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: I

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**	**Theory / Practical**	**Credit**	**Contact Hours per Week**	**Exam Duration in Hrs**	**Component of Marks**		
							Internal	**End Semester**	**Total**
Foundation Courses	UP01FBPH01	Communication skills – Theory	Theory	2	2	1.5	15/6	35/14	50/20
	UP01FBPH02	Remedial Biology – Theory[#]	Theory	2	2	1.5	15/6	35/14	50/20
	UP01FBPH03	Remedial Mathematics – Theory[$]	Theory	2	2	1.5	15/6	35/14	50/20
	UP01FBPH04	Communication skills – Practical	Practical	1	2	2	10/4	15/6	25/10
	UP01FBPH05	Remedial Biology – Practical[#]	Practical	1	2	2	10/4	15/6	25/10
Core Courses	UP01CBPH01	Human Anatomy and Physiology I – Theory	Theory	4	4	3	25/10	75/30	100/40
	UP01CBPH02	Pharmaceutical Analysis I – Theory	Theory	4	4	3	25/10	75/30	100/40
	UP01CBPH03	Pharmaceutics I – Theory	Theory	4	4	3	25/10	75/30	100/40
	UP01CBPH04	Pharmaceutical Inorganic Chemistry – Theory	Theory	4	4	3	25/10	75/30	100/40
	UP01CBPH05	Human Anatomy and Physiology I – Practical	Practical	2	4	4	15/6	35/14	50/20
	UP01CBPH06	Pharmaceutical Analysis I - Practical	Practical	2	4	4	15/6	35/14	50/20
	UP01CBPH07	Pharmaceutics I – Practical	Practical	2	4	4	15/6	35/14	50/20
	UP01CBPH08	Pharmaceutical Inorganic Chemistry – Practical	Practical	2	4	4	15/6	35/14	50/20
			Total:	**30[#]/29[$]**	**-**	**-**	**225**	**575**	**800/320**

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

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

Bachelor of Pharmacy
B. Pharm Semester I

Course Code	UP01CBPH01	Title of the Course	HUMAN ANATOMY AND PHYSIOLOGY I- Theory
Total Credits of the Course	4	Hours per Week	3 + 1 (Tutorial)

Scope	This subject is designed to impart fundamental knowledge on the structure and functions of the various systems of the human body. It also helps in understanding both homeostatic mechanisms. The subject provides the basic knowledge required to understand the various disciplines of pharmacy.
Objectives:	Upon completion of this course the student should be able to 1. Explain the gross morphology, structure and functions of various organs of the human body. 2. Describe the various homeostatic mechanisms and their imbalances. 3. Identify the various tissues and organs of different systems of human body. 4. Perform the various experiments related to special senses and nervous system. 5. Appreciate coordinated working pattern of different organs of each system

Course Content

Unit	Description	Hours
I	**Introduction to human body** Definition and scope of anatomy and physiology, levels of structural organization and body systems, basic life processes, homeostasis, basic anatomical terminology. **Cellular level of organization** Structure and functions of cell, transport across cell membrane, cell division, cell junctions. General principles of cell communication, intracellular signaling pathway activation by extracellular signal molecule, Forms of intracellular signaling: a) Contact-dependent b) Paracrine c) Synaptic d) Endocrine **Tissue level of organization** Classification of tissues, structure, location and functions of epithelial, muscular and nervous and connective tissues.	**10**
II	**Integumentary system** Structure and functions of skin **.**	**10**

	Skeletal system Divisions of skeletal system, types of bone, salient features and functions of bones of axial and appendicular skeletal system Organization of skeletal muscle, physiology of muscle contraction, neuromuscular junction **Joints** Structural and functional classification, types of joints movements and its articulation	
III	**Body fluids and blood** Body fluids, composition and functions of blood, hemopoeisis, formation of hemoglobin, anemia, mechanisms of coagulation, blood grouping, Rh factors, transfusion, its significance and disorders of blood, Reticulo endothelial system. **Lymphatic system** Lymphatic organs and tissues, lymphatic vessels, lymph circulation and functions of lymphatic system	**10**
IV	**Peripheral nervous system**: Classification of peripheral nervous system: Structure and functions of sympathetic and parasympathetic nervous system. Origin and functions of spinal and cranial nerves. **Special senses** Structure and functions of eye, ear, nose and tongue and their disorders.	**08**
V	**Cardiovascular system** Heart – anatomy of heart, blood circulation, blood vessels, structure and functions of artery, vein and capillaries, elements of conduction system of heart and heart beat, its regulation by autonomic nervous system, cardiac output, cardiac cycle. Regulation of blood pressure, pulse, electrocardiogram and disorders of heart.	**07**

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 Tailor. Williams & Wilkins Co,Riverview, MI USA
4	Text book of Medical Physiology- Arthur C,Guyton andJohn.E. Hall. Miamisburg, OH, U.S.A.
5	Principles of Anatomy and Physiology by Tortora Grabowski. Palmetto, GA, U.S.A.

6	Textbook of Human Histology by Inderbir Singh, Jaypee brother's medical publishers, New Delhi.
7	Textbook of Practical Physiology by C.L. Ghai, Jaypee brother's medical publishers, New Delhi.
8	Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee brother's medical publishers, New Delhi.
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.
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 I

Course Code	UP01CBPH02	Title of the Course	Pharmaceutical Analysis I – Theory
Total Credits of the Course	4	Hours per Week	3 + 1 (Tutorial)

Scope	This course deals with the fundamentals of analytical chemistry and principles of electrochemical analysis of drugs
Objectives:	Upon completion of the course student shall be able to 1. Understand the principles of volumetric and electro chemical analysis 2. Carryout various volumetric and electrochemical titrations. 3. Develop analytical skills. 4. Prepare analytical solutions of different strength.

Course Content		
Unit	**Description**	**Hours**
I	**Pharmaceutical analysis**- Definition and scope - Different techniques of analysis, Sampling techniques, Errors in analysis, Significant digits, Accuracy and precision. - Methods of expressing concentration, General principles of volumetric analysis - Primary and secondary standards Preparation and standardization of various molar and normal solutions- Oxalic acid, sodium hydroxide, hydrochloric acid, sodium thiosulphate, sulphuric acid, potassium permanganate and ceric ammonium sulphate	**10**
II	**Acid base titration**: Theories of acid base indicators, classification of acid base titrations and theory involved in titrations of strong, weak, and very weak acids and bases, neutralization curves **Non aqueous titration**: Solvents, acidimetry and alkalimetry titration and estimation of Sodium benzoate and Ephedrine HCl	**10**
III	**Precipitation titrations**: Mohr's method, Volhard's, Modified Volhard's, Fajans method, estimation of sodium chloride.	**10**

	Complexometric titration: Classification, metal ion indicators, masking and demasking reagents, estimation of Magnesium sulphate, and calcium gluconate. **Gravimetry**: Principle and steps involved in gravimetric analysis. Purity of the precipitate: co-precipitation and post precipitation, Estimation of barium sulphate. Basic Principles,methods and application of diazotisation titration.	
IV	**Redox titrations** (a) Concepts of oxidation and reduction (b) Types of redox titrations (Principles and applications) Cerimetry, Iodimetry, Iodometry, Bromatometry, Dichrometry, Titration with potassium iodate	**08**
V	• **Electrochemical methods of analysis** • **Conductometry**- Introduction, Conductivity cell, Conductometric titrations, applications. • **Potentiometry -** Electrochemical cell, construction and working of reference (Standard hydrogen, silver chloride electrode and calomel electrode) and indicator electrodes (metal electrodes and glass electrode), methods to determine end point of potentiometric titration and applications. **Polarography** - Principle, Ilkovic equation, construction and working of dropping mercury electrode and rotating platinum electrode, applications	**07**

Suggested References:	
Sr. No	**References**
1	A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, Stahlone Press of University of London
2	A.I. Vogel, Text Book of Quantitative Inorganic analysis
3	P. Gundu Rao, Inorganic Pharmaceutical Chemistry
4	Bentley and Driver's Textbook of Pharmaceutical Chemistry
5	John H. Kennedy, Analytical chemistry principles
6	Indian Pharmacopoeia

Bachelor of Pharmacy
B. Pharm Semester I

Course Code	UP01CBPH03	Title of the Course	Pharmaceutics I – Theory
Total Credits of the Course	4	Hours per Week	3 + 1 (Tutorial)

Scope	This course is designed to impart a fundamental knowledge on the preparatory pharmacy with arts and science of preparing the different conventional dosage forms.
Objectives:	Upon completion of this course the student should be able to: 1. Know the history of profession of pharmacy 2. Understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations 3. Understand the professional way of handling the prescription 4. Preparation of various conventional dosage forms

Course Content		
Unit	**Description**	**Hours**
I	**Historical background and development of profession of pharmacy**: History of profession of Pharmacy in India in relation to pharmacy education, industry and organization, Pharmacy as a career, Pharmacopoeias: Introduction to IP, BP, USP and Extra Pharmacopoeia. **Dosage forms:** Introduction to dosage forms, classification and definitions **Prescription:** Definition, Parts of prescription, handling of Prescription and Errors in prescription. **Posology:** Definition, Factors affecting posology. Pediatric dose calculations based on age, body weight and body surface area.	**10**
II	**Pharmaceutical calculations**: Weights and measures – Imperial & Metric system, Calculations involving percentage solutions, allegation, proof spirit and isotonic solutions based on freezing point and molecular weight. **Powders:** Definition, classification, advantages and disadvantages, Simple & compound powders – official preparations, dusting powders, effervescent, efflorescent and hygroscopic powders, eutectic mixtures. Geometric dilutions. **Liquid dosage forms:** Advantages and disadvantages of liquid dosage forms. Excipients used in formulation of liquid dosage forms. Solubility enhancement techniques	**10**
III	**Monophasic liquids:** Definitions and preparations of Gargles, Mouthwashes, Throat Paint, Eardrops, Nasal drops, Enemas,	**10**

	Syrups, Elixirs, Liniments and Lotions. **Biphasic liquids:** **Suspensions:** Definition, advantages and disadvantages, classifications, Preparation of suspensions; Flocculated and Deflocculated suspension & stability problems and methods to overcome. **Emulsions:** Definition, classification, emulsifying agent, test for the identification of type of Emulsion, Methods of preparation & stability problems and methods to overcome.	
IV	**Suppositories**: Definition, types, advantages and disadvantages, types of bases, methods of preparations. Displacement value & its calculations, evaluation of suppositories. **Pharmaceutical incompatibilities**: Definition, classification, physical, chemical and therapeutic incompatibilities with examples	**08**
V	**Semisolid dosage forms:** Definitions, classification, mechanisms and factors influencing dermal penetration of drugs. Preparation of ointments, pastes, creams and gels. Excipients used in semi solid dosage forms. Evaluation of semi solid dosages forms	**07**

Suggested References:

Sr. No	References
1	H.C. Ansel et al., Pharmaceutical Dosage Form and Drug Delivery System, Lippincott Williams and Walkins, New Delhi
2	Carter S.J., Cooper and Gunn's-Dispensing for Pharmaceutical Students, CBS publishers, New Delhi
3	M.E. Aulton, Pharmaceutics, The Science& Dosage Form Design, Churchill Livingstone, Edinburgh
4	Indian pharmacopoeia.
5	British pharmacopoeia
6	Lachmann. Theory and Practice of Industrial Pharmacy,Lea& Febiger Publisher, The University of Michigan
7	Alfonso R. Gennaro Remington. The Science and Practice of Pharmacy, Lippincott Williams, New Delhi.
8	Carter S.J., Cooper and Gunn's. Tutorial Pharmacy, CBS Publications, New Delhi.
9	E.A. Rawlins, Bentley's Text Book of Pharmaceutics, English Language Book Society, Elsevier Health Sciences, USA
10	Isaac Ghebre Sellassie: Pharmaceutical Pelletization Technology, Marcel Dekker, INC, New York.
11	Dilip M. Parikh: Handbook of Pharmaceutical Granulation Technology, Marcel Dekker, INC, New York
12	Francoise Nieloud and Gilberte Marti-Mestres: Pharmaceutical Emulsions and Suspensions, Marcel Dekker, INC, New York

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Bachelor of Pharmacy

B. Pharm Semester I

Course Code	UP01CBPH04	Title of the Course	Pharmaceutical Inorganic Chemistry – Theory
Total Credits of the Course	4	Hours per Week	3 + 1 (Tutorial)

Scope	This subject deals with the monographs of inorganic drugs and pharmaceuticals
Objectives:	Upon completion of course student shall be able to 1. Know the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals. 2. Know the biological functions of ions and trace elements. 3. Understand the medicinal and pharmaceutical importance of inorganic compounds. 4. Understand the mechanisms of action of selected inorganic therapeutic and diagnostic agents.

Course Content		
Unit	**Description**	**Hours**
I	**Impurities in pharmaceutical substances:** History of Pharmacopoeia, Sources and types of impurities, principle involved in the limit test for Chloride, Sulphate, Iron, Arsenic, Lead and Heavy metals, modified limit test for Chloride and Sulphate **General methods of preparation**, assay for the compounds superscripted with **asterisk (*),** properties and medicinal uses of inorganic compounds belonging to the following classes	**10**
II	**Acids, Bases and Buffers:** Buffer equations and buffer capacity in general, buffers in pharmaceutical systems, preparation, stability, buffered isotonic solutions, measurements of tonicity, calculations and methods of adjusting isotonicity. **Major extra and intracellular electrolytes**: Functions of major physiological ions, Electrolytes used in the replacement therapy: Sodium chloride*, Potassium chloride, Calcium gluconate* and Oral Rehydration Salt (ORS), Physiological acid base balance. **Dental products**: Dentifrices, role of fluoride in the treatment of dental caries, Desensitizing agents, Calcium carbonate, Sodium fluoride, and Zinc eugenol cement.	**10**
III	**Gastrointestinal agents**	**10**

	Acidifiers: Ammonium chloride* and Dil. HCl **Antacid:** Ideal properties of antacids, combinations of antacids, Sodium Bicarbonate*, Aluminum hydroxide gel, Magnesium hydroxide mixture **Cathartics:** Magnesium sulphate, Sodium orthophosphate, Kaolin and Bentonite **Antimicrobials**: Mechanism, classification, Potassium permanganate, Boric acid, Hydrogen peroxide*, Chlorinated lime*, Iodine and its preparations	
IV	**Miscellaneous compounds** **Expectorants:** Potassium iodide, Ammonium chloride*. **Emetics**: Copper sulphate*, Sodium potassium tartarate **Haematinics:** Ferrous sulphate*, Ferrous gluconate **Poison and Antidote:** Sodium thiosulphate*, Activated charcoal, Sodium nitrite333 **Astringents**: Zinc Sulphate, Potash Alum	**08**
V	**Radiopharmaceuticals**: Radio activity, Measurement of radioactivity, Properties of α, β, γ radiations, Half life, radio isotopes and study of radio isotopes - Sodium iodide I^{131}, Storage conditions, precautions & pharmaceutical application of radioactive substances.	**07**

Suggested References:	
Sr. No	**References**
1	A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, Stahlone Press of University of London, 4th edition.
2	A.I. Vogel, Text Book of Quantitative Inorganic analysis.
3	P. Gundu Rao, Inorganic Pharmaceutical Chemistry, 3rd Edition
4	M.L Schroff, Inorganic Pharmaceutical Chemistry
5	Bentley and Driver's Textbook of Pharmaceutical Chemistry
6	Anand & Chatwal, Inorganic Pharmaceutical Chemistry
7	Indian Pharmacopoeia

Bachelor of Pharmacy
B.Pharm Semester I

Course Code	UP01CBPH05	Title of the Course	Human Anatomy and Physiology – Practical
Total Credits of the Course	2	Hours per Week	4

Objectives:	Students would be able to: 1. distinguish various tissues by observing morphology and structure through microscopy 2. identify various organs of the different body systems and describe their functions 3. identify various bones 4. record pulse rate and blood pressure 5. analyze the problem, communicate suggested solution and interprete the results.

Course Content	
Sr. No.	**Description**
1	Study of compound microscope.
2	Microscopic study of epithelial and connective tissue
3	Microscopic study of muscular and nervous tissue
4	Identification of axial bones
5	Identification of appendicular bones
6	Introduction to hemocytometry
7	Enumeration of white blood cell (WBC) count
8	Enumeration of total red blood corpuscles (RBC) count
9	Determination of bleeding time
10	Determination of clotting time
11	Estimation of hemoglobin content
12	Determination of blood group
13	Determination of erythrocyte sedimentation rate (ESR).
14	Determination of heart rate and pulse rate

15	Recording of blood pressure

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 Tailor. Williams & Wilkins Co,Riverview,MI USA
4	Text book of Medical Physiology- Arthur C,Guyton andJohn.E. Hall. Miamisburg, OH, U.S.A.
5	Principles of Anatomy and Physiology by Tortora Grabowski. Palmetto, GA, U.S.A.
6	Textbook of Human Histology by Inderbir Singh, Jaypee brother's medical publishers, New Delhi
7	Textbook of Practical Physiology by C.L. Ghai, Jaypee brother's medical publishers, New Delhi
8	Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee brother's medical publishers, New Delhi
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.
11	Human Physiology (vol 1 and 2) by Dr. C.C. Chatterrje ,Academic Publishers Kolkata

Bachelor of Pharmacy
B.Pharm Semester I

Course Code	UP01CBPH06	Title of the Course	Pharmaceutical Analysis I – Practical
Total Credits of the Course	2	Hours per Week	4

Objectives:	Students would be able to: 1. Prepare and standardize various titration solutions. 2. Perform various experimental task for volumetric and eletrochemical titration. 3. Handle and operate various laboratory instruments for electrochemical analysis. 4. Describe principle and various terminologies related to volumetric and electrochemical analysis. 5. Analyze the problem, communicate suggested solution and interprete the results.

Course Content	
Sr. No.	**Description**
1	**Determination of strength of following compounds by acid based titration** 1) Sodium carbonate 2) Sodium hydroxide 3) Hydrochloric acid 4) Aspirin
2	**Preparation and standardization of** 1) Sodium hydroxide 2) Sulphuric acid 3) Sodium thiosulfate 4) Potassium permanganate 5) Ceric ammonium sulphate
3	**Assay of the following compounds along with Standardization of Titrant** 1) Ammonium chloride by acid base titration 2) Ferrous sulphate by Cerimetry 3) Copper sulphate by Iodometry 4) Calcium gluconate by complexometry 5) Hydrogen peroxide by Permanganometry

	6) Sodium benzoate by non-aqueous titration 7) Sodium Chloride by precipitation titration
4	**Determination of Normality by electro-analytical methods** 1) Conductometric titration of strong acid against strong base 2) Conductometric titration of strong acid and weak acid against strong base 3) Potentiometric titration of strong acid against strong base

Suggested References:	
Sr. No	**References**
1	A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, Stahlone Press of University of London
2	A.I. Vogel, Text Book of Quantitative Inorganic analysis
3	P. Gundu Rao, Inorganic Pharmaceutical Chemistry
4	Bentley and Driver's Textbook of Pharmaceutical Chemistry
5	John H. Kennedy, Analytical chemistry principles
6	Indian Pharmacopoeia

Bachelor of Pharmacy
B. Pharm Semester I

Course Code	UP01CBPH07	Title of the Course	Pharmaceutics I – Practical
Total Credits of the Course	2	Hours per Week	4

Objectives:	Students would be able to: 1. Interpret the formula and prepare solid dosage forms. 2. Interpret the formula and prepare semi solid dosage forms. 3. Interpret the formula and prepare liquid dosage forms. 4. Analyze the problem, communicate suggested solution and interprete the results.

Course Content	
Sr. No.	**Description**
1	**Syrups** • Syrup IP'66 • Compound syrup of Ferrous Phosphate BPC'68
2	**Elixirs** • Piperazine citrate elixir • b) Paracetamol pediatric elixir
3	**Linctus** • Terpin Hydrate Linctus IP'66 • Iodine Throat Paint (Mandles Paint)
4	**Solutions** • Strong solution of ammonium acetate • Cresol with soap solution • Lugol's solution
5	**Suspensions** • Calamine lotion • Magnesium Hydroxide mixture • Aluminimum Hydroxide gel
6	**Emulsions** • Turpentine Liniment • b) Liquid paraffin emulsion
7	**Powders and Granules** • ORS powder (WHO) • Effervescent granules • Dusting powder • Divded powders

8	**Suppositories** • Glycero gelatin suppository • Coca butter suppository • Zinc Oxide suppository
9	**Gargles and Mouthwashes** • Iodine gargle • Chlorhexidine mouthwash
10	

Suggested References:	
Sr. No	**References**
1	H.C. Ansel et al., Pharmaceutical Dosage Form and Drug Delivery System, Lippincott Williams and Walkins, New Delhi.
2	Carter S.J., Cooper and Gunn's-Dispensing for Pharmaceutical Students, CBS publishers, New Delhi
3	M.E. Aulton, Pharmaceutics, The Science& Dosage Form Design, Churchill Livingstone, Edinburgh
4	Indian pharmacopoeia
5	British pharmacopoeia.
6	Lachmann. Theory and Practice of Industrial Pharmacy,Lea& Febiger Publisher, The University of Michigan
7	Alfonso R. Gennaro Remington. The Science and Practice of Pharmacy, Lippincott Williams, New Delhi.
8	Carter S.J., Cooper and Gunn's. Tutorial Pharmacy, CBS Publications, New Delhi
9	E.A. Rawlins, Bentley's Text Book of Pharmaceutics, English Language Book Society, Elsevier Health Sciences, USA.
10	Isaac Ghebre Sellassie: Pharmaceutical Pelletization Technology, Marcel Dekker, INC, New York.
11	Dilip M. Parikh: Handbook of Pharmaceutical Granulation Technology, Marcel Dekker, INC, New York.
12	Francoise Nieloud and Gilberte Marti-Mestres: Pharmaceuticalb Emulsions and Suspensions, Marcel Dekker, INC, New York

Bachelor of Pharmacy
B.Pharm Semester I

Course Code	UP01CBPH08	Title of the Course	Pharmaceutical Inorganic Chemistry – Practical
Total Credits of the Course	2	Hours per Week	4

Objectives:	Students would be able to: 1. Perform limit test as per the methods given in IP. 2. Identify given inorganic compounds through chemical tests. 3. Perform quantitive analysis of selected inorganic compounds. 4. Prepare inoganic pharmaceuticals following pharmacopoeial procedures. 5. Analyze the problem, communicate suggested solution and interprete the results.

Course Content	
Sr. No.	**Description**
1	**Limit tests for following ions** Limit test for Chlorides and Sulphates Modified limit test for Chlorides and Sulphates Limit test for Iron Limit test for Heavy metals Limit test for Lead Limit test for Arsenic
2	**Identification test** Magnesium hydroxide Ferrous sulphate Sodium bicarbonate Calcium gluconate Copper sulphate
3	**Test for purity** Swelling power of Bentonite Neutralizing capacity of aluminum hydroxide gel Determination of potassium iodate and iodine in potassium Iodide
4	**Preparation of inorganic pharmaceuticals**

	Boric acid Potash alum Ferrous sulphate

Suggested References:	
Sr. No	**References**
1	A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, Stahlone Press of University of London, 4th edition
2	A.I. Vogel, Text Book of Quantitative Inorganic analysis
3	P. Gundu Rao, Inorganic Pharmaceutical Chemistry, 3rd Edition
4	M.L Schroff, Inorganic Pharmaceutical Chemistry
5	Bentley and Driver's Textbook of Pharmaceutical Chemistry
6	Anand & Chatwal, Inorganic Pharmaceutical Chemistry
7	Indian Pharmacopoeia

Bachelor of Pharmacy
B.Pharm Semester I

Course Code	UP01FBPH01	Title of the Course	Communication skills – Theory *
Total Credits of the Course	2	Hours per Week	2

Scope	This course will prepare the young pharmacy student to interact effectively with doctors, nurses, dentists, physiotherapists and other health workers. At the end of this course the student will get the soft skills set to work cohesively with the team as a team player and will add value to the pharmaceutical business
Objectives:	Upon completion of the course the student shall be able to 1. Understand the behavioral needs for a Pharmacist to function effectively in the areas of pharmaceutical operation 2. Communicate effectively (Verbal and Non Verbal) 3. Effectively manage the team as a team player 4. Develop interview skills 5. Develop Leadership qualities and essentials

Course Content		
Unit	**Description**	**Hours**
I	**Communication Skills:** Introduction, Definition, The Importance of Communication, The Communication Process – Source, Message, Encoding, Channel, Decoding, Receiver, Feedback, Context **Barriers to communication:** Physiological Barriers, Physical Barriers, Cultural Barriers, Language Barriers, Gender Barriers, Interpersonal Barriers, Psychological Barriers, Emotional barriers **Perspectives in Communication:** Introduction, Visual Perception, Language, Other factors affecting our perspective - Past Experiences, Prejudices, Feelings, Environment	**07**
II	**Elements of Communication:** Introduction, Face to Face Communication - Tone of Voice, Body Language (Non-verbal communication), Verbal Communication, Physical Communication **Communication Styles:** Introduction, The Communication Styles Matrix with example for each -Direct Communication Style, Spirited Communication Style, Systematic Communication Style, Considerate Communication Style	**07**
III	**Basic Listening Skills:** Introduction, Self-Awareness, Active	**07**

	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	
IV	**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**
V	**Group Discussion:** Introduction, Communication skills in group discussion, Do's and Dont's of group discussion	**04**

Suggested References:	
Sr. No	**References**
1	Basic communication skills for Technology, Andreja. J. Ruther Ford, 2nd Edition, Pearson Education, 2011
2	Communication skills, Sanjay Kumar, Pushpalata, 1stEdition, Oxford Press, 2011
3	Organizational Behaviour, Stephen .P. Robbins, 1stEdition, Pearson, 2013
4	Brilliant- Communication skills, Gill Hasson, 1stEdition, Pearson Life, 2011
5	The Ace of Soft Skills: Attitude, Communication and Etiquette for success, Gopala Swamy Ramesh, 5thEdition, Pearson, 2013
6	Developing your influencing skills, Deborah Dalley, Lois Burton, Margaret, Green hall, 1st Edition Universe of Learning LTD, 2010
7	Communication skills for professionals, Konar nira, 2ndEdition, New arrivals – PHI,2011
8	Personality development and soft skills, Barun K Mitra, 1stEdition, Oxford Press, 2011
9	Soft skill for everyone, Butter Field, 1st Edition, Cengage Learning india pvt.ltd, 2011
10	Soft skills and professional communication, Francis Peters SJ, 1stEdition, Mc Graw Hill Education, 2011
11	Effective communication, John Adair, 4thEdition, Pan Mac Millan,2009 Bringing out the best in people, Aubrey Daniels, 2ndEdition, Mc Graw Hill, 1999
12	Bringing out the best in people, Aubrey Daniels, 2ndEdition, Mc Graw Hill, 1999

Bachelor of Pharmacy
B. Pharm Semester I

Course Code	UP01FBPH02	Title of the Course	Remedial Biology - Theory*
Total Credits of the Course	2	Hours per Week	2

Scope	To learn and understand the components of living world, structure and functional system of plant and animal kingdom.
Objectives:	Upon completion of the course, the student shall be able to 1. Know the classification and salient features of five kingdoms of life 2. Understand the basic components of anatomy & physiology of plant 3. Know understand the basic components of anatomy & physiology animal with special reference to human 4. Understand the various phases of plant growth and different plant tissues

Course Content		
Unit	**Description**	**Hours**
I	**Living world:** • Definition and characters of living organisms • Diversity in the living world • Binomial nomenclature • Five kingdoms of life and basis of classification. Salient features of Monera, Potista, Fungi, Animalia and Plantae, Virus, **Morphology of Flowering plants** • Morphology of different parts of flowering plants – Root, stem, inflorescence, flower, leaf, fruit, seed. • General Anatomy of Root, stem, leaf of monocotyledons & Dicotylidones.	**07**
II	**Body fluids and circulation** • Composition of blood, blood groups, coagulation of blood • Composition and functions of lymph • Human circulatory system • Structure of human heart and blood vessels • Cardiac cycle, cardiac output and ECG **Digestion and Absorption** • Human alimentary canal and digestive glands • Role of digestive enzymes	**07**

	• Digestion, absorption and assimilation of digested food **Breathing and respiration** • Human respiratory system • Mechanism of breathing and its regulation • Exchange of gases, transport of gases and regulation of respiration • Respiratory volumes	
III	**Excretory products and their elimination** • Modes of excretion • Human excretory system- structure and function • Urine formation • Rennin angiotensin system **Neural control and coordination** • Definition and classification of nervous system • Structure of a neuron • Generation and conduction of nerve impulse • Structure of brain and spinal cord • Functions of cerebrum, cerebellum, hypothalamus and medulla oblongata **Chemical coordination and regulation** • Endocrine glands and their secretions • Functions of hormones secreted by endocrine glands **Human reproduction** • Parts of female reproductive system • Parts of male reproductive system • Spermatogenesis and Oogenesis • Menstrual cycle	**07**
IV	**Plants and mineral nutrition:** • Essential mineral, macro and micronutrients • Nitrogen metabolism, Nitrogen cycle, biological nitrogen fixation **Photosynthesis** Autotrophic nutrition, photosynthesis, Photosynthetic pigments, Factors affecting photosynthesis	**05**
V	**Plant respiration:**Respiration, glycolysis, fermentation (anaerobic). **Plant growth and development** • Phases and rate of plant growth, Condition of growth,Introduction to plant growth regulators **Cell - The unit of life** • Structure and functions of cell and cell organelles. Cell division **Tissues** • Definition, types of tissues, location and functions	**04**

Suggested References:	
Sr. No	**References**
1	Text book of Biology by S. B. Gokhale
2	A Text book of Biology by Dr. Thulajappa and Dr. Seetaram
3	A Text book of Biology by B.V. Sreenivasa Naidu
4	A Text book of Biology by Naidu and Murthy
5	Botany for Degree students By A.C.Dutta.
6	Outlines of Zoology by M. Ekambaranatha ayyer and T. N. Ananthakrishnan
7	A manual for pharmaceutical biology practical by S.B. Gokhale and C. K. Kokate

SARDAR PATEL UNIVERSITY

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

Bachelor of Pharmacy
B.Pharm Semester I

Course Code	UP01FBPH03	Title of the Course	REMEDIAL MATHEMATICS-Theory
Total Credits of the Course	2	Hours per Week	2

Scope:	This is an introductory course in mathematics. This subject deals with the introduction to Partial fraction, Logarithm, matrices and Determinant, Analytical geometry, Calculus, differential equation and Laplace transform
Objectives:	Upon completion of the course the student shall be able to:- 1. Know the theory and their application in Pharmacy 2. Solve the different types of problems by applying theory 3. Appreciate the important application of mathematics in Pharmacy 4. Evaluate the differential equation used in pharmacy

Course Content		
Unit	**Description**	**Hours**
I	• **Partial fraction** Introduction, Polynomial, Rational fractions, Proper and Improper fractions, Partial fraction , Resolving into Partial fraction, Application of Partial Fraction in Chemical Kinetics and Pharmacokinetics • **Logarithms** Introduction, Definition, Theorems/Properties of logarithms, Common logarithms, Characteristic and Mantissa, worked examples, application of logarithm to solve pharmaceutical problems. • **Function***:* Real Valued function, Classification of real valued functions, • **Limits and continuity** : Introduction , Limit of a function, Definition of limit of a function ($\in$ - δ definition) , $\lim_{x\to a}\frac{x^n - a^n}{x-a} = na^{n-1}$, $\lim_{\theta\to 0}\frac{\sin\theta}{\theta} = 1$,	**06**
II	**Matrices and Determinant:** Introduction matrices, Types of matrices, Operation on matrices, Transpose of a matrix, Matrix Multiplication, Determinants, Properties of determinants , Product of determinants, Minors and co-Factors, Adjoint or adjugate of a square matrix , Singular and non-singular matrices, Inverse of a matrix, Solution of system of linear of equations using matrix method, Cramer's rule,	**06**

	Characteristic equation and roots of a square matrix, Cayley–Hamilton theorem,Applicationof Matrices in solving Pharmacokinetic equations	
III	**Calculus** **Differentiation** : Introductions, Derivative of a function, Derivative of a constant, Derivative of a product of a constant and a function , Derivative of the sum or difference of two functions, Derivative of the product of two functions (product formula), Derivative of the quotient of two functions (Quotient formula) **Without Proof**, Derivative of x^n *w.r.t*x,where *n* is any rational number, Derivative of e^x,, Derivative of $\log_e x$, Derivative of a^x,Derivative of trigonometric functions from first principles **(without Proof)**, Successive Differentiation, Conditions for a function to be a maximum or a minimum at a point. Application	**06**
IV	**Analytical Geometry** **Introduction:** Signs of the Coordinates, Distance formula, **Straight Line** : Slope or gradient of a straight line, Conditions for parallelism and perpendicularity of two lines, Slope of a line joining two points, Slope – intercept form of a straight line **Integration:** Introduction, Definition, Standard formulae, Rules of integration , Method of substitution, Method of Partial fractions, Integration by parts, definite integrals, application	**06**
V	**Differential Equations** : Some basic definitions, Order and degree, Equations in separable form , Homogeneous equations, Linear Differential equations, Exact equations, **Application in solving Pharmacokinetic equations** • **Laplace Transform** : Introduction, Definition, Properties of Laplace transform, Laplace Transforms of elementary functions, Inverse Laplace transforms, Laplace transform of derivatives, Application to solve Linear differential equations, **Application in solving Chemical kinetics and Pharmacokinetics equations**	**06**

Suggested References:	
Sr. No	**References**
1	Differential Calculus by Shanthinarayan
2	Differential Calculus by Shanthinarayan
3	Pharmaceutical Mathematics with application to Pharmacy by Panchaksharappa Gowda D.H.
4	Integral Calculus by Shanthinarayan
5	Higher Engineering Mathematics by Dr.B.S.Grewal

Bachelor of Pharmacy
B.Pharm Semester I

Course Code	UP01FBPH04	Title of the Course	Communication skills – Practical*
Total Credits of the Course	1	Hours per Week	2

Objectives:	Students would be able to: 1. Identify Basic communication skill. 2. Differentiate Consonant and Vowel Sounds. 3. Learn Writing Skills, Interview Handling Skills and Presentation Skills.

Course Content	
Sr. No.	**Description**
1	**Basic communication covering the following topics** Meeting People Asking Questions Making Friends What did you do? Do's and Dont's
2	**Pronunciations covering the following topics** Pronunciation (Consonant Sounds) Pronunciation and Nouns Pronunciation (Vowel Sounds)
3	**Advanced Learning** Listening Comprehension / Direct and Indirect Speech Figures of Speech Effective Communication Writing Skills Effective Writing Interview Handling Skills E-Mail etiquette Presentation Skills

Suggested References:	
Sr. No	**References**
1	Basic communication skills for Technology, Andreja. J. Ruther Ford, 2nd Edition,

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

Bachelor of Pharmacy
B.Pharm Semester I

Course Code	UP01FBPH05	Title of the Course	Remedial Biology – Practical*
Total Credits of the Course	1	Hours per Week	2

Objectives:	Students would be able to: 1. Differentiate various cells and tissues through histological examination. 2. Identify various types of cells inclusion. 3. Assess blood pressure, blood group and tidal volume. 4. Identify and recognize different bones of human body. 5. Analyze the problem, communicate suggested solution and interprete the results.

Course Content	
Sr. No.	**Description**
1	Introduction to experiments in biology • Study of Microscope • Section cutting techniques • Mounting and staining • Permanent slide preparation
2	Study of cell and its inclusions
3	Study of Stem, Root, Leaf, seed, fruit, flower and their modifications
4	Detailed study of frog by using computer models
5	Microscopic study and identification of tissues pertinent to Stem, Root Leaf, seed, fruit and flower
6	Determination of tidal volume
7	Study the model of male reproductive system
8	Study the model of female reproductive system
9	Study the model of human brain.

Suggested References:

Sr. No	References
1	Practical human anatomy and physiology. by S.R.Kale and R.R.Kale
2	A Manual of pharmaceutical biology practical by S.B.Gokhale, C.K.Kokate and S.P.Shriwastava
3	Biology practical manual according to National core curriculum .Biology forum of Karnataka. Prof .M.J.H.Shafi