Shri Rawatpura Sarkar University, Raipur

Examination Scheme & Syllabus

For

Bachelor of Pharmacy

Semester-I

(Effective from the session: 2018-19)

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Prof. (Dr.) Vijay Kumar Singh **Dr. Veena Devi Singh** **Mr. Nagendra Bhuwane** **Mr. Pushpendra Kurre**

SHRI RAWATPURA SARKAR UNIVERSITY, RAIPUR CHHATTISGARH
BACHELOR OF PHARMACY, SEMESTER I

SCHEME OF TEACHING AND EXAMINATION
Table-I: Course of study for semester I

Sr. No.	Subject Code	Name of the Course with PCI code	Internal assessment								End semester exams			Total Marks
			TA	Sessional exams			Teaching hours per week			Credit				
				CT	Duration	Total	L	T	P		Marks		Duration	
1	BPH101T	Human Anatomy and Physiology I-Theory	10	15	1 Hr	25	3	1		4	75	25	3 Hrs	100
2	BPH102T	Pharmaceutical Analysis-I-Theory	10	15	1 Hr	25	3	1		4	75	25	3 Hrs	100
3	BPH103T	Pharmaceutics I-Theory	10	15	1 Hr	25	3	1		4	75	25	3 Hrs	100
4	BPH104T	Pharmaceutical Inorganic Chemistry-Theory	10	15	1 Hr	25	3	1		4	75	25	3 Hrs	100
5	BATPH105T	Communication skills-Theory	05	10	1 Hr	15	2			2	35	15	1.5 Hrs	50
6	BSCPH106BT / BSCPH106MT	Remedial Biology-Theory / Remedial Mathematics Theory	05	10	1 Hr	15	2			2	35	15	1.5 Hrs	50
7	BPH101P	Human Anatomy and Physiology-Practical	05	10	4 Hrs	15			4	2	35	15	4 Hrs	50
8	BPH102P	Pharmaceutical Analysis I-Practical	05	10	4 Hrs	15			4	2	35	15	4 Hrs	50
9	BPH103P	Pharmaceutics I-Practical	05	10	4 Hrs	15			4	2	35	15	4 Hrs	50
10	BPH104P	Pharmaceutical Inorganic Chemistry-Practical	05	10	4 Hrs	15			4	2	35	15	4 Hrs	50
11	BATPH105P	Communication skills-Practical	05	05	2 Hrs	10			2	1	15	10	2 Hrs	25
12	BPH106BP	Remedial Biology-Practical	05	05	2 Hrs	10			2	1	15	10	2 Hrs	25
			80	**130**	**26 Hrs**	**210**	**Credit:30**				**540**		**35 Hrs**	**750**

#Applicable ONLY for the students who have studied Mathematics / Physics / Chemistry at HSC and Appearing for Remedial Biology (RB)course**.**
$Applicable ONLY for the students who have studied Physics / Chemistry / Botany / Zoology at HSC and Appearing for Remedial Mathematics (RM)course**.**
* Non University Examination (NUE

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BACHELOR OF PHARMACY, SEMESTER I

B. PHARMACY SYLLABUS

<table>
<tr><td>Course Title</td><td colspan="6">Human Anatomy and Physiology I-Theory</td></tr>
<tr><td>Subject code</td><td colspan="3">BPH101T</td><td colspan="2">Total theory periods : 45 Hrs</td><td>Total Tutorial periods : 15</td></tr>
<tr><td rowspan="2">Course Credits</td><td>L</td><td>T</td><td>P</td><td>Credits</td><td colspan="2">Total marks in the end semester : 75</td></tr>
<tr><td>3</td><td>1</td><td></td><td>4</td><td colspan="2">Minimum of class tests to be conducted : 02</td></tr>
<tr><td>Prerequisites</td><td colspan="6">Studied common foundational knowledge of anatomy and physiology in higher secondary (11th & 12th) Biology</td></tr>
<tr><td>Course objectives</td><td colspan="6">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</td></tr>
<tr><td>Course Contents</td><td colspan="6">Unit 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
Unit II
Integumentary system
Structure and functions of skin
Skeletal system
Divisions of skeletal system, types of bone, salient features and functions of bones of axial and appendicular skeletal system
Organization of skeletal muscle, physiology of muscle contraction,</td></tr>
</table>

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	neuromuscular junction **Joints** Structural and functional classification, types of joints movements and its articulation **Unit 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. **Unit 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. **Unit 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.
Course outcomes	• Explain the different types of tissues and the osseous system. • Recall the basics of the anatomy, physiology and the cell. • Describe the haemopoetic system and lymphatic system. • Describe cardiovascular system and digestive system.
Text books	1. Text book of Medical Physiology- Arthur C, Guyton and John. E. Hall. Miamisburg, OH, U.S.A.

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	2. Human Physiology (vol 1 and 2) by Dr. C.C. Chatterrje ,Academic Publishers Kolkata 3. Textbook of Human Histology by Inderbir Singh, Jaypee brother's medical publishers, New Delhi. 4. Textbook of Practical Physiology by C.L. Ghai, Jaypee brother's medical publishers, New Delhi. 5. Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee brother's medical Publishers, New Delhi.
Reference books	1. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co, Riverview, MI USA 2. Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypee brother's medical publishers, New Delhi. 3. Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York

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BACHELOR OF PHARMACY, SEMESTER I

<table>
<tr><td>Course Title</td><td colspan="6">Pharmaceutical Analysis-I-Theory</td></tr>
<tr><td>Subject code</td><td colspan="2">BPH102T</td><td colspan="2">Total theory periods : 45 Hrs</td><td colspan="2">Total Tutorial periods : 15</td></tr>
<tr><td rowspan="2">Course Credits</td><td>L</td><td>T</td><td>P</td><td>Credits</td><td colspan="2">Total marks in the end semester : 75</td></tr>
<tr><td>3</td><td>1</td><td></td><td>4</td><td colspan="2">Minimum of class tests to be conducted : 02</td></tr>
<tr><td>Prerequisites</td><td colspan="6">Basic fundamental studied in Chemistry in higher secondary education</td></tr>
<tr><td>Course objectives</td><td colspan="6">Upon completion of the course student shall be able to
• understand the principles of volumetric and electro chemical analysis
• carryout various volumetric and electrochemical titrations
• develop analytical skills</td></tr>
<tr><td>Course Contents</td><td colspan="6">UNIT-I
(a) Pharmaceutical analysis- Definition and scope
i) Different techniques of analysis
ii) Methods of expressing concentration
iii) Primary and secondary standards.
iv) Preparation and standardization of various molar and normal solutions- Oxalic acid, sodium hydroxide, hydrochloric acid, sodium thiosulphate, sulphuric acid, potassium permanganate and ceric ammonium sulphate
(b) Errors: Sources of errors, types of errors, methods of minimizing errors, accuracy, precision and significant figures.
(c) Pharmacopoeia, Sources of impurities in medicinal agents,limit tests.
UNIT-II
• Acid base titration: Theories of acid base indicators, classification of acid base titrations and theory involved in titrations of strong, weak, and very weak acids and bases, neutralization curves
• Non aqueous titration: Solvents, acidimetry and alkalimetry titration and estimation of Sodium benzoate and Ephedrine HCl
UNIT-III
• Precipitation titrations: Mohr’s method, Volhard’s, Modified Volhard’s, Fajans method, estimation of sodium chloride.</td></tr>
</table>

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	• **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. **UNIT-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 **UNIT-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
Course outcomes	• Analyze drug sample by acid base titration. • Analyze drug sample by precipitation titration &complexometric titration. • Memorize all fundamentals of quantitative chemical analysis.
Text books	1. A.I. Vogel, Text Book of Quantitative Inorganic analysis 2. P. Gundu Rao, Inorganic Pharmaceutical Chemistry 3. Bentley and Driver's Textbook of Pharmaceutical Chemistry
Reference books	1. .H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, Stahlone Press of University of London

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BACHELOR OF PHARMACY, SEMESTER I

<table>
<tr><td>Course Title</td><td colspan="6">Pharmaceutics I-Theory</td></tr>
<tr><td>Subject code</td><td colspan="2">BPH103T</td><td colspan="2">Total theory periods : 45 Hrs</td><td colspan="2">Total Tutorial periods : 15</td></tr>
<tr><td rowspan="2">Course Credits</td><td>L</td><td>T</td><td>P</td><td>Credits</td><td colspan="2">Total marks in the end semester : 75</td></tr>
<tr><td>3</td><td>1</td><td></td><td>4</td><td colspan="2">Minimum of class tests to be conducted : 02</td></tr>
<tr><td>Prerequisites</td><td colspan="6">Basic fundamental knowledge studied in pharmaceutics in diploma in pharmacy</td></tr>
<tr><td>Course objectives</td><td colspan="6">Upon completion of this course the student should be able to:
Know the history of profession of pharmacy
Understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations
Understand the professional way of handling the prescription
Preparation of various conventional dosage forms</td></tr>
<tr><td>Course Contents</td><td colspan="6">UNIT – 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. Paediatric dose calculations based on age, body weight and body surface area.
UNIT – 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</td></tr>
</table>

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	UNIT – III • **Monophasic liquids:** Definitions and preparations of Gargles, Mouthwashes, Throat Paint, Eardrops, Nasal drops, Enemas, Syrups, Elixirs, Liniments and Lotions. • **Biphasic liquids**: • **Suspensions:** Definition, advantages and disadvantages, classifications, Preparation of suspensions; Flocculated and Deflocculated suspension & stability problems and methods to overcome. • **Emulsions:** Definition, classification, emulsifying agent, test for the identification of type of Emulsion, Methods of preparation & stability problems and methods to overcome. **UNIT – IV** • **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. **UNIV – V** • **Semisolid dosage forms:** Definitions, classification, mechanisms and factor 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
Course outcomes	• Understands the knowledge on preparatory pharmacy and professional way of preparing various conventional Drugs. • Discuss history of pharmacy profession and identify the role of prescription. • Explain incompatibilities and pharmacopoeia along with the use of its standard for preparation of various dosage Form. • Understand the concepts of fundamental meteorology and solve the problem of pharmaceutical calculations

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

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BACHELOR OF PHARMACY, SEMESTER I

<table>
<tr><td>Course Title</td><td colspan="6">Pharmaceutical Inorganic Chemistry-Theory</td></tr>
<tr><td>Subject code</td><td colspan="3">BPH104T</td><td colspan="2">Total theory periods : 45 Hrs</td><td>Total Tutorial periods : 15</td></tr>
<tr><td rowspan="2">Course Credits</td><td>L</td><td>T</td><td>P</td><td>Credits</td><td colspan="2">Total marks in the end semester : 75</td></tr>
<tr><td>3</td><td>1</td><td></td><td>4</td><td colspan="2">Minimum of class tests to be conducted : 02</td></tr>
<tr><td>Prerequisites</td><td colspan="6">Basic fundamental knowledge studied in pharmaceutical chemistry in diploma in pharmacy</td></tr>
<tr><td>Course objectives</td><td colspan="6">Upon completion of course student shall be able to
• know the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals
• understand the medicinal and pharmaceutical importance of inorganic compounds</td></tr>
<tr><td>Course Contents</td><td colspan="6">UNIT 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
UNIT 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</td></tr>
</table>

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(ORS), Physiological acid base balance.

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

UNIT III

- **Gastrointestinal agents**

Acidifiers: Ammonium chloride* and Dil. HCl

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

Cathartics: Magnesium sulphate, Sodium orthophosphate, Kaolin and Bentonite

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

UNIT IV

- **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

UNIT V

- **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 &

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	pharmaceutical application of radioactive substances.
Course outcomes	• Outline pharmacopoeial standards for the qualitative and quantitative estimations of inorganic pharmaceuticals. • Describe acids, bases, buffers, water and different GIT agents and recall the fundamental principles of them. • Describe the major intra and extra cellular electrolytes, essential and trace elements, cationic andanionic Components of inorganic drugs.
Text Books	1. A.I. Vogel, Text Book of Quantitative Inorganic analysis 2. P. Gundu Rao, Inorganic Pharmaceutical Chemistry, 3rd Edition 3. M.L Schroff, Inorganic Pharmaceutical Chemistry 4. Bentley and Driver's Textbook of Pharmaceutical Chemistry
Reference Books	1. Anand & Chatwal, Inorganic Pharmaceutical Chemistry 2. Indian Pharmacopoeia 3. A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, Stahlone Press of University of London, 4th edition.

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BACHELOR OF PHARMACY, SEMESTER I

<table>
<tr><td>Course Title</td><td colspan="6">Communication skills-Theory</td></tr>
<tr><td>Subject code</td><td colspan="2">BATPH105T</td><td colspan="2">Total theory periods : 30 Hrs</td><td colspan="2">Total Tutorial periods : 00</td></tr>
<tr><td rowspan="2">Course Credits</td><td>L</td><td>T</td><td>P</td><td>Credits</td><td colspan="2">Total marks in the end semester : 35</td></tr>
<tr><td>2</td><td></td><td></td><td>2</td><td colspan="2">Minimum of class tests to be conducted : 02</td></tr>
<tr><td>Prerequisites</td><td colspan="6">Common foundational communication studied in English language</td></tr>
<tr><td>Course objectives</td><td colspan="6">At the completion of the course 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.</td></tr>
<tr><td>Course Contents</td><td colspan="6">UNIT – I
07 Hours
• Communication Skills: Introduction, Definition, The Importance of Communication, The Communication Process – Source, Message, Encoding, Channel, Decoding, Receiver, Feedback, Context
• Barriers to communication: Physiological Barriers, Physical Barriers, Cultural Barriers, Language Barriers, Gender Barriers, Interpersonal Barriers, Psychological Barriers, Emotional barriers
• Perspectives in Communication: Introduction, Visual Perception, Language, Other factors affecting our perspective - Past Experiences, Prejudices, Feelings, Environment
UNIT – II
07 Hours
• Elements of Communication: Introduction, Face to Face Communication - Tone of Voice, Body Language (Non-verbal communication), Verbal Communication, Physical Communication</td></tr>
</table>

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	• **Communication Styles:** Introduction, The Communication Styles Matrix with example for each -Direct Communication Style, Spirited Communication Style, Systematic Communication Style, Considerate Communication Style **UNIT – III** **07 Hours** • **Basic Listening Skills:** Introduction, Self-Awareness, Active Listening, Becoming an Active Listener, Listening in Difficult Situations • **Effective Written Communication:** Introduction, When and When Not to Use Written Communication - Complexity of the Topic, Amount of Discussion' Required, Shades of Meaning, Formal Communication • **Writing Effectively:** Subject Lines, Put the Main Point First, Know Your Audience, Organization of the Message **UNIT – IV** **05 Hours** • **Interview Skills:** Purpose of an interview, Do's and Dent's of an interview • **Giving Presentations:** Dealing with Fears, Planning your Presentation, Structuring Your Presentation, Delivering Your Presentation, Techniques of Delivery **UNIT – V** **04 Hours** • **Group Discussion:** Introduction, Communication skills in group discussion, Do's and Dont's of group discussion
Course outcomes	• Describe the role of topic sentence, cohesion, coherence and sentence linkers in paragraph writing. • Describe the knowledge of organizing a meeting, chairing the meeting, preparing an agenda, writing minutes,

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	Making an oral presentation and facing an interview. • Rewrite business proposal, business letters and e mail messages • Generate their own C.V, recognize utilization of reference, notes and bibliographies, and recognize concept and Relevance of public relations in a business organization.
Text Books	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 Behavior, 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. Soft skill for everyone, Butter Field, 1st Edition, Cengage Learning india pvt.ltd, 2011
Reference Books	1. Communication skills, Sanjay Kumar, Pushpalata, 1st Edition, Oxford Press, 2011 2. Personality development and soft skills, Barun K Mitra, 1st Edition, Oxford Press, 2011

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BACHELOR OF PHARMACY, SEMESTER I

<table>
<tr><td>Course Title</td><td colspan="5">Remedial Biology-Theory</td></tr>
<tr><td>Subject code</td><td colspan="3">BSCPH106BT</td><td>Total theory periods : 30Hrs</td><td>Total Tutorial periods : 00</td></tr>
<tr><td rowspan="2">Course Credits</td><td>L</td><td>T</td><td>P</td><td>Credits</td><td>Total marks in the end semester : 35</td></tr>
<tr><td>2</td><td></td><td></td><td>2</td><td>Minimum of class tests to be conducted : 02</td></tr>
<tr><td>Prerequisites</td><td colspan="5">Basic fundamental aspects studied in biology in higher secondary education</td></tr>
<tr><td>Course objectives</td><td colspan="5">: Upon completion of the course, the student shall be able to
know the classification and salient features of five kingdoms of life
understand the basic components of anatomy & physiology of plant
know understand the basic components of anatomy & physiology animal with special reference to human</td></tr>
<tr><td>Course Contents</td><td colspan="5">UNIT 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.

UNIT II
Body fluids and circulation
• Composition of blood, blood groups, coagulation of blood</td></tr>
</table>

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- Composition and functions of lymph
- Human circulatory system
- Structure of human heart and blood vessels
- Cardiac cycle, cardiac output and ECG

Digestion and Absorption

- Human alimentary canal and digestive glands
- Role of digestive enzymes
- Digestion, absorption and assimilation of digested food

Breathing and respiration

- Human respiratory system
- Mechanism of breathing and its regulation
- Exchange of gases, transport of gases and regulation of respiration
- Respiratory volumes

UNIT III

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

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- Generation and conduction of nerve impulse
- Structure of brain and spinal cord
- Functions of cerebrum, cerebellum, hypothalamus and medulla oblongata

Chemical coordination and regulation

- Endocrine glands and their secretions
- Functions of hormones secreted by endocrine glands

Human reproduction

- Parts of female reproductive system
- Parts of male reproductive system
- Spermatogenesis and Oogenesis
- Menstrual cycle

UNIT IV

Plants and mineral nutrition:

- Essential mineral, macro and micronutrients
- Nitrogen metabolism, Nitrogen cycle, biological nitrogen fixation

Photosynthesis

- Autotrophic nutrition, photosynthesis, Photosynthetic pigments, Factors affecting

Photosynthesis.

UNIT V

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

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	Tissues • Definition, types of tissues, location and functions.
Course outcomes	• Understanding of living organism. Ability to discriminate structure of living cells and their significance • Anatomy and Physiology of plants and animals. • Cell biology (Basic Nature of Plant cell and Animal cell). • Various tissue system and organ system in plant and animals such as Excretory Endocrine, circulatory, respiratory System. • Discuss about the plant nutrition, nitrogen cycle and photosynthesis in plants.
Text Books	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
Reference Books	1. Botany for Degree students By A.C.Dutta. 2. Outlines of Zoology by M. Ekambaranatha ayyer and T. N. Ananthakrishnan. 3. A manual for pharmaceutical biology practical by S.B. Gokhale and C. K. Kokate 4. Practical human anatomy and physiology by S.R.Kale and R.R.Kale. 5. A Manual of pharmaceutical biology practical by S.B.Gokhale, C.K.Kokate and S.P.Shriwastava. 6. Biology practical manual according to National core curriculum .Biology forum of Karnataka. Prof .M.J.H.Shafi

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SHRI RAWATPURA SARKAR UNIVERSITY, RAIPUR CHHATTISGARH
BACHELOR OF PHARMACY, SEMESTER I

<table>
<tr><td>Course Title</td><td colspan="6">Remedial Mathematics Theory</td></tr>
<tr><td>Subject code</td><td colspan="2">BSCPH106MT</td><td colspan="2">Total theory periods : 30 Hrs</td><td colspan="2">Total Tutorial periods : 00</td></tr>
<tr><td rowspan="2">Course Credits</td><td>L</td><td>T</td><td>P</td><td>Credits</td><td colspan="2">Total marks in the end semester : 35</td></tr>
<tr><td>2</td><td></td><td></td><td>2</td><td colspan="2">Minimum of class tests to be conducted : 02</td></tr>
<tr><td>Prerequisites</td><td colspan="6">Details studied in mathematics in higher secondary education</td></tr>
<tr><td>Course objectives</td><td colspan="6">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
Course Content:</td></tr>
<tr><td>Course Contents</td><td colspan="6">UNIT – I
06 Hours
• Partial fraction
Introduction, Polynomial, Rational fractions, Proper and Improper fractions, Partial fraction , Resolving into Partial fraction, Application of Partial Fraction in Chemical Kinetics and Pharmacokinetics
• Logarithms
Introduction, Definition, Theorems/Properties of logarithms, Common logarithms, Characteristic and Mantissa, worked examples, application of logarithm to solve pharmaceutical problems
• . Function:
Real Valued function, Classification of real valued functions,
• Limits and continuity :
Introduction , Limit of a function, Definition of limit of a function
$\lim_{n\to\alpha} \frac{xn - an}{x - a} = na\, n-1, \lim_{\theta\to 0} \frac{Sin\theta}{\theta} = n1,$
UNIT –II
06 Hours
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, Adjoin or adjugate of a square matrix , Singular and non-singular matrices, Inverse of a matrix, Solution of system of linear of equations using matrix method, Cramer’s rule, Characteristic equation and roots of a square matrix, Cayley–Hamilton</td></tr>
</table>

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theorem, Application of Matrices in solving Pharmacokinetic equations

UNIT – III

06Hours

- **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

UNIT – IV

06 Hours

- **Analytical Geometry**

Introduction: Signs of the Coordinates, Distance formula,
Straight Line : Slope or gradient of a straight line, Conditions for parallelism and perpendicularity of two lines, Slope of a line joining two points, Slope – intercept form of a straight line

- **Integration:**

Introduction, Definition, Standard formulae, Rules of integration , Method of substitution, Method of Partial fractions, Integration by parts, definite integrals, application

UNIT-V

06 Hours

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

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	• **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**
Course outcomes	• Describe the concept of matrix. Definite and indefinite integral and its application in pharmacy • Describe the Calculus Differentiation , Differential Equations and Application in solving Pharmacokinetic equations • Explain the basic concept of graphical representation and diagrammatic representation of data. • Demonstrate the law of regression, standard deviation and correlation. • Apply the principle of probability, t-test and f-test in solving the numerical problems.
Text Books	**Recommended Books (Latest Edition)** 1. Differential Calculus by Shanthinarayan 2. Pharmaceutical Mathematics with application to Pharmacy by Panchaksharappa Gowda D.H.
Reference Books	1. Integral Calculus by Shanthinarayan 2. Higher Engineering Mathematics by Dr.B.S.Grewal

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SHRI RAWATPURA SARKAR UNIVERSITY, RAIPUR CHHATTISGARH
BACHELOR OF PHARMACY, SEMESTER I

Course Title	**Human Anatomy and Physiology-Practical**				
Subject code	**BPH101P**			**Total Practical periods : 04 Hrs / week**	
Course Credits	**L**	**T**	**P**	**Details**	**Total marks in the end semester : 35**
			4	**2**	
Prerequisites	Studied common foundational knowledge of anatomy and physiology in higher secondary (11^{th} & 12^{th}) Biology				
Course objectives	Upon completion of this course the student should be able to: • Explain the gross morphology, structure and functions of various organs of the human body. • Describe the various homeostatic mechanisms and their imbalances. • Identify the various tissues and organs of different systems of human body. • Perform the various experiments related to special senses and nervous system. • Appreciate coordinated working pattern of different organs of each system				
Course Contents	Practical physiology is complimentary to the theoretical discussions in physiology. Practicals allow the verification of physiological processes discussed in theory classes through experiments on living tissue, intact animals or normal human beings. This is helpful for developing an insight on the subject**.** 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				

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	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.
Course outcomes	• Explain the different types of tissues and the osseous system. • Recall the basics of the anatomy, physiology and the cell. • Describe the haemopoetic system and lymphatic system. • Describe cardiovascular system and digestive system.
Text Books	1. Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypee Brother's medical publishers, New Delhi. 2. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co, Riverview, MI USA 3. Text book of Medical Physiology- Arthur C,Guyton andJohn.E. Hall. Miamisburg, OH, U.S.A. 4. Textbook of Human Histology by Inderbir Singh, Jaypee brother's medical publishers, New Delhi. 5. Textbook of Practical Physiology by C.L. Ghai, Jaypee brother's medical publishers,

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	New Delhi. 6. Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee brother's medical publishers, New Delhi.
Reference Books	1. Principles of Anatomy and Physiology by Tortora Grabowski. Palmetto, GA, U.S.A. 2. Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York.

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SHRI RAWATPURA SARKAR UNIVERSITY, RAIPUR CHHATTISGARH
BACHELOR OF PHARMACY, SEMESTER I

Course Title	**Pharmaceutical Analysis I-Practical**				
Subject code	**BPH102P**			**Total Practical periods : 04 Hrs / week**	
Course Credits	**L**	**T**	**P**	**Credits**	**Total marks in the end semester : 35**
			4	**2**	
Prerequisites	**Basic fundamental studied in Chemistry in higher secondary education**				
Course objectives	Upon completion of the course student shall be able to • understand the principles of volumetric and electro chemical analysis • carryout various volumetric and electrochemical titrations • develop analytical skills				
Course Contents	**I Limit Test of the following** (1) Chloride (2) Sulphate (3) Iron (4) Arsenic **II Preparation and standardization of** (1) Sodium hydroxide (2) Sulphuric acid (3) Sodium thiosulfate (4) Potassium permanganate (5) Ceric ammonium sulphate **II 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				

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	III 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
Course outcomes	• Analyze drug sample by acid base titration. • Analyze drug sample by precipitation titration &complexometric titration. • Memorize all fundamentals of quantitative chemical analysis.
Text Books	1. A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, Stahlone Press of University of London 2. A.I. Vogel, Text Book of Quantitative Inorganic analysis 3. P. Gundu Rao, Inorganic Pharmaceutical Chemistry 4. Bentley and Driver's Textbook of Pharmaceutical Chemistry .
Reference Books	1. John H. Kennedy, Analytical chemistry principles 2. Indian Pharmacopoeia

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SHRI RAWATPURA SARKAR UNIVERSITY, RAIPUR CHHATTISGARH
BACHELOR OF PHARMACY, SEMESTER I

Course Title	**Pharmaceutics I-Practical**					
Subject code	**BPH103P**			**Total Practical periods : 04 Hrs / week**		
Course Credits	**L**	**T**	**P**	**Credits**	**Total marks in the end semester : 35**	
			4	**2**		
Prerequisites	**Basic fundamental knowledge studied in pharmaceutics in diploma in pharmacy**					
Course objectives	Upon completion of this course the student should be able to: Know the history of profession of pharmacy Understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations Understand the professional way of handling the prescription Preparation of various conventional dosage forms					
Course Contents	**PHARMACEUTICSI (Practical)** **3 Hours / week** **1. Syrups** a) Syrup IP b) Compound syrup of Ferrous Phosphate BPC'68 **2. Elixirs** a) Piperazine citrate elixir b) Paracetamol pediatric elixir **3.Linctus** a) Terpin Hydrate Linctus IP'66 4. Solutions b) Iodine Throat Paint (Mandles Paint) **4. Solutions** a) Strong solution of ammonium acetate b) Cresol with soap solution c) Lugol's solution **5. Suspensions** a) Calamine lotion b) Magnesium Hydroxide mixture c) Aluminimum Hydroxide gel **5. Emulsions** a) Turpentine Liniment b) Liquid paraffin emulsion **6. Powders and Granules** a) ORS powder (WHO) b) Effervescent granules c)Dusting powder					

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	d) Divded powders **7. Suppositories** a) Glycero gelatin suppository b) Coca butter suppository c) Zinc Oxide suppository **8. Semisolids** a) Sulphur ointment b) Non staining iodine ointment with methyl salicylate c) Carbopal gel **9. Gargles and Mouthwashes** a) Iodine gargle b) Chlorhexidine mouthwash
Course outcomes	• Understands the knowledge on preparatory pharmacy and professional way of preparing various conventional Drugs. • Discuss history of pharmacy profession and identify the role of prescription. • Explain incompatibilities and pharmacopoeia along with the use of its standard for preparation of various dosage Form. • Understand the concepts of fundamental meteorology and solve the problem of pharmaceutical calculations
Text Books	1. Carter S.J., Cooper and Gunn's-Dispensing for Pharmaceutical Students, CBS publishers, New Delhi.. 2. Alfonso R. Gennaro Remington. The Science and Practice of Pharmacy, Lippincott Williams, New Delhi. 3. Carter S.J., Cooper and Gunn's. Tutorial Pharmacy, CBS Publications, New Delhi. 4. E.A. Rawlins, Bentley's Text Book of Pharmaceutics, English Language Book Society, Elsevier Health Sciences, USA.
Reference Books	1. H.C. Ansel et al., Pharmaceutical Dosage Form and Drug Delivery System, Lippincott Williams's andWalkins, New Delhi.

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	2. M.E. Aulton, Pharmaceutics, The Science& Dosage Form Design, Churchill Livingstone, Edinburgh. 3. Indian pharmacopoeia. 4. British pharmacopoeia. 5. Lachmann. Theory and Practice of Industrial Pharmacy,Lea& Febiger Publisher, The University of Michigan.

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SHRI RAWATPURA SARKAR UNIVERSITY, RAIPUR CHHATTISGARH
BACHELOR OF PHARMACY, SEMESTER I

Course Title	**Pharmaceutical Inorganic Chemistry-Practical**					
Subject code	**BPH104P**			**Total Practical periods : 04 Hrs / week**		
Course Credits	**L**	**T**	**P**	**Details**	**Total marks in the end semester : 35**	
			4	**2**		
Prerequisites	**Basic fundamental knowledge studied in pharmaceutical chemistry in diploma in pharmacy**					
Course objectives	Upon completion of this course the student should be able to: • Know the history of profession of pharmacy • Understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations • Understand the professional way of handling the prescription • Preparation of various conventional dosage forms					
Course Contents	**PHARMACEUTICAL INORGANIC CHEMISTRY (Practical)** **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					

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	• 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
Course outcomes	• Outline pharmacopoeial standards for the qualitative and quantitative estimations of inorganic pharmaceuticals. • Describe acids, bases, buffers, water and different GIT agents and recall the fundamental principles of them. • Describe the major intra and extra cellular electrolytes, essential and trace elements, cationic andanionic Components of inorganic drugs.
Text Books	**TEXT BOOKS:** 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

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

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SHRI RAWATPURA SARKAR UNIVERSITY, RAIPUR CHHATTISGARH
BACHELOR OF PHARMACY, SEMESTER I

Course Title	**Communication skills-Practical**				
Subject code	**BATPH105P**				**Total Practical periods : 02 Hrs / week**
Course Credits	**L**	**T**	**P**	**Details**	**Total marks in the end semester : 15**
			2	**1**	
Prerequisites	**Common foundational communication studied in English language**				
Course objectives	At the completion of the course 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				
Course Contents	The following learning modules are to be conducted using words worth® English language lab software **Basic communication covering the following topics** Meeting People Asking Questions Making Friends What did you do? Do's and Don'ts **Pronunciations covering the following topics** Pronunciation (Consonant Sounds) Pronunciation and Nouns Pronunciation (Vowel Sounds) **Advanced Learning** Listening Comprehension / Direct and Indirect Speech Figures of Speech Effective Communication Writing Skills Effective Writing Interview Handling Skills E-Mail etiquette				

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	Presentation Skills
Course outcomes	• Describe the role of topic sentence, cohesion, coherence and sentence linkers in paragraph writing. • Describe the knowledge of organizing a meeting, chairing the meeting, preparing an agenda, writing minutes, Making an oral presentation and facing an interview. • Rewrite business proposal, business letters and e mail messages • Generate their own C.V, recognize utilization of reference, notes and bibliographies, and recognize concept and Relevance of public relations in a business organization.
Text Books	**Recommended Books: (Latest Edition)** 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 Behavior, Stephen .P. Robbins, 1stEdition, Pearson, 2013. 4. The Ace of Soft Skills: Attitude, Communication and Etiquette for success, Gopala Swamy Ramesh, 5thEdition, Pearson, 2013 5. Developing your influencing skills, Deborah Dalley, Lois Burton, Margaret, Green hall, 1st Edition Universe of Learning LTD, 2010 6. Communication skills for professionals, Konar nira, 2ndEdition, New arrivals – PHI, 2011 7. Soft skill for everyone, Butter Field, 1st Edition, Cengage Learning india pvt.ltd, 2011
Reference Books	1. Personality development and soft skills, Barun K Mitra, 1stEdition, Oxford Press, 2011. 2. Brilliant- Communication skills, Gill Hasson, 1stEdition, Pearson Life, 2011

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SHRI RAWATPURA SARKAR UNIVERSITY, RAIPUR CHHATTISGARH
BACHELOR OF PHARMACY, SEMESTER I

Course Title	**Remedial Biology-Practical**					
Subject code	**BPH106BP**				**Total Practical periods : 02 Hrs / week**	
Course Credits	**L**	**T**	**P**	**Credits**	**Total marks in the end semester : 15**	
			2	**1**		
Prerequisites	**basic fundamental aspects studied in biology in higher secondary education**					
Course objectives	**:** Upon completion of the course, the student shall be able to Know the classification and salient features of five kingdoms of life. Understand the basic components of anatomy & physiology of plant. Know understand the basic components of anatomy & physiology animal with special reference to human.					
Course Contents	**REMEDIAL BIOLOGY (Practical)** 1. **Introduction to experiments in biology** a) Study of Microscope b) Section cutting techniques c) Mounting and staining d) 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. Identification of bones 7. Determination of blood group 8. Determination of blood pressure 9. Determination of tidal volume					
Course outcomes	• Understanding of living organism. Ability to discriminate structure of living cells and their significance • Anatomy and Physiology of plants and animals. • Cell biology (Basic Nature of Plant cell and Animal cell).					

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	• Various tissue system and organ system in plant and animals such as Excretory Endocrine, circulatory, respiratory System. • Discuss about the plant nutrition, nitrogen cycle and photosynthesis in plants.
Text Books	1. Practical human anatomy and physiology. by S.R.Kale and R.R.Kale. 2. A Manual of pharmaceutical biology practical by S.B.Gokhale, C.K.Kokate and S.P.Shriwastava.
Reference Books	1. Biology practical manual according to National core curriculum .Biology forum of Karnataka. Prof .M.J.H.Shafi

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