# GANPAT UNIVERSITY

## FACULTY OF PHARMACY

## TEACHING AND EXAMINATION SCHEME

| Programme | Bachelor of Pharmacy | Branch/Spec. | B.Pharm. |
|---|---|---|---|
| Semester | V | | |
| Effective from Academic Year | 2017-18 | Effective for the batch Admitted in | June 2015 |

| Subject Code | Subject Name | Teaching scheme | | | | | | | | | | | | Examination scheme (Marks) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Credit | | | | | | Hours (per week) | | | | | | Theory | | | Practical | | |
| | | Lecture(DT) | | | Practical (Lab.) | | | Lecture(DT) | | | Practical(Lab.) | | | CE | SEE | Total | CE | SEE | Total |
| | | L | TU | Total | P | TW | Total | L | TU | Total | P | TW | Total | | | | | | |
| BPH5A1 | Pharmaceutical Microbiology | 3 | - | 3 | 2 | | 2 | 3 | - | 3 | 3 | 1 | 4 | 40 | 60 | 100 | 40 | 60 | 100 |
| BPH5A2 | Pharmaceutical Technology-I | 3 | - | 3 | 2 | | 2 | 3 | - | 3 | 3 | 1 | 4 | 40 | 60 | 100 | 40 | 60 | 100 |
| BPH5A3 | Biochemistry-I | 3 | - | 3 | 2 | | 2 | 3 | - | 3 | 3 | 1 | 4 | 40 | 60 | 100 | 40 | 60 | 100 |
| BPH5A4 | Pharmacology and Pharmacotherapeutics-I | 4 | - | 4 | 2 | | 2 | 4 | - | 4 | 3 | 1 | 4 | 40 | 60 | 100 | 40 | 60 | 100 |
| BPH5A5 | Pharmacognosy-III | 2 | - | 2 | 2 | | 2 | 2 | - | 2 | 3 | 1 | 4 | 40 | 60 | 100 | 40 | 60 | 100 |
| **Total** | | 15 | - | 15 | 10 | | 10 | 15 | - | 15 | 15 | 5 | 20 | 200 | 300 | 500 | 200 | 300 | 500 |

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## FACULTY OF PHARMACY

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|---|---|---|---|---|---|
| Programme | Bachelor of Pharmacy | | Branch/Spec. | B.Pharm. | |
| Semester | V | | Version | 2.0.0.0 | |
| Effective from Academic Year | 2017-18 | | Effective for the batch Admitted in | June 2015 | |
| Subject code | BPH5A1 | Subject Name | **Pharmaceutical Microbiology** | | |

| Teaching scheme | | | | | | Examination scheme (Marks) | | | |
|---|---|---|---|---|---|---|---|---|---|
| (Per week) | Lecture(DT) | | Practical(Lab.) | | Total | | CE | SEE | Total |
| | L | TU | P | TW | | | | | |
| Credit | 3 | - | 2 | | 2 | Theory | 40 | 60 | 100 |
| Hours | 3 | - | 3 | 1 | 4 | Practical | 40 | 60 | 100 |

Pre-requisites:

Nil

Outcome

- The course will help the student to have a good understanding about growth cycle of microorganisms,effects of various chemical and physical agents on their growth, various staining techniques used for identification of microorganisms by using microscope.
- Students will be able to describe the various methods used for controlling the growth of microorganisms in various fields of pharmaceutical industries.
- Students will be able to describe various tests for detection of presence of microorganisms in sterile and non-sterile dosage forms.

Theory Syllabus

| Unit | Content | Hrs |
|---|---|---|
| 1 | **Introduction to Pharmaceutical Microbiology:** History & contributions of great scientists to microbiology, scope and future of microbiology | **02** |
| 2 | **Classification of microbes:** Study of bacteria & bacterial cell, taxonomy of bacteria, brief introduction of actinomycetes, ricketssia, spirochetes, fungi and viruses and their importance in pharmaceuticals. | **06** |
| 3 | **Microscopy and Staining techniques:** Different types of microscopy, Stains and types of staining techniques | **04** |
| 4 | **Microbial Nutrition, cultivation and isolation:** Nutrition, Cultivation, Isolation and counting of bacteria, preservation of microbes | **06** |
| 5 | **Control of microbes in Pharmaceutical industry:** **a. Disinfection:** Factor affecting Disinfection, Dynamics of Disinfection, Evaluation and effectiveness of Disinfection, **b. Sterilization:** Introduction, significance, sensitivity of microorganisms, methods of sterilization, validation of sterilization | **15** |
| 6 | **Analytical microbiology:** Sterility testing of pharmaceutical products, Microbiological assay of antibiotics , vitamins and amino acids, Microbial Limit tests for pharmaceutical dosage forms | **12** |

**Practical contents**

Practicals related to topics covered in theory shall be carried out. Experiments on Preparation of various media, sub-culturing techniques, staining techniques, isolation of microorganisms, evaluation of disinfectants, sterility testing of pharmaceutical products, etc. shall be carried out.

**References**


1. Microbiology: An Introduction by Tortora, Funke and Case, eighth edition, Pearson Education, Inc., 2006.
2. Microbiology by Pelczar/Chan Kreig, 1st edition, Tata McGraw Hill Publishing Co. Ltd, New Delhi, 2009.
3. Microbiology by L.M. Prescott, J.P.Harley& D.A. Klein, 6th edition, McGraw Hill Publishing Co., 2005
4. Text book of Microbiology, R. Ananthnarayan & Jayaram Panikar, 7th edition, Panikar Publication, 2005.
5. Bergey's manual of Systematic Bacteriology, Vol.1, 2, 3 & 4, Lippincott Williams and Wilkins, USA, 1986
6. Disinfection, Sterilization and Preservation, fourth edition, Symour and S. Black., Philadelphia, 2002.
7. Prescott & Dunn's Industrial Microbiology. Forth Edition, CBS Publishers and Distributors, 2004.
8. Pharmaceutical Microbiology by N.K.Jain, Second Edition, VallabhPrakashan, Delhi, 2010.
9. Indian Pharmacopoeia, volume I & II by the controller of Publications, Delhi,1985.

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## FACULTY OF PHARMACY

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|---|---|---|---|
| Programme | Bachelor of Pharmacy | Branch/Spec. | B.Pharm. |
| Semester | V | Version | 2.0.0.0 |
| Effective from Academic Year | 2017-18 | Effective for the batch Admitted in | June 2015 |
| Subject code | BPH5A2 | Subject Name | **Pharmaceutical Technology-I** |

| Teaching scheme | | | | | | Examination scheme (Marks) | | | |
|---|---|---|---|---|---|---|---|---|---|
| (Per week) | Lecture(DT) | | Practical(Lab.) | | Total | | CE | SEE | Total |
| | L | TU | P | TW | | | | | |
| Credit | 3 | - | 2 | | 2 | Theory | 40 | 60 | 100 |
| Hours | 3 | - | 3 | 1 | 4 | Practical | 40 | 60 | 100 |

Pre-requisites:

Nil

**Learning Outcome**

- The course will help students to have basic understanding of formulation, manufacturing of liquid, semisolid and aerosol preparations as per GMP and other standards used in Pharmaceutical Industries.
- The students should able to understand the manufacturing aspects of sterile dosage forms, maintenance of sterility to design sterile dosage forms and Quality control aspects for various sterile dosage forms.
- The students should able to describe how GMP is helpful to design and manufacture pharmaceutical products in Pharmaceutical industry.

**Theory Syllabus**

| Unit | Content | Hrs |
|---|---|---|
| 1. | **Liquid dosage forms:** Introduction, advantages and disadvantages, types of additives used-vehicles, stabilizers, preservatives, suspending agents, emulsifying agents, solubilizers, colors, flavours, etc; manufacturing, packaging and evaluation of clear liquids, suspensions and emulsions ( including micro emulsion and multiple emulsion) and brief outline of other liquid products such as extracts, tincture, infusion etc. official in IP. | **08** |
| 2. | **Semisolid dosage forms:** Definition, Advantages and disadvantages, types, mechanisms of drug penetration through skin, factors influencing penetration, semisolid bases, their selection and ideal requirements of bases. General formulation, manufacturing, evaluation and packaging of semisolid preparations like ointment, paste, cream, suppository and passsaries, gels and jellies. | **10** |
| 3. | **Pharmaceutical aerosols:**Definition, propellants, general formulation of aerosols, containers, manufacturing (cold filling and pressure filling technique) and packaging methods, pharmaceutical applications, evaluation of aerosol. | **05** |
| 4. | **Sterile dosage forms:** Definitions, Advantages, Disadvantages, Ideal requirements and Formulation of sterile dosage forms, Water for injection-Preparation and quality control, Design and requirements for production area- Aseptic techniques, sources of contamination and methods of prevention, design of aseptic area, laminar flow benches, services and maintenance, containers and closures, methods of filling including form fill and seal technology. Evaluation of sterile dosage forms, parenteral suspensions, prefilled syringes, parenteral nutrients, freeze dried products, nanosuspensions etc, Examples of sterile dosage forms official in I.P. Ophthalmic preparations: requirements, formulations, methods of preparations, containers and evaluation. | **15** |
| 5. | **Good manufacturing practice for pharmaceuticals and validation:**<br>Brief introduction to GMP (schedule M) and quality assurance, practice of GMP- procedure (SOPs), building, equipment, personnel, components, documentation, containers, labeling, laboratory Control, distribution records, recovery<br>Introduction to validation, validation of selective unit operations (e.g. granulation, compression) used in tablet manufacturing and steam sterilizer. | **07** |

**Practical content**

Practical shall be conducted from the topics covered in theory explaining the principle involved in formulation and evaluation of liquid, semisolid, sterile preparations etc.

| References | |
|---|---|
| 1 | Pharmaceutical dosage forms and drug delivery systems by Ansel& others, ninth edition, Lippincott Williams & Wilkins, New York, 2005. |
| 2 | Pharmaceutics: The Science of Dosage Form Design by Michael E. Aulton, second edition, Churchill Livingstone, 2002. |
| 3 | Remington: The Science and Practice of Pharmacy by Gennaro and Alfonso R., twentieth edition, Vol-I & II, Lippincott Williams & Wilkins, New York. |
| 4 | Pharmaceutical dosage forms: Disperse systems: vol.1, 2 and 3, H.A. Lieberman, Martin M. Rieger and Leon Lachman and, Marcel Dekker Inc., New York, 1996. |
| 5 | Pharmaceutical dosage forms: Parenteral medications: vol.1, 2 and 3, H.A. Lieberman, Leon Lachman and Kenneth E. Avis, Marcel Dekker Inc., New York, 1993. |
| 6 | Modern Pharmaceutics by Gilbert S. Banker and Christopher T. Rhodes, third edition, Marcel Dekker, Inc., New York, 1996. |
| 7 | GMP for Pharmaceuticals by Sidney H. Willigand Storker, fifth edition , Marcel Dekker Inc., 2001. |
| 8 | Pharmaceutical process validation by Robert A. Nash and Alfred H. Wachter, third edition, Marcel dekker Inc., new York, 2003. |
| 9 | The theory and practice of Industrial Pharmacy by L Lachman, H Lieberman, special Indian edition, CBS Publishers & Distributors, New Delhi, 2009. |
| 10 | Pharmacopoeia : I.P., U. S. P., B.P |

# GANPAT UNIVERSITY

## FACULTY OF PHARMACY

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|---|---|---|---|---|---|---|---|---|
| Programme | Bachelor of Pharmacy | | | | Branch/Spec. | B.Pharm. | | |
| Semester | V | | | | Version | 2.0.0.0 | | |
| Effective from Academic Year | | | 2017-18 | | Effective for the batch Admitted in | | | June 2015 |
| Subject code | BPH5A3 | | Subject Name | | **Biochemistry-I** | | | |
| Teaching scheme | | | | | Examination scheme (Marks) | | | |
| (Per week) | Lecture(DT) | | Practical(Lab.) | | Total | | CE | SEE | Total |
| | L | TU | P | TW | | | | | |
| Credit | 3 | - | 2 | | 2 | Theory | 40 | 60 | 100 |
| Hours | 3 | - | 3 | 1 | 4 | Practical | 40 | 60 | 100 |

Pre-requisites:

Nil

Learning Outcome

The students are expected to

- Learn the biochemistry aspects specifically carbohydrates, vitamins, hormones, basic chemistry of cell etc.
- Understand basic idea of bioenergetics and biological oxidation process in living cells.

Theory Syllabus

| Unit | Content | Hrs |
|---|---|---|
| **1.** | **Cell:**Biochemical organization of the cell, Cell membraneand Transport processes across cell membrane | **03** |
| **2.** | **Bioenergetics:** The Concept of free energy, Exergonic and endergonic reactions, Determination of change in free energy from equilibrium constant, Sources and release of energy, ATPand its biological significance, Other energy rich phosphate compounds | **03** |
| **3.** | **Biologicaloxidation:** Redox potential, Electron transport OR Respiratorychain with enzymes and inhibitors, Oxidative Phosphorylation, mechanism ofoxidative phosphorylation, inhibitors of oxidative phosphorylation, Enzymes involvedinoxidationreduction reactions | **05** |
| **4.** | **Co-enzymes:** Vitamins as Co-Enzymes and their significance. | **06** |
| **5.** | **Hormones:** Role of various hormones in metabolism with significance. | **06** |
| **6.** | **Introduction to carbohydrates, Carbohydrate metabolism**<br>Conversionof polysaccharides to Glucose-1-Phosphate. Glycolysisand fermentation and their Regulation, Gluconeogenesis, Glycogenesis and glycogenolysis, Metabolismof galactose and fructose. Role of sugar nucleosides in biosynthesis and pentose-phosphate pathway. Role of hormones in maintenance of blood sugar level.<br>**The Citric Acid Cycle**<br>Significance,Reaction and energetic of the cycle, Amphibolic role of the cycleand Glyoxalic Acid cycle, Uric acid cycle | **15** |
| **7.** | **Techniques used in biochemistry:** Colorimetry, Spectrophotometry, Centrifugation, Electrophoresis and Chromatography | **03** |
| **8.** | **Brief introduction to water and mineral metabolism** | **04** |

Practical content

| | |
|---|---|
| **1.** | Separation of amino acids by paper chromatography and TLC. |
| **2.** | Achromicand chromic period of salivary amylase. |
| **3.** | Estimation of chlorides, phosphates, acidity and ammonia, glucose, diastase in urine and analysis of normal and abnormal constituents of urine. |
| **4.** | Identification of carbohydratesand proteins and biochemistry of cheese, milk, bread. |
| **5.** | Measurement of pH of biological fluids. |
| **6.** | Formal titration |

References


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|---|---|
| **1.** | Biochemistry by U. Satyanarayana, Books and Allied (P) Ltd., Calcutta, Latest Edition. |
| **2.** | Fundamentals of Biochemistry by Dr. A. C. Deb, Latest edition. |
| **3.** | Textbook of Biochemistry by Dr.Ramarao, Latest edition. |
| **4.** | Textbook of Biochemistry by Dr. K. Rambabu, Latest edition. |
| **5.** | Text book of Medical Biochemistry by S. Ramkrishnan, K. G. Prasannan, Orient Longman, Madras. |

| | |
|---|---|
| **6.** | Principles of Biochemistry by G. F. Zubay, W. W. Parson and D. E. Vance, WBC Publishers, England, Latest Edition. |
| **7.** | Biochemistry by S. C. Rastogi, Tata McGraw Hill, New Delhi, Latest Edition. |
| **8.** | Outlines of Biochemistry by E. E. Conn and P. K. Stumpf, John Wiley and Sons, New York. |
| **9.** | Principles of Biochemistry by A. L. Lehninger, CBS Publishers and Distributors. |
| **10.** | Harper's Biochemistry Edited by R. K. Murry, D. K. Granner, P. A. Mayes and V. W. Rodwell, Prentice Hall International Inc., Latest Edition. |
| **11.** | Introductory Practical Biochemistry by R. Singh and S. K. Sawhney, Narosa Publishing House, New Delhi, 2002. |
| **12.** | An Introduction to Practical Biochemistry by D. T. Plummer,, Tata McGraw Hill, New Delhi. |
| **13.** | Laboratory manual in Biochemistry, J. Jayaraman, Wiley eastern Ltd., New Delhi. |
| **14.** | Practical Biochemistry by R. K. Goyal, Latest Edition. |

# GANPAT UNIVERSITY

## FACULTY OF PHARMACY

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|---|---|---|---|---|---|---|---|---|
| Programme | Bachelor of Pharmacy | | | | Branch/Spec. | B.Pharm. | | |
| Semester | V | | | | Version | 2.0.0.0 | | |
| Effective from Academic Year | | | 2017-18 | | Effective for the batch Admitted in | | | June 2015 |
| Subject code | BPH5A4 | | Subject Name | | **Pharmacology and Pharmacotherapeutics-I** | | | |
| Teaching scheme | | | | | Examination scheme (Marks) | | | |
| (Per week) | Lecture(DT) | | Practical(Lab.) | | Total | | CE | SEE | Total |
| | L | TU | P | TW | | | | | |
| Credit | 4 | - | 2 | | 2 | Theory | 40 | 60 | 100 |
| Hours | 4 | - | 3 | 1 | 4 | Practical | 40 | 60 | 100 |

Pre-requisites:

Nil

Outcome

- At the end of this course students will be able to understand pharmacology and clinical strategy used for management of gastrointestinal, respiratory and cardiovascular diseases.
- The students are expected to strengthen their skills in therapeutics as well clinical pharmacist.
- The students will be able to utilize their skills of handling of equipments and instruments and softwares for studying pharmacological effects of the drugs used for above mentioned disorders.

Theory Syllabus

| Unit | Content | Hrs |
|---|---|---|
| 1. | **Pharmacology of Peripheral and Autonomic Nervous system:** | |
| | **a.**Neurohumoral transmission (autonomic and somatic)- organization and function, co-transmission | 01 |
| | **b.** Cholinergic system and drugs- cholinergic transmission,receptors, Parasympathomimetics, anticholinesterases, anticholinesterase poisoning, Parasympatholytics, drugs acting on autonomicganglia ( stimulants and blockers) | 04 |
| | **c.** Adrenergic system and drugs- adrenergic transmission, direct, indirect and mixed Sympathomimetics, Sympatholytics, Neuron blocking agents | 04 |
| | **d.** Skeletal muscle relaxants (peripherally, directly and centrally acting) – classification, mechanism of actions, actions and uses, difference between competitive and non-competitive blockers, difference between centrally and peripherally acting muscle relaxants. | 02 |
| | **e.** Local anaesthetics- classification, mechanism of actions, local and systemic actions, adverse effects, uses and techniques of local anaesthesia | 02 |
| 2. | **a.** Histamine, 5-HT and their antagonists. **b.**Prostanglandins, thromboxane and leukotrienes. **c.**Pentagastrin, cholecystokinin, Angiotensin, Bradykinin and substance P. | 05 |
| 3. | **Pharmacology of following class of drugs** | |
| | **a.** Laxatives- classification, mechanism of action, details of each class, and antidiarrhoeal drugs- oral rehydration, drug therapy- specific and non- specific, details of each class of drugs **b.** Emetics and antiemetics- classification, uses, contraindications **c.** Antitussive agents and Expectorants- classification , individual drugs | 10 |
| | **a.** Cardiac Glycosides and other Cardiotonics **b.** Antihypertensive Drugs **c.** Anti-anginal Drugs **d.** Anti-arrhythmic Drugs **e.**Antihyperlipidemic Drugs **f.** Diuretics and anti-Diuretics | 12 |
| | **a.** Haematinics and Erythropoietin **b.** Drugs Affecting Coagulation, Bleeding and Thrombosis **c.** Plasma Expanders | 03 |
| 4. | **Definition, epidemiology, etiology, pathophysiology, signs and symptoms, diagnosis, complications, treatment and management of following diseases/conditions:** | |
| | Peptic Ulcer Disease, Gastro Esophageal Reflux Disorder (GERD), Inflammatory Bowel Disease, Hepatitis | 04 |
| | Bronchial asthma, COPD | 02 |
| | Glaucoma | 01 |
| | Congestive Heart Failure, Hypertension, Coronary Artery Disease, Cardiac Arrhythmia | 06 |
| | Acute renal failure, Chronic renal failure | 02 |

| | | |
|---|---|---|
| | Obesity and Anemia | 03 |
| Practical content | | |
| 1. | To find out Nature of Unknown Drugs (Acetylcholine, Histamine, Bacl2, Neostigmine, Atropine, Mepyramine and Papaverine) using Rat/Guinea Pig/Chicken Ileum Preparation. | |
| 2. | Simulation **Experiments on Cardiovascular System:a)**Effects of Drugs on Isolated Frog Heart **b)**Effects of Various Drugs on the Rat/cat blood Pressure. | |
| 3. | Simulation **Experiments on Autonomic Nervous System:** Effect of various drugs on phrenic-hemidiaphram preparation. | |
| 4. | Simulation **Experiments on Autonomic Nervous System: a)** To study the effects of autonomic drugs on rabbits eye **b)**To study the effects of autonomic drugs on cilliary movement of frog esophagus | |
| 5. | Demonstration experiment: **a)**To study effect of antihistaminic drugs on guinea pigs**b)**To study effect of antiulcer drugs using rats**c)**To study the effect of anti-motility drugs using mice/rat | |
| 6. | To evaluate case study(minimum 1 case) of Glaucoma,Organo phosphorus poisoning, Myasthenia gravis, Peptic Ulcer Disease and GERD, Inflammatory Bowel Disease, Hepatitis, Bronchial asthma and COPD, Diarrhoea and Constipation, Emesis, Hypertension, Acute/ Chronic renal failure, Congestive Heart Failure, Cardiac Arrhythmia, Atherosclerosis, Obesity. | |
| References | | |
| 1 | Goodman & Gilman's, The Pharmacological basis of therapeutics, 12th Edition, McGraw Hill, New Delhi, 2011. | |
| 2 | Rang, H.P. & Dale, M.M., Rang and Dale's Pharmacology. 7th ed., Elsevier Churchill Living stone, London, 2012. | |
| 3 | Basic and clinical pharmacology by Katzung, B.G., 12th ed., McGraw Hill, New Delhi, 2009. | |
| 4 | Roger Walker and Cate Whittlesea, Clinical Pharmacy and Therapeutics, 5th ed., Churchill Livingstone, Edinburgh, 2011. | |
| 5 | Eric T. Herfindal et al., Text Book of Therapeutics: Drug and Disease Management, 8th ed., Williams and Wilkins, Philadelphia, 2006. | |
| 6 | Brian R. Walker et al., Davidson's Principle and Practice of Medicine, 22nd ed., Churchill Livingstone, Edinburgh, 2014. | |
| 7 | S. George Carrutherset.,Melmon and Morrelli's Clinical Pharmacology, 4th ed., McGraw Hill Medical, 2008. | |
| 8 | Joseph T. Dipiro et al., Pharmacotherapy: A Pathophysiological Approach, 9th ed., McGraw-Hill Education, 2014. | |
| 9 | Satoskar, R.S. and Bhadarkar, S.D., Pharmacology and Pharmacotherapeutics, 21st ed., Popular Prakashan, Mumbai, 2010. | |
| 10 | Richard A. Harvey et al., Pharmacology (Lippincott Illustrated Reviews Series), 5th Ed. Lippincott- Raven Company, Philadelphia, New York, 2011. | |
| 11 | G. Parathsarthee, K. Nyfort-Hansen and M. C. Nahata. A Textbook of Clinical Pharmacy Practice: Essential Concepts and Skills, 2nd Ed., Universities Press, 2012. | |
| 12 | K.D. Tripathi, Essential of Medical Pharmacology, 6th Ed., Jaypee Brothers Medical Publisher (P) Ltd., New Delhi, 2008. | |
| 13 | Seth S.D., Vimlesh Seth, Text Book of pharmacology, 3rd Ed., Elsevier, 2008. | |
| 14 | Sheth U.K. et al-Selected topics in Experimental Pharmacology, 1st Ed., The Kothari Book Depot, Mumbai, 1972. | |
| 15 | R.K. Goyal et al., Elementals of Clinical Pharmacy, 6th Ed., B.S. Prakashan Ahmedabad, 2011-12. | |
| 16 | Fundamentals of experimental pharmacology by Ghosh, M.N., 6th ed., Hilton & Company, Kolkatta, 2014. | |
| 17 | Kulakarni S.K., Handbook of Experimental Pharmacology, 4th Ed., VallabhPrakashan, New Delhi, 2012. | |
| 18 | Practicals in Pharmacology by R. K. Goyal, 9th ed., B.S. Shah Prakashan, Ahmedabad, 2010. | |

# GANPAT UNIVERSITY

## FACULTY OF PHARMACY

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|---|---|---|---|---|---|---|---|---|
| Programme | Bachelor of Pharmacy | | | | Branch/Spec. | B.Pharm. | | |
| Semester | V | | | | Version | 2.0.0.0 | | |
| Effective from Academic Year | | | 2017-18 | | Effective for the batch Admitted in | | | June 2015 |
| Subject code | BPH5A5 | | Subject Name | | **Pharmacognosy III** | | | |
| Teaching scheme | | | | | Examination scheme (Marks) | | | |
| (Per week) | Lecture(DT) | | Practical(Lab.) | Total | | CE | SEE | Total |
| | L | TU | P TW | | | | | |
| Credit | 2 | - | 2 | 2 | Theory | 40 | 60 | 100 |
| Hours | 2 | - | 3 1 | 4 | Practical | 40 | 60 | 100 |

Pre-requisites:

Nil

Learning Outcome

- Students will understand the importance of secondary plant metabolites and their biogenetic pathways, so they can understand the possible development of drugs.
- Students get acquainted with sources, cultivation techniques, identification techniques and important uses of glycosidal drugs for future reference.

Theory Syllabus

| Unit | Content | Hrs |
|---|---|---|
| 1 | Introduction to primary and secondary metabolites, Biogenesis and biosynthesis, Brief Introduction to Biogenesis of important secondary Metabolic pathways such as acetate mevalonate, shikimic acid, malonate and important pathways for certain classes of alkaloid and glycosides. Different techniques to study biogenetic pathways with reference to radio tracer technique. | 07 |
| | **Study of the biological sources, cultivation, collection, commercial varieties, chemical constituents, substitutes, adulterants, uses, diagnostic macroscopic and microscopic features and specific chemical tests of following groups of drugs containing glycosides:** | |
| 2 | Definition, properties, classification, identification and therapeutics of Glycosides. | 03 |
| 3 | **Anthraquinone cathartics:** Aloe, Senna, Rhubarb, Cascara | 04 |
| 4 | **Cardioactive sterols:** Digitalis, Squill, Strophanthus, Thevetia | 04 |
| 5 | **Coumarins:** Psoralea, Ammimajus, Ammivisnaga | 02 |
| 6 | **Saponins:** Liquorice, gInseng, Dioscorea, Senega, Sarsaparila, Quillaia | 04 |
| 7 | **Cyanogenetic glycosides:** Almond, Linseed | 01 |
| 8 | **Isothiocyanate glycosides:** Mustard, Black mustard | 01 |
| 9 | **Bitter glycosides:** Gentian, Picrorrhiza, Chirata, Kalmegh, Quassia | 03 |
| 10 | **Flavanoids:** *Rutagraveolens* | 01 |

Practical content

| | |
|---|---|
| 1 | Identification of crude drugs listed in theory. |
| 2 | Microscopic study of underlined important glycoside containing crude drugs. |

References


1. Trease and Evan's Pharmacognosy; W. C. Evans; W. B. Saunders Co., Singapore; 15th Edition; 2008.
2. Pharmacognosy: V. E. Tyler, L. R. Brady, J. E. Habbers, Lea and Febiger Philadelphia, 9th Edition, 1988.
3. Text book of Pharmacognosy: C. S. Shah, J. S. Quadry, B. S. Shah Prakashan, Ahmedabad, 13th revised Edition, 2007-08.
4. Textbook of Pharmacognosy: T.E. Wallis, CBS Publishers and Distributors, New Delhi, 5th Edition, reprinted, 2003.
5. Pharmacognosy: Phytochemistry Medicinal Plants: Jean Bruneton, TEC& DOC Paris, 2nd Edition, 1999.
6. Cultivation and Utilization of Aromatic Plants, Handa S. S. and Kaul M. K., Regional Research Laboratory Jammu-Tawi, 1997.
7. Cultivation and Utilization of Aromatic Plants. Edited by C.K. Atal and B.M. Kapoor Regional Research Laboratory, Jammu- Tawi, 1982.
8. Cultivation and Utilization of Medicinal Plants. Edited by C.K. Atal and B.M. Kapoor Regional Research Laboratory, Jammu- Tawi, 1982.