GPAT Physical Chemistry Syllabus

Here are some important topics from the physical chemistry syllabus of GPAT:

GPAT Topics	GPAT Sub Topics
Composition & physical states of matter	Intermolecular forces & their impact on the state of the matter. Various physical properties of matter, dipole moment, dielectric constant, Van Der Waal's equation & critical phenomenon, liquefaction of gases, and aerosols.
Colligative Properties	The liquid state, vapor pressure, ideal & real solutions. Raoult's law, the elevation of boiling point, depression of freezing point, osmotic pressure, and determination of molecular weight based on colligative properties.
Thermodynamics	First, second & third laws of thermodynamics, Thermochemical laws, isothermic & adiabatic processes, reversible processes, work of expansion, heat content, enthalpy, and heat capacity. Gibb's & Helmholtz equation & chemical potential.
Solutions	Solubility, factors affecting solubility, solubility curves. Types of solutions, the effect of co-solvency, pH & other factors on solubility. Solubility of gases in liquids, liquids in liquids, & solids in liquids, critical solution temperature, the law of partitioning & its applications. Solute-solvent interactions. Expression of the concentration of pharmaceutical solutions & calculations. Molarity, molality, mole fraction & percentage expressions.
Electrochemistry	Properties of electrolyte solutions, electrolysis. Faraday's law of electrolysis, electron transport, electrical cell, single electrode potential, concentration cells, half-cells & half-cell potential, types of half cells, sign convention, Nernst equation, salt bridge, electromotive series, standard potential, SHE. Measuring the relative voltage of half cells, Calculation of standard potential.

	Reference & indicator electrodes. Standard oxidation-reduction potential.
Ionic equilibrium	Theory of conductivity, equivalent conductance, mobility of ions, specific conductance. 8. Kinetics Order of reactions, derivation & internal form of rate laws, molarities of reaction, derivation of rate constants.

GPAT Physical Pharmacy Syllabus

Some crucial topics from the GPAT exam Physical pharmacy syllabus are:

GPAT Topics	GPAT Sub Topics
Matter, properties of matter	States of matter, change in the state of matter, latent heat and vapor pressure, sublimation critical point, eutectic mixtures, gases, aerosols- inhalers, relative humidity, liquid complexes, liquid crystals, glasses state, solid crystalline and amorphous polymorphism.
Micromeritics and powder rheology	Particle size and distribution, an average particle size number and weight distribution, particle number, methods of determining particle size and volume, optical microscopy, sieving, sedimentation, determining surface areas, permeability, adsorption, derived properties of powders, porosity, packing arrangement densities, bulkiness, and flow properties.
Surface and interfacial phenomenon	Liquid interface, surface and interfacial tensions, surface free energy, measurement of surface and interfacial tension, spreading coefficient, adsorption and liquid interfaces, surface active agents, HLB classification, solubilization, detergency, absorption at solid interfaces, solid gas and solid-liquid interfaces, complex films, electrical properties of interfaces.
Viscosity and rheology	Newtonian systems, law of flow, kinematics viscosity, effect of temperature, non-Newtonian systems, pseudoplastics, dilatant, plastic, thixotropy in formulations, determination of viscosity and thixotropy by capillary, falling ball, rotational viscometer, application of theology in pharmacy

Dispersion systems	Colloidal dispersions: Definition, types, properties of colloids, protective colloids, application of colloids in pharmacy, Suspensions and emulsions: Interfacial properties of suspended particles settling in suspension, theory of sedimentation, effect of Brownian movement, sedimentation of flocculated particles, sedimentation parameters, wetting of particles, significance of electrical properties in dispersions, controlled flocculation, flocculation in structured vehicles, rheological considerations, emulsions: types, theories, physical stability.

Also Read: GPAT Previous Year Cut off: Check Category-wise Qualifying Marks Here!

GPAT Organic Chemistry Syllabus

Important topics from the organic chemistry NBE GPAT syllabus 2026 are mentioned below:

GPAT Topics	GPAT Sub Topics
General principles	A brief review of the classification & sources of organic compounds, Sp3, Sp2, Sp hybridization, sigma & pi- bonds, bond lengths, bond angles & bond energies along with their significance in reactions should be carried out. An overview of bond polarization, hydrogen bonds, inductive effects, resonance, and hyperconjugation be taken. Concepts of homolytic & heterolytic bond fission, acidity & basicity with different theories should be covered briefly. Ease of formation & order of stabilities of electron-deficient & electron-rich species along with the reasons for the same should be covered. Relationships between energy content, stability, reactivity & their importance in chemical reactions should be covered. Calculations for determining empirical & molecular formulas should be covered.
Protection & deprotection of groups	Introduction to protection & deprotection of functional groups. Two examples each for amino, hydroxyl, & carbonyl groups. The significance of these in syntheses should be explained in NBEMS GPAT 2026 syllabus PDF.
Aromaticity & chemistry of aromatic compounds	Concept of aromaticity, Huckel's rule & its use in determining the aromatic/non-aromatic character of a compound. A brief coverage of the structure of benzene. Detailed coverage of electrophilic & nucleophilic aromatic substitution reactions. Reactivity & orientation in these reactions. Reactivity & orientation in mono- & disubstituted benzenes. Benzyne mechanism.

Polycyclic aromatic hydrocarbons	Syntheses & reactions with mechanisms of bi & tricyclic fused carbocyclic rings like naphthalene, anthracene, & phenanthrene.
Heterocyclic Chemistry	IUPAC Nomenclature of heterocyclic rings [3-10 membered] containing O, S, & N atoms. The nomenclature of above rings containing mono-, di-, & multiple [same or different] heteroatoms should also be covered. Nomenclature of 2 & 3 fused rings containing mono -, di -, & multiple heteroatoms [same or different] should also be covered. Syntheses & reactions of three to six-membered rings in detail. Syntheses of five & six-membered rings containing mono- or any diheteroatoms [O, S, & N]. Syntheses of quinoline, isoquinoline, benzoxazole, benzothiazole, & benzimidazole, benzotriazole, and benzothiazole.
Bridged Rings	Bridged ring systems & their nomenclature.C8, C9, C11 bridged bicyclic alkanes. Chemistry of hexamine, morphan, biperiden, amantadine, diazabicyclo[2.2.2] octane
Carbohydrates	Carbohydrates. Definition & classification. D & L nomenclature in sugars. Different ways of drawing / representing a sugar molecule [including cyclic Structure], interconversion of these representations. Anomers & epimers. Mutarotation. Reactions of glucose. Chain extension & chain reduction of a sugar.
Amino acids & proteins	Definition & classification. D & L Amino acids, natural, essential, & nonessential amino acids. Denaturation, Strecker, and Gabriel phthalimide methods for the preparation of amino acids. Peptide bond & its formation. Two protective groups each, for -NH2 & -COOH functionalities during protein synthesis. Sequencing of a protein by chemical & enzymatic methods.

GPAT Pharmaceutical Chemistry Syllabus

Read the given topics below to score a high percentile in the Pharmaceutical Chemistry subject:

GPAT Topics	GPAT Sub Topics

Pharmaceutical Inorganic Chemistry	• **Pharmaceutical Impurities:** Impurities in pharmaceutical substances, sources, types & effects of impurities. Limit tests for heavy metals like lead, iron, arsenic, and mercury & for chloride & sulphate as per Indian Pharmacopoeia [I. P.]. • **Monographs:** Monograph & its importance, various tests included in monographs as per I. P. A study of the following compounds concerning their methods of preparation, assay, & pharmaceutical uses of sodium citrate, calcium carbonate, copper sulphate, light & heavy kaolin, ammonium chloride & ferrous gluconate. • **Isotopes:** Isotopes- stable & radioactive, mode & rate of decay. Types & measurement of radioactivity. Radiopharmaceuticals & their diagnostic & therapeutic applications in pharmacy & medicine such as 125I, 32P, 51Cr, 60Co, 59Fe, 99Tc-M. Radiocontrast media, use of BaSO4 in medicine. • Dentifrices, desensitizing agents, & anticaries agents
Medicinal Chemistry	Therapeutic classes of drugs, Various classes of therapeutic agents
Pharmacy Profession & Introduction to Pharmaceuticals	Pharmacy as a career, evaluation of Pharmacy, earlier period middle to modern ages. Definition, importance of pharmaceuticals, areas concerned, scope of Pharmaceutics, history and development of the profession of Pharmacy and Pharmaceutical industry in India. A brief review of present Indian Pharma. Industry in global perspective.
Allopathic dosage	Merits/demerits, importance, formulation development - vehicles/excipients with examples for the dosage form: liquid dosage form: monophasic liquid dosage form. Aromatic waters, syrup, elixir, linctus, lotion, liniment, glycerites, solutions, spirits, ENT preparations, mixtures, paints, mouthwash.

GPAT Pharmacology Syllabus

The Pharmacology topics can be revised using the topics given below:

GPAT Topics	GPAT Sub Topics
General Pharmacology	Introduction to Pharmacology- Definition, scope and source of drugs, dosage forms and routes of drug administration. Pharmacodynamics-Mechanism of drug action, Receptors, classification and drug-receptor interactions, combined effects of drugs, factors modifying drug actions. Pharmacokinetics-Mechanism and principle of absorption, distribution, metabolism and excretion of drugs. Principles of basic and clinical pharmacokinetics. Pharmacogenetics. Adverse drug reactions. Discovery and development of new drugs-Preclinical and clinical studies.
Pharmacology of peripheral nervous system	Parasympathomimetics, Parasympatholytics, Sympathomimetics, Sympatholytics, Ganglionic stimulants and blockers. Neuromuscular blocking agents and skeletal muscle relaxants (peripheral). Local anesthetic agents. Drugs used in Myasthenia Gravis.
Pharmacology of cardiovascular system	Introduction of hemodynamics and Electrophysiology of heart. Page 18 of 54 Anti-hypertensive drugs, Anti-anginal agents, Anti-arrhythmic drugs. Drugs used in congestive heart failure. Anti-hyperlipidemic drugs. Drugs used in the therapy of shock. Haematinics, anticoagulants and haemostatic agents. Fibrinolytics and antiplatelet drugs. Blood and plasma volume expanders.
Chemotherapy	General principles of chemotherapy. Sulphonamides and co-trimoxazole. Antibiotics- Penicillins, cephalosporins, chloramphenicol, Macrolides, quinolones and fluoroquinolons,. Tetracyclines. Aminoglycosides and miscellaneous antibiotics. Chemotherapy of tuberculosis, leprosy, fungal diseases, viral diseases, AIDS, protozoal diseases, worm infections, urinary tract infections and sexually transmitted diseases. Chemotherapy of malignancy.
Autacoids and their Antagonists	Histamine, 5-HT and their agonsists and antagonists. Prostaglandins, thromboxanes and leukotrienes. pentagastrin, cholecystokinin, angiotensin, bradykinin and substance P.,Analgesic, anti-pyretic, anti-inflammatory and anti-gout drugs.

GPAT Syllabus 2026 PDF: Pharmacognosy

Relevant topics from Pharmacognosy syllabus expected in the GPAT entrance exam are:

GPAT Topics	GPAT Sub Topics
Introductory Pharmacognosy	Historical development, modern concept and scope of Pharmacognosy. The significance of Pharmacognosy in various systems of medicine practiced in India viz: Ayurveda, Unani, Homeopathic and Siddha.
Classification of crude drugs	Based on alphabetical, morphological, pharmacological, chemical, taxonomical and chemotaxonomic methods: organized and unorganized drugs: official and unofficial drugs. Plants, animals and minerals: marine products: plant tissue culture.
Techniques in microscopy	Details of mountants, clearing agents, and chemomicroscopic (microchemical) reagents.
Introduction to phytoconstituents	Definition, classification, chemical tests and pharmaceutical importance of: carbohydrates and their derivatives, fats and proteins, alkaloids, glycosides, flavonoids, steroids, saponins, tannins, resins, lipids and volatile oils
Introduction to phytoconstituents	Definition, classification, chemical tests and pharmaceutical importance of: carbohydrates and their derivatives, fats and proteins, alkaloids, glycosides, flavonoids, steroids, saponins, tannins, resins, lipids and volatile oils.

GPAT Biochemistry Syllabus

In the Biochemistry subject generally the given below topics are asked in the exam to evaluate the aptitude of candidates:

GPAT Topics	GPAT Sub Topics
Cell	Revision of ultrastructure of the cell, functions of various cellular constituents. Applications of biochemical principles to the pharmacy.

Carbohydrates	Types of carbohydrates, their functions, digestion, & absorption. Aerobic & anaerobic oxidation with energetics. Glycogenesis, glycogenolysis, & gluconeogenesis. Hexose monophosphate shunt [HMP shunt]. Diseases associated with carbohydrate metabolism.
Proteins	Different types of proteins. Their functions, digestion & absorption. Denaturation & its effect on biological activity. Renaturation of proteins. Urea formation, urea cycle, creatinine formation. Transamination & deamination. Proteins as enzymes.
Lipids	Different types of lipids. Their functions, digestion, absorption & metabolism. (Beta-Oxidation of fatty acids with energetics. Biosynthesis of cholesterol [from acetate], adrenocorticoids, androgens, progesterone, estrogens, & bile acids / salts. Ketone bodies, their formation & biochemical significance. Diseases associated with lipid metabolism.
Vitamins	Definition. Classification, structures [except B12] biochemical role, sources, daily requirements, & deficiency symptoms. Vitamins as co-factors in biochemical reactions.
Biological oxidations & reductions	Oxidation-reduction systems in the body their role. Oxidative phosphorylation & Electron transport chain. Cytochromes & inhibitors of the same.
Enzymes	Classification & their various roles. Enzyme co-factors. Enzyme kinetics. Michaelis-Menton equation along with its transformations. Double reciprocal plot. Factors affecting enzyme action. Enzyme inhibition, competitive & non-competitive, & kinetics.

GPAT Biotechnology Syllabus

Here are some important Biotechnology related topics which are often seen in GPAT exam:

GPAT Topics	GPAT Sub Topics
Plant Cell and Tissue Culture	Cell and tissue culture, Processes and applications

Animal Cell Culture	Introduction to animal cell culture, medium used in ATC. Use of FCS, primary culture, secondary culture, cell line. Cloning: concept and application with technical hurdles. Transgenic animals as a source of food, organs and tissues, concept of xeno transplant.
Fermentation Technology and Industrial Microbiology	Fermentation as a biochemical process, types of fermentation.2. Fermenter - working and construction, accessory components, modification.3. Fermentation monitoring and in situ recovery of products.