COURSE STRUCTURE
AND
DETAILED SYLLABUS

II - B.PHARMACY - I & II - SEMESTERS

B - PHARMACY

FOR
B.PHARMACY FOUR YEAR DEGREE COURSE
[Choice Based Credit System (CBCS)]
R15 Regulations
(Applicable for the batches admitted from 2015-2016 Onwards)

ANURAG GROUP OF INSTITUTIONS
AUTONOMOUS
VENKATAPUR, GHATKESAR, HYDERABAD – 500 088, TELANGANA STATE.

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II YEAR I SEMESTER **COURSE STRUCTURE**

Subject Code	Category	Subject Name	Lectures	T/P	Credits
A63001	PC	Pharmaceutical Unit Operations-I	3	1	3
A63002	PS	Pharmaceutical Organic Chemistry-III	4	1	4
A63003	BS	Biostatistics	3	1	3
A63004	PS	Physical Pharmacy -I	3	1	3
A63005	PS	Anatomy, Physiology and Pathophysiology	3	1	3
A63006	MC	Environmental Science	2	0	0
A63201	PS	Pharmaceutical Organic Chemistry-III Lab	0	3	2
A63202	BS	computer Applications Lab	0	3	2
A63203	PS	Physical Pharmacy-I Lab	0	3	2
A63204	PS	Health Education and Pathophysiology- Lab	0	3	2
		Total	18	17	24

II YEAR II SEMESTER **COURSE STRUCTURE**

Subject Code	Category	Subject Name	Lectures	T/P	Credits
A64001	PC	Pharmaceutical Unit Operations-II	3	1	3
A64002	PC	Pharmaceutical Analysis-I	3	1	3
A64003	PC	Pharmacognosy-I	3	1	3
A64004	PC	Physical Pharmacy-II	4	1	4
A64005	PC	Pharmaceutical Jurisprudence	3	1	3
A64006	MC	Gender Sensitization	2	0	0
A64201	PC	Pharmaceutical Unit Operations-II Lab	0	3	2
A64202	PC	Pharmaceutical Analysis-I Lab	0	3	2
A64203	PC	Pharmacognosy-I Lab	0	3	2
A64204	PC	Physical Pharmacy-II Lab	0	3	2
		Total	18	17	24

Note: All the end examinations (Theory and Practical) are of Three hours duration.
T – Tutorial **P – Practical**

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B.Pharmacy II year I Sem.	**L**	**T/P**	**C**
	3	**1/-**	**3**

PHARMACEUTICAL UNIT OPERATIONS – I

Objective: The student shall be exposed to various aspects of handling of maerials, fluids, application of Extraction, Evaporation, Distillation, drying, size reduction, size separation and mixing in Pharmaceutical Industry.

UNIT-I

Unit operation: Definition of laboratory scale, pilot scale, and industrial scale operations. Unit processes, material and energy balance. Material handling systems. Handling of solids: Belt, screw, chain, pneumatic and bucket conveyers Hadling of liquids: reciprocating pumps, piston pumps Handling of gases: Fans, Reciprocating compressor, centrifugal blower

UNIT-II

Extraction: Theory of extraction, seed extraction, equipment, counter current extraction, leaching of solids and equipment.

Evaporation: Basic concept of phase equilibria, factors affecting the evaporation. Principle, construction, working, advantages, disadvantages and pharmaceutical applications of following evaporators, film evaporators, single effect and multiple effect evaporators.

UNIT-III

Distillation: Raoult's law, volatility, simple steam and flash distillations, principles of rectification, Azeotropic and extractive distillation.

Drying: Moisture content and mechanism of drying, rate of drying and time of drying calculations, classification and types of dryers. Principle, construction, working, advantages, disadvantages and pharmaceutical applications of tray dryer, Fluid bed dryer, spray dryer and freeze-dryer.

UNIT-IV

Size Reduction and size separation: Definition, objectives of size reduction, factors affecting size reduction, laws governing energy and power requirements of a mill, Principle, construction, working, advantages, disadvantages and pharmaceutical applications of ball mill, hammer mill, fluid energy mill. Official standards for powders, modes of motions in size separation. Sieve analysis: testing of powders, equipment for size separation: Rotex Screen, cyclone separator, Air separator, bag filter.

UNIT-V

Mixing: Theory of mixing, solid solid, solid liquid and liquid liquid mixing. Mixing of solids: Twin shell blender, double cone, Sigma blade, planetary mixer, ribbon blender; Mixing of liquids: silverson mixer, colloid mill; Mixing of semi solids: Triple roller mill.

Outcomes: Student will understand the concepts of fluid flow, parameters of Evaporation, Distillation, drying, size reduction, size separation and mixie.ng. They also understand the safety factors and posses a sound knowledge of the above.

TEXT BOOKS

1. Carter SJ, Cooper and Gunss's Tutorial Pharmacy (2005). Tutorial Pharmacy. 6th ed. Delhi: CBS publisher.
2. Subramanyam CVS (2009). Pharmaceutical Unit Operation. Delhi: Vallabh Prakashan.
3. Sambamurty K (2008). Pharmaceutical Engineering. Delhi: Newage INT(P) LMT.
4. Badger and Banchoro (2010). Introduction to Chemical Engineering. Delhi: Tata Mc graw hill Education pvt lmt.
5. DERLY (2010). Pharmaceutical Engineering. 2nd ed. Hyderabad: Pharma Med Press.
6. Mc Cabe and Smith (2005). Unit operations. 7th ed. delhi: Mc Graw-Hill Companies
7. M.C Cabe and Smith (2001). Elements of Chemical Engineering. 6th ed. Newyork: Mc graw-hill.
8. Lippincott Williams and Wilkins (2010). Remingtons Pharmaceutical sciences. 4th ed. New-Delhi: Wolters Kluwer(India) Pvt ltd.
9. Rawlin's EA, Bentley's (2004). Textbook of Pharmaceutics. 8th ed. Delhi: All India traveller book seller.

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B.Pharmacy II year I Sem.	**L**	**T/P**	**C**
	4	**1/-**	**4**

PHARMACEUTICAL ORGANIC CHEMISTRY – III

Scope and Objective: This course is designed to impart a very good knowledge about
a) The chemistry of highly complicated organic compounds like heterocyclic's, carbohydrates, aminoacids, polypeptides and proteins along with their stereo chemical aspects; and
b) Some named organic reactions with mechanisms

Note: Definition, nomenclature, structure, acidity-basicity and characteristic reactions of the following heterocyclic compounds of Unit I. Few examples of drugs which contain the cited ring system.

UNIT – I

Five membered and six membered ring systems with one hetero atom:
Furan, Pyrrole and Pyridine.

Fused ring systems with one hetero atom:
Indole, Quinoline and Iso-quinoline

Five membered and six membered ring systems with two hetero atoms:
Pyrazole, Imidazole, Oxazole, Isoxazole, Thiazole and Pyrimidine.

Fused ring systems with two hetero atoms: Benzimidazole, Phenothiazine

UNIT – II

Stereochemistry of Carbon compounds: Optical rotation, plane polarized light, optical activity, chirality, notations (assignment of configuration), relative configuration (Fischer DL configuration) and absolute configuration (R&S), sequence rules with examples, enantiomers, meso compounds, racemic mixture and resolution of racemic mixtures, Elements of symmetry.Stereochemistry of alkenes: Concept of E & Z configurations.

UNIT-III

Carbohydrates: Definition, classification, nomenclature, study of glucose structure, mutarotation, oxidation-reduction reactions, osazone formation, epimerization, Lobry De Bruyn – Van Ekenstein reaction, structure of the disaccharide sucrose, glycosidic linkage, structural components of starch and cellulose.
A brief account on pharmaceutical importance of various carbohydrates.

UNIT-IV

a) **Amino acids**: Definition, classification, essential amino acids, configuration, three important methods of preparation, Zwitter ionic nature, isoelectric point. A brief account

on the pharmaceutical importance of amino acids.

b) **Polypeptides and proteins**: Definition, Classification, denaturation, C-terminal and N-terminal concept, Peptide synthesis. A brief account of the pharmaceutical importance of Polypeptides and proteins.

c) **Lipids (oils and fats):** Definition, fatty acids, characterization of lipids (Saponification value, acid value and Iodine value), hydrogenation and rancidity of oils and fats.

UNIT - V

a) Definitions of nucleic acids, nucleotides, nucleosides. A brief account on structure of DNA and RNA.

b) **A study of the mechanism and application in synthesis of the following named reactions**

A. Beckmann rearrangement
B. Birch reduction
C. Mannich reaction
D. Michael addition reaction

Outcome: as the structural and stereo chemical aspects and chemistry of organic compounds are discussed, it would help the students to have a good command over structural composition of organic compounds to evaluate and analyse the chemistry of these compounds.

TEXT BOOKS

1. Morrison TR, Boyd RN, Bhattacharjee SK, 2011, Organic chemistry, 7th Ed, Pearson Prentice hall of India private limited, New Delhi.
2. Arun bhal, Bhal BS, 2010, Advanced Organic chemistry, S.Chand & Company Ltd, New Delhi.
3. Agarwal OP, 2008, Reactions and Reagents in Organic Chemistry, 43rd Ed, Goel Publishing House, Meerut.
4. Finar IL, 2009, The Fundamentals Principles of Organic Chemistry, 6th Ed, Vol.I Pearson Education Ltd, New Delhi.
5. Jerry March, 2007, Advanced Organic Chemistry, 6th Ed, John Wiley & Sons Publishers, New Delhi.
6. Tatchell AR, Furniss BS, Hannaford AJ, Smith PWG, 2008, Vogel's Textbook of Practical Organic Chemistry, 5th Ed, Pearson Education Ltd, New Delhi.

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B.Pharmacy II year I Sem.	**L**	**T/P**	**C**
	3	**1/-**	**3**

BIOSTATISTICS

LEARNING OUTCOMES

After studying this course, the student will

1. Understand the basic concepts and terminology of biostatistics, including the various kinds of variables, frequency, measurement, and measurement scales.
2. Understand the probability and distributions and how to use them to calculate probabilities in real-world problems.
3. be able to calculate and interpret parametric and non-parametric statistics for making statistical inferences.
4. Understand how regression and correlation differ and when the use of each is appropriate.
5. able to calculate and interpret the epidemiological concepts of relative risk, odds ratios.

Unit-1: INTRODUCTION TO BIOSTATISTICS: Introduction, Some Basic Concepts (Data, Statistics, Sources of Data, Biostatistics, Variable (Quantities, Qualitative, Random, Discrete and Continuous), Population, Sample), Measurement and Measurement Scales (Nominal, Ordinal, Interval, Ratio), Sampling (random and non-random), The Scientific Method and the Design of Experiments

DESCRIPTIVE STATISTICS: Introduction, Measures of Central Tendency, Descriptive Statistics: Measures of Dispersion

Unit-2: SOME BASIC PROBABILITY: **CONCEPTS**, Introduction, Two Views of Probability: Objective and Subjective, Elementary Properties of Probability, Calculating the Probability of an Event, Bayes' Theorem.

PROBABILITY DISTRIBUTIONS: Introduction, Probability Distributions of Discrete Variables, The Binomial Distribution, The Poisson Distribution, Continuous Probability Distributions, The Normal Distribution, Normal Distribution Applications.

Unit -3: HYPOTHESIS TESTING: Introduction, Hypothesis Testing (Small Sample): A Single Population Mean, Hypothesis Testing: The Difference Between Two Population Means, Paired Comparisons. A Single Population Proportion, the Difference between Two Population Proportions. The Ratio of Two Population Variances. The Type II Error and the Power of a Test, Determining Sample Size to Control Type II Errors.

ANALYSIS OF VARIANCE: Introduction, the Completely Randomized Design, the Randomized Complete Block Design, Latin Square Design.

Unit-4: SIMPLE LINEAR REGRESSION AND CORRELATION: Introduction, the Regression Model, the Sample Regression Equation, Evaluating the Regression Equation, the Correlation Model, the Correlation Coefficient.

THE CHI-SQUARE DISTRIBUTION AND THE ANALYSIS OF FREQUENCIES: Introduction, the Mathematical Properties of the Chi-Square Distribution, Tests of Independence, Relative Risk, Odds Ratio.

Unit-5: NONPARAMETRIC AND DISTRIBUTION-FREE STATISTICS: Introduction, Measurement Scales, The Sign Test, The Wilcoxon Signed-Rank Test for Location, The Median Test, The Mann–Whitney Test, The Kolmogorov–Smirnov Goodness-of-Fit Test, The Kruskal–Wallis One-Way Analysis of Variance by Ranks, The Friedman Two-Way Analysis of Variance by Ranks.

Reference Books:

1. Lloyd D Fisher and Gerald Van Belle, "Biostatistics A Methodology for the Health Sciences", 2nd Edition, Wiley.
2. Olive Jean Dunn and Virginia A. Clark, "Basic Statistics A primer for the biomedical sciences", Wiley.
3. Anders Kallen, "Understanding Biostatistics", Wiley.
4. BK Mahajan, "Methods in Biostatistics for Medical Students and Research Workers", Jaypee.
5. P.S.S. Sunder Rao, and J. Richard, "Introduction to Biostatistics and Research Methods", PHI.
6. Wayne W. Daniel, and Chad L. Cross, "Biostatistics: Basic Concepts and Methodology for the Health Sciences, Wiley.

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B.Pharmacy II year I Sem. **L T/P C**
3 1/- 3

PHYSICAL PHARMACY-I

Objective: The student shall know important physical properties of drug molecules, phase value & its importance. Different law of thermodynamics, electrolyte and non-electrolyte solutions, importance of pH and drug research.

UNIT-I

Intermolecular forces and states of matter: Binding forces between molecules, the states of matter, the gaseous state, the liquid state, solids and the crystalline state.

Phase equilibria and the phase rule: Systems containing one, two and three components,**Physical properties of Drug Molecules**: Dielectric constant induced polarization, dipole moment, refractive index and molar refraction, optical rotatory dispersion.

UNIT-2

Thermodynamics: The first law of thermodynamics. Thermochemistry. The second law of thermodynamics. The third law of thermodynamics, Free energy functions and applications.

UNIT-3

Solutions of Non electrolytes: Concentration expressions, ideal and real solutions, colligative properties, molecular weight determinations.

Solutions of Electrolytes: Properties of solutions of electrolytes. The Arrhenius theory of electrolyte dissociation. The modern theory of strong electrolytes

UNIT -4

Ionic equilibria: Modern theories of acids, bases and salts, Sorensen's pH scale, specific concentration as a function of pH, calculation of pH, acidity constants.

Buffers and buffered isotonic systems: The buffer equation, buffer capacity, buffers in pharmaceutical and biological systems, buffered isotonic solutions, methods of adjusting tonicity and pH (relevant numerical problems).

UNIT-5

Micromeritics: Particle characteristics, Particle size and size distribution, methods for determining particle size, powder characteristics, methods for determining surface area, pore size, particle shape and surface area, Porosity, derived properties of powders.

Outcomes: Student will know about the physical properties of molecules, particle size & distribution. Three laws of thermodynamics, properties of electrolytes and non electrolytes, pH and buffers. They also understand the importance of these studies in the physical pharmaceutics &Formulationdevelopment.

Text Books

1. Subrahmanyam C.V.S , **Essentials of Physical Pharmacy**, 2005, Delhi ,Vallabh Prakashan, 1st edition .
2. Martin A.N & Cammarata .A ,**Physical Pharmacy and Pharmaceutical sciences**,1983 Philadelphia, 6th Edition,
3. Hougen and Watson K.M, **Chemical Process principles,**2004, New Age International ,2nd edition
4. Shoton & Ridgway, **Physical Pharmaceutics** ,2004,London , Oxford press ,2nd edition,
5. Gennaro A.R , Remington's Pharmaceuticals Sciences , 2010 , Mack Publishing ,21st edition

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B.Pharmacy II year I Sem.	**L**	**T/P**	**C**
	3	**1/-**	**3**

ANATOMY, PHYSIOLOGY AND PATHOPHYSIOLOGY

Objective: 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 and homeostatic imbalances of various systems of the body. Since a medicament, which is produced by the pharmacist, is used in various disease conditions to correct the abnormal functioning of the body systems, the basic knowledge of this subject is must for a student to understand how drugs act on various systems/organs in correcting the disease state of organs/systems. Thus it becomes a prerequisite subject for the pharmacy course.

UNIT-I

Basic Principles of Cell Injury, Adaptation & Process of Inflammation: Causes of cellular injury, pathogenesis, morphology of cell injury. Cellular adaptations, atrophy, hypertrophy, acute and chronic inflammation, mediators of inflammation, brief outline of the process of repair.

UNIT-II

A.Urinogenital system: Various parts, structures and functions of the kidney and urinary tract. Physiology of urine formation and acid base balance, Male and Female reproductive systems, physiology of menstruation, coitus and fertilization. Sex differentiation, spermatogenesis.

B. Pathophysiology of following diseases:

Renal failure, Glomerulonephritis, Renal calculi, Urinary Tract Infections (UTI) ,Infertility.Sexually transmitted diseases (STD),Dysmenorrhea

UNIT-III

A.Digestive System: Gross anatomy of the gastro intestinal tract, functions of its different parts including those of the liver, pancreas and gall bladder, various gastrointestinal secretions and their role in the absorption and digestion of food.

B. Path physiology of following diseases:

Peptic ulceration, Zollinger – Ellison's Syndrome, Inflammatory Bowel Disease, Jaundice ,Hepatitis

UNIT-IV

A.Respiratory System: Anatomy and functions of respiratory system, mechanism and regulation of respiration, respiratory volumes and vital capacity.

B. Pathophysiology of following diseases:

Asthma, COPD, Tuberculosis

UNIT-V

Hormones and functions in Health and disease: Basic anatomy and physiology of pituitary, thyroid, parathyroid, adrenals, pancreas, testes and ovary, their hormones and functions.

Outcome: Upon completion of the course the student shall be able to

1. Understand the gross morphology, structure and functions of various organs of the human body. Understand the various homeostatic mechanisms and their imbalances.
2. Identify the various tissues and organs and study the pathophysiology of different systems of human body.
3. Appreciate coordinated working pattern of different organs of each system
4. Appreciate the interlinked mechanisms in the maintenance of normal functioning (homeostasis) of human body.
5. Perform the simple urine analysis for normal and abnormal constituents and also record human body temperature, pulse rate and Body Mass Index etc...

TEXT BOOKS

1) Gerard Tortora, J., Bryan Derrickson, H. (2009). Principles of Anatomy and Physiology. 12th ed. New Jersey: John Wiley and Sons Inc.
2) Elaine Marieb, N. (2009). Essential of Human Anatomy & Physiology. 8th ed. New Delhi: Pearson education Inc.
3) Anne Waugh, Allison Grant, Ross & Willson. (2010). Text Book of Human Anatomy and physiology in health and illness.11th Ed.UK: Elsevier Ltd.
4) Robbins. (2012). Basic Pathology. 8th Ed. Noida: Elsvier Ltd.
5) Harsh Mohan. (2010). Text Book of Pathology. 6th ed. New Delhi: Jaypee Brothers Medical Publidshers Pvt. Ltd.
6) Arthur Guyton, C., John Hall, E. (2005). Textbook of Medical Physiology. 10th Ed. New Delhi: Elsevier Ltd.
7) Sembulingam, K., and Prema Sembulingam. (2004). Essentials of Medical Physiology. 3rd Ed. New Delhi: Jaypee Bros Medical publishers Ltd.

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B.Pharmacy II year I Sem.	**T**	**T/P**	**C**
	2	**-/-**	**-**

ENVIRONMENTAL SCIENCE

Objectives:

1. This course will give the importance of maintenance of ecological balance for sustainable development.
2. Understanding the impacts of developmental activities and mitigation measures.
3. Understanding of environmental policies and regulations

UNIT-I:

The Multidisciplinary nature of environmental studies:

Definition, scope and importance.

Natural Resources:

a. Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.

b. Water resources: Use and over-utilization of surface and ground water, floods, drought, dams-benefits and problems.

c. Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

d. Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-agrochemicals problems, water logging, salinity, case studies

e. Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources, case studies.

f. Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

UNIT-II:

Ecosystems: Concept of an ecosystem. Structure and function of an ecosystem. Producers, consumers and decomposers. Energy flow in the ecosystem. Ecological succession. Food chains, food webs and ecological pyramids.

Introduction, types, characteristic features, structure and function of the following ecosystem:

a) Forest ecosystem b) Grassland ecosystem, c) Desert ecosystem, d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT-III:

Biodiversity and its conservation: Introduction, definition: genetic species and ecosystem diversity.

Biogeographically, classification of India. Value of biodiversity: consumptive use, productive use, and social, ethical, aesthetic and option values, biodiversity at global, national and local

levels. India as a mega-diversity nation. Hot spots of biodiversity. **Threats to biodiversity:** Habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India.

Conservation of biodiversity: In-situ conservation of biodiversity

UNIT-IV :

Environmental Pollution: **Definition, causes, effects and control measures of**: a) Air pollution, b) Water pollution, c) Soil pollution, d) Marine pollution, e) Noise pollution, f) Thermal pollution and g) Nuclear hazards.

Solid and liquid waste Management: Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies.

Disaster management: Floods, earthquake, cyclone and landslides.

UNIT-V

Social Issues and the Environment: From unsustainable to sustainable development. Urban problems related to energy. Water conservation, rain water harvesting, watershed management Resettlement and rehabilitation of people; its problems and concerns.

Case studies. Environmental ethics: Issues and possible solutions. Climate change, global warming, acid rain, ozone layer depletion, nuclear Accidents and holocaust.

Case studies: Wasteland reclamation. Consumerism and waste products.

Environment protection Act. The air (prevention and control of pollution) act 1981. The Water (prevention and control of pollution) act 1974.The wildlife protection Act 1972. The Forest conservation Act 1980. Issues involved in enforcement of environmental legislation. Public awareness.

Human population and the Environment

Population growth, variation among nations. Population explosion – Family welfare programme. Environment and human health, human rights. Value education, role of information technology in environment and human health. Case studies.

TEXT BOOKS

1. M. Anji Reddy , (2007) Text Book of Environmental Sciences & Technology, Hyderabad, BS Publications.
2. Connar, (1997) Basic Concepts of Environmental Chemistry, New York, Lewis Publications.
3. D.K Asthana and Meera, (2006) Text book of Environmental studies, New Delhi, S Chand Publications.
4. Y. Anjaneyulu (2004), Introduction to Environmental Science, Hyderabad, B.S. Publication.
5. William P. Cunningham & Mary Ann Cunningham (2007), Principles of Environmental Science - Inquiry & Applications, New York, MC GrawHill Publications.
6. W. P. Cooper (2008), Environmental Encyclopedia, , Mumbai, Jaico Publishing House
7. K. C. Agarwal (2008), Environmental Biology, Bikaner, Nidi Publishers Ltd,
8. R.Rajagopalan, (2005), Environmental Studies, India, Oxford University Press.

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B.Pharmacy II year I Sem	**L**	**T/P**	**C**
	0	**-/3**	**2**

PHARMACEUTICAL ORGANIC CHEMISTRY- III LAB

I. Synthesis of some heterocyclic compounds.
a. Benzotriazole from O-phenylene diamine.
b. 2,3-Diphenyquinoxaline from O-phenylene diamine.
c. Piperazine-2,5-dione from Glycine.
d. 1,4-dihydro pyridine from ethyl acetoacetate.

II. Molecular rearrangements and named reactions
a. Benzimidazole from o-phenylenediamine (Phillip's Reaction).
b. Benzanilide from benzophenone oxime (Beckmann's rearrangement)
c. Preparation of 2-phenylindole from Phenyl hydrazine by Fischer's method.

III Analysis of oils & fats
a. Determination of Acid value of a fixed oil.
b. Determination of Saponification value of a fixed oil.
c. Determination of Iodine value of a fixed oil.

IV. Systematic analysis of organic binary mixtures

REFERENCES

1. Tatchell AR, Furniss BS, Hannaford AJ, Smith PWG, 2008, Vogel's Textbook of Practical Organic Chemistry, 5th Ed, Pearson Education Ltd, New Delhi.
2. Bansal RK, 2010, Laboratory Manual of Organic Chemistry, 5th Ed, New Age International (P) Ltd, New Delhi.
3. Mann FG, Saunders BC, 2001, Practical Organic Chemistry, 4th Ed, Orient Longman Limited, New Delhi.
4. Ahluwalia V.K., Renu Aggarwal, 2000, Comprehensive Practical Organic Chemistry Preparation and Quantitative Analysis, University Press (India) Private Limited, Hyderabad.
5. Indian Pharmacopoeia. – 2010.

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B.Pharmacy II year I Sem	**L**	**T/P**	**C**
	0	**-/3**	**2**

COMPUTER APPLICATIONS LAB

1.Sample programs in C: Program to calculate simple and complex arithmetic expressions, program using structures, program using loops and nested loops, program using functions and simple programs using arrays.
2. Operating systems like WINDOWS, UNIX, etc
3. Software packages like MS-WORD, EXCEL, ACCESS and POWER POINT.

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B.Pharmacy II year I Sem	**L**	**T/P**	**C**
	0	**-/3**	**2**

PHYSICAL PHARMACY-1 LAB

1. Molecular weight – Rast-camphor method
2. Molecular weight – Landsberger method.
3. Calibration of pH Meter
4. pH Estimation – pH meter
5. Phenol water system – CST
6. Effect of impurity on CST of Phenol –Water system.
7. Determination of Refractive index of liquids.
8. Preparation of Buffers and Buffer Capacity Determination.
9. Ternary phase diagram.
10. pH Estimation – colourimetric method.
11. Percent composition – polarimeter & refractometer
12. Lower consolute temperature – Tea and Water
13. Effect of particle size and effect of glidant on angle of repose
14. Microscopic size analysis.
15. Determination of particle size by Andreason Pippette

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	0	**-/3**	**2**

Health Education and Pathophysiology Lab

1. 1. Study of reproductive system with the help of charts and models – 2 Experiments.
2. Study of Various devices used in Famliy planning like Copper T, Lippers loop, Pills, Diaphram and Condom.
3. Study of pregnancy diagnosis test.
4. Microscopic studies of abnormal tissue sections – 4 Experiments.
5. Simple experiments involved in the analysis of normal and abnormal urine; collection of specimen, appearance, determination of pH, sugars, proteins, urea and creatinine – 4 Experiments.
6. Recording of human body temperature, pulse rate and Body Mass Index (BMI).
7. Determination of tidal volume & vital capacity.
8. Determination of blood glucose using Folin –Wu method.

REFERENCES

1. Gerard J Tortora, Bryan H Derrickson.Principles of Anatomy and Physiology. Vol -1&2 .12th Ed New Jersey: John Wiley and Sons Inc; 2009.
2. S. R. Kale and R. R. Kale, Practicl Biochemistry and Clinical Pathology, 12th Ed, Pune, Nirali Prakashan, 2011
3. David T. Plummer, An Introduction to Practical Biochemistry, 3rd Ed, Delhi, Tata McGraw Hill Education Pvt. Ltd., 2011

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B.Pharmacy II year II Sem.	**L**	**T/P**	**C**
	3	**1/-**	**4**

PHARMACEUTICAL UNIT OPERATIONS-II

Objective: The student shall be taught on operations like Filtration, Centrifugation, Crystallization, Industrial hazards and safety precautions.

UNIT –I

Fluid Flow: Types of flow, Reynold's number, viscosity, concept of boundary layer, basic equations of fluid flow, valves, flow meters, manometers and measurement of flow and pressure. Concept of fluid statics and dynamics, Bernoulli's theorem.

Heat Transfer: Nature of heat flow Conduction: - Fourier's law, thermal conductivity, compound resistance in series, heat flow through a cylinder - mean radius and mean area.

Convection: - Natural and forced convection, temperature gradients in forced convection, surface and over all coefficients. Parallel current and counter current flow.

Radiation: -black body, Stefan Boltzaman law, and gray body. Heaters, heat interchangers, scraped surface exchangers, extended surface equipment.

Steam as heating medium: - properties and uses of steam traps, vacuum pumps, condensers, entrainment separators, foam and its prevention.

UNIT-II

Filtration and Centrifugation: Theory of filtration, filter aids, filter media, industrial filters including filter press, rotary filter, edge filter. Factors affecting filtration, mathematical, optimum-cleaning cycle in batch filters.

Principles of centrifugation, Industrial centrifugal filters, centrifugal filters, and centrifugal sedimeters.

UNIT-III

Crystalization: Characteristics of crystals like; purity, size, shape, geometry, habit, forms, size and factors affecting it. Solubility curves. Material and heat balances around Swenson Walker Crystallizer. Supersaturation theory and its limitations. Nucleation mechanisms, crystal growth. Study of various types of crystallizers, agitated batch, single vacuum, circulating magma and crystal crystallizers. Caking of crystals and its prevention. Numerical problems on yields.

UNIT-IV

Dehumidification and Humidity control :Basic concepts and definition, wet bulb and adiabatic saturation temperature. Psychrometric chart and measurement of humidity, application of humidity measurement in pharmacy, equipments for dehumidification operations.

UNIT-V

Industrial hazards and safety precautions: Mechanical, Chemical, Electrical, fire and dust hazards. Industrial dermatities, accident records.

Outcome: Students will be familiar with concepts of Filtration, Centrifugation**,** Crystallization, Industrial hazards and safety precautions and understand the pharmaceutical applications in industry.

TEXT BOOKS

1. Carter SJ, Cooper and Gunss's Tutorial Pharmacy (2005). Tutorial Pharmacy. 6th ed. Delhi: CBS publisher .
2. Subramanyam CVS (2009). Pharmaceytical Engineering. Delhi: Vallabh Prakashan
3. Sambamurty K (2008). Pharmaceutical Engineering. Delhi: Newage INT(P) LMT.
4. Mc Cabe and Smith (2005). Unit operations. 7th ed. Newyork: Mc Graw-Hill Companies.
5. Macebe WI, Smith Macro JC (2001). Unit operations To Chemical Engineering. London: Hill Int. Book CO.
6. Lachman L, Lieberman H, Kaniz JL (1991). The Theory and Practice of Industrial Pharmacy. 3rd ed. Lee and Febiger Philadelphia,USA: Varghese Publisher house.
7. Badger and Banchoro (2010). Introduction to Chemical Engineering. New-Delhi: Tata Mc graw hill Education pvt lmt.
8. Perry. (2007). Handbook of Chemical engineering. Newyork: McGraw Hill Professional.
9. Aulton ME (2002). Pharmaceutics-The science of dosage form design. Churchill livingstone: Harcourt publications limited.
10. Rawlin's EA, Bentley's (2004). Textbook of Pharmaceutics. 8th ed. India: All India traveller book seller.

ANURAG GROUP OF INSTITUTIONS
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B.Pharmacy II year II Sem.	**L**	**T/P**	**C**
	3	**1/-**	**4**

PHARMACEUTICAL ANALYSIS-I

Objective: The basic concepts and analytical techniques of various pharmaceuticals are discussed in a detailed manner.

UNIT–I

Computation of analytical results, significant figures, concept of error, precision, accuracy, standard deviation, rejection of doubtful values with special reference to volumetric analysis. Calibration of analytical equipment used in volumetric analysis.

A) Theory of Neutralization Titration: Acidimetry, Alkalimetry and pH indicators.

B) General Principles and theory of oxidation-reduction methods. An account of the indicators used in these titrations.

Application of the above methods in the analysis of drugs.

UNIT-II

A) Complexometric titration: Theory, types and application in pharmaceutical analysis. Masking and demasking and their applications.

B)Non-aqueous Titration: Theory, types, solvents used and application in pharmaceutical analysis.

C) Precipitation Titration: Theory, types and application in pharmaceutical analysis.

D) Karl-Fisher method of estimation of water and other methods of moisture determination.

UNIT-III

A) Potentiometry: Types of Electrodes Potentiometric titrations, applications in pharmaceutical analysis.

B)Conductometric titrations: Basic concepts, different types of conductometric titrations, applications in pharmaceutical analysis.

C) Polarography: Apparatus and principles, general Applications in pharmaceutical analysis.

UNIT – IV

A) Differential Scanning Calorimetry & Differential Thermal Analysis

B) Radio Immuno Assay & Enzyme Linked Immunosorbent Assay

C) Principle, instrumentation and applications involved in the following

i) Refractometry

ii) Polarimetry

UNIT–V

Study of seperations and determinations involving the following techniques and their applications in pharmacy.

A) Column Chromatography: Adsorption and partition theory, preparation, procedure, methods of detection.

B) Thin layer chromatography: Theoretical consideration, preparation, procedure, detection of compounds.

C) Paper chromatography: Theory of partition, different techniques employed, filter papers used, quantitative and qualitative detection.

D) Introduction to paper electrophoresis.

Outcome: The knowledge gained upon the detailed study of the analytical techniques will be useful to analyze the pharmaceutical substances in a systematic, qualitative and quantitative manner.

TEXT BOOKS

1. Dr A.V Kasture, DR S.G Wadodkar, Dr K.R Mahadik, Dr H.N More (2011)Pharmaceutical Analysis, Vol I&II, 17th edn., Pune: Nirali Prakashan.
2. Dr Gurudeep R. Chatwal, Dr Sham K.Anand (2002) Instrumental Methods of Chemical Analysis, 5th edn., Mumbai: Himalaya Publishing House.
3. Dr B.K Sharma (2011) Instrumental Methods of Chemical Analysis, 27th edn., Meerut: Goel Publishing House.
4. A.A Napoleon (2006) Pharmaceutical Titrimetric Analysis, 1st edn., Vellore: Kalaimani Publishers and Distributors.

REFERENCE BOOKS

1. A.H. Beckett & J.B. Stanlake (1997) Practical Pharmaceutical Chemistry, Vol I&II, 1st edn., New Delhi: CBS Publishers.
2. J Mendham, R.C Denny, JD Barnes, M.Thomas, B.Sivasankar (2000) Vogel's Text book of Quantitative Chemical Analysis, 6th edn., India: Pearson Education Ltd.
3. Indian Pharmacopoeia 2014

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B.Pharmacy II year II Sem.	**L**	**T/P**	**C**
	3	**1/-**	**3**

PHARMACOGNOSY – I

Objectives: To know the medicinal and pharmaceutical imporatance of drugs obtained from the natural sources and to acquire the knowledge on crude drugs by studying them under a suitable pharmacognostic scheme.

Systematic Pharmcognosy study, which includes sources (Biological and Geographical) macroscopic characters, microscopic characters, chemical constituents, chemical tests, uses, substituent and adulterants of the crude drugs mentioned in the following units.

UNIT-I
INTRODUCTION TO PHARMACOGNOSY

Definition, History, Scope and Development of Pharmacognosy. Crude drug: Definition, Classification:-Alphabetical, Morphological, Taxonomical, Chemical classification and Pharmacological classification with examples.

NATURAL SOURCES OF DRUGS WITH EXAMPLES

Plant source, Animal source, Mineral source, Marine source and microorganisms. Organized and unorganized crude drugs with examples.

UNIT-II

Cultivation, collection, harvesting, drying, garbling, packing, storage and preservation of medicinal plants. Factors influencing cultivation of medicinal plants.

Plant hormones and their applications. Definitions and examples for Polyploidy, mutation and hybridization with reference to medicinal plants.

UNIT-III
SYSTEMATIC PHAMACOGNOSTIC STUDY OF CARBOHYDRATES AND DERIVED PRODUCTS

Acacia, Agar, Guar gum, Starch, Pectin, Isabgol and Honey.

SYSTEMATIC PHAMACOGNOSTIC STUDY OF FALLOWING FIBERS
Cotton, Jute, Wool, and Silk.

UNIT-IV
SYSTEMIC PHARMACOGNOSTIC STUDY OF THE FOLLOWING LIPIDS

Plant sources: Castor oil, Linseed oil, Coca butter, and Olive oil.

Animal sources: Cod liver oil, Shark liver oil, Bees wax, Wool fat, Spermaceti wax, Lard and Emu bird oil.

UNIT-V
SYSTEMIC PHARMACOGNOSTIC STUDY OF THE FOLLOWING VOLATILE OILS

Coriander, Cinnamon, Clove, Fennel, Cedar wood oil, Gaultheria, Lavender, Patchouli, Artemesia, Taxus,Coleus and Crocus.

Outcome:
At the end of semester the student shall be aware of different sources of crude drugs, cultivation aspects of medicinal and aromatic plants, evaluation methods of crude drugs, the medicinal importance and the role of crude drugs as excipients in various pharmaceutical dosage forms

TEXT BOOKS

1. Kokate, C.K., et al., Pharmacognosy , 2010, Pune, Nirali Prakashan, 45th edition.
2. Trease and Evans, Pharmacognosy, 2006, New Delhi, Elsevier, 15th edition.
3. Tyler, V. E.et al., Pharmacognosy 2011, India, Wolters Kluwer, 9th edition
4. Walls, T. E. Textbook of Pharmacognosy, 2005, New Delhi, CBS Publishers and distributors, 5th edition.
5. Vinod Rangari.D Pharmacognosy and phytochemistry, 209, Maharashtra, India, Nishad deshmukh, 2nd edition.
6. Govt. of India, The Ayurvedic Pharmacopeia of India, 2001, New Delhi, The Controller of Publication, Civil Lines, 1st edition, Volume I- II.
7. Handa and Kapoor, V. K., Text book of Pharmacognosy, 2004, New Delhi, Vallabh Prakashan, 3rd edition.
8. Ali. Mohd. Pharmacognosy, 2008, New Delhi, CBS Publishers and Distributors, 1st edition, Volume I- II.
9. Mukherjee. K, Quality Control Herbal Drugs, 2010, New Delhi, Business Horizons, 4th edition.
10. Farooqi, A. A. and Sree Ramu. B.S, Cultivation of medicinal and aromatic crops, 2010, India, University press, Hyderabad, 3rd edition.
11. Ansari.S.H, Essentials of pharmacognosy, 2011, New Delhi, Birla Publications, 4th edition.

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B.Pharmacy II year II Sem.	**T**	**T/P**	**C**
	4	**1/-**	**4**

PHYSICAL PHARMACY-II

Objective: The student shall be taught on industrial phenomenon of liquids, rate & order of reactants, micromeritics, flow of liquids and type of colloids and their properties.

UNIT-I

Solubility and Distribution Phenomena: Solvent-solute interaction, solubility of gases in liquids, liquids in liquids, solids in liquids, Distribution of solutes in immiscible solvents. Application of Partition-coefficient in Pharmacy.

Introduction to phenomena of diffusion: Ficks first law and second law.

UNIT-2

Chemical Kinetics: Rates and orders of the reaction. Determination of order of a reaction. Influence of temperature and other factors on reaction rates Decomposition and stabilization of medicinal agents, kinetics in the solid state and accelerated stability analysis (relevant numerical problems).

Complexation: Metal complexes, organic molecular complexes in inclusion complex, and methods of analysis,

UNIT-3

Interfacial Phenomena: Liquid interfaces, measurement of surface and interfacial tensions, adsorption at liquid interfaces. Spreading coefficient Surface-active agents and systems of hydrophilic lipophillic classification, Solubilization, Wetting phenomena and detergency, Adsorption at solid interfaces. Electrical properties of interfaces. (Electrical Double Layer-Concept),

UNIT- 4

Colloids: Introduction, types of colloidal systems, solubilization, Stability of colloids, purification of colloidal dispersions, Gold number, optical properties, kinetic properties, electrical properties and Donnan Membrane equilibrium.

Coarse Dispersions: Suspensions, emulsions: suspensions, interfacial properties of suspended particles. Settling in suspensions. Formulation of suspensions: emulsions- theories of emulsification, physical stability of emulsions, preservation of emulsions, rheological properties of emulsions and suspensions

UNIT- 5

Rheology: Concept of viscosity. Factors influencing viscosity .Newtonian system, non-Newtonian system, thixotropy, measurement and applications in formulations. Determination of viscosity, Types of viscometer and its applications.

Polymers: Definition, Types of Polymers, Water Soluble and Water Insoluble Polymers; Pharmaceutical Application of Polymers.

Outcomes: Student will know about the influence of temperature and other factors on rate of reactants, interfacial phenomena, Newtonian and non-newtonian flows.

Text Books

1. Subrahmanyam C.V.S , Textbook of Physical Pharmaceutics, 2005, Delhi ,Vallabh Prakashan, 1st edition .
2. Martin A.N & Cammarata .A ,Physical Pharmacy and Pharmaceutical sciences,1983 Philadelphia, 6th Edition,
3. Hougen and Watson K.M, Chemical Process principles,2004, New Age International ,2nd edition
4. Shoton & Ridgway, Physical Pharmaceutics ,2004,London , Oxford press ,2nd edition,
5. Gennaro A.R , Remington's Pharmaceuticals Sciences , 2010 , Mack Publishing ,21st edition

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II Year B. Pharmacy II-Sem	**L**	**T/P**	**C**
	3	**1/-**	**3**

PHARMACEUTICAL JURISPRUDENCE

Objective: The objective of the course is to expose the students all the laws and roles, which are voges in the country. The scope of the course is extended to update all the laws and roles including recent amendments taken place.

UNIT-I
INTRODUCTION
a) Pharmaceutical Legislations. A brief review
b) Drugs & Pharmaceutical Industry. A brief review
c) Pharmaceutical Education. A brief review.
d) Pharmaceutical ethics
e) Pharmaceutical policy 2002

UNIT-II
Drugs and Cosmetics Act 1940 and Rules 1945

UNIT-III
a) Pharmacy Act 1948
b) Drugs (Prices Control) Order 1995.
c) Drugs and Magic Remedies (Objectionable Advertisements) Act 1954 and Rules 1955

UNIT-IV
a) Medicinal & Toilet Preparations (Excise Duties) Act 1955
b) Narcotic Drugs & Psychotropic Substances Act 1985 &A.P. N. D. P.S Rules 1986

UNIT-V
A study of the salient features of the following
a) Prevention of Cruelty to animals Act 1960.
b) AP State Shops & Establishments Act 1988 & Rules 1990.
c) Factories Act 1948.
d) WTO,
e) The Indian Patents Act 1970

Outcome: The outcomes which are expected from the students at the end of the course are:Familiarization of the students with all the legal tenets and enforceable in the country, besides Pharmaceutical ethics and policies.

TEXT BOOKS

1. B.M.Mithal, 2009, A Text book of Forensic Pharmacy, 10th ed,
Vallabh Prakashan, Delhi.
2. C.K.Kokate & S.B.Gokhale, 2012, Textbook of Forensic Pharmacy, 2nd ed, Pharmamed press, Hyderabad.

REFERENCES

1. N.K.Jain, 2009, A Text book of Forensic Pharmacy, 7th ed, Vallabh Prakashan, Delhi.

2. Dr.B.S.Kuchekar, A.M.Khadatare and Sachin C.Itkar, 2006, Forensic Pharmacy, 6th ed, Nirali Prakashan, Pune.

3. K.Sampath, 2008, Pharmaceutical Jurisprudence (Forensic Pharmacy), 1st ed, Birla publications pvt ltd, Delhi.

4. Dr.B.S.Kuchekar, 2009, Textbook of Pharmaceutical Jurisprudence, 14th ed, Nirali Prakashan, Pune.

5. Dr.B.Suresh, 2011, Forensic pharmacy (Forensic Pharmacy), 14th ed, Birla publications Pvt. Ltd, Delhi.

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II Year B. Pharmacy II-Sem	**L**	**T/P**	**C**
	2	**-/-**	**-**

GENDER SENSITIZATION

Course Objectives:

1. To develop students sensibility with regard to issues of gender in contemporary India.
2. To provide a critical perspective on the socialization of men and women.
3. To introduce students to information about some key biological aspects of genders.
4. To expose the students to debates on the politics and economics of work.
5. To help students reflect critically on gender violence.
6. To expose students to more egalitarian interactions between men and women.

Course Outcomes:

1. Students will have developed a better understanding of important issues related to gender in contemporary India.
2. Student will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
3. Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
4. Students will acquire insight into the gendered division of labour and its relation to politics and economics.
5. Men and women students and professionals will be better equipped to work and live together as equals.
6. Students will develop a sense of appreciation of women in all walks of life.
7. Through providing accounts of studies and movements as will as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

Unit-I:
UNDERSTANDING GENDER:

Gender: Why Should We Study It? (Towards a World of Equals: Unit-1)
Socialization: Making Women Making Men (Towards a World of Equals: Unit-2)
Introduction. Preparing for Womanhood. Growing up Male. First lesions in Caste. Different Masculinities. Just Relationships: Being Together as Equals (Towards a World of Equals: Unit-12)Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Others and Fathers. Further Reading: Rosa Parks-The Brave Heart.

Unit-II:
GENDER AND BIOLOGY:

Missing Women: Sex Selection and Its Consequences (Towards a World of Equals: Unit-4) Declining Sex Ratio. Demographic Consequences. Gender Spectrum: Beyond the Binary (Towards a World of Equals: Unit-10)Two or Many? Struggles with Discrimination. Additional Reading: Our Bodies, Our Health (Towards a World of Equals: Unit-13)

Unit-III:
GENDER AND LABOUR:

Housework: the Invisible Labour (Towards a World of Equals: Unit-3)"My Mother doesn't Work." "Share the Load."Women's Work: Its Politics and Economics (Towards a World of Equals; Unit-7)Fact and Fiction. Unrecognized and Unaccounted work. Further Reading: Wages and Conditions of Work.

Unit-IV:
ISSUES OF VIOLENCE:

Sexual Harassment: Say No! (Towards a World of Equals: Unit-6) Sexual Harassment not Eve-Teasing- Coping with Everyday Harassment-Further Reading: "Chupulu". Domestic Violence: Speaking Out (Towards a World of Equals: Unit-8)Is Home a Safe Place? – When Women Unite (Film). Rebuilding Lives. Further Reading: New Forums for Justice. Thinking about Sexual Violence (Towards a World of Equals: Unit-11)Blaming the Victim-"I Fought for my Life…." – Further Reading: The Caste Face of Violence.

Unit-V
GENDER STUDIES:

Knowledge: Through the Lens of Gender (Towards a World of Equals: Unit-5)
Point of View. Gender and the Structure of Knowledge. Further Reading: Unaknowledged.Women Artists of Telangana.Whose History? Questions for Historians and Others (Towards a World of EqualsReclaiming a Past. Writing other Histories. Further Reading: Missing Pages from Modern Telangana History.Essential Reading: All the Units in the Textbook, "Towards a World of Eqals: A Bilingual Textbook on Gender" written by A.Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagarj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu.
Note: Since it is Interdisciplinary Course, Resource Persons can be drawn from the fields of English Literature or Sociology or Political Science or any other qualified faculty who has expertise in this field.

Reference Books:
1. Sen, Amartya, "More than One Million Women are Missing." New York Review of Books 37.20 (20 December 1990). Print. 'We Were Making Hisoty…' Life Stories of

Women in the Telangana People's Struggle. New Delhi: Kali for Women, 1989.
2. Tripti Lahiri. "By the Numbers: Where Indian Women Work." Women's Studies Journal (14 November 2012) Available online at:http://blogs.wsj.com/ India real time/2012/11/14/by-the-numbers-where-Indian-women-work/>
3. K.Satyanarayana and Susie Tharu (Ed.) Steel Nibs Are Sprouting: New Dalit Writing From South India, Dossier 2, Telugu and Kannada http://harpercollings.co.in/BookDetail.asp?Book Code=373221
4. Vimala. "Vantilliu (The Kitchen)". Women Writing in India: 600 Bc To the Present, Volume It: The 20th Century, Ed. Susie Tharu and K.Lalitha. Delhi: Oxford University Press, 1995. 599-601.
5. Shatrunghna, Veena et al. Women's Work and its impact on Child Health and Nutrition, Hyderabad, National Institute of Nutrition, Indian Council of Medical Research, 1993.
6. Stree Shakti Sanghatana. "We Were Making History…' Life Stories of Women in the Telangana People's Struggle, New Delhi: Kali for Women, 1989.
7. Menon, Nivedita, Seeing like a Feminist. New Delhi: Zubaan-Penguin Books, 2012
8.Jayaprabha, A. "Chupulu (Stares)". Women Writing in India: 600BC to the Present. Volume II: The 20th Century Ed. Susie Tharu and K.Lalita, Delhi: Oxfor Univerity Press. 1995, 596-597.
9.Javeed. Shayan and Anupam Manuhaar. "Women and Wage Discrimination in India: A Critical Analysis." International Journal of Humanities and Social Science Invention 2,.4 (2013).
10. Gautam, Liela and Gita Ramaswamy. "A 'conversation' between a Daughter and a Mother." Broadsheet on Contemporary Politics. Special Issue on Sexuality and Harassment: Gender Politics on Campus Today. Ed. Madhumeeta Sinha and Asma Rasheed. Hyderabad: Anveshi Research Center for Women's Studies, 2014.
11. Abdulali Sohaila. "I Fought For My Life… and Won." Available online at: http://www.thealternative.in/lifestyle/i-fought-for-my-lifeand-won-sohaila-abdulal/
12. Jeganathan pradeep, Partha Chatterjee (Ed). "Community, Gender and Violence Subaltern Studies XI". Permanent Black Ravi Dayal Publishers, New Delhi, 2000.
13. K.Kapadia. The Violence of Development: The Politics of Identity, Gener and Social Inequalities in India. London: Zed Books, 2002.
14. S.Benhabib. Situating the Self: Gender, Community, and Postmodernism in Contemporary Ethics, London: Routledge, 1992.
15. Virginia Woolf. A Room of One's Own, Oxford: Black Swan, 1992.
16. T.Banuri and M. Mahmood, Just Development Beyond Adjustment with a Human Face, Karachi: Oxford University Press, 1997.

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B.Pharmacy II year II Sem	**L**	**T/P**	**C**
	0	**-/3**	**2**

PHARMACEUTICAL UNIT OPERATIONS-II LAB

1. Measurement of flow of fluids and their pressure, determination of reynold's number and calculation of frictional losses.
2. Evaluation of filter media, determination of rate filtration and study of factors affecting filtration including filter aids.
3. Determination of Humidity use of Dry Bulb and Wet Bulb thermometers and Psychometric charts.
4. Determination of overall Heat Transfer Coefficient.
5. Determination of rate of evaporation.
6. Determination of rate of drying, free moisture content and bound moisture content.
7. Experiments to illustrate the influence of various parameters on the time of drying.
8. Experiments to illustrate principles of size reduction, Laws governing energy and power requirements of a size reduction.
9. Experiments to illustrate solid solid mixing, determination of mixing efficiency using different types of mixers.

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B.Pharmacy II year II Sem.	**L**	**T/P**	**C**
	0	**-/3**	**2**

PHARMACEUTICAL ANALYSIS – I LAB

1. Assay of Pharmaceutical compounds based on chemical methods such as
   a) acid base
   b) oxidation-reduction
   c) non-aqueous
   d) Complexometric titration methods.
2. Conductometric determination of end point of titration of HCI with NaOH.
3. Potentiometric determination of end point.
4. Separation and Identification of drugs by Ascending paper chromatography.
5. Separation and Identification of drugs by Circular paper chromatography.
6. Separation and Identification of drugs by Thin Layer chromatography.
7. Quantitative determination by Polarimeter.
8. Determination of refractive index of liquids by Abbe refractometer.

TEXT BOOKS

1. M.M Alam, mumoona Akthar, Asif Husain, M.Shaquiquzzaman (2011) Practical Pharmaceutical Analytical Chemistry, New Delhi: Elsevier.
2. Sonali Sheorey, Meera Honrao (2003) Practical Pharmaceutical Analysis-I, 1st edn., Nashik: Career Publishers.
3. Indian Pharmacopoeia 2011

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B.Pharmacy II year II Sem.	**L**	**T/P**	**C**
	0	**-/3**	**2**

PHYSICAL PHARMACY-II LAB

1. 1. Determination of viscosity using Ostwald viscometer.
2. Percent composition – Capillary Flow method
3. Determination of bulk density, true density and percentage porosity.
4. Determination of Surface tension using Stalagmometer
5. Determination of CMC of a surfactant.
6. Partition coefficient determination.
7. Determination of sedimentation volume and degree of flocculation.
8. Determination of Order of reaction – First order.
9. Effect of temperature on solubility of solid in liquid.
10. Effect of addition of Salt/pH/cosolvent on the solubility
11. HLB value estimation of surfactants.
12. Preparation of Multiple emulsion - Demonstration.
13. Demonstration of Brook field viscometer.
14. Calculation of Zeta potential –Demonstration

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B.Pharmacy II year II Sem.	**L**	**T/P**	**C**
	0	**-/3**	**2**

PHARMACOGNOSY - I LAB

1. Spotting of crude drugs mentioned in the theory.
2. Collection of natural herbs and preparation of herbarium / laminated photos for five drugs.
3. Measurement of particle size range of potato starch.
4. Isolation and determination of volatile oil content in caraway fruit/clove.
5. Measurement of size range of phloem fibers in Cinnamon powder.
6. Chemical test for identification and detection to adulteration in acacia, tragacanth, agar and honey.
7. Determination of Swelling factor of isabgol seeds
8. Perform the Transverse section of fallowing crude drugs Fennel, coriander, clove, cinnamon.
9. Perform the physical evaluation of olive oil/castor oil (Solubility, density and viscosity)
10. Perform the chemical methods of evaluation of crude drugs containing fixed oils and lipids, methods mentioned in IP for Castrol oil, Olive oil, Kokum butter, bees wax.
11. Extraction of pectin from orange peels.

TEXT BOOKS

1. Kandhelwal, K.R., Practical Pharmacognosy, 2010, Pune, Nirali Prakashan, 22nd edition.
2. Kokate, C. K., Practical Pharmacognosy, 2004, Delhi, Vallabh Prakashan, 4th edition.