

National Institute of Pharmaceutical Education and Research

Syllabus for NIPER JEE 2020

- Medicinal Chemistry
- Natural Products
- Pharmacology and toxicology
- Pharmaceutics and Formulation
- Pharmaceutical analysis
- Biotechnology
- Practice of Pharmacy
- Hospital pharmacy & Clinical research
- Stereochemistry

Medicinal Chemistry

Hybridization, aromaticity, Huckles rule reaction mechanisms- Electrophilic, Nucleophilic , SN1, SN2, Elimination E1 E2 etc. Ester hydrolysis, Aac1 Aac2.....all eight mechanisms (Jerry march) Markovnikovs rule, Bredts rule, Stereo selectivity, stereo specificity, regioselectivity, chemoselectivity, chirality, stereochemistry, conformations, rearrangements, acids and bases. Imine-enamine Tautomerism, keto-enol tautomerism, pericyclic reactions, racemic mixture, resolution methods.

Natural Products

In natural products more stress should be given on phytochemistry part rather than pharmacognosy aspects but you should know about biological sources and chemical constituents. Methods of extraction, isolation and characterization of natural products. Various separation techniques used for isolation of natural products. Biosynthetic pathways. Primary metabolites, their examples. Secondary metabolites, various classes of secondary metabolites (eg. Alkaloids, glycosides, tannins, lignans, saponins, lipids, flavonoids, coumarins, etc.). Here most imp. part is chemistry of these classes. Phytochemistry , Secondary metabolites , Biosynthetic pathways , Methods of extraction, isolation and characterization of natural products.

Pharmacology and toxicology

Pharmacokinetics, pharmacodynamics, pharmacological effect, desired, undesired, toxic, adverse effects. Bioavailability, bioequivalence, various factors of ADME. Drug metabolism: various pathways and other details. Drug interactions, agonist, antagonist, partial agonist, protein binding, drug distribution, distribution volume, excretion pathways etc. Mechanism of drug action, drug-receptor interaction. Various adrenergic, cholinergic and other receptors. Detailed study of CNS pharmacology specially opiod receptors.

Pharmaceutics and Formulation

Drug delivery systems (DDS): NDDS models, osmotic pumps, various release patterns eg. Controlled release, delayed release. Sustained release etc., order of release. Oral controlled DDS, factors affecting controlled release. Carriers in DDS: polymers and their classification, types, carbohydrates,

surfactants, proteins, lipids, prodrugs etc. Transdermal drug delivery systems (TDDS): principles, absorption enhancers, evaluation of TDDS. Parenterals: requirements, advantages, disadvantages, release pattern, route of drug delivery. Drug targeting: microspheres, nanoparticles, liposomes, monoclonal antibodies, etc..and some idea on polymers used in this field.

Pharmaceutical analysis

Stability testing of pharmaceuticals, various stability tests, kinetic studies, shelf life determination, thermal stability, formulation stability. Various analytical techniques Tests: physical and chemical tests, limit tests, microbiological tests, biological tests, disintegration and dissolution tests. Thermal techniques: DSC, DTA, TGA, etc. Chromatography- detailed. QA and QC: GLP, TQM, ISO system. Solubility: pH, pka, surfactant HLB values, Rheology. (IMP) Crystallinity, polymorphism, solvates and hydrates, crystal habits, porosity, surface area flow properties. Dosage forms, Stages of dosage form development. Osmolality, osmolarity, osmotic pressure, conductivity.

Biotechnology

Classification of enzymes and their functions mechanism of action of Pharmaceutical technology, Blotting techniques (Western, southern) , Genetic Engineering , Gene cloning , Gel electrophoresis , RNA synthesis , Immunoassays, protein, rDNA technology, DNA synthesis.

Practice of Pharmacy

Adverse Drug Reactions, Rational drug use as well as some typical case studies in diabetes and hypertension and some case study regarding cvs and antiinfective. Therapeutic drug monitoring.

Hospital pharmacy & Clinical research

You should give attention to statistics in which mean, median, mode, anova, paired ttest. Pharmacy Act and D&C act. and knowledge about important laboratories of India and their location. Very frequently asked question:Polarity of solvents for chromatographyRf values for better separation.Absorbent in reverse phase chromatographyPartition coefficient between liquid-liquid phase.

Stereochemistry

Evaluation of formulation, principles and methods of release control in oral formulations , Pharmacology and toxicology ,Compartmental modeling , Bioavailability, bioequivalence studies, Dosage forms , Packaging ,TDDS , Additives of formulation, types, examples, advantages, disadvantages, drug excipient interaction, incompatibility, various types of incompatibilities ,Standardization of natural products ,Fischer, sawhorse and newmon projection formulas ,Pharmaceutics and formulation (Pharmaceutical Technology) , Various adrenergic, cholinergic and other receptors ,Pharmacodynamics , Pharmacokinetics ,Bioavailability, bioequivalence, various factors of ADME , Pharmacological effect, desired, undesired, toxic, adverse effects ,Drug interactions, agonist, antagonist, protein binding, drug distribution, distribution volume, excretion pathways ,Drug metabolism , Mechanism of drug action , Pharmacological screening ,Detailed study of CNS pharmacology Transdermal drug delivery systems , Drug-receptor interaction , Chemotherapy and pathophysiology , Diseases , Drug delivery systems (DDS) , Bioassay methods , Biological sources of important classes of natural products , Carriers in DDS , Drug targeting , Parenteral , Solubilization , Complexation , Viscosity measurements , Dosage form development- stages, implications of dosage form.