



SARDAR PATEL UNIVERSITY
Vallabh Vidyanagar, Gujarat
 (Reaccredited with 'A' Grade by NAAC (CGPA 3.25)
 Syllabus with effect from the Academic Year 2021-2022

PROGRAMME STRUCTURE
Bachelor of Pharmacy (B. Pharm) Semester: II

| To Pass | At least 40% Marks in the aggregate of University and Internal examination in each course. | | | | | | | |
|----------------------------|--|--|-----------|------------------------|----------------------|--------------------|--------------|----------------|
| Course Type | Course code | Name of the course | Credit | Contact Hours per Week | Exam Duration in Hrs | Component of Marks | | |
| | | | | | | Internal | End Semester | Total |
| Core Course | UP02CBPH01 | Human Anatomy and Physiology II – Theory | 4 | 4 | 3 Hrs | 25/10 | 75/30 | 100/40 |
| | UP02CBPH02 | Pharmaceutical Organic Chemistry I – Theory | 4 | 4 | 3 Hrs | 25/10 | 75/30 | 100/40 |
| | UP02CBPH03 | Pharmaceutical Engineering –Theory | 4 | 4 | 3 Hrs | 25/10 | 75/30 | 100/40 |
| | UP02CBPH04 | Human Anatomy and Physiology II – Practical | 2 | 4 | 4 Hrs | 15/6 | 35/14 | 50/20 |
| | UP02CBPH05 | Pharmaceutical Organic Chemistry I– Practical | 2 | 4 | 4 Hrs | 15/6 | 35/14 | 50/20 |
| | UP02CBPH06 | Pharmaceutical Engineering –Practical | 2 | 4 | 4 Hrs | 15/6 | 35/14 | 50/20 |
| Skill Enhancement Course | UP02SBPH01 | Computer Applications in Pharmacy – Theory * | 3 | 3 | 2 Hrs | 25/10 | 50/20 | 75/30 |
| | UP02SBPH02 | Computer Applications in Pharmacy – Practical* | 1 | 2 | 2 Hrs | 10/4 | 15/6 | 25/10 |
| Ability Enhancement Course | UP02ABPH01 | Environmental sciences – Theory * | 3 | 3 | 2 Hrs | 25/10 | 50/20 | 75/30 |
| Total: | | | 25 | - | - | 180 | 445 | 625/250 |

* The subject experts at Department level shall conduct examinations





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Bachelor of Pharmacy
B.Pharm Semester II

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|-----------------------------|------------|---------------------|---------------------------------|
| Course Code | UP02ABPH01 | Title of the Course | Environmental sciences- Theory* |
| Total Credits of the Course | 3 | Hours per Week | 3 |

| | |
|--------------------|--|
| Scope: | Environmental Sciences is the scientific study of the environmental system and the status of its inherent or induced changes on organisms. It includes not only the study of physical and biological characters of the environment but also the social and cultural factors and the impact of man on environment. |
| Objectives: | Upon completion of the course the student shall be able to: 1. Create the awareness about environmental problems among learners. 2. Impart basic knowledge about the environment and its allied problems. 3. Develop an attitude of concern for the environment. 4. Motivate learner to participate in environment protection and environment improvement. 5. Acquire skills to help the concerned individuals in identifying and solving environmental problems. 6. Strive to attain harmony with Nature. |

| Course Content | | |
|----------------|--|-------|
| Unit | Description | Hours |
| 1 | The Multidisciplinary nature of environmental studies Natural Resources Renewable and non-renewable resources: Natural resources and associated problems a) Forest resources; b) Water resources; c) Mineral resources; d) Food resources; e) Energy resources; f) Land resources: Role of an individual in conservation of natural resources. | 10 |
| 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 |





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| 3 | Environmental Pollution: Air pollution; Water pollution; Soil pollution | 10 |
|----------|---|-----------|

| Suggested References: | |
|------------------------------|--|
| Sr. No | References |
| 1 | Y.K. Sing, Environmental Science, New Age International Pvt, Publishers, Bangalore |
| 2 | Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner. |
| 3 | Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad – 380 013 |
| 4 | Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p |
| 5 | Clark R.S., Marine Pollution, Clarendon Press Oxford |
| 6 | Cunningham, W.P. Cooper, T.H. Gorhani, E& Hepworth, M.T.2001, Environmental Encyclopedia, Jaico Publ. House, Mumbai, 1196p |
| 7 | De A.K., Environmental Chemistry, Wiley Eastern Ltd |
| 8 | Down of Earth, Centre for Science and Environment |





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B.Pharm Semester II

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|--------------------------------|------------|---------------------|--|
| Course Code | UP02CBPH01 | Title of the Course | Human Anatomy and Physiology II -Theory |
| Total Credits of the Course | 4 | Hours per Week | 3 + 1 (Tutorial) |

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| Scope: | This subject is designed to impart fundamental knowledge on the structure and functions of the various systems of the human body. It also helps in understanding both homeostatic mechanisms. The subject provides the basic knowledge required to understand the various disciplines of pharmacy |
| Objectives: | Upon completion of this course the student should be able to: 1. Explain the gross morphology, structure and functions of various organs of the human body. 2. Describe the various homeostatic mechanisms and their imbalances. 3. Identify the various tissues and organs of different systems of human body. 4. Perform the hematological tests like blood cell counts, haemoglobin estimation, bleeding/clotting time etc and also record blood pressure, heart rate, pulse and respiratory volume. 5. Appreciate coordinated working pattern of different organs of each system 6. Appreciate the interlinked mechanisms in the maintenance of normal functioning (homeostasis) of human body. |

| Course Content | | |
|----------------|---|-------|
| Unit | Description | Hours |
| 1 | Nervous system Organization of nervous system, neuron, neuroglia, classification and properties of nerve fibre, electrophysiology, action potential, nerve impulse, receptors, synapse, neurotransmitters. Central nervous system: Meninges, ventricles of brain and cerebrospinal fluid. structure and functions of brain (cerebrum, brain stem, cerebellum), spinal cord (gross structure, functions of afferent and efferent nerve tracts, reflex activity) | 10 |
| 2 | Digestive system Anatomy of GI Tract with special reference to anatomy and functions of stomach, (Acid production in the stomach, regulation of acid production through parasympathetic nervous system, pepsin role in protein digestion) small intestine and large intestine, anatomy and functions of salivary glands, pancreas and liver, movements of GIT, digestion and absorption of nutrients and disorders of GIT. | 06 |





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Syllabus with effect from the Academic Year 2021-2022

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| | Energetics Formation and role of ATP, Creatinine Phosphate and BMR | |
| 3 | Respiratory system Anatomy of respiratory system with special reference to anatomy of lungs, mechanism of respiration, regulation of respiration Lung Volumes and capacities transport of respiratory gases, artificial respiration, and resuscitation methods. | 10 |
| 4 | Endocrine system Classification of hormones, mechanism of hormone action, structure and functions of pituitary gland, thyroid gland, parathyroid gland, adrenal gland, pancreas, pineal gland, thymus and their disorders | 10 |
| 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 Introduction to genetics Chromosomes, genes and DNA, protein synthesis, genetic pattern of inheritance | 09 |

| Suggested References: | |
|-----------------------|--|
| Sr. No | References |
| 1 | Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypee brothers medical publishers, New Delhi. |
| 2 | Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York |
| 3 | Physiological basis of Medical Practice-Best and Taylor. Williams & Wilkins Co, Riverview, MI USA |
| 4 | Text book of Medical Physiology- Arthur C, Guyton and John. E. Hall. Miamisburg, OH, U.S.A |
| 5 | Principles of Anatomy and Physiology by Tortora Grabowski. Palmetto, GA, U.S.A. |
| 6 | Textbook of Human Histology by Inderbir Singh, Jaypee brothers medical publishers, New Delhi. |
| 7 | Textbook of Practical Physiology by C.L. Ghai, Jaypee brothers medical publishers, New Delhi. |
| 8 | Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee brother's medical publishers, New Delhi. |
| 9 | Physiological basis of Medical Practice-Best and Taylor. Williams & Wilkins Co, Riverview, MI USA |
| 10 | Text book of Medical Physiology- Arthur C, Guyton and John. E. Hall. Miamisburg, OH, U.S.A. |
| 11 | Human Physiology (vol 1 and 2) by Dr. C.C. Chatterrje ,Academic Publishers Kolkata |





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Bachelor of Pharmacy
B.Pharm Semester - II

| | | | |
|-----------------------------|------------|---------------------|---|
| Course Code | UP02CBPH02 | Title of the Course | Pharmaceutical Organic Chemistry I – Theory |
| Total Credits of the Course | 3 | Hours per Week | 3 + 1 (Tutorial) |

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| Scope: | This subject deals with classification and nomenclature of simple organic compounds, structural isomerism, intermediates forming in reactions, important physical properties, reactions and methods of preparation of these compounds. The syllabus also emphasizes on mechanisms and orientation of reactions. |
| Objectives: | Upon completion of the course the student shall be able to 1. write the structure, name and the type of isomerism of the organic compound 2. write the reaction, name the reaction and orientation of reactions 3. Account for reactivity/stability of compounds, 4. Identify/confirm the identification of organic compound. |

| Course Content: General methods of preparation and reactions of compounds superscripted with asterisk (*) to be explained To emphasize on definition, types, classification, principles/mechanisms, applications, examples and differences | | |
|---|---|-------|
| Unit | Description | Hours |
| 1 | Classification, nomenclature and isomerism Classification of Organic Compounds Common and IUPAC systems of nomenclature of organic compounds (up to 10 Carbons open chain and carbocyclic compounds) Structural isomerisms in organic compounds | 07 |
| 2 | Alkanes*, Alkenes* and Conjugated dienes* SP ³ hybridization in alkanes, Halogenation of alkanes, uses of paraffins. Stabilities of alkenes, SP ² hybridization in alkenes E ₁ and E ₂ reactions – kinetics, order of reactivity of alkyl halides, rearrangement of carbocations, Saytzeffs orientation and evidences. E ₁ verses E ₂ reactions, Factors affecting E ₁ and E ₂ reactions. Ozonolysis, electrophilic addition reactions of alkenes, Markownikoff's orientation, | 10 |





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| | free radical addition reactions of alkenes, Anti Markownikoff's orientation. Stability of conjugated dienes, Diel-Alder, electrophilic addition, free radical addition reactions of conjugated dienes, allylic rearrangement | |
| 3 | Alkyl halides* SN ₁ and SN ₂ reactions - kinetics, order of reactivity of alkyl halides, stereochemistry and rearrangement of carbocations. SN ₁ versus SN ₂ reactions, Factors affecting SN ₁ and SN ₂ reactions Structure and uses of ethylchloride, Chloroform, trichloroethylene, tetrachloroethylene, dichloromethane, tetrachloromethane and iodoform. Alcohols* - Qualitative tests, Structure and uses of Ethyl alcohol, Methyl alcohol, chlorobutanol, Cetosteryl alcohol, Benzyl alcohol, Glycerol, Propylene glycol | 10 |
| 4 | Carbonyl compounds* (Aldehydes and ketones) Nucleophilic addition, Electromeric effect, aldol condensation, Crossed Aldol condensation, Cannizzaro reaction, Crossed Cannizzaro reaction, Benzoin condensation, Perkin condensation, qualitative tests, Structure and uses of Formaldehyde, Paraldehyde, Acetone, Chloral hydrate, Hexamine, Benzaldehyde, Vanilin, Cinnamaldehyde. | 10 |
| 5 | Carboxylic acids* Acidity of carboxylic acids, effect of substituents on acidity, inductive effect and qualitative tests for carboxylic acids, amide and ester Structure and Uses of Acetic acid, Lactic acid, Tartaric acid, Citric acid, Succinic acid. Oxalic acid, Salicylic acid, Benzoic acid, Benzyl benzoate, Dimethyl phthalate, Methyl salicylate and Acetyl salicylic acid Aliphatic amines* - Basicity, effect of substituent on Basicity. Qualitative test, Structure and uses of Ethanolamine, Ethylenediamine, Amphetamine | 08 |

Suggested References:

| Sr. No | References |
|--------|--|
| 1 | Organic Chemistry by Morrison and Boyd |
| 2 | Organic Chemistry by I.L. Finar, Volume-I |
| 3 | Textbook of Organic Chemistry by B.S. Bahl & Arun Bahl. |
| 4 | Organic Chemistry by P.L.Soni |
| 5 | Practical Organic Chemistry by Mann and Saunders |
| 6 | Vogel's text book of Practical Organic Chemistry |
| 7 | Advanced Practical organic chemistry by N.K.Vishnoi |
| 8 | Introduction to Organic Laboratory techniques by Pavia, Lampman and Kriz |
| 9 | Reaction and reaction mechanism by Ahluwalia/Chatwal |





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| | | | |
|-----------------------------|------------|---------------------|---------------------------------------|
| Course Code | UP02CBPH03 | Title of the Course | Pharmaceutical Engineering– Theory |
| Total Credits of the Course | 3 | Hours per Week | 3 + 1 (Tutorial) |

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| Scope: | This course is designed to impart a fundamental knowledge on the art and science of various unit operations used in pharmaceutical industry |
| Objectives: | Upon completion of the course student shall be able: 1. To know various unit operations used in Pharmaceutical industries. 2. To understand the material handling techniques. 3. To perform various processes involved in pharmaceutical manufacturing process. 4. To carry out various test to prevent environmental pollution. 5. To appreciate and comprehend significance of plant lay out design for optimum use of resources. 6. To appreciate the various preventive methods used for corrosion control in Pharmaceutical industries. |

| Course Content | | |
|----------------|--|-------|
| Unit | Description | Hours |
| 1 | Flow of fluids: Types of manometers, Reynolds number and its significance, Bernoulli's theorem and its applications, Energy losses, Orifice meter, Venturimeter, Pitot tube and Rotometer. Size Reduction: Objectives, Mechanisms & Laws governing size reduction, factors affecting size reduction, principles, construction, working, uses, merits and demerits of Hammer mill, ball mill, fluid energy mill, Edge runner mill & end runner mill. 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 |
| 2 | Heat Transfer: Objectives, applications & Heat transfer mechanisms. Fourier's law, Heat transfer by conduction, convection & radiation. Heat interchangers & heat exchangers. 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 | 10 |





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| | multiple effect evaporator. Distillation: Basic Principles and methodology of simple distillation, flash distillation, fractional distillation, distillation under reduced pressure, steam distillation & molecular distillation | |
| 3 | Drying: Objectives, applications & mechanism of drying process, measurements & applications of Equilibrium Moisture content, rate of drying curve. principles, construction, working, uses, merits and demerits of Tray dryer, drum dryer spray dryer, fluidized bed dryer, vacuum dryer, freeze dryer. 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 & Silverson Emulsifier, | 08 |
| 4 | Filtration: Objectives, applications, Theories & Factors influencing filtration, filter aids, filter medias. Principle, Construction, Working, Uses, Merits and demerits of plate & frame filter, filter leaf, rotary drum filter, Meta filter & Cartridge filter, membrane filters and Seidtz filter. Centrifugation: Objectives, principle & applications of Centrifugation, principles, construction, working, uses, merits and demerits of Perforated basket centrifuge, Non-perforated basket centrifuge, semi continuous centrifuge & super centrifuge. | 08 |
| 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 there prevention. Ferrous and nonferrous metals, inorganic and organic non metals, basic of material handling systems. | 07 |

| Suggested References: | |
|-----------------------|--|
| Sr. No | References |
| 1 | Introduction to chemical engineering – Walter L Badger & Julius Banchemo, Latest edition. |
| 2 | Solid phase extraction, Principles, techniques and applications by Nigel J.K. Simpson- Latest edition. |
| 3 | Unit operation of chemical engineering – McCabe Smith, Latest edition. |
| 4 | Pharmaceutical engineering principles and practices – C.V.S Subrahmanyam et al., Latest edition. |
| 5 | Remington practice of pharmacy- Martin, Latest edition |
| 6 | Theory and practice of industrial pharmacy by Lachmann., Latest edition |
| 7 | Physical pharmaceutics- C.V.S Subrahmanyam et al., Latest edition. |
| 8 | Cooper and Gunn's Tutorial pharmacy, S.J. Carter, Latest edition |





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B.Pharm Semester II

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|-----------------------------|------------|---------------------|--|
| Course Code | UP02CBPH04 | Title of the Course | Human Anatomy and Physiology II- Practical |
| Total Credits of the Course | 2 | Hours per Week | 4 |

| | |
|--------------------|---|
| Objectives: | Student would be able to: 1. Summarize functional characteristics of various systems 2. Describe the fundamental physiological mechanism involves in demonstrated practicals 3. Interlinking various systems in terms of Feedback mechanisms and perform various tests related to blood cells counts which relates with the diagnosis of various disease conditions 4. Identify and describe functionality of various devices for family planning and pregnancy diagnostic tests 5. Analyze the problem, communicate suggested solution and interpret the results. |
|--------------------|---|

| Course Content | |
|----------------|---|
| Sr. No. | Description |
| 1 | To study the integumentary and special senses using specimen, models, etc., |
| 2 | To study the nervous system using specimen, models, etc.,s |
| 3 | To study the endocrine system using specimen, models, etc |
| 4 | To demonstrate the general neurological examination |
| 5 | To demonstrate the function of olfactory nerve |
| 6 | To examine the different types of taste. |
| 7 | To demonstrate the visual acuity |
| 8 | To demonstrate the reflex activity |
| 9 | Recording of body temperature |
| 10 | To demonstrate positive and negative feedback mechanism |





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| 11 | Determination of tidal volume and vital capacity |
| 12 | Study of digestive, respiratory, cardiovascular systems, urinary and Reproductive systems with the help of models, charts and specimens |
| 13 | Recording of basal mass index |
| 14 | Study of familyplanning devices and pregnancy diagnosis test |
| 15 | Demonstration of total blood count by cell analyser |
| 16 | Permanent slides of vital organs and gonads |

| Suggested References: | |
|------------------------------|---|
| Sr. No | Referencess |
| 1 | Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypee brothers medical publishers, New Delhi. |
| 2 | Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York |
| 3 | Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co,Riverview, MI USA |
| 4 | Text book of Medical Physiology- Arthur C,Guyton andJohn.E. Hall. Miamisburg, OH, U.S.A. |
| 5 | Principles of Anatomy and Physiology by Tortora Grabowski. Palmetto, GA, U.S.A. |
| 6 | Textbook of Human Histology by Inderbir Singh, Jaypee brothers medical publishers, Delhi |
| 7 | Textbook of Practical Physiology by C.L. Ghai, Jaypee brothers medical publishers, New Delhi |
| 8 | Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee brother's medical publishers, New Delhi |
| 9 | Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co, Riverview, MI USA |
| 10 | Text book of Medical Physiology- Arthur C, Guyton and John. E. Hall. Miamisburg, OH, U.S.A |
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B. Pharm Semester II

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|-----------------------------|------------|---------------------|--|
| Course Code | UP02CBPH05 | Title of the Course | Pharmaceutical Organic Chemistry I - Practical |
| Total Credits of the Course | 2 | Hours per Week | 4 |

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| Objectives: | Student would be able to: <ol style="list-style-type: none">1. Identify the nature of organic compounds2. Identify unknown organic compounds using chemical tests3. Prepare various derivatives of organic compounds4. Interpret the stereo models of organic compounds5. Analyze the problem, communicate suggested solution and interpret the results. |
|--------------------|--|

| Course Content | |
|----------------|---|
| Sr. No. | Description |
| 1 | Systematic qualitative analysis of unknown organic compounds like <ol style="list-style-type: none">1. Preliminary test: Color, odour, aliphatic/aromatic compounds, saturation and unsaturation, etc.2. Detection of elements like Nitrogen, Sulphur and Halogen3. Solubility test4. Functional group test like Phenols, Amides/ Urea, Carbohydrates, Amines, Carboxylic acids, Aldehydes and Ketones, Alcohols, Esters, Aromatic and Halogenated Hydrocarbons, Nitro compounds and Anilides.5. Melting point/Boiling point of organic compounds6. Identification of the unknown compound from the literature using melting point/ boiling point.7. Preparation of the derivatives and confirmation of the unknown compound by melting point/ boiling point.8. Minimum 5 unknown organic compounds to be analysed systematically. |
| 2 | Preparation of suitable solid derivatives from organic compounds |
| 3 | Construction of molecular models |





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| Sr. No | References |
| 1 | Organic Chemistry by Morrison and Boyd |
| 2 | Organic Chemistry by I.L. Finar , Volume-I |
| 3 | Textbook of Organic Chemistry by B.S. Bahl & Arun Bahl |
| 4 | Organic Chemistry by P.L.Soni |
| 5 | Practical Organic Chemistry by Mann and Saunders |
| 6 | Vogel's text book of Practical Organic Chemistry |
| 7 | Advanced Practical organic chemistry by N.K.Vishnoi |
| 8 | Introduction to Organic Laboratory techniques by Pavia, Lampman and Kriz. |
| 9 | Reaction and reaction mechanism by Ahluwaliah/Chatwal |





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B.Pharm Semester II

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|--------------------------------|------------|---------------------|--|
| Course Code | UP02CBPH06 | Title of the Course | Pharmaceutical Engineering- Practical |
| Total Credits of the Course | 2 | Hours per Week | 4 |

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| Objectives: | Student would be able to: <ol style="list-style-type: none">1. Perform the experiments involving unit operations like filtration, distillation, evaporation, drying, mixing, crystallization.2. Identify the equipment and carry out the experiments related to size reduction and size separation3. Describe the basic concepts of Heat transfer and HVAC (Humidity Ventilation and Air Conditioning).4. Analyze the problem, communicate suggested solution and interpret the results. |
|--------------------|--|

| Course Content | |
|----------------|--|
| Sr. No. | Description |
| 1 | Determination of radiation constant of brass, iron, unpainted and painted glass |
| 2 | Steam distillation – To calculate the efficiency of steam distillation |
| 3 | To determine the overall heat transfer coefficient by heat exchanger |
| 4 | Construction of drying curves (for calcium carbonate and starch) |
| 5 | Determination of moisture content and loss on drying |
| 6 | Determination of humidity of air – i) From wet and dry bulb temperatures –use of Dew point method |
| 7 | Description of Construction working and application of Pharmaceutical Machinery such as rotary tablet machine, fluidized bed coater, fluid energy mill, de humidifier |
| 8 | Size analysis by sieving – To evaluate size distribution of tablet granulations – Construction of various size frequency curves including arithmetic and logarithmic probability plots |
| 9 | Size reduction: To verify the laws of size reduction using ball mill and |





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| | determining Kicks, Rittinger's, Bond's coefficients, power requirement and critical speed of Ball Mill |
| 10 | Demonstration of colloid mill, planetary mixer, fluidized bed dryer, freeze dryer and such other major equipment |
| 11 | Factors affecting Rate of Filtration and Evaporation (Surface area, Concentration and Thickness/ viscosity) |
| 12 | To study the effect of time on the Rate of Crystallization |
| 13 | To calculate the uniformity Index for given sample by using Double Cone Blender. |

| Suggested References: | |
|------------------------------|--|
| Sr. No | References |
| 1 | Introduction to chemical engineering – Walter L Badger & Julius Banchero, Latest edition. |
| 2 | Solid phase extraction, Principles, techniques and applications by Nigel J.K. Simpson- Latest edition. |
| 3 | Unit operation of chemical engineering – McCabe Smith, Latest edition. |
| 4 | Pharmaceutical engineering principles and practices – C.V.S Subrahmanyam et al., Latest edition. |
| 5 | Remington practice of pharmacy- Martin, Latest edition |
| 6 | Theory and practice of industrial pharmacy by Lachmann., Latest edition |
| 7 | Physical pharmaceutics- C.V.S Subrahmanyam et al., Latest edition. |
| 8 | Cooper and Gunn's Tutorial pharmacy, S.J. Carter, Latest edition |





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|-----------------------------|------------|---------------------|--|
| Course Code | UP02SBPH01 | Title of the Course | Computer Applications in Pharmacy- Theory* |
| Total Credits of the Course | 3 | Hours per Week | 3 |

| | |
|--------------------|---|
| Scope: | This subject deals with the introduction Database, Database Management system, computer application in clinical studies and use of databases. |
| Objectives: | Upon completion of the course the student shall be able to 1. know the various types of application of computers in pharmacy 2. know the various types of databases 3. know the various applications of databases in pharmacy 4. identify the role of computer in data analysis |

| Course Content | | |
|----------------|---|-------|
| Unit | Description | Hours |
| 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 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 |
| 2 | Web technologies: Introduction to HTML, XML, CSS and Programming languages, introduction to web servers and Server Products Introduction to databases, MYSQL, MS ACCESS, Pharmacy Drug database | 06 |
| 3 | Application of computers in Pharmacy Drug information storage and retrieval, Pharmacokinetics, Mathematical model in Drug design, Hospital and Clinical Pharmacy, Electronic | 06 |





SARDAR PATEL UNIVERSITY

Vallabh Vidyanagar, Gujarat

(Reaccredited with 'A' Grade by NAAC (CGPA 3.25)

Syllabus with effect from the Academic Year 2021-2022

| | | |
|----------|---|-----------|
| | 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. | |
| 4 | Bioinformatics: Introduction, Objective of Bioinformatics, Bioinformatics Databases, Concept of Bioinformatics, Impact of Bioinformatics in Vaccine Discovery | 06 |
| 5 | Computers as data analysis in Preclinical development: Chromatographic data analysis(CDS), Laboratory Information management System (LIMS) and Text Information Management System(TIMs) | 06 |

Suggested References:

| Sr. No | References |
|--------|--|
| 1 | Computer Application in Pharmacy – William E.Fassett –Lea and Febiger, 600 South Washington Square, USA, (215) 922-1330. |
| 2 | Computer Application in Pharmaceutical Research and Development –Sean Ekins – Wiley-Interscience, A John Willey and Sons, INC., Publication, USA |
| 3 | Bioinformatics (Concept, Skills and Applications) – S.C.Rastogi-CBS Publishers and Distributors, 4596/1- A, 11 Darya Gani, New Delhi – 110 002(INDIA) |
| 4 | Microsoft office Access - 2003, Application Development Using VBA, SQL Server, DAP and Infopath – Cary N.Prague – Wiley Dreamtech India (P) Ltd., 4435/7, Ansari Road, Daryagani, New Delhi - 110002 |





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Vallabh Vidyanagar, Gujarat
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Syllabus with effect from the Academic Year 2021-2022

Bachelor of Pharmacy
B.Pharm Semester II

| | | | |
|-----------------------------|------------|---------------------|--|
| Course Code | UP02SBPH02 | Title of the Course | Computer Applications in Pharmacy – Practical* |
| Total Credits of the Course | 1 | Hours per Week | 2 |

| | |
|--------------------|---|
| Objectives: | Student would be able to: 1. Generate database using various tools 2. Program to retrieve data from database 3. Apply MS of Access for storage and retrieving drug information 4. Export contents to web and xml pages 5. Analyze the problem, communicate suggested solution and interpret the results. |
|--------------------|---|

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





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|-----------|---|
| 11 | Exporting Tables, Queries, Forms and Reports to web pages |
| 12 | Exporting Tables, Queries, Forms and Reports to XML pages |

| Suggested References: | |
|------------------------------|--|
| Sr. No | References |
| 1 | Computer Application in Pharmacy – William E.Fassett –Lea and Febiger, 600 South Washington Square, USA, (215) 922-1330 |
| 2 | Computer Application in Pharmaceutiscal Research and Development –Sean Ekins – Wiley-Interscience, A John Willey and Sons, INC., Publication, USA |
| 3 | Bioinformatics (Concept, Skills and Applications) – S.C.Rastogi-CBS Publishers and Distributors, 4596/1- A, 11 Darya Gani, New Delhi – 110 002(INDIA) |
| 4 | Microsoft office Access - 2003, Application Development Using VBA, SQL Server, DAP and Infopath – Cary N.Prague – Wiley Dreamtech India (P) Ltd., 4435/7, Ansari Road, Daryagani, New Delhi - 110002 |

