

**SCHEME OF TEACHING**

<b>Course Code</b>	<b>Name of the Course</b>	<b>No. of hours</b>	<b>Tutorial</b>	<b>Credit Points</b>
BP201T	Human Anatomy and physiology-II (Theory)	3	1	4
BP202T	Pharmaceutical Organic Chemistry-I (Theory)	3	1	4
BP203T	Pharmaceutical Engineering (Theory)	3	1	4
BP204T	Computer Applications in Pharmacy (Theory)*	3	-	3
BP205T	Environmental Sciences (Theory)*	3	-	3
BP201P	Human Anatomy and Physiology-II (Practical)	4	-	2
BP202P	Pharmaceutical Organic Chemistry-I (Practical)	4	-	2
BP203P	Pharmaceutical Engineering (Practical)	4	-	2
BP204P	Computer Applications in Pharmacy (Practical)*	2	-	1
	<b>Total</b>	<b>29</b>	<b>03</b>	<b>25</b>

\* Non-University Examination (NUE)

**SCHEME OF EVALUATION**

Course Code	Name of the Course	Marks Distribution			
		University (End Semester Exam)	Institute		Total
			Sessional Exams	Continuous Mode	
BP201T	Human Anatomy and physiology-II (Theory)	75	15	10	100
BP202T	Pharmaceutical Organic Chemistry-I (Theory)	75	15	10	100
BP203T	Pharmaceutical Engineering (Theory)	75	15	10	100
BP204T	Computer Applications in Pharmacy (Theory)*	50	15	10	075
BP205T	Environmental Sciences (Theory)*	50	15	10	075
BP201P	Human Anatomy and Physiology-II (Practical)	35	10	05	050
BP202P	Pharmaceutical Organic Chemistry-I (Practical)	35	10	05	050
BP203P	Pharmaceutical Engineering (Practical)	35	10	05	050
BP204P	Computer Applications in Pharmacy (Practical)*	15	05	05	025
<b>Total</b>		<b>445</b>	<b>110</b>	<b>70</b>	<b>625</b>

\* Non-University Examination (NUE)

<b>Subject Code: 201T</b>	<b>Subject Title: Human Anatomy and Physiology-II (Theory)</b>
<b>Pre-requisite: --</b>	

**Course Objective: Upon completion of this course, the students would be able to**

1. Explain the gross morphology, structure and functions of various organs of the human body.
2. Describe the various homeostatic mechanisms and their imbalances.
3. Identify the various tissues and organs of different systems of the human body.
4. Perform hematological tests like blood cell counts, haemoglobin estimation, bleeding/clotting time etc. and record blood pressure, heart rate, pulse and respiratory volume.
5. Appreciate coordinated working pattern of different organs of each system.
6. Appreciate the interlinked mechanisms in the maintenance of normal functioning (homeostasis) of human body.

Teaching Scheme (Hours per week)			Evaluation Scheme (Marks)			
Lecture	Tutorial	Credit	Theory			Total
			University Assessment	Continuous Assessment	Internal Assessment	
3	1	4	75	10	15	100

**Detailed Syllabus:**

Sr. No.	UNIT	Hours	Weightage (%)
1.	<p><b>Nervous system</b>                      Organization of nervous system, neuron, neuroglia, classification and properties of nerve fibre, electrophysiology, action potential, nerve impulse, receptors, synapse, neurotransmitters.                      Central nervous system: Meninges, ventricles of brain and cerebrospinal fluid. Structure and functions of brain (cerebrum, brain stem, cerebellum), spinal cord (gross structure, functions of afferent and efferent nerve tracts, reflex activity)</p>	<b>10 Hours</b>	<b>22.22%</b>
2.	<p><b>Digestive system</b>                      Anatomy of GI Tract with special reference to anatomy</p>	<b>06 Hours</b>	<b>13.33%</b>

	<p>and functions of stomach, ( Acid production in the stomach, regulation of acid production through parasympathetic nervous system, pepsin role in protein digestion) small intestine and large intestine, anatomy and functions of salivary glands, pancreas and liver, movements of GIT, digestion and absorption of nutrients and disorders of GIT.</p> <p><b>Energetics:</b> Formation and role of ATP, Creatinine Phosphate and BMR.</p>		
<b>3.</b>	<p><b>Respiratory system</b>  Anatomy of respiratory system with special reference to anatomy of lungs, mechanism of respiration, regulation of respiration.  Lung Volumes and capacities transport of respiratory gases, artificial respiration, and resuscitation methods.</p> <p><b>Urinary system</b>  Anatomy of urinary tract with special reference to anatomy of kidney and nephrons, functions of kidney and urinary tract, physiology of urine formation, micturition reflex and role of kidneys in acid base balance, role of RAS in kidney and disorders of kidney.</p>	<b>10 Hours</b>	<b>22.22%</b>
<b>4.</b>	<p><b>Endocrine system</b>  Classification of hormones, mechanism of hormone action, structure and functions of pituitary gland, thyroid gland, parathyroid gland, adrenal gland, pancreas, pineal gland, thymus and their disorders.</p>	<b>10 Hours</b>	<b>22.22%</b>
<b>5.</b>	<p><b>Reproductive system</b>  Anatomy of male and female reproductive system, Functions of male and female reproductive system, sex hormones, physiology of menstruation, fertilization, spermatogenesis, oogenesis, pregnancy and parturition</p> <p><b>Introduction to genetics</b>  Chromosomes, genes and DNA, protein synthesis, genetic pattern of inheritance</p>	<b>9 Hours</b>	<b>20%</b>

<b>Subject Code: 201P</b>	<b>Subject Title: Human Anatomy and Physiology-II (Practical)</b>
<b>Pre-requisite: --</b>	

**Course Objective:** Upon completion of this course the student should be able to

1. Summarize functional characteristics of various systems.
2. Describe the fundamental physiological mechanism involved in demonstrated practical.
3. Interlinking various systems in terms of feedback mechanisms and performing various tests related to blood cells counts which relate with the diagnosis of various disease conditions.
4. Identify and describe functionality of various devices for family planning and Pregnancy diagnostic tests.
5. Analyze the problem, communicate suggested solution and interpret the results.

<b>Teaching Scheme (Hours per week)</b>		<b>Evaluation Scheme (Marks)</b>			
<b>Practical</b>	<b>Credit</b>	<b>Theory</b>			<b>Total</b>
		<b>University Assessment</b>	<b>Continuous Assessment</b>	<b>Internal Assessment</b>	
4	2	35	5	10	50

**List of practical:**

<b>Sr. No.</b>	<b>Title of the Practical</b>
1	To study the integumentary and special senses using specimen, models, etc.,
2	To study the nervous system using specimen, models, etc.,
3	To study the endocrine system using specimen, models, etc
4	To demonstrate the general neurological examination
5	To demonstrate the function of olfactory nerve
6	To examine the different types of taste.
7	To demonstrate the visual acuity
8	To demonstrate the reflex activity
9	Recording of body temperature

10	To demonstrate positive and negative feedback mechanism.
11	Determination of tidal volume and vital capacity.
12	Study of digestive, respiratory, cardiovascular systems, urinary and reproductive systems with the help of models, charts and specimens.
13	Recording of basal mass index
14	Study of family planning devices and pregnancy diagnosis test.
15	Demonstration of total blood count by cell analyser
16	Permanent slides of vital organs and gonads.

**Recommended Study Material:**

1. Essentials of Medical Physiology, K. Sembulingam and P. Sembulingam. Jaypee brothers medical publishers, New Delhi.
2. Anatomy and Physiology in Health and Illness, Kathleen J.W. Wilson, Churchill Livingstone, New York
3. Physiological basis of Medical Practice-Best and Taylor. Williams & Wilkins Co, Riverview, MI USA
4. Text book of Medical Physiology- Arthur C, Guyton and John.E. Hall. Miamisburg, OH, U.S.A.
5. Principles of Anatomy and Physiology, Tortora Grabowski. Palmetto, GA, U.S.A.
6. Textbook of Human Histology, Inderbir Singh, Jaypee brothers medical publishers, New Delhi.
7. Textbook of Practical Physiology, C.L. Ghai, Jaypee brothers medical publishers, New Delhi.
8. Practical workbook of Human Physiology, K. Srinageswari and Rajeev Sharma, Jaypee brother's medical publishers, New Delhi.
9. Practical Anatomy and Physiology, Goyal, R. K., Natvar M. P., Shah S. A., B.S. Shah Prakashan, Ahmedabad.
10. Textbook of Anatomy and Physiology, Goyal, R. K., Natvar M. P., Shah S. A., B.S. Shah Prakashan, Ahmedabad.
11. Textbook of Practical Physiology, Rannade VG, PVG Publisher, Pune.
12. Human Anatomy and Physiology, Paul D. Anderson, Jones and Bartlett publisher, London

<b>Subject Code: BP202T</b>	<b>Subject Title: Pharmaceutical Organic Chemistry-I (Theory)</b>
<b>Pre-requisite: --</b>	

**Course Objective:** Upon completion of this course, the students would be able to

1. Assign nomenclature to structure as per IUPAC system.
2. Identify the type of isomerism of the organic compound.
3. Write the reaction with their reactivity, stability, and orientation.
4. Enumerate the preparations, reactions and uses of important organic compounds.

Teaching Scheme (Hours per week)			Evaluation Scheme (Marks)			
Lecture	Tutorial	Credit	Theory			Total
			University Assessment	Continuous Assessment	Internal Assessment	
3	1	4	75	10	15	100

#### Detailed Syllabus:

Sr. No.	UNIT	Hours	Weightage (%)
1.	<p><b>Classification, nomenclature, and isomerism</b>                      Classification of Organic Compounds Common and IUPAC systems of nomenclature of organic compounds (up to 10 Carbons open chain and carbocyclic compounds) Structural isomerism in organic compounds</p>	<b>7 Hours</b>	<b>15.55%</b>
2.	<p><b>Alkanes*, Alkenes* and Conjugated dienes*</b>                      SP<sup>3</sup> hybridization in alkanes, Halogenation of alkanes, uses of paraffins. Stabilities of alkenes, SP<sup>2</sup> hybridization in alkenes                      E<sub>1</sub> and E<sub>2</sub> reactions – kinetics, order of reactivity of alkyl halides, rearrangement of carbocations, Saytzeffs orientation and evidence. E<sub>1</sub> versus E<sub>2</sub> reactions, Factors affecting E<sub>1</sub> and E<sub>2</sub> reactions. Ozonolysis, electrophilic addition reactions of alkenes, Markownikoff's orientation, free radical addition reactions of alkenes, Anti Markownikoff's orientation.                      Stability of conjugated dienes, Diel-Alder, electrophilic addition, free radical addition reactions of conjugated</p>	<b>10 Hours</b>	<b>22.22%</b>

	dienes, allylic rearrangement		
3.	<p><b>Alkyl halides*</b>  <math>SN^1</math> and <math>SN^2</math> reactions - kinetics, order of reactivity of alkyl halides, stereochemistry, and rearrangement of carbocations. <math>SN^1</math> versus <math>SN^2</math> reactions, Factors affecting <math>SN^1</math> and <math>SN^2</math> reactions Structure and uses of ethyl chloride, Chloroform, trichloroethylene, tetrachloroethylene, dichloromethane, tetrachloromethane and iodoform.</p> <p><b>Alcohols*:</b> Qualitative tests, Structure and uses of Ethyl alcohol, Methyl alcohol, Chlorobutanol, Cetosteryl alcohol, Benzyl alcohol, Glycerol, Propylene glycol</p>	10 Hours	22.22%
4.	<p><b>Carbonyl compounds* (Aldehydes and ketones)</b>  Nucleophilic addition, Electromeric effect, aldol condensation, Crossed Aldol condensation, Cannizzaro reaction, Crossed Cannizzaro reaction, Benzoin condensation, Perkin condensation, qualitative tests, Structure and uses of Formaldehyde, Paraldehyde, Acetone, Chloral hydrate, Hexamine, Benzaldehyde, Vanilin, Cinnamaldehyde.</p>	10 Hours	17.77%
5.	<p><b>Carboxylic acids*</b>  Acidity of carboxylic acids, effect of substituents on acidity, inductive effect and qualitative tests for carboxylic acids, amide and ester.  Structure and Uses of Acetic acid, Lactic acid, Tartaric acid, Citric acid, Succinic acid, Oxalic acid, Salicylic acid, Benzoic acid, Benzyl benzoate, Dimethyl phthalate, Methyl salicylate and Acetyl salicylic acid.</p> <p><b>Aliphatic amines*:</b> Basicity, effect of substituent on Basicity. Qualitative test, Structure and uses of Ethanolamine, Ethylenediamine, Amphetamine.</p>	8 Hours	17.77%

**Note: General method of preparations and reactions of compounds superscripted with asterisk to be explained.**



<b>Subject Code: BP202P</b>	<b>Subject Title: Pharmaceutical Organic Chemistry-I (Practical)</b>
<b>Pre-requisite: --</b>	

**Course objective:** Upon completion of this course the student should be able to

1. Identify the nature of organic compounds.
2. Prepare various derivatives of organic compounds.
3. Interpret the stereo models of organic compounds.
4. Analyze the problem, communicate suggested solution and interpret the results.

Teaching Scheme (Hours per week)		Evaluation Scheme (Marks)			
Practical	Credit	Theory			Total
		University Assessment	Continuous Assessment	Internal Assessment	
4	2	35	5	10	50

**List of Practical:**

Sr. No.	Title of the unit
1.	<ul style="list-style-type: none"> <li>• Systematic qualitative analysis of unknown organic compounds like Preliminary test: Color, odour, aliphatic/aromatic compounds, saturation and unsaturation, etc.</li> <li>• Detection of elements like Nitrogen, Sulphur and Halogen by Lassaigne's test</li> <li>• Solubility test</li> <li>• Functional group tests like Phenols, Amides/ Urea, Carbohydrates, Amines, Carboxylic acids, Aldehydes and Ketones, Alcohols, Esters, Aromatic and Halogenated Hydrocarbons, Nitro compounds and Anilides.</li> <li>• Melting point/Boiling point of organic compounds</li> <li>• Identification of the unknown compound from the literature using melting point/ boiling point.</li> <li>• Preparation of the derivatives and confirmation of the unknown compound by melting point/ boiling point.</li> <li>• Minimum 5 unknown organic compounds to be analyzed systematically.</li> </ul>
2.	Preparation of suitable solid derivatives from organic compounds
3.	Construction of molecular models

**Recommended Study Material:**

1. Organic Chemistry, Morrison and Boyd, Pearson Education, India
2. Organic Chemistry, I.L. Finar , Volume-I, Pearson Education, India
3. Textbook of Organic Chemistry, B.S. Bahl & Arun Bahl, S. Chand Publisher
4. Organic Chemistry, P. L. Soni, Sultan Chand & Sons Publisher
5. Practical Organic Chemistry, Mann and Saunders, Pearson Education, India
6. Vogel's textbook of Practical Organic Chemistry, Pearson Education, India
7. Advanced Practical Organic Chemistry. N. K. Vishnoi, S. Chand Publisher
8. Introduction to Organic Laboratory techniques, Pavia, Lampman and Kriz., Brooks/Cole
9. Reaction and reaction mechanism Ahluwalia/Chatwal.
10. Reaction and reaction mechanism, P. S. Kalsi, New Age International Publisher
11. Textbook of Organic, Medicinal and Pharmaceutical Chemistry, Willson & Gisvolds, Walter Kluwer India Pvt. Ltd.
12. Organic Chemistry, Bhupinder Mehta and Manju Mehta, PHI
13. Organic Chemistry, Jonathan Clayden, Nick Greeves & Stuart Warren, Oxford University Press.

<b>Subject Code:</b> BP203T	<b>Subject Title:</b> Pharmaceutical Engineering (Theory)
<b>Pre-requisite:</b> --	

**Course Objective:** Upon completion of the course student shall be able to

1. Summarize various unit operations used in pharmaceutical industries with applications.
2. Describe and suggest material handling techniques.
3. Suggest and justify appropriate equipment of the unit operations including their principle, construction, working and specific applications.
4. Describe preventive methods used for environmental pollution and corrosion control in pharmaceutical industries.
5. Draw and comprehend significance of pharmaceutical plant lay out design.

Teaching Scheme (Hours per week)			Evaluation Scheme (Marks)			
Lecture	Tutorial	Credit	Theory			Total
			University Assessment	Continuous Assessment	Internal Assessment	
3	1	4	75	10	15	100

**Detailed Syllabus:**

Sr. No.	UNIT	Hours	Weightage (%)
1.	<p><b>Flow of fluids:</b> Types of manometers, Reynolds number and its significance, Bernoulli 's theorem and its applications, Energy losses, Orifice meter, Venturi meter, Pitottube and Roto meter.</p> <p><b>Size Reduction:</b> Objectives, Mechanisms &amp; Laws governing size reduction, factors affecting size reduction, principles, construction, working, uses, merits and demerits of Hammer mill, ball mill, fluid energy mill, Edge runner mill &amp; end runner mill.</p> <p><b>Size Separation:</b> Objectives, applications &amp; mechanism of size separation, official standards of powders, sieves, size separation Principles, construction, working, uses, merits and</p>	<b>10 Hours</b>	<b>22.22%</b>

	demerits of Sieve shaker, cyclone separator, Air separator, Bag filter & elutriation tank.		
2.	<p><b>Distillation:</b> Basic Principles and methodology of simple distillation, flash distillation, fractional distillation, distillation under reduced pressure, steam distillation &amp; molecular distillation</p> <p><b>Evaporation:</b> Objectives, application, and factors influencing evaporation, differences between evaporation and other heat processes. principles, construction, working, uses, merits and demerits of Steam jacketed kettle, horizontal tube evaporator, climbing film evaporator, forced circulation evaporator, multiple effect evaporator &amp; Economy of multiple effect evaporator.</p> <p><b>Heat Transfer :</b> Objectives, applications &amp; Heat transfer mechanisms. Fourier's law, Heat transfer by conduction, convection &amp; radiation. Heat interchangers &amp; heat exchangers</p>	<b>10 Hours</b>	<b>22.22%</b>
3.	<p><b>Drying:</b> Objectives, applications &amp; mechanism of drying process, measurements &amp; applications of Equilibrium Moisture content, rate of drying curve. principles, construction, working, uses, merits and demerits of Tray dryer, drum dryer spray dryer, fluidized bed dryer, vacuum dryer, freeze dryer.</p> <p><b>Mixing:</b> Objectives, applications &amp; factors affecting mixing, Difference between solid and liquid mixing, mechanism of solid mixing, liquids mixing and semisolids mixing. Principles, Construction, Working, uses, Merits and Demerits of Double cone blender, twin shell blender, ribbon blender, Sigma blade mixer, planetary mixers, Propellers, Turbines, Paddles &amp; Silverson Emulsifier</p>	<b>8 Hours</b>	<b>17.77%</b>
4.	<p><b>Filtration</b> Objectives, applications, Theories &amp; Factors influencing filtration, filter aids, filter medias. Principle, Construction, Working, Uses, Merits and demerits of plate &amp; frame filter, filter leaf, rotary drum filter, Meta filter &amp; Cartridge filter, membrane filters and Seidtz filter.</p> <p><b>Centrifugation:</b> Objectives, principle &amp; applications of Centrifugation, principles, construction, working, uses, merits and</p>	<b>8 Hours</b>	<b>17.77%</b>

	demerits of Perforated basket centrifuge, non-perforated basket centrifuge, semi continuous centrifuge & super centrifuge		
5.	<b>Materials of pharmaceutical plant construction, Corrosion and its prevention</b> Factors affecting materials selected for pharmaceutical plant construction, Theories of corrosion, types of corrosion and their prevention. Ferrous and nonferrous metals, inorganic and organic nonmetals, basic of material handling systems.	<b>7 Hours</b>	<b>15.55%</b>

<b>Subject Code: BP203P</b>	<b>Subject Title: Pharmaceutical Engineering (Practical)</b>
<b>Pre-requisite: --</b>	

**Course Objective:** Upon completion of the course student shall be able to

1. Perform the experiments involving unit operations like filtration, distillation, evaporation, drying, mixing, crystallization.
2. Identify the equipment and carry out the experiments related to size reduction and size separation.
3. Describe the basic concepts of heat transfer and HVAC (humidity ventilation and air conditioning).
4. Analyze the problem, communicate suggested solution and interpret the results.

Teaching Scheme (Hours per week)		Evaluation Scheme (Marks)			
Practical	Credit	Theory			Total
		University Assessment	Continuous Assessment	Internal Assessment	
4	2	35	5	10	50

**List of Practical:**

Sr. No.	Title of the unit
1.	Determination of radiation constant of brass, iron, unpainted and painted glass.
2.	Steam distillation – To calculate the efficiency of steam distillation.
3.	To determine the overall heat transfer coefficient by heat exchanger.
4.	Construction of drying curves (for calcium carbonate and starch).
5.	Determination of moisture content and loss on drying.
6.	Determination of humidity of air – i) From wet and dry bulb temperatures – use of Dew point method.
7.	Description of Construction working and application of Pharmaceutical Machinery such as rotary tablet machine, fluidized bed coater, fluid energy mill, de humidifier
8.	Size analysis by sieving – To evaluate size distribution of tablet granulations. – Construction of various size frequency curves including arithmetic and logarithmic probability plots.
9.	Size reduction: To verify the laws of size reduction using ball mill and determining Kicks, Rittinger ‘s, Bond’s coefficients, power requirement and critical speed of Ball Mill.
10.	Demonstration of colloid mill, planetary mixer, fluidized bed dryer, freeze dryer and such other major equipment.

<b>11.</b>	Factors affecting Rate of Filtration and Evaporation (Surface area, Concentration and Thickness/ viscosity)
<b>12.</b>	To study the effect of time on the Rate of Crystallization.
<b>13.</b>	To calculate the uniformity Index for given sample by using Double Cone Blender.

#### **Recommended Study Material:**

1. Introduction to Chemical Engineering, Walter L Badger & Julius Banchero, Latest edition.
2. Solid phase extraction, Principles, Techniques and Applications, Nigel J.K. Simpson, Latest edition.
3. Unit Operation of Chemical Engineering, McCabe Smith, Latest edition.
4. Pharmaceutical Engineering- Principles and Practices, C.V.S Subrahmanyam et al., Latest edition.
5. Remington, The Science and Practice of Pharmacy, Martin, Latest edition.
6. Theory and Practice of Industrial Pharmacy, Leon Lachmann., Latest edition.
7. Physical pharmaceutics, C.V.S Subrahmanyam et al., Latest edition.
8. Cooper and Gunn's Tutorial pharmacy, S.J. Carter, Latest edition.
9. Practical Manual of Pharmaceutical Engineering, Munira Momin, Tejal Mehta, B. S. Shah Prakashan

<b>Subject Code: BP204T</b>	<b>Subject Title: Computer Applications in Pharmacy (Theory)</b>
<b>Pre-requisite: --</b>	

**Course Objective:** Upon completion of the course student shall be able to

1. Apply knowledge of computer in pharmacy.
2. Classify and explain various types of databases.
3. Enlist and describe various applications of databases in pharmacy.
4. Write advantages and disadvantages of computers in pharmacy management system.
5. Explain various software's of computers used in pharmacy.

Teaching Scheme (Hours per week)			Evaluation Scheme (Marks)			
Lecture	Tutorial	Credit	Theory			Total
			University Assessment	Continuous Assessment	Internal Assessment	
3	-	3	50	10	15	75

#### Detailed Syllabus:

Sr. No.	UNIT	Hours	Weightage (%)
1.	<p><b>Number system, Concept of Information Systems and Software</b> Binary number system, Decimal number system, Octal number system, Hexadecimal number systems, conversion decimal to binary, binary to decimal, octal to binary etc, binary addition, binary subtraction – One's complement, Two's complement method, binary multiplication, binary division.</p> <p>Information gathering, requirement and feasibility analysis, data flow diagrams, process specifications, input/output design, process life cycle, planning and managing the project.</p>	<b>6 Hours</b>	<b>20%</b>
2.	<p><b>Web technologies:</b> Introduction to HTML, XML, CSS and Programming languages, introduction to web servers and Server Products Introduction to databases, MYSQL, MS ACCESS, Pharmacy Drug</p>	<b>6 Hours</b>	<b>20%</b>



	database		
<b>3.</b>	<p><b>Application of computers in Pharmacy</b> Drug information storage and retrieval, Pharmacokinetics, Mathematical model in Drug design, Hospital and Clinical Pharmacy, Electronic Prescribing and discharge (EP) systems, barcode medicine identification and automated dispensing of drugs, mobile technology and adherence monitoring. Diagnostic System, Lab-diagnostic System, Patient Monitoring System, Pharma Information System</p>	<b>6 Hours</b>	<b>20%</b>
<b>4.</b>	<p><b>Bioinformatics</b> Introduction, Objective of Bioinformatics, Bioinformatics Databases, Concept of Bioinformatics, Impact of Bioinformatics in Vaccine Discovery</p>	<b>6 Hours</b>	<b>20%</b>
<b>5.</b>	<p><b>Computers as data analysis in Preclinical development:</b> Chromatographic data analysis(CDS), Laboratory Information management System (LIMS) and Text Information Management System(TIMs)</p>	<b>6 Hours</b>	<b>20%</b>

<b>Subject Code: BP204P</b>	<b>Subject Title: Computer Applications in Pharmacy (Practical)</b>
<b>Pre-requisite: --</b>	

**Course Objective:** Upon completion of the course student shall be able to

1. Generate database using various tools.
2. Program to retrieve data from database.
3. Apply MS of access for storage and retrieving drug information
4. Export contents to web and xml pages
5. Analyze the problem, communicate suggested solution and interpret the results.

Teaching Scheme (Hours per week)		Evaluation Scheme (Marks)			
Practical	Credit	Theory			Total
		University Assessment	Continuous Assessment	Internal Assessment	
2	2	15	5	5	25

**List of Practical:**

Sr. No.	Title
1.	Design a questionnaire using a word processing package to gather information about a particular disease.
2.	Create a HTML web page to show personal information.
3.	Retrieve the information of a drug and its adverse effects using online tools
4.	Creating mailing labels Using Label Wizard, generating label in MS WORD
5.	Create a database in MS Access to store the patient information with the required fields Using access
6.	Design a form in MS Access to view, add, delete and modify the patient record in the database
7.	Generating report and printing the report from patient database
8.	Creating invoice table using – MS Access
9.	Drug information storage and retrieval using MS Access
10.	Creating and working with queries in MS Access
11.	Exporting Tables, Queries, Forms and Reports to web pages
12.	Exporting Tables, Queries, Forms and Reports to XML pages

**Recommended Study Material:**

1. Computer Application in Pharmacy – William E. Fassett –Lea and Febiger, 600South Washington Square, USA, (215) 922-1330.
2. Computer Application in Pharmaceutical Research and Development –Sean Ekins – Wiley-Interscience, A John Willey and Sons, INC., Publication, USA
3. Bioinformatics (Concept, Skills and Applications) – S. C. Rastogi-CBS Publishers and Distributors, 4596/1- A, 11 Darya Gani, New Delhi – 110 002(INDIA)
4. Microsoft office Access - 2003, Application Development Using VBA, SQL Server,DAP and Infopath – Cary N. Prague – Wiley Dreamtech India (P) Ltd., 4435/7, Ansari Road, Darya Ganj, New Delhi - 110002

<b>Subject Code: BP205T</b>	<b>Subject Title: Environmental Sciences (Theory)</b>
<b>Pre-requisite: --</b>	

**Course Objective:** Upon completion of the course student shall be able to

1. Summarize basic knowledge about the environment and its allied problems.
2. Narrate various Environmental Pollution like Air pollution, Water pollution and Soil pollution.
3. Describe basic concept, structure and function of an ecosystem.

Teaching Scheme (Hours per week)			Evaluation Scheme (Marks)			
Lecture	Tutorial	Credit	Theory			Total
			University Assessment	Continuous Assessment	Internal Assessment	
3	-	3	50	10	15	75

#### Detailed Syllabus:

Sr. No.	UNIT	Hours	Weightage (%)
1.	<b>The Multidisciplinary nature of environmental studies</b> Natural Resources Renewable and non-renewable resources: Natural resources and associated problems a) Forest resources; b) Water resources; c) Mineral resources; d) Food resources; e) Energy resources; f) Land resources: Role of an individual in conservation of natural resources	<b>10 Hours</b>	<b>33.33%</b>
2.	<b>Concept of an ecosystem.</b> Structure and function of an ecosystem. Introduction, types, characteristic features, structure and function of the ecosystems: Forest ecosystem; Grassland ecosystem; Desert ecosystem; Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)	<b>10 Hours</b>	<b>33.33%</b>
3.	<b>Environmental Pollution.</b> Air pollution; Water pollution; Soil pollution	<b>10 Hours</b>	<b>33.33%</b>

**Recommended Study Material:**

1. Environmental Science, Y.K. Sing, New Age International Pvt, Publishers, Bangalore
2. Environmental Biology, Agarwal, K.C. 2001, Nidi Publ. Ltd. Bikaner.
3. The Biodiversity of India, Bharucha Erach, Mapin Publishing Pvt. Ltd., Ahmedabad – 380 013, India
4. Hazardous Waste Incineration, Brunner R.C., 1989, McGraw Hill Inc.
5. Marine Pollution, Clark R.S., Clarendon Press, Oxford
6. Environmental Encyclopedia, Cunningham, W.P., Cooper. T.H., Gorhani, E. & Hepworth, M.T., 2001, Jaico Publ. House, Mumbai
7. Environmental Chemistry, De A.K., Wiley Eastern Ltd.
8. Down of Earth, Centre for Science and Environment