varanasi.

Reference Books:

1. The Wealth of India Publication and Directorate (CSIR, New Delhi)
2. Database on medicinal plants used in Ayurveda by CCRAS, New Delhi.
3. Indian Medicinal Plants by K.R.Kirtikar and B.D.Basu



L	T	P	Credits
0	0	3	1

Internal: 25 Marks

External: 25 Marks

Total: 50Marks

Note: Practical's as per topics in the syllabus mentioned below

25 वनौषधि द्रव्यों की Herbarium sheets का निर्माण which will be collected from the field visits

अर्जुन अश्वगन्धा आमलकी बिल्व भृंगराज धतूरा एला गूडुची
 हरीतकी हरिद्रा ज्योतिष्मती करंज कुमारी मण्डूकपर्णी पाटा
 चन्दन कण्टकारी वाराहीकन्द खदिर निर्गुण्डी निम्ब मरिच मंजिष्ठा
 पिप्पली सारिवा शतावरी शंखपुष्पी तुलसी

Text Books:

1. Dravyaguna vijana; by Dr. Mansi Deshpandey, Chaukhamba Sanskrit Pratisnthana, New Delhi.
- 2 Dravyaguna vijana Vol 1-5 by Prof.Sharma P.V; published by Chaukhambha Bharti Academy, Varanasi.

Reference Books:

1. The Wealth of India Publication and Directorate (CSIR, New Delhi)
- 2 .Database on medicinal plants used in Ayurveda by CCRAS, New Delhi.
- 3 .Indian Medicinal Plants by K.R.Kirtikar and B.D.Bas



L	T	P	Credits
2	0	0	2

Sessional: 40 Marks

Exam: 60 Marks

Total: 100 Marks

Duration of Exam: 3 hrs

Note: Examiner will set 9 questions in total, with two questions from each section/unit and one question covering all units will be Q.9. This Q.9 will be compulsory and of short answer type. Each question carries equal marks (12 marks). Students have to attempt 5 questions in total including question No. 9.

Unit I-

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

b) Operating System: Definition, Need and organization of OS, Functions performed by operating system. Type of Operating System. DOS, windows, Directories and files. Commands (internal & external). Icons, Clipboard. Folders, Major differences between a DOS and Windows.

Unit II-

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

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

Unit III-

a) Computer Virus: Definition, Causes and symptoms of virus, Types of viruses, Detections, prevention and cure against viruses using antivirus software packages.

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

Unit IV-**Ms Office Package:**

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

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

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

Reference Book

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

Text Book

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

Text Books:

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

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



L	T	P	Credits
0	0	3	1

Internal: 25 Marks

External: 25 Marks

Total: 50Marks

Note:

Practical's as per topics in the syllabus for the course will be conducted in the laboratory class. Following is suggested a list of exercises out of which a minimum of 8/10 experiments must be performed by a student during the semester.

List of Practicals:

1. Basic exercises of MS Word
2. Basic exercises of Excel
3. Basic exercises of Internet
4. Basic exercises of PowerPoint presentation
5. Basic exercises of spreadsheets
6. Basic exercises of E:mail
7. Basic exercises of searching databases related to Ayurvedic Pharmacy
8. Basic exercises of Paint
9. Basic exercises of preparing Pdf files
10. Basic exercises of converting doc files into one another

Text Books:

1. Sinha PK, Sinha P. Computer Fundamentals. New Delhi: BPB Publications.
2. Rajaraman V. Fundamental of Computers. New Delhi: Prentice Hall (India).



L	T	P	Credits
2	1	0	3

Sessional: 40 Marks
Exam: 60 Marks
Total: 100 Marks
Duration of Exam: 3 hrs

Note: Examiner will set 9 questions in total, with two questions from each section/unit and one question covering all units will be Q.9. This Q.9 will be compulsory and of short answer type. Each question carries equal marks (12 marks). Students have to attempt 5 questions in total including question No. 9.

Unit-I Introduction to Environment and Biodiversity

Definition; Natural and manmade environments and inter-relationships amongst and between them, components of environment and relationship between different components, Relationship between man and environment, impact of technology on environment, environmental degradation.

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

Unit-II Environmental Pollution: Air Pollution: Composition of air, structure of atmosphere, ambient air quality standards, classification of air pollutants, sources of common air pollutants like SPM, SO₂, NOX, natural and anthropogenic sources, effects of common air pollutants, carbon credit.

Noise Pollution: Introduction, sources of noise pollution, ambient noise levels, effects of noise pollution on human being and wildlife, noise pollution controls, noise standards.

Water Pollution: Introduction, water quality standards, sources of water pollution, classification of water pollutants, effects of water pollutants, eutrophication, and measures to control water pollution.

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

Unit-IV Social Issues and Environment: Sustainable development and practices of improving environment, laws and acts for environmental protection, waste management.

Text Book:

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

Reference Book:

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



L	T	P	Credits
2	1	0	3

Sessional: 40 Marks

Exam: 60 Marks

Total: 100 Marks

Duration of Exam: 3 hrs

Note: Examiner will set 9 questions in total, with two questions from each section/unit and one question covering all units will be Q.9. This Q.9 will be compulsory and of short answer type. Each question carries equal marks (12 marks). Students have to attempt 5 questions in total including question No. 9.

Unit-I Need for Communication

Need for effective communication, The Seven Cs of Effective Communication- Completeness, Conciseness, Consideration, Concreteness, Clarity, Courtesy, and Correctness.

Barriers to Communication: Miscommunication, Physical Noise and Overcoming measures.

Unit-II Review of English Grammar (theoretical concepts)

Sentence Structure; Sentence formation, Use of appropriate diction, Tenses and Prepositions.

English Phonetics: International Phonetic Alphabets -Classification of consonant and vowel sounds; Mechanism of Production.

Unit-III Writing Skills

Technical Writing: Differences between technical and literary style, Elements of style; Common Errors.

Letter Writing: Formal, informal and demi-official letters; business letters.

Resume Writing: Differences between bio-data, CV and Resume, cover letter, application for job.

Unit-IV Soft skill development

Soft skills: First Impressions, Attire, Capturing Audience, Tone, Behavior and Telephone Etiquette -Good practice when making and receiving a call, Leaving a message on a voicemail.

Development of Soft skill: Becoming a good leader and team-player.

Text Books:

1. Herta A. Murphy, et al., Effective Business Communication, Tata Mc-Graw Hill: New Delhi
2. Krishna Mohan and Meenakshi Raman, Effective English Communication, TMH

Reference Books:

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



Semester- II

BPA-201

PHARMACEUTICAL BIOLOGY

L	T	P	Credits
3	0	0	3

Sessional: 40 Marks

Exam: 60 Marks

Total: 100 Marks

Duration of Exam: 3 hrs

Note: Examiner will set 9 questions in total, with two questions from each section/unit and one question covering all units will be Q.9. This Q.9 will be compulsory and of short answer type. Each question carries equal marks (12 marks). Students have to attempt 5 questions in total including question No. 9.

Unit -I

Structure of typical plant cell and its important inclusions. Structure and functions of some important plant tissues like parenchyma, xylem, sclerenchyma, phloem etc.

Unit -II

General morphology of plants with special reference to external features of flowers, fruits, seeds, barks, roots and leaves.

Unit -III

Principles of classification of plants with special reference to the plants of the following families. Studies of chemical constituents and medicinal value of Rutaceae, Leguminosae, Umbelliferae, Apocynaceae, Solanaceae, Convolvulaceae, Euphorbiaceae, Liliaceae, Zingiberaceae.

Unit -IV

Definition of the crude, organized and unorganized drugs, Classification of the crude drugs. Methods of systematic studies of the crude drugs, Cultivation, collection and storage of crude drugs.

Text Books:

1. A text book of 'Pharmacognosy' by R.K. Parmar, Vol.I, Edn.-I, P.Prakashan, India.
2. Kokate CK, Gokhale SB, Purohit AP: *Pharmacognosy* 36th edn. Nirali Prakashan, Pune, India.

Reference Books:

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



L	T	P	Credits
0	0	3	1

Internal: 25 Marks

External: 25 Marks

Total: 50Marks

Note:

Practical's as per topics in the syllabus for the course will be conducted in the laboratory class. Following is suggested a list of exercises out of which a minimum of 8/10 experiments must be performed by a student during the semester.

List of experiments:

1. To study different parts of leaves.
2. To study different parts of flowers.
3. To study different parts of fruits.
4. To study different parts of compound microscope.
5. To study different parts of binocular microscope.
6. To study different root systems
7. To study difference between monocot and dicot plants morphologically.
8. To carry out morphology of leaves, flower and fruit.
9. To study different types of barks.
10. To study different Plant tissues like Parenchyma, collenchyma, sclerenchyma, xylem, phloem etc.

Text Books:

1. A text book of '*Pharmacognosy*' by R.K. Parmar, Vol.I, Edn.-I, P.Prakashan, India.
2. Kokate CK, Gokhale SB, Purohit AP: *Parmacognosy* 36th edn. Nirali Prakashan, Pune, India.

Reference Books:

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



BPA-202

PHARMACEUTICAL CHEMISTRY- ORGANIC AND INORGANIC CHEMISTRY

L	T	P	Credits
3	0	0	3

Sessional: 40 Marks

Exam: 60 Marks

Total: 100 Marks

Duration of Exam: 3 hrs

Note: Examiner will set 9 questions in total, with two questions from each section/unit and one question covering all units will be Q.9. This Q.9 will be compulsory and of short answer type. Each question carries equal marks (12 marks). Students have to attempt 5 questions in total including question No. 9.

ORGANIC CHEMISTRY

Unit-I

a.) Structure and Properties

Empirical formula, inductive and electromeric effects, hydrogen bonding, atomic and molecular orbitals, dipole moment.

b.) Aliphatic Compounds

Structure, nomenclature, preparation and reactions of alkanes, alkenes.

Unit-II

a.) Isomerism

Isomerism and nomenclature and associated physicochemical properties, optical activity, stereoisomerism, specification of configuration.

b.) Reaction Mechanisms

Addition reactions, Elimination reactions, Substitution reactions (nucleophilic and electrophilic substitutions).

INORGANIC CHEMISTRY

Unit-III

a.) Introduction of Periodic Table

Introduction of periodic table, electronic configuration. Properties and important compounds of iron, gold, sodium and potassium.

b.) Pharmaceutical Agents

Preparation and uses of Ammonium chloride and physical and chemical properties of Borax with their uses.

Unit-IV

a.) Quantitative and Qualitative study

General introduction of Quantitative and Qualitative study of heavy metals (Lead, arsenic mercury) in Ayurvedic preparation.

b.) Titrimetric analysis

General introduction of Titrimetric analysis and General introduction of Gravimetric methods of analysis.

Text Books:

1. Sykes PA. A Guidebook to Mechanisms in Organic Chemistry. Hyderabad: Orient Longman.
2. Vogel. Vogel's Textbook of Micro and Semimicro Qualitative Inorganic Analysis. Hyderabad.

Reference Books:

1. Block JH, Roche E, Soine TO, Wilson CO. Inorganic Medicinal and Pharmaceutical Chemistry. Philadelphia: Lea and Febiger.
2. Jeffery GH, Bessett J, Mendham J, Denney RC. Vogel's Textbook of Quantitative Inorganic Analysis including Elementary Instrumental Analysis. London: ELBS and Longman
3. Roberts JD, Caserio MC. Basic Principles of Organic Chemistry. New York: WA. Benjamin Inc.



L	T	P	Credits
0	0	3	1

Internal: 25 Marks

External: 25 Marks

Total: 50Marks

Note:

Practical's as per topics in the syllabus for the course will be conducted in the laboratory class. Following is suggested a list of exercises out of which a minimum of 8/10 experiments must be performed by a student during the semester.

List of experiments:

1. To prepare p-nitroaniline.
2. To prepare anthraquinone from anthracene.
3. To prepare beta naphthyl benzoate from beta naphthol.
4. To prepare nitro benzene.
5. To prepare m-dinitrobenzene.
6. Limit test for chlorides, sulfates
7. Limit test for iron, lead, heavy metals.
8. Identification of Nitrogen in compounds.
9. Identification of Halogen in compounds.
10. Estimation of NaOH by Titration.

Text Books:

1. Orient Longman. Atherden LM. Bentley and Driver's Textbook of Pharmaceutical Chemistry. New Delhi: Oxford University Press
2. Vogel. Vogel's Textbook of Micro and Semmicro Qualitative Inorganic Analysis. Hyderabad:

Reference Books:

1. Block JH, Roche E, Soine TO, Wilson CO. Inorganic Medicinal and Pharmaceutical Chemistry. Philadelphia: Lea and Febiger.
2. Jeffery GH, Bessett J, Mendham J, Denney RC. Vogel's Textbook of Quantitative Inorganic Analysis including Elementary Instrumental Analysis. London: ELBS and Longman
3. Mann FC, Saunders BC. Practical Organic Chemistry. London: ELBS/ Longman.
4. Morrison TR, Boyd RN. Organic Chemistry. New Delhi: Prentice Hall India.
5. Roberts JD, Caserio MC. Basic Principles of Organic Chemistry. New York: WA. Benjamin Inc.



L	T	P	Credits
3	0	0	3

Sessional: 40 Marks

Exam: 60 Marks

Total: 100 Marks

Duration of Exam: 3 hrs

Note: Examiner will set 9 questions in total, with two questions from each section/unit and one question covering all units will be Q.9. This Q.9 will be compulsory and of short answer type. Each question carries equal marks (12 marks). Students have to attempt 5 questions in total including question No. 9.

Unit -I Introduction to Pharmacognosy and Plant microscopy

Introduction, development, present status and future scope of Pharmacognosy. Techniques in microscopy covering use of mountants, clearing agents, chemomicroscopic reagents, micrometer, quantitative microscopy

Unit -II Introduction to plant metabolites

Definitions of selected botanical terms related to groups of plant constituents: Carbohydrates, glycosides, tannins, lipids, volatile oils, terpenes, resins combinations, alkaloids, flavonoids, anthraquinones, coumarins, saponins, gums & mucilage's.

Unit -III Sources of drugs

Terrestrial, Marine and Microbial and a brief introduction to following groups with biological source, chemical constituents and uses of the drugs listed:

Thallophytes:

(a)Algae-Diatoms, Agar and Alginic Acid.

(b)Fungi-Ergot, Yeast and Mushrooms.

Pteridophytes : Male fern

Unit -IV

Spermatophytes: (a) Gymnosperms –Medicinal importance of family Pinaceae.

(b) Angiosperms– Covering important medicinal plants of families with special reference to their biological source, major chemical constituents and uses: Apocynaceae, Compositae, Labiatae, Convolvulaceae, Liliaceae, Leguminosae, Papaveraceae, Rubiaceae, Rutaceae Solanaceae, Scrophulariaceae and Umbelliferae.

Text Books:

1. A text book of 'Pharmacognosy' by R.K. Parmar, Vol.I, Edn.-I, P.Prakashan, India.
2. Kokate CK, Gokhale SB, Purohit AP: *Pharmacognosy* 36th edn. Nirali Prakashan, Pune, India.

Reference Books:

1. Evans WC (3002): *Trease and Evan's Pharmacognosy*. 15th edn., Saunder' Elsevier Pvt Ltd. New Delhi-24, India.
2. Quality Standards of Indian Medicinal Plants. New Delhi: ICMR.
3. Medicinal Plants of India. New Delhi: ICMR.



BPA-204

PHARMACEUTICS (GENERAL AND DISPENSING PHARMACY)

L	T	P	Credits
3	0	0	3

Sessional: 40 Marks

Exam: 60 Marks

Total: 100 Marks

Duration of Exam: 3 hrs

Note: Examiner will set 9 questions in total, with two questions from each section/unit and one question covering all units will be Q.9. This Q.9 will be compulsory and of short answer type. Each question carries equal marks (12 marks). Students have to attempt 5 questions in total including question No. 9.

Unit I

Orientation and Historical Background of the Profession and Metrology

Orientation, Introduction and scope of pharmacy profession, official compendia.

Introduction to units of weights and volume in both metric systems, imperial systems and SI system. Simple calculation involved in preparing solutions of solids in liquids (W/V), liquids in liquids (V/V), Method of allegation.

Unit II

Liquid orals and solutions

Formulation, characteristics and evaluation. Official pharmaceutical solutions, products for oral, and topical use including syrups, elixirs, glycerin, mouth washes, gargles, spirits, nasal drops, throat paints, aromatic waters, lotions and liniments.

Unit III

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. Evaluation of powder dosage form.

Unit IV

a) Prescription

Description and parts of a prescription, handling the prescription, reading the prescription, checking the written prescription, compounding the prescription.

b) Incompatibilities

Types and methods to overcome them, inorganic incompatibilities Therapeutic Incompatibilities.

Text Books: Recent editions of the following books to be referred

1. L. Lachman, H.A. Lieberman and J.L. Kanig, The Theory and Practice of Industrial Pharmacy, Lea and Febiger, Philadelphia, U.S.A.
2. N.K.Jain, Vallabh Prakashan, Text book of General & Dispensing Pharmacy, Edn. 2012, India.

Reference Books:

1. Indian Pharmacopoeia 2007. New Delhi: Indian Pharmacopoeia Commission
2. Remington, The Science and Practice of Pharmacy, Mack Publishing Co., U.S.A.
3. S.J. Carter, Dispensing for Pharmaceutical Students, 11th and 12th edition, 1967 and 1975, Pitman Books Ltd., London, U.K.



L	T	P	Credits
3	0	0	3

Sessional: 40 Marks

Exam: 60 Marks

Total: 100 Marks

Duration of Exam: 3 hrs

Note: Examiner will set 9 questions in total, with two questions from each section/unit and one question covering all units will be Q.9. This Q.9 will be compulsory and of short answer type. Each question carries equal marks (12 marks). Students have to attempt 5 questions in total including question No. 9.

Unit I Definition and etymology of word Rasa, brief history of Rasa Shastra, concept of Rasa shala, concept of Rasamandap, importance of Rasaushadhi, concept of Rasa & Rasayana, fundamental principles of Rasashastra.

Unit-II Brief description of technical terminologies (Paribhasa prakarana)

Avapa, Nirvapa, Dhalana, Bhavana, Jarana, Murcchan, Shodhana, Marana, Varitara, Rekhapurna, Apunarbhava, Uttama, Niruttha, Amritikarana, Lohitikarana, Mrta loha, Satwa patana, Shuddhavarta, Bijavarta, Rudra bhaga and Dhanvantari bhaga etc. Concept of Shodhana, Marana and, Amritikarana with their importance as per classical and modern literature.

Dravya varga Amlavarga, Kshiratraya, Madhuratraya, Panchamrttika, Panchagavya, Panchamrta, Ksarastaka, Dravakagana, Mitra pancaka, Rakta varga, Sweta varga, Lavanapancaka etc.

Unit-III Brief description of yantra and their application

Uluhala yantra, Khalva yantra, Kachchhapa yantra Urdhwa patan yantra, Adaha patan yantra, Jaranarth tula yantra, Dola yantra, Damaru yantra, Vidhyadhara yantra, Tiryak patana yantra, Patala yantra, Palika yantra, Puta yantra, Valuka yantra, Lavana yantra, Bhudhara yantra, Sthali yantra, Swedana yantra.

Unit-IV Brief description and application of Musha (crucible) and Kosthi

Samanya Musa, Gostanimusa, Vajramusa, Maha musa, Yoga musa, Vrintak musa, Malla/pakwa musa, different types of crucibles. Satvapatana kosthi, Chullika, Patala kosthi, Gara kosthi, Angara kosthi and knowledge of various heating appliances viz. Gas stove, Hot plate and heating mantle.

Text Books:

- 1 Text book of Rasa Shastra by Dr. K.Ramachandra Reddy, Chaukhamba Sanskrit Bhawan, Varanasi
- 2 Text Book of Rasashastra by Dr. Siddhinandana Mishra, Chaukhamba Sanskrit Bhawan, Varanasi
- 3 Text book of Nutan Ayurvediya Rasa Shastra by Dr. Santosh Kumar Mishra, Chaukhambha Orientalia, Varanasi

Reference Books:

1. The Drugs & Cosmetics Act 1940.
2. The Ayurvedic Formulary of India, Part-I&II Govt. of India Publication.
3. The Ayurvedic Pharmacopoeia of India Part-II, Govt. of India Publication.
4. Ayurved Sar Sangraha.
5. Rasa Tantra Sara avum Siddha Prayog Sangraha, Sri Krishan Gopal Bhawan Kaleda, Rajasthan.



L	T	P	Credits
0	0	3	1

Internal: 25 Marks

External: 25 Marks

Total: 50Marks

Note:

Practical's as per topics in the syllabus for the course will be conducted in the laboratory class. Following is suggested a list of exercises out of which a minimum of 8/10 experiments must be performed by a student during the semester.

List of experiments:

1. To study the classification of different Rasa Dravya.
2. To study the identification of different drugs of Maharasa group.
3. To study the identification of different drugs of Uparasa group.
4. To study the identification of different drugs of Sadharanarasa group.
5. To study the identification of different drugs of Dhatu-Upadhatu group.
6. To study the identification of different Heat appliances used in Ayurvedic Drug preparation.
7. To study the Plan of Pharmacy.
8. To study the practical aspect of Shodhana.
9. To study the practical aspect of Bhavna and mardana.
10. To study the various classical tests and parameters of available sample of Bhasma.

Text Books:

1. Text book of Rasa Shastra by Dr. K.Ramachandra Reddy, Chaukhamba Sanskrit Bhawan , Varanasi
2. Text Book of Rasa Shastra by Dr. Siddhinandana Mishra ,Chaukhamba Sanskrit Bhawan, Varanasi
3. Text book of Nutan Ayurvediya Rasa Shastra by Dr. Santosh Kumar Mishra, Chakhambha Orientalia,Varanasi

Reference Books:

1. The Drugs & Cosmetics Act 1940.
2. The Ayurvedic Formulary of India, Part-I&II Govt. of India Publication.
3. The Ayurvedic Pharmacopoeia of India Part-II, Govt. of India Publication.
4. Ayurved Sar Sangraha.
5. Rasa Tantra Sara avum Siddha Prayog Sangraha, Sri Krishan Gopal Bhawan Kaleda, Rajasthan.



HS-204

BUSINESS COMMUNICATION

L	T	P	Credits
2	0	0	2

Sessional: 40 Marks

Exam: 60 Marks

Total: 100 Marks

Duration of Exam: 3 hrs

Note: Examiner will set 9 questions in total, with two questions from each section/unit and one question covering all units will be Q.9. This Q.9 will be compulsory and of short answer type. Each question carries equal marks (12 marks). Students have to attempt 5 questions in total including question No. 9.

Syllabus as per HPTU guidelines



L	T	P	Credits
2	1	0	3

Sessional: 40 Marks

Exam: 60 Marks

Total: 100 Marks

Duration of Exam: 3 hrs

Note: Examiner will set 9 questions in total, with two questions from each section/unit and one question covering all units will be Q.9. This Q.9 will be compulsory and of short answer type. Each question carries equal marks (12 marks). Students have to attempt 5 questions in total including question No. 9.

Unit I-

a) Natural Disasters: Introduction, floods, earthquakes and landslides, cyclones and thunderstorms, tsunami, drought, heat waves, sandstorms.

b) Man made Disasters: War and terrorism, riots and demonstrations, residential and industrial fires, transportation accidents, nuclear power accidents, hazardous materials and toxic emission, utility failure.

Unit II-Problems Regarding Victims:

Saving victims – first 24hours, conducting medical relief operations, managing relief operations, psychological issues, carrying out rehabilitation work.

Unit III- Planning for Disaster Management:

Local disaster management cell, preparation of a business recovery plan, government response in disaster.

Unit –IV- Information Technology and Environment:

Role of information technology and human health, role of an individual in conservation of natural resources and in disaster management.

Text Book:

1. Trivedi RK, Goel PK. Introduction to air pollution. Hyderabad: BS Publications.
2. Rao CS. Environmental pollution control engineering. New Delhi: Wiley Eastern.

Reference Book:

1. Satish M. Citizen's guide to disaster management. New Delhi: Macmillan Publishers.
2. Duggal KN. Elements of public health engineering. New Delhi: S Chand & Co.

