

## **B. Pharmacy 1<sup>st</sup> Year Subjects and Syllabus:**

B. Pharm(a) also called Bachelor in Pharmacy, is an undergraduate academic degree in the medical field of Pharmacy. In the United States, at Washington State University this degree was granted as the baccalaureate pharmacy degree only, where it has now been superseded by the Pharm. D degree. In India, Pharmacy Council of India (PCI) is responsible to provide Pharmacy graduate level education all over the universities. Hence, it is a statutory body that is regulated by the provisions of the Pharmacy Act, 1948, passed by the Indian Parliament. One is eligible to opt for this course after successfully completing Standard Twelve in science stream with Physics, Chemistry, Maths or Biology as combination subjects. Students of Pharmacy are expected to they perform various experiments preparing new drugs for various diseases as practical knowledge along with the theory part. Here we are going to know about the first year curriculum.

### **Regulations:**

- The total duration of the course- 4 years. Typically the course spread out over 6-8 semesters. Each year consists of 2 semesters ideally. Each semester shall consist of minimum 100 working days.
- Eligibility- 10+2 passed with Science stream subjects (PCB or PCM) from a recognized board with English as one of the subjects and at least 50% marks is the minimum educational qualification. In some states, it is also compulsory to follow their own additional entrance tests.
- Entrance Examination: BHU B. Pharma Entrance Examination, GPAT- Graduate Pharmacy Aptitude Test, MHT-CET Maharashtra Common Entrance Test, GCET-Goa Common Entrance Test etc.

### **Subjects for B Pharm 1st year (Semester 1)**

<b>Subjects</b>	<b>Theory Hours</b>	<b>Marks</b>	<b>Practical Hours</b>	<b>Marks</b>
HUMAN ANATOMY AND PHYSIOLOGY-I	45	100	4/week	50
PHARMACEUTICAL ANALYSIS	45	100	4/week	50
PHARMACEUTICS- I	45	100	3/week	50
<b>PHARMACEUTICAL INORGANIC CHEMISTRY</b>	45	100	4/week	50
COMMUNICATION SKILLS*	30	50	2/week	25
REMEDIAL BIOLOGY*/ REMEDIAL MATHEMATICS(Only theory)*	30	50	30	25
<b>Total marks</b>	<b>675/725 \$/750#</b>			

#Applicable ONLY for the students who have studied Mathematics / Physics / Chemistry at HSC and appearing for Remedial Biology (RB) course.

\$Applicable ONLY for the students who have studied Physics / Chemistry / Botany / Zoology at HSC and appearing for Remedial Mathematics (RM) course.

\* Non University Examination (NUE)

## Syllabus for 1st Semester

Subjects	Syllabus Theory	Practical
HUMAN ANATOMY AND PHYSIOLOGY-I	Unit I(Introduction to human body, Cellular level of organization, Tissue level of organization); Unit II(Integumentary system, Skeletal system, Joints); Unit III(Body fluids and blood, Lymphatic system); Unit IV(Peripheral nervous system, Peripheral nervous system); Unit V (Cardiovascular system)	1. Study of compound microscope. 2. Microscopic study of epithelial and connective tissue 3. Microscopic study of muscular and nervous tissue 4. Identification of axial bones 5. Identification of appendicular bones 6. Introduction to hemocytometry. 7. Enumeration of white blood cell (WBC) count 8. Enumeration of total red blood corpuscles (RBC) counts 9. Determination of bleeding time 10. Determination of clotting time 11. Estimation of hemoglobin content 12. Determination of blood group. 13. Determination of erythrocyte sedimentation rate (ESR). 14. Determination of heart rate and pulse rate 15. Recording of blood pressure.
PHARMACEUTICAL ANALYSIS	Unit I(Pharmaceutical analysis, Errors, Pharmacopoeia); Unit II(Acid base titration, Non aqueous titration); Unit III(Precipitation titration, Complexometric titration, Gravimetry, Basic Principles, methods and application of diazotisation titration); Unit IV(Redox titrations); Unit V(Electrochemical methods of analysis- Conductometry, Potentiometry, Polarography)	Limit Tests- (1) Chloride (2) Sulphate (3) Iron (4) Arsenic; Preparation and standardization of - (1) Sodium hydroxide Sulphuric acid (3) Sodium thiosulfate (4) Potassium permanganate (5) Ceric ammonium sulphate; Assay of the following compounds along with Standardization of Titrant- (1) Ammonium chloride by acid base titration (2) Ferrous sulphate by Cerimetry (3) Copper sulphate by Iodometry (4) Calcium gluconate by complexometry (5) Hydrogen peroxide by Permanganometry (6) Sodium benzoate by non-aqueous titration (7) Sodium Chloride by precipitation titration; Determination of Normality by electro-analytical methods - (1) Conductometric titration of strong acid against strong base (2) Conductometric

<p>PHARMACEUTICS- I</p>	<p>Unit I(Historical background and development of profession of pharmacy, Prescription, Dosage forms, Posology); Unit II(Pharmaceutical calculations, Powders, Liquid dosage forms); Unit III(Monophasic liquids, Biphasic liquids Suspensions, Emulsions); Unit IV(Suppositories, Pharmaceutical incompatibilities); Unit V- Semisolid dosage forms</p>	<p>titration of strong acid and weak acid against strong base (3) Potentiometric titration of strong acid against strong base</p> <p>1. Syrups a) Syrup IP'66 b) Compound syrup of Ferrous Phosphate BPC'68 2. Elixirs a) Piperazine citrate elixir b) Paracetamol pediatric elixir 3.Linctus a) Terpin Hydrate Linctus IP'66 4. Solutions b) Iodine Throat Paint (Mandles Paint) a) Strong solution of ammonium acetate b) Cresol with soap solution c) Lugol's solution 5. Suspension Calamine lotion b) Magnesium Hydroxide mixture c) Aluminium Hydroxide gel 6. Emulsions a) Turpentine Liniment b) Liquid paraffin emulsion 7. Powders and Granules a) ORS powder (WHO) b) Effervescent granules c)Dusting powder d)Divided powders 8. Suppositories a) Glycero gelatin suppository b) Cocoa butter suppository c) Zinc Oxide suppository 8. Semisolids a) Sulphur ointment b) Non staining-iodine ointment with methyl salicylate c) Carbopol gel 9. Gargles and Mouthwashes a) Iodine gargle b) Chlorhexidine mouthwash</p>
<p>PHARMACEUTICAL INORGANIC CHEMISTRY</p>	<p>Unit I(Impurities in pharmaceutical substances, General methods of preparation of compounds); Unit II(Acids, Bases and Buffers, Major extra and intracellular electrolytes, Dental products); Unit III(Gastrointestinal agents, Acidifiers, Antacid, Cathartics, Antimicrobials); Unit IV(Miscellaneous compounds, Expectorants, Emetics, Haematinics, Poison and Antidote, Astringents); Unit V- Radiopharmaceuticals</p>	<p>1.Limit tests for following ions(Chlorides Sulphates Modified limit test for Chloride and Sulphates Limit test for Iron Limit test for Heavy metals Limit test for Lead Limit test for Arsenic) 2. Identification test Magnesium hydroxide Ferrous sulphate Sodium bicarbonate Calcium gluconate Copper sulphate 3.Test for purity Swelling power of Bentonite Neutralizing capacity of aluminum hydroxide gel Determination of potassium iodate and iodine in potassium Iodide 4.Preparation of inorganic pharmaceuticals Boric acid Potash alum Ferrous sulphate</p>
<p>COMMUNICATION SKILLS</p>	<p>Unit I(Communication Skills, Barriers to communication, Perspectives in Communication); Unit II(Elements of Communication, Communication Styles); Unit III(Basic Listening Skills,</p>	<p>Basic communications covering the following topics -Meeting People Asking Questions Making Friends What did you do? Do's and Don'ts; Pronunciations covering the following topics- Pronunciation (Consonant Sounds) Pronunciation and Nouns Pronunciation (Vowel Sounds); Advanced</p>

	Effective Written Communication, Writing Effectively); Unit IV(Interview Skills, Giving Presentations); Unit V- Group Discussion	Learning Listening Comprehension / Direct and Indirect Speech Figures of Speech Effective Communication Writing Skills Effective Writing Interview Handling Skills E-Mail etiquette Presentation Skills
REMEDIALBIOLOGY	Unit I(Living world, Morphology of Flowering plants); Unit II(Body fluids and circulation, Digestion and Absorption, Breathing and respiration); Unit III(Excretory products and their elimination, Neural control and coordination, Chemical coordination and regulation, Human reproduction); Unit IV(Plants and mineral nutrition, Photosynthesis); Unit V(Plant respiration, Plant growth and development, Cell - The unit of life, Tissues	1. Introduction to experiments in biology a) Study of Microscope b) Section cutting techniques c) Mounting and staining d) Permanent slide preparation 2. Study of cell wall and its inclusions 3. Study of Stem, Root, Leaf, seed, fruit, flower and their modifications 4. Detailed study of frog by using computer models 5. Microscopic study and identification of tissues pertinent to Stem, Root Leaf, seed, fruit and flower 6. Identification of bones 7. Determination of blood group 8. Determination of blood pressure 9. Determination of tidal volume
REMEDIAL MATHEMATICS	Unit I(Partial fraction, Logarithms, Function, Limits and continuity); Unit II(Matrices and Determinant); Unit III(Calculus –Differentiation); Unit IV(Analytical Geometry- Introduction, Straight Line, Integration); Unit V(Differential Equations-Application in solving Pharmacokinetic equations, Laplace Transform- Application in solving Chemical kinetics and Pharmacokinetics equations)	

### B Pharmacy first year Subjects for Semester 2

Subjects	Theory		Practical	
	Hours	Marks	Hours	Marks
HUMAN ANATOMY AND PHYSIOLOGY-II	45	100	4/week	50
PHARMACEUTICAL ORGANIC CHEMISTRY-I	45	100	4/week	50
BIOCHEMISTRY	45	100	4/week	50

<b>PATHOPHYSIOLOGY</b>	45	100	-	-
<b>COMPUTER APPLICATIONS IN PHARMACY*</b>	30	75	-	25
<b>ENVIRONMENTAL SCIENCES*</b>	30	75	-	-
<b>Total marks</b>	<b>725</b>			

\* The subject experts at college level shall conduct examinations

## B Pharma First year Syllabus for Semester 2

<b>Subjects</b>	<b>Syllabus</b>	<b>Practical</b>
<b>HUMAN ANATOMY AND PHYSIOLOGY-II</b>	<p><b>Theory</b></p> <p>Unit I- <b>Nervous system</b> (Organization of nervous system, neuron, neuroglia, classification and properties of nerve fibre, electrophysiology, action potential, nerve impulse, receptors, synapse, neurotransmitters. <b>Central nervous system:</b> 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> <p>Unit II- <b>Digestive system</b> (Anatomy of GI Tract with special reference to anatomy and functions of stomach, Acid production in the stomach, regulation of acid production through parasympathetic nervous system, pepsin role in protein digestion) small intestine 54 and large intestine, anatomy and functions of salivary glands, pancreas and liver, movements of GIT, digestion and absorption of nutrients and disorders of GIT. Energetics-Formation and role of ATP, Creatinine Phosphate and BMR) ;Unit III- <b>Respiratory system</b> (Anatomy of respiratory system with special reference to anatomy of</p>	<ol style="list-style-type: none"> <li>1. To study the integumentary special senses using specimen models, etc.,</li> <li>2. To study the nervous system using specimen, models</li> <li>3. To study the endocrine system using specimen, models, etc</li> <li>4. To demonstrate the general neurological examination</li> <li>5. To demonstrate the function of olfactory nerve</li> <li>6. To examine the different types of reflex</li> <li>7. To demonstrate the visual reflex</li> <li>8. To demonstrate the reflex</li> <li>9. Recording of body temperature</li> <li>10. To demonstrate positive and negative feedback mechanisms</li> <li>11. Determination of tidal volume and vital capacity.</li> <li>12. Study of diaphragm, respiratory, cardiovascular system, urinary and reproductive system with the help of models, charts and specimens.</li> <li>13. Recording of body mass index.</li> <li>14. Study of family planning devices and pregnancy diagnosis test.</li> <li>15. Demonstration of total blood count by cell analysis</li> </ol> <p>Permanent slides of vital organs and gonads</p>

lungs, mechanism of respiration, regulation of respiration Lung Volumes and capacities transport of respiratory gases, artificial respiration, and resuscitation methods), **Urinary system** (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); Unit IV- **Endocrine system** (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.); Unit V- **Reproductive system** (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), Introduction to genetics Chromosomes, genes and DNA, protein synthesis, genetic pattern of inheritance

Unit I- **Classification, nomenclature and isomerism**, Classification of Organic Compounds Common and IUPAC systems of nomenclature of organic compounds (up to 10 Carbons open chain and carbocyclic compounds) Structural isomerisms in organic compounds); Unit II- **Alkanes\***, **Alkenes\*** and **Conjugated dienes\*** (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 evidences. E<sub>1</sub> verses E<sub>2</sub> reactions, Factors affecting E<sub>1</sub> and E<sub>2</sub> reactions. Ozonolysis, electrophilic addition

I. Systematic qualitative analysis of unknown organic compounds

1. Preliminary test: Color, odor, aliphatic/aromatic compounds, saturation and unsaturation, Detection of elements like N, Sulphur and Halogen by Lassaigne's test 3. Solubility test 4. Functional group test like Phenols, Amines, Urea, Carbohydrates, Amines, Carboxylic acids, Aldehydes, Ketones, Alcohols, Esters, Alkyl and Halogenated Hydrocarbons, Nitro compounds and Anilines. Melting point/Boiling point of organic compounds 6. Identification of the unknown compound from literature using melting point

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 dienes, allylic rearrangement); Unit III- **Alkyl halides\*** (SN1 and SN2 reactions - kinetics, order of reactivity of alkyl halides, stereochemistry and rearrangement of carbocations. SN1 versus SN2 reactions, Factors affecting SN1 and SN2 reactions, Structure and uses of ethylchloride, Chloroform, trichloroethylene, tetrachloroethylene, dichloromethane, tetrachloromethane and iodoform), **Alcohols\*** (Qualitative tests, Structure and uses of Ethyl alcohol, Methyl alcohol, chlorobutanol, Cetosteryl alcohol, Benzyl alcohol, Glycerol, Propylene glycol); Unit IV- **Carbonyl compounds\* (Aldehydes and ketones)** 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); Unit V- **Carboxylic acids\*** (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), **Aliphatic amines\*** - Basicity, effect of substituent on Basicity. Qualitative test, Structure and uses of Ethanolamine, Ethylenediamine, Amphetamine)

boiling point. 7. Preparation of derivatives and confirmation of unknown compound by melting point/ boiling point. 8. Mini-project on unknown organic compound analysed systematically;

II- Preparation of suitable derivatives from organic compounds

III. Construction of molecular models

## BIOCHEMISTRY

Unit I- **Biomolecules** (Introduction, classification, chemical nature and biological role of carbohydrate, lipids, nucleic acids, amino acids and proteins), **Bioenergetics** (Concept of free energy, endergonic and exergonic reaction, Relationship between free energy, enthalpy and entropy; Redox potential. Energy rich compounds; classification; biological significances of ATP and cyclic AMP) ; Unit II- **Carbohydrate metabolism**(Glycolysis – Pathway, energetics and significance, Citric acid cycle- Pathway, energetics and significance, HMP shunt and its significance, Glucose-6-Phosphate dehydrogenase (G6PD) deficiency, Glycogen metabolism Pathways and glycogen storage diseases (GSD), Gluconeogenesis- Pathway and its significance, Hormonal regulation of blood glucose level and Diabetes mellitus), **Biological oxidation**(Electron transport chain (ETC) and its mechanism. Oxidative phosphorylation & its mechanism and substrate phosphorylation, Inhibitors ETC and oxidative phosphorylation/Uncouplers.); Unit III -**Lipid metabolism**( $\beta$ -Oxidation of saturated fatty acid (Palmitic acid), Formation and utilization of ketone bodies, ketoacidosis  
De novo synthesis of fatty acids (Palmitic acid), Biological significance of cholesterol and conversion of cholesterol into  
bile acids, steroid hormone and vitamin D, Disorders of lipid metabolism: Hypercholesterolemia, atherosclerosis, fatty liver and obesity.) **Amino acid metabolism**

1. Qualitative analysis of carbohydrates (Glucose, Fructose, Lactose, Maltose, Sucrose and Starch)
2. Identification tests for Proteins (albumin and Casein)
3. Quantitative analysis of reducing sugars (DNSA method) and non-reducing sugars (Biuret method)
4. Qualitative analysis of uric acid and abnormal constituents
5. Determination of blood creatinine
6. Determination of blood sugar
7. Determination of serum total cholesterol
8. Preparation of buffer solutions and measurement of pH
9. Study of enzymatic hydrolysis of starch
10. Determination of Salivary amylase activity
11. Study the effect of Temperature on Salivary amylase activity
12. Study the effect of substrate concentration on salivary amylase activity.

(General reactions of amino acid metabolism: Transamination,

deamination & decarboxylation, urea cycle and its disorders,

Catabolism of phenylalanine and tyrosine and their metabolic disorders(Phenyketonuria, Albinism, alkeptonuria, tyrosinemia), Synthesis and significance of biological substances; 5-HT, melatonin,

dopamine, noradrenaline, adrenaline, Catabolism of heme; hyperbilirubinemia and jaundi); Unit IV- **Nucleic acid metabolism and genetic information transfer**

(Biosynthesis of purine and pyrimidine nucleotides,

Catabolism of purine nucleotides and Hyperuricemia and Gout disease, Organization of mammalian genome,

Structure of DNA and RNA and their functions, DNA replication (semi conservative model),

Transcription or RNA synthesis

Genetic code, Translation or Protein synthesis and inhibitors); Unit V- **Enzymes**

(Introduction, properties, nomenclature and IUB classification of enzymes,

Enzyme kinetics (Michaelis plot, Line Weaver Burke plot)

Enzyme inhibitors with examples,

Regulation of enzymes: enzyme induction and repression, allosteric

enzymes regulation, Therapeutic and diagnostic applications of enzymes and isoenzymes, Coenzymes –Structure and biochemical functions)

**Unit I - Basic principles of Cell injury and Adaptation:**

(Introduction, definitions, Homeostasis, Components and Types of Feedback systems,

Causes of cellular injury, Pathogenesis (Cell membrane damage, Mitochondrial damage,

Ribosome damage, Nuclear damage), Morphology of cell injury – Adaptive changes

(Atrophy, Hypertrophy, hyperplasia, Metaplasia, Dysplasia), Cell swelling, Intra cellular accumulation, Calcification, Enzyme leakage and Cell Death Acidosis & Alkalosis, Electrolyte imbalance), **Basic mechanism involved in the process of inflammation and repair:**

(Introduction, Clinical signs of inflammation, Different types of Inflammation, Mechanism

of Inflammation – Alteration in vascular permeability and blood flow, migration of

WBC's, Mediators of inflammation, Basic principles of wound healing in the

skin, Pathophysiology of Atherosclerosis); **Unit II- Cardiovascular System:**

PATHOPHYSIOLOGY

(Hypertension, congestive heart failure, ischemic heart disease (angina, myocardial infarction, atherosclerosis and arteriosclerosis), **Respiratory system:** (Asthma, Chronic obstructive airways diseases.), **Renal system:** (Acute and chronic renal failure.)

Unit III- **Haematological Diseases:** (Iron deficiency, megaloblastic anemia (Vit B12 and folic acid), sickle cell anemia, thalasemia, hereditary acquired anemia, haemophilia), **Endocrine system:** (Diabetes, thyroid diseases, disorders of sex hormones.), **Nervous system:** (Epilepsy, Parkinson's disease, stroke, psychiatric disorders:

Depression, schizophrenia and Alzheimer's disease.),  
**Gastrointestinal system:** (Peptic Ulcer),

Unit IV- **Inflammatory bowel diseases**, jaundice, hepatitis (A,B,C,D,E,F) alcoholic liver

Disease, **Disease of bones and joints:** (Rheumatoid arthritis, osteoporosis and gout), **Principles of cancer:** (classification, etiology and pathogenesis of cancer), **Diseases of bones and joints:** (Rheumatoid Arthritis, Osteoporosis, Gout), **Principles of Cancer:** (Classification, etiology and pathogenesis of Cancer)

Unit V- **Infectious diseases:** (Meningitis, Typhoid, Leprosy, Tuberculosis, Urinary tract infections), **Sexually transmitted diseases:** (AIDS, Syphilis, Gonorrhoea)

Unit IV- **Number system:** (Binary number system, Decimal number system, Octal

COMPUTER APPLICATIONS  
IN PHARMACY

1. Design a questionnaire using word processing package to

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.),

**Concept of Information Systems and Software :** (Information gathering, requirement and feasibility analysis, data flow diagrams, process specifications, input/output design, process life cycle, planning and managing the project.); Unit II- **Web technologies:** (Introduction to HTML, XML,CSS and

Programming languages, introduction to web servers and Server Products, Introduction to databases, MYSQL, MS ACCESS, Pharmacy Drug database.); Unit III- **Application of computers in Pharmacy** (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); Unit IV- **Bioinformatics:** (Introduction, Objective of Bioinformatics, Bioinformatics Databases, Concept of Bioinformatics, Impact of Bioinformatics in Vaccine Discovery)

**Unit-V Computers as data analysis in Preclinical development:**

information about a particular disease.

2. Create a HTML web page personal information.

3. Retrieve the information and its adverse effects using tools

4 Creating mailing labels Using Label Wizard , generating labels MS WORD

5. Create a database in MS Access store the patient information the required fields Using access

6. Design a form in MS Access view, add, delete and modify patient record in the database

7. Generating report and print report from patient database

8. Creating invoice table using Access

9. Drug information storage retrieval using MS Access

10. Creating and working with queries in MS Access

11. Exporting Tables, Queries and Reports to web pages

12. Exporting Tables, Queries and Reports to XML pages

(Chromatographic data analysis(CDS),  
Laboratory Information management

System (LIMS) and Text Information  
Management System(TIMs))

Unit-I:The Multidisciplinary nature of  
environmental studies

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.); Unit II: Ecosystems

§ Concept of an ecosystem.

## ENVIRONMENTAL SCIENCES

§ 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); Unit- III:

Environmental Pollution: Air pollution;  
Water pollution; Soil pollution.

### **Information related to Bachelor in Pharmacy degree**

The fees of B. Pharmacy course is near about 1.5 lacs per semester. B.Pharm students who excel in academics can avail the scholarship in India as well as abroad. There are some scholarship programmes conducted by some universities based on the few criteria. One of them is called as Apex Life Scholarship and it is for Higher Studies in India/Abroad. The amount in India varies between Rs. 500/- to Rs. 3500/- (monthly) whereas Rs. 1 lac to Rs. 5 lacs for abroad studies. Starting from the qualification of H.Sc, SSC,

Undergraduates, Postgraduates and students of Professional Courses can apply for the same.

To name some private organisations offering scholarships to students for education include Mahalaxmi Education Trust, Bombay, C. Mahindra Education Trust, Sahu Jain Trust, Birla Education Trust, J.N. Tata Endowment and Aga Khan Education Service (India). Also one can consider the option of taking a loan from banks offering education loans.