

**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

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 Content:**

**Unit-I**

**10 hours**

**a) Introduction to human body**

**3 hours**

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

**b) Cellular level of organization**

**3 hours**

Structure and functions of cell, transport across cell membrane, cell division, cell junctions. General principles of cell communication, intracellular signalling pathway activation by extracellular signal

molecule, Forms of intracellular signalling: a) Contact-dependent b) Paracrine c) Synaptic d) Endocrine

**c) Tissue level of organization**

**4 hours**

Classification of tissues, structure, location and functions of epithelial,

Principal

Pravara Rural College of Pharmacy  
Pravaranagar, A/p. Loni-413736

	muscular and nervous and connective tissues.	10 hours
<b>Unit -II</b>		4 hours
	<b>a) Integumentary system</b> Structure and functions of skin	4 hours
	<b>b) Skeletal system</b> 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.	2 hours
	<b>c) Joints</b> Structural and functional classification, types of joints movements and its articulation	10 hours
<b>Unit-III</b>		7 hours
	<b>a) Body fluids and blood</b> Body fluids, composition and functions of blood, blood cells, hemopoiesis, formation of hemoglobin, anaemia, mechanisms of coagulation, blood grouping, Rh factors, transfusion, its significance and disorders of blood, Reticulo endothelial system.	3 hours
	<b>b) Lymphatic system</b> Lymphatic organs and tissues, lymphatic vessels, lymph circulation and functions of lymphatic system.	08 hours
<b>Unit-IV</b>		3 Hours
	<b>a) Peripheral nervous system:</b> Classification of peripheral nervous system: Structure and functions of sympathetic and parasympathetic nervous system. Origin and functions of spinal and cranial nerves.	5 Hours
	<b>b) Special senses</b> Structure and functions of eye, ear, nose, tongue, and their disorders.	07 hours
<b>Unit-V</b>		
	<b>Cardiovascular system</b> Heart – anatomy of heart, blood circulation, blood vessels, structure and functions of artery, vein and capillaries, elements of conduction system of heart and heart beat, its regulation by autonomic nervous system, cardiac output, cardiac cycle. Regulation of blood pressure, pulse, electrocardiogram and disorders of heart.	

### Recommended Books:

1. Chatterjee, C.C., Human Physiology. Medical Allied Agency, Kolkata.
2. Ganong, W.F., Review of Medical Physiology. Prentice-Hall International, London.
3. Guyton, A.C., Textbook of Medical Physiology. W. B. Saunders Co., Philadelphia, USA.
4. Tortora, G.J. and Grabowski, S.R., 2005. Principals of Anatomy and Physiology. Harper Collins College Publishers, New York.
5. Vander, A.J., Sherman, J.H. and Luciano, D.S., Human Physiology. McGraw-Hill Publishing Co., USA.
6. Waugh, A. and Grant, A., Ross and Wilson's Anatomy and Physiology in Health and Illness. Churchill-Livingstone, London.
7. West, J.B., Best and Taylor's Physiological Basis of Medical Practice. Williams and Wilkins, Baltimore, USA.
8. Warwick, R. and Williams, P., Gray's Anatomy. Longman, London.
9. Chaudhari S K. Concise Medical Physiology. New Central Book Agency (P) Ltd., Calcutta.
10. Godkar P.B and Godkar D.P., Textbook of Medical Laboratory Technology. Bhalani Publishing House, Mumbai.
11. Joshi V.D. Practical Physiology. Vora Medical Publications, Mumbai.
12. DiFiore-Mariano S.H., Atlas of Human Histology. Lea and Febiger, Philadelphia.
13. Garg K., Bahel I. and Kaul M., A Textbook of Histology. CBS Publishers and Distributors, New Delhi.
14. Goyal, R.K., Patel, N.M. and Shah, S.A., Practical Anatomy, Physiology and Biochemistry. B. S. Shah Prakashan, Ahmedabad.
15. Ranade, V.G., Joshi, P.N. and Pradhan, S., Textbook of Practical Physiology. Pune Vidyarthi Griha Prakashan, Pune.
16. Singh, I., BD., Chaurasia's Human Anatomy. CBS Publisher and Distributors, New Delhi.
17. Singh, I., Textbook of Human Histology. Jaypee brothers Medical Publishers, New Delhi.
18. Mukherjee, K.L., Medical Laboratory Technology. Tata McGraw Hill Publishing Company Ltd. New Delhi.
19. Beck, W.S., Human Design: Molecular, Cellular and Systemic Physiology. Harcourt Brace Jovanovich Inc. New York.
20. Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypee Brothers medical publishers, New Delhi.
21. Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York
22. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co, Riverview, MI USA
23. Textbook of Human Histology by Inderbir Singh, Jaypee brother's medical publishers, New Delhi.
24. Textbook of Practical Physiology by C.L. Ghai, Jaypee brother's medical publishers, New Delhi.



- 6) A R Paradkar, Introduction to Pharmaceutical Engineering, 10<sup>th</sup> edition, 2007, Published by Nirali Prakashan, Pune.
- 7) Atmaram Pawar and R S Gaud, Modern Dispensing Pharmacy, 3<sup>rd</sup> edition reprint, 2010, Career Publications.
- 8) Indian Pharmacopoeia, 2010, Volumes I, II & III, Published by The Indian Pharmacopoeia Commission, Ghaziabad, Government of India, Ministry of Health & Family Welfare.
- 9) British Pharmacopoeia, 2009, Volumes I-IV and Veterinary, Published by British Pharmacopoeia Commission, the Stationary Office on behalf of Medicines and Healthcare products Regulatory Agency (MHRA), United Kingdom.
- 10) United States Pharmacopoeia 35 - National Formulary 30 by United States Pharmacopoeia Convention, Volumes 1-3.

### 1.1.2 T MODERN DISPENSING PRACTICES

(Theory 3 hrs / week)

**CREDITS 03**

#### **Learning Objective :**

On completion of following theory topics & laboratory experiments, learner should be able to :

#### **A. Knowledge :**

1. review basic requirements in the compounding and dispensing of pharmaceutical products
2. state the parts of a typical medication container label.
3. apply basic mathematical calculations in the compounding and dispensing.
4. calculate the dose according to need of patient by using various formulas.
5. generate accurate and appropriate drug information and report health care professionals regarding ADR, Idosyncrasy, Pharmacovigilance.
6. provide consultation to patients and other health care professionals regarding various diseases.
7. Counsel patient for prescription drug, OTC products and cosmetics.
8. read, interpret, and translate into english any prescription or medication order written in latin or other.
9. judge a prescription for completeness and legality with respect to incomplete or missing information.
10. Identify the type of incompatibility and explain the methods to remove these incompatibilities.



Principal  
 Wara Rural College of Pharmacy  
 Pravaranagar, A/p. Loni-413736

**B. Skills :**

1. select proper containers for packaging of pharmaceutical preparations.
2. list commonly prescribed drugs by generic name, trade names, common therapeutic use and usual dose.
3. describe the advantages and disadvantages of various solid, liquid and semisolid dosage forms.
4. demonstrate a working knowledge of drug dosages, routes of administration, and dosage forms.
5. demonstrate skill in the operation of common pharmaceutical measuring, weighing and compounding devices.
6. identify and differentiate between various solid and liquid dosage forms for oral and topical use.
7. summarize pharmaceutical/medical terminology, abbreviations and symbols commonly used in the prescribing, dispensing, and charting of medications in the pharmacy.
8. predict specific uses for various solid and liquid dosage forms for oral and topical use.

**UNIT I**

**Meaning of compounding and dispensing**

Fundamental operations in compounding and dispensing, containers, closures for dispensed products, labeling of dispensed medicines, storage and stability of medicines.

**Prescription and its parts**

Types, parts of prescription Responding to prescription, pricing of prescription.

**UNIT II**

**Good compounding and dispensing practices**

Personnel, house keeping, building. Documentations – Introduction to prescription filling, drug profile, PMR, Purchase records, Stock records.

**Pharmaceutical calculations**

Alligations, percentage calculations, molarity, normality, millimoles, milliequivalence calculations, Isotonic solutions, proof spirit, improvisation and dilution of dosage forms.

**UNIT III**

**Posology**

Meaning, factors affecting dose, calculation of doses for infants and children.

**Incompatibilities in prescription**

Study of various types of incompatibilities: physical, chemical and therapeutic. Methods to remove these incompatibilities.

**UNIT IV**



Principal  
Bavara Rural College of Pharmacy  
Pravaranagar, A/p. Loni-413736

18. Organic Reactions Stereochemistry and Mechanisms by Kalsi P. S., Forth Edition, New Age International Limited, 2006.
19. Advanced Organic Chemistry, Reactions and Mechanisms by Singh M. S., Second Edition, Dorking Kindersley Pvt. Limited, 2008.
20. Organic Reactions, Mechanisms with Problems by Tyagi Rajpal, First Edition, Discovery Publishing House, 2005.

### **1.1.5 T HUMAN ANATOMY & PHYSIOLOGY –I**

(Theory 3 hrs / week)

**CREDITS 03**

**Learning objectives:** on completion of following theory topics & laboratory experiments, learner should be able to:

#### ***A/ Knowledge:***

1. explain the relevance and significance of Human Anatomy and Physiology to Pharmaceutical Sciences.
2. explain basic terminologies used in anatomy and physiology as well as prefixes & suffixes used to identify body parts and directional terms.
3. clarify the progression of structural levels (cells, tissues, organs, and systems) contributes to the body's order, there function and stability.
4. explain the anatomy & physiology of skeletal & smooth muscle.
5. explain Composition and functions of blood component & Hemostasis and Blood Coagulation.
6. demonstrate how all parts of the human body contribute to the maintenance of homeostasis.
7. clarify the anatomy, physiology & disorders of cardiovascular system, lymphatic system and digestive system.
8. explain WHO Definition of health and health promotion.

#### ***B/ Skill:***

1. explain the construction, working, care and handling of various materials, instruments, glassware's and equipments required for understanding the practical.
2. explain the precautions taken by student while doing the practical in the laboratory.
3. demonstrate the simple laboratory techniques.

*Priya*  
Principal

Javara Rural College of Pharmacy  
Pravaranagar, A/p. Loni-413736



4. clarify significance of bleeding time, clotting time, detection of blood group, haemoglobin detection, W.B. C. count, R.B. C. count of blood sample and blood pressure determination.
5. demonstrate human cardiovascular system and digestive system.
6. enrich the practical knowledge students should take to visit the Hospitals/Medical College/Blood Bank.

## UNIT I

### **Introduction:**

Definition and scope of anatomy, physiology and related topics. Basic terminologies used in anatomy and physiology.

Functional organization of human body and control of the "Internal Environment".

### **Cell and Tissues:**

Structure of cell, its components and their functions.

Genetic control of protein synthesis, cell function and cell reproduction.

Structure and functions of plasma membrane. Various transport mechanisms across membrane.

Structure, functions, characterization and subtypes of following class of tissues:

Epithelial, Connective, Muscle, Nervous tissues

## UNIT II

### **Muscular system:**

Anatomy & physiology of skeletal & smooth muscle, neurotransmission, Excitation and contraction of smooth and skeletal muscle, energy metabolism and muscle tone.

### **The Blood Cell, Immunity and Blood Coagulation:**

Composition and functions of blood.

Nature, types and function of plasma proteins.

Red Blood Cell, Anemia and Polycythemia

Resistance of the body to infections....

i) WBCs and Inflammation ii) Immunity and Allergy Innate immunity.

Blood types: Transfusion, Tissue and organ transplantation.

Hemostasis and Blood Coagulation.

### **Lymph and lymphatic system:**

Composition, formation, circulation and functions of lymph. Structure of lymph node.

Anatomy, physiology and functions of spleen. Disorders of lymphatic system.

## UNIT III

### **Cardiovascular system:**

Anatomy of heart and blood vessels. Cardiac muscle, the heart as pump and function of heart valves.(cardiac cycle and ECG)



Principal

Yavara Rural College of Pharmacy  
Bhamburda, A/p. Loni-413736

**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:

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 Content:**

**Unit-I Nervous system**

**10 hours**

Organization of nervous system, neuron, neuroglia, classification and properties of nerve fiber, 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 Digestive system**

**08hours**

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**

**6 hours**

Anatomy of respiratory system with special reference to anatomy of lungs, mechanism of respiration, regulation of respiration Lung Volumes

  
Principal

Jara Rural College of Pharmacy  
Awaranagar, A/p. Loni-413736



	and capacities transport of respiratory gases, artificial respiration, and resuscitation methods.	4 hours
	<b>Urinary system</b> Anatomy of urinary tract with special reference to anatomy of kidney and nephrons, functions of kidney and urinary tract, physiology of urine formation, micturition reflex and role of kidneys in acid base balance, role of RAS in kidney and disorders of kidney.	08 hours
<b>Unit-IV</b>	<b>Endocrine system</b> Classification of hormones, mechanism of hormone action, structure and functions of pituitary gland, thyroid gland, parathyroid gland, adrenal gland, pancreas, pineal gland, thymus and their disorders.	09 hours
<b>Unit-V</b>	<b>Reproductive system</b> Anatomy of male and female reproductive system, Functions of male and female reproductive system, sex hormones, physiology of menstruation, fertilization, spermatogenesis, oogenesis, pregnancy and parturition	07 Hours
	<b>Introduction to genetics</b> Chromosomes, genes and DNA, protein synthesis, genetic pattern of inheritance	02 hours

#### Recommended Books

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 Taylor. Williams & Wilkins Co, Riverview, MI USA
4. Text book of Medical Physiology- Arthur C. Guyton and John.E. Hall. Miamisburg, OH, U.S.A.
5. Principles of Anatomy and Physiology by Tortora Grabowski. Palmetto, GA, U.S.A.
6. Textbook of Human Histology by Inderbir Singh, Jaypee brothers medical publishers, New Delhi.
7. Textbook of Practical Physiology by C.L. Ghai, Jaypee brothers medical publishers, New Delhi.
8. Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee brother's medical publishers, New Delhi.

### 2.3.6 T PHARMACOGNOSY & PHYTOCHEMISTRY-I

(Theory) (3 Hrs/Week)

**Learning objectives:** on successful completion of theory and laboratory experiments, learner should be able to,

**A. Knowledge:**

1. Explain meaning & significance of Pharmacognostic parameters & Pharmacognostic study of crude drugs.
2. Comprehend & explain underlying reason of evolutionary significance of secondary metabolites production in plants & other organisms & deduce their significance as medicinal molecules. Learner should be able to explain evolution of Phytochemistry to current phase.
3. Comprehend & explain primary metabolites comprehensively from source to their Pharmaceutical & industrial applications. In relation with primary metabolites, learner should be able to define, classify, explain source, name & draw chemical structures, identify from the structure, organize the biosynthetic sequence, describe methods of extraction & underlying rationale of qualitative & quantitative analysis, explain general processes of preparation of semisynthetic products, explain their properties.
4. Define, classify, explain source, name & draw chemical structures, identify from the structure, organize the biosynthetic sequence, and describe methods of extraction & underlying rationale of qualitative & quantitative analysis of glycosides & tannin compounds of plant origin.

**B. Skills:**

1. Able to prepare permanent slides & explain the significance of reference material such as herbarium specimen, permanent slides etc. in plant authentication.
2. Demonstrate skill of plant material sectioning, staining, mounting & focusing.
3. Decide on staining reagents required for specific part of plant.
4. Identify the parts of plants from its morphological & microscopical features by applying experimental & theoretical knowledge of morphology & anatomy obtained in theory classes.
5. Draw morphological & microscopical diagrams & able to label component/parts.
6. Able to conduct extractions/isolations & explain significance of use of various chemicals & physical conditions.
7. Able to identify unorganized crude drugs & samples of powders of organized & unorganized crude drugs using morphological, chemical, physical & microscopical characteristics.
8. Able to handle various equipments as per SOPs (such as spectrophotometer, Tintometer, simple / compound / digital microscope, Abbe's Refractometer, Melting point apparatus) & judge the quality of material.
9. Explain significance of how laboratory experiments are linked with social needs.
10. Able to judge the quality of crude drugs by different means & explain the significance of same in commerce & industry.



Principal

ravara Rural College of Pharmacy  
Pravaranagar, A/p. Loni-413736



Topic No.	Name of the Topic and Contents	No of Hrs
<b>SECTION-I</b>		
1	<b>Plant metabolites:</b> Primary & secondary metabolites: Meaning, types, & their functions in plant; Comparative account of primary & secondary metabolism; Role of secondary metabolites in plants; Rationale behind use of secondary metabolites as medicinal compounds; Overview of historical contribution in development of phytochemistry.	03
2	<b>Pharmacognostic scheme for study of crude drugs:</b> Meaning, component, & significance of individual Pharmacognostic parameter	04
3	<b>Primary metabolites of Pharmaceutical &amp; industrial utility:</b> <i>General consideration:</i> Definition, classification, occurrences, properties, nomenclature, chemistry (including general biogenesis, qualitative/quantitative analysis) & pharmaceutical & industrial applications of carbohydrates, lipids & proteins & their derived products. <b>Carbohydrates:</b> A] Systematic Pharmacognostic study of: Agar, Guar gum, Acacia, Isabgol, Sterculia, Tragacanth & Okra mucilage. B] Source, extraction, properties & uses of: Starch, pectin, inulin, chitosan & cyclodextrins. <b>Lipids:</b> A] Systematic Pharmacognostic study of: Castor oil, Linseed oil, Neem oil, Hydnocarpus oil, Cod liver oil, Shark liver oil, Rice Bran oil, Cocoa butter, Kokum butter, Wool fat, & Bees wax; B] Source, extraction, properties & uses of: Lecithin, Polyunsaturated fatty acids, & Carotenoids. <b>Proteins &amp; enzymes:</b> A] Source, method of preparation, properties & uses of: Thaumatin, Papain, Bromelin, Streptokinase & gelatin. <b>Natural fibers:</b> Source, method of preparation, properties & applications of Cotton, Wool, Silk & Jute.	17
<b>SECTION-II</b>		
4	<b>4. Secondary metabolites for medicinal utility:</b> <b>A] Glycosides:</b> <i>General consideration:</i> Definition, classification, occurrences, properties, nomenclature, & chemistry (including general biogenesis, qualitative/quantitative analysis) of glycoside containing drugs. <i>Systematic Pharmacognostic study:</i> A] <i>Saponin glycosides:</i> Liquorice, ginseng, & dioscorea B] <i>Cardioactive glycosides:</i> Digitalis, squill, & strophanthus C] <i>Anthraquinone glycosides:</i> Aloe, senna, rhubarb, cascara D] <i>Others:</i> Kalmegh, gentian, Citrus peels, Artemisia, Visnaga	15

*Priya*

Principal

Pravara Rural College of Pharmacy  
Pravaranagar, A/p. Loni-413736



## 2.4.5 I PHARMACOGNOSY & PHYTOCHEMISTRY - II

(Theory) (3 Hrs/Week)

**Learning objectives:** on successful completion of theory and laboratory experiments, learner should be able to,

### **A. Knowledge:**

1. Comprehend & explain underlying reason of evolutionary significance of alkaloids formation in plants & other organisms & deduce their significance as medicinal molecules.
2. Explain & draw basic heterocyclic system present in alkaloids, define & classify alkaloids, explain source, name & draw chemical structures, identify from the structure, organize the biosynthetic sequence in formation of major group of alkaloids, describe methods of their extraction & explain underlying rationale of qualitative & quantitative analysis of alkaloids.
3. Explain historical significance & contribution of alkaloids in modern drug discovery, & their currently marketed semisynthetic derivatives/ analogues.
4. Define, classify, explain source, name & draw chemical structures, identify from the structure, organize the biosynthetic sequence, and describe methods of extraction & underlying rationale of qualitative & quantitative analysis of terpenoids & resins. Explain historical significance & contribution of terpenoids / resins in modern drug discovery, & their currently marketed semisynthetic derivatives/ analogues.

### **B. Skills:**

1. Demonstrate skill of plant material sectioning, staining, mounting & focusing; decide on staining reagents required for specific part of plant.
2. Identify the parts of plants from its morphological & microscopical features by applying experimental & theoretical knowledge of morphology & anatomy obtained in theory classes.
3. Draw morphological & microscopical diagrams & be able to label component / parts.
4. Conduct extractions/isolations & explain significance of use of various chemicals & physical conditions.
5. Identify unorganized crude drugs using morphological, chemical, physical & microscopical characteristics.
6. Conduct various analytical parameters of volatile oils & judge the quality of volatile oils.



Principal

ivara Rural College of Pharmacy  
ravaranagar, A/p. Loni-413736

7. Handle various equipments as per SOPs (such as spectrophotometer, simple / compound / digital microscope, Polarimeter, Abbe's Refractometer, hydrodistillation / microwave distillation assembly).
8. Judge the quality of crude drugs by different means & explain the significance of same in commerce & industry.
9. Listen carefully, raise logical query, draw information, understand rationale during field visits & prepare brief report for evaluation.

Topic No.	Name of the Topic and Contents	No of Hrs
	<b>SECTION-I</b>	
	<b>Alkaloids</b>	
	A] <i>General consideration:</i> Definition, classification, occurrences, properties, nomenclature, & chemistry (including general biogenesis, qualitative/quantitative analysis) of alkaloids.	03
1	B] <i>Systematic Pharmacognostic study including history &amp; contribution to modern medicine:</i> <i>Pyridine-piperidine:</i> Tobacco <i>Tropane:</i> Belladonna, datura, coca <i>Quinoline and Isoquinoline:</i> Cinchona, ipecac, opium. <i>Indole:</i> Ergot, rauwolfia, catharanthus and nux-vomica <i>Imidazole:</i> Pilocarpus <i>Steroidal:</i> Veratrum and kurchi <i>Alkaloidal Amine:</i> Ephedra and colchicum <i>Glycoalkaloid:</i> Solanum <i>Purines:</i> Coffee and tea	24
	<b>SECTION-II</b>	
	<b>Terpenoids &amp; Resins</b>	
	A] <i>General consideration:</i> Definition, classification, occurrences, properties, nomenclature, & chemistry (including general biogenesis, qualitative/quantitative analysis) of terpenoids/resins.	03
2	B] <i>Systematic Pharmacognostic study</i> (including history & contribution to modern medicine of followings): <i>Lower terpenoids:</i> Clove, Cinnamon, Coriander, Lavender, Sandal wood, Artemisia <i>Diterpenoids:</i> Taxus, Coleus <i>Triterpenoids:</i> Ginseng <i>Tetraterpenoids:</i> Annato & Saffron <i>Resins:</i> Podophyllum, Guggul, Boswellia & Cannabis	15

  
**Prindipal**  
 Ravara Rural College of Pharmacy  
 Ravaranagar, A/p. Loni-413736