

GANDHINAGAR INSTITUTE OF PHARMACY
DIPLOMA OF PHARMACY
PART 1 (FIRST YEAR)



SCHEME OF TEACHING

Course Code	Name of the Course	No. of Hours (Theory/ Practical)	No. of Hours (Tutorial)	Credit Points
DP101T	Pharmaceutics (Theory)	3	1	4
DP102T	Pharmaceutical Chemistry (Theory)	3	1	4
DP103T	Pharmacognosy (Theory)	3	1	4
DP104T	Human Anatomy and Physiology (Theory)	3	1	4
DP105T	Social Pharmacy (Theory)	3	1	4
DP101P	Pharmaceutics (Practical)	3	0	1.5
DP102P	Pharmaceutical Chemistry (Practical)	3	0	1.5
DP103P	Pharmacognosy (Practical)	3	0	1.5
DP104P	Human Anatomy and Physiology (Practical)	3	0	1.5
DP105P	Social Pharmacy (Practical)	3	0	1.5
Total		30	5	27.5

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SCHEME OF EVALUATION

Course Code	Name of the Course	Marks Distribution		
		University (End Semester Exam)	Institute Sessional Exams	Total
DP101T	Pharmaceutics (Theory)	80	20	100
DP102T	Pharmaceutical Chemistry (Theory)	80	20	100
DP103T	Pharmacognosy (Theory)	80	20	100
DP104T	Human Anatomy and Physiology (Theory)	80	20	100
DP105T	Social Pharmacy (Theory)	80	20	100
DP101P	Pharmaceutics (Practical)	80	20	100
DP102P	Pharmaceutical Chemistry (Practical)	80	20	100
DP103P	Pharmacognosy (Practical)	80	20	100
DP104P	Human Anatomy and Physiology (Practical)	80	20	100
DP105P	Social Pharmacy (Practical)	80	20	100
Total		800	200	1000

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Subject Code: DP101T	Subject Title: Pharmaceutics (Theory)
Pre-requisite: --	

Scope:

This course is designed to impart basic knowledge and skills on the art and science of formulating and dispensing different pharmaceutical dosage forms.

Course Objectives:

This course will discuss the following aspects of pharmaceutical dosage forms:

1. Basic concepts, types and need.
2. Advantages and disadvantages, methods of preparation / formulation.
3. Packaging and labelling requirements.
4. Basic quality control tests, concepts of quality assurance and good manufacturing practices.

Course Outcomes:

Upon successful completion of this course, the students will be able to

1. Describe about the different dosage forms and their formulation aspects.
2. Explain the advantages, disadvantages and quality control tests of different dosage forms.
3. Discuss the importance of quality assurance & good manufacturing practices.

Teaching Scheme (Hours per week)			Evaluation Scheme (Marks)		
Lecture	Tutorial	Credit	Theory		Total
			University Assessment	Internal Assessment	
3	1	4	80	20	100

Detailed Syllabus:

Sr. No.	Topic	Hours	Weightage (%)
1	<ul style="list-style-type: none"> History of the profession of Pharmacy in India in relation to Pharmacy education, industry, pharmacy practice, and various professional associations. Pharmacy as a career Pharmacopoeia: Introduction to IP, BP, USP, NF and Extra Pharmacopoeia. Salient features of Indian Pharmacopoeia 	7	9.33
2	Packaging materials: Types, selection criteria, advantages and disadvantages of glass, plastic, metal, rubber as packaging materials	5	6.66
3	Pharmaceutical aids: Organoleptic (Colouring, flavouring, and sweetening) agents Preservatives: Definition, types with examples and uses	3	3.99
4	Unit operations: Definition, objectives/applications, principles, construction and workings of:	9	12.00

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Sr. No.	Topic	Hours	Weightage (%)
	Size reduction: hammer mill and ball mill		
	Size separation: Classification powder according to IP, Cyclone separator, Sieves and standards of sieves		
	Mixing: Double cone blender, Turbine mixer, Triple roller mill and Silverson mixer homogenizer		
	Filtration: Theory of filtration, membrane filter and sintered glass filter		
	Drying: working of fluidized bed dryer and process of freeze drying		
	Extraction: Definition, Classification, method and applications		
5	Tablets - coated and uncoated, various modified tablets (sustained release, extended-release, fast dissolving, double layered etc.)	8	10.66
	Capsules - hard and soft gelatine capsules	4	5.33
	Liquid oral preparations - solution, syrup, elixir, emulsion, suspension, dry powder for reconstitution	6	7.99
	Topical preparations - ointments, creams, pastes, gels, liniments and lotions, suppositories and pessaries	8	10.66
	Nasal preparations, Ear preparations	2	2.66
	Powders and granules - Insufflations, dusting powders, effervescent powders and effervescent granules	3	3.99
	Sterile formulations – Injectables, eye drops and eye ointments	6	7.99
	Immunological products: Sera, vaccines, toxoids and their manufacturing methods.	4	5.33
6	Basic structure, layout, sections and activities of pharmaceutical manufacturing plants	5	6.66
	Quality control and quality assurance: Definition and concepts of quality control & quality assurance, current good manufacturing practice (cGMP), Introduction to concept of calibration and validation		
7	Novel drug delivery systems: Introduction, Classification with examples, advantages and challenges	5	6.66

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Subject Code: DP101P	Subject Title: Pharmaceutics (Practical)
Pre-requisite: --	

Scope:

This course is designed to train the students in formulating and dispensing common pharmaceutical dosage forms.

Course Objectives:

This course will discuss and train the following aspects of preparing and dispensing various pharmaceutical dosage forms:

1. Calculation of working formula from the official master formula.
2. Formulation of dosage forms based on working formula.
3. Appropriate Packaging and labelling requirements.
4. Methods of basic quality control tests.

Course Outcomes:

Upon successful completion of this course, the students will be able to

1. Calculate the working formula from the given master formula.
2. Formulate the dosage form and dispense in an appropriate container.
3. Design the label with the necessary product and patient information.
4. Perform the basic quality control tests for the common dosage forms.

Teaching Scheme (Hours per week)		Evaluation Scheme (Marks)		
Practical	Credit	Theory		Total
		University Assessment	Internal Assessment	
3	1.5	80	20	100

List of Practical:

Sr. No.	Title of Experiment
1.	Handling and referring the official references: Pharmacopoeias, Formularies, etc. for retrieving formulas, procedures, etc.
2.	Formulation of the following dosage forms as per monograph standards and dispensing with appropriate packaging & labelling <ul style="list-style-type: none"> • Liquid Oral: Simple syrup, Piperazine citrate elixir, Aqueous Iodine solution • Emulsion: Castor oil emulsion, Cod liver oil emulsion • Suspension: Calamine lotion, Magnesium hydroxide mixture • Ointment: Simple ointment base, Sulphur ointment • Cream: Cetrimide cream • Gel: Sodium alginate gel • Liniment: Turpentine liniment, White liniment BPC • Dry powder: Effervescent powder granule, Dusting powder • Sterile Injection: Normal Saline, Calcium gluconate Injection

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Sr. No.	Title of Experiment
	<ul style="list-style-type: none">• Hard Gelatine Capsule: Tetracycline capsules• Tablet: Paracetamol tablets
3.	Formulation of at least five commonly used cosmetic preparations – e.g. cold cream, shampoo, lotion, toothpaste etc.
4.	Demonstration on various stages of tablet manufacturing processes.
5.	Appropriate methods of usage and storage of all dosage forms including special dosage such as different types of inhalers, spacers, insulin pens
6.	Demonstration of quality control tests and evaluation of common dosage forms viz. tablets, capsules, emulsion, sterile injections as per the monographs

Assignments:

The students shall be asked to submit written assignments on the following topics (One assignment per student per sessional period. i.e., a minimum of THREE assignments per student)

1. Various systems of measures commonly used in prescribing, compounding and dispensing practices.
2. Market preparations (including Fixed Dose Combinations) of each type of dosage forms, their generic name, minimum three brand names and label contents of the dosage forms mentioned in theory/practical.
3. Overview of various machines / equipments / instruments involved in the formulation and quality control of various dosage forms / pharmaceutical formulations.
4. Overview of extemporaneous preparations at community / hospital pharmacy vs. manufacturing of dosage forms at industrial level.
5. Basic pharmaceutical calculations: ratios, conversion to percentage fraction, alligation, proof spirit, isotonicity.

Field Visit:

The students shall be taken for an industrial visit to pharmaceutical industries to witness and understand the various processes of manufacturing of any of the common dosage forms viz. tablets, capsules, liquid orals, injectables, etc. Individual reports from each student on their learning experience from the field visit shall be submitted.

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Subject Code: DP102T	Subject Title: Pharmaceutical Chemistry (Theory)
Pre-requisite: --	

Scope:

This course is designed to impart basic knowledge on the chemical structure, storage conditions and medicinal uses of organic and inorganic chemical substances used as drugs and pharmaceuticals. Also, this course discusses the impurities, quality control aspects of chemical substances used in pharmaceuticals.

Course Objectives:

This course will discuss the following aspects of the chemical substances used as drugs and pharmaceuticals for various disease conditions:

1. Chemical classification, chemical name, chemical structure.
2. Pharmacological uses, doses, stability and storage conditions.
3. Different types of formulations / dosage form available and their brand names.
4. Impurity testing and basic quality control tests.

Course Outcomes:

Upon successful completion of this course, the students will be able to

1. Describe the chemical class, structure and chemical name of the commonly used drugs and pharmaceuticals of both organic and inorganic nature.
2. Discuss the pharmacological uses, dosage regimen, stability issues and storage conditions of all such chemical substances commonly used as drugs.
3. Describe the quantitative and qualitative analysis, impurity testing of the chemical substances given in the official monographs.
4. Identify the dosage form & the brand names of the drugs and pharmaceuticals popular in the marketplace.

Teaching Scheme (Hours per week)			Evaluation Scheme (Marks)		
Lecture	Tutorial	Credit	Theory		Total
			University Assessment	Internal Assessment	
3	1	4	80	20	100

Detailed Syllabus:

Sr. No.	Topic	Hours	Weightage (%)
1	Introduction to Pharmaceutical chemistry: Scope and objectives Sources and types of errors: Accuracy, precision, significant figures Impurities in Pharmaceuticals: Source and effect of impurities in Pharmacopoeial substances, importance of limit test, Principle and procedures of Limit tests for chlorides, sulphates, iron, heavy metals	8	10.66

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Sr. No.	Topic	Hours	Weightage (%)
	and arsenic.		
2	Volumetric analysis: Fundamentals of volumetric analysis, Acid-base titration, non-aqueous titration, precipitation titration, complexometric titration, redox titration Gravimetric analysis: Principle and method.	8	10.66
3	Inorganic Pharmaceuticals: Pharmaceutical formulations, market preparations, storage conditions and uses of	7	9.33
	<ul style="list-style-type: none"> • Haematinics: Ferrous sulphate, Ferrous fumarate, Ferric ammonium citrate, Ferrous ascorbate, Carbonyl iron • Gastro-intestinal Agents: Antacids: Aluminium hydroxide gel, Magnesium hydroxide, Magaldrate, Sodium bicarbonate, Calcium Carbonate, Acidifying agents, Adsorbents, Protectives, Cathartics • Topical agents: Silver Nitrate, Ionic Silver, Chlorhexidine Gluconate, Hydrogen peroxide, Boric acid, Bleaching powder, Potassium permanganate • Dental products: Calcium carbonate, Sodium fluoride, Denture cleaners, Denture adhesives, Mouth washes • Medicinal gases: Carbon dioxide, nitrous oxide, oxygen 		
4	Introduction to nomenclature of organic chemical systems with particular reference to heterocyclic compounds containing up to three rings	2	2.66
Study of the following category of medicinal compounds with respect to classification, chemical name, chemical structure (compounds marked with*) uses, stability and storage conditions, different types of formulations and their popular brand names			
5	Drugs Acting on Central Nervous System <ul style="list-style-type: none"> • Anaesthetics: Thiopental Sodium*, Ketamine Hydrochloride*, Propofol • Sedatives and Hypnotics: Diazepam*, Alprazolam*, Nitrazepam, Phenobarbital* • Antipsychotics: Chlorpromazine Hydrochloride*, Haloperidol*, Risperidone*, Sulpiride*, Olanzapine, Quetiapine, Lurasidone • Anticonvulsants: Phenytoin*, Carbamazepine*, Clonazepam, Valproic Acid*, Gabapentin*, Topiramate, Vigabatrin, Lamotrigine • Anti-Depressants: Amitriptyline Hydrochloride*, Imipramine Hydrochloride*, Fluoxetine*, Venlafaxine, Duloxetine, Sertraline, Citalopram, Escitalopram, Fluvoxamine, Paroxetine 	9	11.99
6	Drugs Acting on Autonomic Nervous System <ul style="list-style-type: none"> • Sympathomimetic Agents: Direct Acting: Nor- Epinephrine*, Epinephrine, Phenylephrine, Dopamine*, Terbutaline, Salbutamol (Albuterol), Naphazoline*, Tetrahydrozoline. Indirect Acting Agents: Hydroxy Amphetamine, Pseudoephedrine. Agents With Mixed Mechanism: Ephedrine, Metaraminol • Adrenergic Antagonists: Alpha Adrenergic Blockers: Tolazoline, Phentolamine • Phenoxybenzamine, Prazosin. Beta Adrenergic Blockers: 	9	11.99

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Sr. No.	Topic	Hours	Weightage (%)
	Propranolol*, Atenolol*, Carvedilol • Cholinergic Drugs and Related Agents: Direct Acting Agents: Acetylcholine*, Carbachol, And Pilocarpine. Cholinesterase Inhibitors: Neostigmine*, Edrophonium Chloride, Tacrine Hydrochloride, Pralidoxime Chloride, Echothiopate Iodide • Cholinergic Blocking Agents: Atropine Sulphate*, Ipratropium Bromide • Synthetic Cholinergic Blocking Agents: Tropicamide, Cyclopentolate Hydrochloride, Clidinium Bromide, Dicyclomine Hydrochloride*		
7	Drugs Acting on Cardiovascular System • Anti-Arrhythmic Drugs: Quinidine Sulphate, Procainamide Hydrochloride, Verapamil, Phenytoin Sodium*, Lidocaine Hydrochloride, Lorcanide Hydrochloride, Amiodarone and Sotalol • Anti-Hypertensive Agents: Propranolol*, Captopril*, Ramipril, Methyldopate Hydrochloride, Clonidine Hydrochloride, Hydralazine Hydrochloride, Nifedipine • Antianginal Agents: Isosorbide Dinitrate	5	6.66
8	Diuretics: Acetazolamide, Frusemide*, Bumetanide, Chlorthalidone, Benzthiazide, Metolazone, Xipamide, Spironolactone	2	2.66
9	Hypoglycemic Agents: Insulin and Its Preparations, Metformin*, Glibenclamide*, Glimepiride, Pioglitazone, Repaglinide, Gliflozins, Gliptins	3	3.99
10	Analgesic And Anti-Inflammatory Agents: Morphine Analogues, Narcotic Antagonists; Nonsteroidal Anti- Inflammatory Agents (NSAIDs) - Aspirin*, Diclofenac, Ibuprofen*, Piroxicam, Celecoxib, Mefenamic Acid, Paracetamol*, Aceclofenac	3	3.99
11	Anti-Infective Agents • Antifungal Agents: Amphotericin-B, Griseofulvin, Miconazole, Ketoconazole*, Itraconazole, Fluconazole*, Naftifine Hydrochloride • Urinary Tract Anti-Infective Agents: Norfloxacin, Ciprofloxacin, Ofloxacin*, Moxifloxacin • Anti-Tubercular Agents: INH*, Ethambutol, Para Amino Salicylic Acid, Pyrazinamide, Rifampicin, Bedaquiline, Delamanid, Pretomanid* • Antiviral Agents: Amantadine Hydrochloride, Idoxuridine, Acyclovir*, Foscarnet, Zidovudine, Ribavirin, Remdesivir, Favipiravir • Antimalarials: Quinine Sulphate, Chloroquine Phosphate*, Primaquine Phosphate, Mefloquine*, Cycloguanil, Pyrimethamine, Artemisinin • Sulfonamides: Sulfanilamide, Sulfadiazine, Sulfamethoxazole, Sulfacetamide*, Mafenide Acetate, Cotrimoxazole, Dapsone*	8	10.66
12	Antibiotics: Penicillin G, Amoxicillin*, Cloxacillin, Streptomycin, Tetracyclines: Doxycycline, Minocycline, Macrolides:	8	10.66

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Sr. No.	Topic	Hours	Weightage (%)
	Erythromycin, Azithromycin, Miscellaneous: Chloramphenicol* Clindamycin		
13	Anti-Neoplastic Agents: Cyclophosphamide*, Busulfan, Mercaptopurine, Fluorouracil*, Methotrexate, Dactinomycin, Doxorubicin Hydrochloride, Vinblastine Sulphate, Cisplatin*, Dromostanolone Propionate	3	3.99

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Subject Code: DP102P	Subject Title: Pharmaceutical Chemistry (Practical)
Pre-requisite: --	

Scope:

This course is designed to impart basic training and hands-on experiences to synthesis chemical substances used as drugs and pharmaceuticals. Also, to perform the quality control tests, impurity testing, test for purity and systematic qualitative analysis of chemical substances used as drugs and pharmaceuticals.

Course Objectives:

This course will provide the hands-on experience on the following aspects of chemical substances used as drugs and pharmaceuticals:

1. Limit tests and assays of selected chemical substances as per the monograph
2. Volumetric analysis of the chemical substances
3. Basics of preparatory chemistry and their analysis
4. Systematic qualitative analysis for the identification of the chemical drugs

Course Outcomes:

Upon successful completion of this course, the students will be able to

1. Perform the limit tests for various inorganic elements and report.
2. Prepare standard solutions using the principles of volumetric analysis.
3. Test the purity of the selected inorganic and organic compounds against the monograph standards.
4. Synthesize the selected chemical substances as per the standard synthetic scheme.
5. Perform qualitative tests to systematically identify the unknown chemical substances.

Teaching Scheme (Hours per week)		Evaluation Scheme (Marks)		
Practical	Credit	Theory		Total
		University Assessment	Internal Assessment	
3	1.5	80	20	100

List of Practical:

Sr. No.	Title of Experiment
1.	Limit test for: Chlorides; sulphate; Iron; heavy metals
2.	Identification tests for Anions and Cations as per Indian Pharmacopoeia
3.	Fundamentals of volumetric analysis: Preparation of standard solution and standardization of Sodium Hydroxide, Potassium Permanganate
4.	Assay of the following compounds <ul style="list-style-type: none"> • Ferrous sulphate- by redox titration • Calcium gluconate-by complexometric • Sodium chloride-by Modified Volhard's method

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Sr. No.	Title of Experiment
	<ul style="list-style-type: none">• Ascorbic acid by cerimetry• Ibuprofen by alkalimetry
5.	Fundamentals of preparative organic chemistry Determination of Melting point and boiling point of organic compounds
6.	Preparation of organic compounds <ul style="list-style-type: none">• Benzoic acid from Benzamide• Picric acid from Phenol
7.	Identification and test for purity of pharmaceuticals Aspirin, Caffeine, Paracetamol, Sulfanilamide
8.	Systematic Qualitative analysis experiments (4 substances)

Assignments

The students shall be asked to submit the written assignments on the following topics (One assignment per student per sessional period. i.e., a minimum of THREE assignments per student)

1. Different monographs and formularies available and their major contents.
2. Significance of quality control and quality assurance in pharmaceutical industries.
3. Overview on Green Chemistry.
4. Various software programs available for computer aided drug discovery.
5. Various instrumentations used for characterization and quantification of drug.

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Subject Code: DP103T	Subject Title: Pharmacognosy (Theory)
Pre-requisite: --	

Scope:

This course is designed to impart knowledge on the medicinal uses of various drugs of natural origin. Also, the course emphasizes the fundamental concepts in the evaluation of crude drugs, alternative systems of medicine, nutraceuticals and herbal cosmetics.

Course Objectives:

This course will discuss the following aspects of drug substances derived from natural resources:

1. Occurrence, distribution, isolation, identification tests of common phytoconstituents.
2. Therapeutic activity and pharmaceutical applications of various natural drug substances and phytoconstituents.
3. Biological source, chemical constituents of selected crude drugs and their therapeutic efficacy in common diseases and ailments.
4. Basic concepts in quality control of crude drugs and various system of medicines.
5. Applications of herbs in health foods and cosmetics.

Course Outcomes:

Upon successful completion of this course, the students will be able to

1. Identify the important/common crude drugs of natural origin.
2. Describe the uses of herbs in nutraceuticals and cosmeceuticals.
3. Discuss the principles of alternative system of medicines.
4. Describe the importance of quality control of drugs of natural origin.

Teaching Scheme (Hours per week)			Evaluation Scheme (Marks)		
Lecture	Tutorial	Credit	Theory		Total
			University Assessment	Internal Assessment	
3	1	4	80	20	100

Detailed Syllabus:

Sr. No.	Topic	Hours	Weightage (%)
1	Definition, history, present status and scope of Pharmacognosy	2	2.66
2	Classification of drugs: <ul style="list-style-type: none"> • Alphabetical • Taxonomical • Morphological • Pharmacological • Chemical • Chemo-taxonomical 	4	5.33

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Sr. No.	Topic	Hours	Weightage (%)
3	Quality control of crude drugs: <ul style="list-style-type: none"> • Different methods of adulteration of crude drugs • Evaluation of crude drugs 	6	7.99
4	Brief outline of occurrence, distribution, isolation, identification tests, therapeutic activity and pharmaceutical applications of alkaloids, terpenoids, glycosides, volatile oils, tannins and resins.	6	7.99
5	Biological source, chemical constituents and therapeutic efficacy of the following categories of crude drugs.	34	45.33
	Laxatives Aloe, Castor oil, Ispaghula, Senna	30	39.99
	Cardiotonic Digitalis, Arjuna		
	Carminatives and G.I. regulators Coriander, Fennel, Cardamom, Ginger, Clove, Black Pepper, Asafoetida, Nutmeg, Cinnamon		
	Astringents Myrobalan, Black Catechu, Pale Catechu		
	Drugs acting on nervous system Hyoscyamus, Belladonna, Ephedra, Opium, Tea leaves, Coffee seeds, Coca		
	Anti-hypertensive Rauwolfia		
	Anti-tussive Vasaka, Tolu Balsam		
	Anti-rheumatics Colchicum seed		
	Anti-tumour Vinca, Podophyllum		
	Antidiabetics Pterocarpus, Gymnema		
	Diuretics Gokhru, Punarnava		
	Anti-dysenteric Ipecacuanha		
	Antiseptics and disinfectants Benzoin, Myrrh, Neem, Turmeric		
	Antimalarials Cinchona, Artemisia		
	Oxytocic Ergot		
	Vitamins Cod liver oil, Shark liver oil		
	Enzymes Papaya, Diastase, Pancreatin, Yeast		
	Pharmaceutical Aids Kaolin, Lanolin, Beeswax, Acacia, Tragacanth, Sodium alginate, Agar, Guar gum, Gelatine		
	Miscellaneous Squill, Galls, Ashwagandha, Tulsi, Guggul		
6	Plant fibres used as surgical dressings: Cotton, silk, wooland regenerated fibres. Sutures – Surgical Catgut and Ligatures	3	3.99
7	Basic principles involved in the traditional systems of medicine like: Ayurveda, Siddha, Unani and Homeopathy Method of preparation of Ayurvedic formulations like: Arista, Asava, Gutika, Taila, Churna, Lehya and Bhasma	8	10.66
8	Role of medicinal and aromatic plants in national economy and their export potential	2	2.66

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Sr. No.	Topic	Hours	Weightage (%)
9	Herbs as health food: Brief introduction and therapeutic applications of: Nutraceuticals, Antioxidants, Pro-biotics, Pre-biotics, Dietary fibres, Omega-3-fatty acids, Spirulina, Carotenoids, Soya and Garlic	4	5.33
10	Introduction to herbal formulations	4	5.33
11	Herbal cosmetics: Sources, chemical constituents, commercial preparations, therapeutic and cosmetic uses of: Aloe vera gel, Almond oil, Lavender oil, Olive oil, Rosemary oil, Sandal Wood oil	4	5.33
12	Phytochemical investigation of drugs	2	2.66

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Subject Code: DP103P	Subject Title: Pharmacognosy (Practical)
Pre-requisite: --	

Scope:

This course is designed to train the students in physical identification, morphological characterization, physical and chemical characterization and evaluation of commonly used herbal drugs.

Course Objectives:

This course will provide hands-on experiences to the students in:

1. Identification of the crude drugs based on their morphological characteristics.
2. Various characteristic anatomical characteristics of the herbal drugs studied through transverse section.
3. Physical and chemical tests to evaluate the crude drugs.

Course Outcomes:

Upon successful completion of this course, the students will be able to

1. Identify the given crude drugs based on the morphological characteristics.
2. Take a transverse section of the given crude drugs.
3. Describe the anatomical characteristics of the given crude drug under microscopical conditions.
4. Carry out the physical and chemical tests to evaluate the given crude drugs.

Teaching Scheme (Hours per week)		Evaluation Scheme (Marks)		
Practical	Credit	Theory		Total
		University Assessment	Internal Assessment	
3	1.5	80	20	100

List of Practical:

Sr. No.	Title of Experiment
1.	Morphological Identification of the following drugs: Ispaghula, Senna, Coriander, Fennel, Cardamom, Ginger, Nutmeg, Black Pepper, Cinnamon, Clove, Ephedra, Rauwolfia, Gokhru, Punarnava, Cinchona, Agar.
2.	Gross anatomical studies (Transverse Section) of the following drugs: Ajwain, Datura, Cinnamon, Cinchona, Coriander, Ashwagandha, Liquorice, Clove, Curcuma, Nuxvomica, Vasaka
3.	Physical and chemical tests for evaluation of any FIVE of the following drugs: Asafoetida, Benzoin, Pale catechu, Black catechu, Castor oil, Acacia, Tragacanth, Agar, Guar gum, Gelatine.

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Assignments

The students shall be asked to submit the written assignments on the following topics (One assignment per student per sessional period. i.e., a minimum of THREE assignments per student)

1. Market preparations of various dosage forms of Ayurvedic, Unani, Siddha, Homeopathic (Classical and Proprietary), indications, and their labelling requirements.
2. Market preparations of various herbal cosmetics, indications, and their labelling requirements.
3. Herb-Drug interactions documented in the literature and their clinical significances.

Field Visit

The students shall be taken in groups to a medicinal garden to witness and understand the nature of various medicinal plants discussed in theory and practical courses. Additionally, they shall be taken in groups to the pharmacies of traditional systems of medicines to understand the availability of various dosage forms and their labelling requirements. Individual reports from each student on their learning experience from the field visit shall be submitted.

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Subject Code: DP104T	Subject Title: Human Anatomy and Physiology (Theory)
Pre-requisite: --	

Scope:

This course is designed to impart basic knowledge on the structure and functions of the human body. It helps in understanding both homeostasis mechanisms and homeostatic imbalances of various systems of the human body.

Course Objectives:

This course will discuss the following:

1. Structure and functions of the various organ systems and organs of the human body.
2. Homeostatic mechanisms and their imbalances in the human body.
3. Various vital physiological parameters of the human body and their significances.

Course Outcomes:

Upon successful completion of this course, the students will be able to

1. Describe the various organ systems of the human body.
2. Discuss the anatomical features of the important human organs and tissues.
3. Explain the homeostatic mechanisms regulating the normal physiology in the human system.
4. Discuss the significance of various vital physiological parameters of the human body.

Teaching Scheme (Hours per week)			Evaluation Scheme (Marks)		
Lecture	Tutorial	Credit	Theory		Total
			University Assessment	Internal Assessment	
3	1	4	80	20	100

Detailed Syllabus:

Sr. No.	Topic	Hours	Weightage (%)
1	Scope of Anatomy and Physiology Definition of various terminologies	2	2.66
2	Structure of Cell: Components and its functions	2	2.66
3	Tissues of the human body: Epithelial, Connective, Muscular and Nervous tissues - their sub-types and characteristics.	4	5.33
4	Osseous system: structure and functions of bones of axial and appendicular skeleton	3	3.99
	Classification, types and movements of joints, disorders of joints.	3	3.99
5	Haemopoietic system <ul style="list-style-type: none"> • Composition and functions of blood • Process of Hemopoiesis • Characteristics and functions of RBCs, WBCs and platelets • Mechanism of Blood Clotting • Importance of Blood groups 	8	10.66

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Sr. No.	Topic	Hours	Weightage (%)
6	Lymphatic system <ul style="list-style-type: none"> • Lymph and lymphatic system, composition, function and its formation. • Structure and functions of spleen and lymph node. 	3	3.99
7	Cardiovascular system <ul style="list-style-type: none"> • Anatomy and Physiology of heart • Blood vessels and circulation (Pulmonary, coronary and systemic circulation) • Cardiac cycle and Heart sounds, Basics of ECG • Blood pressure and its regulation 	8	10.66
8	Respiratory system <ul style="list-style-type: none"> • Anatomy of respiratory organs and their functions. • Regulation Mechanism of respiration. • Respiratory volumes and capacities - definitions 	4	5.33
9	Digestive system <ul style="list-style-type: none"> • Anatomy and Physiology of GIT • Anatomy and functions of accessory glands • Physiology of digestion and absorption 	8	10.66
10	Skeletal muscles <ul style="list-style-type: none"> • Histology • Physiology of muscle contraction • Disorder of skeletal muscles 	2	2.66
11	Nervous system <ul style="list-style-type: none"> • Classification of nervous system • Anatomy and physiology of cerebrum, cerebellum, midbrain • Function of hypothalamus, medulla oblongata and basal ganglia • Spinal cord-structure and reflexes • Names and functions of cranial nerves. • Anatomy and physiology of sympathetic and parasympathetic nervous system (ANS) 	8	10.66
12	Sense organs - Anatomy and physiology of <ul style="list-style-type: none"> • Eye • Ear • Skin • Tongue • Nose 	6	7.99
13	Urinary system <ul style="list-style-type: none"> • Anatomy and physiology of urinary system • Physiology of urine formation • Renin - angiotensin system • Clearance tests and micturition 	4	5.33
14	Endocrine system (Hormones and their functions) <ul style="list-style-type: none"> • Pituitary gland • Adrenal gland • Thyroid and parathyroid gland • Pancreas and gonads 	6	7.99

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Sr. No.	Topic	Hours	Weightage (%)
15	Reproductive system <ul style="list-style-type: none">• Anatomy of male and female reproductive system• Physiology of menstruation• Spermatogenesis and Oogenesis• Pregnancy and parturition	4	5.33

Subject Code: DP104P	Subject Title: Human Anatomy and Physiology (Practical)
Pre-requisite: --	

Scope:

This course is designed to train the students and instil the skills for carrying out basic physiological monitoring of various systems and functions.

Course Objectives:

This course will provide hands-on experience in the following:

1. General blood collection techniques and carrying out various haematological assessments and interpreting the results.
2. Recording and monitoring the vital physiological parameters in humansubjects and the basic interpretations of the results.
3. Microscopic examinations of the various tissues permanently mounted in glass slides.
4. Discuss the anatomical and physiological characteristics of various organ systems of the body using models, charts and other teaching aids.

Course Outcomes:

Upon successful completion of this course, the students will be able to

1. Perform the haematological tests in human subjects and interpret the results.
2. Record, monitor and document the vital physiological parameters of humansubjects and interpret the results.
3. Describe the anatomical features of the important human tissues under the microscopical conditions.
4. Discuss the significance of various anatomical and physiologicalcharacteristics of the human body.

Teaching Scheme (Hours per week)		Evaluation Scheme (Marks)		
Practical	Credit	Theory		Total
		University Assessment	Internal Assessment	
3	1.5	80	20	100

List of Practical:

Sr. No.	Title of Experiment
1.	Study of compound microscope
2.	General techniques for the collection of blood
3.	Microscopic examination of Epithelial tissue, Cardiac muscle, Smooth muscle, Skeletal muscle, Connective tissue and Nervous tissue of ready / pre-prepared slides.
4.	Study of Human Skeleton-Axial skeleton and appendicular skeleton
5.	Determination of a. Blood group

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Sr. No.	Title of Experiment
	b. ESR c. Haemoglobin content of blood d. Bleeding time and Clotting time
6.	Determination of WBC count of blood
7.	Determination of RBC count of blood
8.	Determination of Differential count of blood
9.	Recording of Blood Pressure in various postures, different arms, before and after exertion and interpreting the results
10.	Recording of Body temperature (using mercury, digital and IR thermometers at various locations), Pulse rate/ Heart rate (at various locations in the body, before and after exertion), Respiratory Rate
11.	Recording Pulse Oxygen (before and after exertion)
12.	Recording force of air expelled using Peak Flow Meter
13.	Measurement of height, weight, and BMI
14.	Study of various systems and organs with the help of chart, models and specimens a) Cardiovascular system b) Respiratory system c) Digestive system d) Urinary system e) Endocrine system f) Reproductive system g) Nervous system h) Eye i) Ear j) Skin

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Subject Code: DP105T	Subject Title: Social Pharmacy (Theory)
Pre-requisite: --	

Scope:

This course is designed to impart basic knowledge on public health, epidemiology, preventive care and other social health related concepts. Also, to emphasize the roles of pharmacists in the public health programs.

Course Objectives:

This course will discuss about basic concepts of:

1. Public health and national health programs
2. Preventive healthcare
3. Food and nutrition related health issues
4. Health education & promotion
5. General roles and responsibilities of pharmacists in public health

Course Outcomes:

Upon successful completion of this course, the students will be able to

1. Discuss about roles of pharmacists in the various national health programs.
2. Describe various sources of health hazards and disease preventive measures.
3. Discuss the healthcare issues associated with food and nutritional substances.
4. Describe the general roles and responsibilities of pharmacists in public health.

Teaching Scheme (Hours per week)			Evaluation Scheme (Marks)		
Lecture	Tutorial	Credit	Theory		Total
			University Assessment	Internal Assessment	
3	1	4	80	20	100

Detailed Syllabus:

Sr. No.	Topic	Hours	Weightage (%)
1	Introduction to Social Pharmacy <ul style="list-style-type: none"> • Definition and Scope. Social Pharmacy as a discipline and its scope in improving the public health. Role of Pharmacists in Public Health. (2) • Concept of Health - WHO Definition, various dimensions, determinants, and health indicators. (3) • National Health Policy - Indian perspective (1) • Introduction to Millennium Development Goals, Sustainable Development Goals, FIP Development Goals (1) 	9	11.99
2	Preventive healthcare – Role of Pharmacists in the following <ul style="list-style-type: none"> • Demography and Family Planning (3) • Mother and child health, importance of breastfeeding, ill effects 	18	13.99

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Sr. No.	Topic	Hours	Weightage (%)
	<ul style="list-style-type: none"> of infant milk substitutes and bottle feeding (2) • Overview of Vaccines, types of immunity and immunization (5) • Effect of Environment on Health - Water pollution, importance of safe drinking water, waterborne diseases, air pollution, noise pollution, sewage and solid waste disposal, occupational illnesses, Environmental pollution due to pharmaceuticals (7) • Psychosocial Pharmacy: Drugs of misuse and abuse - psychotropics, narcotics, alcohol, tobacco products. Social Impact of these habits on social health and productivity and suicidal behaviours (2) 		
3	Nutrition and Health <ul style="list-style-type: none"> • Basics of nutrition – Macronutrients and Micronutrients (3) • Importance of water and fibres in diet (1) • Balanced diet, nutrition deficiency diseases, ill effects of junk foods, calorific and nutritive values of various foods, fortification of food (3) • Introduction to food safety, adulteration of foods, effects of artificial ripening, use of pesticides, genetically modified foods (1) • Dietary supplements, nutraceuticals, food supplements - indications, benefits, Drug-Food Interactions (2) 	10	13.33
4	<p>Introduction to Microbiology and common microorganisms (3)</p> <p>Epidemiology: Introduction to the terms Epidemiology, its applications, terms such as epidemic, pandemic, endemic, mode of transmission, quarantine, isolation, incubation period, contact tracing.</p> <p>Causative agents, epidemiology and clinical presentations and Role of Pharmacists in educating the public in prevention of the following communicable diseases:</p> <ul style="list-style-type: none"> • Respiratory infections - chickenpox, measles, rubella, mumps, influenza (including Avian-Flu, H1N1, SARS, MERS, COVID-19), diphtheria, whooping cough, meningococcal meningitis, acute respiratory infections, tuberculosis, Ebola (7) • Intestinal infections - poliomyelitis, viral hepatitis, cholera, acute diarrheal diseases, typhoid, amebiasis, worm infestations, food poisoning (7) • Arthropod-borne infections - dengue, malaria, filariasis and, chikungunya (4) • Surface infections - trachoma, tetanus, leprosy (3) • STDs, HIV/AIDS (3) 	28	37.33
5	<p>Introduction to health systems and all ongoing National health programs in India, their objectives, functioning, outcome and the role of pharmacists.</p>	8	10.66
6	<p>Pharmacoeconomics - Introduction, basic terminologies, importance of Pharmacoeconomics</p>	2	2.66

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Subject Code: DP105P	Subject Title: Social Pharmacy (Practical)
Pre-requisite: --	

Scope:

This course is designed to provide simulated experience in various publichealth and social pharmacy activities.

Course Objectives:

This course will train the students on various roles of pharmacists in public health and social pharmacy activities in the following areas:

1. National immunization programs
2. Reproductive and child health programs
3. Food and nutrition related health programs
4. Health education and promotion
5. General roles and responsibilities of the pharmacists in public health
6. First Aid for various emergency conditions including basic life support and cardiopulmonary resuscitation.

Course Outcomes:

Upon successful completion of this course, the students will be able to

1. Describe the roles and responsibilities of pharmacists in various National health programs.
2. Design promotional materials for public health awareness.
3. Describe various health hazards including microbial sources.
4. Advice on preventive measures for various diseases.
5. Provide first aid for various emergency conditions.

Note: Demonstration / Hands-on experience / preparation of charts / models / promotional materials / role plays / enacting / e-brochures / e-flyers / podcasts /video podcasts / any other innovative activities to understand the concept of various elements of social pharmacy listed here. (At least one activity to be carried out for each one of the following):

Teaching Scheme (Hours per week)		Evaluation Scheme (Marks)		
Practical	Credit	Theory		Total
		University Assessment	Internal Assessment	
3	1.5	80	20	100

List of Practical:

Sr. No.	Title of Experiment
1.	National immunization schedule for children, adult vaccine schedule, Vaccines not included in the National Immunization Program.
2.	RCH – reproductive and child health – nutritional aspects, relevant national health

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Sr. No.	Title of Experiment
	programmes.
3.	Family planning devices
4.	Microscopical observation of different microbes (readymade slides)
5.	Oral Health and Hygiene
6.	Personal hygiene and etiquettes - hand washing techniques, Cough and sneeze etiquettes.
7.	Various types of masks, PPE gear, wearing/using them, and disposal.
8.	Menstrual hygiene, products used
9.	First Aid - Theory, basics, demonstration, hands on training, audio-visuals, and practice, BSL (Basic Life Support) Systems [SCA - Sudden Cardiac Arrest, FBAO - Foreign Body Airway Obstruction, CPR, Defibrillation (using AED) (Includes CPR techniques, First Responder).
10.	Emergency treatment for all medical emergency cases viz. snake bite, dog bite, insecticide poisoning, fractures, burns, epilepsy etc.
11.	Role of Pharmacist in Disaster Management.
12.	Marketed preparations of disinfectants, antiseptics, fumigating agents, antilarval agents, mosquito repellents, etc.
13.	Health Communication: Audio / Video podcasts, Images, Power Point Slides, Short Films, etc. in regional language(s) for mass communication / education / Awareness on 5 different communicable diseases, their signs and symptoms, and prevention.
14.	Water purification techniques, use of water testing kit, calculation of Content/percentage of KMnO ₄ , bleaching powder to be used for wells/tanks
15.	Counselling children on junk foods, balanced diets - using Information, Education and Communication (IEC), counselling, etc. (Simulation Experiments).
16.	Preparation of various charts on nutrition, sources of various nutrients from Locally available foods, calculation of caloric needs of different groups (e.g. child, mother, sedentary lifestyle, etc.). Chart of glycemic index of foods.
17.	Tobacco cessation, counselling, identifying various tobacco containing products through charts/pictures

Assignments

The students shall be asked to submit the written assignments on the following topics (One assignment per student per sessional period. i.e., a minimum of THREE assignments per student)

1. An overview of Women's Health Issues
2. Study the labels of various packed foods to understand their nutritional contents
3. Breastfeeding counselling, guidance – using Information, Education and Communication (IEC)
4. Information about the organizations working on de-addiction services in the region (city / district, etc.)
5. Role of a pharmacist in disaster management – A case study
6. Overview on the National Tuberculosis Elimination Programme (NTEP)
7. Drug disposal systems in the country, at industry level and citizen level
8. Various Prebiotics or Probiotics (dietary and market products)
9. Emergency preparedness: Study of local Government structure with respect to Fire, Police departments, health department
10. Prepare poster/presentation for general public on any one of the Health Days. e.g. Day, AIDS

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Day, Handwashing Day, ORS day, World Diabetes Day, World Heart Day, etc.

11. List of home medicines, their storage, safe handling, and disposal of unused medicines
12. Responsible Use of Medicines: From Purchase to Disposal
13. Collection of newspaper clips (minimum 5) relevant to any one topic and its submission in an organized form with collective summary based on the news items
14. Read a minimum of one article relevant to any theory topic, from Pharma /Science/ or other Periodicals and prepare summary of it for submission
15. Potential roles of pharmacists in rural India

Field Visit

The students shall be taken in groups to visit any THREE of the following facilities to witness and understand the activities of such centers/facilities from the perspectives of the topics discussed in theory and/or practical courses. Individual reports from each student on their learning experience from the field visits shall be submitted.

1. Garbage Treatment Plant
2. Sewage Treatment Plant
3. Bio-medical Waste Treatment Plant
4. Effluent Treatment Plant
5. Water purification plant
6. Orphanage / Elderly-Care-Home / School and or Hostel/Home for persons with disabilities
7. Primary health care center