

Yashoda Shikshan Prasarak Mandal's

YASHODA TECHNICAL CAMPUS, SATARA

FACULTY OF PHARMACY

Doctor of Pharmacy

An Autonomous Institute



COURSE STRUCTURE



Yashoda Shikshan Prasarak Mandal's
YASHODA TECHNICAL CAMPUS, SATARA
 An Autonomous Institute
FACULTY OF PHARMACY
Department of Doctor of Pharmacy

First Year Doctor of Pharmacy

Course Code	Course Domain	Course Name	Teaching Scheme				Evaluation Scheme				TOTAL		
			L	T	P	Credit	Sch eme	Theory		Practical			
								Max .	Min. Passi ng	Max .		Min. Passi ng	
PD101T	F	Human Anatomy and Physiology	3	1	0	4	SE1	30	50	-	-	100	
							SE2						
							SE3						
							EYE	70					
PD102T	F	Pharmaceutics	2	1	0	3	SE1	30	50	-	-	100	
							SE2						
							SE3						
							EYE	70					
PD103T	F	Medicinal Biochemistry	3	1	0	4	SE1	30	50	-	-	100	
							SE2						
							SE3						
							EYE	70					
PD104T	F	Pharmaceutical Organic Chemistry	3	1	0	4	SE1	30	50	-	-	100	
							SE2						
							SE3						
							EYE	70					
PD105T	F	Pharmaceutical Inorganic Chemistry	2	1	0	3	SE1	30	50	-	-	100	
							SE2						
							SE3						
							EYE	70					
PD106T	F	Remedial Mathematics*	3	1	0	4*	SE1	30	50	-	-	100	
							SE2						
							SE3						
							EYE	70					
PD107T	F	Remedial Biology#	3	1	0	4#	SE1	30	50	-	-	100	
							SE2						
							SE3						
							EYE	70					
PD108P	F	Human Anatomy and Physiology	0	0	3	1.5	SE1		-	-	20	50	100
							SE2				10		
							SE3				70		
							CIA						
PD109P	F	Pharmaceutics	0	0	3	1.5	SE1		-	-	20	50	100
							SE2				10		
							SE3				70		
							CIA						
PD110P	F	Medicinal Biochemistry	0	0	3	1.5	SE1		-	-	20	50	100
							SE2				10		
							SE3				70		
							CIA						
							EYE						



PD111P	F	Pharmaceutical Organic Chemistry	0	0	3	1.5	SE1	-	-	20	50	100
							SE2					
							SE3					
							CIA			10		
							EYE			70		
PD112P	F	Pharmaceutical Inorganic Chemistry	0	0	3	1.5	SE1	-	-	20	50	100
							SE2					
							SE3					
							CIA			10		
							EYE			70		
PD113P	F	Remedial Biology	0	0	3	1.5#	SE1	-	-	20	50	100
							SE2					
							SE3					
							CIA			10		
							EYE			70		
TOTAL			13/ 16*	5/ 6*	15/ 18#	25.5/ 29.5*	TOTAL MARKS					1000/1100* /1200#
Total Contact Hours Per Week			33/37*/40#			/31#						

Course Category	Programme Core Course	Multi disciplinary Minor	Vocational and Skill Enhancement Course	Ability Enhancement Course	Indian Knowledge System	Co – curricular Courses	Total
	PC	OE	VS	AE	IK	CC	
Credit	25.5	00	00	00	00	00	25.5/29.5* /31#

L:- Lecture, T:- Tutorial, P:- Practical, SE:-Sessional Examination, CIA:- Continues Internal Assessment, EYE: - End Year Examination

Note

*Applicable ONLY for the students who have studied Physics / Chemistry / Botany / Zoology at HSC and appearing for Remedial Mathematics (RM) course.

#Applicable ONLY for the students who have studied Mathematics / Physics / Chemistry at HSC and appearing for Remedial Biology (RB) course.


BOS Chairman


Dean Academics


Associate Director


Director



Date :- 04/09/2026



Yashoda Shikshan Prasarak Mandal's
YASHODA TECHNICAL CAMPUS, SATARA

An Autonomous Institute
FACULTY OF PHARMACY
Department of Doctor of Pharmacy

Second Year Doctor of Pharmacy

Course Code	Course Domain	Course Name	Teaching Scheme				Evaluation Scheme				TOTAL	
			L	T	P	Credit	Scheme	Theory		Practical		
								Ma x.	Min. Passi ng	Ma x.	Min. Pass ing	
PD201T	F	Pathophysiology	3	1	0	4	SE1	30	50	-	-	100
							SE2					
							SE3					
							EYE					
PD202T	F	Pharmaceutical Microbiology	3	1	0	4	SE1	30	50	-	-	100
							SE2					
							SE3					
							EYE					
PD203T	F	Pharmacognosy & Phytopharmaceuticals	3	1	0	4	SE1	30	50	-	-	100
							SE2					
							SE3					
							EYE					
PD204T	F	Pharmacology-I	3	1	0	4	SE1	30	50	-	-	100
							SE2					
							SE3					
							EYE					
PD205T	F	Community Pharmacy	2	1	0	3	SE1	30	50	-	-	100
							SE2					
							SE3					
							EYE					
PD206T	F	Pharmacotherapeutics-I	3	1	0	4	SE1	30	50	-	-	100
							SE2					
							SE3					
							EYE					
PD207P	F	Pharmaceutical Microbiology	0	0	3	1.5	SE1	-	-	20	50	100
							SE2					
							SE3					
							CIA			10		
							EYE			70		
PD208P	F	Pharmacognosy & Phytopharmaceuticals	0	0	3	1.5	SE1	-	-	20	50	100
							SE2					
							SE3					
							CIA			10		
							EYE			70		
PD209P	F	Pharmacotherapeutics-I	0	0	3	1.5	SE1	-	-	20	50	100
							SE2					
							SE3					
							CIA			10		
							EYE			70		
Total			17	6	9	27.5	TOTAL MARKS				900	
Total Contact Hours Per Week			32									



Course Category	Programme Core Course	Multi disciplinary Minor	Vocational and Skill Enhancement Course	Ability Enhancement Course	Indian Knowledge System	Co – curricular Courses	Total
	PC	OE	VS	AE	IK	CC	
Credit	27.5	00	00	00	00	00	27.5

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BOS Chairman


Dean Academics


Associate Director


Director

Date: 04/09/2026



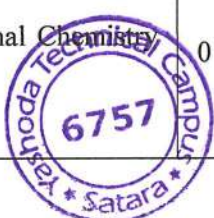


Yashoda Shikshan Prasarak Mandal's
YASHODA TECHNICAL CAMPUS, SATARA

An Autonomous Institute
FACULTY OF PHARMACY
Department of Doctor of Pharmacy

Third Year Doctor of Pharmacy

Course Code	Course Domain	Course Name	Teaching Scheme				Evaluation Scheme					TOTAL	
			L	T	P	Credit	Sch eme	Theory		Practical			
								Ma x.	Min. Passi ng	M ax.	Min. Passing		
PD301T	F	Pharmacology-II	3	1	0	4	SE1	30	50	-	-	100	
							SE2						
							SE3						
							EYE	70					
PD302T	F	Pharmaceutical Analysis	3	1	0	4	SE1	30	50	-	-	100	
							SE2						
							SE3						
							EYE	70					
PD303T	F	Pharmacotherapeutics -II	3	1	0	4	SE1	30	50	-	-	100	
							SE2						
							SE3						
							EYE	70					
PD304T	F	Pharmaceutical Jurisprudence	2	0	0	2	SE1	30	50	-	-	100	
							SE2						
							SE3						
							EYE	70					
PD305T	F	Medicinal Chemistry	3	1	0	4	SE1	30	50	-	-	100	
							SE2						
							SE3						
							EYE	70					
PD306T	F	Pharmaceutical Formulations	2	1	0	3	SE1	30	50	-	-	100	
							SE2						
							SE3						
							EYE	70					
PD307P	F	Pharmacology-II	0	0	3	1.5	SE1	-	-	20	50	100	
							SE2						
							SE3						
							CIA						10
							EYE						70
PD308P	F	Pharmaceutical Analysis	0	0	3	1.5	SE1	-	-	20	50	100	
							SE2						
							SE3						
							CIA						10
							EYE						70
PD309P	F	Pharmacotherapeutics -II	0	0	3	1.5	SE1	-	-	20	50	100	
							SE2						
							SE3						
							CIA						10
							EYE						70
PD310P	F	Medicinal Chemistry	0	0	3	1.5	SE1	-	-	20	50	100	
							SE2						
							SE3						
							CIA						10
							EYE						70



PD311P	F	Pharmaceutical Formulations	0	0	3	1.5	SE1	-	-	20	50	100
							SE2					
							SE3					
							CIA					
							EYE					
TOTAL			16	5	15	28.5	TOTAL MARKS					1100
Total Contact Hours Per Week			36									

Course Category	Programme Core Course	Multi disciplinary Minor	Vocational and Skill Enhancement Course	Ability Enhancement Course	Indian Knowledge System	Co – curricular Courses	Total
	PC	OE	VS	AE	IK	CC	
Credit	28.5	00	00	00	00	00	28.5

L:- Lecture, T:- Tutorial, P:- Practical, SE:-Sessional Examination, CIA:- Continues Internal Assessment, EYE: - End Year Examination


BOS Chairman


Dean Academics


Associate Director


Director

Date :- 04/09/2020





Fourth Year Doctor of Pharmacy

Course Code	Course Domain	Course Name	Teaching Scheme				Evaluation Scheme				TOTAL		
			L	T	P	Credit	Scheme	Theory		Practical			
								Ma x.	Min. Passing	Ma x.		Min. Passing	
PD401T	F	Pharmacotherapeutics -III	3	1	0	4	SE1	30	50	-	-	100	
							SE2						
							SE3						
							EYE						
PD402T	F	Hospital Pharmacy	2	1	0	3	SE1	30	50	-	-	100	
							SE2						
							SE3						
							EYE						
PD403T	F	Clinical Pharmacy	3	1	0	4	SE1	30	50	-	-	100	
							SE2						
							SE3						
							EYE						
PD404T	F,R	Biostatistics & Research Methodology	2	1	0	3	SE1	30	50	-	-	100	
							SE2						
							SE3						
							EYE						
PD405T	F	Biopharmaceutics & Pharmacokinetics	3	1	0	4	SE1	30	50	-	-	100	
							SE2						
							SE3						
							EYE						
PD406T	F	Clinical Toxicology	2	1	0	3	SE1	30	50	-	-	100	
							SE2						
							SE3						
							EYE						
PD407P	F	Pharmacotherapeutics -III	0	0	3	1.5	SE1	-	-	20	50	100	
							SE2						
							SE3						
							CIA			10			
							EYE			70			
PD408P	F	Hospital Pharmacy	0	0	3	1.5	SE1	-	-	20	50	100	
							SE2						
							SE3						
							CIA			10			
							EYE			70			
PD409P	F	Clinical Pharmacy	0	0	3	1.5	SE1	-	-	20	50	100	
							SE2						
							SE3						
							CIA			10			
							EYE			70			
PD410P	F	Biopharmaceutics & Pharmacokinetics	0	0	3	1.5	SE1	-	-	20	50	100	
							SE2						
							SE3						
							CIA			10			
							EYE			70			
TOTAL			15	6	12	27	TOTAL MARKS						1000
Total Contact Hours Per Week			33			27	TOTAL MARKS						1000

Course Category	Programme Core Course	Multi disciplinary Minor	Vocational and Skill Enhancement Course	Ability Enhancement Course	Indian Knowledge System	Co – curricular Courses	Total
	PC	OE	VS	AE	IK	CC	
Credit	27	00	00	00	00	00	27

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Associate Director



Director



Date : 04/09/2028



Yashoda Shikshan Prasarak Mandal's
YASHODA TECHNICAL CAMPUS, SATARA

An Autonomous Institute
FACULTY OF PHARMACY
Department of Doctor of Pharmacy

Fifth Year Doctor of Pharmacy

Course Code	Course Domain	Course Name	Teaching Scheme				Evaluation Scheme					TOTAL
			L	T	P	Credit	Scheme	Theory		Practical		
								Max.	Min. Passing	Max.	Min. Pas	
PD501T	F,R	Clinical Research	3	1	0	4	SE1	30	50	-	-	100
							SE2					
							SE3					
							EYE	70				
PD502T	F	Pharmacoepidemiology and Pharmacoeconomics	3	1	0	4	SE1	30	50	-	-	100
							SE2					
							SE3					
							EYE	70				
PD503T	F	Clinical Pharmacokinetics & Pharmacotherapeutic Drug Monitoring	2	1	0	3	SE1	30	50	-	-	100
							SE2					
							SE3					
							EYE	70				
PD504P	F	Clerkship *	0	1	0	1	SE1	-	-	20	50	100
							SE2					
							SE3					
							CIA			10		
							EYE			70		
PD505PR	F,R	Project work (Six Months)	0	0	20	10	EYE	-	-	100	50	100
TOTAL			8	4	20	22	TOTAL MARKS					500
Total Contact Hours Per Week			32									

Course Category	Programme Core Course	Entrepreneurship Management Courses	Value Education Course	Ability Enhancement Course	Indian Knowledge System	Mini Project	Total
	PC	EM	VE	AE	IK	PR	
Credit	11	00	00	01	00	10	22

L:- Lecture, T:- Tutorial, P:- Practical, SE:-Sessional Examination, CIA:- Continues Internal Assessment, EYE:- End Year Examination

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Associate Director

Director

Date :- 04/09/2026



Yashoda Shikshan Prasarak Mandal's
YASHODA TECHNICAL CAMPUS, SATARA
 An Autonomous Institute
FACULTY OF PHARMACY
Department of Doctor of Pharmacy

Sixth Year Doctor of Pharmacy

Course Code	Course Domain	Course Name	Teaching Scheme				Evaluation Scheme					TOTAL
			L	T	P	Credit	Sch eme	Theory Max.	Min. Pass ing	Practical M ax.	Min. Passi ng	
PD601IR	F	Internship	0	0	0	0	-	-	-	-	-	-
TOTAL						0	TOTAL MARKS					
Total Contact Hours Per Week												

Course Category	Programme Core Course	Entrepreneurship Management Courses	Value Education Course	Ability Enhancement Course	Indian Knowledge System	Internship	Total
	PC	EM	VE	AE	IK	IR	
Credit	00	00	00	00	00	0	0

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 Dean Academics


 Associate Director


 Director

Date:- 04/09/2026



Yashoda Shikshan Prasarak Mandal's

YASHODA TECHNICAL CAMPUS, SATARA

FACULTY OF PHARMACY

Doctor of Pharmacy

An Autonomous Institute



SYLLABUS

First Year Doctor of Pharmacy



Yashoda Shikshan Prasarak Mandal's
YASHODA TECHNICAL CAMPUS, SATARA
An Autonomous Institute
FACULTY OF PHARMACY
Department of Doctor of Pharmacy

Course Structure

Class	Pharm D First Year
Course Code and Course Title	PD101T, Human Anatomy & Physiology
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial/Practical	03/01/00
Credits	04
Evaluation Scheme: SE I, II & III /EYE	30/70

Course Outcomes (COs):		Bloom's Level
Upon successful completion of this course, the student will be able to:		
PD101T_1	Explain the terminologies related to human anatomy and physiology	L2
PD101T_2	Describe the structures, functions, and coordinated working of various systems of the human body.	L2
PD101T_3	Explain and apply the technologies used for evaluating physiological functions of the human body.	L3
PD101T_4	Analyze the impact of social and environmental factors on human body systems.	L4
PD101T_5	Analyze the role of homeostatic imbalance in causing common diseases and disorders.	L4

Course Contents:		100 Hrs
Unit 1	Scope of anatomy and physiology, basic terminologies used in this subject (Description of the body as such planes and terminologies)	04 Hrs.
Unit 2	Structure of cell – its components and their functions.	03 Hrs.
Unit 3	Elementary tissues of the human body: epithelial, connective, Muscular and nervous tissues-their sub-types and characteristics	06 Hrs.
Unit 4	a) Osseous system - structure, composition and functions of the Skeleton. (done in practical classes - 6hrs) b) Classification of joints, Types of movements of joints and disorders of joints (Definitions only)	07 Hrs.
Unit 5	Haemopoetic System a) Composition and functions of blood b) Haemopoiesis and disorders of blood components (definition of disorder) c) Blood groups d) Clotting factors and mechanism e) Platelets and disorders of coagulation	09 Hrs.
Unit 6	Lymph a) Lymph and lymphatic system, composition, formation and circulation. b) Spleen: structure and functions, Disorders c) Disorders of lymphatic system (definition only)	06 Hrs.


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Unit 7	Cardiovascular system a) Anatomy and functions of heart b) Blood vessels and circulation (Pulmonary, coronary and systemic circulation) c) Electrocardiogram (ECG) d) Cardiac cycle and heart sounds e) Blood pressure – its maintenance and regulation f) Definition of the following disorders -Hypertension, Hypotension, Arteriosclerosis, Atherosclerosis, Angina, Myocardial infarction, Congestive heart failure, Cardiac arrhythmias	08 Hrs.
Unit 8	Respiratory system a) Anatomy of respiratory organs and functions b) Mechanism / physiology of respiration and regulation of respiration c) Transport of respiratory gases d) Respiratory volumes and capacities, and Definition of: Hypoxia, Asphyxia, Dybarism, Oxygen therapy and resuscitation.	10 Hrs.
Unit 9	Digestive system a) Anatomy and physiology of GIT b) Anatomy and functions of accessory glands of GIT c) Digestion and absorption d) Disorders of GIT (definitions only)	06 Hrs.
Unit 10	Nervous system a) Definition and classification of nervous system b) Anatomy, physiology and functional areas of cerebrum c) Anatomy and physiology of cerebellum d) Anatomy and physiology of mid brain e) Thalamus, hypothalamus and Basal Ganglia f) Spinal cord: Structure & reflexes – mono-poly-planter g) Cranial nerves – names and functions h) ANS – Anatomy & functions of sympathetic & parasympathetic N.S.	09 Hrs.
Unit 11	Urinary system a) Anatomy and physiology of urinary system b) Formation of urine c) Renin Angiotensin system – Juxtaglomerular apparatus - acid base Balance d) Clearance tests and micturition	04 Hrs.
Unit 12	Endocrine system a) Pituitary gland b) Adrenal gland c) Thyroid and Parathyroid glands d) Pancreas and gonads	06 Hrs.
Unit 13	Reproductive system a) Male and female reproductive system b) Their hormones – Physiology of menstruation c) Spermatogenesis & Oogenesis	06 Hrs.

Spahi
Member Secretary



SPShan
BoS Chairman



	d) Sex determination (genetic basis) e) Pregnancy and maintenance and parturition f) Contraceptive devices	
Unit 14	Sense organs a) Eye b) Ear c) Skin d) Tongue & Nose	07 Hrs.
Unit 15	Skeletal muscles a) Histology b) Physiology of Muscle contraction c) Physiological properties of skeletal muscle and their disorders (definitions)	04 Hrs.
Unit 16	Sports physiology a) Muscles in exercise, Effect of athletic training on muscles and muscle performance, b) Respiration in exercise, CVS in exercise, Body heat in exercise, Body fluids and salts in exercise, c) Drugs and athletics	05 Hrs.

Text Books

Sr. No	Title	Author	Publisher
1	Principles of anatomy and physiology	Tortora Gerard J. and Nicholas	Harpercollins college New York.
2	foundations of anatomy and physiology	Wilson, K.J.W. Ross and Wilson's	Churchill Livingstone, Edinburg.
3	Gray's anatomy	Peter L. Williams	Churchill Livingstone, London
4	Physiology of human body	Guyton arthur	Holtasaunders.

Note: Refer latest available edition

Reference Books

Sr. No.	Title	Author	Publisher
1	Human physiology. Volume 1&11	Chatterjee,C.C.	Medical allied agency, Calcutta.
2	Text book of practical physiology	Ranade VG	PVG
3	Essentials of Medical Pharmacology	Tripathi, K. D.	Jaypee


Member Secretary




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4	The pharmacological basis of therapeutics	Goodman Gilman	Mc Graw Hill
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Note: Refer latest available edition

E- Learning Resources

Sr. No.	Title	Course Instructor	Platform	Web link
1	Human Physiology	By Prof. Sudip Mukherjee - IIT (BHU) Varanasi	Swayam	https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_bt79
2	Electrophysiology of Heart	Prof. Arijita Banerjee- IIT Kharagpur	Swayam	https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_bt99
3	Neuroscience of Human Movements	By Prof. Varadhan - IIT Madras	Swayam	https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ge76


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Department of Doctor of Pharmacy

Course Structure

Class	Pharm D First Year
Course Code and Course Title	PD102T, Pharmaceutics
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial/Practical	02/01/00
Credits	03
Evaluation Scheme: SE I, II & III /EYE	30/70

Course Outcomes (COs):		Bloom's Level
Upon successful completion of this course, the student will be able to:		
PD102T_1	Explain the history of pharmacy, pharmacopoeias, and the basic classification of dosage forms.	L2
PD102T_2	Calculate medication doses for children and concentration determination of pharmaceutical formulation.	L3
PD102T_3	Explain the formulation of various dosage form.	L2
PD102T_4	Describe preparation methods and advantages of various dosage form and surgical dressing.	L2
PD102T_5	Identify and apply basic methods to correct incompatibilities in prescriptions	L4

Course Contents:		75 Hrs
Unit 1	a. Introduction to dosage forms - classification and definitions b. Prescription: definition, parts and handling c. Posology: Definition, Factors affecting dose selection. Calculation of children and infant doses.	06 Hrs.
Unit 2	Historical back ground and development of profession of pharmacy and pharmaceutical industry in brief.	06 Hrs.
Unit 3	Development of Indian Pharmacopoeia and introduction to other Pharmacopoeias such as BP, USP, European Pharmacopoeia, Extra pharmacopoeia and Indian national formulary.	07 Hrs.
Unit 4	Weights and measures, Calculations involving percentage solutions, allegation, proof spirit, isotonic solutions etc.	06 Hrs.
Unit 5	Powders and Granules: Classification advantages and disadvantages, Preparation of simple, compound powders, Insufflations, Dusting powders, Eutectic and Explosive powders, Tooth powder and effervescent powders and granules.	06 Hrs.
Unit 6	Monophasic Dosage forms: Theoretical aspects of formulation including adjuvant like stabilizers, colorants, flavours with examples. Study of Monophasic liquids like gargles, mouth washes, Throat paint, Ear drops, Nasal drops, Liniments and lotions, Enemas and collodions	07 Hrs.


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Unit 7	Biphasic dosage forms: Suspensions and emulsions, Definition, advantages and disadvantages, classification, test for the type of emulsion, formulation, stability and evaluation.	07 Hrs.
Unit 8	Suppositories and pessaries: Definition, advantages and disadvantages, types of base, method of preparation, Displacement value and evaluation	06 Hrs.
Unit 9	Galenicals: Definition, equipment for different extraction processes like infusion, Decoction, Maceration and Percolation, methods of preparation of spirits, tinctures and extracts.	06 Hrs.
Unit 10	Pharmaceutical calculations	06 Hrs.
Unit 11	Surgical aids: Surgical dressings, absorbable gelatin sponge, sutures, ligatures and medicated bandages.	06 Hrs.
Unit 12	Incompatibilities: Introduction, classification and methods to overcome the incompatibilities.	06 Hrs.

Text Books

Sr. No	Title	Author	Publisher
1	Cooper and Gunn's Dispensing for Pharmaceutical Students	Carter, S.J	CBS Publishers & Distributors
2	A text book Professional Pharmacy	N.K.Jain and S.N.Sharma	Vallabh Prakashan
3	Bentley Textbook Of Pharmaceutics	Ea Rawlin	Elsevier India
4	Pharmaceutics	Aulton	Churchill

Note: Refer latest available edition

Reference Books

Sr. No.	Title	Author	Publisher
1	Introduction to Pharmaceutical dosage forms	Howard C. Ansel	Lippincott Williams and Wilkins
2	Remington's Pharmaceutical Sciences	Loyd V. Allen Jr. (editor in chief)	Philadelphia College of Pharmacy
3	Aultons Pharmaceutics	Aulton, M. E.	Churchill
4.	Modern Pharmaceutics Vol. I	Alexander, T. C.	Informa

Note: Refer latest available edition

E- Learning Resources

Sr. No.	Title	Course Instructor	Platform	Web link
1	Pharmaceutical Dosage Forms	Prof. Ruchi Chawla	Swayam	https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ch79

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S. P. Ch
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Department of Doctor of Pharmacy

Course Structure

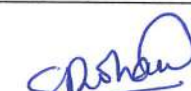
Class	Pharm D First Year
Course Code and Course Title	PD103T, Medicinal Biochemistry
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial/Practical	03/01/00
Credits	04
Evaluation Scheme: SE I, II & III/EYE	30/70

Course Outcomes (COs):		Bloom's Level
Upon successful completion of this course, the student will be able to:		
PD103T_1	Describe the biochemical organization of cells & its role.	L2
PD103T_2	Describe the classification and functions of biomolecules.	L2
PD103T_3	Explain and apply the principles of metabolism of biomolecules.	L3
PD103T_4	Apply and interpret the metabolic disorders of biomolecules.	L5
PD103T_5	Explain and analyze the principle of different biochemical tests of biomolecules.	L4

Course Contents:		100Hrs
Unit 1	Introduction to biochemistry: Cell and its biochemical organization, transport process across the cell membranes. Energy rich compounds; ATP, Cyclic AMP and their biological significance.	06 Hrs.
Unit 2	Enzymes: Definition; Nomenclature; IUB classification; Factor affecting enzyme activity; Enzyme action; enzyme inhibition. Isoenzymes and their therapeutic and diagnostic applications; Coenzymes and their biochemical role and deficiency diseases.	11 Hrs.
Unit 3	Carbohydrate metabolism: Glycolysis, Citric acid cycle (TCA cycle), HMP shunt, Glycogenolysis, gluconeogenesis, glycogenesis. Metabolic disorders of carbohydrate metabolism (diabetes mellitus and glycogen storage diseases); Glucose, Galactose tolerance test and their significance; hormonal regulation of carbohydrate metabolism.	11 Hrs.
Unit 4	Lipid metabolism: Oxidation of saturated (β -oxidation); Ketogenesis and ketolysis; biosynthesis of fatty acids, lipids; metabolism of cholesterol; Hormonal regulation of lipid metabolism. Defective metabolism of lipids (Atherosclerosis, fatty liver, hypercholesterolemia).	10 Hrs.
Unit 5	Biological oxidation: Coenzyme system involved in Biological oxidation. Electron transport chain (its mechanism in energy capture; regulation and inhibition); Uncouplers of ETC; Oxidative phosphorylation;	05 Hrs.


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Unit 6	Protein and amino acid metabolism: protein turn over; nitrogen balance; Catabolism of Amino acids (Transamination, deamination & decarboxylation). Urea cycle and its metabolic disorders; production of bile pigments; hyperbilirubinemia, porphoria, jaundice. Metabolic disorder of Amino acids.	10 Hrs.
Unit 7	Nucleic acid metabolism: Metabolism of purine and pyrimidine nucleotides; Protein synthesis; Genetic code; inhibition of protein synthesis; mutation and repair mechanism; DNA replication (semiconservative /onion peel models) and DNA repair mechanism.	09 Hrs.
Unit 8	Introduction to clinical chemistry: Cell; composition; malfunction; Roll of the clinical chemistry laboratory.	03 Hrs.
Unit 9	The kidney function tests: Role of kidney; Laboratory tests for normal function includes- a) Urine analysis (macroscopic and physical examination, quantitative and semiquantitative tests.) b) Test for NPN constituents. (Creatinine /urea clearance, determination of blood and urine creatinine, urea and uric acid) c) Urine concentration test d) Urinary tract calculi. (stones)	09 Hrs.
Unit 10	Liver function tests: Physiological role of liver, metabolic, storage, excretory, protective, circulatory functions and function in blood coagulation. a) Test for hepatic dysfunction-Bile pigments metabolism. b) Test for hepatic function test- Serum bilirubin, urine bilirubin, and urine urobilinogen. c) Dye tests of excretory function. d) Tests based upon abnormalities of serum proteins. Selected enzyme tests	11 Hrs.
Unit 11	Lipid profile tests: Lipoproteins, composition, functions. Determination of serum lipids, total cholesterol, HDL cholesterol, LDL cholesterol and triglycerides	06 Hrs.
Unit 12	Immunochemical techniques for determination of hormone levels and protein levels in serum for endocrine diseases and infectious diseases. Radio immuno assay (RIA) and Enzyme Linked Immuno Sorbent Assay (ELISA)	04 Hrs.
Unit 13	Electrolytes: Body water, compartments, water balance, and electrolyte distribution. Determination of sodium, calcium, potassium, chlorides, bicarbonates in the body fluids.	05 Hrs.

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Text Books

Sr. No	Title	Author	Publisher
1	Harpers review of biochemistry	Martin	McGraw Hill
2	Text book of biochemistry	D.Satyanarayana	Elsevier India
3	Text book of clinical chemistry	Alex kaplan &Laverve L.Szabo	Lea & Febiger
4	Principles of biochemistry	Lehninger	W.H. Freeman

Note: Refer latest available edition

Reference Books

Sr. No.	Title	Author	Publisher
1	Text book of biochemistry	Ramarao	UBS Publishers
2	Practical Biochemistry	David T.Plummer	McGraw-Hill
3	Practical Biochemistry	Pattabhiraman	McGraw-Hill
4	Techniques In Biochemistry	T. Devasena	Ahuja Publication

Note: Refer latest available edition

E- Learning Resources

Sr. No.	Title	Course Instructor	Platform	Web link
1	Biochemistry & cell biology	Dr. Anjana Jajoo	Swayam	https://onlinecourses.swayam2.ac.in/e-learning/preview/cec26_cy12
2	Nutritional & clinical biochemistry	Dr. Senjam Sunil Singh	Swayam	https://onlinecourses.swayam2.ac.in/e-learning/preview/cec26_cy02
3	Analytical techniques in biochemistry	Prof Ashok Sharma	Swayam	https://onlinecourses.swayam2.ac.in/e-learning/preview/cec26_cy11


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Course Structure

Class	Pharm D First Year
Course Code and Course Title	PD104T, Pharmaceutical organic chemistry
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial/Practical	03/01/00
Credits	04
Evaluation Scheme: SE I, II & III /EYE	30/70

Course Outcomes (COs):		Bloom's Level
Upon successful completion of this course, the student will be able to:		
PD104T_1	Explain the strong foundation in organic chemistry by using principles, enabling accurate analysis of chemical structures and reactions.	L2
PD104T_2	Apply proficiency in naming and categorizing organic compounds.	L3
PD104T_3	Explain the reaction mechanisms, facilitating design of synthetic pathways to predict chemical transformations.	L2
PD104T_4	Apply insight into advanced concepts like resonance and substitution reactions.	L3
PD104T_5	Apply knowledge to analyze and predict outcomes of chemical reactions contributing to synthesise of novel compounds.	L3

Course Contents:		100Hrs
Unit 1	Structures and Physical properties: a. Polarity of bonds, polarity of molecules, M.P, Inter molecular forces, B.P, Solubility, non ionic solutes and ionic solutes, protic and aprotic Solvents, ion pairs, b. Acids and bases, Lowry bronsted and Lewis theories c. Isomerism	05 Hrs.
Unit 2	Nomenclature of organic compound belonging to the following classes: Alkanes, Alkenes, Dienes, Alkynes, Alcohols, Aldehydes, Ketones, Amides, Amines, Phenols, Alkyl Halides, Carboxylic Acid, Esters, Acid Chlorides And Cycloalkanes.	07 Hrs.
Unit 3	Free radicals chain reactions of alkane : Mechanism, relative reactivity and stability	02 Hrs.
Unit 4	Alicyclic compounds : Preparations of cyclo alkanes, Bayer strain theory and orbital picture of angle strain.	02 Hrs.
Unit 5	Nucleophilic aliphatic substitution mechanism: Nucleophiles and leaving groups, kinetics of second and first order reaction, mechanism and kinetics of SN2 reactions. Stereochemistry and steric hindrance, role of solvents, phase transfer catalysis, mechanism and kinetics of SN1 reactions, stereochemistry, carbocation and their stability, rearrangement of carbocation, role of solvents in SN1 reaction, Ion dipole bonds, SN2 versus SN1 solvolyses, nucleophilic assistance by the solvents.	10 Hrs.


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Unit 6	Dehydro halogenation of alkyl halides: 1,2 elimination, kinetics, E2 and E1 mechanism, elimination via carbocation, evidence for E2 mechanism, absence of rearrangement isotope effect, absence hydrogen exchange, the element effect, orientation and reactivity, E2 versus E1, elimination versus substitution, dehydration of alcohol, ease of dehydration, acid catalysis, reversibility, orientation.	10 Hrs.
Unit 7	Electrophillic and free radicals addition: Reactions at carbon-carbon, double bond, electrophile, hydrogenation, heat of hydrogenation and stability of alkenes, markownikoff rule, addition of hydrogen halides, addition of hydrogen bromides, peroxide effect, electrophillic addition, mechanism, rearrangement, absence of hydrogen exchange, orientation and reactivity, addition of halogen, mechanism, halohydrin formation, mechanism of free radicals additon, mechanism of peroxide initiated addition of hydrogen bromide, orientation of free addition, additions of carbene to alkene, cyclo addition reactions.	10 Hrs.
Unit 8	Carbon-carbon double bond as substituents: Free radical halogenations of alkenes, comparision of free radical substitution with free radical addition, free radical substitution in alkenes, orientation and reactivity, allylic rearrangements.	04 Hrs.
Unit 9	Theory of resonance: Allyl radical as a resonance hybrid, stability, orbital picture, resonance stabilisation of allyl radicals, hyper conjugation, allyl cation as a resonance hybrid, nucleophyllic substitution in allylic substrate, SN1 reactivity, allylic rearrangement, resonance stabilisation of allyl cation, hyper conjugation, nucleophilic substitution in allylic substrate, SN2 nucleophilic substitiuon in vinylic substrate, vinylic cation, stability of conjugated dienes, resonance in alkenes, hyper conjugation, ease of formation of conjugated dienes, orientation of elimination, electrophilic addition to conjugated dienes, 1,4-addition, 1,2-versus 1,4-addition, rate versus equilibrium, orientation and reactivity of free radical addition to conjugated dienes.	10 Hrs.
Unit 10	Elecrophilic aromatic substitution: Effect of substituent groups, determination of orientation, determination of relative reactivity, classification of substituent group, mechanism of nitration, sulphonation, halogenation, friedel craft alkylation, friedel craft acylation, reactivity and orientation, activating and deactivating O,P,M directing groups, electron release via resonance, effect of halogen on electrophilic aromatic substitution in alkyl benzene, side chain halogination of alkyl benzene, resonance stabilization of benzyl radical.	05 Hrs.
Unit 11	Nucleophilic addition reaction: Mechanism, ionisation of carboxylic acids, acidity constants, acidity of acids, structure of carboxylate ions, effect of substituent on acidity, nucleophilic acyl substitution reaction, conversion of acid to acid chloride, esters, amide and anhydride. Role of caboxyl group, comparison of alkyl nucleophilic substitution with acyl nucleophilic substitution.	05 Hrs.
Unit 12	Mechanism of aldol condensation, claisen condensation, cannizzaro reaction, crossed aldol condensation, crossed cannizzaro reaction, benzoin condensation,	08 Hrs.


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	perkin condensation, Knoevenagel, Reformatsky reaction, Wittig reaction, Michael addition.	
Unit 13	Hoffman rearrangement: Migration to electron deficient nitrogen, Sandmeyer's reaction, basicity of amines, diazotisation and coupling, acidity of phenols, Williamson synthesis, Fries rearrangement, Kolbe reaction, Reimer tieman's reactions.	07 Hrs.
Unit 14	Nucleophilic aromatic substitution: Bimolecular displacement mechanisms, orientation, comparison of aliphatic nucleophilic substitution with that of aromatic.	03 Hrs.
Unit 15	Oxidation reduction reaction.	02 Hrs.
Unit 16	Study of the following official compounds- preparation, test for purity, assay and medicinal uses of Chlorbutol, Dimercaprol, Glyceryl trinitrate, Urea, Ethylene diamine dihydrate, Vanillin, Paraldehyde, Ethylene chloride, Lactic acid, Tartaric acid, citric acid, salicylic acid, aspirin, methyl salicylate, ethyl benzoate, benzyl benzoate, dimethyl phthalate, sodium lauryl sulphate, saccharin sodium, mephensin.	10 Hrs.

Text Books

Sr. No	Title	Author	Publisher
1	Vogels Text Book Of Practical Organic Chemistry	F. Brain	Pearson
2	Organic chemistry	T.R.Morrison	Pearson
3	Text book of Pharmaceutical chemistry	Bentley and Driver	Oxford
4	Organic chemistry, the fundamentals of chemistry	I.L.Finar	Pearson

Note: Refer latest available edition

Reference Books

Sr. No.	Title	Author	Publisher
1	Advanced organic chemistry	Jerry March	Wiley
2	A Textbook Of Organic Chemistry	Arun Bahl	S.Chand
3	The Organic Chemistry Of Drugs Synthesis	Lednicer	Wiley
4	The Principles Of Heterocyclic Chemistry	Katritzky, A. R.	Pharma med Press

Note: Refer latest available edition

E- Learning Resources

Sr. No	Title	Author	Platform	Web link
1	Basic Organic Chemistry	Dr. B. S. Balaji	Swayam	https://onlinecourses.swayam2.ac.in/e-learning/preview/cec26_cy06
2	Introductory Organic Chemistry II	Neeraja Dashaputre	NPTEL	https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_cy45


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Course Structure

Class	Pharm D First Year
Course Code and Course Title	PD105T, Pharmaceutical Inorganic Chemistry
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial/Practical	02/01/00
Credits	03
Evaluation Scheme: SE I, II & III /EYE	30/70

Course Outcomes (COs):		Bloom's Level
Upon successful completion of this course, the student will be able to:		
PD105T_1	Explain the principles of analytical technique for the analysis of inorganic pharmaceuticals	L2
PD105T_2	Apply the importance of inorganic pharmaceuticals in preventing and curing the disease.	L3
PD105T_3	Identify and analyse the effect of errors and impurity in analysis.	L4
PD105T_4	Describe and apply the principles of volumetric analysis in quantitative estimation of pharmaceutical ingredients.	L3
PD105T_5	Explain the applications of medicinal agents.	L2

Course Contents:		75 Hrs
Unit 1	Errors	3 Hrs
Unit 2	Volumetric analysis	4 Hrs
Unit 3	Acid-base titration	4 Hrs
Unit 4	Redox Titration	2 Hrs
Unit 5	Non- Aqueous Titration	3 hrs
Unit 6	Precipitation Titration	5 Hrs
Unit 7	Complexometric titrations	3 Hrs
Unit 8	Theory of indicators	3 Hrs
Unit 9	Gravimetry analysis	2 Hrs
Unit 10	Limit tests	5 Hrs
Unit 11	Medicinal gases	2 Hrs
Unit 12	Acidifiers	2 Hrs
Unit 13	Antacids	5 Hrs
Unit 14	Cathartics	3 Hrs
Unit 15	Electrolyte replenishers	5 Hrs
Unit 16	Essential Trace elements	3 Hrs
Unit 17	Antimicrobials	3 Hrs
Unit 18	Pharmaceutical aid	3 Hrs

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Unit 19	Dental Products	5 Hrs
Unit 20	Miscellaneous compounds	4 Hrs
Unit 21	Radio Pharmaceuticals	4 Hrs

Text Books

Sr. No	Title	Author	Publisher
1	Indian Pharmacopoeia	Ministry of health	Govt. of India
2	A text book Inorganic medicinal chemistry	Surendra N. Pandeya	S G Publisher,
3	Inorganic Pharmaceutical Chemistry III- Edition	P.Gundu Rao	Vallabh Prakashan
4	Textbook of Pharmaceutical Inorganic Chemistry	Dr. Santosh Karajgi	Shashwat Publication

Note: Refer latest available edition

Reference Books

Sr. No.	Title	Author	Publisher
1	Inorganic Pharmaceutical Chemistry	Anand & Chatwal	Himalaya
2	Practical Pharmaceutical chemistry Vol-I & Vol-II	Beckett, A. H	C.B.S
3	Pharmaceutical Analysis	D. Lee	Blackwell
4	Pharmaceutical Analysis	Watson	Elsevier India

Note: Refer latest available edition

E- Learning Resources

Sr. No.	Title	Course Instructor	Platform	Web link
1	Inorganic Chemistry	Prof. S. Sivaramakrishnan	NPTEL	https://nptel.ac.in/courses/104/106/104106086?utm_source=chatgpt.com
2	Pharmaceutical Analysis	Prof. B. K. Sharma	Swayam	https://onlinecourses.nptel.ac.in/noc20_cy24/preview?utm_source=chatgpt.com

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Course Structure

Class	Pharm D First Year
Course Code and Course Title	PD106T, Remedial Mathematics
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial/Practical	03/01/00
Credits	04
Evaluation Scheme: SE I, II & III / EYE	30/70

Course Outcomes (COs):		Bloom's Level
Upon successful completion of this course, the student will be able to:		
PD106T_1	Explain Trigonometry, Analytical geometry, Matrices, Determinant, Integration, Differential equation, Laplace transform and their applications	L2
PD106T_2	Solve the problems of different types by applying theory	L3
PD106T_3	Apply the important applications of mathematics in pharmacy.	L3

Course Contents:		100Hrs
Unit 1	Algebra : Determinants, Matrices	12 Hrs
Unit 2	Trigonometry : Sides and angles of a triangle, solution of triangles	10 Hrs
Unit 3	Analytical Geometry : Points, Straight line, circle, parabola	14 Hrs
Unit 4	Differential calculus: Limit of a function, Differential calculus, Differentiation of a sum, Product, Quotient Composite, Parametric, exponential, trigonometric and Logarithmic function. Successive differentiation, Leibnitz's theorem, Partial differentiation, Euler's theorem on homogeneous functions of two variables	24 Hrs
Unit 5	Integral Calculus: Definite integrals, integration by substitution and by parts, Properties of definite integrals.	16 Hrs
Unit 6	Differential equations: Definition, order, degree, variable separable, homogeneous, Linear, heterogeneous, linear, differential equation with constant coefficient, simultaneous linear equation of second order.	14 Hrs
Unit 7	Laplace transform: Definition, Laplace transform of elementary functions, Properties of linearity and shifting.	10 Hrs

Text Books

Sr. No	Title	Author	Publisher
1	Basic Mathematics	Shah, S.	Tech-Max
2	Remedial Mathematics	Bais, V. K.	PV Books
3	Mathematics for Pharmacy Students Vol I	Gujar, K. N.	Everest Pub.
4	Mathematics for Pharmacy Students Vol II	Gujar, K. N.	Everest Pub.

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Course Structure

Class	Pharm D First Year
Course Code and Course Title	PD107T, Remedial Biology
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial/Practical	03/01/00
Credits	04
Evaluation Scheme: SE I, II & III / EYE	30/70

Course Outcomes (COs):		Bloom's Level
Upon successful completion of this course, the student will be able to:		
PD107T_1	Understand the characters of living organisms and classification of kingdoms	L2
PD107T_2	Understand basic knowledge on morphology and functions of various plant parts such as root, stem, leaf, flower, fruit and seed.	L2
PD107T_3	Understand the roles of plants and animals in providing in traditional and modern medicine.	L2

Course Contents:		100 Hrs
Unit 1	Introduction	3 Hrs
Unit 2	General organization of plants and its inclusions	6 Hrs
Unit 3	Plant tissues	6 Hrs
Unit 4	Plant kingdom and its classification	6 Hrs
Unit 5	Morphology of plants	6 Hrs
Unit 6	Root, Stem, Leaf and Its modifications	10 Hrs
Unit 7	Inflorescence and Pollination of flowers	6 Hrs
Unit 8	Morphology of fruits and seeds	5 Hrs
Unit 9	Plant physiology	10 Hrs
Unit 10	Taxonomy of Leguminosae, umbelliferae, Solanaceae, Lilliacae, Zinziberaceae, Rubiaceae	10 Hrs
Unit 11	Study of Fungi, Yeast, Penicillin and Bacteria	8 Hrs
Unit 12	Study of Animal cell	4 Hrs
Unit 13	Study animal tissues	5 Hrs
Unit 14	Detailed study of frog	5 Hrs
Unit 15	Study of Pisces, Raptiles, Aves	5 Hrs
Unit 16	Geneal organization of mammals	3 Hrs
Unit 17	Study of poisonous animal	2 Hrs

Text Books

Sr. No	Title	Author	Publisher
1	Text book of Biology	S.B.Gokhale	Nirali Prakashan
2	Remedial Biology	S. S. Randhawa	PV Books

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Course Structure

Class	Pharm D First Year
Course Code and Course Title	PD108P, Human Anatomy & Physiology
Prerequisite/s	PD101T
Teaching Scheme: Lecture/Tutorial/Practical	00/00/03
Credits	1.5
Evaluation Scheme: SE I, II & III /CIA/EYE	20/10/70

Course Outcomes (COs):		Bloom's Level
Upon successful completion of this course, the student will be able to:		
PD108P_1	Demonstrate the different human body systems.	L3
PD108P_2	Apply physiological and diagnostic procedures to evaluate blood parameters.	L3
PD108P_3	Analyze and interpret blood parameter data.	L4
PD108P_4	Express effectively in the form of oral and writing journal.	L3
PD108P_5	Practice safety precautions and ethics while performing experiments in Laboratory.	L3

Course Contents:		100 Hrs
Unit 1	Study of tissues of human body a) Epithelial tissue. b) Muscular tissue.	
Unit 2	Study of tissues of human body a) Connective tissue. b) Nervous tissue.	
Unit 3	Study of appliances used in hematological experiments.	
Unit 4	Determination of W.B.C. count of blood.	
Unit 5	Determination of R.B.C. count of blood.	
Unit 6	Determination of differential count of blood.	
Unit 7	Determination of a) Erythrocyte Sedimentation Rate. b) Hemoglobin content of Blood. c) Bleeding time & Clotting time.	
Unit 8	Determination of a) Blood Pressure. b) Blood group.	
Unit 9	Study of various systems with the help of charts, models & specimens a) Skeleton system part I-axial skeleton. b) Skeleton system part II- appendicular skeleton. c) Cardiovascular system.	


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	d) Respiratory system. e) Digestive system. f) Urinary system. g) Nervous system. h) Special senses. i) Reproductive system.
Unit 10	Study of different family planning appliances.
Unit 11	To perform pregnancy diagnosis test.
Unit 12	Study of appliances used in experimental physiology.
Unit 13	To record simple muscle curve using gastrocnemius sciatic nerve preparation.
Unit 14	To record simple summation curve using gastrocnemius sciatic nerve preparation.
Unit 15	To record simple effect of temperature using gastrocnemius sciatic nerve preparation.
Unit 16	To record simple effect of load & after load using gastrocnemius sciatic nerve preparation.
Unit 17	To record simple fatigue curve using gastrocnemius sciatic nerve preparation.

Text Books

Sr. No	Title	Author	Publisher
1	Principles of anatomy and physiology	Tortora Gerard J. and Nicholas	Harpercollins college New York.
2	foundations of anatomy and physiology	Wilson, K.J.W. Ross and Wilson's	Churchill Livingstone, Edinburg.
3	Gray's anatomy	Peter L. Williams	Churchill Livingstone, London
4	Physiology of human body	Guyton arthur	Holtsaunders.

Note: Refer latest available edition

Reference Books

Sr. No.	Title	Author	Publisher
1	Human physiology. Volume 1&11	Chatterjee, C.C.	Medical allied agency, Calcutta.
2	Text book of practical physiology	Ranade VG	PVG
3	Essentials of Medical Pharmacology	Tripathi, K. D.	Jaypee
4	The pharmacological basis of therapeutics	Goodman Gilman	Mc Graw Hill

Note: Refer latest available edition


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E- Learning Resources

Sr. No.	Title	Course Instructor	Platform	Web link
1	Human Physiology	By Prof. Sudip Mukherjee - IIT (BHU) Varanasi	Swayam	https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_bt79
2	Electrophysiology of Heart	Prof. Arijita Banerjee- IIT Kharagpur	Swayam	https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_bt99
3	Neuroscience of Human Movements	By Prof. Varadhan - IIT Madras	Swayam	https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ge76


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Course Structure

Class	Pharm D First Year
Course Code and Course Title	PD109P, Pharmaceutics
Prerequisite/s	PD102T, Pharmaceutics
Teaching Scheme: Lecture/Tutorial/Practical	00/00/03
Credits	1.5
Evaluation Scheme: SE I, II & III/CIA /EYE	20/10/70

Course Outcomes (COs):		Bloom's Level
Upon successful completion of this course, the student will be able to:		
PD109P_1	Calculate different dosage forms.	L3
PD109P_2	Demonstrate different dosage forms.	L2
PD109P_3	Examine and analyze the prepared dosage forms	L4
PD109P_4	Express effectively in the form of oral and writing journal.	L3
PD109P_5	Practice safety precautions and ethics while performing experiments in Laboratory.	L3

Course Contents:		100 Hrs
Unit I	Syrups A. Simple Syrup I.P B. Syrup of Ephedrine Hcl NF C. Syrup Vasaka IP D. Syrup of ferrous Phosphate IP E. Orange Syrup	
Unit II	Elixir A. Piperizine citrate elixir BP B. Cascara elixir BPC C. Paracetamol elixir BPC	
Unit III	Linctus A. Simple Linctus BPC B. Pediatric simple Linctus BPC	
Unit IV	Solutions A. Solution of cresol with soap IP B. Strong solution of ferric chloride BPC C. Aqueous Iodine Solution IP D. Strong solution of Iodine IP E. Strong solution of ammonium acetate IP	
Unit V	Liniments A. Liniment of turpentine IP B. Liniment of camphor IP	


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Unit VI	Suspensions A. Calamine lotion B. Magnesium Hydroxide mixture BP
Unit VII	Emulsions A. Cod liver oil emulsion B. Liquid paraffin emulsion
Unit VIII	Powders A. Eutectic powder B. Explosive powder C. Dusting powder D. Insufflations
Unit IX	Suppositories A. Boric acid suppositories B. Chloral suppositories
Unit X	Mixtures A. Mixtures with Physical incompatibilities B. Chemical & Therapeutic incompatibilities

Text Books

Sr. No	Title	Author	Publisher
1	Cooper and Gunn's Dispensing for Pharmaceutical Students	Carter, S.J	CBS Publishers & Distributors
2	A text book Professional Pharmacy	N.K.Jain and S.N.Sharma	Vallabh Prakashan
3	Bentley Textbook Of Pharmaceutics	Ea Rawlin	Elsevier India
4	Pharmaceutics	Aulton	Churchill

Note: Refer latest available edition

Reference Books

Sr. No.	Title	Author	Publisher
1	Introduction to Pharmaceutical dosage forms	Howard C. Ansel	Lippincott Williams and Wilkins
2	Remington's Pharmaceutical Sciences	Loyd V. Allen Jr. (editor in chief)	Philadelphia College of Pharmacy
3	Aultons Pharmaceutics	Aulton, M. E.	Churchill
4.	Modern Pharmaceutics Vol. I	Alexander, T. C.	Informa

Note: Refer latest available edition

E- Learning Resources

Sr. No.	Title	Course Instructor	Platform	Web link
1	Pharmaceutical Dosage Forms	Prof. Ruchi Chawla	Swayam	https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ch79


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FACULTY OF PHARMACY
Department of Doctor of Pharmacy

Course Structure

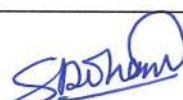
Class	Pharm D First Year
Course Code and Course Title	PD110P, Medicinal Biochemistry
Prerequisite/s	PD103T
Teaching Scheme: Lecture/Tutorial/Practical	00/00/03
Credits	1.5
Evaluation Scheme: SE I, II & III /CIA/EYE	20/10/70

Course Outcomes (COs):		Bloom's Level
Upon successful completion of this course, the student will be able to:		
PD110P_1	Apply and analyze normal and abnormal constituents of urine and serum by qualitative and quantitative biochemical laboratory techniques.	L4
PD110P_2	Apply and analyze the biochemical analysis of blood and serum constituents by quantitative method.	L4
PD110P_3	Apply and evaluate serum metabolites, enzyme activity, buffer systems, lipid profile, and electrolyte balance by biochemical and enzymatic analytical techniques.	L4
PD110P_4	Express effectively in the form of oral and writing journal.	L3
PD110P_5	Practice safety precautions and ethics while performing experiments in Laboratory.	L3

Course Contents:		100 Hrs
Unit 1	Qualitative analysis of normal constituents of urine.*	
Unit 2	Qualitative analysis of abnormal constituents of urine.*	
Unit 3	Quantitative estimation of urine sugar by Benedict's reagent method**	
Unit 4	Quantitative estimation of urine chlorides by Volhard's method.**	
Unit 5	Quantitative estimation of urine creatinine by Jaffe's method.**	
Unit 6	Quantitative estimation of urine calcium by precipitation method.**	
Unit 7	Quantitative estimation of serum cholesterol by Libermann Burchard's method.**	
Unit 8	Preparation of Folin Wu filtrate from blood.*	
Unit 9	Quantitative estimation of blood creatinine.**	
Unit 10	Quantitative estimation of blood sugar Folin-Wu tube method.**	
Unit 11	Estimation of SGOT in serum.**	
Unit 12	Estimation of SGPT in serum.**	
Unit 13	Estimation of Urea in Serum.**	


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Unit 14	Estimation of Proteins in Serum.**
Unit 15	Determination of serum bilirubin**
Unit 16	Determination of Glucose by means of Glucoseoxidase.**
Unit 17	Enzymatic hydrolysis of Glycogen/Starch by Amylases.**
Unit 18	Study of factors affecting Enzyme activity. (pH & Temp.)**
Unit 19	Preparation of standard buffer solutions and its pH measurements (any two)*
Unit 20	Experiment on lipid profile tests**
Unit 21	Determination of sodium,calcium,and potassium in serum.*

Note: ** indicate major experiments & * indicate minor experiments

Text Books

Sr. No	Title	Author	Publisher
1	Harpers review of biochemistry	Martin	McGraw Hill
2	Text book of biochemistry	D.Satyanarayana	Elsevier India
3	Text book of clinical chemistry	Alex kaplan &Laverne L.Szabo	Lea & Febiger
4	Principles of biochemistry	Lehninger	W.H. Freeman

Note: Refer latest available edition

Reference Books

Sr. No.	Title	Author	Publisher
1	Text book of biochemistry	Ramarao	UBS Publishers
2	Practical Biochemistry	David T.Plummer	McGraw-Hill
3	Practical Biochemistry	Pattabhiraman	McGraw-Hill
4	Techniques In Biochemistry	T. Devasena	Ahuja Publication

Note: Refer latest available edition

E- Learning Resources

Sr. No.	Title	Course Instructor	Platform	Web link
1	Biochemistry & cell biology	Dr. Anjana Jajoo	Swayam	https://onlinecourses.swayam2.ac.in/e-learning/preview/cec26_cy12
2	Nutritional & clinical biochemistry	Dr. Senjam Sunil Singh	Swayam	https://onlinecourses.swayam2.ac.in/e-learning/preview/cec26_cy02
3	Analytical techniques in biochemistry	Prof Ashok Sharma	Swayam	https://onlinecourses.swayam2.ac.in/e-learning/preview/cec26_cy11


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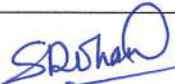
Class	Pharm D First Year
Course Code and Course Title	PD111P, Pharmaceutical organic chemistry
Prerequisite/s	PD104T
Teaching Scheme: Lecture/Tutorial/Practical	00/00/03
Credits	1.5
Evaluation Scheme: SE I, II & III /CIA/EYE	20/10/70

Course Outcomes (COs):		Bloom's Level
Upon successful completion of this course, the student will be able to:		
PD111P_1	Perform and analyze qualitative analysis of unknown organic Compounds and prepare derivatives of organic compounds.	L4
PD111P_2	Apply the different reaction mechanism like acetylation, Benzoylation, coupling reactions, Bromination, Nitration and condensation reactions in the Synthesis of compounds using.	L3
PD111P_3	Apply the different reaction mechanism like Oxidation, reduction and Hydrolysis reactions in the synthesis of compounds and Construct molecular models.	L3
PD111P_4	Express effectively in the form of oral and writing journal.	L3
PD111P_5	Practice safety precautions and ethics while performing experiments in Laboratory.	L3

Course Contents:		100 Hrs
Unit 1	Identification of organic compounds belonging to the following classes by: Systematic qualitative organic analysis including preparation of derivatives Phenols, amides, carbohydrates, amines, carboxylic acids, aldehyde and ketones, Alcohols, esters, hydrocarbons, anilides, nitrocompounds.	
Unit 2	Introduction to the various laboratory techniques through demonstration involving synthesis of the following compounds (at least 8 compounds to be synthesised): 1.Acetanilide / aspirin (Acetylation) 2.Benzanilide / Phenyl benzoate (Benzoylation) 3.P-bromo acetanilide / 2,4,6 – tribromo aniline (Bromination) 4.Dibenzylidene acetone (Condensation) 5.1-Phenylazo-2-naphthol (Diazotisation and coupling) 6.Benzoic acid / salicylic acid (Hydrolysis of ester) 7.M-dinitro benzene (Nitration) 8.9, 10 – Anthraquinone (Oxidation of anthracene) / preparation of benzoic acid from toluene or benzaldehyde 9.M-phenylene diamine (Reduction of M-dinitrobenzene) / Aniline from nitrobenzene 10.Benzophenone oxime	


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	11.Nitration of salicylic acid 12.Preparation of picric acid 13.Preparation of O-chlorobenzoic acid from O-chlorotoluene 14.Preparation of cyclohexanone from cyclohexanol
Unit 3	Introduction to the use of stereo models: Methane, Ethane, Ethylene, Acetylene, Cis alkene, Trans alkene, inversion of configuration.

Text Books

Sr. No	Title	Author	Publisher
1	Vogels Text Book Of Practical Organic Chemistry	F. Brain	Pearson
2	Organic chemistry	T.R.Morrison and R. Boyd	Pearson
3	Text book of Pharmaceutical chemistry	Bentley and Driver	Oxford
4	Organic chemistry, the fundamentals of chemistry	I.L.Finar	Pearson

Note: Refer latest available edition

Reference Books

Sr. No.	Title	Author	Publisher
1	Advanced organic chemistry	Jerry March	Wiley
2	A Textbook Of Organic Chemistry	Arun Bahl	S.Chand
3	The Organic Chemistry Of Drugs Synthesis	Lednicer	Wiley
4	The Principles Of Heterocyclic Chemistry	Katritzky, A. R.	Pharma med Press

Note: Refer latest available edition

E- Learning Resources

Sr. No	Title	Author	Platform	Web link
1	Basic Organic Chemistry	Dr. B. S. Balaji	Swayam	https://onlinecourses.swayam2.ac.in/e-learning/preview/cec26_cy06
2	Introductory Organic Chemistry II	Neeraja Dashaputre	NPTEL	https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_cy45


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Course Structure

Class	Pharm D First Year
Course Code and Course Title	PD112P, Pharmaceutical Inorganic Chemistry
Prerequisite/s	PD105T
Teaching Scheme: Lecture/Tutorial/Practical	00/00/03
Credits	1.5
Evaluation Scheme: SE I, II & III /CIA/EYE	20/10/70

Course Outcomes (COs):		Bloom's Level
Upon successful completion of this course, the student will be able to:		
PD112P_1	Perform and interpret the limit tests for impurities in pharmaceutical ingredients	L2
PD112P_2	Apply and analyze various volumetric and gravimetric methods for estimation of mixtures.	L3
PD112P_3	Analyze and identify the inorganic substances and prepare its pharmaceutical preparations.	L4
PD112P_4	Express effectively in the form of oral and writing journal.	L3
PD112P_5	Practice safety precautions and ethics while performing experiments in Laboratory.	L3

Course Contents:		100 Hrs
Unit 1	Limit test (6 exercises) a. Limit test for chlorides b. Limit test for sulphates c. Limit test for iron d. Limit test for heavy metals e. Limit test for arsenic f. Modified limit tests for chlorides and sulphates	
Unit 2	Assays (10 exercises) a. Ammonium chloride- Acid-base titration b. Ferrous sulphate- Cerimetry c. Copper sulphate- Iodometry d. Calcilugluconate- Complexometry e. Hydrogen peroxide – Permanganometry f. Sodium benzoate – Nonaqueous titration g. Sodium chloride – Modified volhard's method h. Assay of KI – KIO ₃ titration i. Gravimetric estimation of barium as barium sulphate j. Sodium antimony gluconate or antimony potassium tartarate	
Unit 3	Estimation of mixture (Any two exercises) a. Sodium hydroxide and sodium carbonate b. Boric acid and Borax c. Oxalic acid and sodium oxalate	

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Unit 4	Test for identity (Any three exercises) a. Sodium bicarbonate b. Barium sulphate c. Ferrous sulphate d. Potassium chloride
Unit 5	Test for purity (Any two exercises) a. Swelling power in Bentonite b. Acid neutralising capacity in aluminium hydroxide gel c. Ammonium salts in potash alum d. Adsorption power heavy Kaolin e. Presence of Iodates in KI
Unit 6	Preparations (Any two exercises) a. Boric acids b. Potash alum c. Calcium lactate d. Magnesium sulphate

Text Books

Sr. No	Title	Author	Publisher
1	Indian Pharmacopoeia	Ministry of health	Govt. of India
2	A text book Inorganic medicinal chemistry	Surendra N. Pandeya	S G Publisher,
3	Inorganic Pharmaceutical Chemistry III- Edition	P.Gundu Rao	Vallabh Prakashan
4	Textbook of Pharmaceutical Inorganic Chemistry	Dr. Santosh Karajgi	Shashwat Publication

Note: Refer latest available edition

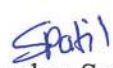
Reference Books

Sr. No.	Title	Author	Publisher
1	Inorganic Pharmaceutical Chemistry	Anand & Chatwal	Himalaya
2	Practical Pharmaceutical chemistry Vol-I & Vol-II	Beckett, A. H	C.B.S
3	Pharmaceutical Analysis	D. Lee	Blackwell
4	Pharmaceutical Analysis	Watson	Elsevier India

Note: Refer latest available edition

E- Learning Resources

Sr. No.	Title	Course Instructor	Platform	Web link
1	Inorganic Chemistry	Prof. S. Sivaramakrishnan	NPTEL	https://nptel.ac.in/courses/104/106/104106086?utm_source=chatgpt.com
2	P'ceutical Analysis	Prof. B. K. Sharma	Swayam	https://onlinecourses.nptel.ac.in/noc20_cy24/preview?utm_source=chatgpt.com


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Class	Pharm D First Year
Course Code and Course Title	PD113P, Remedial Biology
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial/Practical	00/00/03
Credits	1.5
Evaluation Scheme: SE I, II & III/CIA/ EYE	20/10/70

Course Outcomes (COs):		Bloom's Level
Upon successful completion of this course, the student will be able to:		
PD113P_1	Understand various cells and tissues through histological examination.	L2
PD113P_2	Understand different parts of Plants	L2
PD113P_3	Analyze the system using software	L3

Course Contents:		100 Hrs
Unit 1	Introduction of biology experiments	
Unit 2	Study of cell wall constituents and cell inclusions	
Unit 3	Study of Stem modifications	
Unit 4	Study of Root modifications	
Unit 5	Study of Leaf modifications	
Unit 6	Identification of Fruits and seeds	
Unit 7	Preparation of Permanent slides	
Unit 8	T.S. of Senna, Cassia, Ephedra, Podophyllum	
Unit 9	Simple plant physiological experiments	
Unit 10	Identification of animals	
Unit 11	Detailed study of Frog	
Unit 12	Computer based tutorials	

Reference Books

Sr. No.	Title	Author	Publisher
1	A manual for pharmaceutical biology practical	S.B.Gokhale and C.K.Kokate	Nirali Prakashan
2	Text book of Biology	S.B.Gokhale	Nirali Prakashan
3	Remedial Biology	S. S. Randhawa	PV Books

Note: Refer latest available edition


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