**ANAND PHARMACY COLLEGE, ANAND**
**(An Autonomous College under UGC Regulations 2023)**
**Managed by Shri Ramkrishna Seva Mandal**
(Approved by PCI, NAAC Accredited – A+ Grade, 3.38 CGPA)
Awarding University: Gujarat Technological University, Ahmedabad

Name of Program: **B. Pharm**
Semester: **I**
Course Code: **B010101TP**
Course Name: **Pharmaceutical Engineering**
Course Type: **Core**
Year of Implementation: **2024 – 25**

**Teaching and Examination Scheme:**

| Number of hours/ Week | | | Number of Credits | | | Total credits | Evaluation Scheme (Marks) | | | | | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Sessional Exams | | | | | | Term End Assessment | | |
| | | | | | | | Theory | | | Practical | | | | | |
| L | Tu | P | L | Tu | P | | CIE | E | T | CIE | E | T | T | P | |
| 3 | 1 | 4 | 3 | 1 | 2 | 6 | 10 | 15 | 25 | 5 | 15 | 25 | 75 | 75 | 200 |

**Scope:**
This course is designed to impart fundamental knowledge on the art and science of various unit operations used in the pharmaceutical industry.

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

| | |
|---|---|
| CO1 | Understand the importance of various unit operations to design a Pharmaceutical dosage form |
| CO2 | Differentiate the application of the instruments used to perform unit operation on the basis of principles |
| CO3 | Apply the understanding of unit operation and its instrument to design a pharmaceutical dosage form |
| CO4 | Recognize the role of materials of pharmaceutical plant construction, Corrosion, and its prevention |
| CO5 | Recall principles, construction, working and applications of instruments used in practical of various unit operations |
| CO6 | Perform experiments, analyze data and interpret results related to various unit operation |

**Detailed Syllabus:**
Total Teaching hours: **45 hours**

| | | |
|---|---|---|
| **Unit 1** | **Flow of fluids:** Types of manometers, Reynolds number and its significance, Bernoulli's theorem and its applications, energy losses, orifice meter, venturi meter, pitot tube and rotameter.<br>**Size Reduction:** Objectives, mechanisms & laws governing size reduction, factors affecting size reduction, principles, construction, working, uses, merits and demerits of hammer mill, ball mill, fluidenergy mill, edge runner mill & end runner mill.<br>**Size Separation:** Objectives, applications & mechanism of size separation, official standards of powders, sieves, size separation principles, construction, working, uses, merits and demerits of Sieve shaker, cyclone separator, air separator, bag filter & elutriation tank. | **10 hours** |

| | | |
|---|---|---|
| **Unit 2** | **Heat Transfer:** Objectives, applications & heat transfer mechanisms. Fourier's law, heat transfer by conduction, convection & radiation. Heat interchangers & heat exchangers.<br>**Evaporation:** Objectives, applications, and factors influencing evaporation, differences between evaporation and other heat process. principles, construction, working, uses, merits and demerits of Steam jacketed kettle, horizontal tube evaporator, climbing film evaporator, forced circulation evaporator, multiple effect evaporator& Economy of multiple effect evaporator.<br>**Distillation:** Basic principles and methodology of simple distillation, flash distillation, fractional distillation, distillation under reduced pressure, steam distillation & molecular distillation | **10 hours** |
| **Unit 3** | **Drying:** Objectives, applications & mechanism of the drying process, measurements & applications of equilibrium moisture content, rate of drying curve. principles, construction, working, uses, merits anddemerits of tray dryer, drum dryer spray dryer, fluidized bed dryer,vacuum dryer, freeze dryer.<br>**Mixing:** Objectives, applications & factors affecting mixing, difference between solid and liquid mixing, mechanism of solid mixing, liquids mixing and semisolids mixing. principles, construction, working, uses, merits and demerits of double cone blender, twin shell blender, ribbon blender, sigma blade mixer, planetary mixers, propellers, turbines, paddles and silverson emulsifier. | **10 hours** |
| **Unit 4** | **Filtration:** Objectives, applications, theories & factors influencing filtration, filter aids, filter media. principle, construction, working, uses, merits and demerits of plate & frame filter, filter leaf, rotary drum filter, meta filter & cartridge filter, membrane filters and seitz filter.<br>**Centrifugation:** Objectives, principles& applications of centrifugation, principles, construction, working, uses, merits and demerits of perforated basket centrifuge, non-perforated basket centrifuge, semi- continuous centrifuge & super centrifuge. | **08 hours** |
| **Unit 5** | **Materials of pharmaceutical plant construction, Corrosion, and its prevention:** Factors affecting during materials selected for pharmaceutical plant construction, theories of corrosion, types of corrosion and their prevention. Ferrous and nonferrous metals, inorganic and organic non-metals, and basic material handling systems. | **07 hours** |

**Tutorials** **Tutorial hours: 15 hours**

Tutorials will be based on the above syllabus

**List of Practicals**

1. To determine the overall heat transfer coefficient by heat exchanger.
2. Determination of humidity of air– i) from wet and dry bulb temperatures–use of Dew point method.
3. Size analysis by sieving– To evaluate size distribution of tablet granulations Construction of various size frequency curves including arithmetic and logarithmic plots.
4. Size reduction: To verify the laws of size reduction using ball mill and determining Kicks, Rittinger's, Bond's coefficients, power requirement and critical speed of BallMill.
5. Factors affecting Rate of Filtration and Evaporation (Surface area, Concentration and

Thickness/ viscosity)

6. To study the effect of time on the Rate of Crystallization.
7. Construction of drying curves (for calcium carbonate and starch).
8. Determination of moisture content and loss on drying.
9. Steam distillation– To calculate the efficiency of steam distillation.
10. Determination of radiation constant of brass, iron, unpainted and painted glass.
11. Description of Construction working and application of Pharmaceutical Machinery suchas rotary tablet machine, fluidized bed coater, fluid energy mill, de-humidifier.
12. Demonstration of colloid mill, planetary mixer, fluidized bed dryer, freeze dryer and such other major equipment.
13. To calculate the uniformity Index for given sample by using Double Cone Blender.

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


1. Walter LB & Julius TB. Introduction to Chemical Engineering. McGraw-Hill Inc.USA
2. Nigel J.K.S impson. Solid Phase Extraction Principles Techniques and Applications. CRC Press Inc. New York. USA.
3. Mcabe Smith & Harriott. Unit Operation of Chemical Engineering. McGraw Hill Education. Singapore.
4. C.V.S Subrahmanyam et al. Pharmaceutical Engineering Principles and Practices. Vallabh Prakashan. New Delhi. India.
5. David b. Troy, Paul Beringer Remington Practice of Pharmacy. Elsevier exclusive. Lippincott williams & wilkins. Philadelphia.
6. Lachman Leon & Liebermans HA. Theory and Practice of Industrial Pharmacy. CBS Publishers & Distributors Pvt. Ltd. New Delhi. India.
7. C.V.S Subrahmanyam et al. Physical Pharmaceutics Vallabh Prakashan. New Delhi. India.
8. Carter S.J. Cooper and Gunn's Tutorial Pharmacy. CBS Publishers & Distributors. New Delhi. India.


L= Lecture, Tu= Tutorial, P= Practical, T = Theory

^ This is not an exhaustive list

**ANAND PHARMACY COLLEGE, ANAND**
**(An Autonomous College under UGC Regulations 2023)**
**Managed by Shri Ramkrishna Seva Mandal**
(Approved by PCI, NAAC Accredited – A+ Grade, 3.38 CGPA)
Awarding University: Gujarat Technological University, Ahmedabad

Name of Program: **B. Pharm**
Semester: **I**
Course Code: **B010102TP**
Course Name: **Pharmaceutical Inorganic Chemistry**
Course Type: **Core**
Year of Implementation: **2024 – 25**

**Teaching and Examination Scheme:**

| Number of hours/ Week | | | Number of credits | | | Total credits | Evaluation Scheme (Marks) | | | | | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Sessional Exams | | | | | | Term End Assessment | | |
| | | | | | | | Theory | | | Practical | | | | | |
| L | Tu | P | L | Tu | P | | CIE | E | T | CIE | E | T | T | P | |
| 3 | 1 | 4 | 3 | 1 | 2 | 6 | 10 | 15 | 25 | 5 | 20 | 25 | 75 | 75 | 200 |

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

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

| | |
|---|---|
| CO1 | Identify impurity sources and apply principles of limit tests for inorganic contaminants inpharmaceuticals |
| CO2 | Utilize the knowledge of properties and uses of inorganic compounds in the formulation ofpharmaceutical products |
| CO3 | Demonstrate the preparations of inorganic compounds following standard procedures |
| CO4 | Understand and apply knowledge of assay for determination of the purity of inorganicpharmaceutical compounds |
| CO5 | Illustrate basic principles involved in systematic analysis and preparation of inorganic compounds |
| CO6 | Apply analytical skills for interpretation of limit tests, identification tests, purity tests, andpreparation of inorganic pharmaceutical compounds |

**Detailed Syllabus:**
Total Teaching hours: **45 hours**

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

| | | |
|---|---|---|
| **Unit 1** | **Impurities in pharmaceutical substances**:<br>History of pharmacopoeia, sources and types of impurities | **03 hours** |
| | Principle, procedure and significance involved in the limit test for Chloride, Sulphate, Iron, Arsenic, Lead and Heavy metals, modified limit test for Chloride and Sulphate | **07 hours** |

| | | |
|---|---|---|
| **Unit 2** | **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<br><br>**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 acidbase balance<br><br>**Dental products:** Dentifrices, role of fluoride in the treatment of dental caries, Desensitizing agents, Calcium carbonate, Sodium fluoride, and Zinc eugenol cement. | **04 hours**<br><br>**04 hours**<br><br>**02 hours** |
| **Unit 3** | **Gastrointestinal agents**<br>**Acidifiers**: Ammonium chloride* and Dil. HCl<br>**Antacid:** Ideal properties of antacids, combinations of antacids, Sodium bicarbonate*, Aluminium hydroxide gel, Magnesium hydroxide mixture<br>**Cathartics:** Magnesium sulphate, Sodium orthophosphate, Kaolin and Bentonite<br><br>**Antimicrobials:** Mechanism, classification, Potassium permanganate, Boric acid, Hydrogen peroxide*, Chlorinated lime*, Iodine and its preparations | **06 hours**<br><br>**04 hours** |
| **Unit 4** | **Miscellaneous compounds**<br>**Expectorants:** Potassium iodide, Ammonium chloride***Emetics:** Copper sulphate*, Sodium potassium tartrate **Haematinics**: Ferrous sulphate*, Ferrous gluconate<br><br>**Poison and Antidote**: Sodium thiosulphate*, Activated charcoal, Sodium nitrite<br>**Astringents:** Zinc Sulphate, Potash Alum | **05 hours**<br><br>**03 hours** |
| **Unit 5** | **Radiopharmaceuticals:** Radio activity, Measurement of radioactivity, Properties of α, β, γ radiations, Half-life, radio isotopes and study of radio isotopes- Sodium iodide I131, Storage conditions, precautions & pharmaceutical application of radioactive substances | **07 hours** |

**Tutorials** **Tutorial hours: 15 hours**

Tutorials will be based on the above syllabus

**List of Practicals**

**1. Limit tests for following ions:**

a. Limit test for Chlorides and Sulphates

b. Modified limit test for Chlorides and Sulphates

c. Limit test for Iron

d. Limit test for Heavy metals

e. Limit test for Lead

f. Limit test for Arsenic

**2. Identification test:**

a. Magnesium hydroxide
b. Ferrous sulphate
c. Sodium bicarbonate
d. Calcium gluconate
e. Copper sulphate

**3. Test for purity:**

a. Swelling power of Bentonite
b. Neutralizing capacity of aluminum hydroxide gel
c. Determination of potassium iodate and iodine in potassium Iodide

**4. Preparation of inorganic pharmaceuticals**:

a. Boric acid
b. Potash alum
c. Ferrous sulphate

**5. To perform qualitative analysis of Cation and Anion**

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


1. Block JH, Roche E, Soine TO and Wilson CO. Inorganic Medicinal and Pharmaceutical Chemistry. Lea and Febiger. UK.
2. Subba Rao B. and Alagarsamy V. Practical Pharmaceutical Inorganic Chemistry. Pharma Med Press. India.
3. Belsare DP & Dhake AS. Inorganic Pharmaceutical Chemistry. Career Publication. Nasik. India
4. Devala Rao G. Practical Pharmaceutical Inorganic Chemistry. Birla Publication Pvt. Ltd. Delhi. India.
5. Bentley and Driver's Textbook of Pharmaceutical Chemistry. Oxford / BSP Books. UK.
6. Indian Pharmacopoeia. Ministry of Welfare. Government of India.
7. Beckett AH, Stenlake JB. Practical Pharmaceutical Chemistry. CBS Publishers and Distributors. New Delhi. India.
8. Mendham J, Denney RC, Barnes JD, Thomas MJ. Vogel's Text Book of Quantitative Inorganic Analysis. Pearson Education Limited. Delhi India.
9. Rao PG. Inorganic Pharmaceutical Chemistry. Vallabh Prakashan. New Delhi. India.
10. Schroff ML. Inorganic Pharmaceutical Chemistry. National Book Centre. USA.
11. Chatwal GR. Pharmaceutical Chemistry Inorganic. Himalaya Publishing House. Mumbai. India.
12. Block JH. Inorganic Medicinal and Pharmaceutical Chemistry. Bombay Varghese Publishing House. Mumbai.


L= Lecture, Tu= Tutorial, P= Practical, T = Theory

^ This is not an exhaustive list

**ANAND PHARMACY COLLEGE, ANAND**
**(An Autonomous College under UGC Regulations 2023)**
**Managed by Shri Ramkrishna Seva Mandal**
(Approved by PCI, NAAC Accredited – A+ Grade, 3.38 CGPA)
Awarding University: Gujarat Technological University, Ahmedabad

Name of Program: **B. Pharm**
Semester: **I**
Course Code: **B010103TP**
Course Name: **Human Anatomy and Physiology- I**
Course Type: **Core**
Year of Implementation: **2024 – 25**

**Teaching and Examination Scheme:**

| Number of hours/ Week | | | Number of credits | | | Total credits | Evaluation Scheme (Marks) | | | | | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Sessional Exams | | | | | | Term End Assessment | | |
| | | | | | | | Theory | | | Practical | | | | | |
| L | Tu | P | L | Tu | P | | CIE | E | T | CIE | E | T | T | P | |
| 3 | 1 | 4 | 3 | 1 | 2 | 6 | 10 | 15 | 25 | 5 | 20 | 25 | 75 | 75 | 200 |

**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.

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

| | |
|---|---|
| CO1 | To analyse and explain the structure and function of the human body at the various levels of organization enabling them to apply this knowledge in pharmacological context |
| CO2 | To describe and illustrate the detailed anatomy of skeletal, and digestivesystems with labelled sketches |
| CO3 | To interpret and articulate the coordinated functions and disorders in theskeletal, and digestive systems of the human body |
| CO4 | To evaluate and illustrate the structure, functions, and regulatory mechanisms of the cardiovascular, blood and lymphatics, including related disorders |
| CO5 | To apply knowledge of microscopy to identify tissues and organs and understanding their important functions and grasp the principles behindhaematological tests |
| CO6 | To perform and interpret haematological tests and accurately record important cardiovascular system vitals |

**Detailed Syllabus:**
Total Teaching hours: **45 hours**

| | | |
|---|---|---|
| **Unit 1** | **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<br>**Cellular level of organization:** Parts of a Cell, 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 | **12 hours** |

| | | |
|---|---|---|
| | **Tissue level of organization:** Classification of tissues, structure, location and functions of epithelial, muscular and nervous and connective tissues.<br>**Introduction to genetics**: Chromosomes, genes and DNA, Protein synthesis,Genetic pattern of inheritance | |
| **Unit 2** | **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<br>**Joints** Structural and functional classification, types of joints movementsand its articulation | **10 hours** |
| **Unit 3** | **Body fluids and blood:** Body fluids, composition and functions of blood, hemopoiesis, formation of haemoglobin, anemia, mechanisms of coagulation, blood grouping, Rh factors, transfusion, its significance and disorders of blood, Reticuloendothelial system<br>**Lymphatic system:** Lymphatic organs and tissues, lymphatic vessels, lymph circulation and functions of lymphatic system | **10 hours** |
| **Unit 4** | **Digestive system:** Anatomy of GI Tract with special reference to anatomy andfunctions 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, Disorders of GIT<br>**Energetics:** Formation and role of ATP, Creatinine Phosphate, BMR. | **06 hours** |
| **Unit 5** | **Cardiovascular system:** Heart – anatomy of heart, Heart Valves and Circulation of Blood, blood vessels, structure and functions of artery, vein andcapillaries, 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. | **07 hours** |

**Tutorials** **Tutorial hours: 15 Hours**

Tutorials will be based on the above syllabus

**List of Practicals**

1. Study of compound microscope
2. To demonstrate positive and negative feedback mechanism
3. Microscopic study of epithelial, connective, muscular and nervous tissue
4. Identification of axial & appendicular bones with the help of charts and model
5. Introduction to hemocytometry
6. Enumeration of white blood cell (WBC) count
7. Enumeration of total red blood corpuscles (RBC) count
8. Demonstration of total blood count by cell analyser
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 and recording of blood pressure
15. Study of digestive system with the help of models, charts and specimens

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


1. Tortora GJ, Derikson BH. Principles of Anatomy and Physiology. Wiley India Pvt. Ltd. New Delhi. India.
2. K. Sembulingam, P. Sembulingam. Essentials of Medical Physiology. Jaypee brother's medical publishers. New Delhi. India.
3. Waugh A, Grant A. Ross and Wilson Anatomy and Physiology in Health and Illness. Churchill Livingstone, Elsevier. New York.
4. West JB. Best and Tailor's Physiological basis of Medical Practice. BI Waverly Pvt. Ltd. New Delhi. India.
5. Guyton AC, Hall JE. Text book of Medical Physiology. Sunders International Print O-Pac. Noida, UP. India.
6. Singh IH. Textbook of Human Histology by, Jaypee brother's medical publishers. New Delhi. India.
7. Varshney VP, Bedi M. Ghia's Textbook of Practical Physiology. Jaypee brother's medical publishers. New Delhi. India.
8. Nageswari KS, Sharma R. Practical workbook of Human Physiology. Jaypee brother's medical publishers. New Delhi. India.
9. Goyal RK, Patel NM. Practical Anatomy and Physiology B S Shah Prakashan. Ahmedabad. India.


L= Lecture, Tu= Tutorial, P= Practical, T = Theory

^ this is not an exhaustive list

**ANAND PHARMACY COLLEGE, ANAND**
**(An Autonomous College under UGC Regulations 2023)**
**Managed by Shri Ramkrishna Seva Mandal**
(Approved by PCI, NAAC Accredited – A+ Grade, 3.38 CGPA)
Awarding University: Gujarat Technological University, Ahmedabad

Name of Program: **B. Pharm**
Semester: **I**
Course Code: **B010104TP**
Course Name: **Communication Skills**
Course Type: **Value Added Course**
Year of Implementation: **2024 – 25**

**Teaching and Examination Scheme:**

| Number of hours/ Week | | | Number of credits | | | Total credits | Evaluation Scheme (Marks) | | | | | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Sessional Exams | | | | | | Term End Assessment | | |
| | | | | | | | Theory | | | Practical | | | | | |
| L | Tu | P | L | Tu | P | | CIE | E | T | CIE | E | T | T | P | |
| 2 | 0 | 2 | 2 | 0 | 1 | 3 | 5 | 10 | 15 | 5 | 10 | 15 | 35 | 35 | 100 |

**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 studentwill get the soft skills set to work cohesively with the team as a team player and will add valueto the pharmaceutical business.

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

| | |
|---|---|
| CO1 | Understand the basic communication skills required for Pharmacy profession |
| CO2 | Identify the need of various communication skills to interact effectively with various health professionals |
| CO3 | Implement the understanding of soft skills in actual practice |
| CO4 | Apply the skills in group discussion, interview and presentation |
| CO5 | Recall essentials of effective communication, interview, and presentation skills |
| CO6 | Perform effective communication, interview, and presentation competencies |

**Detailed Syllabus:**
Total Teaching hours: **30 hours**

| | | |
|---|---|---|
| **Unit 1** | **Communication Skills:** Introduction, definition, the importanceof communication, the communication process – source, message, encoding, channel, decoding, receiver, feedback, context<br>**Barriers to communication:** Physiological barriers, physical barriers, cultural barriers, language barriers, gender barriers, interpersonal barriers, psychological barriers, emotional barriers<br>**Perspectives in Communication:** Introduction, visual perception, language, other factors affecting our perspective - past experiences, prejudices, feelings, environment | **07 hours** |
| **Unit 2** | **Elements of Communication:** Introduction, face to face communication - tone of voice, body language (non-verbal | **07 hours** |

| | | |
|---|---|---|
| | 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 3** | **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 | **07 hours** |
| **Unit 4** | **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 | **05 hours** |
| **Unit 5** | **Group Discussion:** Introduction, communication skills in group discussion, Do's and Dont's of group discussion | **04 hours** |

**List of Practicals**

The following learning modules are to be **conducted using Any Software English** language lab software

**Basic communication covering the following topics**

The following learning modules are to be conducted using Any Software English language lab software

1. **Basic communication covering the following topics**
   a. Meeting People - Introduce Yourself
   b. Asking Questions
   c. Making Friends - Peer to peer Story telling
   d. What did you do?- From Problem to solution : A critical thinking
   e. Do's and Dont's – Debate
2. **Pronunciations covering the following topics** - Grammar detective Challenge
   a. Pronunciation (Consonant Sounds)
   b. Pronunciation and Nouns
   c. Pronunciation (Vowel Sounds)
3. **Advanced Learning**
   a. Listening Comprehension / Direct and Indirect Speech - Active Listening Exercise
   b. Figures of Speech – Group Discussion
   c. Effective Communication - Impromptu Speaking
   d. Writing Skills – Media Analysis
   e. Effective Writing
   f. Interview Handling Skills
   g. E-Mail etiquette
   h. Presentation Skills

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


1. Ruther Ford AJ. Basic communication skills for Technology. Pearson Education Inc. New Delhi India.
2. Sanjay Kumar & Pushpa Lata. Communication skills. Oxford Press. New Delhi. India.
3. Stephen. PR. et al. Organizational Behavior. Pearson. Australia.
4. Gill Hasson. Brilliant - Communication skills. Pearson. 2011/BS Publications. India.
5. Gopala Swamy R. The Ace of Soft Skills: Attitude, Communication and Etiquette for success. Pearson. 2013.India
6. Deborah D. Lois B. & Margaret G. Developing your influencing skills. Universe of Learning LTD.
7. Konar N. Skills for professionals. New arrivals – PHI. India.
8. Barun KM. Personality development and soft skills. Oxford Press. New Delhi India
9. Butter Field. Soft Skill for Everyone. Cengage Learning India Pvt. Ltd. India.
10. Francis Peters SJ. Soft skills and professional communication. McGraw Hill Education. USA.
11. John Adair. Effective communication.UK.
12. Aubrey Daniels. Bringing Out the Best in People. McGraw Hill. USA.


L= Lecture, Tu= Tutorial, P= Practical, T = Theory

^ This is not an exhaustive list

**ANAND PHARMACY COLLEGE, ANAND**
**(An Autonomous College under UGC Regulations 2023)**
**Managed by Shri Ramkrishna Seva Mandal**
(Approved by PCI, NAAC Accredited – A+ Grade, 3.38 CGPA)
Awarding University: Gujarat Technological University, Ahmedabad

Name of Program: **B. Pharm**
Semester: **I**
Course Code: **B010105TP**
Course Name: **Computer Applications in Pharmacy**
Course Type: **Core**
Year of Implementation: **2024 – 25**

**Teaching and Examination Scheme:**

| Number of hours/ Week | | | Number of credits | | | Total credits | Evaluation Scheme (Marks) | | | | | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Sessional Exams | | | | | | End Semester Assessment | | |
| | | | | | | | Theory | | | Practical | | | | | |
| L | Tu | P | L | Tu | P | | CIE | E | T | CIE | E | T | T | P | |
| 2 | 0 | 2 | 2 | 0 | 1 | 3 | 5 | 10 | 50 | 5 | 10 | 50 | 35 | 35 | 100 |

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

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

| | |
|---|---|
| CO1 | Understand the techniques for number system conversions, information systemdesign, and web development |
| CO2 | Recognize the use of computer in database management of drug development and bioinformatics |
| CO3 | Identify the need of computer in dispensing of medicine and medication adherence system |
| CO4 | Implement the utility of computer to automate the patient oriented pharmaceutical care |
| CO5 | Recall the application of computer and their practical skills in pharmaceutical field |
| CO6 | Create important documents need for effective patient counselling accomplishing online tools |

**Detailed Syllabus:**
Total Teaching hours: **30 hours**

| | | |
|---|---|---|
| **Unit 1** | **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<br>**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 | **06 hours** |
| **Unit 2** | **Web Technologies:** Introduction to HTML, XML, CSS andprogramming languages, introduction to web servers and server products. Introduction to databases, MYSQL, MS ACCESS,pharmacy drug database | **06 hours** |

| | | |
|---|---|---|
| **Unit 3** | **Application of Computers in Pharmacy** – Drug information storageand 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 | **06 hours** |
| **Unit 4** | **Bioinformatics:** Introduction, objective of bioinformatics, bioinformatics databases, concept of bioinformatics, impact of bioinformatics in vaccine discovery | **06 hours** |
| **Unit 5** | **Computers as Data Analysis in Preclinical Development:** Chromatographic data analysis (CDS), Laboratory Information management System (LIMS) and Text Information Management System (TIMS) | **06 hours** |

**List of Practicals**

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 fieldsusing 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
13. Creating google form
14. Smart work in PowerPoint

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


1. Fassett, William E. Computer Application in Pharmacy. Lea and Febiger. USA.
2. Ekins, Sean. Computer Application in Pharmaceutical Research and Development. Wiley-Interscience. USA.
3. Rastogi SC. Bioinformatics (Concept, Skills and Applications). CBS Publishers and Distributors. New Delhi. India.
4. Prague W, Cary N. Microsoft Office Access - 2003, Application Development Using VBA, SQL Server, DAP and Infopath. Wiley Dreamtech India (P) Ltd. New Delhi. India.


L= Lecture, Tu= Tutorial, P= Practical, T = Theory

^ This is not an exhaustive list

**ANAND PHARMACY COLLEGE, ANAND**
**(An Autonomous College under UGC Regulations 2023)**
**Managed by Shri Ramkrishna Seva Mandal**
(Approved by PCI, NAAC Accredited – A+ Grade, 3.38 CGPA)
Awarding University: Gujarat Technological University, Ahmedabad

Name of Program: **B. Pharm**
Semester: **I**
Course Code: **B010106TP**
Course Name: **Remedial Biology**
Course Type: **Core**
Year of Implementation: **2024 – 25**

**Teaching and Examination Scheme:**

| Number of Hours/ Week | | | Number of credits | | | Total credits | Evaluation Scheme (Marks) | | | | | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Sessional Exams | | | | | | Term End Assessment | | |
| | | | | | | | Theory | | | Practical | | | | | |
| L | Tu | P | L | Tu | P | | CIE | E | T | CIE | E | T | T | P | |
| 2 | 0 | 2 | 2 | 0 | 1 | 3 | 5 | 10 | 15 | 5 | 10 | 15 | 35 | 35 | 100 |

**Scope:**
Learn and understand the components of living world, structure and functional systems of plant and animal kingdom.

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

| | |
|---|---|
| CO1 | Identify and describe the classification and key features of the five kingdoms of life |
| CO2 | Examine and illustrate the morphology of plants, flowers, fruits, and seeds |
| CO3 | Analyse the fundamental components of plant anatomy and physiology |
| CO4 | Examine various tissue systems and organ systems in humans |
| CO5 | Recall and summarize the classification, as well as plant and human anatomy and physiology |
| CO6 | Develop microscopy, section cutting, staining, and slide preparation skills forbiological studies, cellular structures, plant anatomy, and physiological functions using computer models and practical lab techniques |

**Detailed Syllabus:**
Total Teaching Hours: **30 Hours**

| | | |
|---|---|---|
| **Unit 1** | **Living world:** Definition and characters of living organisms, Diversity in theliving world, Binomial nomenclature, Five kingdoms of life and basis of classification. Salient features of Monera, Protista, Fungi, Animalia and Plantae, Virus. | **04 hours** |
| | **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 & Dicotylidones | **03 hours** |

| | | |
|---|---|---|
| **Unit 2** | **Body fluids and circulation:** Composition of blood, blood groups, coagulation of blood, Composition and functions of lymph, Human circulatory system, Structure of human heart andblood vessels, Cardiac cycle, cardiac output and ECG | **03 hours** |
| | **Digestion and Absorption:** Human alimentary canal and digestive glands, Role of digestive enzymes, Digestion, absorption and assimilation of digested food | **02 hours** |
| | **Breathing and respiration:** Human respiratory system, Mechanism of breathing and its regulation, Exchange of gases, transport of gases and regulation of respiration, Respiratory volumes | **02 hours** |
| **Unit 3** | **Excretory products and their elimination:** Modes of excretion, Human excretory system- structure and function, Urine formation, Rennin angiotensin system | **01 hours** |
| | **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 | **02 hours** |
| | **Chemical coordination and regulation:** Endocrine glands and their secretions, Functions of hormones secreted by endocrine glands | **02 hours** |
| | **Human reproduction:** Parts of female reproductive system, Parts of male reproductive systemSpermatogenesis and Oogenesis, Menstrual cycle | **02 hours** |
| **Unit 4** | **Plants and mineral nutrition:** Essential mineral, macro and micronutrients, Nitrogen metabolism, Nitrogencycle, biological nitrogen fixation | **03 hours** |
| | **Photosynthesis:** Autotrophic nutrition, photosynthesis, Photosynthetic pigments, Factorsaffecting photosynthesis. | **02 hours** |
| **Unit 5** | **Plant respiration**: Respiration, glycolysis, fermentation (anaerobic). | **01 hours** |
| | **Plant growth and development:** Phases and rate of plant growth, Condition of growth, Introduction to plantgrowth regulators | **01 hours** |
| | **Cell - The unit of life:** Structure and functions of cell and cell organelles. Cell division | **01 hours** |
| | **Tissues:** Definition, types of tissues, location and functions. | **01 hours** |

**List of Practicals**

1. Introduction to experiments in biology a) Study of Microscope
2. Section cutting techniques & Mounting and staining
3. Permanent slide preparation
4. Study of cell and its inclusions
5. Study of Stem, Root, Leaf, seed and their modifications
6. Study of fruit, flower and their modifications
7. Detailed study of frog by using computer models
8. Microscopic study and identification of tissues pertinent to stem and Root
9. Microscopic study and identification of tissues pertinent to Leaf

10. Microscopic study and identification of tissues pertinent to seed
11. Microscopic study and identification of tissues pertinent to fruit and flower
12. Identification of bones
13. Determination of blood group
14. Determination of blood pressure
15. Determination of tidal volume

**Recommended Books: (Latest Editions)**


1. Sreenivasa Naidu BV. A Textbook of Biology. Anmol Publications. New Delhi.
2. Naidu BV, Murthy. A Textbook of Biology. Anmol Publications. New Delhi.
3. Dutta AC. Botany for Degree Students. Oxford University Press. New Delhi.
4. Ekambaranatha AM, Ananthakrishnan TN. Outlines of Zoology. S. Viswanathan (Printers & Publishers) Pvt. Ltd, Chennai.
5. Gokhale SB, Kokate CK. A Manual for Pharmaceutical Biology Practical. Nirali Prakashan, Pune.
6. Kale SR, Kale RR. Practical Human Anatomy and Physiology. Nirali Prakashan. Pune.
7. Goyal RK, Patel NM. Practical Anatomy and Physiology. B. S. Shah Prakashan. Ahmedabad.
8. Shah BK. Kapadia NS. Pharmacognosy. Nirav & Roopal Prakashan. Ahmedabad.
9. Khandelwal KR. Practical Pharmacognosy: Techniques and Experiments. Nirali Prakashan. Pune.


L= Lecture, Tu= Tutorial, P= Practical, T = Theory

^ This is not an exhaustive list

**ANAND PHARMACY COLLEGE, ANAND**
**(An Autonomous College under UGC Regulations2023)**
**Managed by Shri Ramkrishna Seva Mandal**
(Approved by PCI, NAAC Accredited – A+ Grade, 3.38 CGPA)
Awarding University: Gujarat Technological University, Ahmedabad

Name of Program: **B. Pharm**
Semester: **I**
Course Code: **B010107TT**
Course Name: **Remedial Mathematics**
Course Type: **Core**
Year of Implementation: **2024 – 25**

**Teaching and Examination Scheme:**

| Number of hours/ Week | | | Number of credits | | | Total credits | Evaluation Scheme (Marks) | | | | | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Sessional Exams | | | | | | Term End Assessment | | |
| | | | | | | | Theory | | | Practical | | | | | |
| L | Tu | P | L | Tu | P | | CIE | E | T | CIE | E | T | T | P | |
| 2 | 0 | 0 | 2 | 0 | 0 | 2 | 5 | 10 | 50 | 0 | 0 | 0 | 35 | 0 | 50 |

**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

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

| | |
|---|---|
| CO1 | Understand the basics of mathematics |
| CO2 | Know the theory and their application in Pharmacy |
| CO3 | Solve the different types of problems by utilizing basic concepts |
| CO4 | Apply the basic concept of mathematics in Pharmacy |

**Detailed Syllabus:**
Total Teaching hours: **30 hours**

| | | |
|---|---|---|
| **Unit 1** | **Partial fraction**<br>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<br>**Function:** Real valued function, classification of real valued functions<br>**Limits and continuity:**<br>Introduction, Limit of a function, Definition of limit of a function ($\in - \delta$ definition), $\lim_{x \to a} \frac{x^n - a^n}{x - a} = na^{n-1}$ , $\lim_{\theta \to o} \frac{\sin \theta}{\theta} = 1$ | **06 hours** |
| **Unit 2** | **Matrices and Determinant**<br>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 | **06 hours** |

| | | |
|---|---|---|
| | adjugate of a square matrix, singular and non-singular matrices, inverse of a matrix, solution of system of linear of equations using matrixmethod, Cramer's rule, characteristic equation and roots of a square matrix, Cayley–Hamilton theorem, application of matrices in solving pharmacokinetic equations | |
| **Unit 3** | **Calculus: Differentiation**<br>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 (product formula), derivative of the quotient of two functions(quotient formula) – without proof, derivative of xn w.r.tx, where n is any rational number, derivative of ex, derivative of log ex , derivative of ax, derivative of trigonometric functions from first principles (without proof), successive differentiation, conditions for a<br>function to be a maximum or a minimum at a point. application | **06 hours** |
| **Unit 4** | **Analytical Geometry**<br>**Introduction:** Signs of the coordinates, distance formula,<br>**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<br>**Integration:** Introduction, definition, standard formulae, rules of integration, method of substitution, method of partial fractions, integration by parts, definite integrals, application | **06 hours** |
| **Unit 5** | **Differential Equations**<br>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, 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 | **06 hours** |

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


1. Shanthinarayan. Differential Calculus. S Chand Publishers, New Delhi. India.
2. Panchaksharappa Gowda DH. Pharmaceutical Mathematics with Application to Pharmacy. Pharmamed Press, Hyderabad. India.
3. Shanthinarayan. Integral Calculus. S Chand Publishers, New Delhi. India.
4. Grewal BS. Higher Engineering Mathematics. Khanna Publishers, New Delhi. India.


L= Lecture, Tu= Tutorial, P= Practical, T = Theory

^ This is not an exhaustive list

**ANAND PHARMACY COLLEGE, ANAND**
**(An Autonomous College under UGC Regulations 2023)**
**Managed by Shri Ramkrishna Seva Mandal**
(Approved by PCI, NAAC Accredited – A+ Grade, 3.38 CGPA)
Awarding University: Gujarat Technological University, Ahmedabad

Name of Program: **B. Pharm**
Semester: **I**
Course Code: **B010108PP**
Course Name**: Communicative English**
Course Type: **Ability Enhancement Course (AEC)**
Year of Implementation: **2024 – 25**

**Teaching and Examination Scheme:**

| Number of hours/ Week | | | Number of credits | | | Total credits | Evaluation Scheme (Marks) | | | | | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Sessional Exams | | | | | | Term End Assessment | | |
| | | | | | | | Theory | | | Practical | | | | | |
| L | Tu | P | L | Tu | P | | CIE | E | T | CIE | E | T | T | P | |
| 0 | 0 | 2 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 5 | 10 | 15 | 0 | 35 | 50 |

**Scope:**
This course aims to enhance the proficiency in listening, speaking, reading, and writing through interactive and practical activities, preparing them for effective communication in academic and everyday contexts.

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

| | |
|---|---|
| CO1 | Enhance listening, comprehension skills and spoken English to improve fluency and quality in these contexts |
| CO2 | Develop effective reading strategies and improve writing skills using principles of grammar |

**Detailed Syllabus:**
Total Teaching hours: **30 hours**

| | | |
|---|---|---|
| **Unit 1** | **Fundamentals of English Communication:** Introduction, pronunciation, basic listening and reading skills, foundational writing, and vocabulary | **06 hours** |
| **Unit 2** | **Practical Speaking and Listening:** Self-introductions, following instructions, vocabulary enhancement, grammar basics, reading comprehension, and paragraph writing | **06 hours** |
| **Unit 3** | **Interactive Communication:** Everyday conversations, news listening, idioms, inference reading, email writing, and tenses. | **06 hours** |
| **Unit 4** | **Advanced Communication Skills:** Public speaking, dialogues, academic vocabulary, essay writing, critical reading, and conditionals | **06 hours** |
| **Unit 5** | **Applied English and Review:** Group discussions, interview listening, phrasal verbs, summarizing, presentation skills, and comprehensive course review | **06 hours** |

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


1. David Green. Contemporary English Grammar Structures and Composition. Laxmi Publication. New Delhi.
2. Wren P C & Martin H. English Grammar and Composition, S Chand Publishing. New Delhi. India.
3. Roman Kenneth and Raphaelson Joel. Writing That Works, How to Communicate Effectively in Business. HarperCollins Publishers Gurugram, Haryana. India.
4. Sharma RC & Mohan Krishna. Business Correspondence and Report Writing. Tata McGraw Hill, New Delhi. India.
5. Inthira SR & Saraswathi V. Enrich your English – Communication skills, CIEFL & OUP. India
6. Pachter Barbara. The Essentials of Business Etiquette: How to Greet, Eat, and Tweet Your Way to Success. McGraw-Hill Education. India.
7. Lewis Norman. Unlock your Word Power: Have English at your Fingertips. Penguin Random House. India.
8. Thomson A J & Martinet A V. A Practical English Grammar. Oxford University Press. Noida. India.


L= Lecture, Tu= Tutorial, P= Practical, T = Theory

^ This is not an exhaustive list

આણંદ ફાર્મસી કોલેજ, આણંદ
(યુજીસી રેગ્યુલેશન્સ 2023 હેઠળ ઓટોનોમસ
કોલેજ)
શ્રી રામકૃષ્ણ સેવા મંડળ સંચાલિત
(PCI માન્ય, એક્રીડીટેશન NAAC– A+ ગ્રેડ, 3.38 CGPA)
એવોર્ડિંગ યુનિવર્સિટી. ગુજરાત ટેકનોલોજીકલ યુનિવર્સિટી, અમદાવાદ

કાર્યક્રમનું નામ: બી.ફાર્મ

વર્ષ: **૧**

અભ્યાસક્રમ નો કોડ: B010109PP

અભ્યાસક્રમ નું નામ: **Communicative Gujarati -Practical**

અભ્યાસક્રમ નો પ્રકાર: **એબિલિટી એન્હાન્સમેન્ટ કોર્સ (એઇસી)**

અમલીકરણ નું વર્ષ: **2024 – 25**

**અધ્યાપન અને પરીક્ષા યોજના:**

| Number of hours/ Week | | | Number of credits | | | Total credits | Evaluation Scheme (Marks) | | | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Sessional Exams | | | | Term End Assessment | | |
| | | | | | | | Theory | | Practical | | | | |
| L | Tu | P | L | Tu | P | | T | CIE | E | T | T | P | |
| 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 5 | 10 | 15 | 0 | 35 | 50 |

**અવકાશ:** આ કોર્સ ગુજરાતી ભાષાની બુનિયાદ સાથે સંબંધિત છે.

અભ્યાસક્રમ પૂર્ણ થયા પછી વિદ્યાર્થી નીચે આપેલા અભ્યાસક્રમ ના પરિણામો (CO) ને સમજવાં માં સક્ષમ હશે:

| | |
|---|---|
| CO1 | શ્રવણશક્તિ,સમજણ શક્તિ અને ગુજરાતી બોલવા માં વધારો કરે છે અને એની પ્રવાહિતામાં સુધારો કરી આપેલાસંદર્ભોમાં ગુણવત્તા વધારે છે. |
| CO2 | વ્યાકરણ ના સિદ્ધાંતોનો ઉપયોગ કરીને અસરકારક વાંચન વ્યૂહરચના વિકસાવવી અને લેખન કુશળતામાં સુધારો કરવો. |

**અભ્યાસક્રમ નો વિષય:**

શિક્ષણ ના કુલ કલાકો: **30 કલાક**

| | | |
|---|---|---|
| **૧** | **ગુજરાતી ભાષાનો સંક્ષિપ્ત ઇતિહાસ:**<br>અ. ગુજરાતી ભાષાની ઉત્પત્તિ અને ઉત્ક્રાંતિ<br>બ. ગુજરાતી ભાષાના પ્રાદેશિક પ્રકારો | **૦૨ કલાકો** |
| **૨** | **ગુજરાતી કલા, સંસ્કૃતિ અને જીવનશૈલી:**<br>અ. ગુજરાતનું સાંસ્કૃતિક યોગદાન<br>બ. મુખ્ય તહેવારો અને ઉજવણીઓ<br>ક. રાંધણકળાનો વારસો<br>ડ. સામાજિક માળખું અને આજીવિકા<br>ઇ. ઐતિહાસિક સીમાચિહ્નો | **૦૩ કલાકો** |

| | | |
|---|---|---|
| ૩ | **ગુજરાતી ભાષાનું મૂળ:**<br>અ. ગુજરાતી લિપિ અને મૂળાક્ષરો<br>બ. મૂળભૂત ઉચ્ચારણ નિયમો<br>ક. સામાન્ય શુભેચ્છાઓ અને પરિચય | **૦૩ કલાકો** |
| ૪ | **વાક્યો:**<br>અ. વાક્ય નું માળખું<br>બ. સર્વનામોનો પરિચય<br>ક. ગુજરાતીમાં સહાયક ક્રિયાપદો: વર્તમાન, ભૂતકાળ અને ભવિષ્ય<br>ડ. બે શબ્દોનાં વાક્યો, બે કરતાં વધુ શબ્દોનાં વાક્યો અને ત્રણ શબ્દો નાં વાક્યો<br>ઇ.અનિવાર્ય અને પૂછપરછના વાક્યો | **૦૩ કલાકો** |
| ૫ | **સંખ્યાઓ, સામાન્ય શબ્દો અને શબ્દસમૂહો:**<br>અ. સંખ્યાઓ ૧-૫૦<br>બ. સામાન્ય શબ્દો - સમાનાર્થી શબ્દો અને વિરોધી શબ્દો<br>ક. સામાન્ય શબ્દસમૂહો અને રૂઢિપ્રયોગો | **૦૩ કલાકો** |
| ૬ | **ગુજરાતી વ્યાકરણ:**<br>અ. સમાનાર્થી શબ્દો અને વિરોધી શબ્દો<br>બ. સંધી | **૦૨ કલાકો** |
| ૭ | **બોલવાની અને સાંભળવાની કળા ને અમલ મા મુકવુ:**<br>અ. ગુજરાતી વાર્તાઓ સાંભળવી :ટૂંકા સંવાદોનું અર્થઘટન કરવું અને સારાંશ<br>બ. ગુજરાતી કાર્યક્રમને સાંભળવું: ટૂંકા સંવાદોનું અર્થઘટન<br>ક. નવા ગુજરાતી કાર્યક્રમને સાંભળવું અને તેની ચર્ચા કરવી<br>ડ. ગુજરાતી વક્તાઓને સાંભળવા અને તેમને અમલ મા મુકવુ | **૦૮ કલાકો** |
| ૮ | **વિવિધ ઘટનાક્રમો નું ગુજરાતીમાં વાર્તાલાપ:**<br>અ. સામાજિક ક્રિયાપ્રતિક્રિયાઓ: કાર્યસ્થળ માટે શબ્દભંડોળ, વ્યાવસાયિક સંદેશાવ્યવહાર માટેના શબ્દસમૂહો અને ઘટનાક્રમો ને અમલ મા મુકવુ<br>બ. વાસ્તવિક જીવનની પરિસ્થિતિ (ખરીદી કરવી, જમવાનું, મુસાફરી વગેરે કરી રહ્યા હોય) પર ભૂમિકા ભજવવી.<br>ક. આરોગ્ય અને કટોકટી : આરોગ્ય અને તબીબી પરિસ્થિતિઓ માટે શબ્દભંડોળ, કટોકટીમાં મદદ મેળવવા માટેના શબ્દસમૂહો, દૃશ્યાવલિઓ ભજવતી ભૂમિકા | **૦૬ કલાકો** |

**Recommended Books:**


1. પ્રા. ડૉ. પ્રતિભા શાહ. પ્રા. ડૉ. બી. સી. રાઠોડ.ગુજરાતી વ્યાકરણ પરિચય.અક્ષર પબ્લિકેશન, અમદાવાદ.
2. બિપિન પી. ત્રિવેદી.વ્યાકરણ વિહાર. ત્રિવેદી પબ્લિકેશન. ગાંધીનગર
3. પ્રા. આશાબહેન સી. પટેલ. વિશાલ ચૌધરી. ગુજરાતી વ્યાકરણ. બુક બર્ડ પબ્લિકેશન. ગાંધીનગર.
4. નારસંગ ડોડિયા. ગુજરાતી વ્યાકરણ ભાષાદર્પણ. ત્રિપાદા પબ્લિકેશન. ભાવનગર
5. "Learn Gujarati in 30 Days" by Krishna Gopal Vikal
6. "Gujarati: A Complete Course for Beginners" by Dr. K. G. Venkataraman
7. "Colloquial Gujarati" by J. S. Speake
8. "Gujarati for Beginners" by Anjana Patel
9. "Complete Gujarati: A Teach Yourself Guide" by David G. Smith
10. "A Modern Gujarati Grammar" by M. G. Patel

11. "Gujarati-English/English-Gujarati Dictionary" by R. G. Desai

**ANAND PHARMACY COLLEGE, ANAND**
**(An Autonomous College under UGC Regulations 2023)**
**Managed by Shri Ramkrishna Seva Mandal**
(Approved by PCI, NAAC Accredited – A+ Grade, 3.38 CGPA)
Awarding University: Gujarat Technological University,Ahmedabad

Name of Program: **B. Pharm**
Semester: **I**
Course Code: **B010109PP**
Course Name**: Communicative Gujarati-Practical**
Course Type: **Ability Enhancement Course (AEC)**Year of Implementation: **2024 – 25**

**Teaching and Examination Scheme:**

| Number of hours/ Week | | | Number of credits | | | Total credits | Evaluation Scheme (Marks) | | | | | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Sessional Exams | | | | | | Term End Assessment | | |
| | | | | | | | Theory | | | Practical | | | | | |
| L | Tu | P | L | Tu | P | | CIE | E | T | CIE | E | T | T | P | |
| 0 | 0 | 2 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 5 | 10 | 15 | 0 | 35 | 50 |

**Scope:**
This course deals with the fundamentals of Gujarati language

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

| | |
|---|---|
| CO1 | Enhance listening, comprehension skills and spoken Gujarati to improve fluency and quality in these contexts. |
| CO2 | Develop effective reading strategies and improve writing skills using principles of grammar. |

**Detailed Syllabus:**
Total Teaching hours: **30 hours**

| | | |
|---|---|---|
| **Unit 1** | **Brief history of Gujarati Language:**<br>a. Origin and evolution of Gujarati language<br>b. Regional Variants of Gujarati Language | **02 hours** |
| **Unit 2** | **Gujarati Art, Culture and lifestyle:**<br>a. Cultural contribution of Gujarat<br>b. Major festivals and celebrations<br>c. Culinary heritage<br>d. Social structure and livelihood<br>e. Historic landmarks | **03 hours** |
| **Unit 3** | **Basic of Gujarati language**:<br>a. Gujarati script and alphabets<br>b. Basic pronunciation rules<br>c. Common Greetings and introduction | **03 hours** |
| **Unit 4** | **Sentences:**<br>a. Sentence structure<br>b. Introduction to pronouns<br>c. Auxiliary verbs in Gujarati: Present, Past and future<br>d. Sentences of two words, more than two words, three words.<br>e. Imperative sentences and interrogative sentences | **03 hours** |

| | | |
|---|---|---|
| **Unit 5** | **Numbers, common words and phrases:**<br>a. Numbers 1-50<br>b. Common words – Synonyms and Antonyms<br>c. Common phrases and idioms | **03 hours** |
| **Unit 6** | **Gujarati Grammar:**<br>a. Synonyms and Antonyms<br>b. Sandhi | **02 hours** |
| **Unit 7** | **Practicing speaking and listening:**<br>a. Listening to Gujarati stories: Interpreting short dialogues and summarizing<br>b. Listening to Gujarati podcasts: Interpreting short dialogues<br>c. Listening and discussing Gujarati new broadcasts<br>d. Listening and practicing Gujarati orators | **08 hours** |
| **Unit 8** | **Conversation in Gujarati in various scenarios**:<br>a. **Social interactions**: Vocabulary for workplace, Phrases forprofessional communication, Practice scenarios<br>b. Simulating role play on real life situation (Shopping, dining, travelling, etc.)<br>c. **Health and Emergencies**: Vocabulary for health and medical situations, Phrases for seeking help in emergencies, Role playing scenarios | **06 hours** |

**ANAND PHARMACY COLLEGE, ANAND**
**(An Autonomous College under UGC Regulations2023)**
**Managed by Shri Ramkrishna Seva Mandal**
(Approved by PCI, NAAC Accredited – A+ Grade, 3.38 CGPA)
Awarding University: Gujarat Technological University, Ahmedabad

Name of Program: **B. Pharm**
Semester: **II**
Course Code: **B010201TP**
Course Name: **Physical Pharmaceutics I**
Course Type: **Core**
Year of Implementation: **2024 – 25**

**Teaching and Examination Scheme:**

| Number of hours/ Week | | | Number of credits | | | Total credits | Evaluation Scheme (Marks) | | | | | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Sessional Exams | | | | | | Term End Assessment | | |
| | | | | | | | Theory | | | Practical | | | | | |
| L | Tu | P | L | Tu | P | | CIE | E | T | CIE | E | T | T | P | |
| 3 | 1 | 4 | 3 | 1 | 2 | 6 | 10 | 15 | 25 | 5 | 15 | 25 | 75 | 75 | 200 |

**Scope:**
The course deals with the various physical and physicochemical properties, and principles involved in dosage forms/formulations. Theory and practical components of the subject help the student to get a better insight into various areas of formulation research and development, and stability studies of pharmaceutical dosage forms.

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

| | |
|---|---|
| CO1 | Understand the fundamentals of physicochemical properties of pharmaceutical sciences |
| CO2 | Recognize the techniques to determine the physicochemical properties of a drug andexcipients |
| CO3 | Identify the role of physical characteristics of a drug or excipients in a specific dosage form |
| CO4 | Apply the concepts of physical pharmacy to design safe, stable, and effective dosage forms. |
| CO5 | Recall the physical pharmacy principles, methodologies, and their applicability indosage form development. |
| CO6 | Perform experiments to estimate the physicochemical parameters of pharmaceutical ingredients and analyse the data. |

**Detailed Syllabus:**
Total Teaching hours: **45 hours**

| | | |
|---|---|---|
| **Unit 1** | **Solubility of drugs:**<br>Solubility expressions, mechanisms of solute-solvent interactions, ideal solubility parameters, basics of BCS classification, solvation & association, quantitative approach to the factors influencing solubility of drugs, diffusion principles in biological systems. Solubility of gas in liquids, solubility of liquids in liquids, (binary solutions, ideal solutions) Raoult's law, real solutions. Partially miscible liquids (phenol-water | **10 hours** |

| | | |
|---|---|---|
| | system, triethylamine-water system, nicotine-water system). Ternary phase diagram (benzene, alcohol, water). Critical solution temperature and applications. Distribution law, its limitations and applications. | |
| **Unit 2** | **States of Matter and properties of matter:**<br>**State of matter**-Introduction, properties, changes in the state of matter, types – solid crystalline, solid amorphous, glassy states, polymorphism, pseudo- polymorphism, liquid crystals & liquid complexes. liquid state - latent heats, vapour pressure, sublimation critical point, eutectic mixtures, gases, aerosols – inhalers, gas laws, relative humidity. phase equilibria & phase rule: one, two & three component systems.<br>**Physicochemical properties of drug molecules:** Refractive index, optical rotation, dielectric constant, dipole moment, dissociation constant, determinations and applications. | **12 hours** |
| **Unit 3** | **Surface and interfacial phenomenon:**<br>Liquid interface, surface & interfacial tensions (Introduction, Difference, Equation), surface free energy,<br>Measurement of surface & interfacial tensions- capillary rise, drop weight and drop count, Wilhelmy plate, Du Nouy ring method, spreading coefficient, adsorption at liquid interfaces, surface active agents, HLB Scale - methods to determine HLB value, applications, solubilisation, detergency, Adsorption at solid interface (Langmuir and Freundlich isotherm), electrical properties of interphase – double layer theory and zeta potential. | **10 hours** |
| **Unit 4** | **Complexation and Protein Binding:**<br>**Complexation** - Introduction, classification, applications, methods of analysis based on solubility, distribution, pH-titration and spectroscopic method. Complexation and drug action, crystalline structures of complexes and Thermodynamic treatment of stability constants.<br>**Protein binding**- mechanism, factors affecting, determination and applications. | **08 hours** |
| **Unit 5** | **pH, buffers and Isotonic solutions:**<br>Sorensen's pH scale, pH determination (electrometric and calorimetric), applications of buffers, buffer equation, buffer capacity, buffers in pharmaceutical and biological systems, buffered isotonic solutions. | **05 hours** |

**Tutorials** **Tutorial hours: 15 Hours**

Tutorials will be based on the above syllabus

**List of Practicals**

1. Determination the solubility of drug at room temperature.
2. Determination of pKa value by Half Neutralization/ Henderson Hasselbalch equation.
3. Determination of Partition co- efficient of benzoic acid in benzene and water.
4. Determination of Partition co- efficient of Iodine in CCl4 and water.
5. Determination of % composition of NaCl in a solution using phenol-water system by CST method.
6. Determination of surface tension of given liquids by drop count and drop weight method.
7. Determination of HLB number of a surfactant by saponification method.
8. Determination of Freundlich and Langmuir constants using activated char coal.
9. Determination of critical micellar concentration of surfactant.

10. Determination of stability constant and donor acceptor ratio of PABA-Caffeinecomplex by solubility method.
11. Determination of stability constant and donor acceptor ratio of Cupric-Glycinecomplex by pH titration.

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


1. Martin AN. Physical Pharmacy: Physical Chemical Principles in the Pharmaceutical Sciences. Philadelphia: Lea & Febiger. Philadelphia.
2. Parrott EL. Experimental Pharmaceutics. Burgess Publishing Company, Minneapolis.
3. Cooper J, Gunn C. Tutorial Pharmacy. CBS Publishers & Distributors, New Delhi.
4. Stocklosam J. Pharmaceutical Calculations. Lea & Febiger. Philadelphia.
5. Liberman HA, Lachman C. Pharmaceutical Dosage Forms: Tablets, Volumes 1-6. Marcel Dekker Inc. New York.
6. Liberman HA, Lachman C. Disperse Systems. Volumes 1-3. Marcel Dekker Inc. New York.
7. Ramasamy C, Manavalan R. Physical Pharmaceutics. Vignesh Publisher. Chennai.
8. Subramanyam CVS, Thimmasetty J. Laboratory Manual of Physical Pharmaceutics. Vallabh Prakashan. New Delhi.
9. Subramanyam CVS. Physical Pharmaceutics. Vallabh Prakashan. New Delhi.
10. Roop KK, Gaurav J. Textbook of Physical Pharmacy. CBS Publishers & Distributors. New Delhi.


L= Lecture, Tu= Tutorial, P= Practical, T = Theory

^ This is not an exhaustive list

**ANAND PHARMACY COLLEGE, ANAND**
**(An Autonomous College under UGC Regulations2023)**
**Managed by Shri Ramkrishna Seva Mandal**
(Approved by PCI, NAAC Accredited – A+ Grade, 3.38 CGPA)
Awarding University: Gujarat Technological University, Ahmedabad

Name of Program: **B. Pharm**
Semester: **II**
Course Code: **B010202TP**
Course Name: **Biochemistry**
Course Type: **Core**
Year of Implementation: **2024 – 25**

**Teaching and Examination Scheme:**

| Number of hours/ Week | | | Number of credits | | | Total credits | Evaluation Scheme (Marks) | | | | | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Sessional Exams | | | | | | Term End Assessment | | |
| | | | | | | | Theory | | | Practical | | | | | |
| L | Tu | P | L | Tu | P | | CIE | E | T | CIE | E | T | T | P | |
| 3 | 1 | 4 | 3 | 1 | 2 | 6 | 10 | 15 | 25 | 5 | 20 | 25 | 75 | 75 | 200 |

**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.

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

| | |
|---|---|
| CO1 | Understand cellular oxidative phosphorylation and biological oxidation |
| CO2 | Understand and apply the knowledge of the metabolism of carbohydrates, lipids, amino acids,proteins, and nucleic acids in various physiological and pathological conditions |
| CO3 | Use concepts of enzyme catalysis and inhibition for therapeutic and diagnostic purposes |
| CO4 | Explore the genetic organization and apply this knowledge for DNA replication and RNAtranscription processes |
| CO5 | Apply principles of various biochemical methods and able to interpret variation in normallevels of constituents present in biological fluids |
| CO6 | Evaluate various constituents in blood and urine using various biochemical techniques |

**Detailed Syllabus:**
Total Teaching hours: **45 hours**

| | | |
|---|---|---|
| **Unit 1** | **Biomolecules:**<br>Introduction, classification, chemical nature and biological role of carbohydrate, lipids, nucleic acids, amino acids and proteins.<br><br>**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 | **04 hours**<br><br>**04 hours** |
| **Unit 2** | **Carbohydrate metabolism:**<br>Glycolysis – Pathway, energetics and significance Citric acid cycle- Pathway, energetics and significance, HMP shunt and its significance; Glucose-6- Phosphate dehydrogenase (G6PD) deficiency | **04 hours** |

| | | |
|---|---|---|
| | Glycogen metabolism Pathways and glycogen storage diseases (GSD)Gluconeogenesis- Pathway and its significance, Hormonal regulation of blood glucose level and Diabetes mellitus | **03 hours** |
| | **Biological oxidation:** Electron transport chain (ETC) and its mechanism, Inhibitors of ETC, Oxidative phosphorylation & its mechanism and substrate level phosphorylation and Inhibitors of oxidative phosphorylation/Uncouplers | **03 hours** |
| **Unit 3** | **Lipid metabolism:** β-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 | **03 hours** |
| | Disorders of lipid metabolism: Hypercholesterolemia, atherosclerosis, fatty liverand obesity. | **02 hours** |
| | **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(Phenyketonuria, Albinism, alkeptonuria, tyrosinemia) | **03 hours** |
| | Synthesis and significance of biological substances; 5-HT, melatonin, dopamine, noradrenaline, adrenaline, Catabolism of heme; hyperbilirubinemia and jaundice | **02 hours** |
| **Unit 4** | **Nucleic acid metabolism and genetic information transfer:** Biosynthesis ofpurine and pyrimidine nucleotides, Catabolism of purine nucleotides and Hyperuricemia and Gout disease | **04 hours** |
| | 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 | **06 hours** |
| **Unit 5** | **Enzymes:** Introduction, properties, nomenclature and IUB classification of enzymes, Factors affecting enzyme activity, Enzyme kinetics (Michaelis plot, Line Weaver Burke plot), Enzyme inhibitors with examples | **03 hours** |
| | Regulation of enzymes: enzyme induction and repression, allosteric enzymes regulation Therapeutic and diagnostic applications of enzymes and isoenzymesCoenzymes –Structure and biochemical functions | **03 hours** |

**Tutorials** **Tutorial hours: 15 Hours**

Tutorials will be based on above syllabus

**List of Practicals**

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
13. Estimation of Creatinine in serum by Modified Jaffe method.

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


1. Goyal RK, Shah SA, Mehta A A. Practicals in Biochemistry and Clinical Pathology. BS Shah Prakashan. Ahmedabad. India.
2. Plummer DT. An introduction to practical biochemistry. McGaw Hill Education (India) Pvt.Ltd. Chennai. India.
3. Rao GD. A manual of Practical Biochemistry. Birla Publication Pvt. Ltd Delhi. India.
4. Murry RK, Granner DK & Rodwell VW. Harper's Illustrated Biochemistry. Mc Graw Hill Education.Asia.
5. Rao R. Textbook of Biochemistry. UBS Publisher. New Delhi. India.
6. Deb A C. Fundamental of Biochemistry. New Central Book Agency. Calcutta. India.
7. Satyanarayan D & U Chakrapani U. Biochemistry. Book & Allied Pvt, Ltd. Kolkata. India.
8. Nelson D L. Cox MM. Lehninger Principles of Biochemistry. W.H Freeman and Company. NewYork. USA.
9. Berg J M. Tymoczko JL. Stryer L. Biochemistry. W.H Freeman and Company. New York. USA.
10. Harvey RA. Ferrier DR. Lippincott Illustrated Reviews: Biochemistry. Wolters Kulver. Baltimore.USA.


L= Lecture, Tu= Tutorial, P= Practical, T = Theory

^ This is not an exhaustive list

**ANAND PHARMACY COLLEGE, ANAND**
**(An Autonomous College under UGC Regulations 2023)**
**Managed by Shri Ramkrishna Seva Mandal**
(Approved by PCI, NAAC Accredited – A+ Grade, 3.38 CGPA)
Awarding University: Gujarat Technological University, Ahmedabad

Name of Program: **B. Pharm**
Semester: **II**
Course Code: **B010203TP**
Course Name: **Pharmaceutical Organic Chemistry**
Course Type: **Core**
Year of Implementation: **2024 – 25**

**Teaching and Examination Scheme:**

| Number of hours/ Week | | | Number of credits | | | Total credits | Evaluation Scheme (Marks) | | | | | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Sessional Exams | | | | | | Term End Assessment | | |
| | | | | | | | Theory | | | Practical | | | | | |
| L | Tu | P | L | Tu | P | | CIE | E | T | CIE | E | T | T | P | |
| 3 | 1 | 4 | 3 | 1 | 2 | 6 | 10 | 15 | 25 | 5 | 20 | 25 | 75 | 75 | 200 |

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

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

| | |
|---|---|
| CO1 | Understand fundamental concept of organic chemistry and classify various organic compounds |
| CO2 | Understand the principles of organic reactions and chemistry of specific functional groups |
| CO3 | Illustrate the structure and uses of specified organic compounds |
| CO4 | Apply IUPAC system of nomenclature of organic compounds |
| CO5 | Apply the basic principles involved in the systematic qualitative analysis of organic compounds |
| CO6 | Identify organic compounds by performing qualitative analysis and construct molecularmodels |

**Detailed Syllabus:**
Total Teaching hours: **45 hours**

**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 1** | **Fundamental concepts of organic chemistry, Classification, IUPAC nomenclature and Isomerism**<br>Polarity of bond and Polarity in molecules, Inductive effect, electrometric effect, resonance and hyperconjugation effect. Homolytic and heterolytic bond breaking, Electrophiles and nucleophiles, carbocations, carbanions and radicals.<br>Classification of Organic Compounds<br>Common and IUPAC systems of nomenclature of organic compounds (up to 10 Carbons open chain and carbocyclic compounds)<br>Isomerism in organic compounds. | **03 hours**<br>**04 hours** |
| **Unit 2** | **Alkanes*, Alkenes* and Conjugated dienes*:**<br>$SP^3$ hybridization in alkanes, Halogenation of alkanes, uses of paraffins<br>$SP^2$ hybridization in alkenes, Stabilities of alkenes, E1 and E2 reactions – kinetics, order of reactivity of alkyl halides, rearrangement of carbocations, Saytzeff's and Hofmann orientation and evidences. Factors affecting E1 and E2 reactions, E1 verses E2 reactions<br>Electrophilic addition reactions of alkenes, Markownikoff's orientation, free radical addition reactions of alkenes, Anti Markownikoff's orientation, Ozonolysis<br>Stability of conjugated dienes, Diel-Alder reaction, electrophilic addition, free radical addition reactions of conjugated dienes, allylic rearrangement | **02 hours**<br>**03 hours**<br>**02 hours**<br>**03 hours** |
| **Unit 3** | **Alkyl halides*:**<br>$S_N1$ and $S_N2$ reactions - kinetics, order of reactivity of alkyl halides, stereochemistry and rearrangement of carbocations. Factors affecting $S_N1$ and $S_N2$ reactions, $S_N1$ versus $S_N2$ reactions.<br>Structure and uses of ethyl chloride, chloroform, trichloroethylene, tetrachloroethylene, dichloromethane, tetrachloromethane and iodoform<br>**Alcohols***- Qualitative tests, Structure and uses of ethyl alcohol, methyl alcohol, chlorbutanol, cetosteryl alcohol, benzyl alcohol, glycerol, propylene glycol | **04 hours**<br>**02 hours**<br>**04 hours** |
| **Unit 4** | **Carbonyl compounds* (Aldehydes and ketones):**<br>Nucleophilic addition reaction, Electromeric effect, aldol condensation, Crossed Aldol condensation, Cannizzaro reaction, Crossed Cannizzaro reaction, Benzoin condensation, Perkin condensation<br>Qualitative tests of aldehyde and ketones<br>Structure and uses of formaldehyde, paraldehyde, acetone, chloral hydrate, hexamine, benzaldehyde, vanillin, cinnamaldehyde | **06 hours**<br>**02 hours**<br>**02 hours** |

| | | |
|---|---|---|
| **Unit 5** | **Carboxylic acids*:**<br>Acidity of carboxylic acids, effect of substituents on acidity, inductive effect | **01 hours** |
| | Qualitative tests for carboxylic acids, amide and ester. | **02 hours** |
| | 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 | **02 hours** |
| | **Aliphatic amines*** - Basicity, effect of substituent on Basicity.Qualitative test for amine Structure and uses of Ethanolamine, Ethylenediamine, Amphetamine | **03 hours** |

**Tutorials** **Tutorial hours: 15 Hours**

Tutorials will be based on above syllabus

**List of Practicals**

1. Systematic qualitative analysis of unknown organic compounds like
   a. Preliminary test: Color, odour, aliphatic/aromatic compounds, saturation and unsaturation, etc.
   b. Detection of elements like Nitrogen, Sulphur and Halogen by Lassaigne's test
   c. Solubility test
   d. Functional group test like Phenols, Amides/ Urea, Carbohydrates, Amines, Carboxylic acids, Aldehydes and Ketones, Alcohols, Esters, Aromatic and Halogenated Hydrocarbons, Nitro compounds and Anilides.
   e. Melting point/Boiling point of organic compounds
   f. Identification of the unknown compound from the literature using melting point/ boiling point.
   g. Preparation of the derivatives and confirmation of the unknown compound by melting point/ boiling point.
   h. Minimum 5 unknown organic compounds to be analysed systematically.
   i. To separate and identify the given unknown organic binary mixture.
2. Preparation of suitable solid derivatives from organic compounds and spectral analysis of one of the derivatives with respect to FTIR
3. Construction of molecular models

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


1 Morrison RT, Boyd RN. Organic Chemistry. Pearson Education. New Delhi. India.

2. Finar IL. Organic Chemistry. Pearson Education. New Delhi. India.

3. Bahl BS, Bahl A. A textbook of Organic Chemistry. S. Chand Publishing. New Delhi. India.

4. Soni PL, Chawla HM. Textbook of Organic Chemistry. S. Chand Publishing. New Delhi. India.

5. Mann FG, Saunders B C. Practical Organic Chemistry. Longman. London & New York.

6. Vogel I. Practical Organic Chemistry. Logman Scientific & Technical. New York.

7. Vishnoi NK. Advanced practical organic chemistry. Vikas Publishing House. India.

8. Pavia DL, Lampman GM, Kriz GS, Engel RG. Organic Laboratory Techniques. Cengage Learning. USA.
9. Ahluwalia VK. Organic Reaction Mechanisms. Ane Books. India.
10. Clayden J, Greeves N, Warren S. Organic Chemistry. Oxford University Press. USA.
11. Smith MB. March's Advanced Organic Chemistry: Reactions, Mechanisms, and Structure. John Wiley & Sons. USA.

L= Lecture, Tu= Tutorial, P= Practical, T = Theory

^ This is not an exhaustive list

**ANAND PHARMACY COLLEGE, ANAND**
**(An Autonomous College under UGC Regulations 2023)**
**Managed by Shri Ramkrishna Seva Mandal**
(Approved by PCI, NAAC Accredited – A+ Grade, 3.38 CGPA)
Awarding University: Gujarat Technological University, Ahmedabad

Name of Program: **B. Pharm**
Semester: **II**
Course Code: **B010204TP**
Course Name: **Human Anatomy & Physiology II**
Course Type: **Core**
Year of Implementation: **2024 – 25**

**Teaching and Examination Scheme:**

| Number of hours/ Week | | | Number of credits | | | Total credits | Evaluation Scheme (Marks) | | | | | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Sessional Exams | | | | | | Term End Assessment | | |
| | | | | | | | Theory | | | Practical | | | | | |
| L | Tu | P | L | Tu | P | | CIE | E | T | CIE | E | T | T | P | |
| 3 | 1 | 4 | 3 | 1 | 2 | 6 | 10 | 15 | 25 | 5 | 20 | 25 | 75 | 75 | 200 |

**Scope:** This subject is designed to impart fundamental knowledge on the structure andfunctions 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 thevarious disciplines of pharmacy.

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

| | |
|---|---|
| CO1 | To explain the organization, structure and functions of the nervous system, and analyze the roles of the central and peripheral nervous systems in maintaining homeostasis |
| CO2 | To describe and illustrate the detailed anatomy and physiology of therespiratory and urinary system, including related disorders |
| CO3 | To interpret and articulate the detailed structure and functions of thereproductive system, special senses and its disorders |
| CO4 | To explore and correlate the detailed anatomy and physiology of the endocrine system and its disorders |
| CO5 | To relate the knowledge of course in identification of respiratory,cardiovascular, urinary and reproductive systems of the body |
| CO6 | To perform and interpret systemic examination related to the sensory organs and respiratory system |

**Detailed Syllabus:**
Total Teaching hours: **45 hours**

| | | |
|---|---|---|
| **Unit 1** | **Nervous system:** Organization of nervous system, Neuron, neuroglia, classification and properties of nerve fiber, Electrophysiology, action potential, nerve impulse, receptors, Signal transmission at synapse (electrical,chemical), Neurotransmitters<br>**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<br>**Central nervous system:** Meninges, ventricles of brain and cerebrospinal fluid, Structure and functions of brain (cerebrum, brain stem, cerebellum, Diencephalon) | **15 hours** |

| | | |
|---|---|---|
| | Structure & functions of spinal cord (gross structure, functions of afferent and efferent nerve tracts, reflex activity) | |
| **Unit 2** | **Respiratory system:** Anatomy of respiratory system with special reference toanatomy of lungs, Mechanism of respiration, regulation of respiration, Lung Volumes and capacities, transport of respiratory gases, Artificial respiration, and resuscitation methods, Disorders of respiratory system | **05 hours** |
| **Unit 3** | **Urinary system:** Anatomy of urinary tract with special reference to anatomyof kidney and nephrons, Functions of kidney and urinary tract, Physiology ofurine formation, Micturition reflex, Role of kidneys in acid base balance, Role of RAS in kidney and disorders of kidney | **05 hours** |
| **Unit 4** | **Endocrine system:** Classification of hormones, Mechanism of hormoneaction, Structure and functions of pituitary gland, thyroid gland, parathyroid gland, adrenal gland, pancreas, pineal gland, thymus and their disorders. | **10 hours** |
| **Unit 5** | **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. | **06 hours** |
| **Unit 6** | **Integumentary system:** Structure and functions of skin<br>**Special senses:** Structure and functions of eye, ear, nose and tongue and theirdisorders. | **04 hours** |

**Tutorials** **Tutorial hours: 15 Hours**

Tutorials will be based on above syllabus

**List of Practicals:**

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

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


1. Tortora GJ, Derikson BH. Principles of Anatomy and Physiology. Wiley India Pvt. Ltd. New Delhi. India.
2. K. Sembulingam, P. Sembulingam. Essentials of Medical Physiology. Jaypeebrother's medical publishers. New Delhi. India.
3. Waugh A, Grant A. Ross and Wilson Anatomy and Physiology in Health and Illness. Churchill

Livingstone, Elsevier. New York.
4. West JB. Best and Tailor's Physiological basis of Medical Practice. BI Waverly Pvt. Ltd. New Delhi. India.
5. Guyton AC, Hall JE. Text book of Medical Physiology. Sunders International Print O-Pac. Noida, UP. India.
6. Singh IH. Textbook of Human Histology by, Jaypee brother's medical publishers. New Delhi. India.
7. Varshney VP, Bedi M. Ghia's Textbook of Practical Physiology. Jaypee brother's medical publishers. New Delhi. India.
8. Nageswari KS, Sharma R. Practical workbook of Human Physiology. Jaypee brother's medical publishers. New Delhi. India.
9. Goyal RK, Patel NM. Practical Anatomy and Physiology B S Shah Prakashan. Ahmedabad. India.

L= Lecture, Tu= Tutorial, P= Practical, T = Theory

^ this is not an exhaustive list

**ANAND PHARMACY COLLEGE, ANAND**
**(An Autonomous College under UGC Regulations 2023)**
**Managed by Shri Ramkrishna Seva Mandal**
(Approved by PCI, NAAC Accredited – A+ Grade, 3.38 CGPA)
Awarding University: Gujarat Technological University, Ahmedabad

Name of Program: **B. Pharm**
Semester: **II**
Course Code: **B010205TT**
Course Name **Environmental Sciences**
Course Type: **Core**
Year of Implementation: **2024 – 25**

**Teaching and Examination Scheme:**

| Number of hours/ Week | | | Number of credits | | | Total credits | Evaluation Scheme (Marks) | | | | | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Sessional Exams | | | | | | Term End Assessment | | |
| | | | | | | | Theory | | | Practical | | | | | |
| L | Tu | P | L | Tu | P | | CIE | E | T | CIE | E | T | T | P | |
| 2 | 0 | 0 | 2 | 0 | 0 | 2 | 5 | 10 | 15 | 0 | 0 | 0 | 35 | 0 | 50 |

**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.

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

| | |
|---|---|
| CO1 | To transmit fundamental understanding of the environment and related issues |
| CO2 | To investigate innate alterations in the organism as well as environmental system |
| CO3 | To become aware of various forms of pollution and how to prevent it |
| CO4 | To motivate learner to participate in environment protection and environment improvement |

**Course Contents:**
Total Teaching hours: **30 hours**

| | | |
|---|---|---|
| **Unit 1** | **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 | **10 hours** |
| **Unit 2** | **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) | **10 hours** |
| **Unit 3** | **Environmental Pollution:** Air pollution; Water pollution; Soil pollution | **10 hours** |

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


1. Singh YK. Environmental Science. New Age International Pvt. Publishers. Bangalore.
2. Agarwal KC. Environmental Biology. Nidi Publ. Ltd. Bikaner.
3. Bharucha E. The Biodiversity of India. Mapin Publishing Pvt. Ltd. Ahmedabad. India.
4. Brunner RC. Hazardous Waste Incineration. McGraw Hill Inc. USA.
5. Clark RS. Marine Pollution. Clanderson Press, Oxford.
6. Cunningham WP, Cooper TH, Gorhani E, Hepworth MT. Environmental Encyclopedia. Jaico Publ. House. Mumbai.
7. De AK. Environmental Chemistry. Wiley Eastern Ltd. Pune.
8. Down to Earth. Centre for Science and Environment.


L= Lecture, Tu= Tutorial, P= Practical, T = Theory

^ This is not an exhaustive list

**ANAND PHARMACY COLLEGE, ANAND**
**(An Autonomous College under UGC Regulations 2023)**
**Managed by Shri Ramkrishna Seva Mandal**
(Approved by PCI, NAAC Accredited – A+ Grade, 3.38 CGPA)
Awarding University: Gujarat Technological University, Ahmedabad

Name of Program: **B. Pharm**
Semester: **II**
Course Code: **B010206EP**
Course Name**: Meditation in Practice**
Course Type: **Ability Enhancement Course (AEC)**
Year of Implementation: **2024 – 25**

**Teaching and Examination Scheme:**

| Number of hours/ Week | | | Number of credits | | | Total credits | Evaluation Scheme (Marks) | | | | | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Sessional Exams | | | | | | Term End Assessment | | |
| | | | | | | | Theory | | | Practical | | | | | |
| L | Tu | P | L | Tu | P | | CIE | E | T | CIE | E | T | T | P | |
| 0 | 0 | 2 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 5 | 10 | 15 | 35 | 0 | 50 |

**Scope:**
Meditation empowers a student to focus and keep calm to get peace of mind.

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

| | |
|---|---|
| CO1 | Remember meditation types, and methods for stress management, positive thinking, strengths, self-confidence, time management, ethics, communication, leadership, and healthy habits |
| CO2 | Learn essential life skills, stress management, self-awareness, time management, and ethical leadership for holistic personal and professional growth |

**Detailed Syllabus:**
Total Teaching hours: **30 hours**

| | | |
|---|---|---|
| **1.** | **Introduction to Meditation** (1 Hour)<br>a. History and origins<br>b. Different types of meditation<br>c. Benefits of meditation (physical, mental, emotional)<br>**Goals and Aspiration**<br>a. Clarity and Vision<br>b. Overcoming Obstacles<br>c. Action and Motivation<br>**Power of Thought**<br>a. Positive Thinking and Affirmations<br>b. Mindfulness and Thought Awareness<br>c. Transforming Negative Thoughts<br>d. Guided Meditation (30 minutes in every 1 hr. session) | **6 hours** |
| **2.** | **My Strengths**<br>a. Identifying Strengths<br>b. Leveraging Strengths<br>c. Cultivating New Strengths<br>**Developing Self-Confidence** | **6 hours** |

| | | |
|---|---|---|
| | a. Building Self-Confidence<br>b. Affirmations and Positive Self-Talk<br>c. Facing and Overcoming Fears<br>**Overcoming Stress**<br>a. Managing and Reducing Stress<br>b. Relaxation Techniques<br>c. Developing Resilience<br>Guided Meditation (30 minutes in every 1 hr. session) | |
| **3.** | **Managing Time**<br>a. Prioritization and Planning<br>b. Eliminating Distractions<br>c. Work-Life Balance<br>**Healthy Habits and Healthy Relationships**<br>a. Building Healthy Habits<br>b. Nurturing Relationships<br>c. Self-Care and Well-Being<br>**Ethics and Human Values**<br>a. Understanding Core Values<br>b. Ethical Decision Making<br>Cultivating Compassion and Empathy Guided Meditation (30 minutes in every 1 hr. session) | **6 hours** |
| **4.** | **Decision Making Skills**<br>a. Analyzing Options<br>b. Weighing Pros and Cons<br>c. Making Confident Choices<br>**Conflict Resolution**<br>a. Active Listening<br>b. Finding Common Ground<br>c. Negotiation Techniques<br>**Overcoming Obstacles**<br>a. Identifying Challenges<br>b. Developing Resilience<br>c. Strategic Problem Solving<br>Guided Meditation (30 minutes in every 1 hr. session) | **6 hours** |
| **5.** | **Communication Skills**<br>a. Active Listening<br>b. Effective Speaking<br>c. Nonverbal Communication<br>**Leadership Skills**<br>a. Inspiring and Motivating Others<br>b. Decision Making and Delegation<br>c. Building and Leading Teams<br>**Health and Hygiene**<br>a. Daily Hygiene Routines<br>b. Balanced Nutrition<br>c. Regular Exercise<br>**Caring and Sharing**<br>a. Empathy and Compassion<br>b. Acts of Kindness<br>c. Building Supportive Relationships<br>Guided Meditation (30 minutes in every 1 hr. session) | **6 hours** |

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

**Books:** "The Miracle of Mindfulness" by Thich Nhat Hanh, "The Power of Now" byEckhart Tolle
**Apps:** Headspace, Calm, Insight Timer
**Videos:** Guided meditations on YouTube, TED Talks on mindfulness

^ This is not an exhaustive list

**ANAND PHARMACY COLLEGE, ANAND**
**(An Autonomous College under UGC Regulations 2023)**
**Managed by Shri Ramkrishna Seva Mandal**
(Approved by PCI, NAAC Accredited – A+ Grade, 3.38 CGPA)
Awarding University: Gujarat Technological University, Ahmedabad

Name of Program: **B.Pharm**
Semester: **II**
Course Code: **B010207EP**
Course Name**: Yoga in Practice**
Course Type: **Ability Enhancement Course (AEC)**
Year of Implementation: **2024 – 25**

**Teaching and Examination Scheme:**

| Number of hours/ Week | | | Number of credits | | | Total credits | Evaluation Scheme (Marks) | | | | | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Sessional Exams | | | | | | Term End Assessment | | |
| | | | | | | | Theory | | | Practical | | | | | |
| L | Tu | P | L | Tu | P | | CIE | E | T | CIE | E | T | T | P | |
| 0 | 0 | 2 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 5 | 10 | 15 | 35 | 0 | 50 |

**Scope:**
Yoga inculcates discipline in all walks of the life of student. Pranayama practice regulates breathing practices of the student to improve stamina, resilience.

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

| | |
|---|---|
| CO1 | Remember key yoga principles, historical context, fundamental poses, pranayama techniques, Sun Salutations, relaxation practices, and their health benefits |
| CO2 | Perform yoga poses, pranayama, and relaxation techniques to improve overall strength, flexibility, and mental tranquility |

**Detailed Syllabus:**
Total Teaching hours: **30 hours**

| | | |
|---|---|---|
| **Unit 1** | **Introduction and Foundation** | |
| | **Introduction to Yoga and Meditation**<br>a. Overview of yoga and its benefits<br>b. Introduction to meditation and mindfulness<br>c. Basic principles and philosophy of yoga | **02 hours** |
| | **Basic Asanas and Breathing Techniques**<br>a. warming up exercises to prepare the body from head to toe for Yoga<br>b. Basic standing poses (Tadasana, Vrikshasana)<br>c. Seated poses (Sukhasana, Vajrasana)<br>d. Introduction to Pranayama: Anulom Vilom (Alternate Nostril Breathing) | **02 hours** |
| | **Sun Salutations and Relaxation Techniques**<br>a. Learning Sun Salutations (Surya Namaskar)<br>b. Basic relaxation techniques (Savasana) | **02 hours** |
| **Unit 2** | **Deepening Practice Intermediate Asanas**<br>a. Balancing poses (Garudasana, Natarajasana)<br>b. Forward bends (Paschimottanasana)<br>c. Twists (Ardha Matsyendrasana) | **02 hours** |

| | | |
|---|---|---|
| | **Pranayama and Breath Awareness**<br>a. Kapalabhati (Skull Shining Breath)<br>b. Bhramari (Bee Breath)<br>**Introduction to Meditation Techniques**<br>a. Basic seated meditation posture<br>b. Mindfulness meditation<br>c. Body scan meditation | **02 hours**<br><br><br>**02 hours** |
| **Unit 3** | **Advanced Techniques and PhilosophyAdvanced Asanas**<br>a. Inversions (Sarvangasana, Halasana)<br>b. Backbends (Bhujangasana, Ustrasana)<br>c. Hip openers (Baddha Konasana, Upavistha Konasana)<br>**Advanced Pranayama**<br>a. Ujjayi (Victorious Breath)<br>b. Sitali (Cooling Breath)<br>c. Introduction to Bandhas (energy locks)<br>**Philosophy and Ethics of Yoga (2 hours)**<br>a. The Eight Limbs of Yoga (Ashtanga Yoga)<br>b. Yamas and Niyamas (Ethical guidelines)<br>c. Discussion on the Bhagavad Gita and Yoga Sutras | **02 hours**<br><br><br><br>**02 hours**<br><br><br>**02 hours** |
| **Unit 4** | **Asana Practices**<br>a. Surya-Namaskar<br>b. Sarvangasna, Halasana, Kandharasana (setubandhasana)<br>c. Bhujangasana, Naukasana, Mandukasana<br>d. Paschimottasana, Baddhakonasana, Bharadwajasana | **06 hours** |
| **Unit 5** | **Meditation Practices**<br>a. Bhastrika, Anulom Vilom Pranayam Kriya<br>b. Kapalbhati Pranayam Kriya<br>c. Bhramary Pranayam | **06 hours** |

**Recommended Resources**

a. Yoga mat, blocks, and straps
b. Comfortable clothing suitable for movement
c. Journal for self-reflection and note-taking

**Suggested Reading**

a. "Light on Yoga" by B.K.S. Iyengar
b. "The Heart of Yoga" by T.K.V. Desikachar
c. "The Miracle of Mindfulness" by Thich Nhat Hanh