

**JSS Academy of Higher Education & Research, Mysuru**  
(Deemed to be University)  
(Accredited 'A+' Grade by NAAC)



**JSS COLLEGE OF PHARMACY, ROCKLANDS, OOTY**  
(ISO 9001:2015 Certified)



# Curriculum and Academic Calendar

(Academic Year: 2021-2022)

**Course: I. B.PHARM**

## **Vision**

To be preeminent colleges in shaping society-worthy and SMART Pharmacy Professionals of global repute

## **Mission**

- To adopt and lead the transformation of pharmacy education, practice and research nationally and globally.
- To inspire and nurture students to become exemplary professionals to serve the global society
- To develop competencies among students and empower them to meet the changing needs of the profession
- To impart quality education and practice to promote and advance public health
- To impart holistic and value-based education to produce new generation humane pharmacy professionals
- To address the sustainable health care challenges through innovative measures and technologies

## **Programme Educational Objectives**

1. To acquire the theoretical knowledge of Pharmaceutical Sciences
2. To acquire practical skills in
  - Isolation and identification of medicinal compounds from natural sources
  - Synthesis and analysis of medicinal compounds
  - Screening for pharmacological activities
  - Formulation of pharmaceutical dosage forms and their evaluation
  - Comprehensive pharmaceutical care to patients
3. To demonstrate the leadership qualities, ethical attitude and to engage in life-long learning
4. To acquire skills for designing the research questions, protocol, data analysis and reporting research outcomes

## **Programme Outcomes**

1. Pharmacy Knowledge
2. Planning abilities
3. Problem analysis
4. Modern tool usage
5. Leadership skills
6. Professional Identity
7. Pharmaceutical Ethics
8. Communication
9. Pharmacist and society
10. Environment and sustainability
11. Lifelong learning



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**1. EXCERPT FROM JSS ACADEMY OF  
HIGHER EDUCATION & RESEARCH  
REGULATIONS**

### **Medium of instruction and examinations**

Medium of instruction and examination shall be in English.

### **Working days in each semester**

Each semester shall consist of not less than 100 working days. The odd semesters shall be conducted from the month of June/July to November/December and the even semesters shall be conducted from December/January to May/June in every calendar year.

### **Attendance and progress**

A candidate is required to put in at least 80% attendance in individual courses considering theory and practical separately. The candidate shall complete the prescribed course satisfactorily to be eligible to appear for the respective examinations.

### **Program/Course credit structure**

As per the philosophy of Credit Based Semester System, certain quantum of academic work viz. theory classes, tutorial hours, practical classes, etc. are measured in terms of credits. On satisfactory completion of the courses, a candidate earns credits. The amount of credit associated with a course is dependent upon the number of hours of instruction per week in that course. Similarly, the credit associated with any of the other academic, co/extra-curricular activities is dependent upon the quantum of work expected to be put in for each of these activities per week.

### **Credit assignment**

#### **Theory and Laboratory courses**

Courses are broadly classified as Theory and Practical. Theory courses consist of lecture (L) and /or tutorial (T) hours, and Practical (P) courses consist of hours spent in the laboratory. Credits (C) for a course is dependent on the number of hours of instruction per week in that course, and is obtained by using a multiplier of one (1) for lecture and tutorial hours, and a multiplier of half (1/2) for practical (laboratory) hours. Thus, for example, a theory course having three lectures and one tutorial per week throughout the semester carries a credit of 4. Similarly, a practical having four laboratory hours per week throughout semester carries a credit of 2.

### **Minimum credit requirements**

The minimum credit points required for award of a B. Pharm. degree is 208. These credits are divided into Theory courses, Tutorials, Practical, Practice School and Project over the duration of eight semesters. The credits are distributed semester-wise as shown in Table IX. Courses generally progress in sequences, building competencies and their positioning indicates certain academic maturity on the part of the learners. Learners are expected to follow the semester-wise schedule of courses given in the syllabus.

The lateral entry students shall get 52 credit points transferred from their D. Pharm program. Such students shall take up additional remedial courses of 'Communication Skills' (Theory and Practical) and 'Computer Applications in Pharmacy' (Theory and Practical) equivalent to 3 and 4 credit points respectively, a total of 7 credit points to attain 59 credit points, the maximum of I and II semesters.

### **Academic work**

A regular record of attendance both in Theory and Practical shall be maintained by the teaching staff of respective courses.

### **Course of study**

The course of study for II B. Pharm shall include Semester Wise Theory & Practical as given in Table – I to II The number of hours to be devoted to each theory, tutorial and practical course in any semester shall not be less than that shown in Table – I to II.

**Table – I: Course of study for semester I**

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP101T	Human Anatomy and Physiology I– Theory	3	1	4
BP102T	Pharmaceutical Analysis I – Theory	3	1	4
BP103T	Pharmaceutics I – Theory	3	1	4
BP104T	Pharmaceutical Inorganic Chemistry –Theory	3	1	4
BP105T	Communication skills – Theory	2	-	2
BP106RBT BP106RMT	Remedial Biology/ Remedial Mathematics – Theory*	2	-	2
BP107P	Human Anatomy and Physiology – Practical	4	-	2
BP108P	Pharmaceutical Analysis I – Practical	4	-	2
BP109P	Pharmaceutics I – Practical	4	-	2
BP110P	Pharmaceutical Inorganic Chemistry – Practical	4	-	2
BP111P	Communication skills – Practical*	2	-	1
BP112RBP	Remedial Biology – Practical*	2	-	1
<b>Total</b>		<b>32/34<sup>\$</sup>/36<sup>#</sup></b>	<b>4</b>	<b>27/29<sup>\$</sup>/30<sup>#</sup></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)

**Table – II: Course of study for semester II**

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP201T	Human Anatomy and Physiology II – Theory	3	1	4
BP202T	Pharmaceutical Organic Chemistry I – Theory	3	1	4
BP203T	Biochemistry – Theory	3	1	4
BP204T	Pathophysiology – Theory	3	1	4
BP205T	Computer Applications in Pharmacy – Theory*	3	-	3
BP206T	Environmental sciences – Theory*	3	-	3
BP207P	Human Anatomy and Physiology II –Practical	4		2
BP208P	Pharmaceutical Organic Chemistry I– Practical	4	-	2
BP209P	Biochemistry – Practical	4	-	2
BP210P	Computer Applications in Pharmacy – Practical*	2	-	1
<b>Total</b>		<b>32</b>	<b>4</b>	<b>29</b>

\*Non-University Examination (NUE)

**End semester examinations**

The End Semester Examinations for each theory and practical course through semesters III to IV shall be conducted by the university.

**Table – III: Semester I**

Course code	Name of the course	Internal Assessment				End Semester Exams		Total Marks
		Continuous Mode	Sessional Exams		Total	Marks	Duration	
			Marks	Duration				
BP101T	Human Anatomy and Physiology I– Theory	10	15	1 Hr	25	75	3 Hrs	100
BP102T	Pharmaceutical Analysis I – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP103T	Pharmaceutics I – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP104T	Pharmaceutical Inorganic Chemistry – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP105T	Communication skills – Theory *	5	10	1 Hr	15	35	1.5 Hrs	50
BP106RBT BP106RMT	Remedial Biology/ Mathematics – Theory*	5	10	1 Hr	15	35	1.5 Hrs	50
BP107P	Human Anatomy and Physiology – Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP108P	Pharmaceutical Analysis I – Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP109P	Pharmaceutics I – Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP110P	Pharmaceutical Inorganic Chemistry – Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP111P	Communication skills – Practical*	5	5	2 Hrs	10	15	2 Hrs	25
BP112RBP	Remedial Biology – Practical*	5	5	2 Hrs	10	15	2 Hrs	25
<b>Total</b>		<b>70/75<sup>§</sup>/80<sup>#</sup></b>	<b>115/125<sup>§</sup>/130<sup>#</sup></b>	<b>23/24<sup>§</sup>/26<sup>#</sup> Hrs</b>	<b>185/200<sup>§</sup>/210<sup>#</sup></b>	<b>490/525<sup>§</sup>/ 540<sup>#</sup></b>	<b>31.5/33<sup>§</sup>/ 35<sup>#</sup> Hrs</b>	<b>675/725<sup>§</sup>/ 750<sup>#</sup></b>

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

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

\* Non-University Examination (NUE)



**Table – IV: Semester II**

Course code	Name of the course	Internal Assessment				End Semester Exams		Total Marks
		Continuous Mode	Sessional Exams		Total	Marks	Duration	
			Marks	Duration				
BP201T	Human Anatomy and Physiology II – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP202T	Pharmaceutical Organic Chemistry I – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP203T	Biochemistry – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP204T	Pathophysiology – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP205T	Computer Applications in Pharmacy – Theory	10	15	1 Hr	25	50	2 Hrs	75
BP206T	Environmental sciences – Theory	10	15	1 Hr	25	50	2 Hrs	75
BP207P	Human Anatomy and Physiology II –Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP208P	Pharmaceutical Organic Chemistry I– Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP209P	Biochemistry – Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP210P	Computer Applications in Pharmacy – Practical	5	5	2 Hrs	10	15	2 Hrs	25
<b>Total</b>		<b>80</b>	<b>125</b>	<b>20 Hrs</b>	<b>205</b>	<b>520</b>	<b>30 Hrs</b>	<b>725</b>

**Internal assessment: Continuous mode**

The marks allocated for Continuous mode of Internal Assessment shall be awarded as per the scheme given below.

**Table – V: Scheme for awarding internal assessment: Continuous mode**

Theory		
Criteria	Maximum Marks	
Attendance (Refer Table – XII)	4	2
Academic activities (Average of any 3 activities e.g. quiz, assignment, open book test, field work, group discussion and seminar)	3	1.5
Student – Teacher interaction	3	1.5
<b>Total</b>	<b>10</b>	<b>5</b>
Practical		
Attendance (Refer Table – XII)	2	
Based on Practical Records, Regular viva voce, etc.	3	
<b>Total</b>	<b>5</b>	

**Table – VI: Guidelines for the allotment of marks for attendance**

Percentage of Attendance	Theory	Practical
95 – 100	4	2
90 – 94	3	1.5
85 – 89	2	1
80 – 84	1	0.5
Less than 80	0	0

**Sessional Exams**

Two sessional exams shall be conducted for each theory / practical course as per the schedule fixed by the college(s). The scheme of question paper for theory and practical sessional examinations is given below. The average marks of two sessional exams shall be computed for internal assessment as per the requirements given in tables – X.

**Question paper pattern for theory sessional examinations**

**For subjects having University examination**

I. Multiple Choice Questions (MCQs)			
(Answer all the questions)	=	10 x 1	= 10
I. Long Answers (Answer 1 out of 2)	=	1 x 10	= 10
II. Short Answers (Answer 2 out of 3)	=	2 x 5	= 10
		-----	
<b>Total</b>	<b>=</b>	<b>30 marks</b>	
		-----	

**For subjects having Non-University Examination**

I. Long Answers (Answer 1 out of 2)	=	1 x 10	= 10
II. Short Answers (Answer 4 out of 6)	=	4 x 5	= 20
		-----	
<b>Total</b>	<b>=</b>	<b>30 marks</b>	
		-----	

**Question paper pattern for practical sessional examinations**

I. Synopsis	=	10
II. Experiments	=	25
III. Viva voce	=	05
		-----
Total	=	40 marks

**Table – VII. Tentative schedule of end semester examinations**

Semester	For Regular Candidates	For Failed Candidates
III,	November / December	May / June
IV	May / June	November / December

**Question paper pattern for end semester theory examinations****For 75 marks paper**

I. Multiple Choice Questions (MCQs) (Answer all the questions)	=	20 x 1 = 20
I. Long Answers (Answer 2 out of 3)	=	2 x 10 = 20
II. Short Answers (Answer 7 out of 9)	=	7 x 5 = 35
		-----
Total		75 marks
		-----

**Question paper pattern for end semester practical examinations**

I. Synopsis	=	5
II. Experiments	=	25
III. Viva voce	=	5
		-----
Total	=	35 marks
		-----

**Award of Ranks**

Ranks and Medals shall be awarded on the basis of final CGPA. However, candidates who fail in one or more courses during the B.Pharm program shall not be eligible for award of ranks. Moreover, the candidates should have completed the B. Pharm program in minimum prescribed number of years, (four years) for the award of Ranks.

**Award of degree**

Candidates who fulfill the requirements mentioned above shall be eligible for award of degree during the ensuing convocation.

## **2. SYLLABUS**

## **I Semester**

### **BP101T. HUMAN ANATOMY AND PHYSIOLOGY-I (Theory)**

**45 Hours**

**Scope:** This subject is designed to impart fundamental knowledge on the structure and functions of the various systems of the human body. It also helps in understanding both homeostatic mechanisms. The subject provides the basic knowledge required to understand the various disciplines of pharmacy.

**Objectives:** Upon completion of this course the student should be able to Explain the gross morphology, structure and functions of various organs of the human body. Describe the various homeostatic mechanisms and their imbalances. Identify the various tissues and organs of different systems of human body. Perform the various experiments related to special senses and nervous system. Appreciate coordinated working pattern of different organs of each system

#### **Course Content**

##### **Unit I**

**10 hours**

##### **Introduction to human body**

Definition and scope of anatomy and physiology, levels of structural organization and body systems, basic life processes, homeostasis, basic anatomical terminology.

##### **Cellular level of organization**

Structure and functions of cell, transport across cell membrane, cell division, cell junctions. General principles of cell communication, intracellular signaling pathway activation by extracellular signal molecule, Forms of intracellular signaling: a) Contact-dependent b) Paracrine c) Synaptic d) Endocrine

##### **Tissue level of organization**

Classification of tissues, structure, location and functions of epithelial, muscular and nervous and connective tissues

##### **Unit II**

**10 hours**

Integumentary system  
Structure and functions of skin  
Skeletal system

Divisions of skeletal system, types of bone, salient features and functions of bones of axial and appendicular skeletal system

Organization of skeletal muscle, physiology of muscle contraction, neuromuscular junction

Joints

Structural and functional classification, types of joints movements and its articulation

**Unit III**

**10 hours**

**Body fluids and blood**

Body fluids, composition and functions of blood, hemopoiesis, formation of hemoglobin, anemia, mechanisms of coagulation, blood grouping, Rh factors, transfusion, its significance and disorders of blood, Reticulo endothelial system.

**Lymphatic system**

Lymphatic organs and tissues, lymphatic vessels, lymph circulation and functions of lymphatic system

**Unit IV**

**08 hours**

**Peripheral nervous system**

Classification of peripheral nervous system: Structure and functions of sympathetic and parasympathetic nervous system. Origin and functions of spinal and cranial nerves.

Special senses

Structure and functions of eye, ear, nose and tongue and their disorders.

**Unit V**

**07 hours**

**Cardiovascular system**

Heart-anatomy of heart, blood circulation, blood vessels, structure and functions of artery, vein and capillaries, elements of conduction system of heart and heartbeat, its regulation by autonomic nervous system, cardiac output, cardiac cycle. Regulation of blood pressure, pulse, electrocardiogram and disorders of heart.

### **BP107P. HUMAN ANATOMY AND PHYSIOLOGY (Practical)**

**4 Hours/week**

Practical physiology is complimentary to the theoretical discussions in physiology. Practical's allow the verification of physiological processes discussed in theory classes through experiments on living tissue, intact animals or normal human beings. This is helpful for developing an insight on the subject.

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) count
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.

#### **Recommended Books (Latest Editions)**

1. Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypee brother's medical publishers, New Delhi.
2. Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York

3. Physiological basis of Medical Practice-Best and Tailor. 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 by Tortora Grabowski. Palmetto, GA, U.S.A.\
6. Textbook of Human Histology by Inderbir Singh, Jaypee brother's medical publishers, New Delhi.
7. Textbook of Practical Physiology by C.L. Ghai, Jaypee brother's medical publishers, New Delhi.
8. Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee brother's medical publishers, New Delhi.
9. Reference Books (Latest Editions)
10. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co, Riverview, MI USA
11. Text book of Medical Physiology- Arthur C, Guyton and John. E. Hall. Miamisburg, OH, U.S.A.
12. Human Physiology (vol 1 and 2) by Dr. C.C. Chatterrje, Academic Publishers Kolkata.



## **BP102T. PHARMACEUTICAL ANALYSIS (Theory)**

**45 Hours**

**Scope:** This course deals with the fundamentals of analytical chemistry and principles of electrochemical analysis of drugs.

**Objectives:** Upon completion of the course student shall be able to understand the principles of volumetric and electro chemical analysis carryout various volumetric and electrochemical titrations develop analytical skills.

### **Course Content**

#### **UNIT-I**

**10 Hours**

(a) Pharmaceutical analysis- Definition and scope, Different techniques of analysis, Methods of expressing concentration, Primary and secondary standards.

Preparation and standardization of various molar and normal solutions - oxalic acid, sodium hydroxide, hydrochloric acid, sodium thiosulphate, sulphuric acid, potassium permanganate and ceric ammonium sulphate

(b) Errors: Sources of errors, types of errors, methods of minimizing errors, accuracy, precision and significant figures

(c) Pharmacopoeia, Sources of impurities in medicinal agents, limit tests.

#### **UNIT-II**

**10 Hours**

Acid base titration: Theories of acid base indicators, classification of acid base titrations and theory involved in titrations of strong, weak, and very weak acids and bases, neutralization curves

Non aqueous titration: Solvents, acidimetry and alkalimetry titration and estimation of Sodium benzoate and Ephedrine HCl

#### **UNIT-III**

**10 Hours**

Precipitation titrations: Mohr's method, Volhard's, Modified Volhard's, Fajans method, estimation of sodium chloride.

Complexometric titration: Classification, metal ion indicators, masking and demasking reagents, estimation of Magnesium sulphate, and calcium gluconate.

Gravimetry: Principle and steps involved in gravimetric analysis. Purity of the precipitate: coprecipitation and post precipitation, Estimation of barium sulphate. Basic Principles, methods and application of diazotisation titration.

**UNIT-IV**

**08 Hours**

Redox titrations, Concepts of oxidation and reduction, Types of redox titrations (Principles and applications) Cerimetry, Iodimetry, Iodometry, Bromatometry, Dichrometry, Titration with potassium iodate

**UNIT-V**

**07 Hours**

Electrochemical methods of analysis

Conductometry- Introduction, Conductivity cell, Conductometric titrations, applications.

Potentiometry - Electrochemical cell, construction and working of reference (Standard hydrogen, silver chloride electrode and calomel electrode) and indicator electrodes (metal electrodes and glass electrode), methods to determine end point of potentiometric titration and applications.

Polarography - Principle, Ilkovic equation, construction and working of dropping mercury electrode and rotating platinum electrode, applications

**BP108P. PHARMACEUTICAL ANALYSIS (Practical)**

**Hours / Week**

Limit Test of the following

- Chloride
- Sulphate
- Iron
- Arsenic

Preparation and standardization of

- Sodium hydroxide
- Sulphuric acid
- Sodium thiosulfate
- Potassium permanganate
- Ceric ammonium sulphate

Assay of the following compounds along with Standardization of Titrant

- Ammonium chloride by acid base titration
- Ferrous sulphate by Cerimetry
- Copper sulphate by Iodometry
- Calcium gluconate by complexometry
- Hydrogen peroxide by Permanganometry
- Sodium benzoate by non-aqueous titration
- Sodium Chloride by precipitation titration

Determination of Normality by electro-analytical methods

- Conductometric titration of strong acid against strong base
- Conductometric titration of strong acid and weak acid against strong base

- Potentiometric titration of strong acid against strong base

**Recommended Books: (Latest Editions)**

1. A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, Stahlone Press of University of London
2. A.I. Vogel, Text Book of Quantitative Inorganic analysis
3. P. Gundu Rao, Inorganic Pharmaceutical Chemistry
4. Bentley and Driver's Textbook of Pharmaceutical Chemistry
5. John H. Kennedy, Analytical chemistry principles
6. Indian Pharmacopoeia.

## **BP103T. PHARMACEUTICS - I (Theory)**

**45 Hours**

**Scope:** This course is designed to impart a fundamental knowledge on the preparatory pharmacy with arts and science of preparing the different conventional dosage forms.

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

Know the history of profession of pharmacy,

Understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations

Understand the professional way of handling the prescription

Preparation of various conventional dosage forms

### **Course Content**

#### **UNIT – I**

**10 Hours**

Historical background and development of profession of pharmacy: History of profession of Pharmacy in India in relation to pharmacy education, industry and organization, Pharmacy as a career, Pharmacopoeias: Introduction to IP, BP, USP and Extra Pharmacopoeia.

Dosage forms: Introduction to dosage forms, classification and definitions

Prescription: Definition, Parts of prescription, handling of Prescription and Errors in prescription.

Posology: Definition, Factors affecting posology. Pediatric dose calculations based on age, body weight and body surface area.

#### **UNIT – II**

**10 Hours**

Pharmaceutical calculations: Weights and measures – Imperial & Metric system, Calculations involving percentage solutions, alligation, proof spirit and isotonic solutions based on freezing point and molecular weight.

Powders: Definition, classification, advantages and disadvantages, Simple & compound powders – official preparations, dusting powders, effervescent, efflorescent and hygroscopic powders, eutectic mixtures. Geometric dilutions.

Liquid dosage forms: Advantages and disadvantages of liquid dosage forms. Excipients used in formulation of liquid dosage forms. Solubility enhancement

**UNIT – III**

**08 Hours**

Monophasic liquids: Definitions and preparations of Gargles, Mouthwashes, Throat Paint, Eardrops, Nasal drops, Enemas, Syrups, Elixirs, Liniments and Lotions.

Biphasic liquids:

Suspensions: Definition, advantages and disadvantages, classifications, Preparation of suspensions; Flocculated and Deflocculated suspension & stability problems and methods to overcome.

Emulsions: Definition, classification, emulsifying agent, test for the identification of type of Emulsion, Methods of preparation & stability problems and methods to overcome.

**UNIT – IV**

**08 Hours**

Suppositories: Definition, types, advantages and disadvantages, types of bases, methods of preparations. Displacement value & its calculations, evaluation of suppositories.

Pharmaceutical incompatibilities: Definition, classification, physical, chemical and therapeutic incompatibilities with examples.

**UNIT – V**

**07 Hours**

Semisolid dosage forms: Definitions, classification, mechanisms and factors influencing dermal penetration of drugs. Preparation of ointments, pastes, creams and gels. Excipients used in semi solid dosage forms. Evaluation of semi solid dosages forms

**BP109P. PHARMACEUTICS - I (Practical)**

**3 Hours / week**

1. Syrups

- Syrup IP'66
- Compound syrup of Ferrous Phosphate BPC'68

2. Elixirs

- Piperazine citrate elixir
- Paracetamol pediatric elixir

3. Linctus

- Terpin Hydrate Linctus IP'66
- Iodine Throat Paint (Mandles Paint)

4. Solutions

- Strong solution of ammonium acetate
- Cresol with soap solution
- Lugol's solution

5. Suspensions

6. Calamine lotion

7. Magnesium Hydroxide mixture

8. Aluminium Hydroxide gel

9. Emulsions

- Turpentine Liniment
- Liquid paraffin emulsion

10. Powders and Granules

- ORS powder (WHO)
- Effervescent granules

- Dusting powder
- Divded powders

#### 11. Suppositories

- Glycero gelatin suppository
- Coca butter suppository
- Zinc Oxide suppository

#### 12. Semisolids

- Sulphur ointment
- Non staining-iodine ointment with methyl salicylate
- Carbopal gel

#### 13. Gargles and Mouthwashes

- Iodine gargle
- Chlorhexidine mouthwash

#### **Recommended Books: (Latest Editions)**

1. H.C. Ansel et al., Pharmaceutical Dosage Form and Drug Delivery System, Lippincott Williams and Walkins, New Delhi.
2. Carter S.J., Cooper and Gunn's-Dispensing for Pharmaceutical Students, CBS publishers, New Delhi.
3. M.E. Aulton, Pharmaceutics, The Science & Dosage Form Design, Churchill Livingstone, Edinburgh.
4. Indian pharmacopoeia. British pharmacopoeia.
5. Lachmann. Theory and Practice of Industrial Pharmacy, Lea & Febiger Publisher, The University of Michigan.
6. Alfonso R. Gennaro Remington. The Science and Practice of Pharmacy, Lippincott Williams, New Delhi.
7. Carter S.J., Cooper and Gunn's. Tutorial Pharmacy, CBS Publications, New Delhi.
8. E.A. Rawlins, Bentley's Text Book of Pharmaceutics, English Language Book Society, Elsevier Health Sciences, USA.
9. Isaac Ghebre Sellassie: Pharmaceutical Pelletization Technology, Marcel Dekker, INC, New York.
10. Dilip M. Parikh: Handbook of Pharmaceutical Granulation Technology, Marcel Dekker, INC, New York.
11. Francoise Nieloud and Gilberte Marti-Mestres: Pharmaceutical Emulsions and Suspensions, Marcel Dekker, INC, New York.



## **BP104T. PHARMACEUTICAL INORGANIC CHEMISTRY (Theory)**

**45 Hours**

**Scope:** This subject deals with the monographs of inorganic drugs and pharmaceuticals.

**Objectives:** Upon completion of course student shall be able to know the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals understand the medicinal and pharmaceutical importance of inorganic compounds

### **Course Content**

#### **UNIT I**

**10 Hours**

Impurities in pharmaceutical substances: History of Pharmacopoeia, Sources and types of impurities, principle involved in the limit test for Chloride, Sulphate, Iron, Arsenic, Lead and Heavy metals, modified limit test for Chloride and Sulphate

General methods of preparation, assay for the compounds superscripted with asterisk (\*), properties and medicinal uses of inorganic compounds belonging to the following classes

#### **UNIT II**

**10 Hours**

Acids, Bases and Buffers: Buffer equations and buffer capacity in general, buffers in pharmaceutical systems, preparation, stability, buffered isotonic solutions, measurements of tonicity, calculations and methods of adjusting isotonicity

Major extra and intracellular electrolytes: Functions of major physiological ions, Electrolytes used in the replacement therapy: Sodium chloride\*, Potassium chloride, Calcium gluconate\* and Oral Rehydration Salt (ORS), Physiological acid base balance.

Dental products: Dentifrices, role of fluoride in the treatment of dental caries, Desensitizing agents, Calcium carbonate, Sodium fluoride, and Zinc eugenol cement.

#### **UNIT III**

**10 Hours**

Gastrointestinal agents

Acidifiers: Ammonium chloride\* and Dil. HCl

Antacid: Ideal properties of antacids, combinations of antacids, Sodium Bicarbonate\*, Aluminum hydroxide gel, Magnesium hydroxide mixture.

Cathartics: Magnesium sulphate, Sodium orthophosphate, Kaolin and Bentonite.

Antimicrobials: Mechanism, classification, Potassium permanganate, Boric acid, Hydrogen peroxide\*, Chlorinated lime\*, Iodine and its preparations.

#### **UNIT IV**

**08 Hours**

Miscellaneous compounds

Expectorants: Potassium iodide, Ammonium chloride\*.

Emetics: Copper sulphate\*, Sodium potassium tartarate

Haematinics: Ferrous sulphate\*, Ferrous gluconate

Poison and Antidote: Sodium thiosulphate\*, Activated charcoal, Sodium nitrite<sup>333</sup>

Astringents: Zinc Sulphate, Potash Alum

## **UNIT V**

**07 Hours**

Radiopharmaceuticals: Radio activity, Measurement of radioactivity, Properties of  $\alpha$ ,  $\beta$ ,  $\gamma$  radiations, Half-life, radio isotopes and study of radio isotopes - Sodium iodide  $I^{131}$ , Storage conditions, precautions & pharmaceutical application of radioactive substances.

### **BP110P. PHARMACEUTICAL INORGANIC CHEMISTRY (Practical)**

**4 Hours / Week**

1. Limit tests for following ions

Limit test for Chlorides and Sulphates Modified limit test for Chlorides and Sulphates  
Limit test for Iron

2. Limit test for Heavy metals, Limit test for Lead, Limit test for Arsenic
3. Identification test Magnesium hydroxide Ferrous sulphate Sodium bicarbonate Calcium gluconate Copper sulphate
4. Test for purity
5. Swelling power of Bentonite
6. Neutralizing capacity of aluminum hydroxide gel
7. Determination of potassium iodate and iodine in potassium Iodide
8. Preparation of inorganic pharmaceuticals
  - Boric acid
  - Potash alum
  - Ferrous sulphate

#### **Recommended Books (Latest Editions)**

1. A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, Stahlone Press of University of London, 4<sup>th</sup> edition.
2. A.I. Vogel, Text Book of Quantitative Inorganic analysis
3. P. Gundu Rao, Inorganic Pharmaceutical Chemistry, 3<sup>rd</sup> Edition
4. M.L Schroff, Inorganic Pharmaceutical Chemistry
5. Bentley and Driver's Textbook of Pharmaceutical Chemistry
6. Anand & Chatwal, Inorganic Pharmaceutical Chemistry
7. Indian Pharmacopoeia

## **BP105T.COMMUNICATION SKILLS (Theory)**

**30 Hours**

**Scope:** This course will prepare the young pharmacy student to interact effectively with doctors, nurses, dentists, physiotherapists and other health workers. At the end of this course the student will get the soft skills set to work cohesively with the team as a team player and will add value to the pharmaceutical business.

### **Objectives:**

- Upon completion of the course the student shall be able to
- Understand the behavioral needs for a Pharmacist to function effectively in the areas of pharmaceutical operation
- Communicate effectively (Verbal and Non Verbal)
- Effectively manage the team as a team player
- Develop interview skills
- Develop Leadership qualities and essentials

### **Course content**

#### **UNIT – I**

**07 Hours**

Communication Skills: Introduction, Definition, The Importance of Communication, The Communication Process – Source, Message, Encoding, Channel, Decoding, Receiver, Feedback, Context

Barriers to communication: Physiological Barriers, Physical Barriers, Cultural Barriers, Language Barriers, Gender Barriers, Interpersonal Barriers, Psychological Barriers, Emotional barriers

Perspectives in Communication: Introduction, Visual Perception, Language, Other factors affecting our perspective - Past Experiences, Prejudices, Feelings, Environment

#### **UNIT – II**

**07 Hours**

Elements of Communication: Introduction, Face to Face Communication - Tone of Voice, Body Language (Non-verbal communication), Verbal Communication, Physical Communication

Communication Styles: Introduction, The Communication Styles Matrix with example for each - Direct Communication Style, Spirited Communication Style, Systematic Communication Style, Considerate Communication Style

#### **UNIT – III**

**07 Hours**

Basic Listening Skills: Introduction, Self-Awareness, Active Listening, becoming an Active Listener, Listening in Difficult Situations

Effective Written Communication: Introduction, When and When Not to Use Written Communication - Complexity of the Topic, Amount of Discussion' Required, Shades of Meaning, Formal Communication

Writing Effectively: Subject Lines, Put the Main Point First, Know Your Audience, Organization of the Message

**UNIT – IV**

**05 Hours**

Interview Skills: Purpose of an interview, Do's and Dont's of an interview

Giving Presentations: Dealing with Fears, planning your Presentation, Structuring Your Presentation, Delivering Your Presentation, Techniques of Delivery

**UNIT – V**

**04 Hours**

Group Discussion: Introduction, Communication skills in group discussion, Do's and Dont's of group discussion

**BP111P. COMMUNICATION SKILLS (Practical)**

**2 Hours / week**

The following learning modules are to be conducted using wordsworth<sup>®</sup> English language lab software

Basic communication covering the following topics

Meeting People

- Asking Questions
- Making Friends
- What did you do?
- Do's and Dont's
- Pronunciations covering the following topics
- Pronunciation (Consonant Sounds)
- Pronunciation and Nouns
- Pronunciation (Vowel Sounds)
- Advanced Learning
- Listening Comprehension / Direct and Indirect Speech
- Figures of Speech
- Effective Communication
- Writing Skills
- Effective Writing
- Interview Handling Skills
- E-Mail etiquette
- Presentation Skills

**Recommended Books: (Latest Edition)**

- Basic communication skills for Technology, Andreja. J. Ruther Ford, 2<sup>nd</sup> Edition, Pearson Education, 2011
- Communication skills, Sanjay Kumar, Pushpalata, 1<sup>st</sup>Edition, Oxford Press, 2011
- Organizational Behaviour, Stephen .P. Robbins, 1<sup>st</sup>Edition, Pearson, 2013
- Brilliant- Communication skills, Gill Hasson, 1<sup>st</sup>Edition, Pearson Life, 2011
- The Ace of Soft Skills: Attitude, Communication and Etiquette for success, Gopala Swamy Ramesh, 5<sup>th</sup>Edition, Pearson, 2013
- Developing your influencing skills, Deborah Dalley, Lois Burton, Margaret, Green hall, 1st Edition Universe of Learning LTD, 2010
- Communication skills for professionals, Konar nira, 2<sup>nd</sup>Edition, New arrivals – PHI, 2011
- Personality development and soft skills, Barun K Mitra, 1<sup>st</sup>Edition, Oxford Press, 2011
- Soft skill for everyone, Butter Field, 1st Edition, Cengage Learning india pvt.ltd, 2011
- Soft skills and professional communication, Francis Peters SJ, 1<sup>st</sup>Edition, Mc Graw Hill Education, 2011
- Effective communication, John Adair, 4<sup>th</sup>Edition, Pan Mac Millan,2009
- Bringing out the best in people, Aubrey Daniels, 2<sup>nd</sup>Edition, Mc Graw Hill, 1999

## **BP 106RBT. REMEDIAL BIOLOGY (Theory)**

**30 Hours**

**Scope:** To learn and understand the components of living world, structure and functional system of plant and animal kingdom.

**Objectives:** Upon completion of the course, the student shall be able to know the classification and salient features of five kingdoms of life understand the basic components of anatomy & physiology of plant know understand the basic components of anatomy & physiology animal with special reference to human

### **UNIT I**

**07 Hours**

Living world:

Definition and characters of living organisms

Diversity in the living world

Binomial nomenclature

Five kingdoms of life and basis of classification. Salient features of Monera, Protista, Fungi, Animalia and Plantae, Virus,

Morphology of Flowering plants

Morphology of different parts of flowering plants – Root, stem, inflorescence, flower, leaf, fruit, seed.

General Anatomy of Root, stem, leaf of monocotyledons & Dicotyledones.

### **UNIT II**

**07 Hours**

Body fluids and circulation

Composition of blood, blood groups, coagulation of blood

Composition and functions of lymph

Human circulatory system

Structure of human heart and blood vessels

Cardiac cycle, cardiac output and ECG

Digestion and Absorption

Human alimentary canal and digestive glands

Role of digestive enzymes

Digestion, absorption and assimilation of digested food

Breathing and respiration

Human respiratory system

Mechanism of breathing and its regulation

Exchange of gases, transport of gases and regulation of respiration

Respiratory volumes

### **UNIT III**

**07 Hours**

Excretory products and their elimination



Modes of excretion  
Human excretory system- structure and function  
Urine formation  
Rennin angiotensin system  
Neural control and coordination  
Definition and classification of nervous system  
Structure of a neuron  
Generation and conduction of nerve impulse  
Structure of brain and spinal cord  
Functions of cerebrum, cerebellum, hypothalamus and medulla oblongata  
Chemical coordination and regulation  
Endocrine glands and their secretions  
Functions of hormones secreted by endocrine glands  
Human reproduction  
Parts of female reproductive system  
Parts of male reproductive system  
Spermatogenesis and Oogenesis  
Menstrual cycle

#### **UNIT IV**

**05 Hours**

Plants and mineral nutrition:  
Essential mineral, macro and micronutrients  
Nitrogen metabolism, Nitrogen cycle, biological nitrogen fixation  
Photosynthesis  
Autotrophic nutrition, photosynthesis, Photosynthetic pigments, Factors affecting photosynthesis.

#### **UNIT V**

**04 Hours**

Plant respiration: Respiration, glycolysis, fermentation (anaerobic).  
Plant growth and development  
Phases and rate of plant growth, Condition of growth, Introduction to plant growth regulators  
Cell - The unit of life  
Structure and functions of cell and cell organelles. Cell division  
Tissues  
Definition, types of tissues, location and functions.

#### **Text Books**

1. Text book of Biology by S. B. Gokhale
2. A Text book of Biology by Dr. Thulajappa and Dr. Seetaram.

#### **Reference Books**

1. A Text book of Biology by B.V. Sreenivasa Naidu
2. A Text book of Biology by Naidu and Murthy c. Botany for Degree students By A.C.Dutta.
3. Outlines of Zoology by M. Ekambaranatha ayyer and T. N. Ananthkrishnan.
4. A manual for pharmaceutical biology practical by S.B. Gokhale and C. K. Kokate

**BP112RBP. REMEDIAL BIOLOGY (Practical)**

**30 Hours**

- Introduction to experiments in biology
- Study of Microscope
- Section cutting techniques
- Mounting and staining
- Permanent slide preparation
- Study of cell and its inclusions
- Study of Stem, Root, Leaf, seed, fruit, flower and their modifications
- Detailed study of frog by using computer models
- Microscopic study and identification of tissues pertinent to Stem, Root Leaf, seed, fruit and flower
- Identification of bones
- Determination of blood group
- Determination of blood pressure
- Determination of tidal volume

**Reference Books**

1. Practical human anatomy and physiology. by S.R.Kale and R.R.Kale.
2. A Manual of pharmaceutical biology practical by S.B.Gokhale, C.K.Kokate and S.P.Shriwastava.
3. Biology practical manual according to National core curriculum Biology forum of Karnataka. Prof .M.J.H.Shafi

**BP 106RMT. REMEDIAL MATHEMATICS (Theory)****30 Hours**

**Scope:** This is an introductory course in mathematics. This subject deals with the introduction to Partial fraction, Logarithm, matrices and Determinant, Analytical geometry, Calculus, differential equation and Laplace transform.

**Objectives:** Upon completion of the course the student shall be able to: Know the theory and their application in Pharmacy Solve the different types of problems by applying theory Appreciate the important application of mathematics in Pharmacy

**Course Content****UNIT – I****06 Hours**

Partial fraction

Introduction, Polynomial, Rational fractions, Proper and Improper fractions, Partial fraction, Resolving into Partial fraction, Application of Partial Fraction in Chemical Kinetics and Pharmacokinetics

Logarithms

Introduction, Definition, Theorems/Properties of logarithms, Common logarithms, Characteristic and Mantissa, worked examples, application of logarithm to solve pharmaceutical problems.

Function:

Real Valued function, Classification of real valued functions,

Limits and continuity:

Introduction, Limit of a function Definition of limit of a function ( $\epsilon - \delta$  definition,)

$$\lim_{x \rightarrow a} \frac{x^n - a^n}{x - a} = na^{n-1}, \quad \lim_{\theta \rightarrow 0} \frac{\sin \theta}{\theta} = 1,$$

**Unit – II****06 hours**

Introduction matrices, Types of matrices, Operation on matrices, Transpose of a matrix, Matrix Multiplication, Determinants, Properties of determinants, Product of determinants, Minors and co-Factors, Adjoint or adjugate of a square matrix, Singular and non-singular matrices, Inverse of a matrix, Solution of system of linear of equations using matrix method, Cramer's rule, Characteristic equation and roots of a square matrix, Cayley–Hamilton theorem, Application of Matrices in solving Pharmacokinetic equations

**UNIT – III****06 Hours****Calculus**

Differentiation : Introductions, Derivative of a function, Derivative of a constant, Derivative of a product of a constant and a function, Derivative of the sum or difference of two functions, Derivative of the product of two functions, Derivative of the product of two functions (product formula), Derivative of the quotient of two functions (Quotient formula) – Without Proof, Derivative of  $x^n$  w.r.t.x, where n is any rational number, Derivative of  $e^x$ , Derivative of  $\log_e x$ , Derivative of  $a^x$ , Derivative of trigonometric functions from first principles (without Proof), Successive Differentiation, Conditions for a function to be a maximum or a minimum at a point. Application

**UNIT – IV**

**06 Hours**

**Analytical Geometry**

Introduction: Signs of the Coordinates, Distance formula,

Straight Line: Slope or gradient of a straight line, Conditions for parallelism and perpendicularity of two lines, Slope of a line joining two points, Slope – intercept form of a straight line  
Integration: Introduction, Definition, Standard formulae, Rules of integration, Method of substitution, Method of Partial fractions, Integration by parts, definite integrals, application

**UNIT-V**

**06 Hours**

Differential Equations: Some basic definitions, Order and degree, Equations in separable form, Homogeneous equations, Linear Differential equations, Exact equations, Application in solving Pharmacokinetic equations

Laplace Transform: Introduction, Definition, Properties of Laplace transform, Laplace Transforms of elementary functions, Inverse Laplace transforms, Laplace transform of derivatives, Application to solve Linear differential equations, Application in solving Chemical kinetics and Pharmacokinetics equations

**Recommended Books (Latest Edition)**

1. Differential Calculus by Shanthinarayan
2. Pharmaceutical Mathematics with application to Pharmacy by Panchaksharappa Gowda D.H.
3. Integral Calculus by Shanthinarayan
4. Higher Engineering Mathematics by Dr.B.S.Grewal

## II Semester

### BP 201T. HUMAN ANATOMY AND PHYSIOLOGY-II (Theory)

45 Hours

**Scope:** This subject is designed to impart fundamental knowledge on the structure and functions of the various systems of the human body. It also helps in understanding both homeostatic mechanisms. The subject provides the basic knowledge required to understand the various disciplines of pharmacy.

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

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

### Course Content

#### Unit I

10 hours

#### Nervous system

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)

#### Unit II

06 hours

#### Digestive system

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 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**

**10 hours**

#### **Respiratory system**

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.

#### **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**

**10 hours**

#### **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**

**09 hours**

#### **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

## **BP 207 P. HUMAN ANATOMY AND PHYSIOLOGY (Practical)**

**4 Hours/week**

Practical physiology is complimentary to the theoretical discussions in physiology. Practicals allow the verification of physiological processes discussed in theory classes through experiments on living tissue, intact animals or normal human beings. This is helpful for developing an insight on the subject.

To study the integumentary and special senses using specimen, models, etc.,

1. To study the nervous system using specimen, models, etc.,
2. To study the endocrine system using specimen, models, etc
3. To demonstrate the general neurological examination
4. To demonstrate the function of olfactory nerve
5. To examine the different types of taste.
6. To demonstrate the visual acuity
7. To demonstrate the reflex activity
8. Recording of body temperature
9. To demonstrate positive and negative feedback mechanism.
10. Determination of tidal volume and vital capacity.
11. Study of digestive, respiratory, cardiovascular systems, urinary and reproductive systems with the help of models, charts and specimens.
12. Recording of basal mass index .
13. Study of family planning devices and pregnancy diagnosis test.
14. Demonstration of total blood count by cell analyser
15. Permanent slides of vital organs and gonads.

### **Recommended Books (Latest Editions)**

1. Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypee brothers medical publishers, New Delhi.

2. Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York
3. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co,Riverview,MI USA
4. Text book of Medical Physiology- Arthur C,Guyton andJohn.E. Hall. Miamisburg, OH, U.S.A.
5. Principles of Anatomy and Physiology by Tortora Grabowski. Palmetto, GA, U.S.A.
6. Textbook of Human Histology by Inderbir Singh, Jaypee brother's medical publishers, New Delhi.
7. Textbook of Practical Physiology by C.L. Ghai, Jaypee brother's medical publishers, New Delhi.
8. Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee brother's medical publishers, New Delhi.

**Reference Books:**

1. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co, Riverview, MI USA
2. Text book of Medical Physiology- Arthur C, Guyton and John. E. Hall. Miamisburg, OH, U.S.A.
3. Human Physiology (vol 1 and 2) by Dr. C.C. Chatterrje, Academic Publishers Kolkata



**BP202T. PHARMACEUTICAL ORGANIC CHEMISTRY –I (Theory)****45 Hours**

**Scope:** This subject deals with classification and nomenclature of simple organic compounds, structural isomerism, intermediates forming in reactions, important physical properties, reactions and methods of preparation of these compounds. The syllabus also emphasizes on mechanisms and orientation of reactions.

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

To write the structure, name and the type of isomerism of the organic compound

To write the reaction, name the reaction and orientation of reactions

To account for reactivity/stability of compounds,

To identify/confirm the identification of organic compound

**Course Content**

General methods of preparation and reactions of compounds superscripted with asterisk (\*) to be explained. To emphasize on definition, types, classification, principles/mechanisms, applications, examples and differences

**UNIT-I****07 Hours**

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****10 Hours**

Alkanes\*, Alkenes\* and Conjugated dienes\*

SP hybridization in alkanes, Halogenation of alkanes, uses of paraffins. Stabilities of alkenes, SP hybridization in alkenes  $E_1$  and  $E_2$  reactions – kinetics, order of reactivity of alkyl halides, rearrangement of carbocations, Saytzeffs orientation and evidences.  $E_1$  versus  $E_2$  reactions, Factors affecting  $E_1$  and  $E_2$  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 dienes, allylic rearrangement

**UNIT-III****10 Hours**

Alkyl halides\*

$SN_1$  and  $SN_2$  reactions - kinetics, order of reactivity of alkyl halides, stereochemistry and rearrangement of carbocations.  $SN_1$  versus  $SN_2$  reactions, Factors affecting  $SN_1$  and  $SN_2$  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**

**10 Hours**

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**

**08 Hours**

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

## **BP208P. PHARMACEUTICAL ORGANIC CHEMISTRY -I (Practical)**

**4 Hours / week**

1. Systematic qualitative analysis of unknown organic compounds like
  - Preliminary test: Color, odour, aliphatic/aromatic compounds, saturation and unsaturation, etc.
  - Detection of elements like Nitrogen, Sulphur and Halogen by Lassaigne's test
  - Solubility test
  - Functional group test like Phenols, Amides/ Urea, Carbohydrates, Amines, Carboxylic acids, Aldehydes and Ketones, Alcohols, Esters, Aromatic and Halogenated Hydrocarbons, Nitro compounds and Anilides.
  - Melting point/Boiling point of organic compounds
  - Identification of the unknown compound from the literature using melting point/ boiling point.
  - Preparation of the derivatives and confirmation of the unknown compound by melting point/ boiling point.
  - Minimum 5 unknown organic compounds to be analysed systematically.
2. Preparation of suitable solid derivatives from organic compounds
3. Construction of molecular models

### **Recommended Books (Latest Editions):**

1. Organic Chemistry by Morrison and Boyd
2. Organic Chemistry by I.L. Finar , Volume-I
3. Textbook of Organic Chemistry by B.S. Bahl & Arun Bahl.
4. Organic Chemistry by P.L.Soni
5. Practical Organic Chemistry by Mann and Saunders.
6. Vogel's text book of Practical Organic Chemistry
7. Advanced Practical organic chemistry by N.K.Vishnoi.
8. Introduction to Organic Laboratory techniques by Pavia, Lampman and Kriz.
9. Reaction and reaction mechanism by Ahluwaliah/Chatwal.

**BP203 T. BIOCHEMISTRY (Theory)****45 Hours**

**Scope:** Biochemistry deals with complete understanding of the molecular levels of the chemical process associated with living cells. The scope of the subject is providing biochemical facts and the principles to understand metabolism of nutrient molecules in physiological and pathological conditions. It is also emphasizing on genetic organization of mammalian genome and hetero & autocatalytic functions of DNA.

**Objectives:** Upon completion of course student shall able to

Understand the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes.

Understand the metabolism of nutrient molecules in physiological and pathological conditions.

Understand the genetic organization of mammalian genome and functions of DNA in the synthesis of RNAs and proteins.

**Course Content****UNIT I****08 Hours****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****10 Hours****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 level phosphorylation Inhibitors ETC and oxidative phosphorylation/Uncouplers

**UNIT III****10 Hours****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**

General reactions of amino acid metabolism: Transamination, deamination & decarboxylation, urea cycle and its disorders, Catabolism of phenylalanine and tyrosine and their metabolic disorders (Phenylketonuria, Albinism, alcaptonuria, tyrosinemia), Synthesis and significance of biological substances; 5-HT, melatonin, dopamine, noradrenaline, adrenaline, Catabolism of heme; hyperbilirubinemia and jaundice.

### **UNIT IV**

**10 Hours**

#### **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**

**07 Hours**

#### **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.

### **BP 209 P. BIOCHEMISTRY (Practical)**

**4 Hours / Week**

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 Proteins (Biuret method)
4. Qualitative analysis of urine for abnormal constituents
5. Determination of blood creatinine
6. Determination of blood sugar
7. Determination of serum total cholesterol
8. Preparation of buffer solution 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.

#### **Recommended Books (Latest Editions)**

1. Principles of Biochemistry by Lehninger.
2. Harper's Biochemistry by Robert K. Murry, Daryl K. Granner and Victor W. Rodwell.
3. Biochemistry by Stryer.
4. Biochemistry by D. Satyanarayan and U.Chakrapani
5. Textbook of Biochemistry by Rama Rao.
6. Textbook of Biochemistry by Deb.
7. Outlines of Biochemistry by Conn and Stumpf
8. Practical Biochemistry by R.C. Gupta and S. Bhargavan.
9. Introduction of Practical Biochemistry by David T. Plummer. (3rd Edition)
10. Practical Biochemistry for Medical students by Rajagopal and Ramakrishna.
11. Practical Biochemistry by Harold Varley.

## BP 204T. PATHOPHYSIOLOGY (THEORY)

45Hours

**Scope:** Pathophysiology is the study of causes of diseases and reactions of the body to such disease producing causes. This course is designed to impart a thorough knowledge of the relevant aspects of pathology of various conditions with reference to its pharmacological applications, and understanding of basic pathophysiological mechanisms. Hence it will not only help to study the syllabus of pathology, but also to get baseline knowledge required to practice medicine safely, confidently, rationally and effectively.

**Objectives:** Upon completion of the subject student shall be able to –

Describe the etiology and pathogenesis of the selected disease states;

Name the signs and symptoms of the diseases; and

Mention the complications of the diseases.

### Course content

#### Unit I

10 Hours

##### 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

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 & Alkalosis, Electrolyte imbalance

#### Unit II

10 Hours

##### Cardiovascular System:

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

10 Hours

##### Haematological Diseases:

Iron deficiency, megaloblastic anemia (Vit B12 and folic acid), sickle cell anemia, thalasemia, hereditary acquired anemia, hemophilia

Endocrine system: Diabetes, thyroid diseases, disorders of sex hormones

Nervous system: Epilepsy, Parkinson's disease, stroke, psychiatric disorders: depression, schizophrenia and Alzheimer's disease.

#### **Unit IV**

**8 Hours**

Gastrointestinal system: Peptic Ulcer, 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**

**7 Hours**

Infectious diseases: Meningitis, Typhoid, Leprosy, Tuberculosis Urinary tract infections

Sexually transmitted diseases: AIDS, Syphilis, Gonorrhoea

#### **Recommended Books (Latest Editions)**

1. Vinay Kumar, Abul K. Abas, Jon C. Aster; Robbins & Cotran Pathologic Basis of Disease; South Asia edition; India; Elsevier; 2014.
2. Harsh Mohan; Text book of Pathology; 6<sup>th</sup> edition; India; Jaypee Publications; 2010.
3. Laurence B, Bruce C, Bjorn K.; Goodman Gilman's The Pharmacological Basis of Therapeutics; 12<sup>th</sup> edition; New York; McGraw-Hill; 2011.
4. Best, Charles Herbert 1899-1978; Taylor, Norman Burke 1885-1972; West, John B (John Burnard); Best and Taylor's Physiological basis of medical practice; 12<sup>th</sup> ed; united states;
5. William and Wilkins, Baltimore; 1991 [1990 printing].
6. Nicki R. Colledge, Brian R. Walker, Stuart H. Ralston; Davidson's Principles and Practice of Medicine; 21<sup>st</sup> edition; London; ELBS/Churchill Livingstone; 2010.
7. Guyton A, John .E Hall; Textbook of Medical Physiology; 12<sup>th</sup> edition; WB Saunders Company; 2010.
8. Joseph DiPiro, Robert L. Talbert, Gary Yee, Barbara Wells, L. Michael Posey;
9. Pharmacotherapy: A Pathophysiological Approach; 9<sup>th</sup> edition; London; McGraw-Hill Medical; 2014.
10. V. Kumar, R. S. Cotran and S. L. Robbins; Basic Pathology; 6<sup>th</sup> edition; Philadelphia; WB Saunders Company; 1997.
11. Roger Walker, Clive Edwards; Clinical Pharmacy and Therapeutics; 3<sup>rd</sup> edition; London; Churchill Livingstone publication; 2003.



## **BP205 T. COMPUTER APPLICATIONS IN PHARMACY (Theory)**

**30 Hrs (2 Hrs/Week)**

**Scope:** This subject deals with the introduction Database, Database Management system, computer application in clinical studies and use of databases.

**Objectives:** Upon completion of the course the student shall be able to know the various types of application of computers in pharmacy, to know the various types of databases, to know the various applications of databases in pharmacy

### **Course content**

#### **UNIT – I**

**06 hours**

Number system: 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

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**

**06 hours**

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**

**06 hours**

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**

**06 hours**

Bioinformatics: Introduction, Objective of Bioinformatics, Bioinformatics Databases, Concept of Bioinformatics, Impact of Bioinformatics in Vaccine Discovery

#### **UNIT-V**

**06 hours**

Computers as data analysis in Preclinical development:

Chromatographic data analysis(CDS), Laboratory Information Management System (LIMS) and Text Information Management System(TIMs)

### **BP210P. COMPUTER APPLICATIONS IN PHARMACY (Practical)**

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 books (Latest edition)**

1. Computer Application in Pharmacy – William E.Fassett –Lea and Febiger, 600 South 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, Daryagani, New Delhi - 110002

## **BP 206 T. ENVIRONMENTAL SCIENCES (Theory)**

**30 hours**

**Scope:** Environmental Sciences is the scientific study of the environmental system and the status of its inherent or induced changes on organisms. It includes not only the study of physical and biological characters of the environment but also the social and cultural factors and the impact of man on environment.

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

- Create the awareness about environmental problems among learners.
- Impart basic knowledge about the environment and its allied problems.
- Develop an attitude of concern for the environment.
- Motivate learner to participate in environment protection and environment improvement.
- Acquire skills to help the concerned individuals in identifying and solving environmental problems.
- Strive to attain harmony with Nature.

### **Course content**

#### **Unit-I**

**10 hours**

The Multidisciplinary nature of environmental studies, Natural Resources, Renewable and non-renewable resources: Natural resources and associated problems 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**

**10 hours**

Ecosystems, Concept of an ecosystem., 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**

**10 hours**

Environmental Pollution: Air pollution; Water pollution; Soil pollution

#### **Recommended Books (Latest edition):**

1. Y.K. Sing, Environmental Science, New Age International Pvt, Publishers, Bangalore
2. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
3. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad – 380 013, India,
4. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
5. Clark R.S., Marine Pollution, Clarendon Press Oxford
6. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumbai, 1196p
7. De A.K., Environmental Chemistry, Wiley Eastern Ltd.
8. Down of Earth, Centre for Science and Environment

### **3. DETAILS OF SUBJECT TEACHERS**

**I Semester**

<b>S. No.</b>	<b>Name of the Subject</b>	<b>Name of the Teacher</b>	<b>Designation and Department</b>	<b>Mobile No.</b>	<b>e-mail</b>
1	Human Anatomy & Physiology-I	Dr. A. Justin	Associate Professor Department of Pharmacology	9942932150	justin@jssuni.edu.in
2	Pharmaceutical Inorganic Chemistry	Dr. B. Gowramma	Associate Professor, Department of Pharmaceutical Chemistry	9442111172	gowrammab@jssuni.edu.in
3	Pharmaceutical Analysis	Dr. B. Babu	Assistant Professor, Department of Pharmaceutical Analysis	9840142319	babu@jssuni.edu.in
4	Pharmaceutics	Dr. GNK. Ganesh	Associate Professor Department of Pharmaceutics	9442191918	gnk@jssuni.edu.in
5	Remedial Mathematics	Mr. C. Jayakumar	Assistant Professor Department of Pharmacy Practice	9443476698	jrccc@jssuni.edu.in
6	Remedial Biology	Dr L. Priyanka Dwarampudi	Lecturer Department of Pharmacognosy	9885278482	lalithapriyanka25@jssuni.edu.in
7	Communication skills	New Faculty	Part time faculty		

**II Semester**

<b>S. No</b>	<b>Name of the Subject</b>	<b>Name of the Teacher</b>	<b>Designation and Department</b>	<b>Mobile No.</b>	<b>e-mail</b>
1	Human Anatomy & Physiology-II	Dr. A. Justin	Associate Professor Department of Pharmacology	9942932150	justin@jssuni.edu.in
2	Pharmaceutical Organic Chemistry	Dr. B. Gowramma	Associate Professor, Department of Pharmaceutical Chemistry	9442111172	gowrammab@jssuni.edu.in
3	Pathophysiology	Dr. Swathi. Swaroop	Assistant Professor Department of Pharmacy Practice	9629547089	swasasree@jssuni.edu.in
4	Biochemistry	Dr. Gomathi Swaminathan	Lecturer, Department of Pharmaceutical Chemistry	9790095279	gomathiswaminathan@jssuni.edu.in
5	Computer Applications in Pharmacy	Mr. C. Jayakumar	Assistant Professor Department of Pharmacy Practice	9443476698	jrccc@jssuni.edu.in
6	Environmental Sciences	Mr. G. Ramu	Lecturer Department of Pharmacognosy	9489238815	ramupharmu@jssuni.edu.in

**4. I B.PHARM ACADEMIC PLAN**

**I SEMESTER**

<b>Name of the Subject</b>	Human Anatomy and Physiology-I (Theory)
<b>Name of the Faculty</b>	Dr. A. Justin, M.Pharm., Ph.D.,
<b>Designation, Department</b>	Associate Professor, Department of Pharmacology
<b>Mobile Number</b>	9942932150
<b>e-Mail i.d.</b>	<a href="mailto:justin@jssuni.edu.in">justin@jssuni.edu.in</a>

<b>Scope, Course Objectives and Course Outcomes</b>
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**Scope:** This subject is designed to impart fundamental knowledge on the structure and functions of the various systems of the human body. It also helps in understanding both homeostatic mechanisms. The subject provides the basic knowledge required to understand the various disciplines of pharmacy.

**Objectives:** The primary objectives of this course are 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 human body.
4. Perform the various experiments related to special senses and nervous system.
5. Appreciate coordinated working pattern of different organs of each system.

**Course Outcomes (COs):** At completion of this course it is expected that the students will be able to

CO 1: Define the gross anatomy and physiological functions of cell, tissues, bones, muscles, blood

and cardiovascular systems of human body.

CO 2: Interpret the homeostatic mechanisms in human body and understand the disorders associated with their imbalances.

CO 3: Recognize the various tissues and organs structure of multiple systems of human body.

CO 4: Demonstrate the functions of special senses and nervous system using experiments.

CO 5: Interlink the coordinated working pattern of different organs of human body through its physiological functions.

**LECTURE PLAN – Abstract**

Sessional	No. of Hours of Didactic Lecture	No. of Hours of other Activities	Total No. of Lecture Hours
I	22	03	25
II	23	03	26
<b>Total No. ofHours</b>	45	06	51

**I SESSIONAL:22 Lectures + 03 Activities**

Lecture No.	Lecture Details	Hours
<b>Unit-1</b>		<b>(10)</b>
<b>Introduction to Human Body</b>		
1.	Definition and scope of anatomy and physiology Levels of structural organization and body systems	<b>03</b>
2.	Basic life processes, Homeostasis	
3.	Basic anatomical terminology	
<b>Cellular level of organization</b>		
4.	Structure and functions of cell	<b>04</b>
5.	Transport across cell membrane	
6.	Cell division, Cell junctions	
7.	General principles of cell communication, intracellular signaling pathway activation by extracellular signal molecule, Forms of intracellular signaling: a) Contact-dependent b)Paracrine c) Synaptic d) Endocrine	
<b>Tissue level of organization</b>		
8.	Classification of tissues	<b>03</b>
9.	Structure, location and functions of epithelial, muscular tissues	
10.	Structure, location and functions of connective, nervous tissues	
<b>Unit-2:</b>		<b>(10)</b>
<b>Integumentary system</b>		
1.	Structure and functions of skin	<b>02</b>
2.	Structure and functions of skin	
<b>Skeletal system</b>		
3.	Divisions of skeletal system and types of bone	<b>06</b>
4.	Salient features and functions of bones of axial skeletal system	



5.	Salient features and functions of bones of appendicular skeletal system	
6.	Organization of skeletal muscle	
7.	Physiology of muscle contraction	
8.	Neuromuscular junction	
<b>Joints</b>		
9.	Structural and functional classification of joints	<b>02</b>
10.	Types of joints movements and its articulation	
<b>Unit- 3</b>		<b>(10)</b>
<b>Body fluids and blood</b>		
1.	Body fluids, composition and functions of blood	<b>02</b>
2.	Hemopoiesis	
Activity - 1	Unit Test – 1	
Activity - 2	MCQ Test – 1	
Activity - 3	MCQ Test – 2	

**II SESSIONAL: 23 Lectures + 03 Activities**

Lecture No.	Lecture Details	Hours
1.	Formation of hemoglobin, anemia	<b>04</b>
2.	Mechanisms of coagulation	
3.	Blood grouping Rh factors, Transfusion and its significance	
4.	Disorders of blood, Reticuloendothelial system	
<b>Lymphatic system</b>		
1.	Lymphatic organs and tissues	<b>04</b>
2.	Lymphatic vessels	
3.	Lymph circulation	
4.	Functions of lymphatic system	
<b>Unit-4:</b>		<b>(08)</b>
<b>Peripheral Nervous system</b>		
1.	Classification of peripheral nervous system, Structure and functions of sympathetic nervous system	<b>04</b>
2.	Structure and functions of parasympathetic nervous system	
3.	Origin and functions of spinal nerves	
4.	Origin and functions of cranial nerves	
<b>Special senses</b>		
5.	Structure and function of eye and their disorders	<b>04</b>
6.	Structure and function of ear and their disorders	
7.	Structure and function of nose and their disorders	
8.	Structure and function of tongue and their disorders	
<b>Unit-5</b>		<b>(07)</b>

<b>Cardiovascular system</b>		
1.	Heart – anatomy and physiology of heart	<b>07</b>
2.	Blood circulation, blood vessels, structure and functions of artery, vein and capillaries	
3.	Elements of conduction system of heart and heartbeat, its regulation by autonomic nervous system	
4.	Cardiac output, Pulse	
5.	Cardiac cycle	
6.	Regulation of blood pressure	
7.	Electrocardiogram and disorders of heart	
Activity - 1	Unit Test – 1	
Activity - 2	MCQ Test – 1	
Activity - 3	MCQ Test – 2	

### Text books

- Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypee brother's medical publishers, New Delhi
- Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York
- Physiological basis of Medical Practice-Best and Taylor. Williams & Wilkins Co, Riverview, MI USA
- Text book of Medical Physiology- Arthur C, Guyton and John.E. Hall. Miamisburg, OH, U.S.A.
- Principles of Anatomy and Physiology by Tortora Grabowski. Palmetto, GA, U.S.A.
- Textbook of Human Histology by Inderbir Singh, Jaypee brother's medical publishers, New Delhi.
- Textbook of Practical Physiology by C.L. Ghai, Jaypee brother's medical publishers, New Delhi.
- Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee brother's medical publishers, New Delhi.

### Reference Books

- Physiological basis of Medical Practice-Best and Taylor. Williams & Wilkins Co, Riverview, MI USA.
- Text book of Medical Physiology- Arthur C, Guyton and John. E. Hall. Miamisburg, OH, U.S.A.
- Human Physiology (vol1 and 2) by Dr. C.C. Chatterjee, Academic Publishers Kolkata.

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<b>Name of the Subject</b>	Pharmaceutical Analysis (Theory)
<b>Name of the Faculty</b>	Dr.B. Babu M.Pharm., Ph.D

<b>Designation, Department</b>	Assistant Professor, Department of Pharmaceutical Analysis
<b>Mobile Number</b>	9840142319
<b>e-Mail i.d.</b>	<a href="mailto:babu@jssuni.edu.in">babu@jssuni.edu.in</a>

<b>Scope, Course Objectives and Course Outcomes</b>
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**Scope:** This course deals with the fundamentals of analytical chemistry and principles of electrochemical analysis of drugs

**Objectives:** The primary objectives of this course are to

1. To understand the various techniques of analytical.
2. To understand the principles of volumetric and electro chemical analysis.
3. To carryout various volumetric and electrochemical titrations.
4. To develop analytical skills.

**Course Outcomes (COs):** At completion of this course it is expected that the students will be able to

CO 1 : Understand the basic concept of preparation and representation of various forms of solution concentration.

CO 2 : The need to determining the quality of the pharmaceutical product and substances.

CO 3 : The concepts of basic methods and its disadvantages in determining the qualitative and

quantitative aspects of pharmaceuticals.

CO 4 : Practical aspects of instrumentation and various techniques of measurement.

**LECTURE PLAN –Abstract**

Sessional	No. of Hours Lecture	No of Hours of other Activities	Total No. of Lecture Hours
	Pharmaceutical Analysis		
<b>I</b>	22	-	22
<b>II</b>	23	-	23
<b>Total No. of Hours</b>	45	-	45

**I SESSIONAL: 22 Lectures**

Lecture No.	Lecture Details	Hours
<b>PHARMACEUTICAL ANALYSIS</b>		<b>(45)</b>
<b>Unit-1: Pharmaceutical Analysis</b>		
	Orientation to the subject	<b>10</b>
1.	Definition and scope, different techniques of analysis, Methods of expressing concentration	
2.	Primary and Secondary standards	
3.	Preparation and standardization of various molar and normal solutions – Oxalic acid, sodium hydroxide	
4.	Hydrochloric acid, sodium thiosulphate	
5.	Potassium Permanganate, Ceric ammonium sulphate, Sulphuric acid	
6.	Errors: Sources of errors, types of errors	
7.	Methods of minimizing errors	
8.	Accuracy, Precision, Significant figures	
9.	Pharmacopeia	
10.	Sources of impurities in medicinal agents, Limit Test	
<b>Unit-2: Acid Base Titration, Non-Aqueous Titration</b>		
1.	Acid Base Titration: Theories of acid base and indicators	<b>10</b>
2.	Theories of indicators	
3.	Classifications of acid base titrations	
4.	Theory involved in the titration of strong and weak and very weak acids and bases	
5.	Theory involved in the titration of strong and weak and very weak acids and bases	
6.	Neutralization curves	
7.	Types of Non aqueous titration: Solvents	
8.	Introduction to Non aqueous acidimetry and alkalimetry titration	
9.	Estimation of sodium benzoate	
10.	Estimation of Ephedrine HCL	
<b>Unit-3: Precipitation Titration, Complexometric Titration and Gravimetry</b>		
1.	Mohrs method , Volhard's	<b>02</b>
2.	Modified volhards , Fajans method	

**II SESSIONAL: 23 Lectures**

Lecture No.	Lecture Details	Hours
<b>Unit-3: Precipitation Titration, Complexometric Titration and Gravimetry</b>		
1.	Estimation of sodium chloride	<b>08</b>
2.	Complexometric titration: Classification, metal ion indicators	
3.	Masking and demasking reagents	
4.	Estimation of magnesium sulphate and calcium gluconate	
5.	Gravimetry: Principle and steps involved in gravimetric analysis.	
6.	Purity of the precipitate: Co-precipitation and post precipitation	
7.	Estimation of barium sulphate	
8.	Basic principles, methods and application of diazotization titration.	
<b>Unit-4: Redox titration</b>		
1.	Redox titration : Concepts of oxidation and reduction	<b>08</b>
2.	Types of redox titration ( Principle and application)	
3.	Cerimetry	
4.	Iodimetry	
5.	Iodometry	
6.	Bromatometry	
7.	Dichrometry	
8.	Titration with potassium iodate	
<b>Unit-5: Electro chemical Analysis</b>		
1.	Electrochemical methods conductometry – Introduction Conductivity cell	<b>07</b>
2.	Conductometric titration, application	
3.	Potentiometry – Electrochemical cell, construction and working of reference ( Standard hydrogen, silver chloride electrode and calomel electrode)	
4.	Indicator electrode ( metal electrodes and glass electrode)	
5.	Methods to determine end point of potentiometric titration and applications.	
6.	Polarography – Principle, Ilkovic equation, construction and working of dropping mercury electrode.	
7.	Rotating platinum electrode application	

**Reference Books**

1. A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, Stahlone Press of University of London
2. A.I. Vogel, Text Book of Quantitative Inorganic analysis
3. P. Gundu Rao, Inorganic Pharmaceutical Chemistry
4. Bentley and Driver's Textbook of Pharmaceutical Chemistry
5. John H. Kennedy, Analytical chemistry principles
6. Indian Pharmacopoeia.

<b>Name of the Subject</b>	Pharmaceutics (Theory)
<b>Name of the Faculty</b>	Dr. GNK. Ganesh M.Pharm., Ph.D
<b>Designation, Department</b>	Associate Professor, Department of Pharmaceutics
<b>Mobile Number</b>	9442191918
<b>e-Mail i.d.</b>	<a href="mailto:gnk@jssuni.edu.in">gnk@jssuni.edu.in</a>

### Scope, Course Objectives and Course Outcomes

**Scope:** This course is designed to impart a fundamental knowledge on the preparatory pharmacy with arts and science of preparing the different conventional dosage forms.

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

- Know the history of profession of pharmacy.
- Understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations.
- Understand the professional way of handling the prescription.
- Preparation of various conventional dosage forms.

**Course Outcomes (COs):** At completion of this course it is expected that the students will be able to

**CO1:** Explain history of profession of Pharmacy in India & Pharmacopeia and its development.

**CO2:** Learn parts and handling of prescription, posology & dose calculation of drug in children. Different types of dosage form.

**CO3:** Elaborate different pharmaceutical calculation involved in formulation.

**CO4:** Understand basic requirement and formulation of powder and liquid (monophasic & biphasic) dosages form.

**CO5:** Explain type of Pharmaceutical incompatibility.

**CO6:** Learn basic requirement, formulation and evaluation of suppositories and pessaries.

**CO7:** Understand the mechanisms of drug penetration and also the factors influencing permeation through transdermal route.

**CO8:** Explain the formulation and evaluation of semisolid preparation such as ointment, gel cream etc.

### LECTURE PLAN – Abstract

Sessional	Number of Hours of Didactic Lecture	No. of Hours of other activities	Total Number of Lecture Hours
<b>I</b>	20	3	20
<b>II</b>	25	4	25
<b>Total No. of Hours</b>	45	7	45

**I SESSIONAL: 20 lectures**

Lecture No.	Lecture Details	Hours
<b>Unit-1: : Historical background and development of profession of pharmacy</b>		<b>(10)</b>
1.	History of profession of Pharmacy in India in relation to pharmacy education	10
2.	Industry and organization, Pharmacy as a career	
3.	Pharmacopoeias: Introduction to IP, Introduction to BP.	
4.	Introduction to USP	
5.	Dosage forms: Introduction to dosage forms, classification and definitions	
6.	Prescription: Definition, Parts of prescription, handling of Prescription	
7.	Errors in prescription	
8.	Posology: Definition, Factors affecting posology.	
9.	Pediatric dose calculations based on age.	
10.	Pediatric dose calculations based on body weight and body surface area	
<b>Unit-2: Pharmaceutical calculations:</b>		<b>(10)</b>
1.	Weights and measures - Imperial & Metric system, Calculations involving percentage solutions	10
2.	Allegation, proof spirit and isotonic solutions based on freezing point and molecular weight	
3.	Powders: Definition, classification, advantages and disadvantages	
4.	Simple & compound powders	
5.	Official preparations, dusting powders, effervescent, efflorescent Powders	
6.	Hygroscopic powders, eutectic mixtures	
7.	Geometric dilutions.	
8.	Liquid dosage forms: Advantages and disadvantages of liquid dosage forms	
9.	Excipients used in formulation of liquid dosage forms.	
10.	Solubility enhancement techniques.	

**II SESSIONAL:25 Lectures**

Lecture No.	Lecture Details	Hours
<b>Unit-3: Monophasic liquids</b>		<b>(10)</b>
1.	Monophasic liquids: Definitions and preparations of Gargles, Mouthwashes	10
2.	Throat Paint, Eardrops, Nasal drops, Enemas, Syrups,	
3.	Elixirs, Liniments and Lotions	
4.	Biphasic liquids - Suspensions: Definition, advantages and disadvantages, classifications, Preparation of suspensions; flocculated and deflocculated suspension	
5.	Stability problems of suspension and methods to overcome.	
6.	Emulsions: Definition, classification, emulsifying agent.	
7.	Test for the identification of emulsions	
8.	Types of emulsion	
9.	Methods of preparation of emulsion	
10.	stability problems of emulsions and methods to overcome	
<b>Unit-4: Suppositories</b>		<b>(05)</b>
1.	Definition, types, advantages and disadvantages, types of bases	05
2.	Methods of preparations, Displacement value, Calculations	
3.	Evaluation of suppositories, Pharmaceutical incompatibilities: Definition	
4.	Classification, Physical incompatibility	
5.	Chemical and therapeutic incompatibilities with examples	
<b>Unit-5: Semisolid dosage forms</b>		<b>(10)</b>
1.	Definitions, classification	10
2.	Mechanisms	
3.	Factors influencing dermal penetration of drugs	
4.	Preparation of ointments	
5.	Preparation of pastes	
6.	Preparation of creams and gels	
7.	Excipients used in semi solid dosage forms	
8.	Evaluation of semi solid dosages forms	
Activity-1	Unit test – 1	
Activity-2	Unit test – 2	
Activity-3	Unit test – 3	
Activity-4	MCQ test – 1	
Activity-5	MCQ test – 1	
Activity-6	MCQ test – 1	
Activity-7	Rivision Exam – 1	



**References:**

1. H.C. Ansel et al., Pharmaceutical Dosage Form and Drug Delivery System, Lippincott Williams and Walkins, New Delhi.
2. Carter S.J., Cooper and Gunn's-Dispensing for Pharmaceutical Students, CBS publishers, New Delhi.
3. M.E. Aulton, Pharmaceutics, The Science & Dosage Form Design, Churchill Livingstone, Edinburgh.
4. Indian pharmacopoeia.
5. British pharmacopoeia.
6. Lachmann. Theory and Practice of Industrial Pharmacy, Lea & Febiger Publisher, The University of Michigan.
7. Alfonso R. Gennaro Remington. The Science and Practice of Pharmacy, Lippincott Williams, New Delhi.
8. Carter S.J., Cooper and Gunn's. Tutorial Pharmacy, CBS Publications, New Delhi.
9. E.A. Rawlins, Bentley's Text Book of Pharmaceutics, English Language Book Society, Elsevier Health Sciences, USA.
10. Isaac GhebreSellassie: Pharmaceutical Pelletization Technology, Marcel Dekker, INC, New York.
11. Dilip M. Parikh: Handbook of Pharmaceutical Granulation Technology, Marcel Dekker, INC, New York.
12. Françoise Nieloud and Gilberte Marti-Mestres: Pharmaceutical Emulsions and Suspensions, Marcel Dekker, INC, New York.

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<b>Name of the Subject</b>	Pharmaceutical Inorganic Chemistry (Theory)
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<b>Name of the Faculty</b>	Dr.B. Gowramma, M.Pharm., Ph.D
<b>Designation, Department</b>	Associate Professor, Department of Pharmaceutical Chemistry
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<b>Scope, Course Objectives and Course Outcomes</b>
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**Scope:** This subject deals with the monographs of inorganic drugs and pharmaceuticals.

**Objectives:** Upon completion of course, student shall be able to

- know the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals
- understand the medicinal and pharmaceutical importance of inorganic compounds

**Course Outcomes (COs):** At completion of this course it is expected that the students will be able to

CO 1: Well acquainted with the principles of limit tests.

CO 2: Familiar with different classes of inorganic pharmaceuticals and their analysis

CO 3: Identification of different anions, cations and different inorganic pharmaceuticals.

CO 4: Knowledge about the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals understand the medicinal and pharmaceutical importance of inorganic compounds

CO 5: To have been introduced to a variety of inorganic drug classes.

### **LECTURE PLAN –Abstract**

Sessional	No. of Hours of Didactic Lecture	No of Hours of other Activities	Total No. of Lecture Hours
<b>I</b>	22	02	24
<b>II</b>	23	02	25
<b>Total No. of Hours</b>	45	04	49

**I SESSIONAL: 23 Lectures + 02 Activities**

Lecture No.	Lecture Details	Hours
<b>Unit-1: Impurities in Pharmaceutical substance</b>		<b>10</b>
1.	Impurities Introduction	
2.	History of Pharmacopoeia	
3.	Source and types of impurities	
4.	importance of limit test, general principle and procedures for limit test	
5.	limit test for chloride, sulphate	
6.	limit test for Iron,	
7.	limit test for Arsenic	
8.	limit test for Lead	
9.	limit test for heavy metals	
10.	Modified limit test for chloride, sulphate	
a.	Introduction to Biopharmaceutics	
<b>Unit-2: Acids, Bases and Buffers, Major extra and intracellular electrolytes and Dental Products</b>		<b>10</b>
<b>Acids, Bases and Buffers</b>		
1.	Buffer equations and buffer capacity in general, buffers in pharmaceutical systems,	
2.	preparation, stability, buffered isotonic solutions,	
3.	measurements of tonicity, calculations and methods of adjusting isotonicity.	
a.	<b>Major extra and intracellular electrolytes</b>	
3.	Functions of major physiological ions	
4.	Electrolytes used in the replacement therapy: Sodium chloride*, Potassium chloride,	
5.	Calcium gluconate* and Oral Rehydration Salt (ORS),	
6.	Physiological acid base balance	
a.	<b>Dental Products</b>	
7.	Dentifrices, role of fluoride in the treatment of dental caries	
8.	Desensitizing agents, Calcium carbonate	
9.	Sodium fluoride and Zinc eugenol cement	

<b>Unit-3: Gastrointestinal agents</b>		
1.	Gastrointestinal agents- introduction	
2.	<b>Acidifies:</b> Ammonium chloride* and Dil. HCl	<b>2</b>
<b>Activity 1</b>	MCQ Test	
<b>Activity 2</b>	MCQ Test	<b>2</b>

**II SESSIONAL: 22 Lectures + 2 Activities**

Lecture No.	Lecture Details	Hours
<b>Unit-3: Gastrointestinal agents</b>		
1	<b>Antacid:</b> Ideal properties of antacids, combinations of antacids	<b>8</b>
2	Sodium Bicarbonate*, Aluminum hydroxide gel, Magnesium hydroxide mixture	
3	<b>Cathartics:</b> Magnesium sulphate, Sodium orthophosphate	
4	Kaoline and Bentonite	
5	<b>Antimicrobials:</b> Mechanism, classification,	
6	Potassium permanganate, Boric acid,	
7	Hydrogen peroxide*, Chlorinated lime*,	
8	Iodine and its preparations	
<b>Unit-4: Miscellaneous compounds</b>		
1	<b>Expectorants:</b> Potassium iodide	<b>08</b>
2	Ammonium chloride*	
3	<b>Emetics:</b> Copper sulphate*	
4	Sodium potassium tartarate	
5	<b>Haematinics:</b> Ferrous sulphate*, Ferrous gluconate	
6	<b>Poison and Antidote:</b> Sodium thiosulphate*,	
7	Activated charcoal, Sodium nitrate	
8	<b>Astringents:</b> Zinc Sulphate, Potash Alum	
<b>Unit-5: Radiopharmaceuticals</b>		
1	Radio activity	<b>07</b>
2	Measurement of radioactivity	
3	Properties of $\alpha$ , $\beta$ , $\gamma$ radiations	
4	Half-life, radio isotopes	
5	study of radio isotopes - Sodium iodide I <sup>121</sup>	
6	Storage conditions, precautions	
7	pharmaceutical application of radioactive substances	
Acity 1	MCQ Test	<b>2</b>
Acity 2	MCQ Test	

**Text Books**

1. P. Gundu Rao, Inorganic Pharmaceutical Chemistry, 3rd Edition
2. Anand& Chatwal, Inorganic Pharmaceutical Chemistry
3. M.L Schroff, Inorganic Pharmaceutical Chemistry
4. A.I. Vogel, Text Book of Quantitative Inorganic analysis

**Reference Books**

1. A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II
2. Stahlone Press of University of London, 4th edition
3. Bentley and Driver's Textbook of Pharmaceutical Chemistry
4. Indian Pharmacopoeia

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<b>Name of the Subject</b>	Remedial Biology (Theory)
<b>Name of the Faculty</b>	Dr L. Priyanka Dwarampudi

<b>Designation, Department</b>	Lecturer, Department of Pharmacognosy
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**Scope, Course Objectives and Course Outcomes**

**Scope**

To learn and understand the components of living world, structure and functional system of plant and animal kingdom.

**Objectives**

The primary objectives of this course are to

1. Know the classification and salient features of five kingdoms of life.
2. Understand the basic components of anatomy & physiology of plant.
3. Understand the basic components of anatomy & physiology of animal with special reference to human.

**Course Outcomes (COs)**

On successful completion of the subject the student shall be able to

CO 1: Know about the kingdoms of plants, basic concepts and components of animal with reference to human

**LECTURE PLAN –Abstract**

Sessional	No. of Hours of Didactic Lecture	No of Hours of other Activities	Total No. of Lecture Hours
<b>I</b>	15	02	17
<b>II</b>	15	02	17
<b>Total No. of Hours</b>	30	04	34

**I SESSIONAL: 15 Lectures+ 2 Activities**

Lecture No.	Lecture Details	Hours
<b>Unit-1: Living world and Morphology of Flowering Plants</b>		<b>07</b>
1.	Definition and characters of living organisms	
2.	Diversity in the living world	
3.	Binomial nomenclature	
4.	Five kingdoms of life and basis of classification	
5.	Salient features of Monera, Protista, Fungi, Animalia and Plantae, Virus	
6.	Morphology of different parts of flowering plants – Root, stem, inflorescence, flower, leaf, fruit, seed.	
7.	General Anatomy of Root, stem, leaf of monocotyledons & Dicotyledones.	
<b>Unit-2: Body fluids, Digestion and Respiration</b>		<b>08</b>
1.	Composition of blood, blood groups, coagulation of blood	
2.	Composition and functions of lymph	
3.	Human circulatory system	
4.	Structure of human heart and blood vessels	
5.	Cardiac cycle, cardiac output and ECG	
6.	Human alimentary canal and digestive glands Digestion, absorption and assimilation of digested food	
7.	Mechanism of breathing and its regulation, Exchange of gases, transport of gases and regulation of respiration	
8.	Modes of excretion and Human excretory system- structure and function	
	Activity 1 : Group discussion	
	Activity 2 : Class test	

**II SESSIONAL: 15 Lectures+ 2 Activities**

Lecture No.	Lecture Details	Hours
<b>Unit-3: Excretory products, Neural control and Human Reproductive System</b>		<b>06</b>
1.	Urine formation and Rennin angiotensin system	
2.	Definition & classification of nervous system, Structure of a neuron, Generation & conduction of nerve impulse	
3.	Structure of brain and spinal cord, Functions of cerebrum, cerebellum, hypothalamus and medulla oblongata	
4.	Endocrine glands and their secretions	
5.	Functions of hormones secreted by endocrine glands	
6.	Parts of female reproductive system, Parts of male reproductive system, Spermatogenesis, Oogenesis and Menstrual cycle	<b>05</b>
<b>Unit-4: Plants and mineral nutrition, Photosynthesis</b>		
1.	Essential mineral, macro and micronutrients, Nitrogen metabolism	
2.	Nitrogen cycle and biological nitrogen fixation	
3.	Autotrophic nutrition and photosynthesis	
4.	Photosynthetic pigments	
5.	Factors affecting photosynthesis	<b>04</b>
<b>Unit-5: Respiration and Cell</b>		
1.	Plant respiration: Respiration, glycolysis, fermentation (anaerobic).	
2.	Phases and rate of plant growth, Condition of growth, Introduction to plant growth regulators	
3.	Structure and functions of cell and cell organelles. Cell division	
4.	Definition, types of tissues, location and functions.	
	Activity 1 : Group discussion	
	Activity 2 : Class test	

**Text Books**

1. Text book of Biology by S. B.Gokhale b.
2. A Text book of Biology by Dr. Thulajappa and Dr.Seetaram

**Reference Books**

1. A Text book of Biology by B.V. SreenivasaNaidu b.
2. A Text book of Biology by Naidu andMurthy c.
3. Botany for Degree students By A.C.Dutta. d.
4. Outlines of Zoology by M. Ekambaranathaayyer and T. N. Ananthkrishnan. e.
5. A manual for pharmaceutical biology practical by S.B. Gokhale and C. K. Kokate



<b>Name of the Subject</b>	Remedial Mathematics
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<b>Scope, Course Objectives and Course Outcomes</b>
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**Scope:** This course is designed to impart knowledge and skills necessary for introduction to mathematics. This subject deals with the introduction to Partial fraction, Logarithm, matrices and Determinant, Analytical geometry, Calculus, differential equation and Laplace transform.

**Objectives:** The primary objectives of this course are to enable students to

1. Know the theory and their application of mathematics in pharmacy.
2. Solve the different types of problems by applying theory.
3. Appreciate the important application of mathematics in Pharmacy.
4. Perform abstract mathematical reasoning

**Course Outcomes (COs):** At completion of this course it is expected that the students will be able to

CO 1 : Apply mathematical concepts and principles to perform computations for Pharmaceutical Sciences.

CO 2 : Create, use and analyze mathematical representations and mathematical relationships

CO 3 : Communicate mathematical knowledge and understanding to help in the field of

Clinical

Pharmacy

**LECTURE PLAN –Abstract**

Sessional	Number of Hours of Didactic Lecture	No of Hours of other Pedagogy	Total Number of Lecture Hours
<b>I</b>	11	01	12
<b>II</b>	19	02	21
<b>Total No of Hours</b>	30	03	33

**I SESSIONAL: 11 Lectures + 01 Activities**

Lecture No.	Lecture Details	Hours
<b>Unit-1: Partial Fractions, Logarithms, Functions, Limits and continuity</b>		<b>(12)</b>
1	Introduction to polynomial, rational functions, and fractions	<b>(11)</b>
2	Resolving into partial fractions	
3	Application of partial fraction in chemical kinetics and pharmaceuticals	
4	Concept of information systems and software	
5	Logarithms, properties, Pharmaceutical examples	
6	Functions , limits and continuity of given functions	
<b>Unit-II: Matrices and Determinants</b>		
7	Matrices, basic operations and sums. Product of matrices	
8	Determinants, properties, adjoint and inverse of matrices	
9	Solutions of linear equations using matrix method and Cramer’s rule	
10	Characteristic equations of matrix, Cayley Hamilton’s theorem	
11	Applications of matrices in solving pharmacokinetic equations	
Activity -1	Unit Test – I	
Activity -2	MCQ Test -	
Activity -3	Revision Test – 3	

**II SESSIONAL: 19 Lectures+03 Activities**

12	Sums related to matrices and determinants ( <b>Activity</b> )	<b>(01)</b>
<b>Unit-III: Calculus –Differentiation</b>		<b>(19)</b>
13	Derivative of functions , product and quotient rule ( <b>Activity</b> )	<b>(19)</b>
14	Derivatives of $x^n$ , $e^x$ , $\log x$ and $a^x$ using first principles	
15	Derivatives of trigonometric functions using first principles	
16	Condition for maximum and minimum point	
17	Applications of differentiation to pharmaceutical problems	
18	Sums related to differentiation	

19	Sign test and distance formula, sums related to distance formula	
20	Slope of a straight line, Slope intercept form of straight line	
21	Parallelism and perpendicularity of straight lines	
22	Introduction and rules of integration	
23	Method of substitution and partial fraction	
24	Integration by parts , evaluation of definite integrals and applications to pharmaceutical problems	
25	variable separable method of differential equations	
26	Homogenous and linear differential equations	
27	Applications of solving pharmacokinetics equations	
28	Definition and elementary functions of Laplace transforms	
29	Solving linear differential equations	
30	Applications in solving chemical kinetics and pharmacokinetics equations	
Activity -1	Revision MCQ Test – 1	
Activity -2	Revision MCQ Test – 2	
Activity -3	Final Revision Test – 1	

### Recommended Books (Latest Edition)

1. Differential Calculus by Shanthinarayan
2. Pharmaceutical Mathematics with application to Pharmacy by Panchaksharappa Gowda D.H.
3. Integral Calculus by Shanthinarayan
4. Higher Engineering Mathematics by Dr.B.S.Grewal

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**II SEMESTER**

<b>Name of the Subject</b>	Human Anatomy and Physiology-II (Theory)
<b>Name of the Faculty</b>	Dr. A. Justin, M.Pharm., Ph.D
<b>Designation, Department</b>	Associate Professor, Department of Pharmacology
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<b>Scope, Course Objectives and Course Outcomes</b>
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**Scope:** This subject is designed to impart fundamental knowledge on the structure and functions of the various systems of the human body. It also helps in understanding both homeostatic mechanisms. The subject provides the basic knowledge required to understand the various disciplines of pharmacy.

**Objectives:** The primary objectives of this course are 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 human body.
4. Perform the hematological tests like blood cell counts, haemoglobin estimation, bleeding/clotting time etc and also 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.

**Course Outcomes (COs):** At completion of this course it is expected that the students will be able to

CO 1: Define the gross anatomy and physiological functions of nervous, digestive, urinary, respiratory, endocrine and reproductive systems

CO 2: Interpret the homeostatic mechanisms in human body and understand the disorders associated with their imbalances

CO 3: Recognize the various tissues and organs structure of multiple systems of human body

CO 4: Demonstrate the physiological systems of various systems of human body using relevant experiments

CO 5: Interlink the coordinated working pattern of different organs of human body through its physiological functions

**LECTURE PLAN – Abstract**

Sessional	No. of Hours of Didactic Lecture	No. of Hours of other Activities	Total No. of Lecture Hours
<b>I</b>	23	03	26
<b>II</b>	22	03	25
<b>Total No. of Hours</b>	45	06	51

**I SESSIONAL: 23 Lectures + 03 Activities**

Lecture No.	Lecture Details	Hours
<b>Unit-1</b>		<b>(10)</b>
<b>Nervous system</b>		
1.	Organization of nervous system, Neuron, Neuroglia	<b>10</b>
2.	Classification and properties of nerve fibre	
3.	Electrophysiology, action potential, nerve impulse	
4.	Receptors, synapse, neurotransmitters	
5.	Meninges, ventricles of brain and cerebrospinal fluid	
6.	Structure and functions of cerebrum	
7.	Structure and functions of cerebellum	
8.	Structure and functions of brain stem	
9.	Spinal cord - gross anatomy and functions	
10.	Functions of afferent and efferent nerve tracts, reflex activity	
<b>Unit-2:</b>		<b>(06)</b>
<b>Digestive system</b>		
1.	Anatomy and functions of GI tract	<b>06</b>
2.	Production and regulation of stomach acid, pepsin role in protein digestion	
3.	Anatomy and functions of salivary glands, movements of GIT	
4.	Anatomy and functions of pancreas and liver	
5.	Digestion and absorption of nutrients and disorders of GIT	
6.	Energetics: Formation and role of ATP, Creatinine Phosphate and BMR	
<b>Unit -3:</b>		<b>(10)</b>
<b>Respiratory system</b>		
1.	Anatomy of lungs	<b>05</b>
2.	Mechanism of respiration	
3.	Regulation of respiration	

4.	Lung Volumes and capacities transport of respiratory gases	
5.	Artificial respiration and resuscitation methods	
<b>Urinary system</b>		
1.	Anatomy of kidney and nephrons	<b>02</b>
2.	Functions of kidney and urinary tract	
Activity – 1	Unit Test – 1	
Activity – 2	MCQ Test – 1	
Activity – 3	MCQ Test – 2	

**II SESSIONAL: 22 Lectures + 03 Activities**

Lecture No.	Lecture Details	Hours
3.	Physiology of urine formation, micturition reflex	<b>03</b>
4.	Role of kidneys in acid base balance	
5.	Role of RAS in kidney and disorders of kidney	
<b>Unit-4: Endocrine system</b>		<b>(10)</b>
1.	Classification of hormones	<b>10</b>
2.	Mechanism of hormone action	
3.	Structure and functions of pituitary gland	
4.	Structure and functions of thyroid gland	
5.	Structure and functions of parathyroid gland	
6.	Structure and functions of adrenal gland	
7.	Structure and functions of pancreas	
8.	Structure and functions of pineal gland	
9.	Structure and functions of thymus gland	
10.	Endocrine related disorders	
<b>Unit-5:</b>		<b>(09)</b>
<b>Reproductive system</b>		
1.	Anatomy and functions of male reproductive system	<b>06</b>
2.	Anatomy and functions of female reproductive system	
3.	Sex hormones, physiology of menstruation	
4.	Fertilization	
5.	Spermatogenesis, oogenesis	
6.	Pregnancy and parturition	
<b>Introduction to genetics</b>		
1.	Chromosomes, genes and DNA	<b>03</b>
2.	Protein synthesis	
3.	Genetic pattern of inheritance	
Activity – 1	Unit Test – 1	
Activity – 2	MCQ Test – 1	
Activity – 3	MCQ Test – 2	

### **Text books**

1. Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypeebrothers medical publishers, New Delhi.
2. Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York.
3. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co,Riverview,MI USA.
4. Text book of Medical Physiology- Arthur C,Guyton andJohn.E. Hall. Miamisburg, OH, U.S.A.
5. Principles of Anatomy and Physiology by Tortora Grabowski. Palmetto, GA, U.S.A.
6. Textbook of Human Histology by Inderbir Singh, Jaypee brother's medical publishers, New Delhi.
7. Textbook of Practical Physiology by C.L. Ghai, Jaypee brother's medical publishers, New Delhi.
8. Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee brother's medical publishers, New Delhi.

### **Reference Books**

1. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co, Riverview, MI USA.
2. Text book of Medical Physiology- Arthur C, Guyton and John. E. Hall. Miamisburg, OH, U.S.A.
3. Human Physiology (vol 1 and 2) by Dr. C.C. Chatterrje, Academic Publishers Kolkata.

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<b>Name of the Subject</b>	Pharmaceutical Organic Chemistry I (Theory)
<b>Name of the Faculty</b>	Dr.B. Gowramma, M.Pharm., Ph.D
<b>Designation, Department</b>	Associate Professor, Department of Pharmaceutical Chemistry
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### Scope, Course Objectives and Course Outcomes

**Scope:** This subject deals with classification and nomenclature of simple organic compounds, structural isomerism, intermediates forming in reactions, important physical properties, reactions and methods of preparation of these compounds. The syllabus also emphasizes on mechanisms and orientation of reactions.

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

1. Write the structure, name and the type of isomerism of the organic compound
2. Write the reaction, name the reaction and orientation of reactions
3. Account for reactivity/stability of compounds,
4. Identify/confirm the identification of organic compound

**Course Outcomes (COs):** At completion of this course it is expected that the students will be able to

CO 1: Write the structure, name of the organic compound

CO 2: Knowledge about the type of isomerism

CO 3: Write the reaction, name the reaction and orientation of reactions

CO 4: Account for reactivity/stability of compounds

CO 5: Identify/confirm the unknown organic compound

CO 6: Knowledge about the naming reactions of carbonyl compounds

CO 7: To perform common laboratory techniques including reflux, distillation, recrystallization, vacuum filtration, etc.



## LECTURE PLAN –Abstract

Sessional	No. of Hours of Didactic Lecture	No of Hours of other Activities	Total No. of Lecture Hours
I	23	01	24
II	22	02	24
<b>Total No. of Hours</b>	45	03	48

## I SESSIONAL: 23 Lectures + 01 Activities

Lecture No.	Lecture Details	Hours
<b>Unit-1: Classification, nomenclature and isomerism</b>		
1.	Classification of Organic Compounds	7
2.	Common and IUPAC systems of nomenclature of organic compounds	
3.	Common and IUPAC systems of nomenclature of organic compounds	
4.	Common and IUPAC systems of nomenclature of organic compounds	
5.	Common and IUPAC systems of nomenclature of organic compounds	
6.	Common and IUPAC systems of nomenclature of organic compounds	
7.	Structural isomerism's in organic compounds	
<b>Unit-2: Alkanes, Alkenes and Conjugated dienes</b>		
1.	Alkanes preparation, properties	10
2.	SP <sup>3</sup> hybridization in alkanes, Halogenation of alkanes, uses of paraffins	
3.	Alkenes preparation & properties	
4.	E1 reactions -kinetics, order of reactivity of alkyl halides, stereochemistry and rearrangement of carbocations.	
5.	E2 reactions - kinetics, order of reactivity of alkyl halides, stereochemistry	
6.	E <sub>1</sub> versus E <sub>2</sub> reactions, Factors affecting E <sub>1</sub> and E <sub>2</sub> reactions	
7.	Ozonolysis, electrophilic addition reactions of alkenes	
8.	Markownikoff's orientation, free radical addition reactions of alkenes, Anti Markownikoff's orientation.	
9.	Conjugated dienes preparation, properties and Stability	
10.	Diel-Alder, electrophilic addition, free radical addition reactions of conjugated dienes, allylic rearrangement	
<b>Unit-3: Alkyl halides Alcohols</b>		
1.	Alkyl halides preparation & properties	06
2.	SN1 kinetics, order of reactivity of alkyl halides, stereochemistry	
3.	Rearrangement of carbocations.	
4.	SN2 reactions - kinetics, order of reactivity of alkyl halides, stereochemistry	
5.	SN <sub>1</sub> versus SN <sub>2</sub> reactions, Factors affecting SN <sub>1</sub> and SN <sub>2</sub> reactions	
6.	Structure and uses of ethylchloride, Chloroform, trichloroethylene,	

	tetrachloroethylene,	
Activity-1	MCQ Test	<b>01</b>

**II SESSIONAL: 22 Lectures + 2 Activities**

Lecture No.	Lecture Details	Hours
<b>Unit-3: Alkyl halides Alcohols</b>		<b>04</b>
1.	Dichloromethane, tetrachloromethane and iodoform.	
2.	Alcohols preparation & properties	
3.	Qualitative tests, Structure & uses of Ethanol, chlorobutanol,	
4.	Cetosteryl alcohol, Benzyl alcohol, Glycerol, Propylene glycol	
<b>Unit-4: Carbonyl compounds* (Aldehydes and ketones)</b>		<b>10</b>
1.	Aldehydes and ketones preparation	
2.	Aldehydes and ketones properties	
3.	Aldehydes and ketones properties	
4.	Electromeric effect	
5.	aldol condensation, Crossed Aldol condensation	
6.	Cannizzaro reaction, Crossed Cannizzaro reaction	
7.	Benzoin condensation	
8.	Perkin condensation, Qualitative tests,	
9.	Structure and uses of Formaldehyde, Paraldehyde, Acetone, Chloral hydrate	
10.	Hexamine, Benzaldehyde, Vanilin, Cinnamaldehyde.	
<b>Unit-5: carboxylic acid and amines</b>		<b>18</b>
1.	Carboxylic acids preparation & properties	
2.	Acidity of carboxylic acids, effect of substituents on acidity,	
3.	inductive effect and qualitative tests for carboxylic acids	
4.	qualitative tests for amide and ester, Structure and Uses of Acetic acid, Lactic acid	
5.	Tartaric acid, Citric acid, Succinic acid. Oxalic acid, Salicylic acid, Benzoic acid, Benzyl benzoate, Dimethyl phthalate, Methyl salicylate and Acetyl salicylic acid	
6.	Aliphatic amines preparation & properties	
7.	Basicity, effect of substituent on Basicity.	
8.	Qualitative test, Structure & uses- Ethanolamine, Ethylenediamine, Amphetamine	
Activity-1	MCQ Test	<b>02</b>
Activity-2	MCQ Test	

**Text Books**

1. Textbook of Organic Chemistry by B.S. Bahl & ArunBahl.
2. Practical Organic Chemistry by Mann and Saunders.

3. Vogel's text book of Practical Organic Chemistry.
4. Advanced Practical organic chemistry by N.K. Vishnoi.
5. Reaction and reaction mechanism by Ahluwalia/Chatwal.

**Reference Books**

1. Organic Chemistry by Morrison and Boyd.
2. Organic Chemistry by I.L. Finar , Volume-I.
3. Organic Chemistry by P.L.Soni.
4. Introduction to Organic Laboratory techniques by Pavia, Lampman and Kriz.

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<b>Name of the Subject</b>	Biochemistry (Theory)
<b>Name of the Faculty</b>	Dr. Gomathi Swaminathan, M.Pharm., Ph.D.,
<b>Designation, Department</b>	Lecturer, Department of Pharmaceutical Chemistry
<b>Mobile Number</b>	9790095279
<b>e-Mail i.d.</b>	gomathiswaminathan@jssuni.edu.in

### Scope, Course Objectives and Course Outcomes

#### Scope:

Biochemistry deals with complete understanding of the molecular levels of the chemical process associated with living cells. The scope of the subject is providing biochemical facts and the principles to understand metabolism of nutrient molecules in physiological and pathological conditions. It is also emphasizing on genetic organization of mammalian genome and hetero & autocatalytic functions of DNA.

**Objectives:** The primary objectives of this course are to

1. Provide the biochemical facts and the principles to the students of pharmacy.
2. Understand the catalytic activity of enzymes and importance of enzymes in diagnosis of diseases and therapeutic agents.
3. Know the metabolic pathways of biomolecules in health and illness (metabolic disorders).
4. Understand the genetic organization of mammalian genome, protein synthesis, replication, mutation and repair mechanism.

**Course Outcomes (COs):** At completion of this course it is expected that the students will be able to

- CO 1: Define the basic concepts in biochemistry.
- CO 2: Apply concepts and knowledge of medicinal biochemistry to clinical scenarios.
- CO 3: Critically interpret how the biomolecules acts on the body and its mechanisms.
- CO 4: Link the biochemical reactions and pathways of several diseases.
- CO 5: Explain the common laboratory values in clinical chemistry.
- CO 6: Use scientific laboratory equipment in order to gather and analyze data on biochemistry.

#### LECTURE PLAN –Abstract

Sessional	No. of Hours of Didactic Lecture	No of Hours of other Activities	Total No. of Lecture Hours
I	23	3	26
II	22	4	26
<b>Total No. of Hours</b>	45	7	52

**I SESSIONAL: 23 Lectures + 3 Activities**

Lecture No.	Lecture Details	Hours
<b>Unit-1</b>		<b>(08)</b>
<b>Biomolecules &amp; Bioenergetics</b>		<b>08</b>
	Orientation to the subject	
1.	Biomolecules, Introduction, classification	
2.	Chemical nature and biological role of carbohydrate, lipids,	
3.	Nucleic acids, amino acids and proteins.	
4.	Bioenergetics, Concept of free energy, endergonic and exergonic reaction	
5.	Relationship between free energy, enthalpy and entropy	
6.	Redox potential. Energy rich compounds, classification	
7.	Biological significances of ATP	
8.	Biological significances of cyclic AMP	
<b>Unit-2</b>		<b>(10)</b>
<b>Carbohydrate metabolism &amp; Biological oxidation</b>		<b>10</b>
1.	Carbohydrate metabolism, Glycolysis – Pathway, energetics and significance	
2.	Citric acid cycle- Pathway, energetics and significance	
3.	HMP shunt and its significance	
4.	Glucose-6-Phosphate dehydrogenase, (G6PD) deficiency	
5.	Glycogen metabolism Pathways and glycogen storage diseases (GSD)	
6.	Gluconeogenesis- Pathway and its significance	
7.	Hormonal regulation of blood glucose level and Diabetes mellitus	
8.	Biological oxidation, Electron transport chain (ETC) and its mechanism.	
9.	Oxidative phosphorylation & its mechanism and substrate	

	Phosphorylation	
10.	Inhibitors ETC and oxidative phosphorylation/Uncouplers	
<b>Unit-3 (10)</b>		
<b>Lipid &amp; Amino acid metabolism</b>		<b>05</b>
1.	Lipid metabolism, $\beta$ -Oxidation of saturated fatty acid (Palmitic acid)	
2.	Formation and utilization of ketone bodies, ketoacidosis	
3.	De novo synthesis of fatty acids (Palmitic acid), Biological significance of cholesterol	
4.	Conversion of cholesterol into bile acids, steroid hormone and vitamin D	
5.	Disorders of lipid metabolism: Hypercholesterolemia, atherosclerosis, fatty liver and obesity.	
Activity1	MCQ Test	
Activity2	MCQ Test	
Activity3	Revision Test	

**II SESSIONAL: 22 Lectures + 4 Activities**

<b>Lecture No.</b>	<b>Lecture Details</b>	<b>Hours</b>
6.	Amino acid metabolism, General reactions of amino acid metabolism: Transamination, deamination & decarboxylation,	<b>05</b>
7.	Urea cycle and its disorders	
8.	Catabolism of phenylalanine and tyrosine and their metabolic disorders (Phenylketonuria, Albinism, alpeptonuria, tyrosinemia)	
9.	Synthesis and significance of biological substances; 5-HT, melatonin, dopamine, noradrenaline, adrenaline	
10.	Catabolism of heme; hyperbilirubinemia and jaundice	
<b>Unit-4</b>		<b>(10)</b>
<b>Nucleic acid metabolism and Genetic information transfer</b>		<b>10</b>
1.	Nucleic acid metabolism and genetic information transfer-Intro	
2.	Biosynthesis of purine and pyrimidine nucleotides	
3.	Catabolism of purine nucleotides	
4.	Hyperuricemia and Gout disease	
5.	Organization of mammalian genome	
6.	Structure of DNA and their functions	
7.	Structure of RNA and their functions	
8.	DNA replication (semi conservative model)	

9.	Transcription or RNA synthesis	
10.	Genetic code, Translation or Protein synthesis and inhibitors	
<b>Unit-5(07)</b>		
<b>Enzymes</b>		<b>07</b>
1.	Enzymes, Introduction, properties, nomenclature	
2.	IUB classification of enzymes	
3	Enzyme kinetics (Michaelis plot, Line Weaver Burke plot)	
4.	Enzyme inhibitors with examples	
5.	Regulation of enzymes: enzyme induction and repression, allosteric enzymes regulation	
6.	Therapeutic and diagnostic applications of enzymes and isoenzymes	
7.	Coenzymes –Structure and biochemical functions	
Activity-1	MCQ Test	
Activity-2	MCQ Test	
Activity-3	MCQ Test	
Activity-4	Revision Test	

**Text Books**

1. Biochemistry by D. Satyanarayan and U.Chakrapani
2. Textbook of Biochemistry by Deb.
3. Textbook of Biochemistry by Rama Rao.

**Reference Books**

1. Principles of Biochemistry by Lehninger.
2. Harper’s Biochemistry by Robert K. Murry, Daryl K. Granner and Victor W. Rodwell.
3. Biochemistry by Stryer.
4. Outlines of Biochemistry by Conn and Stumpf

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<b>Name of the Subject</b>	Pathophysiology
<b>Name of the Faculty</b>	Dr.Swathi SwaroopaB.,Pharm D

<b>Designation, Department</b>	Assistant Professor, Department of Pharmacy Practice
<b>Mobile Number</b>	9629547089
<b>e-Mail i.d.</b>	<a href="mailto:swasasree@jssuni.edu.in">swasasree@jssuni.edu.in</a>

### Scope, Course Objectives and Course Outcomes

**Scope:** Pathophysiology is the study of causes of diseases and reactions of the body to such disease producing causes. This course is designed to impart a thorough knowledge of the relevant aspects of pathology of various conditions with reference to its pharmacological applications, and understanding of basic pathophysiological mechanisms. Hence it will not only help to study the syllabus of pathology, but also to get baseline knowledge required to practice medicine safely, confidently, rationally and effectively.

**Objectives:** The primary objectives of this course are to

1. Discuss the Basic concepts and principles of pathophysiology
2. Describe the etiology and pathogenesis of the selected disease states;
3. Name the signs and symptoms of the diseases; and
4. Mention the complications of the diseases.

**Course Outcomes (COs):** At completion of this course it is expected that the students will be able to

- CO 1: Demonstrate a basic understanding of the ideas and fundamentals of disease
- CO 2: Identify the causes and mechanism of pathological process that result in disease.
- CO 3: Discuss clinical manifestations or signs and symptoms of selected disease processes and health problems
- CO 4: Determine the consequences of the disease process in chronic and acute conditions



**LECTURE PLAN – Abstract**

Sessional	No. of Hours of Didactic Lecture
	Pathophysiology
<b>I</b>	24
<b>II</b>	21
<b>Total No. of Hours</b>	45

**I SESSIONAL: 24 Lectures**

Lecture No.	Lecture Details	Hours
<b>UNIT 1</b>		<b>10 hours</b>
<b>Basic principles of Cell injury and Adaptation</b>		
1.	Introduction, definitions, Homeostasis, Components and Types of Feedback systems, Causes of cellular injury	<b>01</b>
2.	Pathogenesis	<b>02</b>
3.	Morphology of cell injury – Adaptive changes, Cell swelling	<b>01</b>
4.	Intra cellular accumulation, Calcification, Enzyme leakage and Cell Death Acidosis & Alkalosis, Electrolyte imbalance	<b>01</b>
<b>Basic mechanism involved in the process of inflammation and repair</b>		
5.	Introduction, Clinical signs of inflammation, Different types of Inflammation	<b>01</b>
6.	Mechanism of Inflammation – Alteration in vascular permeability and blood flow, migration of WBC's, Mediators of inflammation	<b>02</b>
7.	Basic principles of wound healing in the Skin	<b>01</b>
8.	Pathophysiology of Atherosclerosis	<b>01</b>
<b>UNIT II</b>		<b>10 Hours</b>
<b>Cardiovascular System</b>		
1.	Hypertension	<b>02</b>
2.	Congestive cardiac failure	<b>01</b>
3.	Angina	<b>01</b>
4.	Myocardial Infarction	<b>01</b>
<b>Respiratory system</b>		
5.	Asthma	<b>01</b>
6.	Chronic obstructive airways diseases	<b>01</b>
<b>Renal System</b>		
7.	Acute renal failure	<b>01</b>

8.	Chronic renal failure	<b>02</b>
<b>UNIT III</b>		<b>04 hours</b>
<b>Haematological Diseases</b>		
1.	Iron deficiency & Megaloblastic Anemia	<b>01</b>
2.	Sickle cell anemia, Thalasemia , Hereditary acquired anemia & Hemophilia	<b>01</b>
<b>Endocrine system</b>		
3.	Diabetes	<b>01</b>
4.	Thyroid diseases & Disorders of sex hormones	<b>01</b>

**II SESSIONAL: 21 Lectures**

<b>Lecture No.</b>	<b>Lecture Details</b>	<b>Hours</b>
<b>UNIT III</b>		<b>06 hours</b>
<b>Nervous system</b>		
5.	Epilepsy	<b>01</b>
6.	Parkinson's disease	<b>01</b>
7.	Stroke	<b>01</b>
8.	Depression	<b>01</b>
9.	Schizophrenia	<b>01</b>
10.	Alzheimer's disease, Gastrointestinal system- Peptic Ulcer	<b>01</b>
<b>UNIT IV</b>		<b>8 hours</b>
<b>Gastrointestinal system</b>		
1.	Inflammatory bowel diseases	<b>01</b>
2.	Jaundice, hepatitis (A,B,C,D,E,F)	<b>01</b>
3.	Alcoholic liver disease.	<b>01</b>
<b>Disease of bones and joints</b>		
4.	Rheumatoid arthritis	<b>01</b>
5.	Osteoporosis	<b>01</b>
6.	Gout	<b>01</b>
7.	<b>Principles of cancer- classification, etiology and pathogenesis of cancer</b>	<b>02</b>
<b>UNIT V</b>		<b>07 Hours</b>
<b>Infectious diseases</b>		
1.	Meningitis	<b>01</b>

2.	Typhoid	<b>01</b>
3.	Leprosy	<b>01</b>
4.	Tuberculosis	<b>01</b>
5.	Urinary tract infections	<b>01</b>
6.	Sexually transmitted diseases-AIDS	<b>01</b>
7.	Sexually transmitted diseases-Syphilis & Gonorrhoea	<b>01</b>

### Reference Books

1. Harsh Mohan; Text book of Pathology; 6 th edition; India; Jaypee Publications; 2010.
2. Vinay Kumar, Abul K. Abas, Jon C. Aster; Robbins & Cotran Pathologic Basis of Disease; South Asia edition; India; Elsevier; 2014.
3. Best, Charles Herbert 1899-1978; Taylor, Norman Burke 1885-1972; West, John B (John Burnard); Best and Taylor's Physiological basis of medical practice; 12th ed; united states; William and Wilkins, Baltimore;1991 [1990 printing].
4. Laurence B, Bruce C, Bjorn K.; Goodman Gilman's The Pharmacological Basis of Therapeutics; 12 th edition; New York; McGraw- Hill; 2011.
5. Nicki R. Colledge, Brian R. Walker, Stuart H. Ralston; Davidson's Principles and Practice of Medicine; 21 st edition; London; ELBS/Churchill Livingstone; 2010.
6. Guyton A, John. E Hall; Textbook of Medical Physiology; 12 th edition; WB Saunders Company; 2010.
7. Joseph DiPiro, Robert L. Talbert, Gary Yee, Barbara Wells, L. Michael Posey; Pharmacotherapy: A Pathophysiological Approach; 9th edition; London; McGraw-Hill Medical; 2014.
8. V. Kumar, R. S. Cotran and S. L. Robbins; Basic Pathology; 6 th edition; Philadelphia; WB Saunders Company; 1997.
9. Roger Walker, Clive Edwards; Clinical Pharmacy and Therapeutics; 3 rd edition; London; Churchill Livingstone publication; 2003.

### Recommended Journals

1. The Journal of Pathology. ISSN: 1096-9896 (Online)
2. The American Journal of Pathology. ISSN: 0002-9440
3. Pathology. 1465-3931 (Online)
4. International Journal of Physiology, Pathophysiology and Pharmacology. ISSN: 1944-8171 (Online)
5. Indian Journal of Pathology and Microbiology. ISSN-0377-4929.

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<b>Name of the Subject</b>	Computer Application in Pharmacy
<b>Name of the Faculty</b>	Mr. C Jayakumar. MCA., M.Phil., B.Ed., PGDCA., FCED
<b>Designation, Department</b>	Assistant Professor, Department of Pharmacy Practice
<b>Mobile Number</b>	9443476698
<b>e-Mail i.d.</b>	<a href="mailto:jrccc@jssuni.edu.in">jrccc@jssuni.edu.in</a>

### Scope, Course Objectives and Course Outcomes

**Scope:** This course is designed to impart knowledge and skills necessary for number systems, database management systems, web technologies and the IT tools used in the field of Pharmacy.

**Objectives:** The primary objectives of this course are to

4. Understand the various IT tools available in the field of pharmacy.
5. Apply the knowledge and applications with respect to Databases.
6. Use web technologies to study about the newer innovations in the field of Pharmacy.
7. Know various uses of databases in the field of pharmacy.

**Course Outcomes (COs):** At completion of this course it is expected that the students will be able to

CO 1: Apply the knowledge of mathematics and computing fundamentals to pharmaceutical applications for any given requirement.

CO 2: Design and develop solutions to analyze pharmaceutical problems using computers.

CO 3: Integrate and apply efficiently the contemporary IT tools to all Pharmaceutical related activities.

CO 4: Solve and work with a professional context pertaining to ethics, social, cultural and regulations with regard to Pharmacy.

### LECTURE PLAN –Abstract

Sessional	Number of Hours of Didactic Lecture	No of Hours of other Pedagogy	Total Number of Lecture Hours
<b>I</b>	23	01	24
<b>II</b>	22	01	23
<b>Total No of Hours</b>	45	02	47

**I SESSIONAL: 23 Lectures + 01 Activities**

Lecture No.	Lecture Details	Hours
<b>Unit-I: Number system</b>		<b>(06)</b>
1	Types of Number systems, Introduction	<b>(06)</b>
2	Conversion from one number system to other, simple sums	
3	Binary arithmetic, addition, subtraction , simple sums	
4	Binary multiplication and division, simple sums	
5	Method of complementation, introduction	
6	One's and Two's complement, uses, simple sums	
<b>Unit-I: Concept of Information Systems and Software</b>		<b>(06)</b>
7	Introduction to information gathering, methods and uses	<b>(06)</b>
8	Introduction to requirement and feasibility analysis	
9	Data flow diagrams, applications and uses	
10	Process Flow and its uses	
11	Input and output designs and their applications	
12	Planning and managing the project	
<b>Unit-II: Web technologies</b>		<b>(06)</b>
13	Introduction to HTML	<b>(06)</b>
14	Designing a web page	
15	Examples XML, applications and uses	
16	Introduction to Style sheets, CSS and their applications	
17	Programming languages and their uses	
18	Introduction to web servers and uses	
<b>Unit-II: Introduction to databases</b>		<b>(05)</b>
19	Server Products and their applications	<b>(05)</b>
20	Introduction to pharmacy databases	
21	MS Access and MYSQL, structure and uses	
22	Pharmacy databases and their types	

23	Use of pharmacy databases	
<b>Activity - 1</b>	Online Databases – Hands on activity	

**II SESSIONAL: 22 Lectures + 01 Activities**

Lecture No.	Lecture Details	Hours
<b>Unit-III: Applications of Computers in pharmacy</b>		<b>(09)</b>
24	Introduction to drug information storage and retrieval	<b>(09)</b>
25	Pharmacokinetics and its applications	
26	Mathematical model in drug design	
27	Applications of computers in hospital and clinical pharmacy	
28	EP systems and their applications	
29	Barcode medicine identification and automated dispensing of drugs	
30	Importance of mobile technology and adherence monitoring	
31	Different types of diagnosing systems and their advantages	
32	Patient monitoring and Pharma info systems	
<b>Activity – 2</b>	Information system – hands on activity online	
<b>Unit-IV: Bioinformatics</b>		<b>(06)</b>
33	Introduction to bioinformatics,uses	<b>(06)</b>
34	Bioinformatics databases	
35	Introduction to vaccine discovery, impact and new trends	
36	Future trends in Bioinformatics	
37	Improvement and new trends in vaccine discovery	
38	Future trends in bioinformatics	
<b>Unit-V : Computers in data analysis and preclinical development</b>		<b>(07)</b>
39	Chromatographic data analysis	<b>(07)</b>
40	Uses, trends and innovations	
41	LIMS , introduction	
42	Uses, trends and innovations of LIMS	
43	TIMS , introduction	
44	Methods and uses of TIMS	
45	New methods and trends of TIMS	

**Reference Books**

1. Computer Application in Pharmacy – William E.Fassett –Lea and Febiger, 600 South 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, Daryagani, New Delhi – 110002.

<b>Name of the Subject</b>	Environmental Sciences (Theory)
<b>Name of the Faculty</b>	Mr. G. Ramu

<b>Designation, Department</b>	Lecturer, Department of Pharmacognosy
<b>Mobile Number</b>	9972317434
<b>e-Mail i.d.</b>	ramupharmu@jssuni.edu.in

### Scope, Course Objectives and Course Outcomes

**Scope:** Environmental Sciences is the scientific study of the environmental system and the status of its inherent or induced changes on organisms. It includes not only the study of physical and biological characters of the environment but also the social and cultural factors and the impact of man on environment. Environmental Studies as an academic field is the product of efforts to understand and respond to the variety of changes humans have wrought in our world. Students in Environmental Studies are motivated by concern for welfare of the many human and non-human communities that shape this planet.

**Objectives:** *Our graduates should be able to*

- recognize the interconnectedness of multiple factors in environmental challenges
- engage constructively with diverse forms of knowledge and experience
- recognize and apply methodological approaches of the social sciences, natural sciences, and humanities
- work productively with those within and beyond the academy on interdisciplinary collaborative projects
- communicate clearly and competently matters of environmental concern and understanding to a variety of audiences in appropriate forms

**Course Outcomes (COs):** Upon completion of the course the student shall be able to:

CO 1: Create the awareness about environmental problems among learners.

CO 2: Impart basic knowledge about the environment and its allied problems.

CO 3: Develop an attitude of concern for the environment.

CO 4: Motivate learner to participate in environment protection and environment improvement.

CO 5: Acquire skills to help the concerned individuals in identifying and solving environmental problems.

CO 6: Strive to attain harmony with Nature.



**LECTURE PLAN – Abstract**

Sessional	No. of Hours of Didactic Lecture	No of Hours of other Activities	Total No. of Lecture Hours
<b>I</b>	15	3	18
<b>II</b>	15	3	18
<b>Total No. of Hours</b>	30	06	36

**I SESSIONAL : 15 Lectures + 3 Activities**

Lecture No.	Lecture Details	Hours
<b>Environmental Sciences</b>		<b>15</b>
<b>Unit- 1 Multidisciplinary nature of Environmental sciences</b>		<b>10</b>
	Orientation to the subject	
11.	Natural resources	
12.	Natural resources and associated problems	
13.	Forest resources	
14.	Continue	
15.	Water resources	
16.	Mineral resources	
17.	Food resources	
18.	Energy resources	
19.	Land resources	
20.	Role of an individual in conservation of natural resources	
<b>Unit-2 : Ecosystems</b>		<b>05</b>
1.	Introduction and Concept of an ecosystem	
2.	Structure, function of ecosystem with characteristics	
3.	Forest ecosystem	
4.	Continue	
5.	Desert ecosystem	
Activity 1	Group Discussion	
Activity 2	Test	
Activity 3	I sessional Syllabus discussion	

**II SESSIONAL : 15 Lectures + 03 Activities**

Lecture No.	Lecture Details	Hours
<b>Unit-2: Ecosystems</b>		<b>05</b>
9.	Grassland ecosystems	
10.	Continue	
11.	Aquatic ecosystems	
12.	Continue	
13.	Continue	
<b>Unit-3: Environmental pollution</b>		<b>10</b>
1.	Air Pollution	
2.	Types and characteristics	
3.	Impact of air pollution on environment	
4.	Continue	
5.	Water pollution	
6.	Types and characteristics	
7.	Impact of water pollution on environment	
8.	Soil pollution	
9.	Impact on soil pollution on environment	
10.	Overall conservation of environment and role of humans in saving the environment. Clean India.	
Activity 1	Group Discussion	
Activity 2	Test	
Activity 3	II sessional Syllabus discussion	

**Recommended Books (Latest edition):**

1. Y.K. Sing, Environmental Science, New Age International Pvt, Publishers, Bangalore
2. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
3. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad – 380 013, India,
4. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
5. Clark R.S., Marine Pollution, Clarendon Press Oxford
6. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumbai, 1196p
7. De A.K., Environmental Chemistry, Wiley Eastern Ltd. 8. Down of Earth, Centre for Science and Environment

**4. TIME TABLE**



**JSS Academy of Higher Education & Research, Mysuru**  
 (Deemed to be University, Accredited 'A+' Grade by NAAC)  
**JSS College of Pharmacy, Rocklands, Ooty – 643 001**  
 (An ISO 9001-2015 Certified Institution)

**I B.Pharm-I Semester Time Table (AY: 2021-22)**

Day	9-10 am	10-11 am	11-12 noon	12 -1 pm	1-2 pm	2-3 pm	3-4 pm	4-5 pm
Monday	PC (Tu) (GNK)	HAP-I (T) (AJ)	PA (T) (BB)	PIC (T) (BG)	LUNCH BREAK	Batch I- HAP-I (AJ), Batch II- PIC(BG), Batch III- PA(BB), Batch IV- PC(GNK),Batch V- (Library)		
Tuesday	RB/RM (T) (LP/CJ)	HAP-I (T) (AJ)	PIC (T) (BG)	PA (T) (BB)		Batch I- (Library),Batch II- HAP-I(AJ), Batch III- PIC(BG), Batch IV- PA(BB), Batch V- PC(GNK)		
Wednesday	HAP-I (Tu) (AJ)	HAP-I (T) (AJ)	PC (T) (GNK)	PIC (T) (BG)		Batch I- PC(GNK), Batch II- Library , Batch III- HAP I(AJ), Batch IV- PIC(BG), Batch V-PA(BB)		
Thursday	PIC (Tu) (BG)	PC (T) (GNK)	PA (T) (BB)	RB/RM (T) (LP/CJ)		Batch I- PA(BB), Batch II- PC(GNK), Batch III- Library, Batch IV- HAP-I (AJ),Batch V- PIC(BG)		
Friday	PA (Tu) (BB)	PC (T) (GNK)	RB (P) (LP)			Batch I-PIC(BG), Batch II- PA(BB), Batch III- PC(GNK), Batch IV- (Library),Batch V- HAP-I (AJ)		
Saturday	CS(T) (NF)	CS(T) (NF)	CS(P) (NF)			Library/Sports		

T- Theory, P- Practical, Tu-Tutorial

**Subject-in-Charge:**

- |  |   |
|--|---|
| 1. Human Anatomy and Physiology-I (HAP-I)          | - Dr. A. Justin [AJ]                                    |
| 2. Pharmaceutics (PC)                              | - Dr. G.N.K. Ganesh [GNK]                               |
| 3. Pharmaceutical Inorganic Chemistry (PIC)        | - Dr. B. Gowramma [BG]                                  |
| 4. Pharmaceutical Analysis (PA)                    | - Dr. B. Babu [BB]                                      |
| 5. Remedial Biology / Remedial Mathematics (RB/RM) | - Dr L. Priyanka Dwarampudi [LP]/ Mr. C. Jayakumar [CJ] |
| 6. Communication skills (CS)                       | - New Faculty [NF]                                      |

**Class-in-Charge:** Dr. A. Justin, Associate Professor, Dept. of Pharmacology [justin@jssuni.edu.in, Mob: 9942932150]



**JSS Academy of Higher Education & Research, Mysuru**  
(Deemed to be University, Accredited 'A+' Grade by NAAC)  
**JSS College of Pharmacy, Rocklands, Ooty – 643 001**  
(An ISO 9001-2015 Certified Institution)

**I B.Pharm-II Semester Time Table (AY: 2021-22)**

Day	9-10 am	10-11 am	11-12noon	12 -1 pm	1-2 pm	2-3 pm	3-4 pm	4-5 pm
Monday	--	HAP-II (T) [AJ]	CAP (T) [CJ]	POC-I (T) [BG]	<b>LUNCH BREAK</b>	Batch I- HAP-II (AJ), Batch II- POC-I (BG), Batch III- BIOCHEM (SNM), Batch IV- CAP (CJ), Batch V- Library		
Tuesday	--	HAP-II (T) [AJ]	BIOCHEM (T) [SG]	POC-I (T) [BG]		Batch I- Library, Batch II- HAP-II (AJ), Batch III- POC-I (BG), Batch IV- BIOCHEM (SNM), Batch V- CAP (CJ)		
Wednesday	--	HAP-II (T) [AJ]	CAP (T) [CJ]	BIOCHEM (T) [SG]		Batch I- CAP (CJ), Batch II- Library, Batch III- HAP-II (AJ), Batch IV- POC-I (BG), Batch V- BIOCHEM (JSK)		
Thursday	--	PP (T) [SS]	ES (T) [GR]	--		Batch I- BIOCHEM (JSK), Batch II- CAP (CJ), Batch III- Library, Batch IV- HAP-II (AJ), Batch V- POC-I (BG)		
Friday	--	PP (T) [SS]	POC-I (T) [BG]	ES (T) [GR]		Batch I- POC-I (BG), Batch II- BIOCHEM (JSK), Batch III- CAP (CJ), Batch IV- Library, Batch V- HAP-II (AJ)		
Saturday	--	PP (T) [SS]	BIOCHEM (T) [SG]	--		Library/Sports		

T- Theory, P- Practical, Tu-Tutorial

**Subject-in-Charges:**

- Human Anatomy and Physiology-II (**HAP-II**)
- Biochemistry (**BIOCHEM**)
- Pharmaceutical Organic Chemistry –I (**POC-I**)
- Pathophysiology (**PP**)
- Computer Applications in Pharmacy (**CAP**)
- Environmental Sciences (**ES**)

- Dr. A. Justin [AJ]
- Theory - Dr. S. Gomathi [SG], Practical Meyyanathan [SNM] / Mr. JSK. Nagarajan [JSK]
- Dr. B. Gowamma [BG]
- Dr. Swathi. Swaroopa [SS]
- Mr. C. Jayakumar [CJ]
- Mr. G. Ramu [GR]

**Class-in-Charge:** Dr. A. Justin, Associate Professor, Dept. of Pharmacology [justin@jssuni.edu.in, Mob: 9942932150]

## **6. STUDENT SUPPORT SERVICES**

Student Services	Person/s Responsible	Responsibilities
Principal	Dr. Dhanabal S Palaniswamy	<ul style="list-style-type: none"> <li>❖ Making decisions on behalf of the faculty, staff, students and alumni to achieve the stated mission and vision of the college.</li> <li>❖ Effectively organizing and allocating the human and financial resources of the college to achieve the stated mission and vision of the college.</li> <li>❖ Implementing and enforcing the policies of the College and the university.</li> <li>❖ Representing and advocating on behalf of the faculty, staff, students and alumni to the university.</li> </ul>
Vice Principal	Dr. Afzal A Mohammed	<ul style="list-style-type: none"> <li>❖ Supervision, coordination and delivery of teaching programs</li> <li>❖ Management of programs to improve the knowledge, skill and attitude of staff</li> <li>❖ Responsibility for general discipline matters of students</li> <li>❖ Centre for continuous learning for professional excellence (CCLPE)</li> <li>❖ Contribute to the overall management of the college</li> </ul>
Administrative Officer	Mr. Basavalinga Deveru H K	<ul style="list-style-type: none"> <li>❖ Coordinating a range of functions, such as finance, human resources and other support areas that contributes significantly to the management function within the college.</li> <li>❖ Managing the delivery of a particular service or function (e.g. finance, library, human resources, facilities)</li> <li>❖ Performing routine administrative activities</li> <li>❖ Providing basic physical and emotional care for students</li> <li>❖ Assisting with coordination and planning of student routines</li> <li>❖ Providing routine customer service tasks such as reception and providing straightforward advice about the college</li> <li>❖ Providing routine support tasks with respect to college maintenance</li> <li>❖ Coordinating the day to day routine operational requirements of a college office</li> <li>❖ Assuming responsibilities for the general cleanliness and maintenance of the college</li> </ul>

## **7. COMMITTEES FOR VARIOUS ACTIVITIES**



**Committees constituted for various activities (AY 2021-22)**

Sl. No.	Committee	Name of the Staff
1	College Council	Principal (Chairman)
		Dr. S N Meyyanathan, Member Secretary
		All HOD's
		Dr. Arun K P, IQAC and Academic Coordinator
		Dr. Satya Narayana Reddy, Research Coordinator
M.Pharm Program Committee		Dr. N. Krishnaveni (Coordinator) All HOD's
		<b>Student Members</b> Student representative of I & II M.Pharm
B.Pharm Program Committee		Dr.S.Jubie (Coordinator) I - IV B.Pharm Class Teachers
		<b>Student members</b> Student representative of I - IV B.Pharm
Pharm.D Program Committee		Dr. K P Arun (Coordinator) I - VI Pharm D Class Teachers
		<b>Student members</b> Student representatives of I - VI Pharm.D
D.Pharm Program Committee		Dr. Anand Vijaykumar, Coordinator
		<b>Student members</b> Student representatives of I & II D.Pharm
2	Academic Coordinator (AC)	Dr.KP.Arun
3	Academic Monitoring Committee (AMC)	Dr.S.P.Dhanabal, Chairman Dr.K.P.Arun, AC, Member Secretary Dr.N.Krishnaveni, PG coordinator Dr.S.Jubie, B.Pharm coordinator Dr.Anand V Kumar, D.Pharm coordinator
4	Examination Cell	Principal (Chief Superintendent)
		Vice-Principal (Dy. Chief Superintendent)
		Dr. R Kalirajan (Coordinator)
		Dr.B. Babu
		Dr.Priyanka
		Dr.R.Vadivelan
		Dr.S.Diwakar

		Dr.Srikanth Jupudi
		Ms.S.Priyadharshini
		Mr. R. Arun
		Mrs. Gomathi Swaminathan
<b>5</b>	<b>Library Committee</b>	Dr. S Ponnusankar (Coordinator)
		Mr. C Jayakumar
		All HODs
<b>6</b>	<b>Sports Committee</b>	Mr.Sivaprasad, PT Teacher (Coordinator)
		Mr. B Shivaramakrishnan
		Dr. M R Jeyaprakash
		Dr.R.Vadivelan
		Dr. Gomathy Subramaniam
		Dr.Aneena Suresh
<b>7</b>	<b>Purchase</b>	Principal (Chairman)
		Dr. Afzal Azam, Vice-Principal
		All HoDs
		Mr. Basavalingadevaru H K, A O I/c
		Mr. Umesh, Stores i/c
<b>8</b>	<b>Research Promotion Committee</b>	Principal (Chairman)
		Dr. Satyanarayana Reddy, Research Coordinator
		All HoD's
		Dr.Vasanthraj
		Dr.K.Shankar
		IQAC Coordinator (External Member)
<b>9</b>	<b>Higher Education, Competitive Examinations/ Personality Development Cell, English Coaching</b>	Dr. A Justin (Coordinator)
		Dr. Rajesh Kumar R
		Dr.K.Shankar
		Dr.J.Jayaram
		Mr.R Arun
		Dr.Mohasina Hyder
<b>10</b>	<b>National Pharmacy Week Celebrations</b>	IPA NLB President, Secretary, Treasurer and all EC Members
<b>11</b>	<b>Industry Institution Interaction Cell Industrial Training &amp; Practice School</b>	Dr. K Gowthamarajan (IIS)
		Dr. T K Praveen (Industrial training)
		Dr.N.Jawaher (Practice school)
		Mr. J S K Nagarajan (Coordinator)

12	Placement	Dr.N.Jawahar
		Dr.Vasanthraj
13	Magazine (Almanac / Pharmasaga / AAA function)	Dr.Satya, Dr.KP.Arun, Dr.Divakar, Mr.Allin Bose, Dr.Srikanth Jubidi (ALMANAC) All Staff of Pharm. Analysis & Pharmacognosy (Pharmasaga & AAA)
14	Website Maintenance	Mr C Jayakumar
		Mr.Gowtham, Computer Analyst
15	National Service Scheme (NSS)	Mr. B Babu, (Coordinator- NSS)
		Dr. V Senthil
		Dr.Mohsina Hyder
16	Hostel Review	Principal & Chief Warden (Chairman)
		Vice-Principal & Deputy Chief Warden
		Mr. Basavalingadevaru H K, A O I/c, Resident Warden – Boys & Girls Hostel
		Dr. K P Arun, Warden, Boy's Hostel
		Dr. N Krishnaveni, Warden, Girl's Hostel
17	Grievance Redressal	Dr. S Ponnusankar, Chairperson
		Dr. Md Afzal Azam-Co-Chair
		Dr. K P Arun, Member Secretary
		Dr. N Krishnaveni, Member
		Dr.K.Gowthamrajan
		Dr. A Justin, Member
		Mr. S Saravanan, Member
18	International Students Cell	Dr.R.Vadivelan, Coordinator
		Ms.Roja (Office Admission section)
19	Anti-Ragging / Disciplinary	Dr. S P Dhanabal, Chairman
		Dy. Superintendent of Police, Ooty Town (Ph : 0423-2223811)
		Inspector of Police, B1 Police Station (Ph : 0423-2223808)
		Dr. Afzal Azam, Vice-Principal
		Mr. Basavalingadevaru H K, AO
		Dr. N Krishnaveni
		Dr. GNK. Ganesh
		Dr. K P Arun
		Dr. S Gomathy Subramanian

		Dr. JSK. Nagarajan
20	Anti-Ragging Squad	Dr. KP. Arun, Chairperson
		Dr. V. Senthil, Member
		Dr. N. Krishnaveni, Member
		Dr. Anand Vijaya Kumar, Member
		Dr. GNK. Ganesh, Member
		Dr. B. Gowramma, Member
21	Internal Compliance Committee	Dr. B. Gowramma, Chairperson
		Dr. T. K. Praveen, Co-Chair
		Dr. N. Krishnaveni, Member Secretary
		Ms. B.S. Roopa, Member
		Inspector – B1 Police Station, Ooty, Member
		Dr. Keerthana, Member
		Mr. Narayanan, NGO Member
22	ISO Certification	Mr. JSK Nagarajan, Management Representative
23	Rotaract Club	Dr. S. Ponnusankar (Coordinator)
		Ms. S. Priyadarshini
24	Smart Campus	Mr. B. Shivramkrishnan
		Dr. J. Jayaram
25	Spektrum Wall Magazine	Mr. B. Shivaramkrishnan (Coordinator)
		Mr. Saravanan
26	Internal Quality Assurance Cell	Dr. K.P. Arun (Coordinator)
		Dr. Satyanarayana Reddy (Joint Coordinator)
		Mr. Allin Bose
27	Statutory Approvals	Dr. P R Anand Vijayakumar
		Dr. S Jubie
28	Red Cross Society & Blood Donation	Dr. G. Ramu (Program Officer)
		Dr. Keerthana
		Dr. Deepalakshmi
29	PG Diploma (Coordinator)	Dr. R. Suresh Kumar
30	Certificate Course (Coordinator)	Dr. N Jawahar
31	Program Coordinators D.Pharm M.Pharm Pharm D M.Pharm	Dr. Anand Vijaya kumar
		Dr. S Jubie
		Dr. K P Arun
		Dr. N. Krishnaveni

32	<b>Class Teachers D.Pharm</b>	I D.Pharm : Dr Gomathy Subramaniam II D.Pharm : Dr Anand Vijayakumar
	<b>B.Pharm</b>	I B.Pharm : Dr A Justin II B.Pharm : Dr Karri VVS Narayana Reddy III B.Pharm : Dr V Senthil IV B.Pharm : Dr N Jawahar
	<b>Pharm D</b>	I Pharm D : Mr J.Saravanan II Pharm D : Ms M Deepalakshmi III Pharm D : Dr G K Sadagoban IV Pharm D : Dr B Swathi Swaroopaa V Pharm D : Dr Roopa B S VI Pharm D : Dr S Ponnusankar
33	<b>Student Services</b>	Dr.M.R.Jayaprakash Dr.Deepalakshmi Dr.S.Jubie Dr.Priyanka
34	<b>Student Counselling</b>	Dr.Gowthamrajan, Member Secretary Dr.K.P.Arun Dr.N.Krishnaveni
35	<b>External guests/students visit Coordination</b>	Dr.R.Sureshkumar Dr.R. Vadivelan Dr.Rajeshkumar Ms.S.Priyadharshini
36	<b>Covid 19 Monitoring Committee (CMC)</b>	Dr.S.N.Meyyanathan Dr.Roopaa Dr.R. Vadivelan Dr.Gomathy Shanish Mr.Mahesh, Asst. warden Mr.K.N.Shivakumar, Asst. warden

**9. RESPONSIBILITIES OF EACH  
COMMITTEE**

### **Education/Admission cell:**

- ❖ The cell is responsible to create awareness about the pharmacy education and profession.
- ❖ The team will be actively participating in two-way communication between aspiring students, who would wish to take up pharmacy curriculum after 10+2.
- ❖ Provides complete information package about the various courses offered by the institution, fee structure and admission process.
- ❖ This cell facilitates and assists the university officials for the smooth and fair conduct of entrance tests for getting the admission into various UG and PG programs and in the selection process.

### **Record Maintenance**

- ❖ Fee collection and documents.
- ❖ Maintaining all the records of students, which include the completed application, academic information, transcripts, and others.
- ❖ Maintaining confidentiality of student educational records.

### **Residential facility**

- ❖ To frame policy for the smooth functioning of the hostels, messes and other facilities within the hostel.
- ❖ To ensure that no ragging takes place in the hostels and maintain a ragging free hostels.
- ❖ To plan for upgradation of facilities in the hostels.
- ❖ To ensure maintenance of discipline in and around the hostel.
- ❖ Any other responsibility assigned by the principal/higher authority.

### **Health Services**

- ❖ To ensure the access to the health care facilities as per the requirements.
- ❖ To facilitate the access to the District Head Quarters Public Hospital, Ooty for free health care checkup and free medications.

### **Institutional Hostel Review Committee**

- ❖ They shall collectively carry out hostel rounds during the working hours of the institution and if necessary even after the working hours to ensure that the student's amenities, dining, and mess needs and discipline are maintained.
- ❖ They shall review hostel income and expenditure every month and give report to the principal and also the warden.
- ❖ They shall carry out random stock verification, and also annual verification of all records, stocks, etc.,
- ❖ They shall periodically assess the quality of food.
- ❖ Purchase made for the various provisions and vegetables for the hostel shall be checked by them with regard to the quantity and quality of the material delivered to the hostel.
- ❖ They shall receive the grievances, complaints, if any, regard to the ragging, theft, etc., if any, from the students and redress them to the extent possible.

### **Teaching & Learning**

- ❖ Students made aware of curriculum, syllabi, method of evaluation through orientation programme in the beginning of the year. Academic calendar of events (course-wise and subject wise for UG and PG courses), feedback and academic planning is given to the students.
- ❖ Unitized teaching plan to ensure proper teaching-learning transaction and continuous evaluation in the form of internal assessment examinations.
- ❖ Teaching-learning (TL) strategies include practical, field work, project work, student seminars, group discussions, case studies, industrial/field visits, in-plant training, along with didactic teaching.
- ❖ ICT enabled TL process (Computers, Internet, LCD, Models, etc.).
- ❖ The learner centric approach ensured through student seminars, assignments, project work, visits, in-house training etc.
- ❖ Faculty function as academic counselors and mentors.
- ❖ Continuous internal assessment that is shared with students to ensure proper understanding of the subject and clarification of doubts. Students are encouraged to use extensively the library resources, computers and e-material in the TL process.

### **Mentoring**

- ❖ Monitor, evaluate and report student progress in key learning areas.
- ❖ Implement strategies to achieve targets related to student learning outcomes.
- ❖ Maintain records of class attendance and recording student progress.
- ❖ Supervising a range of student activities including support and welfare programs and contributing to a range of co-curricular activities.
- ❖ To send sessional marks statement and attendance to the parents after completion of each sessional.
- ❖ Maintain the student profile form which consists of bio - data of students, their residential and permanent addresses, their academic grades.
- ❖ Any problem related to the particular student is attended by the respective Batch teacher which includes counseling the students.

### **Examination section**

- ❖ Each of the college's examinations falls under the responsibility of an examination coordinator.
- ❖ Adhere to all rules and regulations pertaining to the conduct of examinations.
- ❖ Adhere to timelines for the development, conduct and review of examinations.
- ❖ To announce the date of sessional examination well in advance to the students and staff.
- ❖ To collect the question paper from the individual subject teachers and maintain the confidentiality of the same.
- ❖ To assign the invigilation duty to the staff and ensure the smooth conducting of the exam.
- ❖ To check the seating arrangement of the students in the examination hall

### **Extracurricular activities**

#### **Sports:**

- ❖ Represent the views and interests of students on sporting matters to the University, locally and nationally.
- ❖ Encourage students to participate in recreational, intramural, and performance sport along with fitness



and wellbeing programmes.

- ❖ Organize and support meetings of representatives of all classes.
- ❖ To develop and promote all areas of sport provided by the college.
- ❖ Represent students of the university to local and national bodies and organizing campaigns in support of student to promote health and social awareness programmes.
- ❖ To identify the student coordinators for individual sport events well in advance for the smooth conduction of events.
- ❖ To carry out Annual athletic meet for two days in an academic year.
- ❖ The schedule of events is prepared and communicated to all staff and students by displaying on the notice board.

#### **Cultural & Literary:**

- ❖ A team consisting of principal, national pharmacy week celebrations (NPWC) committee members and staff coordinators will decide the schedule, events, rules and regulations of the NPWC.
- ❖ To ensure the commencement of schedule of NPWC well in advance.
- ❖ To prepare the list of participants and event schedules in association with student representatives.
- ❖ Identify the judges for each event in advance.
- ❖ Encourage students to participate in inter-collegiate cultural events and coordinate such programs.
- ❖ Ensuring the discipline of the students during cultural program.

#### **National Service Scheme (NSS)**

- ❖ To provide NSS orientation to the students for social service scheme.
- ❖ To encourage the students for participation in various social service schemes.
- ❖ To conduct NSS regular activities as per the NSS and university guidelines.
- ❖ To organize NSS annual special camp in a selected village.
- ❖ To conduct rallies for promotion of public health awareness.

#### **Placement Cell**

- ❖ To look after the training and placement activities of students.
- ❖ To have close liaison with industry for placement of students.
- ❖ To work in consultation with Coordinator, Industry Institution Interaction Cell (IIIC) for organizing lectures by the professionals from industry.
- ❖ To collect feedback from the companies coming for placement.
- ❖ Arrange Training programmes for soft skills and for interview facing skills for the students using institutional and external expertise.
- ❖ To organize the entrepreneurship workshops.
- ❖ Preparing the 'Placement Brochure' with the curriculum-vitae of outgoing students of all the programs.

#### **Industrial Training**

- ❖ Liaising with pharmaceutical industries for the training of B. Pharm Students in III year
- ❖ Communicating and arranging industrial visits for the students
- ❖ Maintaining all the track records of industrial training and visits

#### **Student Counseling**

- ❖ Providing counseling for the needy students on both professional and personal related aspects.

- ❖ Discuss with the mentors of individual students prior to counseling to get the background information about the student.
- ❖ Providing counseling to the parents on various issues related to their wards whenever necessary.
- ❖ Arranging professional counselors based on the need to counsel students and or parents.

**Higher Education, Competitive Exams / Personality Development Program / English Coaching**

- ❖ Coordinating the personality development programs.
- ❖ Coordinating the coaching classes for competitive exams for higher studies with the assistance of internal and external subject experts.
- ❖ Coordinating English language coaching for the students especially who are from Non-English speaking countries.

**International Students Services Cell**

- ❖ Facilitating the legal procedures and immigration issues of international students.
- ❖ Liaising with the district police and administration for the verification process and VISA proceedings.
- ❖ Providing orientation towards the socio-cultural aspects of the country and college to avoid conflicts during the period of their stay.

**Anti-Sexual Harassment Committee**

- ❖ Addressing the issues related to sexual harassment.
- ❖ Recommending for necessary legal/ administrative actions against the persons if proven guilty.

**Social Discrimination Prevention Committee**

- ❖ Addressing the issues related to social discrimination.
- ❖ Recommending for necessary legal/ administrative actions against the persons if proven guilty.

**Spektrum:**

**Wall Magazine Committee**

- ❖ Coordinating with the student committees to explore the talents of students.
- ❖ Updating the wall magazine periodically and monitoring the performances of the students.

**ANTI – RAGGING COMMITTEE**

As per the decision of the Hon'ble Supreme Court of India in writ petition No. (C) 656 / 1998, "RAGGING IS PROHIBITED". If an incident of ragging comes to the notice of the authority concerned, the accused student(s) will be given an opportunity to explain and if the explanation is not satisfactory the authority will expel him / her from the institution. In this view, an anti – ragging committee is constituted in our institution (as per the regulation notified by AICTE, New Delhi vide F. NO. 37-3/Legal/IACTE/2009 dated July 1, 2009) with the following members. The details of their names and telephone numbers are given here for your assistance. In case of any untoward incidents pertaining to ragging must be immediately brought to the knowledge of the members to curb ragging at its inception stage itself.

**Anti-Ragging / Disciplinary Committee**

Sl.No.	Name of the Member	Designation	Contact No.
1	Dr. S P Dhanabal, Chairman	Chairman	9489044577
2	Dy. Superintendent of Police, Ooty Town	Member	0423-2223811
3	Inspector of Police, B1 Police Station	Member	0423-2223808
4	Dr. Afzal Azam, Vice-Principal	Member	9486687029
5	Mr. Basavalingadevaru H K, AO	Member	9489044575
6	Dr. N Krishnaveni	Member	9442083447
7	Dr. GNK. Ganesh	Member	9442191918
8	Dr. K P Arun	Member	9994934663
9	Dr. S Gomathy Subramanian	Member	9790095279
10	Dr. JSK. Nagarajan	Member	9443149945
<b>Anti-Ragging Squad</b>			
1	Dr. KP. Arun	Chairperson	9994934663
2	Dr. V. Senthil	Member	9842650602
3	Dr. N. Krishnaveni	Member	9442083447
4	Dr. Anand Vijaya Kumar	Member	9443181573
5	Dr. GNK. Ganesh	Member	9442191918
6	Dr. B. Gowramma	Member	9442111172

**SAY NO TO RAGGING – MAKE OUR CAMPUS RAGGING FREE**