

JSS Academy of Higher Education & Research, Mysuru

(Deemed to be University)

(Accredited 'A+' Grade by NAAC)



JSS COLLEGE OF PHARMACY, ROCKLANDS, OOTY

(ISO 9001:2015 Certified)



Curriculum and Academic Calendar

(Academic Year: 2021-2022)

Course: II. B.PHARM

Vision

To be preeminent colleges in shaping society—worthy and SMART pharmacy professionals of global repute

Mission

- To adopt and lead the transformation of pharmacy education, practice and research nationally and globally.
- To inspire and nurture students to become exemplary professionals to serve the global society
- To develop competencies among students and empower them to meet the changing needs of the profession
- To impart quality education and practice to promote and advance public health
- To impart holistic and value-based education to produce new generation humane pharmacy professionals
- To address the sustainable health care challenges through innovative measures and technologies

Programme Educational Objectives

1. To acquire the theoretical knowledge of Pharmaceutical Sciences
2. To acquire practical skills in
 - Isolation and identification of medicinal compounds from natural sources
 - Synthesis and analysis of medicinal compounds
 - Screening for pharmacological activities
 - Formulation of pharmaceutical dosage forms and their evaluation
 - Comprehensive pharmaceutical care to patients
3. To demonstrate the leadership qualities, ethical attitude and to engage in life-long learning
4. To acquire skills for designing the research questions, protocol, data analysis and reporting research outcomes

Programme Outcomes

1. Pharmacy Knowledge
2. Planning abilities
3. Problem analysis
4. Modern tool usage
5. Leadership skills
6. Professional Identity
7. Pharmaceutical Ethics
8. Communication
9. Pharmacist and society
10. Environment and sustainability
11. Lifelong learning

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1. EXCERPT FROM JSS ACADEMY OF HIGHER EDUCATION & RESEARCH REGULATIONS

Medium of instruction and examinations

Medium of instruction and examination shall be in English.

Working days in each semester

Each semester shall consist of not less than 100 working days. The odd semesters shall be conducted from the month of June/July to November/December and the even semesters shall be conducted from December/January to May/June in every calendar year.

Attendance and progress

A candidate is required to put in at least 80% attendance in individual courses considering theory and practical separately. The candidate shall complete the prescribed course satisfactorily to be eligible to appear for the respective examinations.

Program/Course credit structure

As per the philosophy of Credit Based Semester System, certain quantum of academic work viz. theory classes, tutorial hours, practical classes, etc. are measured in terms of credits. On satisfactory completion of the courses, a candidate earns credits. The amount of credit associated with a course is dependent upon the number of hours of instruction per week in that course. Similarly, the credit associated with any of the other academic, co/extra-curricular activities is dependent upon the quantum of work expected to be put in for each of these activities per week.

Credit assignment

Theory and Laboratory courses

Courses are broadly classified as Theory and Practical. Theory courses consist of lecture (L) and /or tutorial (T) hours, and Practical (P) courses consist of hours spent in the laboratory. Credits (C) for a course is dependent on the number of hours of instruction per week in that course, and is obtained by using a multiplier of one (1) for lecture and tutorial hours, and a multiplier of half (1/2) for practical (laboratory) hours. Thus, for example, a theory course having three lectures and one tutorial per week throughout the semester carries a credit of 4. Similarly, a practical having four laboratory hours per week throughout semester carries a credit of 2.

Minimum credit requirements

The minimum credit points required for award of a B. Pharm. degree is 208. These credits are divided into Theory courses, Tutorials, Practical, Practice School and Project over the duration of eight semesters. The credits are distributed semester-wise as shown in Table IX. Courses generally progress in sequences, building competencies and their positioning indicates certain academic maturity on the part of the learners. Learners are expected to follow the semester-wise schedule of courses given in the syllabus.

The lateral entry students shall get 52 credit points transferred from their D. Pharm program. Such students shall take up additional remedial courses of 'Communication Skills' (Theory and Practical) and 'Computer Applications in Pharmacy' (Theory and Practical) equivalent to 3 and 4 credit points respectively, a total of 7 credit points to attain 59 credit points, the maximum of I and II semesters.

Academic work

A regular record of attendance both in Theory and Practical shall be maintained by the teaching staff of respective courses.

Course of study

The course of study for II B. Pharm shall include Semester Wise Theory & Practical as given in Table – I to II The number of hours to be devoted to each theory, tutorial and practical course in any semester shall not be less than that shown in Table – I to II.

Table – I: Course of study for semester III

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP301T	Pharmaceutical Organic Chemistry II – Theory	3	1	4
BP302T	Physical Pharmaceutics I – Theory	3	1	4
BP303T	Pharmaceutical Microbiology – Theory	3	1	4
BP304T	Pharmaceutical Engineering – Theory	3	1	4
BP305P	Pharmaceutical Organic Chemistry II – Practical	4	-	2
BP306P	Physical Pharmaceutics I – Practical	4	-	2
BP307P	Pharmaceutical Microbiology – Practical	4	-	2
BP307P	Pharmaceutical Engineering – Practical	4	-	2
Total		28	4	24

Table – II: Course of study for semester IV

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP401T	Pharmaceutical Organic Chemistry III– Theory	3	1	4
BP402T	Medicinal Chemistry I – Theory	3	1	4
BP403T	Physical Pharmaceutics II – Theory	3	1	4
BP404T	Pharmacology I – Theory	3	1	4
BP405T	Pharmacognosy and Phytochemistry I – Theory	3	1	4
BP406P	Medicinal Chemistry I – Practical	4	-	2
BP407P	Physical Pharmaceutics II – Practical	4	-	2
BP408P	Pharmacology I – Practical	4	-	2
BP409P	Pharmacognosy and Phytochemistry I – Practical	4	-	2
Total		31	5	28

End semester examinations

The End Semester Examinations for each theory and practical course through semesters III to IV shall be conducted by the university.

Table – III: Semester III

Course code	Name of the course	Internal Assessment			End Semester Exams		Total Marks	
		Continuous Mode	Sessional Exams		Total	Marks		Duration
Marks	Duration							
BP301T	Pharmaceutical Organic Chemistry II – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP302T	Physical Pharmaceutics I – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP303T	Pharmaceutical	10	15	1 Hr	25	75	3 Hrs	100

	Microbiology – Theory							
BP304T	Pharmaceutical Engineering – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP305P	Pharmaceutical Organic Chemistry II – Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP306P	Physical Pharmaceutics I – Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP307P	Pharmaceutical Microbiology – Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP308P	Pharmaceutical Engineering– Practical	5	10	4 Hrs	15	35	4 Hrs	50
Total		60	100	20 Hrs	160	440	28Hrs	600

Table – IV: Semester IV

Course code	Name of the course	Internal Assessment				End Semester Exams		Total Marks
		Continuou s Mode	Sessional Exams		Tota l	Mark s	Duratio n	
			Mark s	Duratio n				
BP401 T	Pharmaceutical Organic Chemistry III– Theory	10	15	1 Hr	25	75	3 Hrs	100
BP402 T	Medicinal Chemistry I – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP403 T	Physical Pharmaceutics II – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP404 T	Pharmacology I – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP405 T	Pharmacognosy and Phytochemistry I – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP406P	Medicinal Chemistry I – Practical	5	10	4 Hr	15	35	4 Hrs	50
BP407P	Physical Pharmaceutics II – Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP408P	Pharmacology I – Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP409P	Pharmacognosy and Phytochemistry I – Practical	5	10	4 Hrs	15	35	4 Hrs	50

Total	70	115	21 Hrs	185	515	31 Hrs	700
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Internal assessment: Continuous mode

The marks allocated for Continuous mode of Internal Assessment shall be awarded as per the scheme given below.

Table – V:Scheme for awarding internal assessment: Continuous mode

Theory		
Criteria	Maximum Marks	
Attendance (Refer Table – XII)	4	2
Academic activities (Average of any 3 activities e.g. quiz, assignment, open book test, field work, group discussion and seminar)	3	1.5
Student – Teacher interaction	3	1.5
Total	10	5
Practical		
Attendance (Refer Table – XII)	2	
Based on Practical Records, Regular viva voce, etc.	3	
Total	5	

Table – VI: Guidelines for the allotment of marks for attendance

Percentage of Attendance	Theory	Practical
95 – 100	4	2
90 – 94	3	1.5
85 – 89	2	1
80 – 84	1	0.5
Less than 80	0	0

Sessional Exams

Two sessional exams shall be conducted for each theory / practical course as per the schedule fixed by the college(s). The scheme of question paper for theory and practical sessional examinations is given below. The average marks of two sessional exams shall be computed for internal assessment as per the requirements given in tables – X.

Question paper pattern for theory sessional examinations

For subjects having University examination

I. Multiple Choice Questions (MCQs)			
(Answer all the questions)	=	10 x 1	= 10
I. Long Answers (Answer 1 out of 2)	=	1 x 10	= 10
II. Short Answers (Answer 2 out of 3)	=	2 x 5	= 10

Total	=	30 marks	

For subjects having Non University Examination

I. Long Answers (Answer 1 out of 2)	=	1 x 10	= 10
II. Short Answers (Answer 4 out of 6)	=	4 x 5	= 20

Total	=	30 marks	

Question paper pattern for practical sessional examinations

I. Synopsis	=	10
II. Experiments	=	25
III. Viva voce	=	05

Total	=	40 marks

Table – VII. Tentative schedule of end semester examinations

Semester	For Regular Candidates	For Failed Candidates
III,	November / December	May / June
IV	May / June	November / December

Question paper pattern for end semester theory examinations**For 75 marks paper**

I. Multiple Choice Questions (MCQs) (Answer all the questions)	=	20 x 1 = 20
I. Long Answers (Answer 2 out of 3)	=	2 x 10 = 20
II. Short Answers (Answer 7 out of 9)	=	7 x 5 = 35

Total		75 marks

Question paper pattern for end semester practical examinations

I. Synopsis	=	5
II. Experiments	=	25
III. Viva voce	=	5

Total	=	35 marks

Award of Ranks

Ranks and Medals shall be awarded on the basis of final CGPA. However, candidates who fail in one or more courses during the B.Pharm program shall not be eligible for award of ranks. Moreover, the candidates should have completed the B. Pharm program in minimum prescribed number of years, (four years) for the award of Ranks.

Award of degree

Candidates who fulfill the requirements mentioned above shall be eligible for award of degree during the ensuing convocation.

2. SYLLABUS

PHARMACEUTICAL ORGANIC CHEMISTRY –II

Theory: 03 Hrs./Week

45 Hours

Scope: This subject deals with general methods of preparation and reactions of some organic compounds. Reactivity of organic compounds are also studied here. The syllabus emphasizes on mechanisms and orientation of reactions. Chemistry of fats and oils are also included in the syllabus.

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

1. write the structure, name and the type of isomerism of the organic compound
2. write the reaction, name the reaction and orientation of reactions
3. account for reactivity/stability of compounds,
4. prepare organic compounds

Course Content:

General methods of preparation and reactions of compounds superscripted with asterisk (*) to be explained

To emphasize on definition, types, classification, principles/mechanisms, applications, examples and differences

UNIT I

10 Hours

Benzene and its derivatives

Analytical, synthetic and other evidences in the derivation of structure of benzene, Orbital picture, resonance in benzene, aromatic characters, Huckel's rule

Reactions of benzene - nitration, sulphonation, halogenation- reactivity, Friedelcrafts alkylation- reactivity, limitations, Friedelcrafts acylation.

Substituents, effect of substituents on reactivity and orientation of mono substituted benzene compounds towards electrophilic substitution reaction

Structure and uses of DDT, Saccharin, BHC and Chloramine

UNIT II

10 Hours

Phenols* - Acidity of phenols, effect of substituents on acidity, qualitative tests, Structure and uses of phenol, cresols, resorcinol, naphthols

Aromatic Amines* - Basicity of amines, effect of substituents on basicity, and synthetic uses of aryl diazonium salts

Aromatic Acids* –Acidity, effect of substituents on acidity and important reactions of benzoic acid.

UNIT III

10 Hours

Fats and Oils

Fatty acids – reactions.

Hydrolysis, Hydrogenation, Saponification and Rancidity of oils, Drying oils.

Analytical constants – Acid value, Saponification value, Ester value, Iodine value, Acetyl value, Reichert Meissl (RM) value – significance and principle involved in their determination.

UNIT IV

08 Hours

Polynuclear hydrocarbons:

Synthesis, reactions Structure and medicinal uses of Naphthalene, Phenanthrene, Anthracene, Diphenylmethane, Triphenylmethane and their derivatives

UNIT V

07 Hours

Cyclo alkanes*

Stabilities – Baeyer’s strain theory, limitation of Baeyer’s strain theory, Coulson and Moffitt’s modification, Sachse Mohr’s theory (Theory of strainless rings), reactions of cyclopropane and cyclobutane only.

PHARMACEUTICAL ORGANIC CHEMISTRY -II

Practical: 04 Hrs./week

1. Experiments involving laboratory techniques
 - a. Recrystallization
 - b. Steam distillation
2. Determination of following oil values (including standardization of reagents)
 - a. Acid value
 - b. Saponification value
 - c. Iodine value
3. Preparation of compounds
 - a. Benzanilide/Phenyl benzoate/Acetanilide from Aniline/ Phenol
 - b. /Aniline by acylation reaction.
 - c. 2,4,6-Tribromo aniline/Para bromo acetanilide from Aniline/
 - d. Acetanilide by halogenation (Bromination) reaction.
 - e. 5-Nitro salicylic acid/Meta di nitro benzene from Salicylic acid / Nitro benzene by nitration reaction.
 - f. Benzoic acid from Benzyl chloride by oxidation reaction.
 - g. Benzoic acid/ Salicylic acid from alkyl benzoate/ alkyl salicylate by hydrolysis reaction.
 - h. 1-Phenyl azo-2-naphthol from Aniline by diazotization and coupling reactions.
 - i. Benzil from Benzoin by oxidation reaction.
 - j. Dibenzal acetone from Benzaldehyde by Claisen Schmidt reaction
 - k. Cinnamic acid from Benzaldehyde by Perkin reaction
 - l. *P*-Iodo benzoic acid from *P*-amino benzoic acid

PHYSICAL PHARMACEUTICS-I

Theory: 03 Hrs./Week

45 Hours

Scope: The course deals with the various physical and physicochemical properties, and principles involved in dosage forms/formulations. Theory and practical components of the subject help the student to get a better insight into various areas of formulation research and development, and stability studies of pharmaceutical dosage forms.

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

1. Understand various physicochemical properties of drug molecules in the designing the dosage forms
2. Know the principles of chemical kinetics & to use them for stability testing and determination of expiry date of formulations
3. Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms.

UNIT-I

10 Hours

Solubility of drugs: Solubility expressions, mechanisms of solute solvent interactions, ideal solubility parameters, solvation & association, quantitative approach to the factors influencing solubility of drugs, diffusion principles in biological systems. Solubility of gas in liquids, solubility of liquids in liquids, (Binary solutions, ideal solutions) Raoult's law, real solutions. Partially miscible liquids, Critical solution temperature and applications. Distribution law, its limitations and applications

UNIT-II

10 Hours

States of Matter and properties of matter: State of matter, changes in the state of matter, latent heats, vapour pressure, sublimation critical point, eutectic mixtures, gases, aerosols
– inhalers, relative humidity, liquid complexes, liquid crystals, glassy states, solid- crystalline, amorphous & polymorphism.

Physicochemical properties of drug molecules: Refractive index, optical rotation, dielectric constant, dipole moment, dissociation constant, determinations and applications

UNIT-III

08 Hours

Surface and interfacial phenomenon: Liquid interface, surface & interfacial tensions, surface free energy, measurement of surface & interfacial tensions, spreading coefficient, adsorption at liquid interfaces, surface active agents, HLB Scale, solubilisation, detergency, adsorption at solid interface.

UNIT-IV

08 Hours

Complexation and protein binding: Introduction, Classification of Complexation, Applications, methods of analysis, protein binding, Complexation and drug action, crystalline structures of complexes and thermodynamic treatment of stability constants.

UNIT-V

07 Hours

pH, buffers and Isotonic solutions: Sorensen's pH scale, pH determination (electrometric and calorimetric), applications of buffers, buffer equation, buffer capacity, buffers in pharmaceutical and biological systems, buffered isotonic solutions.

PHYSICAL PHARMACEUTICS – I

Practical: 04 Hrs/week

1. Determination the solubility of drug at room temperature
2. Determination of pKa value by Half Neutralization/ Henderson Hasselbalch equation.
3. Determination of Partition co- efficient of benzoic acid in benzene and water
4. Determination of Partition co- efficient of Iodine in CCl₄ and water
5. Determination of % composition of NaCl in a solution using phenol-water system by CST method
6. Determination of surface tension of given liquids by drop count and drop weight method
7. Determination of HLB number of a surfactant by saponification method
8. Determination of Freundlich and Langmuir constants using activated char coal
9. Determination of critical micellar concentration of surfactants
10. Determination of stability constant and donor acceptor ratio of PABA-Caffeine complex by solubility method
11. Determination of stability constant and donor acceptor ratio of Cupric-Glycine complex by pH titration method.

PHARMACEUTICAL MICROBIOLOGY

Theory: 3 Hrs./Week

45 Hours

Scope: Study of all categories of microorganisms especially for the production of alcohol antibiotics, vaccines, vitamins enzymes etc..

Objectives: Upon completion of the subject student shall be able to;

1. Understand methods of identification, cultivation and preservation of various microorganisms
2. To understand the importance and implementation of sterilization in pharmaceutical processing and industry
3. Learn sterility testing of pharmaceutical products.
4. Carried out microbiological standardization of Pharmaceuticals.
5. Understand the cell culture technology and its applications in pharmaceutical industries.

Unit I

10 Hours

Introduction, history of microbiology, its branches, scope and its importance.

Introduction to Prokaryotes and Eukaryotes

Study of ultra-structure and morphological classification of bacteria, nutritional requirements, raw materials used for culture media and physical parameters for growth, growth curve, isolation and preservation methods for pure cultures, cultivation of anaerobes, quantitative measurement of bacterial growth (total & viable count).

Study of different types of phase contrast microscopy, dark field microscopy and electron microscopy.

Unit II

10 Hours

Identification of bacteria using staining techniques (simple, Gram's & Acid fast staining) and biochemical tests (IMViC).

Study of principle, procedure, merits, demerits and applications of physical, chemical gaseous, radiation and mechanical method of sterilization.

Evaluation of the efficiency of sterilization methods.

Equipments employed in large scale sterilization. Sterility indicators.

Unit III

10 Hours

Study of morphology, classification, reproduction/replication and cultivation of Fungi and Viruses.

Classification and mode of action of disinfectants

Factors influencing disinfection, antiseptics and their evaluation. For bacteriostatic and bactericidal actions

Evaluation of bactericidal & Bacteriostatic.

Sterility testing of products (solids, liquids, ophthalmic and other sterile products) according to IP, BP and USP.

Unit IV

08 Hours

Designing of aseptic area, laminar flow equipments; study of different sources of contamination in an aseptic area and methods of prevention, clean area classification.

Principles and methods of different microbiological assay. Methods for standardization of antibiotics, vitamins and amino acids.

Assessment of a new antibiotic.

Unit V**07 Hours**

Types of spoilage, factors affecting the microbial spoilage of pharmaceutical products, sources and types of microbial contaminants, assessment of microbial contamination and spoilage.

Preservation of pharmaceutical products using antimicrobial agents, evaluation of microbial stability of formulations.

Growth of animal cells in culture, general procedure for cell culture, Primary, established and transformed cell cultures.

Application of cell cultures in pharmaceutical industry and research.

PHARMACEUTICAL MICROBIOLOGY**Practicals: 04 Hrs./week**

1. Introduction and study of different equipments and processing, e.g., B.O.D. incubator, laminar flow, aseptic hood, autoclave, hot air sterilizer, deep freezer, refrigerator, microscopes used in experimental microbiology.
2. Sterilization of glassware, preparation and sterilization of media.
3. Sub culturing of bacteria and fungus. Nutrient stabs and slants preparations.
4. Staining methods- Simple, Grams staining and acid fast staining (Demonstration with practical).
5. Isolation of pure culture of micro-organisms by multiple streak plate technique and other techniques.
6. Microbiological assay of antibiotics by cup plate method and other methods
7. Motility determination by Hanging drop method.
8. Sterility testing of pharmaceuticals.
9. Bacteriological analysis of water
10. Biochemical test.

PHARMACEUTICAL ENGINEERING

Theory: 03 Hrs./Week

45 Hours

Scope: This course is designed to impart a fundamental knowledge on the art and science of various unit operations used in pharmaceutical industry.

Objectives: Upon completion of the course student shall be able:

1. To know various unit operations used in Pharmaceutical industries.
2. To understand the material handling techniques.
3. To perform various processes involved in pharmaceutical manufacturing process.
4. To carry out various test to prevent environmental pollution.
5. To appreciate and comprehend significance of plant lay out design for optimum use of resources.
6. To appreciate the various preventive methods used for corrosion control in Pharmaceutical industries.
7. Course content:

UNIT-I

10 Hours

Flow of fluids: Types of manometers, Reynolds number and its significance, Bernoulli's theorem and its applications, Energy losses, Orifice meter, Venturimeter, Pitot tube and Rotometer.

Size Reduction: Objectives, Mechanisms & Laws governing size reduction, factors affecting size reduction, principles, construction, working, uses, merits and demerits of Hammer mill, ball mill, fluid energy mill, Edge runner mill & end runner mill.

Size Separation: Objectives, applications & mechanism of size separation, official standards of powders, sieves, size separation Principles, construction, working, uses, merits and demerits of Sieve shaker, cyclone separator, Air separator, Bag filter & elutriation tank.

UNIT-II

10 Hours

Heat Transfer: Objectives, applications & Heat transfer mechanisms. Fourier's law, Heat transfer by conduction, convection & radiation. Heat interchangers & heat exchangers.

Evaporation: Objectives, applications and factors influencing evaporation, differences between evaporation and other heat process. principles, construction, working, uses, merits and demerits of Steam jacketed kettle, horizontal tube evaporator, climbing film evaporator, forced circulation evaporator, multiple effect evaporator & Economy of multiple effect evaporator.

Distillation: Basic Principles and methodology of simple distillation, flash distillation, fractional distillation, distillation under reduced pressure, steam distillation & molecular distillation

UNIT- III

08 Hours

Drying: Objectives, applications & mechanism of drying process, measurements & applications of Equilibrium Moisture content, rate of drying curve. principles, construction, working, uses, merits and demerits of Tray dryer, drum dryer spray dryer, fluidized bed dryer, vacuum dryer, freeze dryer.

Mixing: Objectives, applications & factors affecting mixing, Difference between solid and liquid mixing, mechanism of solid mixing, liquids mixing and semisolids mixing. Principles, Construction, Working, uses, Merits and Demerits of Double cone blender, twin shell blender, ribbon blender, Sigma blade mixer, planetary mixers, Propellers, Turbines, Paddles & Silverson Emulsifier,

UNIT-IV

08 Hours

Filtration: Objectives, applications, Theories & Factors influencing filtration, filter aids, filter medias. Principle, Construction, Working, Uses, Merits and demerits of plate & frame filter, filter leaf, rotary drum filter, Meta filter & Cartridge filter, membrane filters and Seidtz filter.

Centrifugation: Objectives, principle & applications of Centrifugation, principles, construction, working, uses, merits and demerits of Perforated basket centrifuge, Non-perforated basket centrifuge, semi continuous centrifuge & super centrifuge.

UNIT- V

07 Hours

Materials of pharmaceutical plant construction, Corrosion and its prevention: Factors affecting during materials selected for Pharmaceutical plant construction, Theories of corrosion, types of corrosion and there prevention. Ferrous and nonferrous metals, inorganic and organic non metals, basic of material handling systems.

PHARMACEUTICAL ENGINEERING

Practical: 04 Hrs/week

1. Determination of radiation constant of brass, iron, unpainted and painted glass.
2. Steam distillation – To calculate the efficiency of steam distillation.
3. To determine the overall heat transfer coefficient by heat exchanger.
4. Construction of drying curves (for calcium carbonate and starch).
5. Determination of moisture content and loss on drying.
6. Determination of humidity of air – i) From wet and dry bulb temperatures –use of Dew point method.
7. Description of Construction working and application of Pharmaceutical Machinery such as rotary tablet machine, fluidized bed coater, fluid energy mill, de humidifier.
8. Size analysis by sieving – To evaluate size distribution of tablet granulations – Construction of various size frequency curves including arithmetic and logarithmic probability plots.
9. Size reduction: To verify the laws of size reduction using ball mill and determining Kicks, Rittinger's, Bond's coefficients, power requirement and critical speed of Ball Mill.
10. Demonstration of colloid mill, planetary mixer, fluidized bed dryer, freeze dryer and such other major equipment.
11. Factors affecting Rate of Filtration and Evaporation (Surface area, Concentration and Thickness/ viscosity)
12. To study the effect of time on the Rate of Crystallization.
13. To calculate the uniformity Index for given sample by using Double Cone Blender.

PHARMACEUTICAL ORGANIC CHEMISTRY –III

Theory: 03 Hrs./Week

45 Hours

Scope: This subject imparts knowledge on stereo-chemical aspects of organic compounds and organic reactions, important named reactions, chemistry of important hetero cyclic compounds. It also emphasizes on medicinal and other uses of organic compounds.

Objectives: At the end of the course, the student shall be able to

1. understand the methods of preparation and properties of organic compounds
2. explain the stereo chemical aspects of organic compounds and stereo chemical reactions
3. know the medicinal uses and other applications of organic compounds

Course Content:

Note: To emphasize on definition, types, mechanisms, examples, uses/applications

UNIT-I

10 Hours

Stereo isomerism

Optical isomerism –

Optical activity, enantiomerism, diastereoisomerism, meso compounds Elements of symmetry, chiral and achiral molecules

DL system of nomenclature of optical isomers, sequence rules, RS system of nomenclature of optical isomers

Reactions of chiral molecules

Racemic modification and resolution of racemic mixture. Asymmetric synthesis: partial and absolute

UNIT-II

10 Hours

Geometrical isomerism

Nomenclature of geometrical isomers (Cis Trans, EZ, Syn Anti systems)

Methods of determination of configuration of geometrical isomers.

Conformational isomerism in Ethane, n-Butane and Cyclohexane.

Stereo isomerism in biphenyl compounds (Atropisomerism) and conditions for optical activity.

Stereospecific and stereoselective reactions

UNIT-III

10 Hours

Heterocyclic compounds:

Nomenclature and classification

Synthesis, reactions and medicinal uses of following compounds/derivatives Pyrrole, Furan, and Thiophene

Relative aromaticity and reactivity of Pyrrole, Furan and Thiophene.

UNIT-IV

08 Hours

Synthesis, reactions and medicinal uses of following compounds/derivatives Pyrazole, Imidazole, Oxazole and Thiazole.

Pyridine, Quinoline, Isoquinoline, Acridine and Indole. Basicity of pyridine Synthesis and medicinal uses of Pyrimidine, Purine, azepines and their derivatives

UNIT-V

07 Hours

Reactions of synthetic importance

Metal hydride reduction (NaBH_4 and LiAlH_4), Clemmensen reduction, Birch reduction, Wolff Kishner reduction.

Oppenauer-oxidation and Dakin reaction.

Beckmanns rearrangement and Schmidt rearrangement. Claisen-Schmidt condensation.

MEDICINAL CHEMISTRY – I**Theory: 03 Hrs./Week****45 Hours**

Scope: This subject is designed to impart fundamental knowledge on the structure, chemistry and therapeutic value of drugs. The subject emphasizes on structure activity relationships of drugs, importance of physicochemical properties and metabolism of drugs. The syllabus also emphasizes on chemical synthesis of important drugs under each class.

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

1. understand the chemistry of drugs with respect to their pharmacological activity
2. understand the drug metabolic pathways, adverse effect and therapeutic value of drugs
3. know the Structural Activity Relationship (SAR) of different class of drugs
4. write the chemical synthesis of some drugs

Course Content:

Study of the development of the following classes of drugs, Classification, mechanism of action, uses of drugs mentioned in the course, Structure activity relationship of selective class of drugs as specified in the course and synthesis of drugs superscripted (*)

UNIT- I**10 Hours****Introduction to Medicinal Chemistry****History and development of medicinal chemistry Physicochemical properties in relation to biological action**

Ionization, Solubility, Partition Coefficient, Hydrogen bonding, Protein binding, Chelation, Bioisosterism, Optical and Geometrical isomerism.

Drug metabolism

Drug metabolism principles- Phase I and Phase II.

Factors affecting drug metabolism including stereo chemical aspects.

UNIT- II**10 Hours****Drugs acting on Autonomic Nervous System Adrenergic Neurotransmitters:**

Biosynthesis and catabolism of catecholamine.

Adrenergic receptors (Alpha & Beta) and their distribution.

Sympathomimetic agents: SAR of Sympathomimetic agents

Direct acting: Nor-epinephrine, Epinephrine, Phenylephrine*, Dopamine, Methyldopa, Clonidine, Dobutamine, Isoproterenol, Terbutaline, Salbutamol*, Bitolterol, Naphazoline, Oxymetazoline and Xylometazoline.

Indirect acting agents: Hydroxyamphetamine, Pseudoephedrine, Propylhexedrine.

Agents with mixed mechanism: Ephedrine, Metaraminol.

Adrenergic Antagonists:

Alpha adrenergic blockers: Tolazoline*, Phentolamine, Phenoxybenzamine, Prazosin, Dihydroergotamine, Methysergide.

Beta adrenergic blockers: SAR of beta blockers, Propranolol*, Metibranolol, Atenolol, Betazolol, Bisoprolol, Esmolol, Metoprolol, Labetolol, Carvedilol.

UNIT-III**10 Hours****Cholinergic neurotransmitters:**

Biosynthesis and catabolism of acetylcholine.

Cholinergic receptors (Muscarinic & Nicotinic) and their distribution.

Parasympathomimetic agents: SAR of Parasympathomimetic agents

Direct acting agents: Acetylcholine, Carbachol*, Bethanechol, Methacholine, Pilocarpine.

Indirect acting/ Cholinesterase inhibitors (Reversible & Irreversible): Physostigmine, Neostigmine*, Pyridostigmine, Edrophonium chloride, Tacrine hydrochloride, Ambenonium chloride, Isoflurophate, Echothiophate iodide, Parathion, Malathion.

Cholinesterase reactivator: Pralidoxime chloride.

Cholinergic Blocking agents: SAR of cholinolytic agents

Solanaceous alkaloids and analogues: Atropine sulphate, Hyoscyamine sulphate, Scopolamine hydrobromide, Homatropine hydrobromide, Ipratropium bromide*.

Synthetic cholinergic blocking agents: Tropicamide, Cyclopentolate hydrochloride, Clidinium bromide, Dicyclomine hydrochloride*, Glycopyrrolate, Methantheline bromide, Propantheline bromide, Benztropine mesylate, Orphenadrine citrate, Biperidine hydrochloride, Procyclidine hydrochloride*, Tridihexethyl chloride, Isopropamide iodide, Ethopropazine hydrochloride.

UNIT- IV

08 Hours

Drugs acting on Central Nervous System Sedatives and Hypnotics:

Benzodiazepines: SAR of Benzodiazepines, Chlordiazepoxide, Diazepam*, Oxazepam, Chlorazepate, Lorazepam, Alprazolam, Zolpidem

Barbiturates: SAR of barbiturates, Barbitol*, Phenobarbital, Mephobarbital, Amobarbital, Butobarbital, Pentobarbital, Secobarbital

Miscellaneous:

Amides & imides: Glutethimide.

Alcohol & their carbamate derivatives: Meprobamate, Ethchlorvynol. Aldehyde & their derivatives: Triclofos sodium, Paraldehyde.

Antipsychotics

Phenothiazines: SAR of Phenothiazines - Promazine hydrochloride, Chlorpromazine hydrochloride*, Triflupromazine, Thioridazine hydrochloride, Piperacetazine hydrochloride, Prochlorperazine maleate, Trifluoperazine hydrochloride.

Ring Analogues of Phenothiazines: Chlorprothixene, Thiothixene, Loxapine succinate, Clozapine.

Fluro buterophenones: Haloperidol, Droperidol, Risperidone.

Beta amino ketones: Molindone hydrochloride.

Benzamides: Sulpieride.

Anticonvulsants: SAR of Anticonvulsants, mechanism of anticonvulsant action

Barbiturates: Phenobarbitone, Methobarbital. **Hydantoins:** Phenytoin*, Mephentoin, Ethotoin

Oxazolidine diones: Trimethadione, Paramethadione **Succinimides:** Phensuximide, Methsuximide, Ethosuximide* **Urea and monoacylureas:** Phenacemide, Carbamazepine* **Benzodiazepines:** Clonazepam

Miscellaneous: Primidone, Valproic acid, Gabapentin, Felbamate

UNIT – V

07 Hours

Drugs acting on Central Nervous System

General anesthetics:

Inhalation anesthetics: Halothane*, Methoxyflurane, Enflurane, Sevoflurane, Isoflurane, Desflurane.

Ultra short acting barbiturates: Methohexital sodium*, Thiamylal sodium, Thiopental sodium.

Dissociative anesthetics: Ketamine hydrochloride.*

Narcotic and non-narcotic analgesics

Morphine and related drugs: SAR of Morphine analogues, Morphine sulphate, Codeine, Meperidine hydrochloride, Anilerdine hydrochloride, Diphenoxylate hydrochloride, Loperamide hydrochloride, Fentanyl citrate*, Methadone hydrochloride*, Propoxyphene hydrochloride, Pentazocine, Levorphanol tartarate.

Narcotic antagonists: Nalorphine hydrochloride, Levallorphan tartarate, Naloxone hydrochloride.

Anti-inflammatory agents: Sodium salicylate, Aspirin, Mefenamic acid*, Meclofenamate, Indomethacin, Sulindac, Tolmetin, Zomepriac, Diclofenac, Ketorolac, Ibuprofen*, Naproxen, Piroxicam, Phenacetin, Acetaminophen, Antipyrine, Phenylbutazone.

PHYSICAL PHARMACEUTICS-II**Theory: 03 Hrs./Week****45 Hours**

Scope: The course deals with the various physical and physicochemical properties, and principles involved in dosage forms/formulations. Theory and practical components of the subject help the student to get a better insight into various areas of formulation research and development, and stability studies of pharmaceutical dosage forms.

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

1. Understand various physicochemical properties of drug molecules in the designing the dosage forms
2. Know the principles of chemical kinetics & to use them for stability testing and determination of expiry date of formulations
3. Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms.

Course Content:**UNIT-I****07 Hours**

Colloidal dispersions: Classification of dispersed systems & their general characteristics, size & shapes of colloidal particles, classification of colloids & comparative account of their general properties. Optical, kinetic & electrical properties. Effect of electrolytes, coacervation, peptization & protective action.

UNIT-II**10 Hours**

Rheology: Newtonian systems, law of flow, kinematic viscosity, effect of temperature, non-Newtonian systems, pseudoplastic, dilatant, plastic, thixotropy, thixotropy in formulation, determination of viscosity, capillary, falling Sphere, rotational viscometers

Deformation of solids: Plastic and elastic deformation, Heckel equation, Stress, Strain, Elastic Modulus

UNIT-III**10 Hours**

Coarse dispersion: Suspension, interfacial properties of suspended particles, settling in suspensions, formulation of flocculated and deflocculated suspensions. Emulsions and theories of emulsification, microemulsion and multiple emulsions; Stability of emulsions, preservation of emulsions, rheological properties of emulsions and emulsion formulation by HLB method.

UNIT-IV**10 Hours**

Micromeritics: Particle size and distribution, mean particle size, number and weight distribution, particle number, methods for determining particle size by different methods, counting and separation method, particle shape, specific surface, methods for determining surface area, permeability, adsorption, derived properties of powders, porosity, packing arrangement, densities, bulkiness & flow properties.

UNIT-V**10 Hours**

Drug stability: Reaction kinetics: zero, pseudo-zero, first & second order, units of basic rate constants, determination of reaction order. Physical and chemical factors influencing the chemical degradation of pharmaceutical product: temperature, solvent, ionic strength, dielectric constant,

specific & general acid base catalysis, Simple numerical problems. Stabilization of medicinal agents against common reactions like hydrolysis & oxidation. Accelerated stability testing in expiration dating of pharmaceutical dosage forms. Photolytic degradation and its prevention.

PHYSICAL PHARMACEUTICS- II

Practical: 04 Hrs/week

1. Determination of particle size, particle size distribution using sieving method
2. Determination of particle size, particle size distribution using Microscopic method
3. Determination of bulk density, true density and porosity
4. Determine the angle of repose and influence of lubricant on angle of repose
5. Determination of viscosity of liquid using Ostwald's viscometer
6. Determination sedimentation volume with effect of different suspending agent
7. Determination sedimentation volume with effect of different concentration of single suspending agent
8. Determination of viscosity of semisolid by using Brookfield viscometer
9. Determination of reaction rate constant first order.
10. Determination of reaction rate constant second order
11. Accelerated stability studies

PHARMACOLOGY-I**Theory: 03 Hrs./Week****45 Hours**

Scope: The main purpose of the subject is to understand what drugs do to the living organisms and how their effects can be applied to therapeutics. The subject covers the information about the drugs like, mechanism of action, physiological and biochemical effects (pharmacodynamics) as well as absorption, distribution, metabolism and excretion (pharmacokinetics) along with the adverse effects, clinical uses, interactions, doses, contraindications and routes of administration of different classes of drugs.

Objectives: Upon completion of this course the student should be able to

1. Understand the pharmacological actions of different categories of drugs
2. Explain the mechanism of drug action at organ system/sub cellular/ macromolecular levels.
3. Apply the basic pharmacological knowledge in the prevention and treatment of various diseases.
4. Observe the effect of drugs on animals by simulated experiments
5. Appreciate correlation of pharmacology with other bio medical sciences

Course Content:**UNIT-I****08 hours****General Pharmacology**

Introduction to Pharmacology- Definition, historical landmarks and scope of pharmacology, nature and source of drugs, essential drugs concept and routes of drug administration, Agonists, antagonists(competitive and non competitive), spare receptors, addiction, tolerance, dependence, tachyphylaxis, idiosyncrasy, allergy.

Pharmacokinetics- Membrane transport, absorption, distribution, metabolism and excretion of drugs .Enzyme induction, enzyme inhibition, kinetics of elimination

UNIT-II**12 Hours****General Pharmacology**

Pharmacodynamics- Principles and mechanisms of drug action. Receptor theories and classification of receptors, regulation of receptors. drug receptors interactions signal transduction mechanisms, G-protein-coupled receptors, ion channel receptor, transmembrane enzyme linked receptors, transmembrane JAK-STAT binding receptor and receptors that regulate transcription factors, dose response relationship, therapeutic index, combined effects of drugs and factors modifying drug action. Adverse drug reactions.

Drug interactions (pharmacokinetic and pharmacodynamic)

Drug discovery and clinical evaluation of new drugs -Drug discovery phase, preclinical evaluation phase, clinical trial phase, phases of clinical trials and pharmacovigilance.

UNIT-III**10 Hours****Pharmacology of drugs acting on peripheral nervous system**

Organization and function of ANS.

Neurohumoral transmission,co-transmission and classification of neurotransmitters.

Parasympathomimetics, Parasympatholytics, Sympathomimetics, sympatholytics.

Neuromuscular blocking agents and skeletal muscle relaxants (peripheral).

Local anesthetic agents.

Drugs used in myasthenia gravis and glaucoma

UNIT-IV**08 Hours****Pharmacology of drugs acting on central nervous system**

Neurohumoral transmission in the C.N.S. special emphasis on importance of various neurotransmitters like with GABA, Glutamate, Glycine, serotonin, dopamine.

General anesthetics and pre-anesthetics.

Sedatives, hypnotics and centrally acting muscle relaxants.

Anti-epileptics

Alcohols and disulfiram

UNIT-V**07 Hours****Pharmacology of drugs acting on central nervous system**

Psychopharmacological agents: Antipsychotics, antidepressants, anti-anxiety agents, anti-manics and hallucinogens.

Drugs used in Parkinsons disease and Alzheimer's disease.

CNS stimulants and nootropics.

Opioid analgesics and antagonists

Drug addiction, drug abuse, tolerance and dependence.

PHARMACOLOGY-I**Practical: 04Hrs/Week**

1. Introduction to experimental pharmacology.
2. Commonly used instruments in experimental pharmacology.
3. Study of common laboratory animals.
4. Maintenance of laboratory animals as per CPCSEA guidelines.
5. Common laboratory techniques. Blood withdrawal, serum and plasma separation, anesthetics and euthanasia used for animal studies.
6. Study of different routes of drugs administration in mice/rats.
7. Study of effect of hepatic microsomal enzyme inducers on the phenobarbitone sleeping time in mice.
8. Effect of drugs on ciliary motility of frog oesophagus
9. Effect of drugs on rabbit eye.
10. Effects of skeletal muscle relaxants using rota-rod apparatus.
11. Effect of drugs on locomotor activity using actophotometer.
12. Anticonvulsant effect of drugs by MES and PTZ method.
13. Study of stereotype and anti-catatonic activity of drugs on rats/mice.
14. Study of anxiolytic activity of drugs using rats/mice.
15. Study of local anesthetics by different methods

Note: All laboratory techniques and animal experiments are demonstrated by simulated experiments by softwares and videos

PHARMACOGNOSY AND PHYTOCHEMISTRY I**Theory: 03 Hrs./Week****45 Hours**

Scope: The subject involves the fundamentals of Pharmacognosy like scope, classification of crude drugs, their identification and evaluation, phytochemicals present in them and their medicinal properties.

Objectives: Upon completion of the course, the student shall be able

1. to know the techniques in the cultivation and production of crude drugs
2. to know the crude drugs, their uses and chemical nature
3. know the evaluation techniques for the herbal drugs
4. to carry out the microscopic and morphological evaluation of crude drugs

Course Content:**UNIT-I****10 Hours****Introduction to Pharmacognosy:**

Definition, history, scope and development of Pharmacognosy

Sources of Drugs – Plants, Animals, Marine & Tissue culture

Organized drugs, unorganized drugs (dried latex, dried juices, dried extracts, gums and mucilages, oleoresins and oleo- gum -resins).

Classification of drugs:

Alphabetical, morphological, taxonomical, chemical, pharmacological, chemo and sero taxonomical classification of drugs

Quality control of Drugs of Natural Origin:

Adulteration of drugs of natural origin. Evaluation by organoleptic, microscopic, physical, chemical and biological methods and properties.

Quantitative microscopy of crude drugs including lycopodium spore method, leafconstants, camera lucida and diagrams of microscopic objects to scale with camera lucida.

UNIT-II**10 Hours****Cultivation, Collection, Processing and storage of drugs of natural origin:**

Cultivation and Collection of drugs of natural origin Factors influencing cultivation of medicinal plants. Plant hormones and their applications.

Polyploidy, mutation and hybridization with reference to medicinal plants

Conservation of medicinal plants**UNIT-III****07 Hours****Plant tissue culture:**

Historical development of plant tissue culture, types of cultures, Nutritional requirements, growth and their maintenance.

Applications of plant tissue culture in pharmacognosy. Edible vaccines.

UNIT IV**10 Hours****Pharmacognosy in various systems of medicine:**

Role of Pharmacognosy in allopathy and traditional systems of medicine namely, Ayurveda, Unani, Siddha, Homeopathy and Chinese systems of medicine.

Introduction to secondary metabolites:

Definition, classification, properties and test for identification of Alkaloids, Glycosides, Flavonoids, Tannins, Volatile oil and Resins

UNIT V

08 Hours

Study of biological source, chemical nature and uses of drugs of natural origin containing following drugs

Plant Products:

Fibers - Cotton, Jute, Hemp

Hallucinogens, Teratogens, Natural allergens

Primary metabolites:

General introduction, detailed study with respect to chemistry, sources, preparation, evaluation, preservation, storage, therapeutic used and commercial utility as Pharmaceutical Aids and/or Medicines for the following Primary metabolites:

Carbohydrates: Acacia, Agar, Tragacanth, Honey

Proteins and Enzymes : Gelatin, casein, proteolytic enzymes (Papain, bromelain, serratiopeptidase, urokinase, streptokinase, pepsin).

Lipids(Waxes, fats, fixed oils) : Castor oil, Chaulmoogra oil, Wool Fat, Bees Wax

Marine Drugs:

Novel medicinal agents from marine sources.

PHARMACOGNOSY AND PHYTOCHEMISTRY I

Practical: 04 Hrs./Week

1. Analysis of crude drugs by chemical tests: (i)Tragacanth (ii) Acacia (iii)Agar (iv) Gelatin (v) starch (vi) Honey (vii) Castor oil
2. Determination of stomatal number and index
3. Determination of vein islet number, vein islet termination and palisade ratio.
4. Determination of size of starch grains, calcium oxalate crystals by eye piece micrometer
5. Determination of Fiber length and width
6. Determination of number of starch grains by Lycopodium spore method
7. Determination of Ash value
8. Determination of Extractive values of crude drugs
9. Determination of moisture content of crude drugs
10. Determination of swelling index and foaming

3.DETAILS OF SUBJECT TEACHERS.

S.No.	Name of the Subject	Name of the Teachers	Designation and Department	Mobile No.	e-mail
1.	Pharmaceutical Organic Chemistry II	Dr. S. Jubie	Associate Professor, Dept. of Pharmaceutical Chemistry	989418588	jubie@jssuni.edu.in
2.	Physical Pharmaceutics I	Dr. Karri V V S Narayana Reddy	Assistant Professor, Dept. of Pharmaceutics	9952478866	narayana.reddy@jssuni.edu.in
3.	Pharmaceutical Microbiology	Dr. R. Rajesh Kumar	Assistant Professor, Dept. of Pharmaceutical Biotechnology	8220194532	bathmic@jssuni.edu.in
		Mr. Alin Bose	Lecturer, Dept. of Pharmaceutical Biotechnology	8197088591	alinbose@jssuni.edu.in
4.	Pharmaceutical Engineering	Mr. Arun R	Lecturer, Dept. of Pharmaceutics	7402222019	arun.r@jssuni.edu.in
5.	Pharmaceutical Organic Chemistry III	Dr. Srikanth J	Lecturer, Dept. of Pharmaceutical Chemistry	9393011114	sjphd@jssuni.edu.in
6.	Medicinal Chemistry I	Dr. Gomathy S	Associate Professor, Dept. of Pharmaceutical Chemistry	9486433876	gomathys@jssuni.edu.in
7.	Physical Pharmaceutics II	Dr. D. Nagasamy Venkatesh	Associate Professor, Dept. of Pharmaceutics	8903123467	nagasamyvenkatesh@jssuni.edu.in
8.	Pharmacology I	Dr. Vadivelan R	Professor, Dept. of Pharmacology	9047539532	vadivelan@jssuni.edu.in
		Dr. Divakar S	Lecturer, Dept. of Pharmacology	9944036345	divakar.s@jssuni.edu.in
9.	Pharmacognosy and Phytochemistry I	Mr. Ramu G	Lecturer, Dept. of Pharmacognosy	9972317434	ramupharmu@jssuni.edu.in

4. II B.PHARM ACADEMIC PLAN**III Semester**

Name of the Subject	Pharmaceutical Organic Chemistry II (Theory)
Name of the Faculty	Dr.Jubie S M.Pharm., Ph.D
Designation, Department	Associate Professor, Department of Pharmaceutical Chemistry
Mobile Number	9894618588
e-Mail i.d.	jubie@jssuni.edu.in

Scope, Course Objectives and Course Outcomes

Scope: This course deals with general methods of preparation and reactions of some organic compounds. Reactivity of organic compounds are also studied here.the syllabus emphasizes on mechanisms and orientation of reactions.Chemistry of fats and oils are also included in the syllabus.

Objectives: The primary objectives of this course are to

1. Study the preparation and reactions of organic compounds
2. Learn the mechanisms, reactivity and orientation of the reactions.
3. Write the structures of medicinal compounds and know their medicinal uses.
4. Study the physical,chemical properties and analysis of fats and oils
5. Study the stability of cycloalkanes

Course Outcomes (COs): At completion of this course it is expected that the students will be able to

1. Understand the general principles and mechanisms involved in various organic reactions.
2. Apply the knowledge of reactivity and orientation of organic reactions in synthesis of medicinal drugs and intermediates.
3. Describe the chemistry of fats and oils.
4. Learn the interpretation of the analysis for fats and oils.
5. Know the medicinal uses and other applications of organic compounds.
6. Acquire the knowledge about the stability of cyclo alkanes.

LECTURE PLAN – Abstract

Sessional	No. of Hours of Didactic Lecture	No of Hours of other Activities	Total No. of Lecture Hours
I	24	2	26
II	21	3	27
Total No. of Hours	45	6	53

I SESSIONAL : 24 Lectures + 3 Activities

Lecture No.	Lecture Details	Hours
Activity-1	Introduction to Pharmaceutical Organic Chemistry II	
Unit-1: Benzene and its derivatives		(10)
1.	Structure of benzene-Analytical, synthetic and other evidences	10
2.	Orbital Structure & Resonance in Benzene	
3.	Aromaticity & Huckel's Rule	
4.	Reactions of Benzene- Nitration	
5.	Reactions of Benzene- Halogenation & Sulphonation	
6.	Reactions of Benzene- Friedal Crafts Alkylation	
7.	Reactions of Benzene- Friedal Crafts Acylation	
8.	Effect of substituent's on reactivity and orientation of mono substituted compounds on substitution	
9.	Effect of substituent's on reactivity and orientation of mono substituted compounds on substitution (cont...)	
10.	Structure and uses of DDT, Saccharin, BHC and Chloramine T	
Unit-2: Phenols, Aromatic Amines & Aromatic Acids		(10)
1.	Preparation of Phenols	10
2.	Reactions of Phenols	
3.	Acidity of Phenols Effect of substituents on Acidity	
4.	Qualitative tests of Phenols & Structure and uses of Phenols, Cresols, Resorcinols and Naphthols	
5.	Preparation of Aromatic amines	
6.	Reactions of Aromatic amines	
7.	Basicity of amines & Effect of substituents on basicity	
8.	Synthetic uses of aryl diazonium salts	
9.	Preparations and important reactions of Aromatic acids	
10.	Effect of substituents on acidity	
Unit-3: Fats and oils		(10)

1.	Introduction of Fatty acids	04
2.	Reactions of Fatty acids	
3.	Hydrolysis and Halogenation of oils	
4.	Saponification, Rancidity and drying of oils	
Activity-1	Discussion on MCQs	
Activity-2	Revision class for first sessional portions	

II SESSIONAL : 21 Lectures + 3 Activities

Lecture No.	Lecture Details	Hours
Unit-3: Fats and oils (cont...)		
1.	Analytical constants- Acid Value	06
2.	Analytical constants- Saponification value	
3.	Analytical constants- Iodine Value	
4.	Analytical constants-Ester Value	
5.	Analytical constants- Acetyl Value	
6.	Analytical constants- RM Value	
Unit-4: Poly nuclear hydrocarbons		(08)
1.	Synthesis and Reactions of Naphthalene	08
2.	Structures and Medicinal uses of Naphthalene	
3.	Synthesis and Reactions of Phenanthrene	
4.	Structures and Medicinal uses of Phenanthrene	
5.	Synthesis and Reactions of Anthracene	
6.	Structures and Medicinal uses of Anthracene	
7.	Diphenyl Methane	
8.	Triphenyl methane	
Unit-5: Cyclo Alkanes		(07)
1.	Preparations of cycloalkanes	07
2.	Reactions of cyclo propane	
3.	Reactions of cyclo butane	
4.	Reactions of cyclo pentane	
5.	Reactions of cyclo hexane	
6.	Baeyer's Strain Theory; Limitations of Baeyer's Strain Theory	
7.	Coulson's and Mofitt's modification & Sachse Mohr's Theory	
Activity-1	Discussion on MCQs	
Activity-2	Revision class for II sessional Portions	
Activity-3	Revision class for End semester examination	

Text books

1. Text book of Organic Chemistry by B.S,Bahl & Arun Bahl
2. Organic Chemstry by Morrision & Boyd.

Reference books

1. Text book of Organic Chemistry by IL.Finar
2. Organic Chemistry by Paula Yerkanis Bruice
3. Organic Chemistry by PL.Soni

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Name of the Subject	Physical Pharmaceutics I (Theory)
Name of the Faculty	Dr. Karri V V S Narayana Reddy M.Pharm., Ph.D
Designation, Department	Assistant Professor, Department of Pharmaceutics
Mobile Number	9952478866
e-Mail i.d.	narayana.reddy@jssuni.edu.in

Scope, Course Objectives and Course Outcomes

Scope: This course is designed to impart knowledge and skills necessary for the understanding of physicochemical properties, and principles involved in dosage forms/formulations. The components of the subject help the student to get a better insight into various areas of formulation research and development, and stability studies of pharmaceutical dosage forms.

Objectives: The primary objectives of this course are to

1. Understand various physicochemical properties of drug molecules in the designing the dosage forms
2. Know the principles of solubility, dissolution, diffusion & to use them identifying the suitable dosage form for drug candidates
3. Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms.

Course Outcomes (COs): At completion of this course it is expected that the students will be able to

CO 1: Define the basic concepts of the physicochemical properties of drug candidates

CO 2: Identify the solutions for the drug candidates with poor physicochemical properties

CO 3: Identify the solutions for improving the solubility of water insoluble drugs

CO 4: Identify the drug dissolution and partitioning properties of drug candidates with their improvement

CO 5: Critically interpret all the drug related properties and finding the best suitable dosage form

LECTURE PLAN – Abstract

Sessional	Number of Hours of Didactic Lecture	No. of Hours of other activities	Total Number of Lecture Hours
I	25	03	28
II	20	03	23
Total Number of Lecture Hours	45	06	51

I SESSIONAL: 25 lectures + 03 Activities

Lecture No.	Lecture Details	Hours
1.	Introduction to Physical Pharmaceutics I	01
Unit-1: Solubility of drugs		(10)
1.	Solubility expressions	10
2.	Mechanisms of solute solvent interactions, ideal solubility & Scatchard-Hildebrand equation	
3.	Solubility parameters, solvation & association	
4.	Quantitative approach to the factors influencing solubility of drugs, Dissolution & drug release	
5.	Diffusion principles in biological systems	
6.	Solubility of gas in liquids, solubility of liquids in liquids, (Binary solutions, ideal solutions)	
7.	Raoult's law, real solutions, azeotropic mixtures, fractional distillation	
8.	Partially miscible liquids	
9.	Critical solution temperature and applications.	
10.	Distribution law, its limitations and applications	
Unit-2: States of Matter and properties of matter:		(10)
1.	State of matter	10
2.	Changes in the state of matter	
3.	Latent heats, vapour pressure	
4.	Sublimation critical point, eutectic mixtures, gases	
5.	Aerosols – inhalers, relative humidity	
6.	Liquid complexes, liquid crystals, glassy states, solid-crystalline	
7.	Amorphous & polymorphism	
8.	Refractive index, optical rotation	
9.	Dielectric constant, dipole moment	
10.	Dissociation constant, determinations and applications	
Unit-3: Surface and interfacial phenomenon		(05)
1.	Introduction and basics of Surface and Interfacial tensions	
2.	General principles	

3.	Surface free energy, spreading coefficient	05
4.	Measurement of Surface and Interfacial tensions	
5.	Adsorption at liquid interface (soluble monomolecular film)	
Activity 1	MCQ test -1	
Activity 2	MCQ test -2	
Activity 3	MCQ test -3	

II SESSIONAL : 20 Lectures + 03 Activities

Lecture No.	Lecture Details	Hours
Unit-3: Surface and interfacial phenomenon		(05)
1.	Surfactants and its applications	05
2.	HLB scale and its applications	
3.	Adsorption at solid interface	
4.	Freundlich and Langmuir constants and BET Equation	
5.	Types of adsorption isotherms, Electrical properties at interfaces	
Unit-4: Complexation and protein binding		(08)
1.	Introduction	08
2.	Classification of Complexation	
3.	Applications	
4.	Methods of analysis	
5.	Protein binding	
6.	Complexation and drug action	
7.	Crystalline structures of complexes	
8.	Thermodynamic treatment of stability constants	
Unit-5: pH, buffers and Isotonic solutions		(07)
1.	Sorensen's pH scale	07
2.	pH determination (electrometric and calorimetric)	
3.	Applications of buffers	
4.	Buffer equation	
5.	Buffer capacity	
6.	Buffers in pharmaceutical and biological systems	
7.	Buffered isotonic solutions	
Activity 1	MCQ test -1	
Activity 2	MCQ test -2	
Activity 3	MCQ test -3	

Text Books:

1. Physical Pharmaceutics by Ramasamy C and ManavalanR.
2. Laboratory Manual of Physical Pharmaceutics, C.V.S. Subramanyam, J. Thimma settee
3. Physical Pharmaceutics I by C.V.S. Subramanyam
4. Test book of Physical Pharmacy, by Gaurav Jain & Roop K. Khar

Reference Books

1. Physical Pharmacy by Alfred Martin
2. Experimental Pharmaceutics by Eugene, Parott.
3. Tutorial Pharmacy by Cooper and Gunn.
4. Stocklosam J. Pharmaceutical Calculations, Lea &Febiger, Philadelphia.
5. Liberman H.A, Lachman C., Pharmaceutical Dosage forms, Tablets, Volume-1 to3, MarcelDekkar Inc.
6. Liberman H.A, Lachman C, Pharmaceutical Dosage forms. Disperse systems, volume 1, 2, 3. Marcel Dekkar Inc.

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Name of the Subject	Pharmaceutical Microbiology (Theory)
Name of the Faculty	Dr. Rajeshkumar R, M.Pharm., Ph.D
Designation, Department	Assistant Professor, Department of Pharmaceutical Biotechnology
Mobile Number	820194532
e-Mail i.d.	bathmic@jssuni.edu.in

Scope, Course Objectives and Course Outcomes

Scope: This course aims to provide information about basic microbiology, which is the minimum requirements of industry-related operations such as sterilization, aseptic techniques, fermentation etc. The course also covers a broad range of skills needed to understand different microbiological principles of nutritional requirements, preservation, microbe cultivation, sterilization methods, spoilage forms and various application of cell culture in industry and research.

Objectives: The primary objectives of this course are to

1. Explain the criteria and procedures for the sterilization processes
2. Explain the definition and features of antiseptic, disinfectant and its mode of action
3. Get detailed insight into the structure and functions of microbes
4. Describe the various cultivation methods of bacteria, yeast, fungi and virus
5. Understand principle, working and applications of instruments viz, autoclave, hot air oven and laminar air flow

Course Outcomes (COs): At completion of this course it is expected that the students will be able to

CO 1: Gain insight into the theory and practical aspects of microbiology

CO 2: Classify and explain the structure and general characteristics of various microorganism

CO 3: Understand various basic concepts of sterilization, disinfectants in maintaining aseptic conditions

CO 4: Get insight into the pure culture technique, inoculations

CO 5: Describe validation parameter to be used for instrumentation evaluation.

CO 6: Design a clean room to maintain an industry, free of microbial ecosystem.

LECTURE PLAN – Abstract

Sessional	No. of Hours of Didactic Lecture	No of Hours of other Activities	Total No. of Lecture Hours
I	27	03	30
II	18	02	20
Total No. of Hours	45	05	50

I SESSIONAL: 27 Lectures + 3 Activities

Lecture No.	Lecture Details	Hours
Unit-1		10
	Orientation to the subject	
1.	Introduction, history of microbiology, its branches, scope and its importance	
2.	Introduction to Prokaryotes and Eukaryotes	
3.	Study of ultra-structure and morphological classification of bacteria	
4.	Nutritional requirements	
5.	Raw materials used for culture media and physical parameters for growth	
6.	Growth curve	
7.	Isolation and preservation methods for pure cultures	
8.	Cultivation of anaerobes	
9.	Quantitative measurement of bacterial growth (total & viable count)	
10.	Study of different types of phase microscopy, dark field microscopy and electron microscopy	
Unit-2		10
11.	Identification of bacteria using staining techniques (simple, Gram's & Acid fast staining)	
12.	Biochemical tests (IMViC)	
13.	Study of principle, procedure, merits, demerits and applications of Physical, chemical and mechanical method of sterilization	
14.	Study of principle, procedure, merits, demerits and applications of Physical, chemical and mechanical method of sterilization (Cont...)	
15.	Study of principle, procedure, merits, demerits and applications of Physical, chemical and mechanical method of sterilization (Cont...)	
16.	Evaluation of the efficiency of sterilization methods	
17.	Evaluation of the efficiency of sterilization methods (Cont...)	
18.	Evaluation of the efficiency of sterilization methods (Cont...)	
19.	Equipment's employed in large scale sterilization	
20.	Sterility indicators	

Unit-3		10
10.	Study of morphology, classification, reproduction/replication and cultivation of Fungi	
11.	Study of morphology, classification, reproduction/replication and cultivation of Virus	
12.	Study of morphology, classification, reproduction/replication and cultivation of Virus (Cont...)	
13.	Classification and mode of action of disinfectants	
14.	Factors influencing disinfection, antiseptics and their evaluation	
15.	Evaluation of bactericidal & Bacteriostatic.	
16.	Evaluation of bactericidal & Bacteriostatic (Cont...)	
Activity1	MCQ Test	
Activity2	MCQ Test	
Activity3	MCQ Test	

II SESSIONAL: 18 Lectures + 2 Activities

Lecture No.	Lecture Details	Hours
17.	Sterility testing of products (solids, liquids, ophthalmic and other sterile products) according to IP	
18.	Sterility testing of products (solids, liquids, ophthalmic and other sterile products) according to BP	
19.	Sterility testing of products (solids, liquids, ophthalmic and other sterile products) according to USP	
Unit-4		08
7.	Designing of aseptic area, laminar flow equipment's	
8.	Study of different sources of contamination in an aseptic area and methods of prevention	
9.	Clean area classification	
10.	Principles and methods of different microbiological assay	
11.	Methods for standardization of antibiotics, vitamins and amino acids	
12.	Assessment of a new antibiotic and testing of antimicrobial activity of a new substance	
13.	Assessment of a new antibiotic and testing of antimicrobial activity of a new substance (Cont...)	
14.	General aspects-environmental cleanliness	07
Unit-5		
9.	Types of spoilage, factors affecting, sources	
10.	Types of spoilage, factors affecting, sources (Cont...)	
11.	Preservation of pharmaceutical products	
12.	Preservation of pharmaceutical products (Cont...)	

13.	Preservation of pharmaceutical products (Cont...)	
14.	General procedure for cell culture	
15.	Application of cell cultures in pharmaceutical industry and research	
Activity-1	MCQ Test	
Activity-2	MCQ Test	

Text Books

1. Ananthnarayan : Text Book of Microbiology, Orient-Longman, Chennai
2. Prescott and Dunn., Industrial Microbiology, 4th edition, CBS Publishers & Distributors, Delhi.
3. Cooper and Gunn's: Tutorial Pharmacy, CBS Publisher and Distribution

Reference Books

1. I.P., B.P., U.S.P.- latest editions.
2. Pelczar, Chan Kreig, Microbiology, Tata McGraw Hill edn
3. Bergeys manual of systematic bacteriology, Williams and Wilkins- A Waverly company

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Name of the Subject	Pharmaceutical Engineering (Theory)
Name of the Faculty	Mr. Arun R , M.Pharm
Designation, Department	Lecturer, Department of Pharmaceutics
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Scope, Course Objectives and Course Outcomes

Scope: This course is designed to impart a fundamental knowledge on the art and science of various unit operations used in pharmaceutical industry.

Objectives: Upon completion of the course student shall be able:

1. To know various unit operations used in Pharmaceutical industries.
2. To understand the material handling techniques.
3. To perform various processes involved in pharmaceutical manufacturing process.
4. To carry out various test to prevent environmental pollution.
5. To appreciate and comprehend significance of plant lay out design for optimum use of resources.
6. To appreciate the various preventive methods used for corrosion control in Pharmaceutical industries.

Course Outcomes (COs): At completion of this course it is expected that the students will be able to

CO 1: Design the layout for pharmaceutical operation unit

CO 2: Handle the equipment associated with liquid handling systems

CO 3: Chose right choice of materials and machines for pharma articles.

CO 2: Solve process related problems in pharma industry

CO 4: Design new pharma equipment

LECTURE PLAN – Abstract

Sessional	No. of . Didactic Lecture	No of Hours of other Activities	Total No. of Lecture Hours
I	20	3	23
II	23	3	26
Total No. of Hours	43	6	49

I SESSIONAL : 20 Lectures + 3 Activities

Lecture No.	Lecture Details	Hours
Unit - 1		(10)
1.	Flow of Fluids – Types of manometers, Reynolds number and its significance	04
2.	Bernoulli's Theorem and its application, energy losses	
3.	Orifice meter, Venturimeter, Pilot tube and Rotometer	
4.	Size Reduction – Objectives, Mechanism and laws governing size reduction	03
5.	Factors affecting size reduction	
6.	Principle, Construction, Working, Uses, merits and demerits of Hammer mill, Ball mill, Fluid energy mill	
7.	Principle, Construction, Working, Uses, merits and demerits of Edge runner mill and End runner mill	03
8.	Size Separation – Objective, Application, Mechanism of size separation, official standard of powders, sieves, size separation	
9.	Principle, Construction, Working, Uses, merits and demerits of sieve shaker, cyclone separator	
10.	Principle, Construction, Working, Uses, merits and demerits of Air separator, elutriation tank	
Unit – 2		(10)
1.	Heat Transfer – Objective, Application and Heat transfer mechanism	03
2.	Fourier's Law	
3.	Heat Transfer by Conduction, Convection and Radiation. Heat Interchangers and Exchangers	
4.	Evaporation – Objective, Application, Factors Influencing Evaporation	04
5.	Difference between Evaporation and other heat processes, Principle, Construction, Working, Uses, Merits and Demerits of Steam jacketed Kettle.	
6.	Principle, Construction, Working, Uses, Merits and Demerits of Horizontal Tube evaporator, Climbing Film evaporator	
7.	Principle, Construction, Working, Uses, Merits and Demerits of Forced circulation evaporator, Multiple effect evaporator, Economy of multiple effect evaporator	

8.	Distillation – Basic principle and methodology of simple distillation	03
9.	Flash and Fractional Distillation	
10.	Distillation under reduced pressure, steam distillation and molecular distillation	
Activity-1	MCQ Test	
Activity-2	MCQ Test	
Activity-3	MCQ Test	

II SESSIONAL : 23 Lectures + 3 Activities

Lecture No.	Lecture Details	Hours
Unit – 3		(08)
1.	Drying - Objectives, Applications and mechanism of drying process	04
2.	Measurements and applications of equilibrium moisture content, rate of drying curve.	
3.	Principle, Construction, Working, Uses, Merits and Demerits of Tray dryer, Drum dryer, Spray dryer	
4.	Principle, Construction, Working, Uses, Merits and Demerits of Fluidized bed dryer, Vacuum dryer and Freeze dryer	
5.	Mixing – Objective, Applications and factors affecting mixing	04
6.	Difference between solid and liquid mixing, Mechanism of solid mixing, liquid mixing and semisolid mixing	
7.	Principle, Construction, Working, Uses, Merits and Demerits of Double cone blender, Twin shell blender, Ribbon Blender	
8.	Principle, Construction, Working, Uses, Merits and Demerits Sigma Blade mixer, Planetary mixer, propellents, Turbines, Paddles and Silverson Emulsifier	
Unit - 4		(8)
1.	Filtration – Objective, Applications, Theories and factors influencing filtration, filter aids, filter medias	4
2.	Theories and factors influencing filtration, filter aids, filter medias (Cont...)	
3.	Principle, Construction, Working, Uses, Merits and Demerits of Plate and Frame filter, Filter leaf	
4.	Principle, Construction, Working, Uses, Merits and Demerits of Rotary drum filter, Meta filter, Cartridge filter	
5.	Principle, Construction, Working, Uses, Merits and Demerits of Membrane filter, Seidtz filter	
6.	Centrifugation – Objective, principles and application of centrifugation	

7.	Principle, Construction, Working, Uses, Merits and Demerits of Perforated basket centrifuge, Non-Perforated basket centrifuge	
8.	Principle, Construction, Working, Uses, Merits and Demerits of Semi-continuous centrifuge and Super centrifuge	
Unit - 5		(7)
1.	Materials of Pharmaceutical Plant Construction, Corrosion and its prevention – Introduction, Factors affecting during material selection for pharmaceutical plant construction	7
2.	Theories of corrosion	
3.	Types of corrosion and their prevention	
4.	Ferrous and Non-Ferrous metals	
5.	Inorganic and Organic non-metals	
6.	Basics of material handling systems	
Activity-1	MCQ test	
Activity-2	MCQ test	
Activity-3	MCQ test	

Text Books

1. Introduction to chemical engineering – Walter L Badger & Julius Banchemo, Latest edition.
2. Solid phase extraction, Principles, techniques and applications by Nigel J.K. Simpson- Latest edition.
3. Unit operation of chemical engineering – McCabe Smith, Latest edition.

Reference Books

1. Remington practice of pharmacy- Martin, Latest edition.
2. Pharmaceutical engineering principles and practices – C.V.S Subrahmanyam et al., Latest edition.
3. Theory and practice of industrial pharmacy by Lachmann., Latest edition.
4. Physical pharmaceutics- C.V.S Subrahmanyam et al., Latest edition.
5. Cooper and Gunn's Tutorial pharmacy, S.J. Carter, Latest edition.

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IV Semester

Name of the Subject	Pharmaceutical Organic Chemistry- III (Theory)
Name of the Faculty	Dr. Srikanth Jupudi, M.Pharm., Ph.D
Designation, Department	Lecturer, Department of Pharmaceutical Chemistry
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Scope, Course Objectives and Course Outcomes

Scope: This subject imparts knowledge on stereo-chemical aspects of organic compounds and organic reactions, important named reactions, chemistry of important hetero cyclic compounds. It also emphasizes on medicinal and other uses of organic compounds.

Objectives: The primary objectives of this course are to

1. To provide knowledge about Stereo-chemical features including conformation and stereo electronic effects and geometrical isomerism
2. Describing detailed mechanisms for common naming reactions
3. To discuss various synthetic procedures, reactions and uses of simple pharmaceutically active organic compounds having
4. five and six membered heterocyclic compounds.

Course Outcomes (COs): At completion of this course it is expected that the students will be able to

CO 1: under stand the concepts of stereochemistry of organic compounds

CO 2: understand the chemistry of heterocyclic compounds, their synthesis mechanisms, reactions and medicinal uses.

CO 3: have knowledge about important named reactions for synthesis of organic compounds

LECTURE PLAN-Theory

Sessional	No. of Didactic Lecture	No of Hours of other Activities	Total No. of Lecture Hours
I	21	02	23
II	21	02	23
Total No. of Hours	41	04	45

Lecture Plan**I SESSIONAL: 21 Lectures**

Lecture No.	Lecture Details	Hours
Unit I: Stereoisomerism		(10)
1.	Introductory class	10
2.	Introduction to stereochemistry, applications & principles	
3.	Concepts of Optical isomerism & Optical activity	
4.	Definition and examples of Enantiomerism, distereoisomerism	
5.	Definition and examples of mesocompounds.	
6.	Elements of symmetry, chirality and achirality.	
7.	DL system of nomenclature of optical isomers	
8.	Sequence rules, RS system of nomenclature of optical isomers	
9.	Reactions of chiral molecules	
10.	resolution of Racemic modifications and racemic mixtures	
11.	Asymmetric synthesis: partial and absolute	
12.	Introduction to geometrical isomerism & significance	
13.	Nomenclature of geometrical isomers (Cis Trans, EZ, Syn Anti systems)	
Unit II: Geometrical Isomerism		(10)
14.	Methods to determine configurations of geometrical isomers	10
15.	Configurational isomerism of ethane	
16.	Configurational isomerism of n-butane	
17.	Configurational isomerism of cyclohexane	
18.	Configurational isomerism of cycloalkanes	
19.	Stereoisomerism in biphenyl compounds	
20.	Conditions for optical activity	
21.	Stereoselective and stereospecific reactions	
22.	MCQ discussion	
23.	MCQ discussion	

II SESSIONAL: 22 Hours

Unit III: Heterocyclic compounds		(10)
24.	Introduction to heterocyclic chemistry, nomenclature and classification	10
25.	Synthesis, reactions and medicinal uses of pyrrole	
26.	Synthesis, reactions and medicinal uses of furan	
27.	Synthesis, reactions and medicinal uses of thiophene	
28.	Relative aromaticity, Reactivity and basicity of pyrrole Basicity of pyrrole and pyridine	
29.	Synthesis, reactions and medicinal uses of pyrazole & imidazole	
30.	Synthesis, reactions and medicinal uses of oxazole & thiazole	
31.	Synthesis, reactions and medicinal uses of pyridine & quinoline	
32.	Synthesis, reactions and medicinal uses of isoquinoline, acridine	
33.	Synthesis, reactions and medicinal uses of indole & basicity of pyridine	
34.	Synthesis, reactions and medicinal uses of purines and their derivatives	
35.	Synthesis, reactions and medicinal uses of pyrimidines, azepine and their derivatives	
Unit IV: Reactions of synthetic importance		(15)
36.	Metal hydride reduction introduction	15
37.	Reactions and synthetic importance of metal hydride reduction NaBH_4	
38.	Reactions and synthetic importance of metal hydride reduction LiAlH_4	
39.	Reactions and synthetic importance of Clemmenson's reduction	
40.	Reactions and synthetic importance of Oppenauer oxidation	
41.	Reactions and synthetic importance of Wolff-Kishner reduction and Birch reduction	
42.	Reactions and synthetic importance of Dakin reaction	
43.	Reactions and synthetic importance of Beckmann rearrangement and Schmidt rearrangement	
44.	Reactions and synthetic importance of Schmidt reaction and Claisen-Schmidt condensation,	
45.	MCQ	
46.	MCQ	

Recommended Books (Latest Editions)

1. Organic chemistry by I.L. Finar, Volume-I & II.
2. A text book of organic chemistry – Arun Bahl, B.S. Bahl.
3. Heterocyclic Chemistry by Raj K. Bansal
4. Organic Chemistry by Morrison and Boyd
5. Heterocyclic Chemistry by T.L. Gilchrist

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Name of the Subject	Medicinal Chemistry-I (Theory)
Name of the Faculty	Dr. Gomathy Subramanian , M. Pharm., Ph.D.,
Designation, Department	Associate Professor, Department of Pharmaceutical Chemistry
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Scope, Course Objectives and Course Outcomes

Scope: This course is designed to impart fundamental knowledge on the structure, chemistry and therapeutic value of drugs. The subject emphasizes on the importance of physic-chemical properties and metabolism of drugs. The syllabus also emphasizes on the chemistry, mechanism, structure activity relationships and on the chemical synthesis of important drugs under each class.

Objectives: The primary objectives of this course are to

1. To study the introduction of Medicinal Chemistry
2. To understand the chemistry of drugs with respect to their biological activity
3. To help the students to understand the metabolic reactions, mechanisms and therapeutic value of drugs.
4. To know the general structural features of drugs and structural activity relationship of important class of drugs
5. To write the chemical synthesis of some important drugs

Course Outcomes (COs): At completion of Medicinal Chemistry-II, students will be able to:

- CO 1 : Understand the basic concepts of medicinal Chemistry
CO-2 : Recognize the structure of drugs and predict the therapeutic action of drugs
CO 3 : Understand chemical synthetic reactions for selected drugs
CO 4 : Knowledge on the structural activity relationship and structural influences on pharmacological actions
CO 5 : Describe the mechanism, use and mode of application of the important drugs

LECTURE PLAN – Abstract

Sessional	No. of Hours of Didactic Lecture	No. of Hours of other Activities	Total No. of Lecture Hours
I	24	3	27
II	21	3	24
Total No. of Hours	45	6	51

I SESSIONAL: 24 Lectures + 3 Activities

Lecture No.	Lecture Details	Hours
Unit-1: INTRODUCTION TO MEDICINAL CHEMISTRY		(10)
1.	Introduction to Medicinal Chemistry	02
2.	History and development of Medicinal chemistry	
3.	Physiochemical properties in related to biological action - ionization, solubility, partition coefficient	03
4.	hydrogen bonding, protein binding	
5.	Chelation, bio-isosterism	
6.	Optical isomerism	
7.	Geometrical isomerism	
8.	Drug Metabolism – phase-I reactions	
9.	Drug metabolism - phase II reactions	
10.	Factors affecting drug metabolism	
Unit-II: DRUGS ACTING ON AUTONOMIC NERVOUS SYSTEM		(10)
1.	Adrenergic neurotransmitters: biosynthesis and catabolism of catecholamine and distribution	02
2.	Biosynthesis and catabolism of adrenergic receptors (alpha & beta) and their distribution	
3.	Sympathomimetic agents: sar of sympathomimetic agents direct acting: nor-epinephrine, epinephrine,	04
4.	Phenylephrine*, dopamine, methyl dopa, clonidine	
5.	Dobutamine, isoproterenol, terbutaline, salbutamol*, bitolterol	
6.	Naphazoline, oxymetazoline and xylometazoline.	
7.	Indirect acting agents: hydroxyamphetamine, pseudoephedrine, propylhexedrine.	
8.	Agents with mixed mechanism: ephedrine, metaraminol.	
9.	A. adrenergic antagonists: alpha adrenergic blockers: tolazoline*, phentolamine, phenoxybenzamine, prazosin, dihydroergotamine, methysergide	
10.	beta adrenergic blockers: sar of beta blockers, Propranolol*, metipranolol, atenolol, betazolol, bisoprolol, esmolol, metoprolol, labetalol, carvedilol.	
Unit-III : CHOLINERGIC NEUROTRANSMITTERS		(10)
1.	Biosynthesis and catabolism of acetylcholine. Cholinergic receptors (muscarinic) and their distribution.	04
2.	Biosynthesis and catabolism of cholinergic receptors (nicotinic)	

	and their distribution.	
3.	Parasympathomimetic agents: SAR of Parasympathomimetic agents direct acting agents: acetylcholine, carbachol*, bethanechol, methacholine, pilocarpine.	
4.	Indirect Acting/ Cholinesterase Inhibitors (Reversible & Irreversible): Physostigmine, Neostigmine*, Pyridostigmine, Edrophonium Chloride, Tacrine Hydrochloride,	
Activity1	Descriptive Test	
Activity2	MCQ Test (Unit-I)	
Activity3	MCQ Test (Unit-II)	

II SESSIONAL: 21 Lectures + 3 Activities

Lecture No.	Lecture Details	Hours
5.	Amibenonium Chloride, isofluorophate, echothiophate iodide, parathion, Malathion, pralidoxime chloride	06
6.	Cholinergic blocking agents: SAR of cholinolytics. Solanaceous alkaloids and analogues: Atropine sulphate, hyosycamine sulphate, scopolamine hydrobromide, Homatropine hydrobromide, ipratropium bromide*	
7.	Synthetic cholinergic blocking agents: tropicamide, cyclopentolate hydrochloride, clidinium bromide, dicyclomine hydrochloride*	
8.	glycopyrrolate, methantheline bromide, propantheline bromide, benztropine mesylate,	
9.	Orphenadrine Citrate, Biperidine Hydrochloride, Procyclidine Hydrochloride*	
10.	Tridihexethyl chloride, isopropamide iodide, ethopropazine hydrochloride.	
Unit-IV: DRUGS ACTING ON CENTRAL NERVOUS SYSTEM		(08)
15.	A. Sedatives and hypnotics: Benzodiazepines: SAR of benzodiazepines, chlordiazepoxide, diazepam*, oxazepam, chlorazepate, lorazepam, alprazolam, zolpidem	02
16.	Barbiturates: SAR Of Barbiturates, Barbitol*, Phenobarbital, Mephobarbital, Amobarbital, Butobarbital, Pentobarbital, Secobarbital	
17.	Miscellaneous: Amides & imides: glutethmide. Alcohol & their carbamate derivatives: meprobomate, ethchlorvynol. Aldehyde & their derivatives: triclofos sodium, paraldehyde	
18.	B. Antipsychotics - Phenothiazines: SAR of phenothiazines - promazine hydrochloride, chlorpromazine hydrochloride*, triflupromazine, thioridazine hydrochloride, piperacetazine hydrochloride, prochlorperazine maleate, trifluoperazine hydrochloride.	03
19.	Chlorprothixene, thiothixene, loxapine succinate, clozapine. Fluro buterophenones: haloperidol, droperidol, risperidone. Beta amino ketones: molindone hydrochloride.	
20.	C. Anticonvulsants: SAR & mechanism of anticonvulsant action	

	Barbiturates: phenobarbitone, methabarbital. Hydantoin: phenytoin*, mephentoin, ethotoin Oxazolindione: trimethadione, paramethadione	03
21.	Succinimides: phensuximide, methsuximide, ethosuximide* Urea and monoacylureas: phenacemide, carbamazepine* Benzodiazepines: clonazepam	
22.	Miscellaneous: Primidone, Valproic acid, Gabapentin, Felbamate.	
Unit-V: DRUGS ACTING ON CENTRAL NERVOUS SYSTEM (CONTD.)		(07)
8.	General anesthetics: Inhalation anesthetics: halothane*, methoxyflurane, enflurane, sevoflurane, isoflurane, desflurane	02
9.	Ultra short acting barbiturates: methohexital sodium*, thiamylal sodium, thiopental sodium. Dissociative anesthetics: ketamine hydrochloride.*	
10.	Narcotic and non-narcotic analgesics Morphine and related drugs: SAR of morphine analogues, morphine sulphate, codeine, meperidine hydrochloride, anileridine hydrochloride, diphenoxylate hydrochloride	03
11.	Loperamide hydrochloride, fentanyl citrate*, methadone hydrochloride*, propoxyphene hydrochloride, pentazocine, levorphanol tartarate	
12.	Narcotic antagonists: nalorphine hydrochloride, levallorphan tartarate, naloxone hydrochloride.	
13.	Anti-inflammatory agents: sodium salicylate, aspirin, mefenamic acid*, meclufenamate, indomethacin, sulindac, tolmetin.	02
14.	Zomepirac, diclofenac, ketorolac, ibuprofen*, naproxen, piroxicam, phenacetin, acetaminophen, antipyrine, phenylbutazone.	
Activity-1	MCQ Test	
Activity-2	MCQ Test	
Activity-3	Descriptive Test	

Text Books

1. Wilson and Gisvold's Organic medicinal and Pharmaceutical Chemistry.
2. Foye's Principles of Medicinal Chemistry, 5th Edition.
3. Burger's Medicinal Chemistry, Vol. I to IV.
4. Textbook of Medicinal Chemistry, Vol. I by Ilango and Valentina

Reference Books

1. Wilson and Gisvold's Organic medicinal and Pharmaceutical Chemistry, 11th Edition.
2. Introduction to principles of drug design- Smith and Williams.
3. Remington's Pharmaceutical Sciences, 20th Edition.
4. Martindale's extra pharmacopoeia.
5. Organic Chemistry by I.L. Finar, Vol. II.
6. The Organic Chemistry of Drug Synthesis by Lednicer, Vol. 1 to 5.
7. Indian Pharmacopoeia 1996 and 2007 Editions.

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Name of the Subject	Physical Pharmaceutics II (Theory)
Name of the Faculty	Dr. D. Nagasamy Venkatesh M.Pharm., Ph.D
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Scope, Course Objectives and Course Outcomes

Scope: This course is designed to impart knowledge and skills necessary for the understanding of physicochemical properties, and principles involved in dosage forms/formulations. The components of the subject help the student to get a better insight into various areas of formulation research and development, and stability studies of pharmaceutical dosage forms.

Objectives: The primary objectives of this course are to

1. Understand various physicochemical properties of drug molecules with respect to its size
2. Understand and apply the concept of flow properties of liquids and solids in manufacturing of pharmaceuticals
3. Know the principles of chemical kinetics & to use them for stability testing and determination of expiry date of formulations

Course Outcomes (COs): At completion of this course it is expected that the students will be able to

- CO 1: Define the basic concepts and properties of the coarse, colloid and micron particles
- CO 2: Identify the solutions for the instability problems in emulsions and suspensions
- CO 3: Interpret the fundamental and derived properties of powders
- CO 4: Conduct and interpret the stability studies
- CO 5: Identify and prevent the degradation mechanisms of drug candidates

LECTURE PLAN – Abstract

Sessional	Number of Hours of Didactic Lecture	No. of Hours of other activities	Total Number of Lecture Hours
I	23	03	26
II	25	03	28
Total Number of Lecture Hours	48	06	54

I SESSIONAL: 23 lectures + 03 Activities

Lecture No.	Lecture Details	Hours
1.	Introduction to Physical Pharmaceutics II	01
Unit-1: Colloidal dispersions		(07)
1.	General characteristics	07
2.	Classification of colloids	
3.	Size, shapes and general properties of colloidal particles	
4.	Optical, kinetic & electrical properties	
5.	Stability of colloids	
6.	Effect of electrolytes, coacervation, peptization	
7.	Sensitization and protective colloidal action	
Unit-2: Rheology		(10)
1.	Newtonian systems	10
2.	Law of flow, kinematic viscosity	
3.	Effect of temperature, non-Newtonian systems	
4.	Pseudoplastic, dilatants	
5.	Plastic, thixotropy, thixotropy in formulation	
6.	Determination of viscosity, capillary	
7.	Falling Sphere, rotational viscometers	
8.	Applications of rheology	
9.	Plastic and elastic deformation	
10.	Plastic and elastic deformation, Heckel equation, Stress, Strain, Elastic Modulus	
Unit-3: Coarse dispersion		(05)
1.	Interfacial properties of suspended particles	05
2.	Settling in suspensions	
3.	Formulation of suspensions	
4.	Evaluation of suspensions	
5.	Stability of suspensions	
Activity 1	MCQ test -1	
Activity 2	MCQ test -2	
Activity 3	MCQ test -3	

II SESSIONAL : 25 Lectures + 03 Activities

Lecture No.	Lecture Details	Hours
Unit-3: Coarse dispersion		(05)
1.	Theories of emulsification	05
2.	Physical stability of emulsions	
3.	Preservation of emulsions	
4.	Rheological properties of emulsions	
5.	Phase equilibria and emulsion formulation.	
Unit-4: Micromeritics		(10)
1.	Introduction to particle size and its importance	10
2.	Particle size and size distribution (average particle size)	
3.	Particle size and size distribution (shape and number, particle-size distribution)	
4.	Particle size and size distribution (number and weight distributions)	
5.	Methods for determining particle size (Optical Microscopy and Sieving)	
6.	Methods for determining particle size (sedimentation particle volume measurement)	
7.	Methods for determining surface area (adsorption method air permeability method)	
8.	Pore size	
9.	DERIVED PROPERTIES OF POWDERS: Densities of Particles (True density, Granule density, Bulk density and Tapped density), Hausners Ratio & compressibility index	
10.	DERIVED PROPERTIES OF POWDERS: Flow Properties (Angle of repose), Porosity and Packing Arrangements	
Unit-5: Drug stability		(10)
1.	Reaction kinetics: zero, pseudo-zero, first & second order	10
2.	determination of reaction order	
3.	Physical factors influencing the chemical degradation of pharmaceutical product	
4.	Chemical factors influencing the chemical degradation of pharmaceutical product	
5.	Simple numerical problems	
6.	Stabilization of medicinal agents against common reactions like hydrolysis	
7.	Stabilization of medicinal agents against common reactions like oxidation	
8.	Photolytic degradation and its prevention	
9.	ICH/WHO stability guidelines	

10.	Accelerated stability testing in expiration dating of pharmaceutical dosage forms, Class test on entire syllabus	
Activity 1	MCQ test -1	
Activity 2	MCQ test -2	
Activity 3	MCQ test -3	

Text Books:

1. Physical Pharmaceutics by Ramasamy C and ManavalanR.
2. Laboratory Manual of Physical Pharmaceutics, C.V.S. Subramanyam, J. Thimma settee
3. Physical Pharmaceutics II by C.V.S. Subramanyam
4. Test book of Physical Pharmacy, by Gaurav Jain & Roop K. Khar

Reference Books

1. Physical Pharmacy by Alfred Martin
2. Experimental Pharmaceutics by Eugene, Parott.
3. Tutorial Pharmacy by Cooper and Gunn.
4. Stocklosam J. Pharmaceutical Calculations, Lea &Febiger, Philadelphia.
5. Liberman H.A, Lachman C., Pharmaceutical Dosage forms, Tablets, Volume-1 to3, MarcelDekkar Inc.
6. Liberman H.A, Lachman C, Pharmaceutical Dosage forms. Disperse systems, volume 1, 2, 3. Marcel Dekkar Inc.

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Name of the Subject	Pharmacology I
Name of the Faculty	Dr. Vadivelan R, M.Pharm., PhD
Designation, Department	Professor, Department of Pharmacology
Mobile Number	9047539532
e-Mail i.d.	vadivelanr@jssuni.edu.in

Scope, Course Objectives and Course Outcomes

Scope: The main purpose of the subject is to understand what drugs do to the living organisms and how their effects can be applied to therapeutics. The subject covers the information about the drug's mechanism of action, physiological and biochemical effects (pharmacodynamics) as well as absorption, distribution, metabolism and excretion (pharmacokinetics) along with the adverse effects, clinical uses, interactions, doses, contraindications and routes of administration of different classes of drugs.

Objectives: The primary objectives of this course are to

1. Understand the pharmacological actions of different categories of drugs
2. Explain the mechanism of drug action at organ system/sub cellular/ macromolecular levels.
3. Apply the basic pharmacological knowledge in the prevention and treatment of various diseases.
4. Understand the basics for drug discovery and development
5. Understand the correlation and links between pharmacology and other bio medical sciences

Course Outcomes (COs): At completion of this course it is expected that the students will be able to

CO1: Define and explain the basic concepts in Pharmacology

CO2: Explain the pharmacological actions of different categories of drugs and their therapeutic applications

CO3: The students will be able correlate between Physiology, Biochemistry, Pathophysiology to understand the therapy for a disease

CO4: Understand the concepts of adverse drug reactions, drug toxicity and drug - drug interactions to minimize the toxic effects of drugs

CO5: Explain the pharmacokinetic (ADME) and pharmacodynamic aspects of a drug

CO6: Students could be able to understand and explain the basic steps involved in the drug discovery and development process

LECTURE PLAN – Abstract

Sessional	No. of Hours of Didactic Lecture	No of Hours of other Activities	Total No. of Lecture Hours
I	20	2	22
II	25	2	27
Total No. of Hours	45	4	49

I SESSIONAL : 20 Lectures + 2 Activities

Lecture No.	Lecture Details	Hours
PHARMACOLOGY - I		(20)
Unit-1: General Pharmacology		
1.	Introduction to Pharmacology- Definition, historical landmarks and scope of pharmacology	08
2.	Nature and source of drugs, essential drugs concepts, agonist	
3.	Routes of drug administration	
4.	Spare receptors, addiction, dependence	
5.	Tachyphylaxis, Idiosyncrasy, allergy	
6.	Pharmacokinetics - ADME	
7.	Enzyme inhibition and induction, Kinetics of Elimination	
Unit-2: General Pharmacology		
21.	Principles and mechanisms of drug action, Receptor theories	12
22.	Classification of receptors	
23.	Drug receptor interactions	
24.	DRC and Therapeutic index	
25.	Combined effect of drugs	
26.	Factors modifying drug action	
27.	Adverse drug effects	
28.	Drug - Drug interactions	
29.	Drug discovery and clinical evaluation of new drugs	
Activity 1	MCQ Test	
Activity 2	Group Discussion	

II SESSIONAL : 25 Lectures + 2 Activities

Lecture No.	Lecture Details	Hours
PHARMACOLOGY - I		(25)
UNIT - 3: Pharmacology of drugs acting on PNS		
1.	Organization and function of ANS	
2.	Neurohumoral transmission, co-transmission and neurotransmitters	
3.	Parasympathomimetics and Parasympatholytics	

4.	Sympathomimetics and sympatholytics	10
5.	Neuromuscular blocking agents	
6.	Skeletal muscle relaxants (peripheral)	
7.	Local anesthetic agents	
8.	Drugs used in myasthenia gravis and glaucoma	
Unit-4: Pharmacology of drugs acting on CNS		08
1.	Neurohumoral transmission in the C.N.S	
2.	General anaesthetics	
3.	Sedatives, hypnotics and centrally acting muscle relaxants	
4.	Anti-epileptics	
5.	Alcohols and disulfiram	
Unit-4: Pharmacology of drugs acting on CNS		07
1.	Psychopharmacological agents	
2.	Drugs used in Parkinsons disease and Alzheimer's disease	
3.	CNS stimulants and nootropics	
4.	Opioid analgesics and antagonists	
5.	Drug addiction, drug abuse	
6.	Tolerance and dependence	
Activity 1	MCQ Test	
Activity 2	Revision	

Text Books (Latest Editions)

1. Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology, Churchill Livingstone Elsevier
2. K.D.Tripathi. Essentials of Medical Pharmacology, JAYPEE Brothers Medical Publishers (P) Ltd, New Delhi.
3. Sharma H. L., Sharma K. K., Principles of Pharmacology, Paras medical publisher
4. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill

Reference Books (Latest editions)

1. Goodman and Gilman's, The Pharmacological Basis of Therapeutics
2. Marry Anne K. K., Lloyd Yee Y., Brian K. A., Robbin L.C., Joseph G. B., Wayne A. K., Bradley R.W., Applied Therapeutics, The Clinical use of Drugs, The Point Lippincott Williams & Wilkins
3. Mycek M.J, Gelnet S.B and Perper M.M. Lippincott's Illustrated Reviews Pharmacology 101
4. Modern Pharmacology with clinical Applications, by Charles R. Craig & Robert,
5. Ghosh MN. Fundamentals of Experimental Pharmacology. Hilton & Company, Kolkata.

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Name of the Subject	Pharmacognosy I (Theory)
Name of the Faculty	Mr G Ramu
Designation, Department	Lecturer, Department of Pharmacognosy
Mobile Number	9972317434
e-Mail i.d.	ramupharmu@jssuni.edu.in

Scope, Course Objectives and Course Outcomes

Scope

Drugs derived from natural resources were extremely contributed to the human health care by providing the herbal medicine since the existence of human civilization. In addition, medicinal plants, microbes and marine sources were also found to be the base for the discovery of various valuable and life saving pharmaceutical products which are currently available. Pharmacognosy has been taught as an important subject in Pharmacy education since around two centuries. The subject Pharmacognosy embraces the scientific and systematic study of biologically active compounds from plants, animals and microbes as well as phytotherapy and nutraceuticals. Most of the available drugs are either obtained directly from plant or their semi-synthetic and synthetic derivatives which necessitates the systematic study of medicinal plants.

It also provides an insight into the history and discovery of each medicinal plant their biological source, chemistry and their therapeutical uses. Through the study of Pharmacognosy, students were enlightened with the cultivation of some important crude drugs and the factors affecting cultivation and their collection. Students were also provided with the various important primary and secondary metabolites of medicinal plants such as carbohydrates, lipids, proteins and fixed oils. Study of this subject also establishes the knowledge about how Pharmacognosy is strongly correlated with other subjects such as Pharmacology, Pharmaceutical chemistry, Pharmaceutical chemistry and Pharmacy practice. Hence the study of Pharmacognosy along with the recent resurgence in the use of herbal medicine, enlighten our undergraduate students regarding the importance and the contribution of our mother nature to the mankind.

Objectives

The primary objectives of this course are to

1. Familiarize with the various present scopes of Pharmacognosy.
2. To know about the contribution of various plants in the medicine.
3. To learn about the some of the important medicinal plants from families such as Apocyanaceae, Solanaceae, Rubiaceae, Umbelliferae, Liliaceae and Leguminosae.
4. To learn about crude drugs obtained from various sources.
5. To understand the different types of classification of crude drugs.
6. To understand the importance of cultivation and propagation of medicinal plants.
7. To enlighten the importance of conservation of medicinal plants.
8. To disseminate the reasons for adulteration

9. To understand about various types of plant fibres and plant metabolites.

Course Outcomes (COs)

On successful completion of the subject the student shall be able to

CO 1 : Know about the basic concept, history and background of Pharmacognosy.

CO 2 : Learn about various methods of classification of crude drugs.

CO 3 : Understand the importance of the factors affecting the cultivation of crude drugs and know about the cultivation of some medicinally valued crude drugs

CO 4 : Recognize about the different cell inclusions, cell wall components and some secondary metabolites

CO 5 : Familiarize with the Pharmacognosy of some of the important primary metabolites such as carbohydrates, lipids and protein containing drugs

CO 6 : Distinguish about the different methods of adulteration of crude drugs.

CO 7 : Acquainted with knowledge about surgical dressings and metabolites

LECTURE PLAN – Abstract

Sessional	No. of Hours of Didactic Lecture	No of hours of other activities	Total no of lecture hours
I	22	02	24
II	23	02	25
Total No. of Hours	45	04	49

I SESSIONAL : 22 Lectures + 2 activities

Lecture No.	Lecture Details	Hours (22)
Unit-1: Introduction to Pharmacognosy		10
1.	Definition, History, Scope and Development of Pharmacognosy	
2.	Sources of Drugs – Plants, Animals, Marine & Tissue Culture	
3.	Organized drugs and Unorganized drugs	
4.	Dried latex, Dried juices, Dried extracts, Gums and Mucilages	
5.	Oleoresins	
6.	Oleo-gum-resins	
7.	Alphabetical, morphological and Taxonomical method of classification of crude drugs	
8.	Pharmacological, Chemo and Serotaxonomical methods	
9.	Adulteration of drugs of natural origin	
10.	Quantitative microscopy of crude drugs	
Unit-2: Processing of crude drugs		10
30.	Importance of cultivation and collection of medicinal plants	
31.	Factors affecting cultivation of medicinal plants	
32.	Different methods of cultivation of medicinal plants	
33.	Plant hormones and their applications I	
34.	Plant hormones and their applications II	
35.	Plant hormones and their applications III	
36.	Polyploidy and Mutation	
37.	Hybridization techniques	
38.	Introduction to conservation of medicinal plants and its importance	
39.	Different methods of conservation of medicinal plants	
Unit-3: Plant Tissue Culture		02
5.	Principle & Tool for Plant Tissue Culture (PTC)	
6.	Nutrients for PTC and Preparation of Medium	
7.	Activity 1 : Group discussion	
8.	Activity 2 : Class test	

II SESSIONAL : 23 Lectures + 2 activities

Lecture No.	Lecture Details	Hours (23)
Unit-3: Plant Tissue Culture		05
1.	Sterilization of Tools and Surface Sterilization	
2.	Suspension culture and Applications	
3.	Initiation of Callus culture	
4.	Immobilization techniques	
5.	Edible vaccines	
Unit-4: Pharmacognosy in various system of medicines		10
23.	Role of Pharmacognosy in traditional system of medicine Ayurveda	
24.	Role of Pharmacognosy in traditional system of medicine Unani	
25.	Role of Pharmacognosy in traditional system of medicine Siddha	
26.	Role of Pharmacognosy in traditional system of medicine Homeopathy	
27.	Role of Pharmacognosy in Chinese system of medicine	
28.	Definition, classification and properties of Alkaloids	
29.	Definition, classification and properties of Glycosides	
30.	Definition, classification and properties of Flavonoids	
31.	Definition, classification and properties of Tannins	
32.	Definition, classification and properties of Volatile oil and Resins	
Unit-5: Plant products and Metabolites		08
16.	Fibres- Cotton, Jute, Hemp	
17.	Hallucinogens, Teratogens and Natural allergens	
18.	Carbohydrates- Acacia, Agar, Tragacanth and Honey	
19.	Proteins and Enzymes- Gelatin and Casein	
20.	Proteolytic enzymes- Papain, Bromelain and Serratiopeptidase	
21.	Urokinase, Streptokinase and Pepsin	
22.	Lipids- Castor oil, Chaulmoogra oil, Wool fat and Bees wax	
23.	Marine drugs- Novel medicinal agents from marine sources	
24.	Activity 1 : Group discussion	
25.	Activity 2 : Class test	

Text Books

1. Pharmacognosy, Kokate, C.K, Purohit, A.R, Gokhale, S.B. 45th Edition, 2010. Nirali Prakashan; Pune
2. Pharmacognosy and Phytochemistry, Vinod D Rangari
3. Trease and Evans Pharmacognosy, Evans, W.C. 15th Edition, 2002. Elsevier Science Limited; Philadelphia.

Reference Books

1. Textbook of Pharmacognosy. Wallis, T.E. 5th Edition, 1985. J.A Churchill Limited; London.
2. Practical Pharmacognosy. Kokate, C.K. 4th Edition, 1994. Vallabh Prakashan; New Delhi
3. Anatomy of crude drugs. Iyengar, M.A., Nayak, S.G.K. 8th Edition, 2001. Manipal Power Press; Manipal
4. Pharmacognosy. Shah, B.S. and Qadry, J.S. 12th Edition, 2005. B.S Shah Prakashan; Ahmedabad.



JSS academy of higher education & research, Mysuru

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JSS College of Pharmacy, Ooty – 643 001

(An ISO 9001-2015 certified Institution)

II. B.Pharmacy, III Semester (Academic Year 2021-2022)

Day	09–10 AM	10–11 AM	11–12 PM	12–01 PM	1-2 PM	2-3 PM	3-4 PM	4-5 PM
Monday	POC-II (Tu) [JS]	Batch I- POC II (P) [JS] Batch II- PP I (P) – [KVVSNR] Batch IV- PE (P) – [AR] Batch III- PMB (P) – [AB] Batch V- Library Reading			L U N C H B R E A K	POC-II (T) [JS]	PE (T) [AR]	PE (T) [AR]
Tuesday	PP-I (Tu) [KVVSNR]	Batch I- Library Reading Batch II- POC II (P) - [JS] Batch IV- PMB (P) - [AB] Batch III- PP I (P) - [KVVSNR] Batch V- PE (P) - [AR]				POC-II (T) [JS]	PE (T) [AR]	Library
Wednesday	PMB (Tu) [RR]	Batch I- PE (P) - [AR] Batch II- Library Reading Batch IV- PP I (P) - [KVVSNR] Batch III- POC II (P) - [JS] Batch V- PMB (P) - [AB]				PMB (T) [RR]	PP-I (T) [KVVSNR]	Library
Thursday	Library	Batch I- PMB (P) - [AB] Batch II- PE (P) - [AR] Batch IV- POC-II (P) - [JS] Batch III- Library Reading Batch V- PP I (P) - [KVVSNR]				POC-II (T) [JS]	PP-I (T) [KVVSNR]	Library
Friday	PE (Tu) [AR]	Batch I- PP I (P) - [KVVSNR] Batch II- PMB (P) - [AB] Batch IV- Library Reading Batch III- PE (P) - [AR] Batch V- POC II (P) - [JS]				PMB (T) [RR]	PP-I (T) [KVVSNR]	Library
Saturday	PMB (T) [RR]							

*T- Theory, P- Practical, Tu-Tutorial hour.

Subject In-charges:

1. Pharmaceutical Organic Chemistry-II (POC-II) - Dr. Jubie S [JS]
2. Physical Pharmaceutics-I (PP-I) - Dr. Karri V V S Narayana Reddy [KVVSNR]
3. Pharmaceutical Microbiology (PMB) - Dr. Raman Rajeshkumar [RR]/ Mr. Alin Bose [AB]
4. Pharmaceutical Engineering (PE) - Mr. Arun R [AR]

Staff In-charge: Dr. Srikanth Jupudi, Email: sjphd@jssuni.edu.in, +91- 9393011114



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II. B.Pharmacy, IV Semester (Academic Year 2021-2022)

Day	09–10 AM	10–11 AM	11–12 PM	12–01 PM	1-2 PM	2-3 PM	3-4 PM	4-5 PM
Monday	POC-III-(Tu) [SK]	Batch I- MC I (P) [GS/PV] Batch III- PC I (P) [VR] Batch V: Library Reading	Batch II- PP II (P) [DNV] Batch IV- PG I (P) [RG]		L U N C H B R E A K	PC-I (T) [VR]	PP-II (T) [DNV]	PG-I (T) [RG]
Tuesday	PP-II (Tu) [DNV]	Batch I- Library Reading Batch III- PP II (P) [DNV] Batch V- PG I (P) [RG]	Batch II- MC I (P) [GS] Batch IV- PC I (P) [DS]			PC-I (T) [VR]	PC-I (Tu) [VR]	PG-I (Tu) [RG]
Wednesday	POC-III (T) [SK]	Batch I- PG I (P) [RG] Batch III- MC I (P) [GS] Batch V- PC I (P) [VR]	Batch II- Library Reading Batch IV- PP II (P) [DNV]			PC-I (T) [VR]	MC-I (T) [GS]	PP-II (T) [DNV]
Thursday	POC-III (T) [SK]	Batch I- PC I (P) [VR] Batch III- Library Reading Batch V- PP II (P) [KVVSNR]	Batch II- PG I (P) [RG] Batch IV- MC I (P) [GS]			MC-I (T) [GS]	PG-I (T) [RG]	MC-I (Tu) [GS]
Friday		Batch I- PP II (P) [KVVSNR] Batch III- PG I (P) [RG] Batch V- MC I (P) [GS/JC]	Batch II- PC I (P) [VR] Batch IV- Library Reading			MC-I (T) [GS]	PG-I (T) [RG]	PP-II (T) [DNV]
Saturday	POC-III (T) [SK]							

*T- Theory, P- Practical, Tu-Tutorial hour.

Subject In-charges:

- | | |
|---|--|
| 1. Pharmaceutical Organic Chemistry-III (POC-III) | - Dr. Srikanth [SK] |
| 2. Medicinal Chemistry-I (MC-I) | - Dr. Gomathy S [GS], Prudhvi [PV], Jagdish Chand [JC] |
| 3. Physical Pharmaceutics-II (PP-II) | - Dr. D Nagasamy Venkatesh [DNV] |
| 4. Pharmacology-I (PC-I) | - Dr. Divakar S [DS] (P), Dr. Vadivelan R [VR] (P&T) |
| 5. Pharmacognosy and Phytochemistry I (PG-I) | - Mr. Ramu G [RG] |

Staff In-charge: Dr. Srikanth J, Email: sjphd@jssuni.edu.in, +91-9393011114, +91-9524441948

6. STUDENT SUPPORT SERVICES

Student Services	Person/s Responsible	Responsibilities
Principal	Dr. Dhanabal S Palaniswamy	<ul style="list-style-type: none"> ❖ Making decisions on behalf of the faculty, staff, students and alumni to achieve the stated mission and vision of the college. ❖ Effectively organizing and allocating the human and financial resources of the college to achieve the stated mission and vision of the college. ❖ Implementing and enforcing the policies of the College and the university. ❖ Representing and advocating on behalf of the faculty, staff, students and alumni to the university.
Vice Principal	Dr. Afzal A Mohammed	<ul style="list-style-type: none"> ❖ Supervision, coordination and delivery of teaching programs ❖ Management of programs to improve the knowledge, skill and attitude of staff ❖ Responsibility for general discipline matters of students ❖ Centre for continuous learning for professional excellence (CCLPE) ❖ Contribute to the overall management of the college
Administrative Officer	Mr. Basavalinga Deveru H K	<ul style="list-style-type: none"> ❖ Coordinating a range of functions, such as finance, human resources and other support areas that contributes significantly to the management function within the college. ❖ Managing the delivery of a particular service or function (e.g. finance, library, human resources, facilities) ❖ Performing routine administrative activities ❖ Providing basic physical and emotional care for students ❖ Assisting with coordination and planning of student routines ❖ Providing routine customer service tasks such as reception and providing straightforward advice about the college ❖ Providing routine support tasks with respect to college maintenance ❖ Coordinating the day to day routine operational requirements of a college office ❖ Assuming responsibilities for the general cleanliness and maintenance of the college

7. GRIEVANCE REDRESSAL COMMITTEE

S. No.	Name	Position	Contact No.
1.	Dr. S Ponnusankar, Professor	Chairman	9489613428
2.	Dr. Afzal A Mohammed, Vice Principal	Co-Chairman	9486687029
3.	Dr.K.Gowthamrajan, Professor,	Member	9443089812
4.	Dr. Krishnaveni Nagappan, Professor	Member	9442083447
5.	Dr. K P.Arun, Associate Professor	Member	9994934663
6.	Dr A Justin, Assistant Professor,	Member	9942932150
7.	Dr. S Saravanan, Assistant Professor	Member	9585625948
8.	Mr.Basavanna, Administrative Officer	Member	9489044575

8. ANTI – RAGGING COMMITTEE

As per the decision of the Hon'ble Supreme Court of India in writ petition No. (C) 656 / 1998, "RAGGING IS PROHIBITED". If an incident of ragging comes to the notice of the authority concerned, the accused student(s) will be given an opportunity to explain and if the explanation is not satisfactory the authority will expel him / her from the institution. In this view, an anti – ragging committee is constituted in our institution (as per the regulation notified by AICTE, New Delhi vide F. NO. 37-3/Legal/IACTE/2009 dated July 1, 2009) with the following members. The details of their names and telephone numbers are given here for your assistance. In case of any untoward incidents pertaining to ragging must be immediately brought to the knowledge of the members to curb ragging at its inception stage itself.

Name of the Staff	Designation	Mobile Phone Number	E-mail. i.d.
Dr. S.P. Dhanabal	Principal & Chief Warden	94890 44577	spdhanabal@jssuni.edu.in
Dr. Afzal Azam	Vice-Principal & Deputy Chief Warden	09486687029	afzal@jssuni.edu.in
Dr. S. Ponnusankar	Professor	94896 13428	drsponnusankar@jssuni.edu.in
Dr. N. Krishnaveni	Professor & Warden (Girl's Hostel)	94420 83447	krisath@jssuni.edu.in
Dr. GNK Ganesh	Associate Professor	94421 91918	gnk@jssuni.edu.in
Dr. Arun K P	Associate Professor & Warden (Boy's Hostel)	99949 34663	kparun@jssuni.edu.in
Mr. H.K. Basavalingadevaru	Administrative Officer & Residential Warden (Boy's Hostel)	94890 44575	basavanna@jssuni.edu.in
Dr. JSK. Nagarajan	Assistant Professor	9443257841	jsk.nagarajan@jssuni.edu.in
Dr. B. Gowramma	Associate Professor	94421 11172	gowramma@jssuni.edu.in
Dr. S Gomathy Subramanian	Assistant Professor	9486433876	gomathys@jssuni.edu.in

SAY NO TO RAGGING – MAKE OUR CAMPUS RAGGING FREE