

BPharm

	Title of the Course Pharmaceutical Analysis I																
	Course C	ode	BP-102[T]														
								5.14									
								Part A				1		т	Р	с	
	Year		1st		Semeste	r	1st			Credit	5	3		1	0	4	
	Course T	уре	Theory or	ly													
	Course Cat	egory	Foundatio	n core													
	Pre-Requi	site/s								Co-Requis	site/s						
	Course Out & Bloom's	comes Level	C01- Und C02- To g C03- To a C04- To e C05- To g	lerstand the principle jain knowledge of so inalyze the techniqu explain about accura compute analytical re	s of volumetric and urces of errors and es of volumetric, gra cy, precision and sig sults and understan	electro chemical an minimizing techniqu vimetric and gas an nificant figure error d the physiochemic	alysis(BL2-Under es.(BL1-Rememb alysis.(BL3-Apply concepts.(BL1-Re al concepts of ana	stand) per) /) emember) alysis, theories of acids	and bases, st	oichiometry etc(BL4-Analyze)						
	Coures Ele	nents	Skill Deve Entrepren Employab Professoo Gender X Human V Environm	lopment ✓ eurship X ility ✓ nal Ethics X alues X ent X				SDG (Goals)	SDG4 SDG8 SDG1	(Quality education) Decent work and economic g 7(Partnerships for the goals)	rowth)						
								Part B									
Modules				Contents							Pedagogy						Hours
UNIT 1	Pharmaceutical secondary stan hydrochloric ac errors, types of in medicinal ag	Analysis- Definition an dards. Preparation and d, sodium thiosulphate errors, methods of min ents, limit tests.	d scope, Different te standardization of v , sulphuric acid, pot imizing errors, accu	echniques of analysi various molar and ni assium permangana racy, precision and	s , Methods of expre rmal solutions- Oxa te and ceric ammon ignificant figures Ph	essing concentration lic acid, sodium hyd ium sulphate Errors armacopoeia, Sourd	Primary and roxide, : Sources of ces of impurities	Lecture based learn	ng, interactive	class, Peer tutorial, Class usi	ng ICT tool/PPT/white bo	ard					10
UNIT 2	Acid base titrati weak, and very estimation of Se	on: Theories of acid ba weak acids and bases odium benzoate and Ep	se indicators, classi , neutralization curv hedrine HCI	fication of acid base as Non aqueous titra	titrations and theory tion: Solvents, acidi	v involved in titration metry and alkalimet	s of strong, ry titration and	Lecture based learn	ng, interactive	class, Peer tutorial, Class usi	ng ICT tool/PPT/white bo	ard					10
Precipitation titrations: Mohr's method. Volhard's. Modified Volhard's. Fajans method, estimation of solum: robinde: Complexementric titration: Classification, metal ion indicators, masking and demasking responses, estimation of Magnesium aughates, and calculum gluconate. Gravimetry: Principle and steps involved in gravimetric analysis. Purity of the precipitate:. co-precipitation and post precipitation. Estimation of thatinum suphate. Basel Forminges. methods and application of adjourned application and post precipitation. Estimation of thatinum suphate. Basel Forminges. methods and application of adjourned application and post precipitation.											10						
UNIT 4	Concepts of ox Bromometry, Di	dation and reduction, 1 chrometry, Titration wit	ypes of redox titration potassium iodate	ons (Principles and	applications) Cerime	try, lodimetry, lodon	netry,	Blended Learning									08
UNIT 5	Electrochemica Potentiometry - electrode) and and application platinum electro	I methods of analysis C Electrochemical cell, c ndicator electrodes (m s. Polarography - Princ ide, applications	conductometry- Intro onstruction and wor atal electrodes and ple, Ilkovic equation	duction, Conductivi king of reference (S glass electrode), me n, construction and v	y cell, Conductomet andard hydrogen, s thods to determine e orking of dropping r	ric titrations, applica ilver chloride electro and point of potentio nercury electrode ar	tions. de and calomel metric titration nd rotating	Lecture based learn	ng, interactive	class, Peer tutorial, Class usi	ng ICT tool/PPT/white bo	ard					07
								Part C									
Module	es				Title					Indicative-ABCA/F Experiments/Field v Internships	'BL/ work/			Bloom's Leve	91	۲	lours
1	1	Aaking of differen buffe	rs and its titration					Exper	iments			BL2-	Understand	1	ŧ	5	
							F	Part D(Marks Distri	oution)								
	utua I		Des 1	-		Future F. 1. 1	_	i neory				d Frankra (* 1			Min Internet	-	
Total Ma	irks	Mini	mum Passing Mari	ks		External Evaluation	n	N	in. External E	valuation	Interna	I Evaluation			Min. Internal Evalu	ation	
100	5	U			75			38			25			13			
Total Ma	irks	Mini	mum Passing Mar	ks		External Evaluation	n	Practical	in. External E	valuation	Interna	I Evaluation			Min. Internal Evalu	ation	
r								Part E									
L	Books	1	1. A.I. Vog	el, Text Book of Qu	antitative Inorganic a	inalysis 3. P. Gundu	Rao, Inorganic Ph	narmaceutical Chemis	ry 4. Bentley a	nd Driver's Textbook of Pharm	naceutical Chemistry						
	Article	5	https://ww	w.orientjchem.org/vo	l36no1/a-review-art	icle-on-pharmaceuti	cal-analysis-of-ph	armaceutical-industry-	according-to-pl	harmacopoeias/							
	References	Books	1. John H.	Kennedy, Analytica	chemistry principles	s 6. Indian Pharmac	opoeia										
	MOOC Cor	irses	https://npt	el.ac.in/courses/104	108363												
	Video	3	You tube,														
								Course Articulation	Matrix								
COs	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	P011 F	PO12	PSO	1	PSO2	PSO3	
CO1	3	3	-	3	3	-	-	1	1	-	3	1	3		2	1	
CO2	2	2	-	2	2	-	-	1	2	-	3	2	2		1	2	
C03	2	2	1		1			2	1	-	2	1	1		1	1	
CO4	2	1	3		1			2	1		2	1	1		Ľ	1	
0.05	3	3	2		1	1		-	-		-		4		1	1.	
000	3 3 2 - 1 1 -				-	-			-		-		·	+			
006	-	1-	-	-	-	-	-	-	-	-			-		-	-	



	BPharm													
Title of the C	Course	Pharmaceutical Inorg	anic Chemistry											
Course C	Course Code BP-104[T]													
	Part A													
Vor		1.01	Semester	1st		Credite	L	т	Р	С				
Tear		151	Jenester	181		Cieurs	3	1	0	4				
Course T	ype	Theory only												
Course Cat	egory	Discipline Core												
Pre-Requis	site/s													
Course Oute & Bloom's I	comes Level	CO1-To understand the history and concept of pharmacepocia and its editions (BL2-Understand) CO2-To know the sources of impurities and methods to determine the impurities in introgram (sharmaceuticals (BL1-Remember) CO3-To know the sources of impurities and methods to determine the impurities in introgram (sharmaceuticals (BL1-Remember) CO3-To know the exister of intermet pharmaceutical introgram compound at BL1-Remember) CO3-To know the methodinal importance of acciding-rated interpations and entrimotopial acents as particularities final agents (BL3-Apply)												
Coures Eler	nents	Skill Development J Entrepreneurship X Employability J Professsonal Ethics Gender X Human Values X Environment X	x	SDG (Goals)		SDC4(Quality education) SDG3(Decant work and economic growth) SDG17(Pertheratings for the goals)								
				Part B										
Modules Contents Parls Pedagogy Hours														

UNIT 1	General methods of preparation, assay for the compounds superscripted with asterisk (*), properties and medicinal uses of inorganic compounds belonging to the following classes	Lecture based learning, ICT, Peer Tutorial		10
UNIT 2	Acids, Bases and Buffers Suffer equations and buffer capacity in general: buffers in pharmaceutical systems, preparation, stability, buffered isotonic solutions, measurements of tonicity, calculations and methods of adjusting isotonicity. Major extrs and intracellular electrolytes. Functions of major physiological ions, Electrolytes used in the replacement therapy. Sodium chloride, "Potassium chloride, Calcium gluconata" and Carl Rehydration Sat (CMS). Physiological acid base balance. "Dental products bentificies, role of fluoride in the treatment of dental carlies, Desensiting agents, Calcium carbonale, Sodium fluoride, and the resultance of the superior encoded of the treatment of dental carlies.	Lecture based learning, ICT, Peer Tutorial		10
UNIT 3	Castrolinestinal agents Aciditers: Ammonium chicride" and Dii HQ Antacit: tiede properties of antacids, combinations of antacids, Sodum Bicatronder: Aluminum hydroxide gel. Magnesum hydroxide mituatu cathantics: Magnesium sulphate, Sodum orthophosphate, Kaolin and Bentonite Antimicrobalis: Mechanism, classification, Potassium permanganate, Boric acid, Hydrogen percodaré, Cholmatel Imrél: Joline and Is preparations	Lecture based learning, ICT, Peer Tutorial		10
UNIT 4	Miscellaneous compounde Expectorants: Potassium iodiie, Armonium chioride", Emetics: Copper subplate", Sodium potassium tartarate Haematinics: Ferrous subplate ", Ferrous guocnate Poison and Antidote: Sodium thiosubplate", Activated charcoal, Sodium nitrita333 Astimperits: Zinc Subplate, Potash Aum	Lecture based learning, ICT, Peer Tutorial		08
UNIT 5	Radiopharmaceuticals: Radio activity, Measurement of radioactivity, Properties of α, β, γ radiations, Half-life, radio isotopes and study of radio isotopes - Sodium iodide 1131, Storage conditions, precautions & pharmaceutical application of radioactive substances.	Lecture based learning, ICT, Peer Tutorial		07
	Part	с		
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Hours	
1	Limit test finding in water of ITM premises sample	Experiments	4	

1	Limit test finding in water of ITM premises sample

Part D(Marks Distribution)

	Theory														
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation										
100	50	75	38	25	13										
			Practical												
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation										
0	0	0	0	0	0										

	Part E
Books	1. A.I. Vogel, Text Book of Quantitative Inorganic analysis 2. P. Gundu Rao, Inorganic Pharmaceutical Chemistry, 3rd Edition 3. M.L. Schroff, Inorganic Pharmaceutical Chemistry 4. Bentley and Driver's Textbook of Pharmaceutical Chemistry 5. Anand & Chatwal, Inorganic Pharmaceutical Chemistry 4. Bentley and Driver's Textbook of Pharmaceutical Chemistry 5. Anand & Chatwal, Inorganic Pharmaceutical Chemistry 4. Bentley and Driver's Textbook of Pharmaceutical Chemistry 5. Anand & Chatwal, Inorganic Pharmaceutical Chemistry 4. Bentley and Driver's Textbook of Pharmaceutical Chemistry 5. Anand & Chatwal, Inorganic Pharmaceutical Chemistry 4. Bentley and Driver's Textbook of Pharmaceutical Chemistry 5. Anand & Chatwal, Inorganic Pharmaceutical Chemistry 4. Bentley and Driver's Textbook of Pharmaceutical Chemistry 5. Anand & Chatwal, Inorganic Pharmaceutical Chemistry 4. Bentley and Driver's Textbook of Pharmaceutical Chemistry 5. Anand & Chatwal, Inorganic Pharmaceutical Chemistry 4. Bentley and Driver's Textbook of Pharmaceutical Chemistry 5. Anand & Chatwal, Inorganic Pharmaceutical Chemistry 4. Bentley and Driver's Textbook of Pharmaceutical Chemistry 5. Anand & Chatwal, Inorganic Pharmaceutical Chemistry
Articles	NA
References Books	1. Indian Pharmacopoeia
MOOC Courses	https://tptel.ac.in/courses
Videos	You tube

COs	PO1	PO2	P03	PO4	P05	P06	P07	PO8	PO9	PO10	PO11	P012	PSO1	PSO2	PSO3
CO1	3	2	1	-	2	1	2	1	3	-	3	-	3	3	-
CO2	3	2	1	2	2	1	1	1	2	-	3	-	2	3	1
CO3	2	2	1	1	2	2	1	1	2	-	3	1	1	2	-
CO4	2	2	1	1	2	1	1	1	1	-	2	-	1	1	-
CO5	3	1	2	1	3	1	2	1	1	-	2	3	1	2	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



	BPharm													
	Title of the Course	Communication Skills	5*											
	Course Code	BP-105[T]												
					Part A									
	Vear	1 et	Semester	1et		Credits	L		т	Ρ	С			
	i cui	104		150		2 0 0								
	Course Type	Theory only												
	Course Category	Non-graded Core Re	quirement											
	Pre-Requisite/s					Co-Requisite/s								
	Course Outcomes & Bloom's Level CO-1 To understand the behavioral needs for a pharmaist to function effectively in the areas of pharmaceutical operation. (BL2-Understand) CO20- Communicate effectively (Verbal and NO-Y-Verbil(BL3-Apply) CO3- Effectively manage the team player(BL2-Understand) CO4- To develop Intensive still(BL3-Apply) CO5- To develop Leadership qualities and essentials (BL6-Create)													
	Coures Elements	Skill Development ✓ Entrepreneurship X Employability ✓ Professsonal Ethics Gender X Human Values X Environment X	×	st	DG (Goals)	SDG4(Quality education) SDG8(Decent work and economic growth) SDG17(Partnerships for the goals)								
					Part B									
Modules		Cor	itents			Pedagogy								
UNIT 1	Communication Skills: Introduction, Definition Encoding, Channel, Decoding, Receiver, Fe Cultural Barriers, Language Barriers, Gende in Communication: Introduction, Visual Perc Feelings, Environment	n, The Importance of C edback, Context Barrie r Barriers, Interperson eption, Language, Oth	Communication, The Communication Process – Sc rs to communication: Physiological Barriers, Phys al Barriers, Psychological Barriers, Emotional barri ar factors affecting our perspective - Past Experier	urce, Message, ical Barriers, ers Perspectives ices, Prejudices,	Lecture based Learning,	interactive classroom,					07			
UNIT 2	Elements of Communication: Introduction, F Verbal Communication, Physical Communic for each -Direct Communication Style, Spirit Style	ace to Face Communic ation Communication S ed Communication Sty	cation - Tone of Voice, Body Language (Non-verba Styles: Introduction, The Communication Styles Ma le, Systematic Communication Style, Considerate	I communication), atrix with example Communication	Lecture based Learning,	interactive classroom, Discussion					07			
UNIT 3	Basic Listening Skills: Introduction, Self-Awe Effective Written Communication: Introduction of Discussion' Required, Shades of Meaning Your Audience, Organization of the Message	areness, Active Listenin on, When and When No I, Formal Communicati	Ig, Becoming an Active Listener, Listening in Diffic to Use Written Communication - Complexity of t on Writing Effectively: Subject Lines, Put the Main	ult Situations he Topic, Amount Point First, Know	Lecture based Learning,	interactive classroom, Discussion					07			
UNIT 4	Interview Skills: Purpose of an interview, Do Presentation, Structuring Your Presentation,	's and Dont's of an inte Delivering Your Prese	rview Giving Presentations: Dealing with Fears, pl ntation, Techniques of Delivery	anning your	Lecture based Learning,	interactive classroom, Discussion					05			
UNIT 5	Group Discussion: Introduction, Communic	ation skills in group dis	cussion, Do's and Dont's of group discussion		Lecture based Learning, interactive classroom, Discussion, ABL (Mooc HR Round) 05									

	Part C													
Modules		Title		Indicative-ABCA/I Experiments/Field Internships	Indicative-ABCA/PBL/ Experiments/Field work/ Bloom's Level Internships									
1	How to pitch yourself for HR Round			Seminar		BL5-Evaluate		10						
	Part D/Marks Distribution)													
			Theo	ory										
Total Marks	Minimum Passing Marks	External Evaluation		Min. External Evaluation	Internal Evaluation	ı	Min. Internal Eva	aluation						
50	25	35	18		15	8								
	Brotinal													

Min. External Evaluation

External Evaluation

0

Min. Internal Evaluation

Internal Evaluation

0

0

Total Marks

0

Minimum Passing Marks

	Part E
Books	1: Basic communication skills for Technology, Andreja. J. Ruther Ford, 2nd Edition, Pearson Education, 2011 2. Communication skills, Sanjay Kumar, Pushpalata, 1stEdition, Oxford Press, 2011 3. Organizational Behaviour, Stephen .P. Robbins, 1stEdition, Pearson, 2013 4. Brilliant- Communication skills, Gill Hasson, 1stEdition, Pearson Life, 2011 5. The Ace of Soft Skills: Attitude, Communication and Eliquette for success, Gopala Swamy Ramesh, 5thEdition, Pearson, 2013
Articles	https://www.helpguide.org/articles/telationships-communication/effective-communication.htm
References Books	1. Developing your influencing skills, Debonah Dalley, Lois Burton, Margaret, Green Hall, 14 Edition Universe of Learning LTD, 2010; Communication skills for professionals. Ronar rinz, AntEdition, New arrivals — PHI, 2011. A Personality development and soft skills. Barun K Marra, 1stEdition, Oxford Press, 2011; 45:01: 45:0
MOOC Courses	https://nptel.ac.in/courses/102104061
Videos	https://www.youtube.com/watch?v=yRwgIZSsR_Y

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	Course Articulation Matrix														
COs	PO1	PO2	PO3	PO4	P05	PO6	P07	P08	PO9	PO10	PO11	P012	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	3	-	1	-	-	3	3	-	1	3
CO2	-	-	-	-		2	1	1	-	-	2	2	-	1	3
CO3	-	1	-	-	-	1	-	1	-	-	2	2	-	1	3
CO4	-	-	-	1		2	1	1	-	-	2	3	-	1	3
CO5	-	-	-	-	-	-	1	1	-	-	1	2	-	1	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



	BPharm															
	Title of	the Course	Remedia	al Mathematics *												
	Cour	se Code	BP-106F	RM[T]												
								P	art A							
											0		L	т	P	с
		rear	ist		Semester	r	IST				Credits	5	2	0	0	2
	Cou	se Type	Theory	only						·						
	Course	Category	Non-gra	ded Core Requiremen	t											
	Pre-R	equisite/s				Co-Requisite/s										
	Course & Bloc	Outcomes m's Level	CO1- To CO2- Si CO3- Aj CO4- To CO5- Aj	o understand the role of olve the different types opreciate the importan of adopt both conventio opply a range of techniq	f mathematics in pha of problems by appl application of mathe al and creative tech ues effectively to sol	armacy(BL1-Remer lying theory(BL2-Un ematics in Pharmac iniques to the solution live problems includi	nber) derstand) y(BL4-Analyze) ons of mathematica ng theory deductio	al problems. n, approxim	.(BL4-Analyze) nation and simu) lation(BL3-Ap)	ply)					
	Coures	Elements	Skill Der Entrepro Employa Profess Gender Human Environ	II Development / II Development / prepreneurarily X playability / ressonal Ethics X nder X sDG (Goal ressonal Ethics X vidonment X						cels) SDG4(Quality education) SDG9(Dean water and sanitation) SDG9(Decent work and economic growth)						
Part B													1			
Modules Contents Pedagogy													Hours			
Partial fraction Introduction, Polymonial, Rational fractions, Proper and Improper fractions, Partial fraction in Chemical Fractions and Pharmacokinetics Legarithms Introduction, Definition, UNIT 1 Theorems/Properties of logarithms, Common logarithms, Characteristic and Marthissa, worked examples, application of logarithms to solve phramaceutical problems, Frunction: Real Valued function, Cassification of real valued functions, Limits and continuity : Introduction, Limit of a function, Definition of limit of a function (definition)													06			
UNIT 2		Matrices and Determinan Multiplication, Determinar square matrix, Singular a Cramer's rule, Characteri Pharmacokinetic equation	Introduction matri ts, Properties of de nd non-singular ma tic equation and ro s	volucion matrices, Types of matrices, Operation on matrices, Transpose of a matrix, Matrix, Toperlise of determinants, Product of determinants, Minora and co-Factors, Angliote to adjugate of a con-singular matrices, Inverse of a matrix, Solution of system of linear of equations using matrix method, quation and roots of a square matrix, Cayley-Hamilton theorem, Application of Matrices in solving											06	
UNIT 3	Calculus Differentiation : Introductions, Derivative of a function, Derivative of a constant, Derivative of a product of a constant and a function, Derivative of the sum or difference of two functions, Derivative of two functions, Derivative of two functions, Derivative of two functions, Derivative of a constant, Derivative of a constant, Derivative of two functions, Derivative of a constant, Derivative of a constant, Derivative of two functions, Derivative of a constant, Derivative of a constan											06				
UNIT 4		Analytical Geometry Intro Conditions for parallelism Integration: Introduction, Integration by parts, defin	luction: Signs of the and perpendicularit lefinition, Standard te integrals, applica	e Coordinates, Distanc ty of two lines, Slope o formulae, Rules of intr ation	e formula, Straight L a line joining two po gration, Method of s	ine: Slope or gradie pints, Slope – intero substitution, Method	nt of a straight line opt form of a straig of Partial fractions	t, ht line I,	lecture based l	earning						06
UNIT 5		Differential Equations: So Differential equations, Ex Properties of Laplace tran derivatives, Application to	ne basic definitions ct equations, Appli sform, Laplace Trai solve Linear differe	, Order and degree, E cation in solving Pharm nsforms of elementary ntial equations, Applic	quations in separabl lacokinetic equation functions, Inverse La ation in solving Cher	e form, Homogeneo s Laplace Transform aplace transforms, L nical kinetics and Pt	us equations, Line 1: Introduction, Def aplace transform of narmacokinetics eq	ar finition, of quations	lecture based l	earning						06
								Pa	art C							
Modul	les				Title						Indicative-ABCA/ Experiments/Field Internships	PBL/ work/		Bloom's L	evel	Hours
1		Laplace Transform							Experimen	ts			BL3-Ap	ply		4
							Pa	art D(Mark	ks Distributio	n)						
								TH	heory							
Total Ma	arks	Mi	imum Passing Ma	arks	E	External Evaluation	1		Min. E	xternal Evalua	ation	Inter	nal Evaluation		Min. Internal Evalu	uation
50		25			35			18				15		8		
					1			Pra	actical							
Total Ma	arks	Mi	imum Passing Ma	arks	E	External Evaluation	1		Min. E	xternal Evalua	ation	Interr	nal Evaluation		Min. Internal Evalu	uation
U		U			U			U				U		0		
								P	art E							
	В	ooks	1. Differ	ential Calculus by Sha	nthinarayan 2. Pharr	maceutical Mathema	atics with application	on to Pharma	acy by Panchal	ksharappa Gov	wda D.H.					
	A	ticles	NA													
	Referen	ces Books	1. Integr	al Calculus by Shanthi	narayan 2. Higher E	ngineering Mathema	atics by Dr. B.S.Gr	ewal								
	MOOD	Courses	https://nj	ptel.ac.in/courses/102	01067 https://www.u	udemy.com/course/r	nath-fundamentals	s-complete-c	course-on-funda	amentals-						
	v	deos	https://w	ww.youtube.com/watc	n?v=d77qWQA4IIw8	list=PL7qxHCXS2	ZmafOUewEGxTK	sc7brHKti_								
							С	ourse Artic	culation Matr	ix						
COs	PO1	PO2	P03	PO4	P05	P06	P07	PO8	PO	9	PO10	P011	P012	PSO1	PSO2	PSO3
CO1	-	2	1	1	1	-	-	-	-		-	2	-	-	1	1
CO2	-	3	1	-	1	-	-	-	-		-	1	-	-	1	-
CO3	-	2	1	-	1	-	-	-	-		-	1	-	-	1	1
CO4	4 1 2 1 1 1 1				-	-		-	1	-	-	-	1			
CO5	-	2	-	-	2	-	-	-	-		-	2	-	-	-	1
CO6	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-



			BPharm										
Title of the Course	Pharmaceutical Inorg	ganic Chemistry											
Course Code	BP-110[P]												
			Part A										
Vor	1st	Somostor	1et	Credite	L	т	Ρ	с					
i ear	151	Sellester	151	Ciedita	0	0	2	2					
Course Type	Lab only												
Course Category	Discipline Core	ne Core											
Pre-Requisite/s				Co-Requisite/s				-					
Course Outcomes & Bloom's Level	CO1- To recall the so CO2- Understand the CO3- To demonstrat CO4- To analyze var CO5- To select suita	Jurces of limit tests, preparation and identification of e medicinal and pharmaceutical importance of inor le the preparation of inorganic pharmaceuticals. (BL rious inorganic pharmaceutical compounds and per paration of inorganic pharmaceutical compounds and per- paration of inorganic pharmaceutical compounds and perparation of inorganic pharmaceutical compound	of compounds(BL1-Remember) ganic compounds(BL2-Understand) L3-Apply) from limit test(BL4-Analyze) aceuticals(BL4-Analyze)										
Coures Elements	Skill Development ✓ Entrepreneurship X Employability ✓ Professsonal Ethics Gender X Human Values X Environment ✓	x	SDG (Goals)	SDG4(Quality education) SDG6(Clean water and sanitation) SDG8(Decent work and economic growth)									

Part B

Contents

Modules

		Par	C		
	Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
	1	Limit tests for following ions Limit test for Chlorides and Sulphates, Modified limit test for Chlorides and Sulphates, Limit test for Iron, Limit test for Heavy metals, Limit test for Lead, Limit test for Arsenic	Experiments	BL4-Analyze	10
ſ	2	Identification test Magnesium hydroxide Ferrous sulphate Sodium bicarbonate Calcium gluconate Copper sulphate	Experiments	BL4-Analyze	10
	3	Test for purity Swelling power of Bentonite, Neutralizing capacity of aluminum hydroxide gel, Determination of potassium iodate and iodine in potassium lodide	Experiments	BL3-Apply	10
ſ	4	Preparation of inorganic pharmaceuticals. Boric acid, Potash alum, Ferrous sulphate	Experiments	BL6-Create	8

Part D(Marks Distribution)

Pedagogy

Hours

				Theory							
Total Marks	Minimum Pa	assing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation					
				Practical							
Total Marks	Minimum Pa	assing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation					
50	25 35 18 18 15 8										
				Part E							
Boo	oks	1. A.H. Beckett & J.B. Stenlake's	a, Practical Pharmaceutical Chemistry Vol I & II, Stahlor	e Press of University of London, 4th edition. 2. A.I. Vogel, Text Bool	k of Quantitative Inorganic analysis						
Artic	cles	https://asianjpr.com/HTMLPaper.	aspx?Journal=Asian%20Journal%20of%20Pharmaceu	tical%20Research;PID=2017-7-1-6							
Reference	es Books	6. Anand & Chatwal, Inorganic P	harmaceutical Chemistry 7. Indian Pharmacopoeia								
MOOC Courses NA											
Vide	905	https://www.youtube.com/watch?	v=3ut36CX-YN0&list=PLQnNyE1lxfVL4np_23Y2f18QV	elWUHvQM							

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	P012	PSO1	PSO2	PSO3
CO1	3	2	•	2	1	-	-	-	2	2	2	-	2	-	3
CO2	2	1	1	3	2	-	-	-	1	1	3	-	2	-	1
CO3	3	2	1	1	2	-	-	-	-	-	3	-	3	1	2
CO4	3	2	1	3	2	-	-	-	1	-	2	-	1	1	1
CO5	3	3	-	1	1	-	-	-	-	1	2	-	3	-	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



			BPharm					
Title of the Course	Communication Skills							
Course Code	BP-111[P]							
			Part A					
Yoar	1 et	Somester	1	Cradita	L	т	Ρ	с
i eai	150	Semester	101	Ciedita	0	0	1	1
Course Type	Soft skill						•	
Course Category	Non-graded Core Req	uirement						
Pre-Requisite/s				Co-Requisite/s				
Course Outcomes & Bloom's Level	CO1- Understand the I CO2- To apply the prac CO3- To take part in at CO4- To develop the in CO5- To improve in err	behavioral needs for a pharmacist to function effectively ctical skills to Communicate effectively (Verbal and Non- dvanced learning on comprehension/direct and indirect a terview handling skills.(BLS-Evaluate) nail etiquette.(BL3-Apply)	in the areas of pharmaceutical operation(BL2-Und Verbal)(BL3-Apply) speech.(BL4-Analyze)	erstand)				
Coures Elements	Skill Development ✓ Entrepreneurship X Employability ✓ Professsonal Ethics X Gender X Human Values X Environment X		SDG (Goals)	SDG3(Good health and well-being) SDG4(Quality education)				

	Pa	rt C		
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Basic communication covering the following topics Meeting People Asking Questions Making Friends What did you do? Do's and Dont's	Role Play	BL3-Apply	2/ WEEK
2	Advanced Learning Listening Comprehension / Direct and Indirect Speech Figures of Speech Effective Communication Writing Skills Effective Writing Interview Handling Skills E-Mail etiquette Presentation Skills	Experiments	BL3-Apply	2/ WEEK
3	Pronunciations covering the following topics Pronunciation (Consonant Sounds) Pronunciation and Nouns Pronunciation (Vowel	Experiments	BL3-Apply	2/ WEEK

Part B

Pedagogy

Hours

Contents

Modules

Part D(Marks Distribution)														
Theory														
Total Marks	Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation													
			Practical											
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation									
5 13 15 15 8 8 10 10 5 5 10 10 10 10 10 10 10 10 10 10 10 10 10														

	Part E
Books	1. Basic communication skills for Technology, Andreja. J. Ruther Ford, 2nd Edition, Pearson Education, 2011 2. Communication skills, Sanjay Kumar, Pushpalata, 1stEdition, Oxford Press, 2011 3. Organizational Behaviour, Stephen .P. Robbins, 1stEdition, Pearson, 2013
Articles	9. Soft skill for everyone, Butter Field, 1st Edition, Cengage Learning India PvL Ltd, 2011
References Books	4. Brilliant-Communication skills, Gill Hasson, 118Edition, Pearson Life, 2011 5. The Ace of Soft Skills: Attitude, Communication and Eliquette for success, Gopala Swamy Ramesh, ShEdition, Pearson, 2013 6. Developing your influencing skills. Deborah Dalley, Lois Burton, Margaret, Green Multi, 115 Edition Universe of Learning Life, 2011 5. 2010
MOOC Courses	https://www.coursera.org/specializations/improve-english
Videos	https://www.youtube.com/watch?v=sm5jgr9TZo

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	P011	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	3	-	-	1	3	3	1	3	1	1
CO2	-	-	-	-	-	2	-	1	-	3	2	1	2	1	1
CO3	-	-	-	-	-	2	-	1	1	2	2	3	2	2	1
CO4	-	-	-	-	-	1	-	-	1	2	2	2	2	2	1
CO5	-	-	•	-	-	1	-	-	1	1	2	1	2	1	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



									BPharm								
	Title of the	Course		Fine art and Music-	•												
	Course C	ode		BP-113[T]													-
									Dort A								
									TattA				L	т	Р	С	
	Year			1st		Semester		1st			Cred	its	1	0	0	1	
	Course 1	ype		Theory only	1								1		-		-
	Course Cat	tegory		Generic Elective													-
	Pre-Requi	site/s									Co-Requ	isite/s					
	Course Out & Bloom's	comes Level		CO1- Drawing exe variety of visual ex	cises are to periences(BL	learn accurate obse L3-Apply)	rvation and skills o	f graphic presentati	on in free hand drawin	exercises from	n objects and nature to stu	dy proportion, volume and	d visual perspective, su	uggestion of solidity by li	ne, mass, va	lue and texture; emph	asis on
	Coures Ele	ments		Skill Development Entrepreneurship Employability Professsonal Ethio Gender X Human Values X Environment X	√ ′ 5 X			s	DG (Goals)	SDG8(D SDG17(ecent work and economic Partnerships for the goals	growth)					
									Part B								
	Modules					Cont	ents					Pedago	pgy			Hours	
1)Study of propo	ortion, line, colour, fo	m, tone, text	ure and graphic rep	resentation			Lectur	e based learning				10		
2			Nature Drawing	g: study of various na	tural forms.					class o	ut of classroom				08		
3			Drawing from v	arious man-made ot	jects.					class o	ut of classroom				07		
4			d)Drawing from	n memory- to develop	the sense o	f observation and th	e capacity to retai	n and recall images	and their co-ordination	active	learning				05		
				Part C													
			Modu	iles							Title			Indicative-ABC Experiments/Fiel Internship	A/PBL/ ld work/ s	Bloom's Level	Hours
Nature drawings:1	Drawing from ma	in-made object:	1 Drawing from	Memory-1 Free-han	d sketching: {	5	No.	of assignments: 2						PBL		BL3-Apply	10
														ų.			-1
								Pa	rt D(Marks Distribu	tion)							
						-			Theory								
Total Ma	arks		Minimum Pa	assing Marks		E	xternal Evaluatio	n	Mir	. External Eva	luation	Interna	I Evaluation		Min. Inter	nal Evaluation	
									Practical	I							
Total Ma	arks		Minimum Pa	assing Marks		E	xternal Evaluatio	n	Mir	. External Eva	luation	Interna	I Evaluation		Min. Inter	nal Evaluation	
0	C)				0			0			0		0			
									Part E								
	Book	5		Color and Light A	Suide for the	Realist Painter (Vol	lume 2) (James Gi	irney Art)									
	Article	S		https://shepherd.co	m/best-book	s/art-references-for-	drawing-the-huma	n-figure									
	References	Books		Let's Draw! Illustrat	ing With Cop	ic Book by Ran; KA	OPPE; Kirishima M	lutsuki (shelved 1 ti	me as drawing-referen	ce)							
	MOOC Co	urses		https://www.nifafinearts.com/course.php?id=29													
	Video	s		https://www.youtube.com/results?search_query=drawing													
								~		-4-1							
COs	PO1	PO2	PO3	PO4	1	P05	P06	P07	PO8	atrix 209	PO10	P011	2012	PSO1	PSO2	PS03	
CO1	-	-	1	-		-	-	-			-	2		-		-	
CO2	-	-	-	-		-	-	-	-		-	-		-	-	-	
C03	-	-	-	-				-	-		-	-		-		-	
CO4	-	-	-	-		-		-	-						-	-	
CO5	-	-	-	-				-	-		-			-		-	
C06	-	-	-	-		-		-	-						-	-	
1.1.1.1	1	1						1	1		1	1					



								BPh	arm									
	Title of the	Course	Instrume	ental Methods of Anal	/sis													
	Course	Code	BP-701	r														
								Pa	τA									
	Voz	-	415		Somostor		716				Cradi	ta	L		Т	Р	С	
	lea		401		Semester		741				Ciedi	15	3		1	0	4	
	Course	Туре	Theory	only														
	Course Ca	ategory	Disciplin	ne Core														
	Pre-Requ	iisite/s									Co-Requi	isite/s						
	Course Ou & Bloom's	itcomes s Level	CO1- U CO2- G CO3- C CO4- S CO5- C	nderstand selected in ain knowledge on inte haracterization and e implify affinity of matte ategorize different or	strumental analytical te raction of EMR with m stimation of ions by spe er with stationary phase panic and inorganic con	echniques (spectro atter and to build th ectroscopical techn e and mobile phase mpounds using suit	scopic and chrom he analytical unde iiques(BL4-Analy a, physical and ch table spectroscop	atographic me erstanding at ti ze) emical proper ic and chroma	thods) and di ne level of ato ies of matter. tographic tecl	(BL2-Underst hniques.(BL3-	n volumetric analysis.(BL molecular structure of or and) Apply)	L2-Understand) ganic and inorganic cor	npounds with	n different fun	ctional groups and the	ir applications in pharm	nacy.(BL1-	Remember)
	Coures El	ements	Skill De Entrepri Employ Profess Gender Human Environ	velopment V eneurship X ability V sonal Ethics X X Values X ment X			:	SDG (Goals)		SDG1(No p SDG8(Deo SDG17(Pa	overty) ent work and economic (therships for the goals)	growth)						
								Pa	t B									
Modules				Contents								Pedagog	у					Hours
UNIT 1	UV Visible spe and Lambert's Photo tube, P and multi com conversions, f	ectroscopy Electronic trai I law, Derivation and dev hotomultiplier tube, Phot ponent analysis Fluorimi actors affecting fluoresce	nsitions, chromop iations. Instrumen o voltaic cell, Silic etry Theory, Conc ence, quenching,	hores, auxochromes, itation - Sources of ra on Photodiode. Applie epts of singlet, double instrumentation and a	spectral shifts, solvent diation, wavelength sel ations - Spectrophotor t and triplet electronic pplications	t effect on absorptio lectors, sample cel metric titrations, Sir states, internal and	on spectra, Beer Is, detectors- ngle component d external	Lecture base	ed learning, in	nteractive class	s, Peer tutorial, Class usi	ing ICT tool/PPT/white b	ioard					10
UNIT 2	Introduction, f Sources of rai applications F interferences,	undamental modes of vit diation, wavelength selec lame Photometry-Princip instrumentation and app	orations in poly at ctors, detectors - (ole, interferences, dications Nephelo	omic molecules, samp Golay cell, Bolometer, instrumentation and a -turbidometry- Princip	le handling, factors aff Thermocouple, Thermi pplications Atomic abs le, instrumentation and	fecting vibrations, li nister, Pyroelectric o sorption spectrosco d applications	nstrumentation - detector and opy- Principle,	Lecture based learning, interactive class, Peer tutorial, Class using ICT boil/PPT/white board										10
UNIT 3	Introduction to applications. 1 Paper chroma Electrophores	chromatography Adsorp Thin layer chromatograph tography-Introduction, m is- Introduction, factors a	otion and partition ny- Introduction, P nethodology, deve affecting electroph	column chromatogra rinciple, Methodology lopment techniques, loretic mobility, Techn	ohy-Methodology, adva , Rf values, advantage: idvantages, disadvanta iques of paper, gel, cap	antages, disadvanti as, disadvantages a ages and applicatio pillary electrophore	ages and and applications. ons isis, applications	Lecture based learning, interactive class, Peer tutorial, Class using ICT tooI/PPT/white board										10
UNIT 4	Gas chromato applications H	graphy - Introduction, the ligh performance liquid cl	eory, instrumental hromatography (H	ion, derivatization, te IPLC)-Introduction, th	nperature programming eory, instrumentation, a	ng, advantages, dis advantages and ap	advantages and oplications.	Lecture based learning, interactive class, Peer tutorial, Class using ICT toolPPT/white board 00										08
UNIT 5	Ion exchange factors affectin applications A	chromatography- Introdung ion exchange, method finity chromatography- In finity chromatography- In	uction, classification tology and application ntroduction, theor	on, ion exchange resi ations Gel chromatogi y, instrumentation an	ns, properties, mechani aphy- Introduction, the I applications	nism of ion exchang eory, instrumentatio	le process, n and	white board										07
								Pa	tC									
Moduk	es				Title						Indicative-ABCA/F Experiments/Field Internships	PBL/ work/			Bloom's Leve	4	٢	Hours
1		Modal making of Gel ele	ectrophoresis					Experiments BL2-Understand							5			
							F	art D(Marks	Distributio	n)								
Total Ma	rks	Mini	mum Passino Ma	arks	E	xternal Evaluation	1	The	Min. E	xternal Evalu	ation	Inter	nal Evaluatio	on		Min. Internal Eval	uation	
100		50			75			38				25			13		-	
					- 1			Prac	tical									
Total Ma	rks	Mini	mum Passing Ma	arks	E	xternal Evaluation	ı		Min. E	xternal Evalu	ation	Interr	nal Evaluatio	on		Min. Internal Eval	uation	
L																		
								Pa	τE									
	Bool	ks	1.Instru	mental Methods of Cl	emical Analysis by B.K	K Sharma 2.Organi	c spectroscopy by	Y.R Sharma	3.Textbook of	Pharmaceutic	al Analysis by Kenneth A	A. Connors 4.Vogel's Te	xtbook of Qu	antitative Che	mical Analysis by A.I.	Vogel	-	
	Artic	es	NA															
	Reference	s Books	1. Practi	cal Pharmaceutical C	hemistry by A.H. Becke	ett and J.B. Stenlak	ke 2. Organic Che	mistry by I. L.	Finar 3. Orga	anic spectrosco	opy by William Kemp 4. 0	Quantitative Analysis of	Drugs by D.	C. Garrett				
L	MOOC C	ourses	https://n	ptel.ac.in/														
	Vide	DS	you tube	1														
							,	Ourse Artio	ilation Met	rix								
COs	P01	PO2	PO3	PO4	P05 I	P06	P07	PO8	PO	9	PO10	P011	PO12	P	SO1	PSO2	PSO3	
CO1	3	1	-	-	1	2	-	-	-		-	3	-	1		2	1	
															-		1	-

CO1	3	1	-	-	1	2	-	-	-	-	3	-	1	2	1
CO2	2	3	-	2	•	-	-	-	-	-	3	-	1	1	1
CO3	2	2	-	1	-	-	-	-	-	-	3	-	1	1	2
CO4	2	2	-	-	-	-	-	-	-	-	2	-	1	2	1
CO5	2	2	-	-	-	-	-	-	-	-	2	-	1	1	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



						BPharm	1						
	Title of th	e Course	Human Anatomy and Physic	logy II									
	Course	e Code	BP201T										
						Part A							
				0					0	L	Т	Ρ	с
	Ye	ar	1st	Semester	2nd				Credits	3	1	0	4
	Cours	е Туре	Theory only										
	Course (Category	Discipline Core										
	Pre-Rec	uisite/s							Co-Requisite/s				
	Course C & Bloom	outcomes o's Level	CO1- Explain the gross mo CO2- Describe the various CO3- Identify the various to CO4- Perform the hematolo CO5- Appreciate coordinate	phology, structure and functions of various organs nomeostatic mechanisms and their imbalances (BL sues and organs of different systems of human boo gical tests like blood cell counts, haemoglobin estin d working pattern of different organs of each system	of the human I 2-Understand dy(BL3-Apply mation, bleedin m(BL2-Under	h body.(BL1-Ren d) y) ing/clotting time erstand)	member) etc and also record blo	ood pressure, heart rate,	pulse and respiratory volume.(BL3-App	y)			
	Course Elements Sain Levelopment 3 Entrepreneurship X Employability 4 Professional Ethics X Gender X Human Values X Environment X					SDG (Goals) SDG3(Good health and well-being) SDG4(Quality education) SDG4(Quality education) SDG17(Partnerships for the goals) SDG17(Partnerships for the goals)							
	Part B												
Modules	Nodules Contents Pedagogy Hours										Hours		
UNIT 1	Nervous system Organization of nervous system, neuron, neuropila, classification and properties of nerve fore, electrophysical action potential, nerve impulse, response, snyapes, neurotransmitters. Central nervous system. Meninges, vertificate of train a ceretoropinal fluid. Structure and functions of brain (cerebrum, brain stem, cerebellum), spinal cord (gross structure, functions afterent and effectent new tracks, refex activity)					ecture based lea	arning, interactive class	, Peer tutorial, Class usi	ng ICT tool/PPT/white board				10
UNIT 2	Digestie explain Anatomy of Gi Tract will special reference to anatomy and functions of domach, field production in the storm regulation of actio production through parasympathic nervous system, popin role in provin digestion small intentiema and large instatina, anatomy and functions of salivary glands, parcreas and liver, movements of GIT, digestion and absorption of nutrients disorders of GIT Energetics Formation and role of ATP. Creatinine Proceptate and BMR.					Lecture based learning, Interactive class, Peer tutorial, Class using ICT tooIPPT/white board						06	
UNIT 3	Anatomy of r Volumes and urinary tract formation, m	respiratory system with special ref d capacities transport of respirator, with special reference to anatomy icturition reflex and role of kidneys	erence to anatomy of lungs, r y gases, artificial respiration, of kidney and nephrons, fund a in acid base balance, role of	nechanism of respiration, regulation of respiration L and resuscitation methods. Urinary system Anatomy tions of kidney and urinary tract, physiology of urini RAS in kidney and disorders of kidney.	ung yof Leo	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board						10	
UNIT 4	Endocrine sy parathyroid g	ystem Classification of hormones, gland, adrenal gland, pancreas, pi	mechanism of hormone actio neal gland, thymus and their	n, structure and functions of pituitary gland, thyroid lisorders	gland, Pee	Peer tutorial						10	
UNIT 5	Reproductive hormones, p Chromosom	e system Anatomy of male and fer hysiology of menstruation, fertilize es, genes and DNA, protein synth	nale reproductive system, Fu ation, spermatogenesis, ooge esis, genetic pattern of inheri	nctions of male and female reproductive system, se resis, pregnancy and parturition Introduction to gen ance	ex letics Lec	Lecture based learning, interactive class, Peer tutorial, Class using ICT tooI/PPT/white board					09		
						Part C							
Modul	les			Title				Indicative-ABCA/ Experiments/Field Internships	PBL/ work/		Bloom's Level		Hours
1		Create respiratory model using	baloon and bottle			Ex	xperiments		BI	.3-Apply		3	-
					Part (D(Marks Dis	stribution)						
						Theory	,						
Total Ma	arks	Minimum Pa	assing Marks	External Evaluation			Min. External Evalua	ation	Internal Evaluation		Mi	in. Internal Evaluat	ion
100		50		75	38	1			25	1	3		
L		1		- 1		Practical			1				
Total Ma	arks	Minimum Pi	assing Marks	External Evaluation			Min. External Evalua	ation	Internal Evaluation		M	in. Internal Evaluat	ion
	Part F												
	Bo	oks	1. Essentials of Medical Ph	vsiology by K. Sembulingam and P. Sembulingam.	Jaypee brothe	ers' medical pub	blishers, New Delhi. 2. /	Anatomy and Physiology	in Health and Illness by Kathleen J.W. V	/ilson, Churchill	Livingstone, New Ye	ork	
	Arti	cles	https://www.medicalnewstor	lay.com/articles/248743									
	Referenc	es Books	1. Physiological basis of Me Publishers Kolkata	dical Practice-Best and Tailor. Williams & Wilkins C	o, Riverview, N	MI USA 2. Text	book of Medical Physic	ology- Arthur C, Guyton	and John. E. Hall. Miamisburg, OH, U.S./	A. 3. Human Phy	vsiology (vol 1 and 2) by Dr. C.C. Chatte	rrje, Academic
	MOOC	Courses	https://www.edx.org/learn/h	man-anatomy									
	Vid	eos	https://www.youtube.com/w	atch?v=uBGl2BujkPQ									

	Course Articulation Matrix														
COs	PO1	PO2	PO3	PO4	P05	P06	P07	P08	PO9	PO10	P011	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	2	2	-	1	-	-	3	-	3	-	2
CO2	1		-	1	-	1	-	1	-	-	3	-	3	-	2
CO3	3	-	-	1	1	1	-	-	-	-	3	-	2	-	2
CO4	1	-	-	1	1	1	-	2	-	-	2	-	2	-	2
CO5	1	-	-	2	1	1	1	1	-	-	2	-	2	-	1
CO6	-	-		-	-	-	-	-	-			-			



	Title of the Course	Biochemistry									
	Course Code	BP203T							-		
	PartA										
	Vor	1 et	Somostor	and	Gradita	L	т	Ρ	с		
	i cai	151	Semester	210	Cieuta	3	1	0	4		
	Course Type	Theory only	nly								
	Course Category	Discipline Core	e Core								
	Pre-Requisite/s		Co-Requisite/s								
	Course Outcomes & Bloom's Level	CO1- To remember the CO2- To understand th CO3- To apply the con CO4- To distinguish the CO5- To evaluate the co	properties, significance and metabolic reactions of cart e metabolism of carbohydrates and process of electron cept of catalytic activity and enzyme inhibition in design a process of DNA replication, transcription and translatio sauses, manifestations and diagnosis of metabolic disord	ohydrates, lipids, nucleic acids, proteins and amine transport and ATP formation(BL2-Understand) of new drugs, diagnostic and therapeutic applicatio n(BL2-Understand) ters(BL5-Evaluate)	acids(BL1-Remember) hs of enzyme(BL3-Apply)						
	Coures Elements	Skill Development ✓ Entrepreneurship X Employability ✓ Professsonal Ethics X Gender X Human Values X Environment X		SDG (Goals)	SDG3(Good health and well-being) SDG4(Quality education)						
Part R											
Modules	Modules Contents				Pedagogy				Hours		

modules		Contents	i cudyogy							
UNIT 1	Biomolecules proteins. Bioer entropy; Redo	Introduction, classification, chemical nature and biological role of earbohydrate, lipids, nucleia exide, amino acide and nergetics Concept of free energy, endergonic and exergonic reaction, Relationship between free energy, enthalpy and any potential. Energy rich compounds, classification; biological significances of ATP and cyclic AMP	Lecture base	ed learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board			08			
UNIT 2	Carbohydrate HMP shunt an glycogen stora Diabetes melli and substrate	matabilism Glycolysia – Pathway, energetica and significance Citic acid cycle–Pathway, energetics and significance dis significance. Ucoscol-Protostike dehydroganese (GPP) deficiency Citycogen matabilism Pathway and age diseases (GSD) GluconceArosynthe dehydroganese (GPP) deficience Hormonal regulation of blood glucose level and hus Biological oxidation: Electron transport dhatil (ETC) and its mechanism. Oxidative phosphorylation & its mechanism level phosphorylation inhibitors ETC and oxidative phosphorylation/tacopiers	Lecture base	ed learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board			10			
UNIT 3	Lipid metaboli synthesis of fa hormone and metabolism G Catabolism of Synthesis and hyperbilirubine	am β-Oxdation of saturated fatty scid (Pelmica caid) Formation and utilization of tectore bodies; ketoacidosis De novo kly adds (Palmica caid) Biological anglinance of cholestero in a conversion of cholestero in to bie adds, steroid vitamia D. Disorders of lipid metabolism: Hypercholesterolemia, afferocalenzais, fatty liver and Oxeby, Hanno add one are tactors of a simo acid or metabolism. The cammical concernition de Accentroviation, curse cycle and its disorders are tactors of a simo acid or metabolism. The cammical committed in de Accentroviation, curse cycle and its disorders are tactors of biological substances; 5+HT, metatonin, doparnine, noradenaline, adrenaline Catabolism of heme; emia and jaundos.	s Lecture based learning, interactive class, Peer tutorial, Class using ICT tooIPPT/white board							
UNIT 4	Nucleic acid m nucleotides ar DNA replicatio	netabolism and genetic information transfer Biosynthesis of purine and pyrimidine nucleotides Catabolism of purine of Hyperuncernia and Gout disease Organization of mammalian genome Structure of DNA and RNA and their functions in Genir Conservative model) Transcription or RNA synthesis Genetic code, Translation or Protein synthesis and inhibitors	Lecture base	ed learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board			10			
UNIT 5	Introduction, p Enzyme inhibi and diagnostic	properties, nomenclature and IUB classification of enzymes Enzyme kinetics (Michaelis plot, Line Weaver Burke plot) Itors with examples Regulation of enzymes: enzyme induction and repression, allosteric enzymes regulation Therapeutic capilications of enzymes and isoenzymes Coenzymes –Structure and biochemical functions	Lecture base	ed learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board			07			
			Pa	rt C						
Modules Title				Indicative-ABCA/PBL/ Experiments/Field work/	Bloom's Level	ŀ	lours			

		Internships							
1	DNA MODEL MAKING	Simulation	BL2-Understand	5					
Part D(Marks Distribution)									

	Theory									
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation					
00 50		75	38	25	13					
	Practical									
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation					

Part E								
Books	1. Textbook of Biochemistry by Rama Rao. 2. Textbook of Biochemistry by Deb.							
Articles	https://www.mcgill.ca/biochemistry/about-us/information/biochemistry							
References Books	1. Principles of Biochemistry by Lehninger. 2. Harper's Biochemistry by Robert K. Murry, Daryl K. Granner and Victor W. Rodwell. 3. Biochemistry by Stryer.							
MOOC Courses	https://www.edx.org/learn/biochemistry/harvard-university-principles-of-biochemistry?index=product&queryID=8/52c57d14373830030886d85bfd4dfc&position=1&linked_from=autocomplete&c=autocomplete							
Videos	https://www.youtube.com/watch?v=GL4R856xhyk&list=PLTU02J9MZQx1bm0FMAaWB8Nxa2qalnWPe							

	Course Articulation Matrix														
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	-	-	1	-	-	-	-	3	-	2	1	3
CO2	2	1	-	-	1	-	-	-	-	-	3	-	2	1	2
CO3	2	2	-	-	-	-	-	-	-	-	3	-	2	1	1
CO4	3	2	-	1	1	-	1	-	-	-	2	-	1	-	1
CO5	3	1	-	1	1	-	-	-	-	-	2	-	-	-	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



	BPharm											
	Title of the Course	Pathophysiology										
	Course Code	BP204T										
				Part A								
	Voar	1et	Semester	and	Credits	L	Т	Ρ	С			
		104	Concordi	210	cicality	3	1	0	4			
	Course Type	Theory only										
	Course Category	Discipline Core										
	Pre-Requisite/s	Co-Requisite/s										
	Course Outcomes & Bloom's Level	CO1- To understand the CO2- To understand the CO3- To apply the print CO4- To explain the elector. To evaluate the CO5- To evaluate the	he process of cell injury, morphology of cell injury and ce he etiopathogenesis of cardiovascular, respiratory and re ciples of pathogenesis in understanding symptoms, sigr iopathogenesis of hematologic, endocrine, nervous, gas principles of physical, chemical and biologic carcinogene or the state of	Ilular adaptations. (BL2-Understand) nal diseases mentioned. (BL2-Understand) is and complications of disease states mentioned. trointestinal, muscular skeletal diseases and Imm sis. (BL5-Evaluate)	BL3-Apply) inopathogenesis of infectious diseases.(BL1-Remember)							
	Coures Elements	Skill Development ✓ Entrepreneurship X Employability ✓ Professsonal Ethics X Gender X Human Values X Environment X		SDG (Goals)	SDG3(Good health and well-being) SDG4(Quality education)							
				Part B								
Modules		Conten	ts		Pedagogy							
UNIT 1	Basic principles of Cell injury and Adaptation: Causes of collius injury, Pathogenesis (Cell In Morphology of cell injury – Adaptive changes i the process of inflammation and repair. Introdi Inflammation – Alteration in vascular permeab wound healing in the skin, Pathophysiology of	Introduction, definitions, nembrane damage, Mitor Atrophy, Hypertrophy, hy and Cell Death Acidosis a cation, Clinical signs of ir ility and blood flow, mign Atherosclerosis	Homeostasis, Components and Types of Feedback syst hondrial damage, Ribosome damage, Nuclear damage perplasia, Metaplasia, Dysplasia), Cell swelling, Intra o Kalkalosis, Electrolyte imbalance Basic mechanism invo filammation, Different types of Inflammation, Mechanism ation of WBC's, Mediators of Inflammation, Basic princip	ems,), illular Ived in Lecture based learning, interactive clas of les of	; in Lecture based learning, interactive class, Peer tutorial, Class using ICT tooIPPT/white board f							
UNIT 2	Cardiovascular System: Hypertension, conges and arteriosclerosis) Respiratory system: Asth	tive heart failure, ischen ma, Chronic obstructive	ic heart disease (angina, myocardial infarction, atherose airways diseases. Renal system: Acute and chronic ren	clerosis al failure Lecture based learning, interactive clas	s, Peer tutorial, Class using ICT tool/PPT/white board				10			
UNIT 3	Haematological Diseases: Iron deficiency, me acquired anemia, hemophilia Endocrine syste Parkinson's disease, stroke, psychiatric disord Ulcer	galoblastic anemia (Vit B m: Diabetes, thyroid dise lers: depression, schizop	12 and folic acid), sickle cell anemia, thalasemia, heredi ases, disorders of sex hormones Nervous system: Epile hrenia and Alzheimer's disease. Gastrointestinal system	tary psy, :: Peptic Lecture based learning, interactive clas	s, Peer tutorial, Class using ICT tool/PPT/white board				10			
UNIT 4	Inflammatory bowel diseases, jaundice, hepat arthritis, osteoporosis and gout Principles of c Rheumatoid Arthritis, Osteoporosis,Gout Princ	itis (A,B,C,D,E,F) alcoho ancer: classification, etio iples of Cancer: Classifi	ic liver disease. Disease of bones and joints: Rheumato logy and pathogenesis of cancer Diseases of bones and ation, etiology and pathogenesis of Cancer	id I joints: Lecture based learning, interactive clas	ts: Lecture based learning, interactive class, Peer tutorial, Class using ICT tooI/PPT/white board							
UNIT 5	Infectious diseases: Meningitis, Typhoid, Lepr Gonorrhea	osy, Tuberculosis Urinary	tract infections Sexually transmitted diseases: AIDS, S	vphilis, Lecture based learning, interactive class	 Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board 							

Part C											
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours							
1	Different desease model making	Seminar	BL2-Understand	5							

1	Different desease model making	Seminar	В	BL2-Understand		5				
	Part D(Marks Distribution)									
			Theory							
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	n	Min. Internal Eval	luation			
100	50	75	38	25	1	13				

Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
100	50	75	38	25	13
			Practical		
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
	0				

	Part E
Books	1. Vinay Kumar, Abul K. Abas, Jon C. Aster, Robbins & Cotran Pathologic Basis of Disease; South Asia edition; India; Elsevier; 2014. 2. Harsh Mohan; Text book of Pathology; 6th edition; India; Jaypee Publications; 2010. 3. Laurence B, Bruce C, Bjorn K.; Goodman Gliman's The Pharmacological Basis of Therapeutics; 12th edition; New York; McGraw-Hill; 2011.
Articles	1. The Journal of Pathology. ISSN: 1096-9898 (Online) 2. The American Journal of Pathology. ISSN: 0002-9440 3. Pathology. 1465-3931 (Online) 4. International Journal of Physiology, Pathophysiology and Pharmacology. ISSN: 1944-8171 (Online)
References Books	1. William and Wilkins, Baltimore;1991 [1900 printing]. 2. Nicki R. Colledge, Brian R. Walker, Shaurt H. Raliston; Davidson's Principles and Practice of Medicine; 21st edition; London; ELBS(Churchill Livingstone; 2010. 3. Guyton A. Johns Flatl; Teabook of Medical Physiology; 12d Providency; 21d Pation; William State Company; 2010. Joseph DPiro, Robert L. Talbert, Gary, Wes, Barbara Wells, L. Michael Poeey, Pharmacotherapy: A Pationsky: State State Company; 2010. Joseph DPiro, Robert L. Talbert, Gary, Wes, Barbara Wells, L. Michael Poeey, Pharmacotherapy: A Pationsky: State State Company; 2010. Joseph DPiro, Robert L. Talbert, Gary, Wes, Barbara Wells, L. Michael Poeey, Pharmacotherapy: A Pationsky: State State Company; 2010. Joseph DPiro, Robert L. Talbert, Gary, Wes, Barbara Wells, L. Michael Poeey, Pharmacotherapy: A Pationsky: State Stat
MOOC Courses	https://www.coursera.org/courses?query=pathophysiology
Videos	https://www.youtube.com/@RhesusMedicine

							Co	ourse Articulation	Matrix						
COs	P01	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	P011	P012	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	1	-	1	-	-	3	-	3	-	3
CO2	3	2	-	-	-	1	-	1	-	-	3	-	2	-	2
CO3	2	-	-	-	-	1	-	1	-	-	3	-	2	-	2
CO4	2	2	-	1	1	-	-	-	-	-	3	-	2	-	2
CO5	3	1	-	1	-	-	-	-	-	-	3	-	1	-	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



	Syllabus-2023-2024											
					BPh	narm						
	Title of the	Course	Computer Applications in Ph	armacy *								
	Course	Code	BP205T									
1					Pa	irt A			1	т	Р	C
	Yea	r	1st	Semester	2nd		Credits		2		P	2
-	C	T	Theory only						3	U	0	3
	Course	Type	Dissipling Care									
-	Dea Deau	ilegory	Discipline Core				Co Dominito	-				
-	Pre-Requ	iisite/s	004 T 1 1 1 1 1 1 1				Co-Requisite	15				
	Course Ou & Bloom'	itcomes s Level	CO2- To illustrate the conce CO3- Applications of web te CO4- To evaluate the applic CO5- To explain about bioin	It types of databases, applications of computers and batabase of number system in computers. (BL2-Inderstand) chnologies such as HTML, XML, CSS, programming langue ations of computers in pharmacy such as drug information s formatics and its impact in vaccine discovery. (BL1-Rememi	ages, Web sen services, pharn ber)	vers and pharmacy drug database. (BL3-Apply) nacokinetics, mathematical model in drug design	, hospital and clinical pharmacy etc.,(B	L5-Evaluate)				
	Coures El	ements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics X Gender X Human Values X Environment X			SDG (Goals)	SDG4(Quality education) SDG5(Gender equality)					
					D-	+ P.						
Modules			Contents		га		Pedagogy					Hours
	Number syste	m: Binary number system Decin	nal number system. Octal nun	ber system. Hexadecimal number systems, conversion								
UNIT 1	decimal to bin method, binar feasibility ana project	ary, binary to decimal, octal to bi y multiplication, binary division C lysis, data flow diagrams, proces	nary etc, binary addition, binar concept of Information System s specifications, input/output of	y subtraction – One's complement, Two's complement s and Software: Information gathering, requirement and lesign, process life cycle, planning and managing the	Lecture based learning, interactive class, Peer tutorial, Class using ICT looi/PPT/white board					06		
UNIT 2	Web technolo Introduction to	gies: Introduction to HTML, XML databases, MYSQL, MS ACCE	, CSS and Programming lange SS, Pharmacy Drug database	ages, introduction to web servers and Server Products	Lecture base	ed learning, interactive class, Peer tutorial, Class	using ICT tool/PPT/white board					06
UNIT 3	Application of Hospital and dispensing of System, Phar	computers in Pharmacy – Drug i Clinical Pharmacy, Electronic Pre drugs, mobile technology and ad ma Information System	information storage and retriev scribing and discharge (EP) s therence monitoring. Diagnost	ral, Pharmacokinetics, Mathematical model in Drug design, ystems, barcode medicine identification and automated ic System, Lab-diagnostic System, Patient Monitoring	Lecture base	ed learning, interactive class, Peer tutorial, Class	using ICT tool/PPT/white board					06
UNIT 4	Bioinformatics in Vaccine Dis	: Introduction, Objective of Bioint	formatics, Bioinformatics Data	bases, Concept of Bioinformatics, Impact of Bioinformatics	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board						06	
UNIT 5	Computers as System (LIMS	data analysis in Preclinical deve and Text Information Managem	elopment: Chromatographic da ent System (TIMS)	da analysis (CDS), Laboratory Information management	Lecture based learning, interactive class, Peer tutorial, Class using ICT tooI/PPT/white board 0						06	
					Pa	# C						
					га	Indicative-ABC	:A/PBL/					
Module	les			Title		Experiments/Fie Internshi	eld work/ ps		Bloom's Level			Hours
1		CADD				Simulation		BL2-Understand			3	
											1	
				F	Part D(Marks	s Distribution)						
Total Ma	arks	Minimum P	assing Marks	External Evaluation		Min External Evaluation	Internal Evaluat	ion		Min Interna	al Evaluation	,
75	ano	38		50	25	In External Evaluation	25		13			
					Prac	stical						
Total Ma	arks	Minimum P	assing Marks	External Evaluation	Flac	Min External Evaluation	Internal Evaluat	ion		Min Interna	al Evaluation	,
Total Ma	diko	0	abbility marks	External Evaluation		Mill. External Evaluation	internal Evaluat			Milli. Interne	ii Lvaluatioi	
		0										
					Pa	.+ E						
	Boo	ks	1. Computer Application in F Publication, USA	harmacy - William E.Fassett -Lea and Febiger, 600 South	Washington S	iquare, USA, (215) 922-1330. 2. Computer Applic	cation in Pharmaceutical Research and	Development -Se	an Ekins – Wiley-Int	erscience, A	John Willey a	and Sons, INC.,
	Artic	es	https://copbela.org/download	s/2020/SELF%20LEARNING%20MATERIAL%20BPHARM	A/semester%2	202/BP205T/MODULE%2003.PDF						
	Reference	s Books	1. Bioinformatics (Concept, S	Skills and Applications) – S.C. Rastogi-CBS Publishers and	Distributors, 4	596/1- A, 11 Darya Gani, New Delhi – 110 002(IN	IDIA) 2. Microsoft office Access - 2003,	Application Develo	opment Using VBA,	SQLServer, D	AP and Info	path – Cary
N Prague – Wiley Dreamtech India (P) Ltd., 443/7, Ansan Road, Daryagani, New Dehi – 11002 MODC Courses https://www.edx.org/optificates/professional-certificate/anarenet.ute/https://www.edx.org/0/25earch 20106334074/Sacanamicencerendes/social-certificate/anarenet.ute/https://www.edx.org/0/25earch												

PO8 PO9

PO10

PO12

2

2

1

1

1

PSO1

1

1

1

PO11

3

2

2

3

1

PSO2

1

1

1

PSO3

1

1

С

PO7

Videos

PO2

1

PO3

PO1

COs

CO1 CO2 CO3 CO4 CO5 CO6 https://www.youtube.com/watch?v=vRDswGc2wyM

PO5

1

1

1

PO4

P06

1

1

1



Title of the Course	Human Anatomy and F	Physiology II									
Course Code	BP207P										
PartA											
Yese	1-1	Secondary 1	2-4	Cardita	L	т	Р	с			
tear	151	Semester	210	Credits	0	0	2	2			
Course Type	Lab only										
Course Category	Discipline Core	ne Core									
Pre-Requisite/s				Co-Requisite/s							
Course Outcomes & Bloom's Level	CO1- To recall the phy CO2- To develop the k CO3- To analyze the fi CO4- To evaluate bod CO5- To determine tid	visiology of special senses with the help of models, chart nowledge on coordinating working of organs of various unctions of cranial nerves by various sensory and motor y temperature and body mass index.(BL5-Evaluate) al volume and vital capacity.(BL3-Apply)	s and specimens. (BL1-Remember) systems with the help of models, charts and specirr functions. (BL4-Analyze)	nens.(BL3-Apply)							
Coures Elements	Skill Development ✓ Entrepreneurship X Employability ✓ Professsonal Ethics X Gender X Human Values X Environment X		SDG (Goals)	SDG3(Good health and well-being) SDG4(Quality education)							

	Part B		
Modules	Contents	Pedagogy	Hours
UNIT 1	Nercoux system Organization of nervous system, neuron, neuroglia, dasalification and properties of nerve fibre, electrophysicology, action potential, new imputer, necestors, systepse, neurotransmitters. Central nervous system. Meninges, eventicises of brain and corebrospinal fluid. Structure and functions of brain (cerebrum, brain stem, cerebelium), spinal cord (gross structure, functions of afferent and efferent never tracts, refers activity)	Peer tutorial	10

	Pa	rt C		
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	 To study the integumentary and special senses using specimen, models, etc., 2. To study the nervous system using specimen, models, etc., 3. To study the endocrine system using specimen, models, etc 4. To demonstrate the general neurological examination 	Experiments	BL2-Understand	16
2	5. To demonstrate the function of olfactory nerve 6. To examine the different types of taste. 7. To demonstrate the visual acuity 8. To demonstrate the reflex activity	Experiments	BL3-Apply	16
3	 Recording of body temperature 10. To demonstrate positive and negative feedback mechanism. 11. Determination of tidal volume and vital capacity. 12. Study of digestive, respiratory, cardiovascular systems, unnary and reproductive systems with the help of models, charts and specimers 	Experiments	BL3-Apply	16
4	 Recording of basal mass index . 14. Study of family planning devices and pregnancy diagnosis test. 15. Demonstration of total blood count by cell analyser 16. Permanent slides of vital organs and gonads. 	Experiments	BL3-Apply	16

Theory								
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation			
Practical								
			Tubulou					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation			

Part E							
Books	1. Textbook of Practical Physiology by C.L. Ghai, Jaypee brothers medical publishers, New Delhi. 2. Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee brother's medical publishers, New Delhi						
Articles	NA						
References Books	1. Physiological basis of Medical Practice-Best and Tailor, Williams & Wilkins Co, Riverview, MI USA 2. Text book of Medical Physiology- Arthur C, Guyton and John. E. Hall. Miamisburg, OH, U.S.A.						
MOOC Courses	NA						
Videos	NA						

							Co	urse Articulation	Matrix						
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	1	1	-	-	-	-	3	-	3	-	1
CO2	2	1	-	-	1	1	-	-	-	-	2	-	3	-	1
CO3	2	1	-	-	1	1	-	-	-	-	2	-	2	-	1
CO4	3	-	-	-	-	1	-	-	-	-	3	-	2	-	2
CO5	2	-	1	1	1	-	-	-	-	-	3	-	2	-	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Part D(Marks Distribution)



BPharm										
Title of the Course	Pharmaceuti	ical Organic Chemistry I								
Course Code	BP208P	98P								
PartA										
Year	1 of	Semester	2nd	Credite	L	т	Ρ	С		
100	154	oomosta	2113	ordato	0	0	2	2		
Course Type	Lab only	s only								
Course Category	Discipline C	Jiscipline Core								
Pre-Requisite/s				Co-Requisite/s	Minimum 5 unknown organic	compounds to be analysed syste	matically.			
Course Outcomes & Bloom's Level	CO1- To exp CO2- To ide CO3- To ana CO4- To app CO5- To ana	plain the qualitative analysis an intify the extra elements, preser alyze the presence of several fu praise the rules concerned with alyze unknown pharmaceutical	d preparation of pharmaceut nt in the pharmaceutical orga unctional groups in pharmace reactivity and orientation of organic compounds by deter	ical organic compounds (BL1-Remember) nic compounds, (BL2-L1nderstand)) autical compounds, (BL4-Analyze) organic compounds, (BL4-Analyze) mining their melling point/boling point, (BL4-Analyze)						
Coures Elements	Skill Develop Entrepreneu Employabilit Professsona Gender X Human Valu Environmen	pment √ µrship X ty √ al Ethics X wes X t X	SDG (Goals)	SDG4(Quality education) SDG8(Decent work and economic growth)						

Part C Indicative-ABCA/PBL/ Experiments/Field work/ Internships Modules Title Bloom's Level Hours Experiments Experiments Experiments Experiments Preliminary test: Color, odour, aliphatic/aromatic compounds, saturation and unsaturation, etc. 2. Detection of elements like Nitrogen, Sulphur and Halogen by Lassaigne's test 3. Solubility test BL3-Apply BL4-Analyze 4 4 BL3-Apply 4 з 4. Functional group test like Phenols, Amides/ Urea, Carbohydrates, Amines, Carboxylic acids, Aldehydes and Ketones, Alcohols, Esters, Aromatic and Halogenated Hydrocarbons, Nitro compounds and Anlides BL3-Apply 4 Experiments Experiments Experiments Exters, Aromatic and Hallogeneted Hydrocations, Netro compounds and Antides 5. Melling point/bioling point of organic compounds 6. Identification of the unknown compound from the ilterature using melting point/ boiling point. 7. Preparation of the derivatives and confirmation of the unknown compound by melling point/ boiling point. 8. Minimum 5 unknown organic compounds to be snalysed systematically. 1. Preparation of suitable solid derivatives from organic compounds 2. Construction of molecular models BL4-Analyze 4 BL4-Analyze BL6-Create 4 Experiments BL4-Analyze 4

Part B

Pedagogy

Hours

Contents

Theory							
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation		
			Practical				
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation		
50	25	35	18	15	8		

	. Part E
Books	1. Practical Organic Chemistry by Mann and Saunders. 2. Vogel's text book of Practical Organic Chemistry
Articles	
References Books	
MOOC Courses	
Videos	

							Co	urse Articulation	Matrix						
COs	PO1	PO2	PO3	PO4	P05	PO6	P07	P08	PO9	PO10	P011	P012	PSO1	PSO2	PSO3
CO1	2	1	-	-	-	-	-	-	-	-	3	-	2	3	1
CO2	3	2	•	-	2	-	-	1	-	-	3	-	3	2	1
CO3	2	1	-	-	1	-	-	-	-	-	3	-	2	2	2
CO4	2	2	•	-	1	-	1	-	-	-	2	-	2	1	1
CO5	3	1	-	-	1	1	-	-	-	-	2	-	2	2	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



	BPharm											
Title of the Course	Biochemistry											
Course Code	BP209P											
			Part A									
Voar	1st	Semester	and	Cradita	L	т	Р	С				
Tear	151	Semester	210	Credits	0	0	2	2				
Course Type	Labonly											
Course Category	Discipline Core											
Pre-Requisite/s			Co-Requisite/s									
Course Outcomes & Bloom's Level	CO1- To remember the CO2- To understand the CO3- To identify the an CO4- To examine and CO5- To determine the	e qualitative analysis of carbohydrates and proteins(BL1 e principle and clinical significance of blood glucose(Bl mount of reducing sugars by DNSA method(BL3-Apply) evaluate the constituents present in Urine and their clin e effect of temperature and substrate concentration on s	-Remember) -2-Understand) 									
Coures Elements	Skill Development ✓ Entrepreneurship X Employability ✓ Professsonal Ethics X Gender X Human Values X Environment X		SDG (Goals)	SDG3(Good health and well-being) SDG4(Quality education)								

Part B

Pedagogy

Hours

Contents

	Pai	tC		
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	 Qualitative analysis of carbohydrates (Blucosa, Fructose, Lactose, Maltose, Sucrose and starch) 2. Identification tests for Proteins (albumin and Casein) 3. Quantitative analysis of reducing sugars (DNSA method) and Proteins (Bluret method) 4. Qualitative analysis of urine for abnormal constituents. 	Experiments	BL2-Understand	16
2	5. Determination of blood creatinine 6. Determination of blood sugar 7. Determination of serum total cholesterol 8. Preparation of buffer solution and measurement of pH	Experiments	BL3-Apply	16
3	 Study of enzymatic hydrolysis of starch 10. Determination of Salivary amylase activity 11. Study the effect of Temperature on Salivary amylase activity. 12. Study the effect of substrate concentration on salivary amylase activity. 	Experiments	BL3-Apply	16

		F	Part D(Marks Distribution)										
			Theory										
Total Marks	Total Marks Ninimum Passing Marks External Evaluation Internal Evaluation Min. Internal Evaluation												
			Practical										
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation								
50	25	35	18	15	8								

	Part E
Books	1. Outlines of Biochemistry by Conn and Stumpf 2. Practical Biochemistry by R.C. Gupta and S. Bhargavan
Articles	NA
References Books	1. Introduction of Practical Biochemistry by David T. Plummer. (3rd Edition) 2. Practical Biochemistry for Medical Students by Rajagopal and Ramakrishna. 3. Practical Biochemistry by Harold Varley
MOOC Courses	NA
Videos	NA

							Co	urse Articulation	Matrix						
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	3	-	2	-	-	-	-	3	-	3	1	2
CO2	2	1	-	2	1		-	-	-	-	3	-	1	1	2
CO3	3	3	-	2	-	1	-	-	-	-	3	-	3	1	2
CO4	2	2	-	2	-		-	-	-	-	3	-	1	-	3
CO5	2	2	-	1	-	-	-	-	-	-	2	-	2	-	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



			BPharm					
Title of the Course	Computer Applications in F	Pharmacy *						
Course Code	BP210P							
			Part A					
Vor	L	т	Ρ	С				
i eai	Tat	Sellester	210	Credita	0	0	1	1
Course Type	Lab only	·	·					
Course Category	Course Category Discipline Core							
Pre-Requisite/s				Co-Requisite/s				
Course Outcomes & Bloom's Level	CO1- To demonstrate and CO2- To understand the p CO3- To summarize the re CO4- To design a question CO5- To create HTML we	I make use of MS Office, MS Word, MS Excel, MS Access and I aaradigms of program languages and be exposed to at least one port and printing the report from patient database(BL2-Unders nnaire using a word processing package to gather information a b page to show personal information(BLE-Create)	AS Power point.(BL1-Remember) language from each model, C and SQL.(BL2-Understand tand) bout a particular disease.(BL3-Apply)	d)				
Coures Elements	Skill Development J Entrepreneurship J Employability J Professsonal Ethics X Gender X Human Values X Environment X		SDG (Goals)	SDG4(Quality education)				

Part B

Pedagogy

Hours

Contents

Modules

	Pa	rt C		
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Design a questionnaire using a word processing package to gather information about a particular disease	Experiments	BL2-Understand	4
2	Create a HTML web page to show personal information.	Experiments	BL2-Understand	4
3	Retrieve the information of a drug and its adverse effects using online tools	Experiments	BL2-Understand	4
4	Creating mailing labels Using Label Wizard, generating label in MS WORD	Experiments	BL2-Understand	4
5	Create a database in MS Access to store the patient information with the required fields Using access	Experiments	BL6-Create	4
6	Design a form in MS Access to view, add, delete and modify the patient record in the database	Experiments	BL2-Understand	4
7	Generating report and printing the report from patient database	Experiments	BL3-Apply	4
8	Creating invoice table using – MS Access	Experiments	BL3-Apply	4

Part D(Marks Distribution) Theory Min. External Evaluation Total Marks Minimum Passing Marks External Evaluation Internal Evaluation Min. Internal Evaluation Practical Min. External Evaluation Total Marks Minimum Passing Marks External Evaluation Internal Evaluation Min. Internal Evaluation 13 15 8 10 5 25

	Part E
Books	1. Computer Application in Pharmacy – William E.Fassett –Lea and Febiger, 600 South Washington Square, USA, (215) 922-1330.
Articles	NA
References Books	1. Computer Application in Pharmaceutical Research and Development – Sean Ekins – Wiley-Interscience, A John Willey and Sons, INC., Publication, USA
MOOC Courses	NA
Videos	NA

	Course Articulation Matrix														
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	P011	PO12	PSO1	PSO2	PSO3
CO1	-	1	-	-	1	-	-	-	-	1	2	-	1	1	1
CO2	-	1	-	•	1	-	-	-	-	-	1	-	1	1	1
CO3	-	1	-	-	2	-	-	-	-	-	1	-	1	1	1
CO4	-	1	-	•	1	1	-	-	-	-	2	-	1	2	-
CO5	-	1	-	•	2	-	-	-	-	-	2	-	-	-	1
CO6	-				-	-	-	-	-		-	-			



	BPharm																
	Title of the C	ourse	Pharmace	autical Organic Cher	nistry II												
	Course C	ode	BP301T	-	-												
[1				Part A		T				т	B		C
	Year		2nd		Se	mester	3rd	3rd			Credits		2	1	F		4
	Course T	m 0	Theony o	ph/									3		U		4
	Course 1	ype	Dissisting	. C													
	Dro Poquir	egory	Discipline	Cole							Co Poquisito/s						
	Fierkequi	illers	C01 To	understand about as	omoticity chomistry	and reactions of hors	rono (PI 1 Pomo	mbor)			CO-Requisite/s		1				
	Course Oute & Bloom's	comes Level	CO2- To CO3- To CO4- To CO5- To	understand the could and Account for reactivity gain knowledge on o gain knowledge on s	y/stability of hydrolysis, hydrolysis, hydrolysis, hydrolysis, hydrolysis, hydrolysia, hydrolysia, hydrolysia, bennols, hydrolysia, hydrol	and reactions of benz drogenation, saponifi ads(BL3-Apply) aromatic amines and all uses of pharmace	cation and rancid d aromatic acids.(utical organic con	BL4-Analyze)	erstand) erstand)								
	Coures Eler	nents	Skill Devi Entreprei Employal Professa Gender > Human V Environm	Entropreneurship X Employability J Professorual Ethics X Gender X Human Yalues X Environment X													
								Part B									
Mod	lules				Contents						Pedag	Jogy					Hours
UNIT-I	Berzene and is derivatives A. Analytical, synthetic and other evidences in the derivation of structure or resonance in herzene, anomatic characters, huckef si vale. Reactions of herzene-initiation, subhort Friedekorsta sklyation- reactivity, limitations, Friedekorsta skyation. C. Substituents, effect of substitu of mono substituted benzene compounds towards electrophilic substitution reaction D. Structure and u Chloramine							bital picture, ation- reactivity, ity and orientation accharin, BHC and	Lecure based lerani	ing, Peer tutorial						10	
UNIT-II	Phenole* - Acidity of phenole, effect of substituents on acidity, qualitative tests. Structure and uses of phenol, cresols, resorcinol, naphthols Aromatic Amines* - Basicity of amines, effect of substituents on basicity, and synthetic uses of any i diazonium salts Aromatic Axids* - Acidity, effect of substituents on acidity and important reactions of benzoic acid										10						
UNIT-III		Fats and Oils a. F constants – Acid v principle involved	atty acids – reactior alue, Saponificatior in their determinatio	ns. b. Hydrolysis, Hy n value, Ester value, on	drogenation, Saponif Iodine value, Acetyl	ication and Rancidity value, Reichert Meiss	r of oils, Drying oil sl (RM) value – si	g clis. c. Analytical - significance and Lecure based leraning, Peer tutorial						10			
UNIT-IV		Polynuclear hydro Diphenylmethane,	carbons: a. Synthe Triphenylmethane	sis, reactions b. Stru and their derivatives	cture and medicinal u	uses of Naphthalene,	, Phenanthrene, A	inthracene,	Lecure based lerani	ing, Peer tutorial						8	
UNIT-V		Cyclo alkanes* St Mohr's theory (Th	abilities – Baeyer's eory of strainless rir	strain theory, limitations of cyo	on of Baeyer's strain clopropane and cyclo	theory, Coulson and butane only	Moffitt's modifica	tion, Sachse	Lecure based lerani	ing, Peer tutorial						7	
			,	5,, ,		,											
Module	es				Title			Part C Indicative-ABCA/PBL/ Experiments/Field work/					Bloom's Level				Hours
1	8	vothesis and medicina	uses of Napthelen	e Phenanthrene				Ex	periments	BI 2-Un	derstand			10			
		finitesis and medicina		pursonally remainder Cylemotias BL2-Understand									10				
							Р	art D(Marks Dis Theory	tribution)								
Total Ma	irks	Mini	mum Passing Mar	ks		External Evaluation			Min. External Evalu	ation	Inte	rnal Evaluation			Min. Internal	Evaluation	n
100	5	D	-		75			38		25 13							
					1			Practical			1						
Total Ma	irks	Mini	mum Passing Mar	ks		External Evaluation			Min. External Evalu	ation	Inte	rnal Evaluation			Min. Internal	Evaluation	n
	Books		1. Organi	c Chemistry by Morr	rison and Boyd 2. Org	ganic Chemistry by I.	L. Finar, Volume-	Part E I 3. Textbook of Or	anic Chemistry by B.S	5. Bahl & Arun Bahl							
	Article	5	NA														
	References	Books	1 Organic	Chemistry by P.L.S	oni 2 Practical Organ	ic Chemistry by Man	n and Saunders.	3 Vogel's text book	of Practical Organic C	Chemistry 4 Advanced Pr	actical organic chemis	try by N.K.Vishnoi. 5 Ir	ntroduction 1	to Organic Lab	oratory technique	s by Pavia,	Lampman
	MOOC Cou	irses	https://np/	tel.ac.in/													
	Videos		youtube a	ind other free resour	ce												
			1				~	Ourse Articulati	n Matrix								
COs	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	P011	PO12	PSO1		PSO2	P	SO3
CO1	3	1	-	-	2	-	1	-	1	-	3	-	3		-	2	
CO2	02 3 1 -		-	-	1	-	-	-	-	-	3	-	2		-	2	
CO3	2	-	-	-	1	-	1	-	1	-	2	-	3		-	3	
CO4	D4 2 1			-	1	-	-	-	-	-	2	-	2		1	1	
CO5	CO5 2 2					-	-	-	2	-	1		-	1			
CO6	-	· · · · · · · ·						-	-	-	-	-	-		-	-	
•																	



								BPha	arm								
	Title of th	e Course	Physica	al Pharmaceutics I													
	Course	Code	BP302	т												-	
								Bod	• •								
								Fdi				L		т	Р	с	
	Ye	ar	2nd		Semest	ter	3rd			C	redits	03		1	0	4	
	Course	е Туре	Theory	y only										1			
	Course C	Category	Discipl	line Core													
	Pre-Req	uisite/s								Co-Re	equisite/s						
	Course O & Bloom	utcomes 's Level	CO1-1 CO2-1 CO3-1 CO4-1 CO5-1	To recollect the states o To gain knowledge of pl To understand the princ To elaborate the signific To describe the principle	of matter and unders H and buffers and th iple of interfacial ten ance of physical pro es of diffusion in biol	tand the applications weir use in the stabiliz nsion and the applica operties of drug mole logical systems and t	of various physic ation of pharmac tions of surface a cules in design an the the concepts of	ochemical prope eutical formulati ctive agents in o nd stability of do of complexation	erties to desig ons.(BL3-Ap drug solubiliza sage forms.(and protein b	n dosage forms(BL2-Understand bly) tion.(BL2-Understand) 3L1-Remember) inding in pharmacy.(BL1-Remen	i) hber)						
	Coures E	ilements	Skill D Entrep Employ Profes Gende Humar Enviro	evelopment ✓ veneurship X vability ✓ vssonal Ethics X er X n Values X nment X				SDG (Goals)		SDG4(Quality education) SDG8(Decent work and econor	nic growth)						
								Bod	P								
Modules				Contents				Pan	D		Pedago	9y					Hours
UNIT-I	Solubility of o association, o gas in liquids Critical soluti	drugs: Solubility expression quantitative approach to the s, solubility of liquids in liquion on temperature and appli	ons, mechanisms he factors influer uids, (Binary solu cations. Distribut	of solute solvent intera ncing solubility of drugs utions, ideal solutions) F tion law, its limitations a	actions, ideal solubili , diffusion principles Raoult's law, real sol nd applications	ity parameters, solva in biological systems lutions. Partially misc	tion & s. Solubility of ible liquids,	Lecture base	d learning, int	eractive class, Peer tutorial, Clas	s using ICT tool/PPT/white	board					10
UNIT-II	States of Ma critical point, crystalline, a constant, dip	tter and properties of mat eutectic mixtures, gases, morphous & polymorphisr ole moment, dissociation	ter: State of matt aerosols – inhal m. Physicochemi constant, determ	er, changes in the state lers, relative humidity, li- ical properties of drug n ninations and applicatio	e of matter, latent he quid complexes, liqu nolecules: Refractive ns	ats, vapour pressure iid crystals, glassy st e index, optical rotati	, sublimation ates, solid- on, dielectric	Lecture base	d learning, inf	aractive class, Peer tutorial, Clas	s using ICT tool/PPT/white	board					10
UNIT-III	Surface and interfacial ter adsorption at	interfacial phenomenon: I nsions, spreading coefficie t solid interface.	Liquid interface, s ent, adsorption at	surface & interfacial ten t liquid interfaces, surfa	sions, surface free e ce active agents, HL	energy, measuremen LB Scale, solubilisati	t of surface & on, detergency,	Lecture base	d learning, int	aractive class, Peer tutorial, Clas	s using ICT tool/PPT/white	board					8
UNIT-IV	Complexation Complexation	n and protein binding: Intr n and drug action, crystall	oduction, Classif line structures of	fication of Complexation complexes and thermo	n, Applications, meth dynamic treatment of	nods of analysis, prot of stability constants.	ein binding,	Lecture base	d learning, int	eractive class, Peer tutorial, Clas	s using ICT tool/PPT/white	board					8
UNIT-V	pH, buffers a buffer equation	nd Isotonic solutions: Sor on, buffer capacity, buffer	ensen's pH scale s in pharmaceuti	e, pH determination (ele cal and biological syste	ectrometric and calor ms, buffered isotoni	rimetric), application c solutions.	s of buffers,	Lecture base	d learning, inf	eractive class, Peer tutorial, Clas	s using ICT tool/PPT/white	board					7
-								Part	C								
Module	95				Title					Indicative-AB Experiments/Fi Internshi	CA/PBL/ eld work/ ips			Bloom's Leve	ı		Hours
UNIT-V		Guest lecture by industr	ry expert						Seminar			BL2	-Understand			2	
							F	Part D(Marks	Distributior)							
								Theo	ory								
Total Ma	rks	Mini	imum Passing N	Aarks		External Evaluation	ı		Min. Ex	ternal Evaluation	Inter	nal Evaluation			Min. Internal Ev	valuation	
100		50			75			38			25			13			
Tetrite	-1		Densis -	1	-	Fotomal Fools 111	_	Pract	ical	and Frankratian		and Evolution			Min. Jatana 17		
Iotal Ma	INS	Mini	mum Passing N	narks		External Evaluation	1		Min. Ex	ternal Evaluation	Inter	na Evaluation			min. Internal Ev	aidation	
								Parl	ιE								
	Boo	oks	1. Phy	sical Pharmacy by Alfre	ed Martin 2. Experim	ental Pharmaceutics	by Eugene, Parc	tt. 3. Tutorial Ph	narmacy by C	ooper and Gunn							
Articles																	
	Reference	es Books	1. Stoc 2, 3. M	klosam J. Pharmaceuti arcel Dekkar Inc. 4. Ph	cal Calculations, Lea ysical Pharmaceutic	a &Febiger, Philadel s by Ramasamy C a	ohia. 2. Liberman nd ManavalanR.	H.A, Lachman (C., Pharmace	utical Dosage forms, Tablets, Vol	ume-1 to 3, MarcelDekkar I	nc. 3. Liberman H.	A, Lachman C	C, Pharmaceutica	al Dosage forms. Dis	sperse syste	ems, volume 1,
	MOOC	Courses	https://i	nptel.ac.in/													
	Vide	eos	You tub	be													
	l	1		1	1	1	(Course Articu	lation Matri	(1	1	1		l		-
COs	101	PO2	PU3	P04	PU5	PU6	PU7	PO8	P09	PO10	P011	P012	PS01		PS02	PS03	5
CO2	2	2	3	-	2	-	-	-	-	-	3	-	3		-	2	
002	-	3	1 *	1.1	1.1	1.7	1.5	1.7	1.7	17		1 -	14		-	14	

CO1	2	2	3	-	2	-	-	-	-	-	3	-	3	-	1
CO2	2	3	2	-	1	-	-	-	-	-	3	-	2	-	2
CO3	2	2	3	-	2	-	•	-	-	-	3	-	1	2	3
CO4	2	1	3	-	2	1	-	-	-	-	3	-	1	1	3
CO5	1	2	3	-	1	-	•	-	-	-	3	-	3	-	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



							BPha	rm							
	Title of th	e Course	Pharmaceutical Microbi	ology										-	
	Course	Code	BP303T											-	
							Part	А							
					a						L	т	Р	С	
	re	ar	2nd		Semester	ard			Creat	5	3	1	0	4	
	Course	ЭТуре	Theory only												
	Course C	ategory	Discipline Core												
	Pre-Req	uisite/s	basic understanding of	cell and biolog	у				Co-Requi	site/s					
	Course O & Bloom	utcomes 's Level	CO1- Understand meth CO2- To understand the CO3- To Learn sterility CO4- Carried out micro CO5- Understand the c	ods of identific e importance a testing of pharr biological stan ell culture tech	ation, cultivation and preservatior nd implementation of sterilization i maceutical products(BL3-Apply) dardization of Pharmaceuticals(B nology and its applications in pha	of various micr in pharmaceutic L4-Analyze) rmaceutical ind	oorganisms(BL2 al processing an ustries(BL2-Und	-Understand d industry(BL erstand)) 2-Understand)						
	Coures E	lements	Skill Development ✓ Entrepreneurship X Employability ✓ Professsonal Ethics X Gender X Human Values X Environment ✓				SDG (Goals)		SDG4(Quality education) SDG6(Clean water and sanitation) SDG8(Decent work and economic g	rowth)					
							Part	в							
Modules	Modules Contents Pedagogy Hours Introduction. history of microbiology, its branches, score and its importance, introduction to Prokarvotes and Eukarvotes Study of ultra- Introduction.														
Introduction, history of microbiology, its branches, scope and its importance. Introduction to Prokaryotes Study of ultra- structure and morphological classification of bacteria, nutritional requirements, raw material useds for outlure media and physical JUNT-1 parameters for growth, growth, growth carve, isolation and preservation methods for pure cultures, suthvation of anaretia, nutritional requirements, suthvation of anaretia, nutritional requirements, suthvation of anaretia, nutritional requirements, interactive class, Peer tutorial, Class using ICT toolPPT/white board 10 and electron microscopy. Identification of bacteria, suiting staining techniques (simple, Gram's & Acid-fast staining) and biochemical tests (IMVIC). Study of													10		
UNIT-II Identification of bacheria using taking techniques (simple, Cram's & Adid - fast taking) and biochenical tests (IMVO). Study of principe, procedure, ments, dements and applications of physical, chemical gaseous, radiation and mechanical metral (IMVO). Study of principe, procedure, ments, dements and applications of physical, chemical gaseous, radiation and mechanical metral (IMVO). Study of principe, procedure, ments, dements and applications of physical, chemical gaseous, radiation and mechanical metral (IMVO). Study of principe, procedure, ments, dements and applications of physical, chemical gaseous, radiation and mechanical metral (IMVO). Study of principe, procedure, metral applications of the efficiency of stellization methods.												10			
UNIT-III	NIT-III Study of morphology classification, neproduction and calibration of Forgi and Virones. Classification and mode of action of bioinformative Factors influencing displayed inclusion, perspective and their invalues of the bioinformative factors in their invalues of the bioinformative factors in their invalues of the bioinformative factors in the bioinformative factors in the invalues of the bioinformative factors in the bioinformative fact												10		
UNIT-IV	Designing of a prevention, cle antibiotics, vit	aseptic area, laminar flow equipme ean area classification. Principles amins and amino acids. Assessm	ents; study of different so and methods of different ent of a new antibiotic.	urces of contar microbiologica	nination in an aseptic area and m I assay. Methods for standardizat	ethods of ion of	Lecture based	learning, inter	active class, Peer tutorial, Class usin	ICT tool/PPT/white board					8
UNIT-V	Types of spoil assessment o microbial stab transformed o	age, factors affecting the microbia f microbial contamination and spo ility of formulations. Growth of ani ell cultures. Application of cell cult	I spoilage of pharmaceut ilage. Preservation of ph mal cells in culture, gene ures in pharmaceutical ir	tical products, s armaceutical pr ral procedure f adustry and res	sources and types of microbial co roducts using antimicrobial agent for cell culture, Primary, establishe earch	ntaminants, s, evaluation of ad and	Lecture based	learning, inter	active class, Peer tutorial, Class usin	ICT tool/PPT/white board					7
м							Part	с							
Modu	iles			Title					Indicative-ABCA/ Experiments/Field Internships	PBL/ work/		Bloom's Leve	I	н	ours
1		Microbiological visit of Pharma	industry					Virtual Labs			BL3-Apply			5	
							Part D(Marks I Theo	Distribution))						
Total M	arks	Minimum Pa	ssing Marks		External Evaluation		1	- Min. Ext	ernal Evaluation	Internal Evalu	ation		Min. Internal Ev	aluation	
100		50		75			38			25		13			
				I			Practi	cal		L		1			
Total M	arks	Minimum Pa	ssing Marks		External Evaluation			Min. Ext	ernal Evaluation	Internal Evalu	ation		Min. Internal Ev	aluation	
							Part	E							
	Boo	ks	1. W.B. Hugo and A.D. Ananthnarayan : Text B	Russel: Pharm look of Microbio	aceutical Microbiology, Blackwell ology, Orient-Longman, Chennai	Scientific public	ations, Oxford Lo	ondon. 2. Pres	acott and Dunn., Industrial Microbiolog	y, 4th edition, CBS Publishers 8	& Distributors, Delhi.	3. Pelczar, Chan Kr	reig, Microbiology, 1	ata McGraw	Hill edn. 4.
L	Artic	cles	https://byjus.com/biolog	y/microbiology/	1										
	Reference	es Books	 Malcolm Harris, Ballie Microbial Technology. 6. 	ere Tindall and . I.P., B.P., U.S.	Cox: Pharmaceutical Microbiolog P latest editions.	y. 2. Rose: Indu	strial Microbiolog	y. 3. Probishe	r, Hinsdill et al: Fundamentals of Micr	obiology, 9th ed. Japan 4. Coop	er and Gunn's: Tuto	al Pharmacy, CBS	Publisher and Dist	ibution. 5. Pe	appler:
	MOOC	Courses	https://nptel.ac.in/												
	Vide	905	https://www.youtube.com	m/watch?v=liqp	0UJ4j_bs&list=PLQnNyE1lxfVIVX	t55hag4kapfWh	PNjjfT				-	-	-		-
							Course Articul	ation Matrix							

COs	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	PO9	PO10	P011	P012	PSO1	PSO2	PSO3
CO1	3	1	-	1	2	-	-	-	-	-	3	-	3	-	3
CO2	3	2	-	1	2	-	-	-	-	-	3	-	2	-	2
CO3	2	1	-	-	1	1	-	-	-	-	3	-	2	-	2
CO4	2	2	-	-	2	-	-	-	-	-	3	-	2	-	2
CO5	2	1	-	-	1	-	-	-	-	-	3	-	1	-	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



					Brita									
	Title of the Course	Pharmaceutical Eng	ineering											
	Course Code	BP304T												
					Part	4								
					T dit?	×	L	T	Р	С	-			
	Year	2nd	Semester	3rd		Credits	3	1	0	4	-			
	Course Type	Theory only		1					1	1	-			
	Course Category	Discipline Core												
	Pre-Requisite/s					Co-Requisite/s								
	Course Outcomes & Bloom's Level	CO1- To know vario CO2- To understand CO3- To perform vario CO4- To carry out v CO5- To appreciate	us unit operations used in pharmaceutical in t the material handling techniques(BL2-Und rious processes involved in pharmaceutical r arious test to prevent environmental pollutior the various preventive methods used for cor	dustries(BL1-Remen erstand) manufacturing proces h(BL3-Apply) rrosion control in phar	nber) ss(BL3-Apply) rmaceutical industri	es. (BL2-Understand)								
	Coures Elements	Skill Development Entrepreneurship J Employability J Professsonal Ethics Gender X Human Values X Environment X	×	SDG	(Goals)	SDG4(Quality aducation) SDG8(Decent work and economic growth) SDG8(Industry Innovation and Infrastructure) SDG12(Responsible consuption and production)								
	Part B													
Modules		Conter	its			Peda	gogy				Hours			
UNIT-I	Mode/es Contents Contents Contents Contents Production Personal Personal													
UNIT 2	Heat Transfer: Objectives, applications & Heat interchangers & heat exchangers. E evaporation and other heat process. prin tube evaporator, climbing film evaporator evaporator. Distillation: Basic Principles a reduced pressure, steam distillation & m	Heat transfer mechanisms. F vaporation: Objectives, appli iples, construction, working, forced circulation evaporato nd methodology of simple di lecular distillation	ourier's law, Heat transfer by conduction, co cations and factors influencing evaporation, uses, merits and demerits of Steam jacketec r, multiple effect evaporator& Economy of mu stillation, flash distillation, fractional distillation	nvection & radiation. differences between d kettle, horizontal ultiple effect n, distillation under	Lecture based lea	arning, interactive class, Peer tutorial, Class using ICT tool/PPT/white	e board				10			
UNIT 3	Drying: Objectives, applications & mecha drying curve. principles, construction, wo vacuum dryer, freeze dryer. Mixing: Obje mechanism of solid mixing, liquids mixing Double cone blender, twin shell blender, Silverson Emulsifier,	nism of drying process, mea: king, uses, merits and deme ttives, applications & factors and semisolids mixing. Prin ibbon blender, Sigma blade i	surements & applications of Equilibrium Mois rits of Tray dryer, drum dryer spray dryer, fui affecting mixing, Difference between solid an iples, Construction, Working, uses, Merits a nixer, planetary mixers, Propellers, Turbines	ture content, rate of dized bed dryer, d liquid mixing, nd Demerits of , Paddles &	Lecture based lea	arning, interactive class, Peer tutorial, Class using ICT tool/PPT/white	e board, Peer tutoria	I			10			
UNIT 4	Filtration: Objectives, applications, Theor Uses, Merits and demerits of plate & fram filter. Centrifugation: Objectives, principle of Perforated basket centrifuge, Non-per	es & Factors influencing filtra e filter, filter leaf, rotary drum & applications of Centrifugat prated basket centrifuge, sen	tion, filter aids, filter medias. Principle, Cons filter, Meta filter & Cartridge filter, membrane ion, principles, construction, working, uses, r ni continuous centrifuge & super centrifuge.	truction, Working, e filters and Seidtz nerits and demerits	Lecture based lea	arning, interactive class, Peer tutorial, Class using ICT tool/PPT/white	board, Peer tutoria	I			08			
UNIT 5	Materials of pharmaceutical plant constru- Pharmaceutical plant construction, Theor inorganic and organic non-metals, basic	board				07								
					Part	o								
Mo	dules		Title			Indicative-ABCA/PBL/ Experiments/Field work/ Internships		Bloom's I	Level	н	ours			
1	To understand the basis	s principle of distillation				Experiments		BL3-Apply		2				
					Part D(Marks D	istribution)								

Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
100	50	75	38	25	13
			Practical		
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation

								Part E							
	В	ooks	1. Phan	naceutical engineeri	ng principles and pra	ctices - C.V.S Sub	rahmanyam et al., L	atest edition. 2. Ren	nington practice	of pharmacy- Martin, L	atest edition. 3. Theory	r and practice of industrial p	pharmacy by Lachmar	nn., Latest edition	
	Ar	ticles	NA												
References Books 1. Solid phase extraction, Principles, techniques and applications by Nigel J.K. Simpson- Latest edition. 2. Unit operation of chemical engineering – Mcabe Smith, Latest edition 3. Cooper and Gunn's Tutbrial pharmacy, S.J. Carter, Latest												S.J. Carter, Latest edition			
MOOC Courses https://riptel.ac.in/															
	Vi	deos	https://w	ww.youtube.com/wa	tch?v=Ey9M1neDgx	0&list=PLNiSYvRo	kSxtpOvMxwzQlnhv	vmXt8tzpU							
1	1		1	1	1	1		iouroo, a tioulatio					1		
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3

008	FOI	102	F 05	1.04	103	FOO	FOI	100	108	1010	FOIL	1012	F301	F 302	F 303
CO1	3	3	-	-	2	-	-	-	-	-	3	-	2	-	1
CO2	2	2	1	•	-	2		-	-	-	3	-	2		2
CO3	2	3	-	-	1	2	-	-	-	-	2	-	2	-	1
CO4	3	2	2	•	-	2		-	-	-	2	-	1	1	1
CO5	2	1	-	1	1	2	-	-	-	-	1	-	1	-	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



	BPharm														
Title of the Course	Pharmaceutical Organ	ic Chemistry II													
Course Code	BP305P														
			Part A												
Vear	2nd	Semester	3rd	Credits	L	т	Ρ	С							
1681	210	Semester	514	Credita	0	0	4	4							
Course Type	Lab only	sonly													
Course Category	Discipline Core	ncipline Core													
Pre-Requisite/s		Co-Requisitors													
Course Outcomes & Bloom's Level	Pre-Requisite/s OC1- To gain the knowledge on different recryptalization and steam divibilition techniques (B2-2 Understand) Course Outcomes & Bloom's Level CO3- To dentify the purity of this and dates application take and point in value and v														
Coures Elements	CUS- to list the individual of antiferint electrophilic aromatic substitutions relactions like formitation in motosubstituted aromatic compounds(ELS-Evaluate) Still Development / Entropendent / Entropendent / Professional Efficis X SDG (Goals) SDG/(Quality education) Gender X SDG (Goals) Human Values X Entropendent / Entropendent X														
			Part B					-							

	Par	tC		
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	I Experiments involving laboratory techniques • Recrystallization • Steam distillation	Experiments	BL3-Apply	8
2	II Determination of following oil values (including standardization of reagents) + Acid value + Saponification value + Iodine value	Experiments	BL5-Evaluate	8
3	III Preparation of compounds • Benzanilide/Phenyl benzoate/Acetanilide from Aniline/ Phenol /Aniline by acylation reaction.	Experiments	BL3-Apply	8
4	2.4.6-Tribromo aniline/Para bromo acetanilide from Aniline/ • Acetanilide by halogenation (Bromination) reaction. • 5-Nitro salicylic acid/Meta di nitro benzene from Salicylic acid / Nitro benzene by nitration reaction	Experiments	BL3-Apply	8
5	Benzoic acid from Benzyl chloride by oxidation reaction. • Benzoic acid/ Salicylic acid from alkyl benzoate/ alkyl salicylate by hydrolysis reaction. • 1-Phenyl azo-2-napthol from Aniline by diazotization and coupling reactions.	Experiments	BL3-Apply	8
6	Benzil from Benzoin by oxidation reaction. • Dibenzal acetone from Benzaldehyde by Claison Schmidt reaction • Cinnammic acid from Benzaldehyde by Perkin reaction • P-lodo benzoic acid from P-amino benzoic acid	Experiments	BL4-Analyze	

Pedagogy

Hours

Contents

				F	Part D(Marks Distribution)									
	Theory													
Total I	Marks	Minimum Pa	ssing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							
-														
					Practical									
Total I	iarks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation													
50	25 25 35 18 18 15 8													
					Part E									
	Boo	oks	1. Practical Organic Chemistry b	y Mann and Saunders. 2. Vogel's text book of Practical	Organic Chemistry									
	Artic	cles	NA											
	Reference	es Books	1. Advanced Practical organic ch	emistry by N.K.Vishnoi. 2. Introduction to Organic Labo	ratory techniques by Pavia, Lampman and Kriz									
	MOOC	Courses	NA											

Videos You tube, simulation

	Course Articulation Matrix														
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	•	2	1	-	-	-	-	-	3	-	1	-	3
CO2	2	3	-	2	1	-	-	-	-	-	2	-	2	-	3
CO3	3	1	-	-	2	-	-	2	-	-	2	-	1	1	1
CO4	2	2	-	1	-	-	-	-	-	-	3	-	1	1	1
CO5	3	1	-	1	-	-	-	-	-	-	1	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



				Benan	n							
Title of the	Course	Physical Pharmaceutic	ysical Pharmaceutics I									
Course	Code	BP306P										
				Part A	L							
You		and	Somestor	2rd		Credite	L T		Ρ	С		
168		2110	Semester	510		Credita	0 0		4	4		
Course	Туре	Lab only	any									
Course Ca	ategory	Discipline Core										
Pre-Requ	uisite/s					Co-Requisite/s						
Course Ou & Bloom'	utcomes s Level	CO1- To understand the CO2- To explain adsort CO3- To apply Hender CO4- To determine the CO5- To estimate the CO5-	To understand the significance of physical properties such as solubility, surface tension, partition coefficient and pKa in the design of dosage forms (BL2-Understand) To explain adsorption isotherms and determine Freundlich-Langmuir constant using activated charcoal (BL2-Understand) To bopy Hendreson - Hasseblack requision for interpretention of pKa value of dosage (SUS) (SUS) (SUS) (SUS) (SUS) To determine the surface tension of sample liquids by drop count and drop weight methods and deduce the HLB value and critical micellar concentration of a surfactant(BL4-Analyze) To determine the sufficient complexes by solubility and pH tration methods and (BL2-Related) To estimate the sublity constants of complexes by solubility and pH tration methods and (SL2-Related)									
Coures El	ements	Skill Development ✓ Entrepreneurship X Employability ✓ Professsonal Ethics X Gender X Human Values X Environment X		SDG (Goals)	SDG4(Quality educ SDG8(Decent work	ation) and economic growth)						
				Part E	\$							
Mod	ules		Cont	ents		Pedagogy			Ноц	urs		
				Part C	;							
Modules			Title		lr Fr	dicative-ABCA/PBL/		Bloom's Level		Hours		

		Internships		
1	 Determination the solubility of drug at room temperature 4 Hrs/week 2. Determination of pKa value by Half Neutralization/ Henderson Hasselbalch equation. 	Experiments	BL3-Apply	8
2	3. Determination of Partition cc- efficient of benzoic acid in benzene and water 4. Determination of Partition co- efficient of lodine in CCI4 and water	Experiments	BL4-Analyze	8
3	 Determination of % composition of NaCl in a solution using phenol-water system by CST method 6. Determination of surface tension of given liquids by drop count and drop weight method 	Experiments	BL4-Analyze	8
4	7. Determination of HLB number of a surfactant by saponification method 8. Determination of Freundlich and Langmuir constants using activated char coal	Experiments	BL4-Analyze	8
5	 Determination of critical micellar concentration of surfactants 10. Determination of stability constant and donor acceptor ratio of PABA-Caffeine complex by solubility method 	Experiments	BL4-Analyze	4
6	11 Determination of stability constant and donor accentor ratio of Cupric-Glyrine complex by pH titration method	Experiments	BI 4-Applyze	8

Part D(Marks Distribution) Theory Min. External Evaluation External Evaluation Internal Evaluation Total Marks Minimum Passing Marks Min. Internal Evaluation 50 15 8 35 18 100 Practical _______ Min. External Evaluation Total Marks Minimum Passing Marks External Evaluation Internal Evaluation Min. Internal Evaluation

	Part E
Books	1. Laboratory Manual of Physical Pharmaceutics, C.V.S. Subramanyam, J. Thimma settee
Articles	NA
References Books	1. Physical Pharmaceutics by Ramasamy C and ManavalanR.
MOOC Courses	NA
Videos	NA

	Course Articulation Matrix														
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	1	1	-	-	-	-	-	3	-	2	2	3
CO2	3	2	1	-	1	-	-	-	-	-	3	-	2	1	1
CO3	2	1	1	1	2	-	-	-	1	-	1	-	-	1	2
CO4	2	2	2	-	1	-	-	-	1	-	2	-	1	1	1
CO5	1	1	3	1	-	-	1	-	-	-	2	-	-	-	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



	BPharm											
Title of the Course	Pharmaceutical Engineering											
Course Code	BP308P											
	Part A											
Year	2nd	Semester	3rd	Credits	L	т	Р	с				
					0	0	4	4				
Course Type	Lab only	a only										
Course Category	Discipline Core	apline Core										
Pre-Requisite/s		Co-Requisite/s										
Course Outcomes & Bloom's Level	Course Outcomes & Bloom's Level & Bloom's Level COX- To dermine overall heat transfer coefficient by heat exclusions of pharmacoulcal equipments such as colloid mill, planetary mixer, fluidized bed dryer and freeze dryer,(BL3-Apply) COX- To determine overall heat transfer coefficient by heat exclusions of pharmacoulcal equipments such as colloid mill, planetary mixer, fluidized bed dryer and freeze dryer,(BL3-Apply) COX- To determine overall heat transfer coefficient by heat exclusions of pharmacoulcal endiplements such as colloid mill, planetary mixer, fluidized bed dryer and freeze dryer,(BL3-Apply) COX- To determine overall heat transfer coefficient by heat exclusions for activate the efficiency of steam distillation(BL4-Analyze) COX- To determine overall heat transfer coefficient by heat exclusions for claimic activatione and start(BL5-KPVaulate)											
Coures Elements	Skill Development V Entrepreneurship V Employability V Professsonal Ethics X Gender X Human Values X Environment X		SDG (Goals)	SDG4(Quality education)								

Part B

Pedagogy

Hours

Contents

Modules

	Pa	rt C		
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	I. Determination of radiation constant of brass, iron, unpainted and painted glass	Experiments	BL2-Understand	6
2	II. Steam distillation – To calculate the efficiency of steam distillation	Experiments	BL3-Apply	6
3	 To determine the overall heat transfer coefficient by heat exchanger. IV. Construction of drying curves (for calcium carbonate and starch). 	Experiments	BL2-Understand	6
4	V. Determination of moisture content and loss on drying. VI. Determination of humidity of air – i) From wet and dry bulb temperatures – use of Dew point method	Experiments	BL3-Apply	6
5	VII. Description of Construction working and application of Pharmaceutical Machinery such as rotary tablet machine, fluidized bed coater, fluid energy mill, de humidifier, VIII. Size analysis by sieving – To evaluate size distribution of tablet granulations – Construction of various size frequency curves including arithmetic and logarithmic probability plots	Experiments	BL3-Apply	6
6	IX. Size reduction: To verify the laws of size reduction using ball mill and determining Kicks, Rittinger's, Bond's coefficients, power requirement and critical speed of Ball Mill. X. Demonstration of colloid mill, planetary mixer, fluidized bed dryer, freeze dryer and such other major equipment	Experiments	BL3-Apply	6
7	XI. Factors affecting Rate of Filtration and Evaporation (Surface area, Concentration and Thickness/viscosity XII. To study the effect of time on the Rate of Crystallization	Experiments	BL3-Apply	6
8	XIII. To calculate the uniformity Index for given sample by using Double Cone Blender.	Experiments	BL3-Apply	6

Part D(Marks Distribution)

	Theory								
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation				
Practical									
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation				
50	25	35	18	15	8				

Part E								
Books	1. Pharmaceutical engineering principles and practices – C.V.S Subrahmanyam et al., Latest edition. 2. Remington practice of pharmacy-Martin, Latest edition.							
Articles	NA							
References Books	1. Theory and practice of industrial pharmacy by Lachmann., Latest edition. 2. Physical pharmaceutics- C.V.S Subrahmanyam et al., Latest edition							
MOOC Courses	NA							
Videos	NA							

							Co	urse Articulation	Matrix						
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	3	1	1	-	-	-	-	-	3	-	2	-	2
CO2	2	3	2	2	2	-	-	-	-	-	3	-	2	-	2
CO3	3	2	1	1	1	-	-	-	-	-	2	-	1	-	3
CO4	2	2	1	1	2	-	-	-	-	-	2	-	3	1	2
CO5	3	1	1	-	1	-	-	-	-	-	1	-	1	1	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Title of the Course	Medicinal Chemistry	licinal Chemistry I								
Course Code	BP402T	л 								
	- Part A									
Vor	2nd	Somestor	415	Credite	L	т	Р	с		
1641	2110	Semester	401	Credits	3	1	0	4		
Course Type	Theory only	anly								
Course Category	Discipline Core									
Pre-Requisite/s		Co-Requisite/s								
Course Outcomes & Bloom's Level	CO1- To recall the v. CO2- To explain the CO3- To identify the CO4- To categorize CO5- To design and	arious classes of medicinal compounds(BL1 physicochemical properties, steric aspects structural requirements of drugs to elicit biol the drugs based on their mechanism of actic create the synthetic routes for medicinal con-	I-Remember) of drugs and their metabolic pathways(BL2 logical response(BL4-Analyze) on and clinical uses(BL2-Understand) mpounds.(BL6-Create)	2-Understand)						
Coures Elements	Skill Development ✓ Sbill Development ✓ Entrepreneursihp ✓ SDG3(Good health and weil-being) Entrepreneursihp ✓ SDG4(Quality education) Professional Efficie X SDG4(Quality education) Gender X SDG4(Cean water and sanitation) Very State X SDG4(Cean water and commit growth) SDG1/Cean water and production) SDG3(Socie Action) SDG3/Coord meth X SDG3(Cean water and commit growth) SDG3/Coord meth X SDG3(Cean water and commit growth) SDG3/Coord meth X SDG3(Cean water and production)									

		Part B	
Modules	Contents	Pedagogy	Hours
UNIT-I	Introduction to Medicinal Chemistry History and development of medicinal chemistry Physicochemical properties in relation to biological action instanto, Stokubing Partition Coefficient, Hydrogen bonding, Protein binding, Poteleton, Bioscietatem, Optical and Geometrical isomerism. Drug metabolism Drug metabolism principles- Phase I and Phase II. Factors affecting drug metabolism including stere or hermical aspects	Lacture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/while board	10
UNIT-II	Drugs acting on Autonomic Nervous System Advenencia Neurotharemitters: Biosynthesis and catabolism of catecholamine. Advenencia creoptors (Alboha S Beta) and ther distribution. Sympathomicalis agents: SAR of Sympathomicalise agents Direct ading: Nor- epinephrine. Epinephrine, Phenrylephrine', Dogamine, Methyldopa, Clonidine, Dobutamine, Isoproterenol, Terobaline, Sabbtamon', Biotlenol, Napharoline, Doynetazzine and Xylometazione: - Indirect ading agents: Hydroxyamphetamine, Pseudophedrine, Proghtwardme Indirect acting agents: Hydroxyamphetamine, Pseudosphedrine, Propythexedrine - Agents with mixed mechanism: Epiderrine, Metamanio Advenencia Chargositas: Alba advenencia Diacolaris, Propythexedrine, Metamine, Metamori, Biotochos, Biotochos, Biotochos, Biotochos, Biotochos, Biotochos, Metamol, Attendol, Betazziola, Biogoroldi, Emolo, Metamolo, Jakenoldi, Clamodio, Clamos, SAR of beta blockers, Propranolof', Metbranolo, Atendol, Betazziol,	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT-III	Chelmergie neutramemitters: Biosynthesis and catabolism of acatylcholine. Chelmergie neutramemite: & Nicolinci) and their distribution. Prevensynaphonimetic agents: SAR of Prevensynaphonimetical agents Direct acting agents: Acatylcholine, Corbacholir, Bethanachol, Methacholine, Pilocarpine. Indirect acting/ Chelmestrase inhibitors (Reversible & Inrevensible): Physositgimine. Neostigmine: Physositgimics: Editory Chelmestrase inhibitors (Reversible & Inrevensible): Physositgimine. Neostigmine: Physositgimics: Editory Chelmestrase inhibitors (Reversible & Inrevensible): Physositgimine indirect and advantage and advantage and advantage and advantage and advantage and agents Solanaceous alkaloids and analogues: Atorgins explante, Hossognimus esylahet, Scoogname hydrochoride, Chalmune somide. Dicyclonimie hydrochoride', Gycopyralate, Metantheline bromide, Cyclopentolate hydrochoride, Cidinium koronide, Dicyclonimie hydrochoride', Gycopyralate, Metantheline bromide, Programtien Bertoring, Bertoring mesylake, Ophenadrine dirate, Biperline hydrochoride', Procycidilen hydrochoride', Tridhexethyl choride, Isopropamide lodde, Ethopropazien hydrochoride.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT-IV	Drugs acting on Central Nervous System A. Sedatives and Hypototics. Benzodiazepines: SAR of Benzodiazepines, Chiordiazepoxide, Diazepani, "Oxazepian, Chiorazepiate, Lonzapani, Aprazolam, Zojokiem Barblantes: SAR of Benzodiazepines, Chiordiazepoxide, Diazepiani, "Oxazepian, Chiorazepiate, Lonzapani, Aprazolam, Zojokiem Barblantes: SAR of Benzodiazepines, Barblant", Phenobarblant, contamenta derivatives: Mayorobomet, Echichoryon of Autoryo Marblantes: Tickofos sodium. Praeldeflyde, & AndrogoYobics Phenofiniazerines: SAR of Phenothiazerines - Premazine hydrochloride, Chiopromazine hydrochloride", Tirluyornazine, Thoridazen hydrochloride, Pipronetazize hydrochloride, Prohoprezine maleate, Titulyorazine hydrochloride, Ring Andogos of Phenofiniazerines: Chioprothoren, Thiothixene, Loxapine succinate, Clozapine, Furo buterophenones: Haloperidol, Droperidol, Risperidon, Beta mino kotnes: Molindon hydrochloride, Benzarides: Supirieria C. Anticonvulsants; SAR of Anticonvulsants, mechanism of anticorvulsant action Barbiturates: Phenobarbitone, Methabatbali, Hydancinsr, Phenytoin', Maphenytoin, Ehroloni Oxazoldine diones: Timethadone, Paramethadone Succimides, Phenauximide, Methauarine, Ehsusumide' Une and monoacylureas: Phenacemide, Carbamazepine' Benzodiazepines: Clonazepam Miscellaneous: Primidone, Valproic acid, Gabapentin, Febamate	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT-V	Drug a zdrag on Central Merrous System General anashetics: hholation aneshetics: Haldhare*, Methoxyfurane. Enfurane, Secollurane, Isofurane, Detalurane. Utiltra short acting babfudrates: Methohexital sodium*, Thiamyfal sodium, Thiopental sodium. Dissociative aneshetics: Ketamine hydrochloride.*	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	7
		Part C	

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Receptor binding of drug simulation	Simulation	BL2-Understand	10

	Part D(Marks Distribution)											
Theory												
Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation												
100	50	75	38	25	13							
			Practical									
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							

Books	
Articles	NA
References Books	1. Introduction to principles of drug design- Smith and Williams. 2. Remington's Pharmaceutical Sciences. 3. Martindale's extra pharmacopoeia 4. Indian Pharmacopoeia
MOOC Courses	https://nptel.ac.in/
Videos	You tube

							Co	urse Articulation	Matrix						
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	3	-	1	-	-	-	2	-	3	-	2	-	3
CO2	2	2	2	-	2	-	-	-	1	-	2	-	2	-	2
CO3	3	1	1	-	1	-	-	-	1	-	2	-	3	-	3
CO4	3	-	-	-	1	-	-	-	1	-	2	-	2	-	2
CO5	3	-	-	-	2	-	-	-	-	-	3	-	1	-	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Title of the Course	Physical Pharmaceuti	Pharmaceutics II									
Course Code	BP407P										
		PartA									
Ver	2-4										
Tear	210	Semester	401	Credits	0	0	4	4			
Course Type	Lab only			•							
Course Category	Discipline Core	ne Core									
Pre-Requisite/s	Lab safety manual			Co-Requisite/s							
Course Outcomes & Bloom's Level	CO1- To choose a go CO2- To interpret the CO3- To make use of CO4- To distinguish t CO5- To determine th	od suspending agent to formulate a stable sus shelf life of a given formulation by accelerated f derived and flow properties of powders to ens he rate constants as per the chemical reaction re viscosity using Ostwald's and Brookfield's vi	pension.(BL5-Evaluate) stability studies.(BL5-Evaluate) ure a stable solid formulation.(BL3-Apply) (BL2-Understand) scometer.(BL4-Analyze)								
Coures Elements	Skill Development ✓ Entrepreneurship X Employability ✓ Professsonal Ethics X Gender X Human Values X Environment X	×	SDG (Goals)	SDG4(Quality education) SDG9(Industry Innovation and Infrastructure)							

Part B

Pedagogy

Hours

Contents

Modules

	Pa	rt C		
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	 Determination of particle size, particle size distribution using sieving method 2. Determination of particle size, particle size distribution using Microscopic method 	Experiments	BL2-Understand	8
2	 Determination of bulk density, true density and porosity 4. Determine the angle of repose and influence of lubricant on angle of repose 	Experiments	BL3-Apply	8
3	 Determination of viscosity of liquid using Ostwald's viscometer 6. Determination sedimentation volume with effect of different suspending agent 	Experiments	BL4-Analyze	8
4	7. Determination sedimentation volume with effect of different concentration of single suspending agent 8. Determination of viscosity of semisolid by using Brookfield viscometer	Experiments	BL4-Analyze	8
5	9. Determination of reaction rate constant first order. 10. Determination of reaction rate constant second order	Experiments	BL3-Apply	8
6	11. Accelerated stability studies	Experiments	BL3-Apply	8

Part D(Marks Distribution) Theory Min. External Evaluation Total Marks Minimum Passing Marks External Evaluation Internal Evaluation Min. Internal Evaluation Practical Min. External Evaluation Minimum Passing Marks External Evaluation Internal Evaluation Min. Internal Evaluation Total Marks 25 35 15 8 18

	Part E
Books	1. Physical Pharmacy by Alfred Martin, Sixth edition 2. Experimental pharmaceutics by Eugene, Parott. 3. Tutorial pharmacy by Cooper and Gunn. 4. Stocklosam J. Pharmaceutical calculations, Lea & Febiger, Philadelphia
Articles	https://benthamscience.com/public/journal/172
References Books	1 Liberman HA, Lachman C., Pharmaceutical Dosage forms, Tablets, Volume-1 to 3, Marcel Dekkar Inc. 2. Liberman HA, Lachman C, Pharmaceutical dosage forms. Disperse systems, volume 1, 2, 3. Marcel Dekkar Inc. 3. Physical Pharmaceutics by Ramasamy C, and Manavalan R.
MOOC Courses	https://swayam.gov.in/nc_details/NPTEL.https://onlinecourses.nptel.ac.in/
Videos	https://www.youtube.com/results?search_guery=kd+channel

							Co	urse Articulation	Matrix						
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	P08	PO9	PO10	P011	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	-	1	-	-	-	2	-	2	-	1	1	1
CO2	2	1	2		2	•	-	-	1	-	2	-	2	2	2
CO3	3	1	-	-	3	-	-	-	1	-	2	-	3	1	3
CO4	2	1	-		2	•	-	-	2	-	3	-	1	1	1
CO5	3	1	-	-	1	-	-	-	1	-	2	-	1	1	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



			BPharm								
Title of the Course	Fine art and Music IV/ on	t and Music IV/ online certification course *									
Course Code	BP410T							-			
PartA											
Your	2nd	Somestor	445	Credite	L	т	Ρ	с			
1001	210	Sellester	401	Cieurs	0	0	1	1			
Course Type	Theory only										
Course Category	Generic Elective	aric Elective									
Pre-Requisite/s				Co-Requisite/s				-			
Course Outcomes & Bloom's Level	CO1- To accquire knowle CO2- To understand abo CO3- To develop skills to	edge about the clinical data mangement and its skills(ut CRF processing, and documentation forms(BL2-Un accquire Job oppurtunities(BL3-Apply)	BL2-Understand) nderstand)								
Coures Elements	Skill Development ✓ Entrepreneurship X Employability ✓ Professsonal Ethics X Gender X Human Values X Environment X		SDG (Goals)	SDG3(Good health and well-being) SDG4(Quality education)							
			Port P								

Part D(Marks Distribution)

Pedagogy

Hours

Contents

Modules

			Theory		
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
25		20	10	5	2
			Practical		
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
	0				

Part E Books 6 Articles 6 References Books 6 MOOC Courses http://www.coursera.org/learn/clinical-data-management Videos 6

							Co	urse Articulation	Matrix						
COs	P01	PO2	PO3	PO4	P05	PO6	P07	P08	PO9	PO10	P011	PO12	PSO1	PSO2	PSO3
CO1	1	1	-	1	-	-	-	-	-	-	2	-	1	-	-
CO2	1	1	-	-	-	-	-	-	-	-	2	-	-	-	-
CO3	1	1	-	-	-	-	-	-	-	-	1	-	-	-	1
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Title of the Course	Industrial Pharmacy I	trial Pharmacy I										
Course Code	BP502T											
	PartA											
Vere	2rd Sameter Eli-											
Tear	Sid	Semester	501	Credits	3	1	0	4				
Course Type	Theory only	•	-	•								
Course Category	Discipline Core	apline Core										
Pre-Requisite/s		Co-Requisite/s										
Course Outcomes & Bloom's Level	CO1- To outline the obj CO2- To discuss the for CO3- To review the for CO4- To illustrate the p CO5- To describe the p	ectives and applications of pre-formulation studies in th rmulation, manufacturing, coating and quality control te mulation and manufacturing considerations of liquid ora harmaceutical aspects of capsules and pellets (BL2) reparation and quality control of parenterals and ophth	e development and stability of dosage forms.(BL3- sts of tablets.(BL2-Understand) ls.(BL4-Analyze) dørstand) almic preparations.(BL4-Analyze)	Apply)								
Coures Elements	Skill Development J Entropreneurship X Emplopabilis J Professional Ehics X Gender X Human Values X Environment X SDG (Boals) SDG3(Good health and weil-being) SDG4(Quality education)											
Part B												
1			1									

Modules	Contents	Pedagogy	Hours							
Unit-1	Preformulation Studies: Introduction to preformulation, goals and objectives, study of physicochemical characteristics of drug substances, a. Physical properties: Physical form (crystal & amorphous), particle size, hape, flow properties, solubility profile (pKa, pH, partition coefficient), polymorphism b. Chemical Properties: Hydrolysis, outdoiton, reduction, acensiadon, polymerization BCS classification of drugs & Is significant Application of preformulation considerations in the development of solid, liquid oral and parenteral closes forms and Is impect on stability of obseque forms.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board								
Unit-2	Tablets: a Introduction, iskal characteristics of tablets, classification of tablets. Excipients, Formulation of tablets, granulation methods, compression and processing problems. Excipients and tablet locating. Tablet coating: Types of coating carating is and inside product less provide tablets, in the coating explorement employed and defects in coating. C. Quality control tests: In process and finished product less product less provide tablets and in procession of symps and elixits suspensions and emulsions; Filing and packaging: evaluation of legad orals official in pharmacopeal	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10							
Unit-3	Capsules: a. Hard gelatin capsules: Introduction, Production of hard gelatin capsule shells. size of capsules, Filling, finishing and special techniques of formutation of hard gelatin capsules, manifacturing defects. In process and final product quality control tests for capsules. J. Soft gelatin capsules. Nature of shell and capsule content, size of capsules, importance of base adsorption and miningram factors, production, in process and final product quality control tests. Packing, storage and stability testing of soft gelatin capsules and their applications. Pellets: Introduction, formulation requirements, pelletization process, equipments for manufacture of pellets	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	8							
Unit-4	Parenteral Products: a Definition, types, advantages and imitations. Preformulation factors and essential requirements, vehicles, additives, importance of isolonicity b. Production proceedure, production facilities and controls, aspecip processing c. Formulation of injections, sterile powders, large volume parenterials and typophilized products. d. Containers and closures selection, filling and seals of ampoules, visit and instain fluids. Quality control tests of parentering products. Dipthinaim Proparations, introducto, formulation considerations, formulation of eye drops, eye ointments and eye lotions; methods of preparations into of ophihalmic preparations.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10							
Unit-5	ophthamic preparations ophthamic preparations <thophthamic preparations<="" th=""> ophthamic preparations<!--</td--></thophthamic>									
	Part C									

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Unit-1	cosmetic preparations from commnely used herbs	Experiments	BL2-Understand	10

Part D	Marks	Distribut

	Part D(Marks Distribution)											
Theory												
Total Marks	Min. Internal Evaluation											
100	50	75	38	25	13							
			Practical									
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							

	Part E									
Books	1. Pharmaceutical dosage forms - Tablets, volume 1-3 by H.A. Liberman, Leon Lachman & J.B. Schwartz 2. Pharmaceutical dosage form - Parenteral medication vol- 1&2 by Liberman & Lachman 3. Pharmaceutical dosage form disperse system VOL-1 by Liberman & Lachman 4. Modern Pharmaceutics by Gilbert S. Banker & C.T. Rhodes, 3rd Edition									
Articles	https://www.fip.org/industrial-pharmacy									
References Books	1. Reminington: The Science and Practice of Pharmana, 20th edition Pharmanaeutical Science (RPS) 2. Theory and Practice of Industrial Pharmacy by Liberman & Lachman 3. Pharmaceutica- The science of dosage form design by M.E.Auton, Churchill Livingstone, Latest addition 4. Introduction for Pharmaceutical Dosage Forms by H.C.Ausel, Las E-Arbier, Philadelphia, Shedidon, 2016									
MOOC Courses	https://nptel.ac.in/									
Videos										

ourse	Articulation	1

	Course Articulation Matrix														
COs	PO1	PO2	P03	PO4	PO5	P06	PO7	P08	PO9	PO10	P011	PO12	PSO1	PSO2	PSO3
CO1	3	1	3	3	1	•	-	-	1	-	3	-	3	1	2
CO2	3	2	2	3	-	-	-	-	1	-	3	-	2	2	2
CO3	3	1	2	3	1	•	-	-	-	-	3	-	2	2	3
CO4	3	2	3	-	-	-	-	-	1	-	3	-	-	-	-
CO5	2	1	3	1	1	•	-	-	-	-	3	-	1	1	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



								BPha	rm							
	Title of the	Course	Pharmac	ognosy and Phy	tochemistry II											
	Course	Code	BP504T													
								Part	۵							
								Tan				L	т	Р	(2
	Ye	ar	3rd			Semester	5th				Credits	3	1	0	4	1
	Course	Туре	Theory of	nly						1					·	-
	Course C	ategory	Disciplin	e Core												
	Pre-Req	uisite/s									Co-Requisite/s					
	Course O & Bloom	utcomes 's Level	CO1- To CO2- To CO3- To CO4- To CO5- To	outline the meta the pharmacogr demonstrate the plan the industri assess the crud	bolic pathway in high istic study of second different types and s al production, estima e drug by modern me	her plants and their b lary metabolites like a steps involved in isolation and utilization of ethods of extraction,	iogenetic studies.(B alkaloids, glycosides ation, identification a f Phytoconstituents. spectroscopy, chror	L1-Remember) s, tannins, volatile and analysis of Ph (BL6-Create) natography, isolati	oils etc, (BL2-Understan ytoconstituents like terpe on and purification.(BL4	id) moids, glycosides, alkaloir -Analyze)	ds and resins.(BL2-Understand)					
	Course Elements Course Selements Course Selements Course Selements Course Selements Course Selements Course Selements Course Selement Sele								SDG (Goals) SDG3(Good health and well-being) SDG4(Quality education)							
								Part	в							
Modules				Contents					-		Pedagogy					Hours
1	Metabolic pal secondary m utilization of r	stabolic pathways in higher plants and their determination a) Brief study of basic metabolic pathways and formation of different condary metabolites through these pathways. Shikimic acid pathway, Acetate pathways and Amino acid pathway. b) Study of lization of radioactive isotopes in the investigation of Biogenetic studies							learning, interactive clas	ss, Peer tutorial, Class usi	ng ICT tool/PPT/white board					7
2	General intro following sec Ruta Steroids Coriander, Ta Bitter Almond	duction, composition, che ondary metabolites: Alkal , Cardiac Glycosides & T nnins: Catechu, Pterocar Iridoids, Other terpenoid	mistry & chemical oids: Vinca, Rauw riterpenoids: Liquo pus Resins: Benzo s & Naphthaquino	classes, biosour olfia, Belladonna rice, Dioscorea, nin, Guggul, Ging nes: Gentian, Arl	ces, therapeutic uses , Opium, Phenylprop Digitalis Volatile oils: er, Asafoetida, Myrrh emisia, taxus, carote	s and commercial ap anoids and Flavonoid Mentha, Clove, Cinr h, Colophony Glycosi noids	plications of ds: Lignans, Tea, namon, Fennel, ides: Senna, Aloes,	Lecture based	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board						14	
3	Isolation, Ider Rutin c) Alkal	ntification and Analysis of oids: Atropine, Quinine, F	Phytoconstituents Reserpine, Caffeine	a) Terpenoids: I d) Resins: Pod	Menthol, Citral, Artem ophyllotoxin, Curcum	iisin b) Glycosides: G in	Blycyrhetinic acid &	Lecture based	learning, interactive clas	is, Peer tutorial, Class usi	ng ICT tool/PPT/white board					6
4	Industrial pro Digoxin, Atro	duction, estimation and u pine, Podophyllotoxin, Ca	tilization of the follo ffeine, Taxol, Vinci	wing phytocons istine and Vinbla	tituents: Forskolin, S stine	ennoside, Artemisinir	n, Diosgenin,	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board						10		
5	electrophores	tochemistry modern met is in the isolation, purifica	nods of extraction, ation and identifica	application of la tion of crude dru	jest techniques like S gs	pectroscopy, chroma	atograpny and	Lecture based	learning, interactive clas	s, Peer tutorial, Class usi	ng ICT tool/PPT/white board					8
r								Part	C			1				
Module	es				Title					Indicative-ABCA/P Experiments/Field v Internships	'BL/ vork/	Bloom's Level				Hours
1		Extraction method of Gi	ven drugs						PBL			BL2-Understand			8	
								Part D(Marks [Distribution)							
Total Ma	arks	Mini	mum Passing Ma	rks	1	External Evalua	ation	Theo	y Min External Eval	ution	Internal Evalu	ation	1	Min Internal	Evaluation	
100		50			75			38			25		13			
					1.2			Practi	al		-					
Total Ma	Total Marks Minimum Passing Marks External Evaluation								Min. External Eval	uation	Internal Evalu	ation		Min. Internal	Evaluation	
								P .	-							
	Boo	ks	1. Text b	ook of Pharmac	ognosy by C.K. Kokal	te, Purohit, Gokhlae	(2007), 37th Edition	Part , Nirali Prakashan	⊑ New Delhi. 2 Herbal dru	ig industry by R.D. Choud	Ihary (1996), Ist Edn, Eastern Pu	blisher, New Delhi.				
	Artic	les	https://w	ww.phytojournal.	com/											
	Reference	s Books	1. W.C.E	vans, Trease an	d Evans Pharmacogr	nosy, 16th edition, W.	.B. Sounders & Co.,	London, 2009. 2.	Mohammad Ali. Pharma	cognosy and Phytochemis	stry, CBS Publishers& Distributio	n, New Delhi.				
	MOOC C	ourses	https://np	tel.ac.in/												
	Vide	os	https://w	ww.youtube.com	watch?v=v1vqV7YH	KWg&list=PLtEqsPS	BZIXtxeljdkyrwrPiM	HidHO7G6								
			1													-
1	1				-	-		Course Articula	ation Matrix							
COs	1 PO1	PO2	P03	1 PO4	PO5	I PO6	PO7	I PO8	PO9	PO10	PO12 PO12	PSO1		PSO2	PSO?	4

COs	PO1	PO2	P03	PO4	PO5	P06	P07	P08	PO9	PO10	P011	P012	PSO1	PSO2	PSO3
CO1	3	2	-	-	-	-	1	-	-	-	3	-	2	2	3
CO2	2	2	-		-	-	-	-	-	-	3	-	2	1	2
CO3	3	2	-	-	-	-	-	-	-	-	2	-	1	1	1
CO4	2	1	1		-	-	1	-	-	-	2	-	-	-	1
CO5	2	-	-	-	-	-	-	-	-	-	1	-	1	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Title of the Course	Industrial Pharmacy I										
Course Code	BP506P										
PartA											
Vera	2-1	S-months.	546	Cradita	L	Т	Р	с			
Tear	310	Semester	501	Credits	0	0	4	4			
Course Type	Labony										
Course Category	Discipline Core	sime Core									
Pre-Requisite/s	Co-Requisite/s										
Course Outcomes & Bloom's Level	CO1- To interpret the CO2- To explain the p CO3- To design pare CO4- To illustrate the CO5- To evaluate gla	pre-formulation studies on drugs (BL2-Understa preparation, evaluation and coating of tablets.(BL nteral and ophthalmic products.(BL6-Create) formulation and evaluation of capsules.(BL5-Ev iss containers as per pharmacopeial specification	ınd) 2-Understand) aluate) s.(BL5-Evaluate)								
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics 3 Gender X Human Values X Environment X	×	SDG (Goals)	SDG3(Good health and well-being) SDC4(Quality education) SDG8(Decent work and economic growth) SDG17(Partnerships for the goals)							

Part B

Contents

Pedagogy

Hours

	Part C											
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours								
1	1. Preformulation studies on paracetamol/aspirin/or any other drug 2. Preparation and evaluation of Paracetamol tablets	Experiments	BL3-Apply	8								
2	3. Preparation and evaluation of Aspirin tablets 4. Coating of tablets- film coating of tables/granules	Experiments	BL4-Analyze	8								
3	5. Preparation and evaluation of Tetracycline capsules 6. Preparation of Calcium Gluconate injection	Experiments	BL3-Apply	8								
4	7. Preparation of Ascorbic Acid injection 8. Quality control test of (as per IP) marketed tablets and capsules	Experiments	BL3-Apply	8								
5	9. Preparation of Eye drops/ and Eye ointments 10. Preparation of Creams (cold / vanishing cream)	Experiments	BL3-Apply	8								
6	11 Evaluation of Class containers (as not IP)	Experimente	PL6 Evoluate	•								

	Part D(Marks Distribution)											
Theory												
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							
			Practical									
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							
50	25	35	18	15	8							

	Part E
Books	3. Pharmaceutical dosage form disperse system VOL-1 by Liberman & Lachman 4. Modern Pharmaceutics by Gilbert S. Banker & C.T. Rhodes, 3rd Edition 5. Remington: The Science and Practice of Pharmacy, 20th edition Pharmaceutical Science (RPS)
Articles	NA
References Books	1. Theory and Practice of Industrial Pharmacy by Liberman & Lachman 2. Pharmaceutics- The science of dosage form design by M.E. Aulton, Churchill Livingstone, Latest edition
MOOC Courses	NA
Videos	NA

	Course Articulation Matrix														
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	3	2	-	-	-	-	-	-	3	-	1	3	3
CO2	2	2	3	1	-	-	-	-	-	-	3	-	1	2	3
CO3	3	1	3	-	-	-	-	-	-	-	3	-	3	-	2
CO4	3	1	1	1	-	-	-	-	-	-	3	-	2	-	2
CO5	3	1	2	1	-	-	-	-	-	-	3	-	1	-	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



BPharm

Piarmacology II Title of the Course Piarmacology II Course Code Piarmacology II Piarmacology II Piarmacology II Piarmacology II Piarmacology II Piarmacology III Piarmacology III <th <="" colspan="4" th=""></th>															
Course Code	Number Num Number Number Number Number Number Number Number Num														
		Part	A												
Year	3rd	Semester	5th	Credits	L	т	Р	С							
	0ld	ochester	out.	ordato	0	0	2	2							
Course Type Lab only															
Course Category	Discipline Core	Core													
Course Type La only Course Type La only Course Category Displine Core Pre-Regulated All looratory techniques and animal experiments are demonstrated by simulated experiments by softwares and videos Co-Regulate/s Optimization Col-To Experiments Col-To Experiments Col-To Experiment Concomes Col-To Experiment Col drugs in micrate(EL 4 Analyze)															
Course Outcomes & Bloom's Level	CO1- To learn the importance of CO2- To illustrate the diuretic at CO3- To identify the dose response CO4- To categorize the PA2 an CO5- To interpret the effect of st	f physiological salt solutions and to identify the effect of various drugs on ctivity of drugs in mice/rats(BL3-Apply)) make relationship, effect of drugs on DRC and to construct the drug conce of PD2 value of drugs using rat anoccocygeus muscle and guinea pig lieu pasmogens and spasmolytics using rabbi (apmm.(BL4-Analyze))	 isolated frog heart, blood pressure and heart rate of dog. (BL1-Rem entrations by various bioassay methods using animal simulator softw m. (BL2-Understand) 	ember) are.(BL4-Analyze)											
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics X Gender X Human Values X Environment X		SDG (Goals)	SDG3(Good health and weil-being) SDG4(Quality education)											

Part B

Pedagogy

Hours

Contents

	Par	tC		
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	1. Introduction to in-vitro pharmacology and physiological salt solutions. 2. Effect of drugs on isolated frog heart	Experiments	BL3-Apply	8
2	3. Effect of drugs on blood pressure and heart rate of dog. 4. Study of diuretic activity of drugs using rats/mice	Experiments	BL5-Evaluate	8
4	 DRC of acetylcholine using frog rectus abdominis muscle. 6. Effect of physostigmine and atropine on DRC of acetylcholine using frog rectus abdominis muscle and rat ileum respectively. 	Experiments	BL3-Apply	8
5	7. Bioassay of histamine using guinea pig ileum by matching method. 8. Bioassay of oxytocin using rat uterine horn by interpolation method.	Experiments	BL3-Apply	8
6	9. Bioassay of serotonin using rat fundus strip by three-point bioassay. 10. Bioassay of acetylcholine using rat ileum/colon by four-point bioassay	Experiments	BL4-Analyze	8
7	11. Determination of PA2 value of prazosin using rat anococcygeus muscle (by Schilds plot method). 12. Determination of PD2 value using guinea pig ileum	Experiments	BL3-Apply	8
8	13. Effect of spasmogens and spasmolytics using rabbit jejunum. 14. Anti-inflammatory activity of drugs using carrageenan induced paw-edema model.	Experiments	BL3-Apply	8

	Part D(Marks Distribution)													
	Theory													
Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Inter														
			Practical											
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation									
50	25	35	18	15	8									

	Part E
Books	1. Ghosh MN. Fundamentals of Experimental Pharmacology. Hitton & Company, Kolkata. 2. Kulkarni SK. Handbook of experimental pharmacology. Vallabh Prakashan
Articles	NA
References Books	1. Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology, Churchil Livingstone Elsevier 2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill.
MOOC Courses	NA
Videos	NA

							Co	urse Articulation	Matrix						
COs	PO1	P02	P03	PO4	P05	P06	P07	P08	PO9	PO10	P011	P012	PSO1	PSO2	PSO3
CO1	2	3	-	-	2	3	-		-	-	3	-	1	2	3
CO2	2	1	-	-	1	3	-	-	-	-	3	-	1	2	2
CO3	3	2	-	-	3	3	-	-	-	-	3	-	-	-	2
CO4	2	-	-	-	2	2	-	-	-	-	3	-	-	-	2
CO5	3	-	-	-	2	2	-	-	-	-	2	-	-	-	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Title of the Course	Pharmacognosy and Ph	osy and Phytochenistry II											
Course Code	BP508P												
PartA													
Vera	2-1	Summet an	Cradita	L	т	Ρ	с						
iea:	510	Semester	501	Ciedita	0	0	2	2					
Course Type	Lab only												
Course Category	Discipline Core												
Pre-Requisite/s				Co-Requisite/s									
Course Outcomes & Bloom's Level	CO1- To remember the CO2- To identify the por CO3- To analyze and er CO4- To isolate the dru CO5- To predict the cru	wide variety of the crude drugs and their sources by m wder mixture and to report the types of adulterants and valuate the powdered crude drug samples by morpholo g from the given crude drug sample. (BLS-Create) de drug by performing chromatographic techniques. (B	orphological characteristics.(BL1-Remember) substituents present.(BL4-Analyze) vgical and microscopical characteristics.(BL4-Analy L5-Evaluate)	ze)									
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics X Gender X Human Values X Environment X		SDG (Goals)	SDG3(Good health and well-being)									

	Pa	rt C		
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	1. Morphology, histology and powder characteristics & extraction & detection of: Cinchona, Cinnamon, Senna, Clove, Ephedra, Fennel and Coriander	Experiments	BL2-Understand	8
3	3. Separation of sugars by Paper chromatography	Experiments	BL2-Understand	8
4	4. TLC of herbal extract	Experiments	BL3-Apply	8
5	5. Distillation of volatile oils and detection of phytoconstituents by TLC	Experiments	BL5-Evaluate	8
6	6. Analysis of crude drugs by chemical tests: (i) Asafoetida (ii) Benzoin (iii) Colophony (iv) Aloes (v) Myrrh	PBL		8

Part B

Contents

Hours

Pedagogy

			F	Part D(Marks Distribution)									
				Theory									
Total Marks	Minimum Pas	sing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							
	Practical												
Total Marks	Minimum Pas	sing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							
50	25		35	18	15	8							
				Part E									
Boo	ks	1.W.C. Evans, Trease and Evan (2007), 37th Edition, Nirali Praka	s Pharmacognosy, 16th edition, W.B. Sounders & Co., L ashan, New Delhi. 4. Herbal drug industry by R.D. Chou	ondon, 2009. 2. Mohammad Ali. Pharmacognosy and Phytochemis dhary (1996), Ist Edn, Eastern Publisher, New Delhi.	try, CBS Publishers& Distribution, New Delhi. 3. Text	book of Pharmacognosy by C.K. Kokate, Purohit, Gokhlae							

Articles	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4204033/#text=Pharmacognosy%20deals%20with%20the%20natural,model%20molecules%20in%20drug%20discovery.
References Books	5. Essentials of Pharmacognosy, Dr.SH.Ansari, Ilnd edition, Birla publications, New Delhi, 2007 6. Herbal Cosmetics by H.Pande, Asia Pacific Business press, Inc, New Delhi. 7. A.N. Kalia, Textbook of Industrial Pharmacognosy, CBS Publishers, New Delhi, 2005.
MOOC Courses	NA
Videos	kcl tutorial

	Course Articulation Matrix														
COs	PO1	PO2	P03	PO4	P05	PO6	P07	P08	PO9	PO10	P011	P012	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	1	-	-	-	3	-	2	2	1
CO2	2	-	-	-	-	-	1	-	-	-	3	-	1	2	2
CO3	3	-	-	-	-	-	1	-	-	-	3	-	-	-	2
CO4	2	-	-	-	-	-	-	-	-	-	3	-	2	-	1
CO5	2	-	-	-	-	-	1	-	-	-	2	-	-	-	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



	BPharm														
	Title of the 0	ourse	Internation	al Regulatory Requ	irements for Good Man	ufacturing Practices									
	Course C	ode	BP510ET												
								DentA							
								PartA				1	т	P	c
	Year		3rd		Semester	5th				Credits		1	0	0	1
	Course T	/pe	Theory on	lv					Į				-	-	-
	Course Cat	egory	Discipline	Specific Elective											
	Pre-Requi	ite/s		-						Co-Requisite/s					
	Course Out	omes	CO1- Und	erstand the differen	t quality level for global	I regulatory agency (BL	2-Understar	nd)							
	& Bloom's	Level	CO2- Io a	pply the knowldge o	of Qulaity management	t guidelines in real scen	nario(BL3-Ap	ply)	T						
			Skill Devel Entreprene	lopment √ ∋urship X											
	Coures Ele	nents	Employabi	lity √ nal Ethics √			SDG (Go	oals)	SDG3(Good health a SDG4(Quality educa	and well-being) ation)					
			Gender X						SDG12(Responsible SDG16(Peace Justic	consuption and product ce and strong institutions	ion))				
			Environme	ines 🗸 int X											
,						•		Part B							
Modules				Contents				Tartb			Pedago	ау			Hours
UNIT 1	Overview on Pr	oduct Life cycle Mana	gement , Good Manu	facturing Practices	and its Regulations , Fu	unctions of pharmaceut	itical and	Lecture based lea	arning, interactive clas	s. Peer tutorial. Class us	ing ICT tool/PPT/white	board			10
	healthcare indu	stries (Quality, Produc	tion, RA, R&	Overlife and 14	lidatian Channel Cards	nal Deviation Measure	and Out of		5,						-
UNIT 2	specifications, I	ata Integrity Assuran	nnegnty Assurance, ce	Qualification and vi	aldalion, Change Contr	roi, Deviation Managen	nent, Out of	Lecture based lea	arning, interactive clas	s, Peer tutorial, Class us	ing ICT tool/PPT/white	board			10
UNIT 3	CAPA & QRM, Drug substance	Complaint Handling & s and products, GMP	Product Recall, GMF for Biologics product	II, GMP requirements in Medical Devices, GMP Requirements in Pharmaceutical tackure based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board tool/PPT/white board							10				
								art D/Maria Dia							
							P	Theory	stribution)						
Total Ma	irks	Min	imum Passing Mark	s	Ext	ternal Evaluation			Min. External Evalu	ation	Inter	mal Evaluation		Min. Internal Evalu	ation
50	2	5			35			18			15		8		
					1			Practical	I						
Total Ma	irks	Min	imum Passing Mark	s	Ext	ternal Evaluation			Min. External Evalu	ation	Inter	nal Evaluation		Min. Internal Evalua	ation
I															
								Part E							
	Books		https://iris.	who.int/bitstream/h	andle/10665/64465/WH	HO_VSQ_97.01-eng.pd	df?sequence=	1&isAllowed=y							
	Article	5	https://www	v.fda.gov/drugs/pha	rmaceutical-quality-res	sources/current-good-m	nanufacturing	-practice-cgmp-reg	gulations, CDER-OPQ-	Inquiries@fda.hhs.gov					
	References	Books	https://iris.v	who.int/bitstream/ha	ndle/10665/64465/WH	IO_VSQ_97.01-eng.pdf	lf?sequence=	1&isAllowed=y							
	MOOC Cor	irses	https://www	https://www.itsligo.ie/courses/higher-certificate-in-science-in-good-manufacturing-practice-gmp/											
	Video		https://www	v.youtube.com/watc	h?v=mFwA2KTiPwlhttp	ps://www.youtube.com/	/watch?v=mF	wA2KTiPwl							
COs	PO1	PO2	PO3	PO4	P05 P	206 200	7 7	ourse Articulati	on Matrix	PO10	P011	PO12	PSO1	PSO2	PSO3
C01	3	2	1	1	1			-	-		3	1	1	1	1
CO2	2	1	1	1	1			-	-	-	2	1	1	1	1
CO3	-		-	-				-	-	-	-	-	-	-	-
CO4	-	-	-					-	-	-	-	-	-	-	-
CO5	-		-	-				-	-	-	-	-	-	-	-
CO6	-	-						-	-	-	-	-	-	-	-
1	1	1	1							1					



								BPh	arm							
	Title of the	Course	Pharmao	eutical Product De	velopment											
	Course	Code	BP511ET													
								Par	A	-1						
	Yea	ar	3rd		Se	emester	5th				Credits	L	т	Ρ	С	
			-									3	1	0	4	
	Course	Type	Theory o	nly Specific Elective												
	Pre-Reg	uisite/s	Discipling	e opecilic Elective							Co-Requisite/s					
	Course Or & Bloom	utcomes is Level	CO1- To CO2- To CO3- To CO4- To CO5- To	recall the formulat outline the role of select the excipier classify different o choose optimization	ion development of di different pharmaceuti Its for a specific drug f packaging for the dr n technique in the de	ifferent types of dosa cal excipients in product product(BL5-Evalue ug product and mate evelopment of pharm	age forms(BL1-Re duct development ate) erials used for prir aceutical drug pr	member) (BL2-Understar nary and second oduct.(BL4-Anal	d) ary packaging.(BL3-App /ze)	ly)						
	Coures E	lements	Skill Dev Entreprei Employa Professs Gender 3 Human \ Environn	elopment ✓ neurship ✓ bility ✓ onal Ethics × × /alues × nent ×				SDG	(Goals)	SDG3(Good health an SDG4(Quality education	d well-being) m)					
-								Par	В							
Modules				Contents							Pedagogy					Hours
UNIT 1	Introduction to stability asses	o pharmaceutical product ssment, manufacturing ar	t development, obje nd quality control te	ectives, regulations esting of different ty	related to preformula pes of dosage forms	ation, formulation de	velopment,	Lecture base	d learning, interactive cla	ss, Peer tutorial, Class usi	ng ICT tool/PPT/white board					10
UNIT 2	An advanced categories	study of Pharmaceutical	Excipients in pharr	maceutical product	development with a	special reference to	the following	Lecture base	d learning, interactive cla	ss, Peer tutorial, Class usi	ng ICT tool/PPT/white board					10
UNIT 3	An advanced categories	study of Pharmaceutical	Excipients in pharr	maceutical product	development with a	special reference to	the following	Lecture base	d learning, interactive cla	ss, Peer tutorial, Class usi	ng ICT tool/PPT/white board					10
UNIT4	Optimization development pharmaceutic	techniques in pharmaceu with specific examples. C al product development.	utical product developtimization by fact	opment. A study of torial designs and t	various optimization heir applications. A st	techniques for pharr tudy of QbD and its a	naceutical produc application in	t Lecture base	d learning, interactive cla	ss, Peer tutorial, Class usi	ng ICT tool/PPT/white board					08
UNIT 5	Selection and	I quality control testing of	f packaging materia	ils for pharmaceuti	cal product developm	ent- regulatory cons	iderations.	Lecture base	d learning, interactive cla	ss, Peer tutorial, Class usi	ng ICT tool/PPT/white board					07
								Par	С							
Modul	les				Title					Indicative-ABCA/ Experiments/Field Internships	PBL/ work/		Bloom's Level	I		Hours
1		Evaluation of suspendi	ing and emulsifying	agent					Experiments							
								Part D(Marks	Distribution)			1				
								The	ory				r			
Total Ma	arks	Mini	imum Passing Ma	rks	75	External Evaluation	on		Min. External Eval	uation	Internal Evaluatio	on	10	Min. Internal	Evaluation	
100		50			/5			38 Prac	ical		25		13			
Total Ma	arks	Mini	imum Passing Ma	rks		External Evaluation	on		Min. External Eval	uation	Internal Evaluation	on	1	Min. Internal	Evaluation	
								1					t			
								Par	F							
	Boo	ks	1. Pharm	aceutical Statistics	Practical and Clinica	al Applications by Sta	anford Bolton, Ch	arles Bon; Marce	Dekker Inc.							
	Artic	les	https://wv	ww.ema.europa.eu	/en/documents/scient	ific-guideline/note-gu	uidance-pharmac	autical-developm	ent_en.pdf							
	Reference	s Books	3. Pharm	aceutical Dosage I	Forms – Tablets Vol 1	to 3, A. Liberman, L	eon Lachman an	Joseph B. Schv	artz							
	MOOC C	ourses	https://wv	ww.coursera.org/co	urses?query=pharma	aceutical										
	Vide	os	https://wv	ww.youtube.com/w	atch?v=sesDthMPRC	0&list=PLkxD16eG2	21tVre8GBj-LbjfU	Juq1qghVM								
COs	PO1	PO2	P03	PO4	P05	P06	P07	Course Articu PO8	PO9	PO10	P011 P012	PSO1		PSO2	PSO3	

COS	P01	PUZ	P03	PU4	PU5	PU6	P07	P08	PU9	P010	P011	P012	PS01	PS02	PS03
CO1	3	1	3	1	1	-	-	-	-	-	3	-	2	1	1
CO2	2	2	1	1	1	-	-	-	-	-	1	-	1	1	1
CO3	3	1	2	1	1	-	-	-	-	-	3	-	2	2	2
CO4	2	1	2	1	1	-	-	-	-	-	1	-	1	1	1
CO5	1	1	2	2	1	-	-	-	-	-	3	-	1	1	1
006	-	-		-			-	-	-	-		-		-	-



Title of the Course	Purification of Pharmaceutic	cal Compounds						
Course Code	BP512ET							
	-	-	Part A					
Yee	2-4	Comparison (F.4.	Cradita	L	т	Р	С
100	510	Senester	Sui	Credits	1	0	0	1
Course Type	Theory only			· · · ·				
Course Category	Skill Enhancement Courses	5						
Pre-Requisite/s				Co-Requisite/s				
Course Outcomes & Bloom's Level	CO1- To understand the ba CO2- To gain the knowledg	sics of impurites in pharmaceuticals(BL2-Understand) e of techniques to purify the compounds and remove the impu	riteis the basics of impurites in pharmaceuticals(BL3	-Apply)				
Coures Elements	Skill Development ✓ Entrepreneurship X Employability ✓ Professsonal Ethics X Gender X Human Values X Environment X		SDG (Goals)					
			Part B					
Modules		Contents		Pedagogy			Hours	

Part D(Marks Distribution)

	Theory											
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							
50	25	35	18	15	8							
			Practical									
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							

Books https://crescent.education/wp-content/uploads/2021/06/Pharmaceutical-Organic-Chemistry.pdf	
Articles https://www.mdpi.com/books/reprint/8033-extraction-and-purification-ad-bioactive-compounds	
References Books https://crescent.education/wp-content/uplcads/2021/06/Pharmaceutical-Organic-Chemisty.pdf	
MOOC Courses NA	
Videos	

	Course Articulation Matrix														
COs	PO1	PO2	PO3	PO4	P05	PO6	P07	P08	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	1	-	-	-	-	-	-	3	-	1	1	1
CO2	2	2	2	1	-	-	-	-	-	-	3	2	-	1	1
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	•	-	-	-	-	-	-	-	-	-	-	-	-	-



	Title of the	`ourco	Introduction	n to intolloctual	porty rights													
	Course C	odo		n to menectual proj	perty lights													
L	Course C	oue	DP013E1															
								Part	A							-		
	Year		3rd		Semeste	er	5th				Credi	ts	L 3		T 1	P 0	C 4	
	Course T	ype	Theory onl	ly					1								-	
	Course Cat	egory	Skill Enhar	ncement Courses														
	Pre-Requis	site/s									Co-Requ	isite/s						
	Course Oute & Bloom's	comes Level	CO1- To ci CO2- To m CO3- Deve CO4- To ki CO5- To a	reate awareness of nake the pharmacy elop the understand now the database of pply the Knowledge	IPR among pharma students aware about ding of the Intellectua of intellectual property a of IPR in drafting ar	cy students.(BL2-U ut the pharmaceutica al Property Rights ne y and TKDL(BL2-Ur nd fillng of IPR(BL3-	nderstand) al R & D and the a ecessary for resear nderstand) -Apply)	ctivities therein.(BL2-Unders ne pharmace	tand) utical industr	y.(BL3-Apply)							
	Coures Eler	nents	Skill Devel Entreprene Employabi Professoo Gender X Human Va Environme	lopment ✓ eurship ✓ liity ✓ nal Ethics ✓ lues ✓ ent ×			s	SDG (Goals)		SDG1(No p SDG3(Good SDG4(Quali SDG6(Clean SDG8(Dece SDG17(Part	overty) d health and well-being) ity education) n water and sanitation) nt work and economic therships for the goals)) growth)						
								Part	в									
Modules				Contents								Pedago	ду					Hours
UNIT 1	The pharmaceu	tical business and The	pharmaceutical R &	D				Lecture based	learning, inte	eractive class	, Peer tutorial, Class us	ing ICT tool/PPT/white	board					10
UNIT 2	Module 3 – Inte Trade Secrets,	llectual Property Rights Module 4 – IPR: With s	: Introduction about pecific reference to p	patents, copyright, pharma	rademark, Industrial Designs, Geographical Indications, Lecture based learning, interactive class, Peer tutorial, Class using ICT toolPPT/white board					10								
UNIT 3	IPR: Indian pate	ent scenario and Paten	t commercialization a	and licensing	ing Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board													
UNIT 4	Patent drafting functions	and Patent searches, p	atent filing, registrati	ion, granting World	World Intellectual Property Organization (WIPO) and its Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board							08						
UNIT 5	IP in Traditional	Knowledge, TKDL dat	abase in medicinal p	lants, INDIAN WEE	nts, INDIAN WEB-PORTALS FOR PATENTS AND TECHNOLOGIES Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board						07							
								Part	с									
Module	es				Title						Indicative-ABCA Experiments/Fiel	//PBL/ d work/			Bloom's Lev	rel	ŀ	Hours
1		patent drafting and filin	3						Case Study				BL	3-Apply			5	
L							P	art D(Marks [Distribution)							L	
								Theo	у									
Total Mar	rks	Mini	mum Passing Mark	s		External Evaluatio	n		Min. Ext	ternal Evalua	ation	Inter	rnal Evaluation			Min. Internal Eva	aluation	
100	5	0			75			38				25			13			
								Practi	cal									
Total Mar	rks	Mini	mum Passing Mark	is	1	External Evaluatio	n		Min. Ext	ternal Evalua	ation	Inter	rnal Evaluation			Min. Internal Eva	aluation	
1					I			Dort	-									
	Books	1	Cockburn	IM. Intellectual prop	erty rights and pharr	maceuticals: challer	iges and opportuni	r an ties for economi	c research. T	he economic	s of intellectual propert	y. 2009 Jan:150.						
	Article	s	Savale SK,	, Savale VK. Inteller	ctual property rights ((IPR). World J Phan	m Pharm Sci. 2016	6 Apr 22;5:2559-	92.									
	References	Books	Prabu SL,	Prabu SL, Tnk S, editors. Intellectual property rights. BoO-Books on Demand; 2017 Jun 21.														
	MOOC Cou	irses	NEPTEL															
	Videos	3	NA															
L			1				~	ourse Articul	ation Matrix	,								
COs	PO1	PO2	P03	PO4	P05	P06	P07	PO8	PO9		PO10	PO11	PO12	PSO	1	PSO2	PSO3	
CO1	-	2	-	1	-	-	-	3	-		2	3	-	1		1	1	
CO2	-	1	-	-	-	-	-	3	-		-	2	-	1		-	1	
CO3	-	1	-	-	-	-	-	2	-		-	-	-	-		-	-	
CO4	-	-		-	-	-	-	2	-		-	2	-	-		-	-	
CO5	-	-				-	-	-	-		-	1	-	-		-	-	



Title of the Course	Medicinal Chemistry III									
Course Code	BP601T									
			Part A							
Yoar	3rd	Somertor	6th	Cradita	L	т	Р	с		
160	510	Semester	our courses and the second sec	Credita	3	1	0	4		
Course Type	Theory only									
Course Category	Discipline Core	Core								
Pre-Requisite/s				Co-Requisite/s						
Course Outcomes & Bloom's Level	CO1- Understand the in CO2- Understand the c CO3- To recall the class CO4- To Know the impo CO5- To discuss the ap	mportance of drug design and different techniques of d hemistry of drugs with respect to their biological activity sification and nomenclature of drugs of natural and syn ychance of SAR of drugs. (BL1-Remember) proaches in drug design including QSAR, pharmacoph	ug design.(BL2-Understand) ;(BL2-Understand) thetic origin(BL1-Remember) iore modeling, docking and combinatorial chemistry	(BL3-Apply)						
Coures Elements	Skill Development ✓ Entrepreneurship X Employability ✓ Professsonal Ethics X Gender X Human Values X Environment X		SDG (Goals)	SDG3(Good health and well-being) SDG4(Quality education)						

	Part B										
Modules	Contents	Pedagogy	Hours								
1	Historical background, Nomenclature, Stereochemistry, Structure activity relationship, Chemical degradation classification and important products of the following classes. PLactam ambifolice: Peneliani, Pepolopagorias, Fuadmase inhibitors, Monobactama Aminoglycosides: Streptomycin, Neomycin, Kanamycin Tetracyclines: Tetracycline, Oxytetracycline, Chiortetracycline, Minocycline, Doorycyline	Lecture based learning, interactive class, Peer tworial, Class using ICT tool/PPT/white board	10								
2	Antibiotis Historical background, Nomenclature, Stereochemistry, Structure activity relationship, Chemical degradation classification and important products of the following dissess, Macrobic Enythromycin classification and the internoving in Astronomycin. Miscellaneous: Chickamphenicol', Clindamycin. Prodrugs: Basic concepts and application of prodrugs design. Antimilariais: Etiology of malaria. Quiralines: SAR, Quirine subhask, Chickorguine, Primaguine, Primaguine, Popohale, Paraguiner, Quinacrien Mytorchoridre, Metioquine. Biguanides and dihydro triazines: Cycloguani pamoate, Proguanil. Miscellaneous: Pyrimethamine, Artesurete, Artemether, Aborquine.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/while board	10								
3	Arti-buberolar Agenti Synthetic anti luberolar agents: Isonozid'; Ethioamide, Ethambud, Pyrzahamide, Para amino sakiojic acki Arti-buberolar ambiotices: Riffancia: Riabutin, cyclosenies Stregtomynice, Caprenoyini subphate. Urinay truca tami-findere agents Quinolones: SAR of quinolones, Naliduic Acid, Morfoxacin. Enoxacin, Oprofloxacin', Ofloacin, Lomefloxacin, Sparfloxacin, Gatiltoxacin, Moximosci Muscalinaeus: Funzacillon, Nichorantoli, Methamine, Anivital agents: Anantaliden bydrochloride, Idoxurdine triffuonde, Acyclovir', Gancyclovir, Zidovudine, Didanosine, Zaicitabine, Lamivudine, Loviride, Delavirding, Riskurin, Saquiaviri, Indianiar, Risnowi:	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10								
4	Artifungal agents: Antifungal antibiotics: Amphotericin-B, Nystatin, Natamycin, Griseofukin: Synthetic Antifungal agents: Clotimazole, Econazole, Buloconazole, Oxiconazole Ticoconozole, Miconazole', Hedoconazole, Terconazole, Taconazole, Paconazole, Netro Hydrochiotich, Sinthatiar: Anti-protocal Agents: Metromazole - Krelacomazole, Taconazole, Diseofuzio, Eloconazole, Meteriada - Moralizate - Ministeria	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	8								
5	Introduction to Drug Design Various approaches used in drug design. Physicochemical parameters used in quantitative structure activity relationing (OSAR) such a patrition coefficient, Hammerf electronic parameter, Talls estier parameter and Hamsch analysis. Pharmacophore modeling and docking techniques. Combinatorial Chemistry: Concept and applications of combinatorial chemistry: solid phase and sublicin phase synthesis.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	7								
		Part C									

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Pharmacophore modeling and docking	Experiments	BL2-Understand	6

Part D(Marks Distribution)

	Theory										
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						
100	50	75	38	25	13						
			Practical								
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						

Part E									
Books	. Wilson and Giswold's Organic medicinal and Pharmaceutical Chemistry. 2. Foye's Principles of Medicinal Chemistry. 3. Burger's Medicinal Chemistry, Vol I to IV.								
Articles	https://pubs.acs.org/journal/jmcmar								
References Books	1. Introduction to principles of drug design- Smith and Williams. 2. Remington's Pharmaceutical Sciences. 3. Martindale's extra pharmacopoeia								
MOOC Courses	https://ptel.ac.in/								
Videos	kcl tutorial								

COs	PO1	P02	PO3	P04	P05	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	1	2	-	-	-	-	-	3	-	1	2	3-
CO2	2	3	-	-	1	-	-	-	-	-	2	-	1	2	3
CO3	3	2	-	-	2	-	-	-	-	-	2	-	1	2	3
CO4	3	2	-	1	2	-	-	-	-	1	3	1	1	1	1
CO5	2	2	-	1	1	-	-	-	-	1	1	-	1	1	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-


	BPharm															
	Title of the Co	ourse	Herbal Dru	ug Technology												
	Course Co	de	BP603T													
								Dort A								
								TaitA				L	т		Р	С
	Year		3rd		Semester	6	ith			Credits		3	1		0	4
	Course Ty	pe	Theory or	nly					1							
	Course Cate	gory	Discipline	Core												
	Pre-Requisi	te/s								Co-Requisite/s						
	Course Outco & Bloom's L	omes evel	CO1- To U CO2- To H CO3- To H CO4- To A CO5- To ii	Understand raw mat Know the WHO and know the herbal cosi Appreciate patenting Illustrate the scope a	erial as source of herba ICH guidelines for evalu metics, natural sweeten of herbal drugs, GMP (t ind future prospects of t	al drugs from cu uation of herba hers, nutraceuti (BL2-Understa the herbal drug	ultivation to herbal dr I drugs(BL1-Remem cals(BL2-Understan nd) i industry(BL1-Reme	ug product(BL2-Ui iber) id) imber)	nderstand)							
	Coures Elem	ents	Skill Deve Entrepren Employab Professoo Gender X Human Va Environm	elopment ✓ neurship ✓ pility ✓ pnal Ethics X (alues X ent ✓			SDG (G	oals)	SDG3(Good health a SDG4(Quality educa SDG7(Affordable an SDG8(Decent work i SDG11(Sustainable SDG12(Responsible	and well-being) ttion) d clean energy) and economic growth) cities and economies) e consuption and producti	on)					
								Part B								
Modules				Contents							Pedago	1Y				Hours
1	Herbs as raw ma Selection, identif agricultural pract Biopesticides/Bio Preparation and	terials Definition of h ication and authentic ices in cultivation of r insecticides. Indian s standardization of Ay	erb, herbal medicine ation of herbal mater nedicinal plants inclu Systems of Medicine urvedic formulations	a, herbal medicinal p rials Processing of h uding Organic farmir a) Basic principles i s viz Aristas and Asa	roduct, herbal drug prep erbal raw material Biody ig. Pest and Pest mana involved in Ayurveda, Si was, Ghutika,Churna, L	paration Sourc lynamic Agricul agement in mec Siddha, Unani a Lehya and Bha	e of Herbs ture Good dicinal plants: nd Homeopathy b) sma.	Lecture based lea	arning, interactive clas	s, Peer tutorial, Class usi	ng ICT tool/PPT/white	board				11
2	Nutraceuticals G Nutraceuticals in of following herb Drug and Herb-F effects and intera	eneral aspects, Mark ailments like Diabete s as health food: Alfa ood Interactions: Ge actions: Hypercium, k	et, growth, scope an is, CVS diseases, Ca alfa, Chicory, Ginger heral introduction to ava-kava, Ginkobilol	nd types of products ancer, Irritable bowe r, Fenugreek, Garlic, interaction and class ba, Ginseng, Garlic,	available in the market. I syndrome and various Honey, Amla, Ginseng, sification. Study of follov Pepper & Ephedra.	. Health benefit s Gastro intesti I, Ashwagandha wing drugs and	is and role of nal diseases. Study a, Spirulina Herbal- I their possible side	Lecture based lea	arning, interactive clas	s, Peer tutorial, Class usi	ng ICT tool/PPT/white	board				7
3	Herbal Cosmetic protective agents Herbal Excipient builders, disinteg Novel dosage for	s Sources and descr s, bleaching agents, a s – Significance of su rants, flavors & perfu rms like phytosomes	ption of raw material Intioxidants in produ- bstances of natural (mes. Herbal formula	Is of herbal origin us cts such as skin car origin as excipients ations: Conventional	ed via, fixed oils, waxes e, hair care and oral hyg – colorants, sweeteners herbal formulations like	s, gums coloun giene products s, binders, dilue e syrups, mixtu	s, perfumes, . Herbal excipients: ants, viscosity res and tablets and	Lecture based lea	arning, interactive clas	s, Peer tutorial, Class usi	ng ICT tool/PPT/white	board				10
4	Evaluation of Dru Regulatory requi Biopiracy b) Pate Regulations in In drugs.	ugs WHO & ICH guid rements of natural pr enting aspects of Trac dia (ASU DTAB, ASU	elines for the assess oducts: a) Definition litional Knowledge a I DCC), Regulation o	ment of herbal drug of the terms: Patent and Natural Products of manufacture of AS	s Stability testing of her t, IPR, Farmers right, Br a. Case study of Curcum SU drugs - Schedule Z o	rbal drugs. Pate reeder's right, E na & Neem. Re of Drugs & Cos	enting and Bioprospecting and gulatory Issues - metics Act for ASU	Lecture based lea	arning, interactive class	s, Peer tutorial, Class usi	ng ICT tool/PPT/white	board				10
5	General Introduc industries and in Indian systems o storage area, ma	tion to Herbal Industi stitutions involved in f medicine Compone ichinery and equipme	y Herbal drugs indus work on medicinal ar nts of GMP (Schedu ints, standard operat	stry: Present scope nd aromatic plants in ule – T) and its objec ting procedures, hea	and future prospects. A n India. Schedule T – Go tives Infrastructural requ alth and hygiene, docum	brief account o lood Manufactu juirements, wor mentation and r	of plant-based iring Practice of king space, ecords.	Lecture based lea	arning, interactive clas	s, Peer tutorial, Class usi	ng ICT tool/PPT/white	board				7
								Part C								
Module	95				Title					Indicative-ABCA/ Experiments/Field Internships	PBL/ work/			Bloom's L	evel	Hours
1	Pre	paration and standard	lization of Ayurvedic	formulations				Res	arch Paper Presentat	ion			BL2-Underst	and		8
-							Р	art D(Marks Dis	tribution)			·				
								Theory								
Total Ma	arks	Min	imum Passing Mar	ks	Ext	ternal Evaluat	ion		Min. External Evalu	ation	Inter	nal Evaluation			Min. Internal Evalu	ation
100	50				75			38			25			13		
								Practical			T.			T		
Total Ma	arks	Min	imum Passing Mar	ks	Ext	ternal Evaluat	ion		Min. External Evalu	ation	Inter	nal Evaluation			Min. Internal Evalu	ation
L								Part E								
	Books		1. Textboo	ok of Pharmacognos	y by Trease &Evans. 2.	. Textbook of P	harmacognosy byTyl	ler, Brady & Robbe	r.							
	Articles		https://ww	w.researchgate.net/	publication/8914668_He	erbal_medicine	e_Current_status_an	d_the_future								
	References B	ooks	3. Pharma	acognosy by Kokate,	Purohit and Gokhale 4	I. Essential of P	harmacognosy by D	r.S.H.Ansari 5. Pha	armacognosy & Phytoc	chemistry by V.D.Rangari	Pharmacopoeal sta	ndards for Ayurved	lic Formulati	on (Council of Re	search in Indian Medicir	ie & Homeopathy)
	MOOC Cour	ses	https://npt	el.ac.in/												
	Videos		kcl tutorial	1												
								Course Articulati	on Matrix							
COs	PO1	PO2	PO3	PO4	P05 P	PO6	PO7	PO8	PO9	PO10	P011	P012	PSO	1	PSO2	PSO3
CO1	3	2	-	-			2	-	-	-	3	-	1		2	2
CO2	3	2	· · · · · · · · · · · 3					3	-	1	-	2	2			
CO3	1	2	2 -					-	-	-	3	-	1		2	2
CO4	2	2 1					-	-	-	2	-	2		-	1	
CO5	3	2	-	-			1	-	-	-	2	-	1		-	2
CO6	-	-	-	-			-	-	-	-	-	-	-		-	-



					BPh	arm						
	Title of the Course	Biopharmaceutics and Pharm	nacokinetics									
	Course Code	BP604T										
					Par	+ Δ						
					1 ai				L	T P	C	>
	Year	3rd	Semester	6th			Credite	5	3	1 0	4	1
	Course Type	Theory only										
	Course Category	Discipline Core										
	Pre-Requisite/s						Co-Requis	ite/s				
	Course Outcomes & Bloom's Level	CO1- To Understand the bas CO2- To Use of plasma drug CO3- To understand the con CO4- To Understand various CO5- To analyze the bioavai	ic concepts in biopharmaceutics and phan concentration-time data to calculate the p cepts of bioavailability and bioequivalence pharmacokinetic parameters, their signifi lability of a drug and to compare the bioec	rmacokinetics and pharmacokinetic p e of drug products icance & applicatio quivalence betwee	d their significar parameters to d and their signi ons.(BL2-Unde an drug product	nce.(BL3-App escribe the kir ficance.(BL2-I erstand) ts.(BL4-Analy	y) letics of drug absorption, distribution, r Jnderstand) ze)	metabolism, excretion, eliminat	on.(BL2-Understand)		
	Coures Elements	Skill Development ✓ Entrepreneurship X Employability ✓ Professsonal Ethics X Gender X Human Values X Environment X			SDG (Goals)		SDG1(No poverty) SDG3(Good health and well-being) SDG4(Quelity education) SDG8(Decent work and economic gr	rowth)				
					Par	+ B						
Modules		Contents			l di			Pedagogy				Hours
1 In Gi vc bi	ntroduction to Biopharmaceutics Absorption; SIT, absorption of drug from Non per oral extr olume of drug distribution, plasma and tissue inding, Clinical significance of protein binding	to Biopharmaceutics Absorption; Mechanisms of drug absorption through GIT, factors influencing drug absorption doen of drug from Non per oral extra-vascular routes, Distribution Tissue permeability of drugs, binding of drugs, a trug distribution, pasma and tissue periode in binding of drugs, factors affecting protein-drug binding. Kinetics of prote nical significance of protein binding of drugs					eractive class, Peer tutorial, Class usir	ng ICT tool/PPT/white board				10
2 El dr bi cc	Elimination: Drug metabolism and basic understanding metabolic pathways renal excretion of drugs, factors affecting renal ex- drugs, renal clearance, Non renal routes of drug excretion of drugs Eloxavitability and Bosquivalines: Definition and Objectu constanting, Bosquivalence studies, methods to enhance the dissolution rates and biosquivalines: Definition and Objectu correlations, biosquivalence studies, methods to enhance the dissolution rates and biosquivalence.					xoretion of veso of vivo						
3 PI ac of	Pharmacokinetics: Definition and introduction nodels, One compartment open model. (a). Ir dministrations. Pharmacokinetics parameters f their significance and application	to Pharmacokinetics, Comparti travenous Injection (Bolus) (b) s - KE ,t1/2,Vd,AUC,Ka, Clt and	ment models, Non compartment models, p Intravenous infusion and (c) Extra vascu I CLR- definitions methods of eliminations	physiological Ilar i, understanding	Lecture base	d learning, int	aractive class, Peer tutorial, Class usir	ng ICT tool/PPT/white board				10
4 M	fulticompartment models: Two compartment bading and maintenance doses and their sign	open model. IV bolus Kinetics ificance in clinical settings.	of multiple dosing, steady state drug levels	s, calculation of	Lecture base	d learning, int	aractive class, Peer tutorial, Class usir	ng ICT tool/PPT/white board				8
5 N	Ionlinear Pharmacokinetics: a. Introduction, b explanation with example of drugs.	 Factors causing Non-linearity 	. a. Michaelis-menton method of estimatin	ng parameters,	Lecture base	d learning, int	eractive class, Peer tutorial, Class usin	ng ICT tool/PPT/white board				7
					Par	tC						
Modules			Title				Indicative-ABCA/P Experiments/Field w Internships	BL/ vork/		Bloom's Level		Hours
1	in-vitro drug dissolution models	,				PBL			BL2-Understand		8	
[P	Part D(Marks	Distribution)					
Total Marine	N*i-i D	assing Marks	External Fundament		The	Min Fr	ternal Evaluation	Internal Final	untion	P41 1	ornal Evaluation	
Iotai Marks	Minimum P	assing Marks	External Evaluation	1	20	Min. Ex	ternal Evaluation	internal Eval	uauon	Min. Int	ernal Evaluation	•
100	50		15		Pract	tical		23		13		
Total Marks	Minimum P	assing Marks	External Evaluation	n	. 140	Min, Fx	ternal Evaluation	Internal Eval	uation	Min. Int	ernal Evaluation	1
					Par	tE						
	Books	1. Biopharmaceutics and Cli	nical Pharmacokinetics by, Milo Gibaldi. 2.	. Biopharmaceutic	s and Pharma	cokinetics; By	Robert F Notari					
	Articles	https://onlinelibrary.wiley.com	/journal/1099081x									
	References Books 3. Applied biopharmaceutics and pharmacokinetics, Leon Shargel and Andrew B.C.YU 4th edition, Prentice-Hall International edition, USA 4. Bio pharmaceutics and Pharmacokinetics-A Treatise, By D. M. Brahmankar and Sunil B.Jaiswal, Vallabh Prakashan Pitampura, Dehini 5. Pharmacokinetics: By Milo Gibaidi Donald, R. Mercel Dekker Inc.											

	Course Articulation Matrix														
COs	PO1	PO2	PO3	PO4	PO5	P06	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	1	2	-	-	-	-	-	3	-	3	2	3
CO2	3	2	2	1	2	-	-	-	-	-	3	-	1	-	3
CO3	2	2	1	-	2	-	-	-	-	-	3	-	1	2	-
CO4	2	3	1	1	2	-	-	-	-	-	3	-	1	1	1
CO5	3	1	2	1	2	-	-	-	-	-	2	1	-	-	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

kcl tutorial

Videos



	BPharm																	
	Title of the	Course	Pharmac	eutical Biotechnolog	IY.													
	Course	Code	BP605T															
								Part A					1	т		P	c	
	Yea	r	3rd		Se	mester	6th				Credits		3	1		0	4	
	Course	Туре	Theory of	nly														
	Course Ca	itegory	Disciplin	e Core														
	Pre-Requ	isite/s									Co-Requisite/s							
	Course Ou & Bloom's	tcomes s Level	CO1- Un CO2- To CO3- To CO4- To CO5- To	derstanding the imp understand the Ger know the Importanc Appreciate the use elaborate on microt	ortance of Immobilize netic engineering app ee of Monoclonal antii of microorganisms in pial genetics, biotrans	ed enzymes in Pharmac lications in relation to pr bodies in Industries(BL1 fermentation technolog formation and various ir	eutical Industr oduction of ph I-Remember) y(BL1-Remen mmunological	ries(BL2-Understan larmaceuticals(BL2- nber) products.(BL3-Appl	d) Understand) y)									
	Coures Ele	ements	Skill Dev Entrepre Employa Professs Gender 3 Human \ Environn	elopment ✓ neurship X bility ✓ onal Ethics X × /alues X nent X				SDG (Go	als)	SDG3(Good health an SDG4(Quality educat	nd well-being) ion)							
1	Т							Part B										
Modules	I			Contents				Pedagogy										Hours
1	a) Brief introdu immobilization introduction to Catalase, Perc	and applications. c) Bio Protein Engineering. e) xxidase, Lipase, Proteas	vith reference to Pl sensors- Working Use of microbes ir e, Penicillinase. f)	harmaceutical Scien and applications of I industry. Productio Basic principles of g	ces. b) Enzyme Biote biosensors in Pharma n of Enzymes- Gener renetic engineering.	achnology- Methods of e aceutical Industries. d) B ral consideration - Amyla	anzyme Irief ase,	Lecture based lea	rning, interactive clas	ss, Peer tutorial, Class us	ing ICT tool/PPT/white b	oard						10
2	 a) Study of clo engineering in hepatitis- B iii) 	ning vectors, restriction medicine. c) Application Hormones-Insulin. d) B	endonucleases an of r DNA technolo ief introduction to	d DNA ligase. b) Re gy and genetic engi PCR	combinant DNA tech neering in the produc	nology. Application of ge ction of: i) Interferon ii) V	anetic accines-	Lecture based lea	rning, interactive clas	ss, Peer tutorial, Class us	ing ICT tool/PPT/white b	oard						10
3	Types of immu Hypersensitivit toxoids, viral v stability of offic Substitutes.	nity- humoral immunity, ty reactions, Immune sti accine, antitoxins, serun cial vaccines f) Hybridom	 a) Structure of Immu ine suppressions. d arivatives and other duction, Purification 	noglobulins b) Struct) General method of t products relative to ir and Applications g) E	ure and Function of MH the preparation of bacter nmunity. e) Storage con Blood products and Plas	C c) rial vaccines, ditions and ma	Lecture based lea	acture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board								10		
4	 a) Immuno blo Microbial gene biotransformation 	tting techniques- ELISA tics including transform ion and applications. e)	Western blotting, ation, transduction, Mutation: Types of	Southern blotting. b conjugation, plasm mutation/mutants.) Genetic organizatio ids and transposons.	n of Eukaryotes and Pro d) Introduction to Microl	okaryotes c) bial	Lecture based lea	rning, interactive clas	s, Peer tutorial, Class us	ing ICT tool/PPT/white b	oard						8
5	 a) Fermentation Large scale price Glutamic acid, plasma Substiti 	n methods and general oduction fermenter desi Griseofulvin, d) Blood F tuties	requirements, stuc gn and its various (roducts: Collection	ly of media, equipm controls. c) Study of n, Processing and S	ents, sterilization met the production of - p torage of whole huma	thods, aeration process, enicillins, citric acid, Vita an blood, dried human p	stirring. b) Imin B12, Iasma,	Lecture based lea	rning, interactive clas	ss, Peer tutorial, Class us	ing ICT tool/PPT/white b	oard						7
								Part C										
Modul	es				Title			Indicative-ABCA/PBL/ Experiments/Field work/ Bloom's Level								н	lours	
1		DNA ISOLATION FROM	ONION					Exp	eriments			BL2	2-Understand				4	
	L						F	Part D(Marks Dis	ribution)			1				1		
L								Theory										
Total Ma	arks	Mini	mum Passing Ma	rks		External Evaluation		L	Min. External Eval	uation	Interr	nal Evaluation			Min	n. Internal Evalu	ation	
100		50			75			38			25			13				
L	r							Practical										
Total Ma	arks	Mini	mum Passing Ma	rks		External Evaluation			Min. External Eval	uation	Interr	nal Evaluation			Min	n. Internal Evalu	ation	
1											1							
								Part E										
	Book	s	1. B.R. 0	lick and J.J. Paster	nak: Molecular Bioteo	chnology: Principles and	Applications of	of Recombinant DNA	: ASM Press Washin	gton D.C. 2. RA Goldshy	et. al., Kuby Immunolog	IY.						
	Articl	es	https://pd	f.sciencedirectasse	is.com/272281/1-s2.0	0-S1369702101X80012/	1											
	References	Books	3. J.W. G	oding: Monoclonal A	Antibodies. 4. J.M. W	alker and E.B. Gingold: I	Molecular Biol	ogy and Biotechnold	gy by Royal Society	of Chemistry.								
MOOC Courses https://nptel.ac.in/																		
	Video	95	kcl tutoria	al														
	•						C	Course Articulatio	n Matrix									
COs	PO1	PO2	PO3	PO4	P05	P06 P	07	PO8	PO9	PO10	P011	PO12	PSO1	_	PSO2	2	PSO3	
CO1	3	2	-	-	-			-	-	-	3	-	1		2		2	
CO2	2	2		1				-	-	-	3	-	1		2		2	
CO3	2	2							-	-	2	-	1		2		2	
CO4	3	1						-	-	-	3	-	1		1		2	
CO5	3	2	-	1	-	1 -		-	-	-	2	-	1	_	-		2	
CO6	-	-	-	-	-			-	-	-	-	-	-		-		-	



BPharm												
		Title of the Course	Quality Assurance									
		Course Code	BP606T									
					Part A							
		Year	3rd	Semester	6tb	Credits	L	т	Р	с		
							3	1	0	4		
		Course Type	Theory only									
		Course Category	Discipline Core									
		Pre-Requisite/s				Co-Requisite/s						
		Course Outcomes & Bloom's Level	CO1- Understand the c CO2- Understand the s CO3- Understand the r CO4- To evaluate the c CO5- To elaborate the c	stand the cGMP aspects in a pharmaceutical industry appreciate the importance of documentation(BL2-Understand) stand the scope of quality certifications applicable to pharmaceutical industries such as ISO, NABL and CPD concepts in pharmaceutical industry.(BL3-Apply) stand the responsibilities of QA SI OC department(BL2-Understand) state the compliants and documents maintenance in industry with required regulatory guidelines(BL5-Evaluate) borate the califormicin, validation procedures and good wareful 22-Understand)								
		Coures Elements	Skill Development ✓ Entrepreneurship X Employability ✓ Professsonal Ethics ✓ Gender X Human Values X Environment X		SDG (Goals)	SDG3(Good health and well-being) SDG4(Quality education)						
					Part B							
	Modules		Content	S		Pedagogy				Hours		
	1	Quality Assurance and Quality Management of Quality Management (TQM): Definition, eleme overview of QSEM, with special emphasis on overview, elements of QDD program, tools ISC accreditation: Principles and procedures	oncepts: Definition and co nts, philosophies ICH Gu Q-series guidelines, ICH s 0 9000 & ISO14000: Over	oncept of Quality control, Quality assurance and GMP T idelines; purpose, participants, process of harmonizatio stability testing guidelines Quality by design (QbD): Def view, Benefits, Elements, steps for registration NABL	otal n, Brief Inition, Lecture based learning, interactive clas	s, Peer tutorial, Class using ICT tool/PPT/white board				10		

	accreditation: Principles and procedures		
2	Crganization and personnel: Personnel responsibilities, training, hygiene and personal records. Premises: Design, construction and plant layout, aminetannes, santatlaus, environmental control, utilities and maintenance of steries areas, control of contamination. Equipment and raw materials: Equipment selection, purchase specifications, maintenance, purchase specifications and maintenance of stores for raw materials.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
3	Quality Control: Quality control test for containers, nubber closures and secondary packing materials. Good Laboratory Practices: General Provisions, Organization and Personnel, Facilities, Equipment, Testing Facilities Depration, Test and Control Articles, Protocol for Conduct of a Nonclinical Laboratory Study, Records and Reports, Disqualification of Testing Facilities	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
4	Complaints: Complaints and evaluation of complaints, Handling of return good, recalling and waste disposal. Document maintenance in pharmaceutical industry: Batch Formula Record, Master Formula Record, SOP, Quality audit, Quality Review and Quality documentation, Reports and documents, distribution records.	Lecture based learning, interactive class, Peer tutorial, Class using ICT lool/PPT/white board	8
5	Calibration and Validation: Introduction, definition and general principles of calibration, qualification and validation, importance and acope of validation, types of validation, validation master plan, Calibration of pH inter, Qualification of UV-Visible spectophotometer, General principles of Analytical matter Validation. Waterbusing: Good waterbusing practice, materials management	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	7

	Par	tC		
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Calibration of pH meter	Experiments	BL2-Understand	4

Part D	(Marks Distribution)	
	Theory	

	Theory										
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						
100	50	75	38	15	13						
			Practical								
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						

	Part E
Books	1: Quality Assurance Guide by organization of Pharmaceutical Products of India. 2. Good Laboratory Practice Regulations, 2nd Edition, Sandy Weinberg Vol. 69. 3. Quality Assurance of Pharmaceuticals- A compendium of Guide lines and Related materials Vol I WHO Publications
Articles	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3088954/
References Books	4. A guide to Total Quality Management- Kushik Matra and Sethan K. Ghosh 5. How D Practice GMP's – P P Sharma. 6. ISO 9000 and Total Quality Management – Sadhank G Ghosh 7. The International Pharmacopoeia – Vol I, II, III, IV- General Methods of Analysis and Quality specification for Pharmaceutical Substances. Excision Statistications: Excision and Social Substances. Excision and
MOOC Courses	https://ptel.ac.in/
Videos	kcl tutorial

COs	P01	PO2	PO3	PO4	PO5	P06	P07	P08	P09	PO10	P011	P012	PSO1	PSO2	PSO3
CO1	3	1	-	1	2	-	-	-	-	-	3	-	1	2	1
CO2	1	2	-	1	2	-	-	-	-	-	3	-	1	2	1
CO3	2	2	-	1	2	-	-	-	-	-	3	-	1	-1	3
CO4	3	1	-	1	2	-	-	-	-	-	3	-	1	-	2
CO5	2	1	-	1	1	-	-	-	-	-	2	-	1	-	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Title of the Course	Medicinal Chemistry III							
Course Code	BP607P							
			Part A					
Y	2-1	S	Cil.	Condito	L	т	Р	с
Tear	310	Semester	601	Creans	0	0	2	2
Course Type	Lab only	•	•	•				
Course Category	Discipline Core							
Pre-Requisite/s				Co-Requisite/s				
Course Outcomes & Bloom's Level	CO1- To define and sel CO2- To explain princip CO3- To choose the me CO4- To compare the a CO5- To predict the rela	ect the method for preparation of drugs and intermedial le underlying the preparation of drugs(BL2-Understan thod for assay of drugs by quantitative analysis(BL3-A dvantages of microwave technique over conventional ation between physicochemical properties and biologica	tes(BL1-Remember) d) pply) ynthesis of drugs(BL5-Evaluate) al activity(BL3-Apply)					
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics X Gender X Human Values X Environment X		SDG (Goals)	SD03(Cood health and well-being) SD04(Quality education) SD017(Parthernings for the goals)				
			Part B					
Modules		Contents		Pedagogy			Hours	

	Par	C		
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	I Preparation of drugs and intermediates 1 Sulphanilamide 2 7-Hydroxy, 4-methyl coumarin 3 Chlorobutanol 4 Triphenyl imidazole 5 Tolbutamide 6 Hexamine	Experiments	BL3-Apply	9
2	II Assay of drugs 1 Isonicotinic acid hydrazide 2 Chloroquine 3 Metronidazole 4 Dapsone 5 Chlorpheniramine maleate 6 Benzyl penicillin	Experiments	BL6-Create	8
3	III Preparation of medicinally important compounds or intermediates by Microwave irradiation technique	Experiments	BL3-Apply	8
4	IV Drawing structures and reactions using chem draw®	Experiments	BL4-Analyze	8
5	V Determination of physicochemical properties such as logP, clogP, MR, Molecular weight, Hydrogen bond donors and acceptors for class of drugs course content using drug design software Drug likelinges screening (Lininskies ROS)	Experiments	BL5-Evaluate	8

Part D(Marks Distribution)

	Theory											
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							
Practical												
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							
50	25	35	18	15	8							

Part E									
Books	1. Wilson and Giswold's Organic medicinal and Pharmaceutical Chemistry. 2. Foye's Principles of Medicinal Chemistry. 3. Burger's Medicinal Chemistry, Vol 1 to IV.								
Articles	https://pubs.acs.org/journal/jmcmar								
References Books	1. Introduction to principles of drug design- Smith and Williams. 2. Remington's Pharmaceutical Sciences. 3. Martindale's extra pharmacopoeia.								
MOOC Courses	https://nptel.ac.in/								
Videos	Pharmacy India								

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	2	1	-	-	-	-	-	3	-	1	2	1
CO2	3	2		3	1	-	-	-	-	-	2	-	1	2	2
CO3	2	1	-	2	2	-	-	-	-	-	3	-	1	2	2
CO4	2	2		1	1	-	-	-	-	-	2	-	-	-	2
CO5	3	1	-	1	1	-	-	-	-	-	1	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-			

Course Articulation Matrix



Title of the Course	Pharmacology III	cology III									
Course Code	BP608P										
Part A											
Y											
tear	310	Semester	bth	Credits		0	0	2	2		
Course Type	Lab only	•	•								
Course Category	Discipline Core										
Pre-Requisite/s					Co-Requisite/s						
Course Outcomes & Bloom's Level	CO1- To recall the dose CO2- To demonstrate o CO3- o analyze effect o CO4- To evaluate acute CO5- To predict the pha	e calculations in pharmacological experiments, and to re if effect of drugs on gastrointestinal motility and the effe of saline purgative on frog intestine, insulin hypoglycem o rall toxicity (LDSD), acute skin irritation / corrosion an armacokinetic parameters and adapt the biostatistics m	late the antiallergic activity / anti-ulcer activity in rat ct of agonist/antagonists on guinea pig ileum(BL3-A e effect and test for pyrogens using rabbit method(E acute eye irritation / corrosion of a test substance(athods in experimental pharmacology.(BL3-Apply)	models(BL1-Re Apply) 3L4-Analyze) BL5-Evaluate)	emember)						
Coures Elements	Skill Development ✓ Entrepreneurship X Employability ✓ Professonal Ethics X Gender X Human Values X Environment X		SDG (Goals)	SDG3(Good health and well-being)							
Part B											
Modules		Contents			Pedagogy			Hours			

	Pa	tC		
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	1. Dose calculation in pharmacological experiments 2. Antiallergic activity by mast cell stabilization assay	Experiments	BL2-Understand	8
2	 Study of anti-ulcer activity of a drug using pylorus ligand (SHAY) rat model and NSAIDS induced ulcer model. 4. Study of effect of drugs on gastrointestinal mobility 	Experiments	BL4-Analyze	8
3	5. Effect of agonist and antagonists on guinea pig ileum 6. Estimation of serum biochemical parameters by using semi- autoanalyzer	Experiments	BL2-Understand	8
4	7. Effect of saline purgative on frog intestine 8. Insulin hypoglycemic effect in rabbit	Experiments	BL3-Apply	8
5	9. Test for pyrogens (rabbit method) 10. Determination of acute oral toxicity (LD50) of a drug from a given data	Experiments	BL3-Apply	8
6	11. Determination of acute skin irritation / corrosion of a test substance 12. Determination of acute eye irritation / corrosion of a test substance	Experiments	BL2-Understand	8
7	13. Calculation of pharmacokinetic parameters from a given data 14. Biostatistics methods in experimental pharmacology (student's t test, ANOVA)	Experiments	BL3-Apply	8

Part D(Marks Distribution)

	Theory											
Total Marks	Minimum Passing Marks	Min. Internal Evaluation										
	Practical											
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							
50	25	35	18	15	8							

	. Part E
Books	Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology, Churchil Livingstone Elsevier 2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill
Articles	https://www.sciencedirect.com/science/article/abs/pii/S0163725804001718
References Books	1 Marry Anne K. K., Libyd Yee Y., Brian K. A., Robbin L.C., Joseph G. B., Wayne A. K., Bradley R.W., Applied Therapeutics, The Clinical use of Drugs. The Point Lippincott Williams & Wikins 2. Mycek M.J., Geinet S.B and Perper M.M. Lippincott's illustrated Reviews- Pharmacology
MOOC Courses	https://nptel.ac.in/
Videos	Pharmacy india

	Course Articulation Matrix														
COs	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	PO9	PO10	P011	P012	PSO1	PSO2	PSO3
CO1	3	2	-	-	-	3	-	-	-	-	2	-	1	2	2
CO2	3	1	-		-	3	-	-	-	-	3	-	1	2	1
CO3	3	2	-	-	-	2	-	-	-	-	3	-	1	2	1
CO4	2	1	-		-	2	-	-	-	-	2	-	-	-	1
CO5	3	2	-	-	-	2	-	-	-	-	1	-	1	-	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Title of the Course	Herbal Drug Technolo	ах										
Course Code	BP609P											
Part A												
Y	2-1	Sementer	e	Cradita	L	т	P	с				
Tear	310	Semester	601	Credits	0	0	2	2				
Course Type	Lab only			-								
Course Category	Discipline Core	sine Core										
Pre-Requisite/s				Co-Requisite/s								
Course Outcomes & Bloom's Level	CO1- To remember di CO2- To evaluate the CO3- To apply monog CO4- To evaluate par CO5- To assess the to	ifferent preliminary phylochemical screening of cr various herbal formulations(BL4-Analyze) graphic analysis of herbal drugs as per pharmaco ameters such as aldehyde and phenol contents(I total alkaloid and other content(BL3-Apply)	rude drugs(BL2-Understand) vpoeias(BL3-Apply) BL5-Evaluate)									
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics > Gender × Human Values × Environment ×	×	SDG (Goals)	SDG1(No poverty) SDG3(Good health and well-being) SDG4(Quality education) SDG8(Becent work and economic growth) SDG17(Plantnerships for the goals)								

Part B

Contents

Modules

	Part C												
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours									
1	1. To perform preliminary phytochemical screening of crude drugs. 2. Determination of the alcohol content of Asava and Arista	Experiments	BL3-Apply	12									
2	 Evaluation of excipients of natural origin 4. Incorporation of prepared and standardized extract in cosmetic formulations like creams, lotions and shampoos and their evaluation. 	Experiments	BL5-Evaluate	12									
3	 Incorporation of prepared and standardized extract in formulations like syrups, mixtures and tablets and their evaluation as per Pharmacopoeial requirements. 6. Monograph analysis of herbal drugs from recent Pharmacopoeias 	Experiments	BL5-Evaluate	12									
4	7. Determination of Aldehvde content 8. Determination of Phenol content 9. Determination of total alkaloids	Experiments	BI 4-Analyze	12									

Part D(Marks Distribution)

Pedagogy

Hours

							Theor	/						
Tota	al Marks		Minimum Pa	assing Marks		External Evaluation		Min. External Evaluation		Internal Evaluation		nternal Evaluation		
	Practical													
Tota	al Marks		Minimum Pa	assing Marks		External Evaluation Min. External Evaluation				Internal Evaluation Min. Internal Eva				
50	25						18		15		8			
	Part E													
	Boo	ks		1. Textbook of Pharmaco	gnosy by Trease	&Evans. 2. Textbook of Pharmacognosy	byTyler, Brady & Robl	er. 3. Pharmacognosy by Kokate, Purohit a	nd Gokhale					
	Artic	les		https://www.researchgate	.net/publication/8	914668_Herbal_medicine_Current_state	s_and_the_future							
	Reference	s Books		5. Pharmacognosy & Phy Horizons Publishers, New	tochemistry by V. r Delhi, India, 200	D.Rangari 6. Pharmacopoeal standards)2.	for Ayurvedic Formula	ion (Council of Research in Indian Medicin	& Homeopathy) 7. N	lukherjee, P.W. Quality Control of Her	bal Drugs: An Approach to	Evaluation of Botanicals. Business		
	MOOC	ourses		https://nptel.ac.in/										
	Vide	05		Pharmacy India										
							Course Articula	tion Matrix						
COs	PO1	PO2	PO3	PO4	PO5	P06 P07	PO8	P09 P010	P011	P012 PS01	1 PS02	PSO3		

CO1	1	2	1	-	-	-	-	-	-	-	-	-	1	2	-
CO2	1	2	1		-		-	-	-	-	-	-	1	-	1
CO3	1	2	1	-	-	-	-	-	-	-	-	-	-	2	-
CO4	3	2	1	1	-		-	-	-	-	-	-	1	2	1
CO5	2	1	1	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



				BPh	arm							
Title of the	e Course	Online certified courses	related to Pharmacy II *									
Course	e Code	BP610T										
<u> </u>				Par	† A							
			2				0	L	Т	Р	с	
Te	ar	3rd	Semester	ьth			Credits	1	0	0	1	
Course	е Туре	Online course	•									
Course C	Category	Skill Enhancement Cou	rses									
Pre-Req	uisite/s						Co-Requisite/s					
Course O & Bloom	outcomes I's Level	CO1- Explore the clinica	al trial process, the basics of good clinical practice, and	the history of regulatory	r frameworks for medical treatm	ment and tes	sting.(BL2-Understand)					
Coures E	Coures Elements Coures Element				s (Goals) Si Si	SDG3(Good health and well-being) SDG4(Quality education)						
	Part B											
Moc	dules		Contents				Pedagogy			Hou	rs	
1	In Module One you'll learn the basics of what a clinical trial is. You'll hear from inver of clinical trials, and you'll learn about the drug discovery process.			m investigators, patients	, and sponsors about the bene	online	ie		10			
2		In Module Two we'll fo the history of regulato consent, talk about ris	ocus on some important rules and regulations. You'll fin my frameworks for medical treatment and testing. We'll sk, and discuss data integrity.	d out why good clinical also explore some clinic	practice matters and learn about al trial definitions, look at inform	ters and learn about online 10			10			
3		In Module Three we'll patients must do to be we'll hear from some	explore how research in clinical trials makes a differen ecome involved. You'll learn about the importance of div patients who'll tell us how they experienced the trial pro	ce. We'll also walk you t versity in clinical trials, in poess.	I also walk you through what medical teams and clinical trials, inclusion and exclusion criteria, and online 10							
				Par	tC							
Modules			Title			Indicative Experiment Inter	e-ABCA/PBL/ tts/Field work/ rnships	Bloo	m's Level		Hours	
1	Foundamental of good clinical pr	actices			Internships		E	3L2-Understand			10	
	•											
				Part D(Marks	Distribution)							
Total Marks	Minimum Pa	soing Marks	External Evaluation	The	Min External Evaluatio		Internal Evaluation		Min	Internal Eval	ration	
25	10 an warks withintum Passing warks External Evaluation with External E						internal Evaluation		Min.	. memai Evan	101011	
20	za o o practical sector											
Total Marks	Minimum Pa	ssing Marks	External Evaluation		Min. External Evaluatio	on	Internal Evaluation	1	Min.	Internal Eval	uation	
t	1			1								
Ded E												
Boo	Part E Pa											

Videos	kcl tutorial
MOOC Courses	https://nptel.ac.in/
References Books	Guideline IH. Guideline for good clinical practice. J Postgrad Med. 2001;47(3):199-203.
Articles	htps://www.ncbi.nlm.nlh.gov/pms/articles/PMC3097692/
Books	World Health Organization. Handbook for good clinical research practice (GCP): guidance for implementation.

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	-	1	3	-	-	-	-	3	-	1	2	3
CO2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Title of the Course	Artificial intelligence	in Pharmaceutical							
Course Code	BP611ET								
			Part A						
Yoar	3rd	Somestor	eth	Credite	L	т	Р	с	
i ear	310	Semester	our	Cieurs	3	1	0	4	
Course Type	Theory only	ny i i i i i i i i i i i i i i i i i i i							
Course Category	Discipline Specific E	ne Spacific Elective							
Pre-Requisite/s		Co-Requisite/s							
Course Outcomes & Bloom's Level	CO1- Acquire an in- CO2- Recognize and CO3- Implement Al i CO4- To gain the kn CO5- Abilit To apply f	depth comprehension of AI applications in phar d counter prevalent myths associated with AI.B in real-life pharmaceutical use cases without the owlege of AI and how to implement in healthcar time-series forecasting for healthcare applicatio	naceutical domain:(BL2-Understand) L2-Understand) • need for coding.(BL3-Apply) e(BL3-Apply) ns(BL3-Apply)						
Coures Elements	Skill Development J Entrepreneurship X Employability J Professsonal Ethics Gender X Human Values X Environment X	x	SDG (Goals)	SDG3(Good health and well-being) SDG4(Quality education) SDG9(Industry Innovation and Infrastructure) SDG17(Partnerships for the goals)					

Part B

Pedagogy

Hours

Contents

Modules

	Part D(Marks Distribution)											
	Theory											
Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation												
100	50	75	38	25	13							
	Practical											
Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation												

	Part E
Books	Harrer S, Menard J, Rivers M, Green DV, Karpiak J, Jeliazkov JR, Shapovalov MV, del Alamo D, Sternke MC. Artificial intelligence drives the digital transformation of pharma. InArtificial Intelligence in Clinical Practice 2024 Jan 1 (pp. 345-372). Academic Press.
Articles	Patel J, Patel D, Meshram D. Artificial Intelligence in Pharma Industry-A Rising Concept. Journal of Advancement in Pharmacognosy. 2021;1(2).
References Books	Bhupathyragi M, Rani KR, Essa MM, editors. Artificial Intelligence in Pharmaceutical Sciences. CRC Press; 2023 Nov 23.
MOOC Courses	Udemy, coursera, NEPTEL
Videos	YOU TUBE

COs	PO1	PO2	PO3	PO4	P05	PO6	P07	P08	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	-	2	3	-	-	-	-	-	3	-	1	1	2
CO2	2	2	1	•	1	-	-	-	-	-	2	2	1	1	1
CO3	2	3	1	1	1	-	-	-	-	-	1	1	1	1	1
CO4	1	2	1	1	1	-	-	-	-	-	1	1	1	1	1
CO5	1	1	1	1	-	-	-	-	-	-	-	1	1	1	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



	Title of the Course	Good Manufacturing	Pharma Pharma								
	Course Code	BP612ET									
					Part A						
	¥	2-1	Semester	C11-		Credite	L	т	Ρ	c	
	Tear	310	Semester	oui		Credits	1	0	0	1	
	Course Type	Theory only	nly a state of the								
	Course Category	Discipline Specific I	ne Specific Elective								
	Pre-Requisite/s		Co-Requisite's								
	Course Outcomes & Bloom's Level	CO1- To be able to CO2- To have the c CO3- To get familia	To be able to understand the basics of Good Manufacturing Practice for medicinal products for human use and the current legal regulations and guidelines(BL1.Remember) O1. To have the confidence to cultine the main GMM requirements related to premises, storage facilities and personnel (BL2-Inderstand) To a be able to with the principles of the GAM public system and quality control and the important procedures when dealing with complaints and recails(BL3.Apply)								
	Coures Elements	Skill Development - Entrepreneurship × Employability ✓ Professsonal Ethics Gender × Human Values ✓ Environment ×	/ : :	SDG (G	oals)	SDG4(Quality education) SDG12(Responsible consuption and production)					
Part B											
Modules	s Contents					Pedagogy Hours					

UNIT 1	Introduction What is Good Manufacturing Practice? Why is GMP important? Official GMP Directives, the basic requirements of Good Manufacturing Practice, Pharmaceutical Quality System Principle and overview of the Pharmaceutical Quality System. Major updates. Development, content and mighternatiation of PO2.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	8
UNIT 2	Personnel Key personnel. Background and duties of the Qualified person. Duties of the Head of production department. Duties of the Head of quality control. Person releasing the batch. Consultants. Personnel training and hygiene, Premises and Equipment Production area. Storage area. Quality control areas. Ancilary areas. Equipment.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	8
UNIT 3	Documentation Premises, Generation and control of documentation. Types of documents and specifications. Nanufacturing formation and processing instructions. Proceeding instructions. Proceedings and encoders, Production Generation of cross- contamination in production, Guidelines for starting materials. Processing operations. Packaging materials and operations. Guidelines for finished products.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	8
UNIT 4	Quality Control General principles. Main tasks of the Quality control department. Technical transfer of testing methods. Transfer	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	8

Part D(Marks Distribution)

	Theory											
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							
100	50	75	38	25	13							
			Practical									
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							

	Part E
Books	Karmacharya JB. Good manufacturing practices (GMP) for medicinal products. Promising Pharmaceuticals. 2014;101.
Articles	Patel KT, Chotai NP. Pharmaceutical GMP: past, present, and future-a review. Die Pharmazie-An International Journal of Pharmaceutical Sciences. 2008 Apr 1;63(4):251-5.
References Books	Durivage MA, editor. The Certified Pharmaceutical GMP Professional Handbook. Quality Press; 2016 May 23.
MOOC Courses	UDEMY, COURSERA, PHARMASTATE ACADEMY
Videos	You tube

	Course Articulation Matrix														
COs	PO1	PO2	PO3	PO4	PO5	P06	P07	P08	PO9	PO10	P011	P012	PSO1	PSO2	PSO3
CO1	3	-	-	1	2	-	2	2	1	-	3	-	1	1	1
CO2	2	2	-	1	3		2	1	1	-	2	-	1	1	1
CO3	1	1	-	1	1	-	1	1	1	-	1	-	1	1	1
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



		Di han								
Title of the Course	Healthcare Marketplace Capston	re Marketplace Capstone								
Course Code E	BP613ET									
		Part A								
Year	3rd	Semester	6th		Credits		L T	Р 0	C 1	
Course Type	Theory only									
Course Category	Ability Enhancement Courses	cement Courses								
Pre-Requisite/s	This course is offered by the Uni	iversity of Minnesota on the Coursera platform. students are requested to	r the instructions given by institute	Co-Requisite/s						
Course Outcomes & & Bloom's Level	CO1- Learn new concepts from i CO2- Gain a foundational under	01- Learn new concepts from industry experts(BL2-Understand) 02- Gain a foundational understanding of a subject or tool, Develop job-relevant skills with hands-on projects(BL3-Apply)								
Coures Elements	Skill Development X Entrepreneurship X Employability Y Professional Ethics X Gender X Human Values X Entrivironment X		SDC	9 (Goals)	SDG3(Good health and well-being) SDG4(Quality education) SDG8(Decent work and economic growth)					
· · · · · · · · · · · · · · · · · · ·		Part B								
Modules		Contents		F	Pedagogy		Hours			

1	What is your Health Marketgiace Innovation? In this Milestone you will describe a new medical innovation in the context of what marke is extraordinary for investment or use in a community. Your final project for this capstone will feast react articlar milestone components for an assessment of new innovation. Once completel, hope is that you have a body of illustrate your critical thinking to advance your career or which careers into the healthcare market.	
2	What is the Voice of the Healthcare Provider For the second milestone you will complete an analysis of what the key customer - the medical provider - will required of the new technology or innovation to want to use it. This will require you to ask medical providers that you encourter solute healtwore of the technology and whether would find to throuke. Remember the adverse tell provider that you are a student not a sales agent. The health care delivery ourse provides great insight into how care is delivered and will provide the context and background for your brief 24 gaps memor sexiling from this millestone.	
3	Regulatory and IP Status of the innovation, How will the Innovation Generate Revenue, A great innovation needs a solid revenue model for survival solity. In this milestone you will be acted to use parts of the prior three captornes to generate your own market report. (dentifying the innovation's market space, voice of the customer, IP and regulatory path and final path nod reimbursement are critical components for identifying whether a metcal innovation should advance and be sustained commercially and the structure of the structure of the structure of the structure and be sustained commercially and the structure of the structure of the structure of the structure and be sustained commercially and the structure of the struc	
4	Submitting the Final Project	

Part D(Marks Distribution)

	Theory								
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation				
25	20	5	5	0	0				
			Practical						
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation				

	Part E
Books	
Articles	
References Books	
MOOC Courses	https://www.coursera.org/learn/healthcare-marketplace-capstone
Videos	

							Co	urse Articulation	Matrix						
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	P011	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	-	1	-	-	-	-	-	3	1	1	1	1
CO2	2	1	1	-	1	1	-	-	1	-	2	1	1	1	1
CO3	1	1	1	1	1	-	-	-	-	-	1	1	1	1	2
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



BPharm

	Title of the Course	Industrial Pharmacy II	strial Pharmacy II								
	Course Code	BP702T	02T								
				Part A							
	Voar	4th	Semester	Zth	Gradite	L	т	Ρ	С		
	, cu		Concesco	7.01	ordato	3	1	-1	3		
	Course Type	Theory only									
Course Category Discipline Core											
	Pre-Requisite/s				Co-Requisite/s						
	Col-T- To explains pilot plant, scale up techniques and SUPAC guidense (BL 1-Remember) CO2: To outline various aspects of technology transfer involved from R & D to productions. (BL2-Juderstand) & Bloom's Level CO3: To choose and D capty various responsibilities and regulatory requirements for drug approval (BL3-Apply) CO4: To analyze and study various quality management systems in plantmacy field. (BL4-Analyze) CO5: To determine the requirements and approval productions (BL2-Kealuate)										
Skill Development ✓ Entreprensurship X Employability ✓ Professional Elitics X Gender X Human Values X Environment X				SDG (Goals)	SDG4(Quality education)						
				Part B							
Modules		Contents			Pedagogy				Hours		
UNIT 1	Pilot plant scale up techniques: General consider materials, Pilot plant scale up considerations for s Introduction to platform technology	ations - including significance solids, liquid orals, semi solid	e of personnel requirements, space requirements, raw Is and relevant documentation, SUPAC guidelines,	/ Lecture based learning, interactive class, Peer turbrial, Class using ICT tool/PPT/white board					10		

	introduction to platform technology		
UNIT 2	Technology development and transfer: WHO guidelines for Technology Transfer(TT): Terminology. Technology transfer protocol, Quility risk maragement, Transfer from R. 8 D. Do production (Process, packaging and desinig). Granulinity of TT Process APL excipients. finished products, packaging materials) Documentation, Premises and equipment, qualification and validation, quality control, analytical method transfer, Aproved regulatory bodies and agencies, Commercialization – practical aspects and problems (case studies), TT agencies in India - APCTD, NBCC, TIFAC, BCIL, TBSE / SIDB; TT related documentation - confidentiality agreement, licensing, MoUs, legal issues	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT 3	Regulatory effairs: Introduction, Hetorical overview of Regulatory Affairs, Regulatory atthonities, Role of Regulatory affairs department, Responsibility of Regulatory Affairs Regulatory Affairs (Regulatory atthonities) for durg approvale) Tong Development terms. Non-Clinical Drug Development, Pharmacology, Drug Metabolism and Toxicology, General considerations of Investigational New Drug (ND) Application, Investigator & Brochure (IB) and New Drug Application (NDA), Clinical research / BE studies, Onical Research Protocols, Bostatistics in Pranteactulical Power Development, Data Resentation for DAs Addimistrations and Amagement of Clinical Studies.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tooI/PPT/while board, Blended Learning	10
UNIT 4	Quality management systems: Quality management & Certifications: Concept of Quality, Total Quality Management, Quality by Design (QbD), Six Sigma concept, Qual of Specifications (QOS), Change control, Introduction to ISO 9000 series of quality systems standards, ISO 14000, NABL, GLP	Lecture based learning, interactive class, Peer tutorial, Class using ICT too/IPPT/white board	8
UNIT 5	Indian Regulatory Requirements: Central Drug Standard Control Organization (CDSCO) and State Licensing Authority: Organization, Responsibilities, Certificate of Pharmaceutical Product (COPP), Regulatory requirements and approval procedures for New Drugs.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board, Case Based Learning	7

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Regulatory requirements and approval	Case Study	BL3-Apply	5
	Part D(Marks	Distribution)		

Part C

Theory													
Total Marks	Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation												
100	50	75	38	25	13								
			Practical										
Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation													

	Part E
Books	1. International Regulatory Affairs Updates, 2005. available at http://www.iraup.com/about.php 2. Douglas J Pisano and David S. Mantus. Text book of FDA Regulatory Affairs A Guide for Prescription Drugs, Medical Devices, and Biologics' Second Edition.
Articles	5. Regulatory Affairs from Wikipedia, the free encyclopedia modified on 7th April available at http://en.wikipedia.org/wiki/Regulatory_Affairs. 6. International Regulatory Affairs Updates, 2005. available at http://www.iraup.com/about.php
References Books	3. International Regulatory Affairs Updates, 2005. available at http://www.iraup.com/about.php 4.Douglas J Pisano and David S. Mantus. Text book of FDA Regulatory Affairs A Guide for Prescription Drugs, Medical Devices, and Biologics' Second Edition.
MOOC Courses	https://publia.cin/https://www.udemy.com/course/ant/ficate-course-indrug-regulatory-statini-rdra? =&um_source-adwrofs&utm_medum=udemyads&utm_campaign=LongTail_ls_EN_co.INDL&utm_content=deal4584&utm_term=ag_118445032537ad_618853564450kvvde_cdmplti_dsa- 12/22/12/34/P1107785g&amkthtype=Bagd_source=1&gdird=CyWCA/W-OwBhaEnkwAgarzUvsaJSSOVDQVcVVySo?ow5x2Dr2EpdRy078MkbgJMuLMIZ7DRoCu27QMO_BwEExouponCode=IND21PM
Videos	

	Course Articulation Matrix														
COs	COs P01 P02 P03 P04 P06 P07 P08 P09 P010 P011 P012 PS01 PS02 PS03													PSO3	
CO1	2	3	2	-	-	-	-	-	-	-	3	-	3	2	1
CO2	3	3	1	-	-	-	-	-	-	-	3	-	3	2	1
CO3	2	2	1	1	-	-	2	-	-	-	3	-	3	2	1
CO4	3	1	1	-	-	-	-	-	-	-	2	-	3	2	1
CO5	2	3	3	-	-	-	-	-	-	-	2	-	1	1	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	



	BPharm												
	Title of the Course Pharmacy Practice												
	Course Code	Code BP703T											
	Part A												
	Vor	415	Somester	745	Cradita	L	т	Ρ	с				
	tear	401	Semester	Credits	3	1	0	4					
	Course Type	Theory only	•	•									
	Course Category	y Discipline Core											
	Pre-Requisite/s			Co-Requisite/s									
	Course Outcomes & Bloom's Level	CO1- To acquire the km CO2- To outline the org CO3- To demonstrate the CO4- categorize and en CO5- To interpret clinic	owledge on organization of hospitals, various methods anization and structure of community pharmacy and to he knowledge of therapeutic drug monitoring, patient m avulate the role of hospital pharmacist in pharmacy and al laboratory tests of specific disease states to provide	of distribution and hospital formulary in hospitals an build ability to design and run own community phan edication history interview and to apply the knowled therapeutic committee, drug information services, better patient centered service. (BL4-Analyze)	nd apply it in the practice of pharmacy.(BL1-Remember) macy,(BL1-Remember) (ge on assessment of drug related problems.(BL2-Understand) patient counseling, education and training programmes in hospitals.(BL1-Remember)							
	Coures Elements	Skill Development X Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✓ Gender ✓ Human Values ✓ Environment X		SDG (Goals)	SDG1(No poverty) SDG2(Zero hunger) SDG3(Goot health and well-being) SDG4(Quality education) SDG5(Gender quality) SDG6(Clean water and sanitation)								
	Part B												
Modules		Content	5		Pedagogy				Hours				

UNIT 1	a) Hospital and its organization Definition, Classification of hospital-Primary, Secondary and Tertiary hospitals, Classification based on critical basis, Organization Structure of a Hospital and Medical staffs involved in the hospital and Metri functions. b) Hospital pharmacy, Corganization structure, Location, Layout and staff requirements, and Responsibilities and functions of hospital pharmacy. Organization structure, Location, Layout and staff requirements, and Responsibilities and functions of hospital pharmacis.c) Adverse drug reaction Classifications - Excessive pharmacological effects, secondary pharmacological effects, discources, allergic drug reactions, genetically determined toxicity, toxicity blowing suddow withdrawal of drug, Drug interaction- Peerfosi antireactions, adverse drug reactions, genetically determined toxicity, toxicity blowing adadem withdrawal to drug, Drug interaction- heerfosi antireactions, adverse drug reactions, genetically determined toxicity, toxicity blowing adadem withdrawal to drug, Drug interactions, Peerford and management, d) Community Pharmacologianization and structure of real and wholesale drug store, types and design, Lagai requirements for establishment and maintenance of a drug store. Dispensing of proprietary products, maintenance of records of relat and wholesale drug store.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT 2	a) Drug distribution system in a hospital Dispersing of drugs to inpatients, types of drug distribution systems, charging policy and babeling. Dispersing of drugs to anhulatory patients, and Depensing of controlled drugs. I) Hospital formulary patients, contents of hospital formulary, Differentiation of hospital formulary and Drug Ist, preparation and revision, and addition and deletion of drug from hospital formulary, Othersentid and monitoring Need OT Threspectic Drug Monitoring, a close to be considered drugs the Threspectic Drug Monitoring, and Indian scenario for Threspectic Drug Monitoring, a close to be considered drugs the non-adherence, Dammasist role in the medication adherence, and monitoring of patient medication adherence. Or battern the drugs of history interview Need for the patient medication history interview, medication interview forms. I) Community pharmacy management Financial, materials, staff, and infrastructure requirements.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT 3	a) Pharmacy and therapeutic committee Organization, functions, Policies of the pharmacy and therapeutic committee In including drogs into formulary, inpatient and outglatein prescription, automatic stop over, and emergency of upit preparation. D) Drug information services Drug and Poison information center, Sources of drug information, Computerized services, and storage and retrieval of information. Planten consensity: Earlier Courseling: a table provide in trademic courseling: and Bobal cases that retrieval and information. Planten courseling: a table courseling: a table provide in patient courseling: a difficult and provide and the pharmacian in the interdepathmental to Education. Services provide marking program retrieval and information. Services and courseling: a course pharmacian in the interdepathmental community and courseling. And education of the courseling and and pharmacian in the interdepathmental community in the courseling of the courseling and the course in the course of the course of the courseling and the course of the cour	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT 4	prestation and implementation Budget preparation and implementation b) Clinical Plearmacy Introduction to Clinical Plearmacy Concept of clinical plearmacy, functions and responsibilities of clinical phematist. Drug therapy monitoring - medication chart review, clinical review, pharmacish Intervention, Ward round participation, Medication history and Phermacostical care. Doing pattern and drug therapy based on Pharmacokinetic & disease pattern. c) Over the counter (OTC) sales Introduction and sale of over the counter, and Rational used common over the counter medications.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	08
UNIT 5	a) Drug steve management and inventory control Organization of drug store, types of materials stocked and storage conditions, Prucriase and inventory control principies, purchase productine prices and exter procursment and stocking. Economic order quantity, Recoder quantity level, and Methods used for the analysis of the drug expenditure b) Investigational use of drugs Description, principies involved, classification, control, identification, rule of hospital planemasti, advisory committee.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	07

	Pai	tC		
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Visit of ITM Hospital	Internships	BL2-Understand	3
2	Visit of ITM Hospital	Field work	BL2-Understand	2

	Part D(Marks Distribution)												
Theory													
Total Marks	Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation												
100	100 50 For the second sec												
			Practical										
Total Marks	Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation												
1													

	Part E
Books	1.Merchant S.H. and Dr. J.S. Quadry. A textbook of hospital pharmacy. 4th ed. Ahmadabad: B.S. Shah Prakakshan; 2001. 2.Parthasarathi G, Karin Nyfort-Hansen, Milap C Nahata. A textbook of Clinical Pharmacy Practice-essential concepts and skills, 1st ed. Chennai: Orient Longman Private Limited; 2004.
Articles	6. Therapeutic drug monitoring. ISSN: 0163-4356 7. Journal of pharmacy practice. ISSN: 0974-8326 8. American journal of health system pharmacy. ISSN: 1535-2900 (online) 9. Pharmacy times (Monthly magazine)
References Books	3. Tprins Bajaji, Hospital Pharmacy, tet d. Maharashtar: Career Publications; 2008. 4. Scott LT. Basic akills in interpreting laboratory data, 4thed. American Society of Health System Pharmacists Inc; 2008. 5. Parmar N.S. Health Education and Community Pharmacy, 18th ed. India: CSE Visitianers & Distributioners; 2008.
MOOC Courses	https://nptel.ac.in/. https://www.udemy.com/
Videos	You tube

	Course Articulation Matrix														
COs	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	-	-	-	2	•	-	-	-	3	-	1	2	1
CO2	3	1	-	1	-	2	-	-	-	-	3	-	1	1	1
CO3	2	2	-	-	-	1	•	-	-	-	3	-	1	1	1
CO4	3	1	-	1	-	2	-	-	-	-	2	-	1	1	1
CO5	2	1	-	1	-	1	1	-	-	-	2	-	1	2	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



						BPha	rm							
	Title of the	Course	Novel Drug Delivery System											
	Course	Code	BP704T											
						Part	A							
	Von		415	Semester	7th				Cradita	L	т	Р	С	
	Tea	r	401	Semester	701				Credits	3	1	0	4	
	Course	Туре	Theory only								•			
	Course Ca	itegory	Discipline Core											
	Pre-Requ	isite/s							Co-Requisite/s					
	Course Ou & Bloom's	tcomes i Level	CO1- To understand and rati CO2- To outline the concepts CO3- To develop and study of CO4- To illustrate the princip CO5- To predict the rate and	onalize fundamentals and polymers used in the de s of formulation and evaluation of oral, mucosal an oral, mucosal, dermal, pulmonary and Nasa I drug les and fundamentals of drug targeting in the desig maximize therapeutic compliance of site-specific of	sign of controlle d implantable dr delivery systems n of site-specifi trug delivery sys	ed drug de Irug delive ns over con fic drug de /stems by	alivery systems(BL2-Under ry system.(BL1-Remember nventional dosage forms for livery system.(BL2-Under modifying conventional do	rstand) er) or prolonged action.(BL3- stand) sage forms(BL5-Evaluat	Apply) e)					
Skill Development J Entrepreneurating X Employabilt J Professional Ethics X Gender X Human Values X Entvironment X							(Goals)	SDG3(Good health and SDG4(Quality education	well-being)))					
	Part B													
Modules	Modules Contents Pedagogy										Hours			
Unit 1	Controlled dru candidates. Ap Physicochemi properties, ad	g delivery systems: Introduction, proaches to design-controlled re cal and biological properties of d vantages and application of polyr	terminology/definitions and ra elease formulations based on o rugs relevant to controlled rele mers in formulation of controlle	tionale, advantages, disadvantages, selection of di diffusion, dissolution and ion exchange principles. ase formulations Polymers: Introduction, classifica d release drug delivery systems.	tion, Lectu	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board								10
Unit 2	Microencapsu microencapsu advantages ar Drug Delivery	lation: Definition, advantages an lation, applications Mucosal Drug Id disadvantages, transmucosal Systems: Introduction, advantag	d disadvantages, microsphere g Delivery system: Introduction permeability and formulation o es and disadvantages, concep	s /Microcapsules, microparticles, methods of , Principles of bioadhesion / mucoadhesion, conce onsiderations of buccal delivery systems Implantal of implants and osmotic pump	pts, Lectu ble	Lecture based learning, interactive class, Peer tutorial, Class using ICT tooI/PPT/white board								10
Unit 3	Transdermal E components o approaches fo drug delivery s dose), nasal s	Drug Delivery Systems: Introducti f TDDS, formulation approaches r GRDDS – Floating, high densit system: Introduction to Nasal and prays, nebulizers	on, Permeation through skin, Gastroretentive drug delivery y systems, inflatable and gast I Pulmonary routes of drug del	factors affecting permeation, permeation enhancen systems: Introduction, advantages, disadvantages coadhesive systems and their applications Nasopul ivery, Formulation of Inhalers (dry powder and met	s, basic monary Lectu ered	ure based	learning, interactive class	Peer tutorial, Class usin	g ICT tool/PPT/white board					10
Unit 4	Targeted drug monoclonal ar	Delivery: Concepts and approac tibodies and their applications	hes advantages and disadvan	tages, introduction to liposomes, niosomes, nanop	articles, Lectu	ure based	learning, interactive class	Peer tutorial, Class usin	g ICT tool/PPT/white board					8
Unit 5	Ocular Drug D ocuserts Intra and applicatio	elivery Systems: Introduction, in tterine Drug Delivery Systems: In ns	tra ocular barriers and method htroduction, advantages and d	s to overcome –Preliminary study, ocular formulatii isadvantages, development of intrauterine devices	(IUDs) Lectu	ure based	learning, interactive class	, Peer tutorial, Class usin	g ICT tool/PPT/white board					7
						Part	с							
Modul	es			Title				Indicative-ABCA/F Experiments/Field v Internships	PBL/ work/		Bloom's Level		٢	lours
1		To make model of disintegration	1				Simulation			BL3-Apply			5	
					Part D((Marks (Theo	Distribution)							
Total Ma	irks	Minimum Pa	ssing Marks	External Evaluation		meo	Min. External Evalua	tion	Internal Evaluation	1	N	Ain. Internal Ev	aluation	
100	-	50		75	38 25 13									
				1		Practi	cal				1			
Total Ma	irks	Minimum Pa	ssing Marks	External Evaluation			Min. External Evalua	tion	Internal Evaluation	1	h	lin. Internal Ev	aluation	
-										Juation Min. Internal Evaluat				

	Part E
Books	1. N.K. Jain, Controlled and Novel Drug Delivery, CBS Publishers & Distributors, New Delhi, First edition 1997 (reprint in 2001). 2. S.P. Vyas and R.K. Khar, Controlled Drug Delivery-concepts and advances, Vallabh Prakashan, New Delhi, First edition 2002.
Articles	1. Indian Journal of Pharmaceutical Sciences (IPA) 2. Indian Drugs (IDMA) 3. Journal of Controlled Release (Elsevier Sciences) 4. Drug Development and Industrial Pharmacy (Marcel & Decker) 5. International Journal of Pharmaceutics (Elsevier Sciences)
References Books	1 YW Chen, Novel Drug Delivery Systems, 2nd editor, revised and expanded. Marcel Dekker, Inc., New York, 1992. 2. Robinson, J. R., Lee V. H. L, Controlled Drug Delivery Systems, Marcel Dekker, Inc., New York, 1992. 3. Encyclopedia of Controlled Delivery. Edith Mathioutz, Publiched Delivery Systems, Marcel Dekker, Inc., New York, 1992. 3. Encyclopedia of Controlled Delivery. Edith Mathioutz, Publiched Delivery Systems, Marcel Dekker, Inc., New York, 1992. 3. Encyclopedia of Controlled Delivery. Edith Mathioutz, Publiched Delivery Systems, Marcel Dekker, Inc., New York, 1992. 3. Encyclopedia of Controlled Delivery. Edith Mathioutz, Publiched Delivery Systems, Marcel Dekker, Inc., New York, 1992. 3. Encyclopedia of Controlled Delivery. Edith Mathioutz, Publiched Delivery Systems, Marcel Dekker, Inc., New York, 1992. 3. Encyclopedia of Controlled Delivery. Edith Mathioutz, Publiched Delivery, Edith Mathioutz, Publiched Deliver
MOOC Courses	https://nptel.ac.in/
Videos	you tube

							Co	urse Articulation	Matrix						
COs	PO1	PO2	P03	PO4	P05	PO6	P07	P08	PO9	PO10	P011	P012	PSO1	PSO2	PSO3
CO1	2	1	3	-	3	-	-	-	-	-	3	-	2	1	1
CO2	2	1	2	-	2	-	-	-	-	-	3	-	2	2	2
CO3	3	2	2	1	2	-	-	-	-	-	3	-	2	1	1
CO4	2	1	3	-	2	-	-	-	-	-	3	-	1	1	1
CO5	2	1	1	1	1	-	-	-	-	-	2	-	1	1	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



			BPharm					
Title of the Course	Instrumental Methods	s of Analysis						
Course Code	BP705P							-
			Part A					
Vear	4th	Semester	Zth	Gradite	L	т	Ρ	С
iea:	401	Semester	701	Cieuta	0	0	2	2
Course Type	Lab only							
Course Category	Discipline Core							
Pre-Requisite/s	Theory of Respective	Experiments		Co-Requisite/s				
Course Outcomes & Bloom's Level	CO1- To define and s CO2- To explain prim CO3- To choose the CO4- To compare the CO5- To predict the r	select the method for preparation of drugs and inte ciple underlying the preparation of drugs (BL2-Unm method for assay of drugs by quantitative analysis a advantages of microwave technique over conver elation between physicochemical properties and t	ermediates(BL1-Remember) derstand) s(BL3-Apply) titional synthesis of drugs(BL5-Evaluate) piological activity(BL3-Apply)					
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics : Gender X Human Values X Environment X	x	SDG (Goals)	SDG3(Gcod health and well-being) SDG4(Quality education) SDG4(Clean water and sanitation) SDG8(Decent work and economic growth)				

	Pa	tC		
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	1 Determination of absorption maxima and effect of solvents on absorption maxima of organic compounds 2 Estimation of dextrose by colorimetry	Experiments	BL2-Understand	8
2	3 Estimation of sulfanilamide by colorimetry 4 Simultaneous estimation of ibuprofen and paracetamol by UV spectroscopy	Experiments	BL4-Analyze	8
3	5 Assay of paracetamol by UV- Spectrophotometry 6 Estimation of quinine sulfate by fluorimetry	Experiments	BL4-Analyze	8
4	7 Study of quenching of fluorescence 8 Determination of sodium by flame photometry	Experiments	BL4-Analyze	8
5	9 Determination of potassium by flame photometry 10 Determination of chlorides and sulphates by nephelo-turbidometry	Experiments	BL4-Analyze	8
6	11 Separation of amino acids by paper chromatography 12 Separation of sugars by thin layer chromatography	Experiments	BL3-Apply	8
7	13 Separation of plant pigments by column chromatography 14 Demonstration experiment on HPLC	Experiments	BL3-Apply	8
8	15 Demonstration experiment on Gas Chromatography	PBL	BL3-Apply	8

Part B

Pedagogy

Hours

Contents

Modules

		F	Part D(Marks Distribution)		
			Theory		
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
50	25	35	18	15	8
			Practical		
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation

	Part E
Books	1. Vogel's Textbook of Quantitative Chemical Analysis by A.I. Vogel 2. Practical Pharmaceutical Chemistry by A.H. Beckett and J.B. Stenlake
Articles	NA
References Books	1. Organic Chemistry by I. L. Finar 2. Organic spectroscopy by William Kemp 3. Quantitative Analysis of Drugs by D. C. Garrett
MOOC Courses	NA
Videos	NA

							Co	urse Articulation	Matrix						
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	3	1	1	-	1	-	-	-	3	-	1	1	1
CO2	3	1	2	1	1	-	1	-	-	-	3	-	1	1	1
CO3	2	2	2	1	1	-	1	-	-	-	3	-	1	1	1
CO4	2	1	3	1	1	-	1	-	-	-	2	-	1	2	1
CO5	2	1	1	2	1	-	-	-	-	-	3	-	1	1	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



								BPha	m							
	Title of the	Course	Practice Sc	hool *												
	Course	Code	BP706PS													
								Part	4							
	M					70					L	т		Ρ	С	
	Yea	r	4th		Semester	7th			Credit	S	0	0		6	6	
	Course	Туре	Project													
	Course Ca	itegory	Discipline (Core												
	Pre-Requ	isite/s	In the VII s evenly dist domains fo	emester, every cand ributed throughout th or practice school dee	idate shall undergo p e semester. The stu clared by the program	practice school for dent shall opt for a n committee from	a period of 150 hours any one of the time to time.		Co-Requi	site/s	every student 25 pages). Al acquired by ti and grade po	t shall submit a p ong with the exa he student throu ints shall be awa	printed report (in ims of semester gh practice sch arded.	triplicate) on the VII, the report so ool shall be evalu	practice school he/she ubmitted by the student ated by the subject exp	a attended (not more than t, knowledge and skills perts at the college level
	Course Ou & Bloom's	tcomes s Level	CO1- To de CO2- To ex CO3- To ch CO4- To co CO5- To pr	efine and select the r xplain principle unde noose the method for ompare the advantag redict the relation be	nethod for preparatio rlying the preparatior r assay of drugs by q ges of microwave tec tween physicochemi	on of drugs and int n of drugs(BL2-Un juantitative analysi hnique over conve cal properties and	ermediates(BL1-Rem iderstand) is(BL3-Apply) antional synthesis of dr biological activity(BL3	ember) ugs(BL5-Ev -Apply)	aluate)							
	Coures El	ements	Skill Devel Entreprene Employabi Professsor Gender ✓ Human Val Environme	opment 🗸 aurship X lity J nal Ethics X lues J nt X		s	DG (Goals)	SDG1(No SDG3(Go SDG4(Qu SDG6(Cle SDG8(Der SDG17(Pa	poverty) od health and well-being) ality education) an water and sanitation) sent work and economic ç ırtnerships for the goals)	rowth)						
								Part	В							
	Mod	iles				Cont	tents				Pe	dagogy			Hou	irs
								Part	C							
Modu	ules				Title					Indicative-ABCA Experiments/Field Internships	/PBL/ d work/			Bloom's Lev	el	Hours
1		Practice School							Field work							5
							Part	D(Marks D	Distribution)							
								Theor	у		1					
Total M	larks	М	linimum Passing Mark	5	E	External Evaluation Min. External Evaluation			ation	n Internal Evaluation				Min. Internal Evaluation		
		0			0											
					-		1	Practio	al		1					
100ai M	larks	76	Inimum Passing Mark	5	100	xternal Evaluatio	n 60		Min. External Evalu	ation	inte	mai Evaluation		26	Min. Internal Eval	uation
150		15			100		30				30			25		
								Part	E							
	Book	s	Please refe	er Library and Interne	ət											
	Articl	es	Refer to the	e Library and Interne	t											
	References	Books	Please refe	r Library and Interne	rt											
	MOOC Co	ourses	NA													
	Video	95	Refer Libra	ry and Internet, NPT	EL, YOU TUBE											
COs	PO1	PO2	PO3	PO4	PO5	P06	P07 Cou	rse Articula PO8	PO9	PO10	P011	P012	PSO	1	PSO2	PSO3
CO1	2	-	2	1	1	1	2	2	-	-	3	-	2		1	1
CO2	2	-	1	1	-	-	-		-	-	2	-	1		1	1
CO3	1	-	1	-	1	-	-		-	-	2	-	-		1	1
CO4	1	1	1	1	1		-		-	-	3	-	-		1	1
CO5	3	-	1	1	-		-		1	-	2	-	-		-	-
CO6	-	-	-	-	-	-	-		-	-	-	-	-		-	-
-	-					-			-	-		-		-		



								Di na								
	Title of the	Course	Biostatistics	s and Research Meth	odology											
	Course	Code	BP801T													
								Part	A							
			411				0.1				0		L	Т	Р	С
	rea	r	4th		Semester		8th				Credits	5	3	1	0	4
	Course	Туре	Theory only	у												
	Course Ca	itegory	Discipline (Core												
	Pre-Requ	isite/s									Co-Requis	ite/s				
	Course Ou & Bloom's	tcomes s Level	CO1- To de CO2- To ex CO3- To ch CO4- To co CO5- To pr	efine and select the n xplain principle under noose the method for ompare the advantag redict the relation bet	nethod for preparation lying the preparation assay of drugs by q es of microwave tec ween physicochemic	on of drugs and inte n of drugs(BL2-Unc quantitative analysis chnique over conver ical properties and b	rmediates(BL1-R lerstand) (BL3-Apply) itional synthesis o iological activity(E	emember) of drugs(BL5-Ev 3L3-Apply)	aluate)							
	Coures El	ements	Skill Devek Entreprene Employabil Professson Gender X Human Val Environme	opment 🗸 aurship X lity J nal Ethics X lues X nt X			s	DG (Goals)		SDG1(No poverty SDG4(Quality ed SDG8(Decent wc SDG17(Partners)	y) ucation) rk and economic gr hips for the goals)	rowth)				
								Part	в							
	Mode	lles				Conte	nts					Pedag	ogy			lours
							Part C									
Modu	les				Title					li Ex	ndicative-ABCA/PI xperiments/Field w Internships	BL/ rork/		Bloom	's Level	Hours
1		hands on practical of N	IS Excel and SPSS						Simulation				BL2-Under	stand		3
							Pa	art D(Marks D Theor	Distribution)						
Total M	arks	Min	imum Passing Mark	s	E	xternal Evaluation			Min. Ext	ernal Evaluation		Internal	Evaluation		Min. Internal E	valuation
100		50			75			38				25		13		
	1							Practio	al							
Total M	arks	Min	imum Passing Mark	s	E	xternal Evaluation			Min. Ext	ernal Evaluation		Internal	Evaluation		Min. Internal E	valuation
I								Part	E							
	Book	5	1. Pharmac	ceutical statistics- Pra	actical and clinical ap	pplications, Sanford	Bolton, publisher	Marcel Dekker	Inc. NewYor	k. 2. Fundamental	of Statistics – Hima	laya Publishing House- S	C.Guptha			
	Articl	es	datatab.net	t https://www.ijdrt.con	/articles/biostatistic	sresearch-method	ology-with-an-ove	arview-on-clinica	Il-research.po	if						
	References	Books	1. Design a	Ind Analysis of Exper	ments – PHI Learnin	ng Private Limited, I	R. Pannerselvam,	2. Design and A	Analysis of Ex	operiments – Wiley	/ Students Edition, D	Douglas and C. Montgome	iry			
	MOOC Co	ourses	https://nptel	I.ac.in/ datatab.net												
L	Video	95	You tube													
							0	ourse Articula	ation Matrix	r						
COs	PO1	PO2	P03	PO4	PO5	PO6	P07	PO8	PO9	PO	10	P011 P	D12	PSO1	PSO2	PSO3
CO1	3	2	1	2	3	1	-	-	-	-		2 -		2	1	1
CO2	2	1	1	2	3	1	-	-	-	-		2 -		1	1	1
CO3	3	1	1	1	3	1	-	-	-	-		2 -		1	1	1
CO4	2	1	1	1	3	1	-	-	-	-		1 -		-	1	2
CO5	2	1	1	2	3	1	-	-	-	-		1 -		1	2	2
CO6	-	-	-	-	-	-	-	-	-	-					-	-



	Title of the	Course	Social or	d Preventive Pharm	acv										
	Course	Code	BP802T		109										
								Part	A				T	n	0
	Yea	r	4th		Semester		8th			Credits		2	1	P	C
	Course	Туре	Theory	anly					-			3	'	0	4
	Course C	ategory	Disciplin	e Core											
	Pre-Reg	iisite/s								Co-Requisite/s					
	Course Or & Bloom	itcomes s Level	CO1- To CO2- To CO3- To CO4- To CO5- To	define and select th explain principle un choose the method compare the advant predict the relation t	e method for preparat lerlying the preparatio for assay of drugs by ages of microwave te letween physicochem	tion of drugs and on of drugs (BL2 quantitative and chnique over co nical properties a	d intermediates(BL1-R -Understand) alysis(BL3-Apply) inventional synthesis o and biological activity(B	emember) of drugs(BL5-Ev BL3-Apply)	aluate)						
	Coures E	ements	Skill Den Entrepre Employs Professa Gender Human ' Environ	relopment X ineurship X ibility ✓ ional Ethics ✓ ✓ /alues ✓ inent X			SDG (Go	oals)	SDG1(No poverty) SDG2(Zero hunger) SDG3(Good health at SDG4(Quality educati SDG50(Reduced inec SDG10(Reduced inec SDG12(Responsible i SDG12(Life on land) SDG17(Partnerships	nd well-being) ion) yualities) consuption and producti for the goals)	on)				
								Part	в						
	Mod	ules				c	ontents				Pe	dagogy			Hours
								Part	с						
Mod	ules				Title					Indicative-ABCA Experiments/Field Internships	PBL/ work/		Bloo	Hours	
1		Nukkad Natak Progra	m on Awareness of	woman hygiene					Field work				BL3-Apply		4
							_								
							Р	art D(Marks L Theor	Distribution)						
Total M	larks	Mir	nimum Passing Ma	rks	F	External Evalua	ation	Theor	Min. External Evalua	tion	Inter	mal Evaluation	-	Min. Internal	valuation
100		50			75			38			25		13		
								Practic	al						
Total N	larks	Mir	nimum Passing Ma	rks	E	External Evalua	ation		Min. External Evalua	ition	Inter	nal Evaluation		Min. Internal	valuation
								Part	-						
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Article	s	NA													
References	Books	1. Arun Ku India, Nev	umar and N Menaks v Delhi.	hi: Marketing Manag	ement, Vikas Publish	ing, India 2. Raj	jan Saxena: Marketir	ig Management; Tata I	MC Graw-Hill (India Edit	ion) 3. Ramaswamy, U.	S & Nanakama	i, S: Marketing Manage	ement: Global F	Perspective, India	n Context, Macmilan
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CO4	-	1	1	-	1	2	2	1	-	-		-	-	1		1	- 1
C05	-	1	1	-	2	2	1	2	-	-		-	-	1		-	-1
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COs CO1	PO1 2	PO2 2	2	-	1	1	-	-	1	1		2		1		1	2
COs CO1 CO2	PO1 2 1	2 2 2	2	-	1 2	1	-	-	1	1		2	-	1		1	2
COs CO1 CO2 CO3	PO1 2 1 1	2 2 2 2 2	2 1 1	-	1 2 1	1 1 1	-	-	1	1 2 -		2 2 1	-	1		1 1 2	2 - 2
COs CO1 CO2 CO3 CO4	PO1 2 1 1 1 1	P02 2 2 2 2 2 2	2 1 1 1	- - - -	1 2 1 2	1 1 1 1 -	- - -	- - - -	1 1 - 1	1 2 - 1		2 2 1 2	-	1 1 1 1		1 1 2 2	2 - 2 1
COs CO1 CO2 CO3 CO4 CO5	PO1 2 1 1 1 1 1 1	P02 2 2 2 2 2 2 2 2 2	POS 2 1 1 1 1	- - - - - -	1 2 1 2 1 2 1	1 1 1 - 1 1	- - - - -	- - - -	1 - 1 -	1 2 - 1 1		2 2 1 2 1	-	1 1 1 1 1		1 1 2 2 1	2 - 2 1 1



	Title of the	Course	Cell and M	Anticelar Biology												
	Course	Code	BP808ET	57												
								Dert A								
								PartA				L	т		Р	с
	Yea	r	4th		Semester		8th			Credits		3	1		0	4
	Course	Туре	Theory or	nly												
	Course Ca	ategory	Discipline	Electives												
	Pre-Requ	isite/s								Co-Requisite/s						
	Course Ou & Bloom's	tcomes s Level	CO1- To CO2- To CO3- To CO4- To CO5- To	define and select the explain principle und choose the method f compare the advant predict the relation b	method for preparat erlying the preparation or assay of drugs by ages of microwave te etween physicochem	tion of drugs and on of drugs(BL2 quantitative and chnique over co nical properties a	d intermediates(BL1-Ro -Understand) alysis(BL3-Apply) onventional synthesis o and biological activity(B	emember) f drugs(BL5-Eva JL3-Apply)	luate)							
	Coures Ele	ements	Skill Deve Entreprer Employat Professa Gender X Human V Environm	elopment X neurship X ponal Ethics X (alues X ent X			SDG (Go	als)	SDG1(No poverty) SDG2(Zero hunger) SDG3(Good health at SDG4(Quality educat SDG5(Gender equali SDG8(Decent work a SDG10(Reduced inet SDG12(Reduced inet SDG12(Reduced inet SDG15(Life on land) SDG17(Partnerships	nd well-being) ion) y) nd economic growth) qualities) consuption and produc for the goals)	ion)					
								Part B								
	Modu	ules	Contents Pedagogy Hours												5	
		Part C														
Module	s		Part C Indicative-ABCA/PBL/ Title Experiments/Field work/ Bioom's Level H												Hours	
1		DNA ISOLATION FROM	I ONION					E	xperiments			BL	2-Understand		4	L .
							Pa	art D(Marks Di	stribution)			÷				
					1			Theory			1					
Total Mar	rks	Mini	imum Passing Mar	ks	1	External Evalua	ation		Min. External Evalua	ition	Inter	nal Evaluation			Min. Internal Evalua	ation
100	1	50			75			38			25		13			
Tatal Mar		Mini	Dessing Mar		1	Cutamat Cualu		Practica	Min. Fotoscal Fostor		Inter				Min. Internal Fusion	- 41
Total Mar	rks	Milli	inum Passing Mar	K5		External Evalua	auon		Min. External Evalua	llion	inter	nai Evaluation			Min. Internal Evalua	auon
	Book	rs	Pastoroal	r: Molecular Riotoch	nology: Principles on	d Applications o	f RecombinentDNA: At	Part E	atton D.C. 13. RA Coldel	hvet al Kuhvimmun	logy					
	Articl	es	https://do	bal.oup.com/ukhe/di	sciplines/bioscience/	cell-and-molecu	lar-biology/		igion 2.0. 13. NA GOIDSI	iy oc al., Kuby infilluli						
	References	Books	Book: Bas	ic Cell and Molecula	ar Biology (Bergtrom)											
	MOOC Co	ourses	https://npt	el.ac.in/												
	Video	05	you tube s	somus biology chan	iel											
							c	ourse Articulat	ion Matrix							
COs	PO1	PO2	PO3	PO4	P05	PO6	P07	PO8	PO9	PO10	P011	PO12	PSO1		PSO2	PSO3
CO1	3	1	1	-	1	1	-	-	1	-	1	-	1		2	1
CO2	3	1	1	-	1	-	-	-	1	-	2	-	1		1	3
CO3	3	1	1	-	1	1	-	-	-	-	1	-	2		1	2
CO4	3	1	1	-	1	1	-	-	1	-	1	-	1		1	3
CO5	2	1	1	-	-	1	-	-	-	-	1	-	-		1	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-



	Title of the	Course	Cos	metic Science														
	Course	Code	BP8	09ET														
									Dest	•								
									Part	A				I.		т	Р	c
	Yea		4th			Semester		8th				Credit	s	2		•		4
	Course	Type	The	ony only										5			Ū.	-
	Course Ca	tegony	Disc	cinline Electives														
	Pre-Requ	isite/s	Dio									Co-Requi	site/s					
	Course Ou & Bloom's	tcomes Level		 To define and set To explain princip To choose the m To compare the a To predict the rel 	lect the meth ple underlying ethod for ass advantages o lation betwee	hod for preparation ng the preparation say of drugs by q of microwave tec en physicochemi	on of drugs and inte n of drugs(BL2-Unc quantitative analysis chnique over conver cal properties and b	rmediates(BL1-Re lerstand) (BL3-Apply) tional synthesis of iological activity(Bl	member) drugs(BL5-Ev L3-Apply)	aluate)								
	Coures Ele	ements	Skil Enti Emj Prol Ger Hun Env	I Development ✓ repreneurship ✓ ployability ✓ fesssonal Ethics × nder × nan Values × ironment ×				SC)G (Goals)		SDG4(Qualit) SDG8(Decen	y education) t work and economic c	prowth)					
									Part	В								
	Modu	les					Conte	ents					Per	dagogy			ŀ	lours
									Part	с								
Modu	les				Titl	tle						Indicative-ABCA Experiments/Field Internships	/PBL/ I work/			Bloom's Le	evel	Hours
1		Preapartion of some of	cosmetics							Experiment	IS				BL3-Apply			10
Total Ma	arks	Mit	nimum Passin	g Marks		E	xternal Evaluation	Pa	rt D(Marks [Theo	Distribution ry Min. Ex	n) kternal Evaluati	ion	Inter	nal Evaluation			Min. Internal E	valuation
100		50			7	75		3	38				25			13		
									Practi	cal								
Total Ma	arks	Mir	nimum Passin	g Marks		E	xternal Evaluation			Min. Ex	ternal Evaluati	ion	Inter	nal Evaluation	I.		Min. Internal E	valuation
									Part	E								
	Book	s	1) H Tata	arry's Cosmeticolo Publishers.	igy, Wilkinsor	n, Moore, Seven	tn Edition, George	30awin. 2) Cosmet	ics – ⊦ormulat	ions, Manufa	acturing and Qu	aiity Control, P.P. Shai	ma, 4th Edition, Vanda	na Publications	PVI. Ltd., Delhi.	. 3) lext book o	or cosmelicology by Sa	anju wanda & Roop K. Khar,
	Articl	es	Inter	rnational Journal of	Cosmetic Sc	cience												
	References	Books	1) H Tata	arry's Cosmeticolo Publishers.	gy, Wilkinson	n, Moore, Sevent	th Edition, George (Godwin. 2) Cosmeti	cs – Formulati	ons, Manufa	acturing and Qua	ality Control, P.P. Shar	ma, 4th Edition, Vandar	na Publications	Pvt. Ltd., Delhi.	3) Text book of	f cosmelicology by Sa	nju Nanda & Roop K. Khar,
	MOOC Co	urses	https	s://nptel.ac.in/														
	Video	S	NA															
									urse Articula	ation Matri	ix							
COs	PO1	PO2	PO3	PO4	POS	5	P06	P07	PO8	PO9)	PO10	P011	PO12	PSO1	1	PSO2	PSO3
CO1	1	1	1	3	-		-		-	1		-	1	-	2		1	1
CO2	1	1	1	2	-				-	1		-	2	-	1		1	1
CO3	1	1	-	1	-				-	-		-	2	-			1	-
CO4	1	1	1	-	1		-	-	-	-		-	1	-	-		1	1
CO5	1	1	1	-	1		-	-	-	1		-	1	-	-		1	1
C06	-	-	-	-	-				-	-		-	-	-	-		-	-
1	1		1						1				1	1				



								BPharn	n							
	Title of the	Course	Experime	ntal Pharmacology												
	Course (Code	BP810ET													
								Bort A								
								PartA				L	Т		Р	с
	Year		4th		Semester		8th			Credits		3	1		0	4
	Course	Гуре	Theory or	nly					1							
	Course Ca	tegory	Discipline	Electives												
	Pre-Requi	site/s								Co-Requisite/s						
	Course Ou & Bloom's	comes Level	CO1- To CO2- To CO3- To CO4- To CO5- To	define and select the explain principle und choose the method fi compare the advanta predict the relation b	method for prepara arlying the preparati or assay of drugs by ges of microwave to atween physicocher	tion of drugs and on of drugs(BL2 quantitative ana achnique over co nical properties a	I intermediates(BL1- -Understand) alysis(BL3-Apply) inventional synthesis and biological activity	Remember) of drugs(BL5-Eval (BL3-Apply)	uate)							
	Coures Ele	ments	Skill Deve Entreprer Employat Professor Gender X Human V Environm	alopment ✓ neurship X pility ✓ pnal Ethics X d alues X ent X			SDG (C	Goals)	SDG3(Good health and SDG4(Quality educatio SDG8(Decent work and SDG12(Responsible oc SDG17(Partnerships fo	i well-being) n) d economic growth) nsuption and produc r the goals)	tion)					
								Part B								
	Modu	les				c	ontents				Pe	dagogy			Hou	rs
								Part C								
Modu	les				Title					Indicative-ABCA Experiments/Fiel Internships	//PBL/ d work/ s			Bloom's L	evel	Hours
1		ANOVA Using SPSS/Gr	aph Pad					s	imulation				BL3-Apply		:	3
							1	Part D(Marks Di	stribution)							
								Theory								
Total M	arks	Minir	num Passing Mar	ks		External Evalua	ation		Min. External Evaluati	on	Inter	mal Evaluation	1		Min. Internal Evalu	ation
100	:	50			75			38			25		-	13		
	r				-1			Practica	I		1					
Total M	arks	Minir	num Passing Mar	ks		External Evalua	ation		Min. External Evaluati	on	Inter	mal Evaluation	1		Min. Internal Evalu	ation
								Part E					1			
	Book	s	1. Fundar	mentals of experimer	tal Pharmacology-b	y M.N.Ghosh 2.	Hand book of Experi	imental Pharmacolo	gy-S.K.Kulakarni 3. CPCS	SEA guidelines for lab	ooratory animal facility.					
	Article	95	https://ww	w.sciencedirect.com	book/97814832326	69/screening-me	ethods-in-pharmacolo	ogy								
	References	Books	4. Drug di	scovery and Evaluat	on by Vogel H.G. 5.	Drug Screening	Methods by Suresh	Kumar Gupta and	S. K. Gupta 6. Introduction	to biostatistics and r	esearch methods by PS	S Sundar Rao	and J Richard			
	MOOC Co	urses	https://npt	el.ac.in												
	Video	s	You tube													
								Course Articulat	on Matrix							
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	P09	PO10	P011	PO12	PSO1		PSO2	PSO3
CO1	2	1	1	-	1	1	-	-	- ·		2	-	3		1	2
CO2	2	1	1	-	2	1	-	-	- ·		1	-	3		1	2
CO3	2	1	1	-	2	-	-	-			1	-	3		1	2
CO4	2	1	1	-	-	1	-	-			2	-	3		1	2
CO5	2	1	1	-	2	-	-	-	-	-	1	-	3		1	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-



								5.11							
	Title of the	Course	Advance	d Instrumentation Te	chniques										
	Course C	ode	BP811E1	r											
								Par	A						
	Year		4th		Se	mester		8th			Credits		L	T P	С
	Course	200	Theory	anhy.									3	1 0	4
	Course Ca	egory	Disciplin	e Electives											
	Pre-Requi	site/s									Co-Requisite/s				
	Course Out & Bloom's	comes Level	CO1- To CO2- To CO3- To CO4- To CO5- To	define and select the explain principle un choose the method compare the advant predict the relation	e method for prepara derlying the preparat for assay of drugs b tages of microwave t between physicocher	ation of drugs and inte ion of drugs(BL2-Un e y quantitative analysis echnique over conve mical properties and l	ermediates) derstand) s(BL3-App ntional synt biological a	(BL1-Remember) ly) thesis of drugs(BL5-E ctivity(BL3-Apply)	valuate)						
	Coures Ele	ments	Skill Dev Entrepre Employa Professa Gender Human V Environr	relopment ✓ ineurship X ibility ✓ ional Ethics X X Values X nent X				SD	≎ (Goals)	SDG4(Quality educ: SDG15(Life on land SDG17(Partnership	ation) s for the goals)				
								Par	в						
	Modu	es				Cont	ents				Pe	dagogy		н	ours
								С							
Modu	Modules Title Indicative-ABCA/PBL/ Experiments/Field work/ Bloom's Level Ho Internships											Hours			
1		standard curve using l	JV						Experiments				BL3-Apply		4
								Part D(Marks	Distribution)						
								The	ory						
Total Ma	arks	Min	imum Passing Ma	rks		External Evaluation	ı		Min. External Eval	uation	Inter	rnal Evaluation		Min. Internal Ev	aluation
100	5	0			75			38			25		13		
					1			Prac	ical						
Total Ma	arks	Min	imum Passing Ma	rks		External Evaluation	ı		Min. External Eval	Jation	Inter	rnal Evaluation		Min. Internal Ev	aluation
-								Par	E						
	Book	3	1. Instru	mental Methods of C	Chemical Analysis by	B.K Sharma 2. Orga	nic spectros	scopy by Y.R Sharma	3. Text book of Pharmace	utical Analysis by Kenne	th A. Connors 4. Vogel	s Text book of Q	uantitative Chemical Ar	nalysis by A.I. Vogel	
	Article	5	https://w	ww.researchgate.ne	/publication/3277516	81_Advanced_Instru	mentation_	and_lts_Uses							
	References	Books	6. Organ	ic Chemistry by I. L.	Finar 7. Organic spe	ctroscopy by William	Kemp 8. Q	uantitative Analysis o	Drugs by D. C. Garrett 9	Quantitative Analysis o	f Drugs in Pharmaceutic	al Formulations	by P. D. Sethi		
	MOOC Co	urses	https://np	tel.ac.in/courses/10	4106122										
	Video	5	https://w	ww.youtube.com/wa	tch?v=ZMtH-xO2Fv0	&list=PL-IQezHLOAj	4q6tsVPE1	ApKVX3np5wltK							
								Course Articu	lation Matrix						
COs	PO1	PO2	P03	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	2	1	1	-	-	-	1	-	2	-	1	2	2
CO2	2		2	-	-	-	-	-	2	-	1	-	1	1	1
CO3	2	-	2	1	1	-	-	-	1	-	2	-	1	-	1
CO4	2	1	2	1	1	-	-	1	1	-	1	-	2	1	2
CO5	3	-	2	2	2	-	-	-	1	1	2	-	1	1	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



								BPha	rm							
	Title of the	Course	Dietary Su	pplements and Nutra	ceuticals											
	Course	Code	BP812ET													
								Part	A							
	м.,		41							0		L	т	Ρ		С
	rea	r	4th		Semester	atr	n			Credits	-	3	1	0		4
	Course	Туре	Theory or	ly												
	Course Ca	itegory	Discipline	Electives												
	Pre-Requ	isite/s								Co-Requisite/s						
	Course Ou & Bloom's	tcomes s Level	CO1- To 0 CO2- To 0 CO3- To 0 CO4- To 0 CO5- To 0	lefine and select the explain principle under thoose the method for compare the advanta predict the relation be	method for preparation of rlying the preparation of d r assay of drugs by quant ges of microwave techniq tween physicochemical p	drugs and in drugs(BL2-Un titative analys ue over conv roperties and	ntermediates(BL1-Re nderstand) sis(BL3-Apply) rentional synthesis of d biological activity(BL	member) drugs(BL5-Ev L3-Apply)	raluate)							
	Coures El	ements	Skill Deve Entrepren Employat Professo Gender X Human V Environm	lopment X eurship X ility √ nal Ethics X alues √ ent X			SDG (Goa	als)	SDG1(No poverty) SDG2(Zero hunger) SDG3(Good health i SDG4(Quality educ SDG12(Responsible	and well-being) tion) consuption and produc	ion)					
-								Part	В							
	Mod	iles				Con	ntents				Peo	dagogy			Hou	rs
								Part	с							
Modu	ıles				Title					Indicative-ABC/ Experiments/Fiel Internship	/PBL/ d work/		Blo	om's Level		Hours
1		making of report on th	e ingredients under t	he project of Know Y	our Packed Food				Field work				BL4-Analyze			2
Tetel M	lauter 1		inum Dession Mar				Pa	rt D(Marks I Theo	Distribution) ry	-41					Min. Internal Fred	
100	arks	50	innum Passing Mar	N5	Z6	iai Evaluatio	on a	99	Min. External Evalu	ation	26	nai Evaluation	12		Min. Internal Evan	Jation
100		30			15			Practi	cal		23		15			
Total M	arks	Mir	imum Passing Mar	ks	Extern	nal Evaluatio	on	11000	Min. External Evalu	ation	Inter	nal Evaluation			Min. Internal Eval	uation
			-													
	Bool	.5	1. Dietetic (1988). 5.	s by Sri Lakshmi 2. F Prescription for Nutr	Role of dietary fibres and r itional Healing by James F	neutraceutica F.Balch and F	als in preventing disea Phyllis A.Balch 2nd Ed	Part ases by K. T.A dn., Avery Pub	E gusti and P.Faizal: BSPu blishing Group, NY (1997)	blication. 3. Advanced	Nutritional Therapies by liams Editors 2000 Func	Cooper. K.A., (1	1996). 4. The Food Ph odhead Publ.Co.Lond	armacy by Jea on. 7. Goldber	an Carper, Simon & rg, I. Functional For	Schuster, UK Ltd., ods. 1994. Chapman and
			Hall, New	York.												
	Artic		nttps://ww 8. Labuza	. T.P. 2000 Functiona	Provide and Dietary Supplements Nutries	lements: Saf	etv. Good Manufactur	ring Practice (GMPs) and Shelf-Life Tes	ting in Essentials of Fur	ctional Foods M.K. Sacl	hmidl and T.P.I	abuza eds. Aspen Pre	ss. 9. Handbo	ok of Nutraceutical	s and Functional Foods
	Reference	Books	Third Editi	on (Modern Nutrition	10. Shils, ME, Olson, JA	, Shike, M. 1	994 Modern Nutrition	in Health and	Disease. Eighth edition.	Lea and Febiger						
L	MOOC C	ourses	Arogyam.	som	0. TI 0014 1											
L	Vide	05	https://ww	w.youtube.com/watch	1/V=1LSPWcJncso											
							Co	urse Articul	ation Matrix							
COs	PO1	PO2	PO3	PO4	P05 P06		P07	PO8	PO9	PO10	P011	PO12	PSO1	PS	502	PSO3
CO1	2	-	1	-	1 1		-	-	-	-	2	-	1	1		1
CO2	3	-	1	-	- 1		-	-	-	-	1	-	1	2		1
CO3	2	-	1	-	1 1		-	-	-	-	2	-	1	1		-
CO4	2	-	1	-	1 1		-	-	-	-	1	-	1	1		1
CO5	2	-	1	-	1 1		-	-	-	-	2	-	1	1		1
CO6	-	-	-	-			-	-	-	-	-	-	-	-		-



									BPha	m									
	Title of the	Course	Proj	ect Work															
	Course (Code	BP8	313PW															
									Part	۵									
									T dire.					L		т	P	С	
	Year		4th			Semester		8th				Credit	5	0		0	6	6	
	Course	Гуре	Pro	ject													1		
	Course Ca	tegory	Dis	cipline Core															
	Pre-Requi	site/s										Co-Requis	site/s						
	Course Ou & Bloom's	comes Level	CO CO CO CO CO	1- To define and s 2- To explain prin 3- To choose the 4- To compare the 5- To predict the r	select the me iciple underly method for a e advantages relation betw	athod for preparat ing the preparation issay of drugs by s of microwave te een physicochem	ion of drugs and inte n of drugs(BL2-Uno quantitative analysis chnique over conver ical properties and b	rmediates(BL1-Re lerstand) i(BL3-Apply) ntional synthesis of iological activity(Bl	member) drugs(BL5-Ev L3-Apply)	aluate)									
	Coures Ele	ments	Ski Ent Pro Gei Hui Env	I Development × repreneurship ✓ ployability ✓ fesssonal Ethics nder × man Values × vironment ×	×			SC	OG (Goals)		SDG1(No pover SDG3(Good he SDG4(Quality e SDG6(Clean wa SDG8(Decent w	erty) salth and well-being) education) rater and sanitation) work and economic g	rowth)						
								Part	в										
	Modu	les					Conte	ents					Peda	agogy			Ho	urs	
		Part C																	
Modu	es Title Indicative-ABCA/PBL/ Experiments/Field work/ Bloom's Level Internations											el	Hour	rs					
1		As per supervisor's ins	tructions							PBL					BL2-Understand			10	
r								Pa	rt D(Marks E	Distribution)								
Tatal M	and an	Min	imum Dessia	- Marka			Internet Freelanting		Theor	y Min Fu	terrel Fuelvatio		Intern	al Fueluatio	-	1	Min. Internal Fred		
Total Ma	aika		iniuni Fassin	y warks			-xternar Evaluation			MIII. EX			intern				Min. Internal Eva	uation	
									Practio	al									
Total Ma	arks	Min	imum Passin	g Marks		E	External Evaluation			Min. Ex	ternal Evaluation	n	Intern	al Evaluatio	n		Min. Internal Eval	uation	
150		75				100		ŧ	50				50			25			
									D. 1	-									
L	Book	5	As	per Given Topic					Part	-									
	Article	s	As	Der Given Topic hl	ttps://www.sc	ciencedirect.com/s	search NCBI/Pubme	d Library											
	References	Books	As	per Given Topic															
	MOOC Co	urses	NA																
	Videos As per Given Topic																		
			1					Co	ourse Articula	ation Matri:	ĸ								
COs	P01	P02	P03	P04	P	05	P06	207	P08	P09	P	010	P011	PU12	PSO	1	PSO2	PSO3	
C02	2	-	2	2	3		1	-	-	-	-		2		1		-	1	
CO3	2	1	2	3	2		1	-	1	-			-	-	1		t.	2	
CO4	3	2	2	-	1		-	-	-	-	-		1	-	3		3	1	
C05	3	3	1	-	1		1		-	-	-		2	-	-		-	1	
C06	-	-	-	-	-		-		-	-	-		-		-		-	-	
	1	1	1						1								1		



1	100 A 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1																
	Title of the	Course	Regulato	ry Attairs													
	Course	Code	MPH 104	1													
								Part	A								
	Ve	_	1-1			C		4-1				Credite		L	т	Р	с
	164	r	151			Semester		181				Credits		4	0	0	4
	Course	Туре	Theory o	nly													
	Course C	ategory	Discipline	e Core													
	Pre-Requ	isite/s										Co-Requisite/s					
	Course Ou & Bloom'	tcomes s Level	CO1- To CO2- To CO3- To CO4- To CO5- To	define and select the explain principle und choose the method fi compare the advanta predict the relation be	method for prepara erlying the preparat or assay of drugs b ages of microwave t etween physicocher	tion of drugs and int ion of drugs(BL2-Ur y quantitative analys echnique over conve nical properties and	termediates(BL1-Re iderstand) is(BL3-Apply) antional synthesis of biological activity(BL	member) drugs(BL5-Ev L3-Apply)	aluate)								
	Coures El	ements	Skill Dev Entreprei Employa Professs Gender 3 Human \ Environn	elopment √ neurship X bility √ onal Ethics √ < /alues X nent X					SDG (Goals)		SDG4(Quality edu	sation)					
								Part	в								
	Mod	ules				Cont	tents	r ur	0			Pedagogy				Hours	
									_								
Modu	les				Title			Рап	6	Indicative-A Experiments Intern	BCA/PBL/ /Field work/ ships			Bloom's Leve	el		Hours
UNIT-III		prepare regulatory gu	delines for different	countries					Seminar				BL3-Apply			10	
							Pa	rt D(Marks Theo	Distribution)								
Iotai Ma	arks	Mir	imum Passing Ma	rks		External Evaluatio	n		Min. External Evalu	lation		Internal Evaluatio	n		Min. Internai	Evaluation	
100		50			75		2	38			25			13			
					-1			Practi	cal								
Total Ma	arks	Mir	imum Passing Ma	rks	_	External Evaluatio	n		Min. External Evalu	lation		Internal Evaluatio	n		Min. Internal	Evaluation	-
1		0															
	Воо	KS	1. Gener Sciences	ic Drug Product Deve Vol.185. Informa He	elopment, Solid Ora alth care Publishers	Dosage forms, Leo	n Shargel and Isader	Part r Kaufer, Marc rating Global	E el Dekker series, Vol.143 Registrations By Richard	2. The Pharmaceu A Guarino. MD.5th	tical Regulatory Pro edition. Drugs and th	cess, Second Edition E	dited by Ira R. Ben	ry and Robert P	Martin, Drugs an	d the Pharma	aceutical
	Artic	es	https://reg	gsci-ojs-tamu.tdl.org/r	regsci/	5 41		5	- ,	, ,==:	, , ,		,				-
	Reference	s Books	1. Guideb Practical	oook fordrug regulator Guide to Regulatory	ry submissions / Sa Compliance By Fay	ndy Weinberg. By Jo A.Rozovsky and Ro	ohn Wiley & Sons.Ind dney K. Adams 4. w	c. 2. FDA regu ww.ich.org/ 5.	latory affairs: a guide for www.fda.gov/ 6. europa.	prescription drugs, eu/index_en.htm 7.	medical devices, an https://www.tga.gov.	d biologics/edited By D au/tga- basics	ouglas J. Pisano, D	David Mantus. 3	. Clinical Trials ar	d Human Re	search: A
	MOOC C	ourses	https://on	linecourses.nptel.ac.i	in/												
	Vide	05	https://wv	w.youtube.com/watc	h?v=xrZl8g70Hol&	ist=PLpGCFhhV_JS	Xuh8vFq4MwInuNj9	lf6hfRY									
							-										
COs	PO1	PO2	PO3	P04	PO5	PO6	Co POZ	Urse Articul	ation Matrix	PO10	PO11	PO12	PSO1		PSO2	per	13
CO1	1	1		1	1	. 50		2	1.00	. 510	2	1012	1		. 502	1	-
CO2	2	-			2	1		2	-		3		2		1	2	
CO2	1	2		-	-		-	2		-	2	-	2			-	
CO4	2	2	1-	1	F	-	-	2		-	2	-	-		2	-	-
0.04	0	4	1-	-	-	4	-	3		-	2	-	-1		2	-	-
000	2		-	-		1	-	-		1	2	-			4	-	
000	-	-	-	-	-	-	1-	1-	-	-	-	-	-		-	-	



	Title of the	Course	Modern F	harmaceutical Analy	tical Techniques												
	Course	Code	MPH 101	Т													
								Part A									
	Yea	r	1st			Semester		1st				Credits		L 4	т 0	P 0	C 4
	Course	Туре	Theory o	nly													1
	Course C	itegory	Discipline	e Core													
	Pre-Requ	isite/s									c	o-Requisite/s					
	Course Ou & Bloom'	tcomes s Level	CO1- To CO2- To CO3- To CO4- To CO5- To	define and select the explain principle und choose the method compare the advant predict the relation b	e method for prepara lerlying the preparati for assay of drugs by ages of microwave to letween physicocher	tion of drugs and int ion of drugs(BL2-Un / quantitative analysi echnique over conve nical properties and	ermediates(BL1-Re derstand) s(BL3-Apply) ntional synthesis of biological activity(B	member) drugs(BL5-Evalu L3-Apply)	ate)								
	Coures El	ements	Skill Dev Entrepre Employa Professs Gender 3 Human \ Environn	elopment ✓ neurship X bility ✓ onal Ethics X K /alues X nent X					SDG (Goals)	3	SDG4(Quality education)						
				Part B Contents Pedagogy Hours													
	Mod	lles				Cont	ents				Pe	dagogy			н	ours	
				Part C													
N	odules			Title Indicative.ABCA/PBL/ Experiments/Field/work/ Bloom's Level Internships										Hours			
UNIT-4		High Performance Liq	uid chromatography	romalography PBL BL4-Analyze												10	
							Pa	rt D(Marks Dist Theory	ribution)								
100	ai marks	MI	innum Passing Ma	rk5	75	External Evaluation		20	Min. External Eval	lation	or	mai Evaluation	12		Min. Internal EV	aluation	
100		50			75			Bractical			25		13				
Tot	al Marks	Mir	imum Passing Ma	rks		External Evaluation	1	Flactical	Min. External Eval	uation	Inte	rnal Evaluation			Min. Internal Ev	aluation	
		0															
Rooks	Spectrometric Ident	fication of Organic com	pounds - Robert M 3	Silverstein, Sixth edit	ion, John Wiley & S	ons, 2004. 2.Principle	es of Instrumental A	.nalysis - Doglas A	Part E Skoog, F. James Ho	ller, Timothy A. Niema	n, 5thedition, Eastern pre	ss, Bangalore, 1	998. 3. Instrumental meth	nods of an	alysis – Willards, 1	th edition, C	BS publishers. 4
	Pharmaceutical Che	mistry – Beckett and S	enlake, Vol II, 4th e	dition, CBS Publishe	rs, New Delhi, 1997.												
References	nups://www.science	mecc.com/journal/journ	ai-oi-pnarmaceutica	i-analysis													
Books	1. Organic Spectros	opy - William Kemp, 3	rd edition, ELBS, 1991. 2. Quantitative Analysis of Drugs in Pharmaceutical formulation - P D Sethi, 3rd Edition, CBS Publishers, New Delhi, 1997. 3. Pharmaceutical Analysis-Modern methods – Part B - J W Munson, Volume 11, Marcel Dekker Series														
Courses	https://www.udemv.or	.npiei.ac.in/ pm/course/modern-ana	alvfical-techniques?/utm_source=adwords-														
viueos	pmax&utm_medium	udemyads&utm_camp	aign=PMax_la.EN_	cc.INDIA&utm_conte	ent=deal4584&utm_t	erm=agkw	adde_cdm	1pltili	_1007795pd&	gad_source=2&gclid	Cj0KCQjwzZmwBhD8AR	lsAH4v1gVb5Pz	:07EviNr_12MuMwoz1rk	(IhE_Qov_	_xOdxhwjSAvvuE6	ikO0Ay6waA	tDsEALw_wcB8
							Co	urse Articulatio	n Matrix								
COs	PO1	PO2	P03	PO4	PO5	P06	P07	P08	PO9	PO10	P011	PO12	PSO1	1	PSO2	PSO3	
CO1	3	1	3	-	3	-	-	-	-	-	3	-	1		-	1	
CO2	3	2	3	-	2	1	-	-	-	-	3	-	2		1	2	
CO3	3	1	1	-	1	2	-	-	-	-	3	-	2		-	1	
0.04	3	1	1	2	2	2	-	-	-	-	3	-	1		2	2	
CO5	2	1	2		2	2	-	-	-	-	3	-	-		1	-	
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	



		a																
	Title of the	Course	Drug Delr	very System														
	Course	Code	MPH 102	I														
								Par	t A									
	Yea	r	1st		Sen	nester	1st					Credits		L	Т		Р	С
														4	0		0	4
	Course	Туре	Theory o	nly														
	Course Ca	itegory	Discipline	Core														
	Pre-Requ	isite/s										Co-Requisite/s						
	Course Ou & Bloom's	tcomes s Level	CO1- To CO2- To CO3- To CO4- To CO5- To	define and select the explain principle und choose the method f compare the advanta predict the relation b	method for prepara erlying the preparati or assay of drugs by ages of microwave to etween physicocher	tion of drugs and inte on of drugs(BL2-Uni quantitative analysis schnique over conve nical properties and l	ermediates(BL derstand) s(BL3-Apply) ntional synthes biological activi	.1-Remember) sis of drugs(BL5-E ity(BL3-Apply)	valuate)									
	Coures El	ements	Skill Dev Entrepret Employal Professa Gender > Human V Environm	elopment ✓ eeurship X bility ✓ bonal Ethics X t alues X ent X				SDG	(Goals)	SDG1(N SDG3(G SDG4(Q SDG17(f	No poverty) Good health and Quality educatio (Partnerships fo	d well-being) in) or the goals)						
								Par	tВ									
	Mod	iles				Cont	ents					Per	dagogy				Hou	rs
								Par	C									
Modu	les				Title					Indi Expe	licative-ABCA/ eriments/Field Internships	PBL/ work/			Bloom's	Level		Hours
UNIT-1		3D PRINTING TECHN	OLOGY						PBL					BL4-Analyze				10
Total M	arks	Min	imum Passing Ma	ks		External Evaluation	1	Part D(Marks The	Distribution) ory Min. External Ev	aluation		Inter	nal Evaluation	1		Min	n. Internal Evalu	uation
100		50			75			38				25			13			
								Prac	ical			1			_			
Total Ma	arks	Min	imum Passing Mai	ks		External Evaluation	1		Min. External Ev	aluation		Inter	nal Evaluation	1		Min	n. Internal Evalu	uation
		0																
	Bool	s	1.N.K. Ja	in, Controlled and N	ovel Drug Delivery, (CBS Publishers & Dis	stributors, New	Par Delhi, First editio	n 1997 (reprint in 2001)	. 2. S. P. Vya s	s and R. K. Kha	ar, Controlled Drug Del	ivery- concepts	and advances	s, Vallabh Prak	ashan, New	v Delhi, First edit	ion 2002
	Artic	es	2.Indian J	ournal of Pharmace	utical Sciences (IPA)	3. Indian drugs (IDN	(A) 4. Journal (of controlled relea	se (Elsevier Sciences)	desirable 4. Dr	rug Developme	ent and Industrial Phar	nacy (Marcel 8	Decker) desi	rable			
	Reference	Books	5. Y W. C Edith Mat	hien, Novel Drug De hiowitz, Published b	livery Systems, 2nd Wiley Interscience	edition, revised and Publication, John Wi	expanded, Mar lev and Sons	rcel Dekker, Inc., f Inc. New York! Ch	lew York, 1992. 2. Rob ichester/Weinheim	inson, J. R., Le	ee V. H. L, Cor	ntrolled Drug Delivery S	Systems, Marce	el Dekker,Inc.,	New York, 199	2. 3. Encycl	lopedia of contro	lled delivery, Editor-
	MOOC C	ourses	https://onl	inecourses.nptel.ac.	in/		,	,										
	Vide	05	https://ww	w.youtube.com/wato	h?v=1Jk08tf1Gh8													
								Course Arti-	lation Matrix									
COs	PO1	PO2	PO3	PO4	P05	P06	P07	PO8	PO9	PO10		P011	P012	PS	D1	PSO2	2	PSO3
CO1	3	-	3	-	3	1	-	-	-	-		3	-	1		-		1
CO2	3	-	2	-	1	2	-	-	-	-		3	-	2		1		-
CO3	3	1	3	-	2	-	-	-	-	-		3	-	-		-		2
CO4	3	-	1	-	2	1	-	-	-	-		3	-	-		1		2
CO5	2	2	3	1	1	-	-	-	-	-		3	-	1		2		-
CO6	-	-	-	-	-	-	-	-	-	-		-	-	-		-		-



	Title of the	Course	Modern	Pharmaceutics											
	Course (Code	MPH 10:	зт											
							F	Part A							
								urryt				L	т	Р	С
	Year		1st		s	emester	1st			Credits		4	0	0	4
	Course '	Гуре	Theory of	only			1								
	Course Ca	tegory	Disciplin	e Core											
	Pre-Requi	site/s								Co-Requisite/s					
	Course Ou & Bloom's	comes Level	CO1- To CO2- To CO3- To CO4- To CO5- To	define and select the explain principle un choose the method compare the advant predict the relation	e method for prepa derlying the prepar for assay of drugs tages of microwave between physicoch	aration of drugs and intermedi ation of drugs(BL2-Understa by quantitative analysis(BL3- a technique over conventional emical properties and biologi	ates(BL1-Remember) nd) Apply) synthesis of drugs(BL al activity(BL3-Apply)	5-Evaluate)				I			
	Coures Ele	ments	Skill Den Entrepre Employs Professa Gender Human ' Environ	velopment ✓ meurship X ability ✓ sonal Ethics X X Values X ment X			s	DG (Goals)	SDG1(No poverty) SDG3(Good health ar SDG4(Quality educat SDG17(Partnerships	nd well-being) ion) for the goals)					
				Part 8											
	Modu	les		Contents Pedagogy											
				Part C											
Modu	les				Title		·		Indicative-ABCA Experiments/Fiel Internship	VPBL/ d work/			Bloom's Lev	el	Hours
UNIT-V		study of diffussion and	d dissolution param	eters				PBL				BL4-Analyze			10
Total Ma	arks	Mir	nimum Passing Ma	irks		External Evaluation	Part D(Mar 1	ks Distribution) heory Min. External Evalu	uation	Inte	rnal Evaluation			Min. Internal Eva	aluation
100	4	50			75		38			25		1	3		
							P	actical		1					
Total Ma	arks	Mir	nimum Passing Ma	irks		External Evaluation		Min. External Evalu	uation	Inte	rnal Evaluation			Min. Internal Eva	aluation
	Book	5	1.Theory Parente	y and Practice of Ind	ustrial Pharmacy B 1-2: By Leon Lachr	y Lachmann and Libermann 2 nann. 5. Modern Pharmaceut	Pharmaceutical dosa cs: By Gillbert and S. I	Part E Ige forms: Tablets Vol. 1-3 by Banker, 6. Reminoton's Pharm	Leon Lachmann. 3.Phar naceutical Sciences	maceutical Dosage for	ms: Disperse sys	stems, Vol, 1-2; By	Leon Lachma	nn. 4. Pharmaceutica	al Dosage forms:
	Article	95	https://w	ww.ijmpronline.com/				5							
	References	Books	7.Advan edition; E Agra. 12 technolo	ces in Pharmaceutic By Sidney H. Willig. . Pharmaceutical Pri gy, Vol I – III	al Sciences Vol. 1-8 11. Quality Assuran ocess Validation; By	5; By H.S. Bean & A.H. Becke ce Guide; By Organization of y Fra. R. Berry and Robert A.	tt. 8. Physical Pharma Pharmaceutical produ Nash. 13.Pharmaceuti	cy; By Alfred martin 9. Bentley cers of India. 12.Drug formula cal Preformulations; By J.J. V	/'s Textbook of Pharmac tion manual; By D.P.S. K Vells. 14. Applied produc	eutics – by Rawlins. 10. Cohli and D.H.Shah. Ea tion and operations ma	. Good manufact stern publishers, nagement; By E	turing practices for , New Delhi. 13.Hor vans, Anderson, Sv	Pharmaceutic w to practice G weeney and W	als: Aplan for total qu 3MPs; By P. P. Sharn /illiams. 15. Encyclop	ality control, Second na. Vandhana Publications, edia of Pharmaceutical
	MOOC Co	urses	https://sv	vayam.gov.in/nc_de	ails/NPTEL										
	Video	s	https://w	ww.youtube.com/wa	tch?v=mRJvss9bM	Vc&list=PL0o-kamDFTumhse	OKF-6OCrHdhBySNk	AA .							
	1	1	1			T	Course Art	iculation Matrix	Teres	1	1				1
COs	P01	P02	P03	PO4	P05	P06 P07	PO8	PO9	PO10	P011	PO12	PSO1		PS02	PS03
C02	2	-	1		2		-	-		3	-			1	
C03	2	2	2	1	2			-	1.	3	1	2		2	2
CO4	2	1	1	1	2	1.		-	1.	3		1			2
C05	2	2	2	2	-	1	-	-	-	3	-	1			2
CO6					l			-	1.	-		-			
	[- F	1	1	1		1		1	1	1	1		1	



Title of the Course	Pharmaceutics Practice	Iarmaceutics Practical I											
Course Code	MPH 105P	2H 105P											
Part A													
¥	1-1	Commuter.	L	т	Р	с							
Tear	151	Semester	151	Credits	0	0	6	6					
Course Type	Lab only	bony											
Course Category	Discipline Core	iscipline Core											
Pre-Requisite/s		Co-Requisite/s											
Course Outcomes & Bloom's Level	CO1- To define and se CO2- To explain princi CO3- To choose the m	201- To define and select the method for preparation of drugs and intermediates(BL1-Remember) C02- To explain principle underlying the preparation of drugs(BL2-Understand) C03- To choose the method for assay of drugs by quantitative analysis(BL3-Apply)											
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professonal Ethics × Gender × Human Values × Environment ×	:	SDG (Goals)	SDG1(No poverty) SDG3(Good health and well-being) SDG4(Quality education) SDG17(Partherships for the goals)									

Part B

Contents

Modules

	Part	C		
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	 Analysis of pharmacopoeial compounds and their formulations by UV Vis spectrophotometer 2. Simultaneousestimation ofmulti component containing formulations by UV spectrophotometry 	Experiments	BL4-Analyze	8
2	3. Experiments based on HPLC 4. Experiments based on Gas Chromatography	Experiments	BL3-Apply	8
3	5. Estimation of riboflavin/quinine sulphate by fluorimetry 6. Estimation of sodium/potassium by flame photometry	Experiments	BL4-Analyze	8
4	 To perform In-vitro dissolution profile of CR/ SR marketed formulation 8. Formulation and evaluation of sustained release matrix tablets 	Experiments	BL5-Evaluate	8
5	9. Formulation and evaluation osmotically controlledDDS 10. Preparation and evaluation of Floating DDS- hydro dynamically balanced DDS	Experiments	BL6-Create	8
6	11. Formulation and evaluation of Muco adhesive tablets. 12. Formulation and evaluation of trans dermal patches	Experiments	BL6-Create	8
7	13. To carry out preformulation studies of tablets. 14. To study the effect of compressional force on tablets disintegration time.	Experiments	BL3-Apply	8
8	15. To study Micromeritic properties of powders and granulation. 16. To study the effect of particle size on dissolution of a tablet	Experiments	BL3-Apply	8

Pedagogy

Hours

Part D(Marks Distribution)												
Тнеоту												
Total Marks	Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Min. Internal Evaluation Min. Internal Evaluation											
	Practical											
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							
150	0	100	50	50	25							

	Part E
Books	PRACTICAL MANUAL
Articles	JOURNALS
References Books	LAB MANUAL
MOOC Courses	SWAYAM NPTEL
Videos	YOUTUBE

Course Articulation Matrix															
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	3	1	1	-	-	-	-	-	3	-	1	-	1
CO2	3	1	2	2	2	-	-	-	-	-	3	-	2	1	2
CO3	3	2	3	-	1	-	-	-	-	-	3	-	3	-	2
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-		-		-	-	-	-	-	-	-	-	-	-



C 1										
Hours										
ion										
-										
ion										
-										
Course Articulation Matrix										
PSO3										
PS03										
PS03 2										
PSO3 2 -										
PS03 2 - -										
PSO3 2										
at										



	Title of the	Course	Good Man	ufacturing in Pharm	а												
	Course C	ode	MPH 1088	ET													
								Part A									
									Cravilita L				т		Р	С	
		1st		Semester	1	st			Credits		3	1		0	4		
Course Type Theory only											1					I.	
Course Category Discipline Specific Elective																	
Pre-Requisite/s										Co-Requisite/s							
Course Outcomes & Bloom's Level COS- To choice the method for proparation of drugs[BL2-Indextand) COS- To choice the method for assay of drugs by quantitative analysis[BL3-Apply) COS- To choice the method for assay of drugs by quantitative analysis[BL3-Apply] COS- To choice the method for assay of drugs by quantitative analysis[BL3-Apply] COS- To predict the relation between physicochemical properties and biological activity[BL3-Apply]																	
	Coures Ele	ments	Skill Deve Entrepren Employab Professoo Gender X Human Va Environm	elopment √ ieurship X iility √ onal Ethics √ : alues X ent √			SDG (No poverty) SD33(God health and well-being) SD42(Auguity education) SDG (Coals) SD50(Diam water and sanitation) SD51(Diam water and sanitation) SDG (Transport and the sanitation) SD51(Diam water and sanitation) SD51(Diam water and sanitation) SD51(Diam water and sanitation) SD51(Diam water and sanitation) SD51(Diam water and sanitation) SD51(Diam water and sanitation) SD51(Partnerships for the goals) SD517(Partnerships for the goals)										
								Part B									
	Modu	es				Co	ntents				Per	dagogy			Но	ırs	
								Part C									
Modul	es				Title					Indicative-ABC/ Experiments/Fiel Internship	/PBL/ d work/		E	Bloom's Lev	rel	Hours	
1		GMP						\$	Seminar			BI	_3-Apply			2	
							Pa	art D(Marks D Theory	stribution)								
Total Ma	rks	Min	imum Passing Mar	ks	E	External Evaluati	ion	-	Min. External Evalua	ation	Inter	nal Evaluation			Min. Internal Evaluation		
100	ŧ	0			75			38			25 13			13			
					-			Practica	d								
Total Ma	rks	Min	imum Passing Mar	ks	E	External Evaluati	ion		Min. External Evalua	ation	Internal Evaluation				Min. Internal Evaluation		
1					1												
								Part F									
	Book	3	Karmacha	arya JB. Good manu	facturing practices (G	GMP) for medicina	al products. Promising	Pharmaceutica	s. 2014;101.								
	Article	s	Patel KT, 0	Chotai NP. Pharmac	eutical GMP: past, pr	esent, and future	-a review. Die Pharm	azie-An Internat	onal Journal of Pharmac	ceutical Sciences. 2008	Apr 1;63(4):251-5.						
	References	Books	Durivage I	MA, editor. The Cert	ified Pharmaceutical (GMP Professiona	I Handbook. Quality I	Press; 2016 May	23.								
	MOOC Co	urses	UDEMY, C	OURSERA, PHAR	MASTATE ACADEMY	·											
	Video	5	You tube														
CO -	801	000	002	804	DOF	DOR	C	ourse Articulat	ion Matrix	0010	0011	BO12	0004		8600	8503	
COI	2	PU2	PU3	PU4	1	100	1	1	2	POID	2	P012	1		1	1	
CO2	1	-		1	1	-	1	1	2	-	3		1		1	1	
CO3	1	-			1		2	1	2	-	3		2		1	1	
CO4	2	-		1	1		1	2	2	-	2	-	1		-	3	
C05	1	-		1	1		2	2	2	-	2	-	-		-	-	
CO6	-	-					-	-	-	-	-	-	-		-	-	
1		1	1	1	1		1	1	1	1	1	1	1		1	1	


							м	Pharm-Pharma	Ceutics								
	Title of the	Course	Molecula	r Pharmaceutics (Na	no Tech and Targete	d DDS)											
	Course	Code	MPH 20	1T													
								Part A									
	Yea	r	1st			s	iemester		2nd						Credit	s	L T P C 4 0 0 4
	Course	Туре	Theory of	only					1								
	Course Ca	ategory	Disciplin	e Core													
	Pre-Requ	iisite/s	Upon co polymer	mpletion of the cours s for the development	e student shall be al of NTDS The formu	ble to understand Th Ilation and evaluatio	ne various approach In of novel drug deli	es for development very systems	of novel drug deli	very systems.	The criteria f	for selection of drugs ar	nd		Co-Requi	site/s	
	Course Ou & Bloom's	itcomes s Level	CO1- To CO2- To CO3- To CO4- To CO5- To	define and select the explain principle und choose the method f compare the advanta predict the relation b	method for prepara erlying the preparation or assay of drugs by uges of microwave to etween physicocher	tion of drugs and int ion of drugs(BL2-Ur / quantitative analys echnique over conve nical properties and	termediates(BL1-Re inderstand) is(BL3-Apply) entional synthesis of biological activity(B	member) drugs(BL5-Evalua L3-Apply)	te)								
	Coures El	ements	Skill Dev Entrepre Employs Professe Gender Human ' Environ	velopment V eneurship X ability V sonal Ethics X X Values X ment X							SDG (Goals	3)	SDC SDC	G3(Good health a G4(Quality educa	and well-being) tion)		
								Part B									
	Mod	ules				Cont	tents					Ped	lagogy			Но	urs
								Part C									
Modu	les				Title					Indic Experi	ative-ABCA/Field Internships	PBL/ work/			Bloom's L	evel	Hours
UNIT-2		PREPARATION OF N	ANOSOMES			PBL						BL4-Analyze			8		
							Pa	rt D(Marks Dist	ibution)								
								Theory				ir.			T		
Total Ma	arks	Mir	nimum Passing Ma	irks		External Evaluatio	n		Min. External Eva	aluation		Interr	nal Evaluatio	on		Min. Internal Eva	luation
100		50			75			38 Practical				25			13		
Total Ma	arks	Mir	nimum Passing Ma	irks		External Evaluatio	n		Min. External Eva	aluation		Interr	nal Evaluatio	on		Min. Internal Eva	luation
		0															
								Part E				10.01					
	Bool	ks	Y W. Ch and Nov	el Drug Delivery, CBS	Publishers & Distri	butors, New Delhi, F	First edition 1997 (re	ккет, Inc., New Yor print in 2001).	k, 1992. 2. S. P. V	уаь апо к. К. К	nar, Controlle	en nud helivery - conc	æpts and adv	vances, vallabh F	rakasnan, New	v Deini, First edition 2002	. IN.IN. Jain, Controlled
	Artic	es	https://pu	ubs.acs.org/journal/mp	ohbp												
	Reference	s Books	Y W. Chi Novel Dr	en, Novel Drug Delive ug Delivery, CBS Pub	ry Systems, 2nd ed lishers & Distributor	Intion, revised and ex s, New Delhi, First e	<pre>kpanded, Marcel De edition 1997 (reprint</pre>	kker, Inc., New York in 2001).	i, 1992. 2. S. P. Vj	as and R. K. K	Char, Controlle	ed Urug Delivery - conc	epts and adv	vances, Vallabh P	rakashan, New	Delhi, First edition 2002	N.K. Jain, Controlled and
	MOOC C	ourses	https://or	nlinecourses.nptel.ac.	n/												
	Vide	DS	https://w	ww.youtube.com/watc	h?v=rGP7KZOTkzE												
							0	ourse Articulation	Matrix								
COs	PO1	PO2	PO3	PO4	P05	PO6	P07	PO8	PO9	PO10		P011	PO12	PSO	1	PSO2	PSO3
CO1	3	1	3	3	3	-	-	-	-	-		3	-	3		-	3
c02	2	2	2	2	2							2		2		1	2

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1
2
3
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									MPharm-PharmaC	eutics								
	Title of the	Course		Advanced Biop	harmaceutics & F	Pharmacokinetics												
	Course	Code		MPH 202T														
									Part A									
	Y	_		4-4		6		0-4					Caradita		L	т	Р	С
	100	r		151		301	lester	2110					Credits		4	0	0	4
	Course	Туре		Theory only														
	Course C	ategory		Discipline Cor	B						-				-			
	Pre-Req	isite/s											Co-Requisite/s					
	Course Or & Bloom	tcomes s Level		CO1- To defin CO2- To expla CO3- To choo CO4- To comp CO5- To predi	e and select the n in principle under se the method for are the advantag ct the relation bet	nethod for preparal lying the preparation assay of drugs by es of microwave te ween physicochem	tion of drugs and inte on of drugs(BL2-Un quantitative analysis ichnique over conve nical properties and l	ermediates(BL1 derstand) s(BL3-Apply) ntional synthesi biological activit	-Remember) s of drugs(BL5-Evaluat y(BL3-Apply)	e)								
	Coures E	ements		Skill Developn Entrepreneurs Employability Professsonal I Gender X Human Values Environment X	hent ✓ hip X ✓ Ethics X				SDG (Goals	5)	SDG3(Goo SDG4(Qual	od health and v ality education)	vell-being)					
									Part B									
	Mod	ules					Cont	ents			Pedagogy Hours						rs	
			1						Part C									
	Modules					Title						Indicative Experiment Inter	-ABCA/PBL/ :s/Field work/ nships			Bloom's Lev	el	Hours
EXPERIMENT			PREPARATION	S OF TARGETED	DRUG DELIEVE	RY SYSTEM				PBL					BL3-Apply			10
									Part D(Marks Distril Theory	bution)								
Total N	larks		Minimum	Passing Marks		1	External Evaluation	ı	N	lin. External Eval	uation		Inter	nal Evaluation		1	Min. Internal Eval	uation
100		50				75			38				25		13			
									Practical									
Total N	larks		Minimum	Passing Marks		1	External Evaluation	ı	N	lin. External Eval	uation		Inter	nal Evaluation			Min. Internal Eval	Jation
		0																
	Boo	rs		1. Biopharmac edition, Drug I pharmaceutic expande by R Pharmaceutic Development-	eutics and Clinica ntelligence Public al press, RPS Pub lobert. E. Notari, N al Technology, Vo Solubility, Perme	al Pharmacokinetic ations, Hamilton, Il Jishing,2009. 13. A Aarcel Dekker Inc, I 13, James Swarb ability, and Charge	s, An Introduction, 4 linois, 1971. 3. Ency bisorption and Drug New York and Basel rick, James. G. Boyl State, Alex Avdeef, VOL ECIII AR PHAG	th edition, revise /clopedia of Pha Development-5 l, 1987. 10. Biopl an, Marcel Deki John Wiley & S	Part E ed and expande by Rob armaceutical Technology Solubility, Permeability, harmaceutics and Relev ker Inc, New York, 1996. ons, Inc,2003.	ert. E. Notari, Marc , Vol 13, James Sv Ind Charge State, J ant Pharmacokinel 12. Basic Pharma	el Dekker Inc, varbrick, Jame: Alex Avdeef, Jo tics by John. G cokinetics, 1st	New York and is. G. Boylan, ohn Wiley & S Wagner and t edition, Sunil	I Basel, 1987. 2. Biop Marcel Dekker Inc, N ons, Inc, 2003. 9. Bic M.Pemarowski, 1st S Jambhekar and P	pharmaceutics and R lew York, 1996. 12. I pharmaceutics and I edition, Drug Intellige hilip J Breen, pharm	televant Pharmac Basic Pharmacoki Clinical Pharmaco Ince Publications, aceutical press, R	okinetics by Jo inetics, 1st edit kinetics, An In Hamilton, Illin PS Publishing	ohn. G Wagner and tion, Sunil S Jambi troduction, 4th edit ois, 1971. 11. Ency ,2009. 13. Absorpt	M.Pemarowski, 1st lekar and Philip J Breen, ion, revised and colopedia of ion and Drug
	Artic	es		1 Bionharman	eutics and Clinics	al Pharmacokinetics	by Milo Gibaldi 4th	edition Philade	Inhia Lea and Febiner	1001 2 Bionharm	aceutics and P	harmacokinet	ics A Treatise D N	Brahmankar and S	unil R Jaiswal \	/allahPrakasha	an Pitamnura Delh	ni 3 Applied
	Reference	s Books		Biopharmaceu Perrier, 2nd ed Thom~ N. Toze	tics and Pharmac ition, Marcel Dekl ar, Lea and Febig	cokinetics by Sharg ker Inc.,New York, er, Philadelphia, 19	el. Land YuABC, 2n 1982 6. Current Cor 195 8. Dissolution, B	dedition, Conne ncepts in Pharm ioavailability and	cticut Appleton Century aceutical Sciences: Biop d Bioequivalence, Abdou	Crofts, 1985 4. Tex oharmaceutics, Sw J. H.M, Mack Publi	arbrick. J, Leai shing Compan	harmaceutics and Febiger, F ny, Pennsylvar	and Pharmacokinetic Philadelphia, 1970 7 ia 1989	cs, Dr. Shobha Rani . Clinical Pharmacoki	R. Hiremath, Prisi inetics, Concepts	m Book 5. Pha and Application	rmacokinetics by N ns 3rd edition by N	filo Gibaldi and D. JalcolmRowland and
-	MOOC C	ourses		NPTEL				-	-		-	-	-	-				
	Vide	5		https://www.yo	utube.com/watch	?v=hXmiai9ZR0												
COs	PO1	PO2	PO3	PC	04	P05	P06	P07	PO8	PO9	PO10	F	011	P012	PSO1	PS	502	PSO3
CO1	3	1	1	3		1	3	-	-	-	-	3		-	1	1		1
CO2	2	1	2	2		2	2	-	-	-	-	2		-	2	2		2
CO3	2	2	3	1		2	1	-	-	-	-	2	1	-	1	2		2
CO4	3	-	1	2		2	2	-	-	-		3		-	2	-		2
CO5	3	1	3	2		3	2	-	-	-	-	2		-	1	1		3
								-	-	-	-							



							N	IPharm-Pha	irmaCeutic	s							
	Title of the	Course	Computer	Aided Drug Deliver	y System												
	Course	Code	MPH 203	г													
								Par	t A								
								T di					L	т		Р	С
	Yea	r	1st		Semester		2nd				Credits		4	0		0	4
	Course	Туре	Theory o	nly													4
	Course Ca	itegory	Discipline	Core													
	Pre-Requ	isite/s									Co-Requisite/s	1					
	Course Ou & Bloom's	tcomes s Level	CO1- To CO2- To CO3- To CO4- To CO5- To	define and select th explain principle un choose the method compare the advant predict the relation I	e method for preparat derlying the preparation for assay of drugs by ages of microwave te between physicochem	ion of drugs and in on of drugs(BL2-U quantitative analy chnique over conv ical properties an	ntermediates(BL1-R Inderstand) sis(BL3-Apply) ventional synthesis o d biological activity(B	emember) of drugs(BL5-E BL3-Apply)	valuate)								
	Coures El	ements	Skill Dev Entreprer Employal Professa Gender X Human V Environm	elopment ✓ eeurship X bility ✓ onal Ethics X alues X ent X			SDG	i (Goals)	SE SE SE	DG3(Good healt DG4(Quality edu DG7(Affordable a DG9(Industry Inn	h and well-being) ication) and clean energy) iovation and Infrastruc	ture)					
								Par	t B								
	Mod	iles				Cor	ntents				dagogy			Но	urs		
								Par	t C								
Modu	les				Title						Indicative-ABCA/ Experiments/Field Internships	PBL/ work/		Bloom's Le	Hours		
1		ARTIFICIAL INTELLIG	ENCE IN HEALTH	CARE					Seminar					BL4-Analyze			2
							Р	art D(Marks	Distributior	n)							
								The	ory					r			
Total Ma	arks	Mini	imum Passing Mar	ks	E	External Evaluati	on		Min. Ex	xternal Evaluati	on	Inter	nal Evaluation	1		Min. Internal Eva	luation
100		50			75			38				25					
Total M	arke	Mini	mum Passing Mar	**		Extornal Evaluati	on.	Praci	Min Ex	stornal Evaluati	0.0	Inter	nal Evaluation			Min Internal Eva	lustion
Total Ma	aika		intum Passing Ma	ND			on		MIII. EX	xternal Evaluation	011	inter				Mint. Internal Eva	luation
								Par	+ F								
	Bool	s	1. Compu Vol 13, Ja	ter Applications in I ames Swarbrick, Ja	Pharmaceutical Resea mes. G. Boylan, Marci	arch and Developr el Dekker Inc, Nev	nent, Sean Ekins, 20 v York, 1996.	006, John Wile	y & Sons. 2. (Computer-Aided	Applications in Pharm	aceutical Technology,	1st Edition, Jel	ena Djuris, Woodh	ead Publishin	g 3. Encyclopediaof Ph	armaceutical Technology,
	Artic	es	1. Compu Vol 13. Ja	ter Applications in F mes Swarbrick. Jar	harmaceutical Resea	rch and Developn I Dekker Inc, New	nent, Sean Ekins, 20 v York, 1996.	006, John Wiley	y & Sons. 2. C	Computer-Aided	Applications in Pharm	aceutical Technology, 1	1st Edition, Jel	ena Djuris, Woodh	ead Publishin	g 3. Encyclopediaof Pha	armaceutical Technology,
	Reference	Books	1. Compu	ter Applications in F	harmaceutical Resea	rch and Developn	ent, Sean Ekins, 20	006, John Wiley	y & Sons. 2. 0	Computer-Aided	Applications in Pharm	aceutical Technology, 1	1st Edition, Jel	ana Djuris, Woodh	ead Publishin	g 3. Encyclopediaof Pha	armaceutical Technology,
	MOOC C	ourses	voi 13, Ja notel	mes owardnock, Jar	nes. G. boylan, Marce	I Dekker Inc, New	/ TUIK, 1990.										
	Vide	05	pharmawi	ns													
L			Ľ														
-		1					с	ourse Articu	lation Matri	ix							r
COs	PO1	PO2	P03	PO4	PO5	P06	P07	PO8	PO9	9 1	PO10	P011	PO12	PSO1		PSO2	PSO3
CO1	1	1	3	-	3	-	1	-	-		-	3	-	1		-	1
CO2	2	2	3	-	3	-	-	-	-			3	-	-		1	2
CO4	2	-	2	-	2	-	-	-	-		-	3	-	2		4	2
C05	3	-	4	1	3	-	1	1	-		-	2	1	-		2	-
CO6	-	-		-		-	-	- E			-	-	-	-		-	-
000	-	1	-	1	-	-	1	1	1-		-	-	-	-		1	



	Title of the	Course	Cosmeti	cs and Cosmeceution	als												
	Course	Code	MPH 20	ŧΤ													
								Part	A								
	Yea	r	1st		Semester		2nd	T un			Credits		L	T		P	c
	Course	Туре	Theory	only									4	U		0	4
	Course Ca	ategory	Disciplin	e Core													
	Pre-Requ	isite/s									Co-Requisite/s	5					
	Course Ou & Bloom's	tcomes s Level	CO1- To CO2- To CO3- To CO4- To CO5- To	define and select to explain principle ur choose the method compare the advar predict the relation	ne method for prepara iderlying the preparati I for assay of drugs by tages of microwave te between physicochen	tion of drugs and ir on of drugs(BL2-U quantitative analys chnique over conv nical properties and	ntermediates(BL1-R nderstand) sis(BL3-Apply) entional synthesis o d biological activity(I	temember) of drugs(BL5-Ev BL3-Apply)	valuate)				·				
	Coures El	ements	Skill Der Entrepre Employu Profess Gender Human Environ	velopment ✓ meurship X ability ✓ sonal Ethics X X Values X ment X			SDG	i (Goals)	s	DG3(Good healt DG4(Quality edu DG9(Industry Inr	th and well-being) ucation) novation and Infrastruc	ture)					
								Part	в								
	Mod	ules				Cor	ntents					Peo	lagogy			Ho	urs
								Part	С								
Modu	les				Title						Indicative-ABCA/ Experiments/Field Internships	PBL/ work/			Bloom's Le	evel	Hours
UNIT-4		COSMETIC PREPAR	ATIONS						PBL					BL3-Apply			12
Total Ma	arks	Min	nimum Passing Ma	irks		External Evaluation	P	art D(Marks Theo	Distributio ory Min. E	on) İxternal Evaluati	ion	Inter	nal Evaluation	1		Min. Internal Eva	luation
100		50			75			38				25			13		
								Practi	ical			1					
Total Ma	arks	Min	nimum Passing Ma	ırks		External Evaluation	on		Min. E	xternal Evaluati	ion	Inter	nal Evaluatior	1		Min. Internal Eva	luation
		0															
			Harn/a	Cosmeticology 8th	adition Poucher'sperfs	mecosmeticsands	Soans 10th edition	Part	E	Manufacture an	ad quality control PP S	harma 4th edition Hand	book of cosme	atic science and T	echnology A	O Barel M Paveand H	I Maihach 3rd edition
	Bool	(5	Cosmet	c and Toiletries rece	ent suppliers catalogue	e. CTFA directory.	, .,				,						
	Artic	es	https://or	linelibrary.wiley.cor	n/journal/14682494		400 55 5					40 PC 11 C		= .			
	Reference	s Books	Harry's (Cosmeti	c and Toiletries rece	attion. Poucher'sperfu nt suppliers catalogue	mecosmeticsandS . CTFA directory.	oaps,10th edition. C	osmetics - For	mulation, Ma	anuracture and q	quality control, PP.Shar	ma,4th edition Handbo	ok of cosmetic	science and Tech	nology A. O.	Barei, M. Payeand H.I.	waibach. 3rd edition
	MOOC C	ourses	https://n	otel.ac.in/													
	Vide	os	https://w	ww.youtube.com/wa	tch?v=bcCkQ1liaKA												
							_										
COs	PO1	PO2	PO3	PO4	P05	P06	P07	PO8	PO!	9 9	PO10	P011	P012	PSO1		PSO2	PSO3
CO1	1	-	-	-	2	-	-	-	-		-	3	-	1		1	1
CO2	3	1	-	-	2	-	-	-	-		-	3	-	2		2	2
CO3	2	2		-	2	-	-	-	-		-	1	-	1		-	2
CO4	1	2	-	-	1	-	-	-	-		-	2	-	1		-	3
CO5	3	-	-	-	-	-	-	-	-		-	1	-	-		2	2
CO6	-	-	-	-	-	-	-	-	-		-	-	-	-		-	-



Title of the Course	Pharmaceutics Practical	11						
Course Code	MPH 205P							
			Part A					
Y	1-1	Company	2-4	Cradita	L	т	Р	с
Tear	151	Semester	2110	Credits	7	0	0	7
Course Type	Lab only							
Course Category	Discipline Core							
Pre-Requisite/s	TO GAIN EXPERIMEM	TAL KNOWLEDGE		Co-Requisite/s				
Course Outcomes & Bloom's Level	CO1- To define and sele CO2- To explain principl CO3- To choose the me CO4- To compare the ar	ect the method for preparation of drugs and intermediates le underlying the preparation of drugs(BL2-Understand) thod for assay of drugs by quantitative enalysis(BL3-App dvantages of microwave technique over conventional sym	(BL1-Remember) ly) thesis of drugs(BL5-Evaluate)					
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics X Gender X Human Values X Environment X		SDG (Goals)	SDG3(Good health and weil-being) SDG4(Quality education)				

Part B

Pedagogy

Hours

Contents

Modules

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	Part	C		
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	1. To study the effect of temperature change, non-solvent addition, incompatible polymer addition in microcapsules preparation	Experiments	BL4-Analyze	4
2	2. Preparation and evaluation of Alginate beads	PBL	BL6-Create	4
3	3. Formulation and evaluation of gelatin /albumin microspheres	PBL	BL6-Create	4
4	4. Formulation and evaluation of liposomes/niosomes	PBL	BL6-Create	4
5	5. Formulation and evaluation of spherules	PBL	BL6-Create	4
6	6. Improvement of dissolution characteristics of slightly soluble drug by Solid dispersion technique.	PBL	BL4-Analyze	4
7	7. Comparison of dissolution of two different marketed products /brands	PBL	BL5-Evaluate	4
8	8. Protein binding studies of a highly protein bound drug & poorly protein bound drug	PBL	BL4-Analyze	4

		F	Part D(Marks Distribution)		
			Theory		
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
			Practical		
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
150	75	100	50	50	25

	Part E
Books	7. Pharmaceutics- The science of dosage form design by M.E.Aulton, Churchill Livingstone, Latest edition
Articles	https://www.ipinnovative.com/journal-name/JPBS
References Books	1 Modern Pharmaceutics by Gilbert S. Banker & C.T. Rhodes, 3rd Edition 2. Remington: The Science and Practice of Pharmacy, 20th edition Pharmaceutical Science (RPS) 3. Theory and Practice of Industrial Pharmacy by Liberman & Lachman
MOOC Courses	https://nptel.ac.in/
Videos	NA

							Co	ourse Articulation	Matrix						
COs	PO1	PO2	P03	PO4	P05	P06	P07	PO8	PO9	PO10	P011	P012	PSO1	PSO2	PSO3
CO1	3	-		-			-	-	-	-	3	-	1	-	1
CO2	3	-	1	1	-	-	-	-	-	-	3	-	-	1	2
CO3	2	-	2	2			-	-	-	-	3	-	2	-	3
CO4	3	-	-	1	-	-	-	-	-	-	3	-	-	-	2
CO5	-	-		-			-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



								MPharm-F	PharmaCeutics								
	Title of th	e Course	Seminar	s													
	Course	Code	MPH 20	6S													
									Part A								
	Ye	ar	1st		Sem	ester	2nd					Credits		L	т	Р	с
														0	0	7	7
	Course	туре	Lab only	-													
	Course C	ategory	Disciplin	e Core								Co Dominito/o		-			
	Pre-Req	uisite/s	C01 T	dofine and coloct th	a mathad for propara	tion of drugs and inte	modiatos/PI 1	1 Romombor				Co-Requisite/s					
	Course O & Bloom	utcomes 's Level	CO2- To CO3- To	explain principle un choose the method	derlying the preparati for assay of drugs by	on of drugs (BL2-Unc quantitative analysis	derstand) s(BL3-Apply)	r-Keineinber									
	Coures E	lements	Skill De Entrepre Employa Profess Gender Human Environ	velopment ✓ aneurship X ability ✓ sonal Ethics X X Values X nent X				SI	DG (Goals)	SDC SDC SDC	33(Good health and 54(Quality educatior 57(Affordable and cl	well-being) i) ean energy)					
	Mar	tula a				Canto		F	Part B				4		-		
	MO	luies				Conte	ents					Pe	dagogy			Но	urs
Module	5				Title			F	Part C		Indicative-ABCA/ Experiments/Field Internships	PBL/ work/			Bloom's L	Level	Hours
1	1	Polymers in NDDS							Seminar					BL2-Underst	and		12
2		Gene theray							Seminar					BL2-Underst	and		10
3		PKPD studies							Research Paper Pre	sentation				BL4-Analyze	1		12
4		Insilico drug designing							Simulation					BL3-Apply			8
								Part D(Ma	rks Distribution)								
					-			1	Theory								
Total Ma	rks	Mir	imum Passing Ma	irks		External Evaluation	1		Min. Externa	Evaluation	1	Inter	nal Evaluation			Min. Internal Eva	luation
								P	ractical			1					
Total Ma	rks	Min	imum Passing Ma	irks		External Evaluation	1		Min. Externa	Evaluation	1	Inter	nal Evaluation			Min. Internal Eva	luation
100		50			75			38				25			13		
								Part E									
	Boo	oks	NA														
	Artic	cles	NA														
L	Reference	es Books	NA														
	MOOCO	ourses	NA														
L	Vide	105	NA														
								Course Ar	ticulation Matrix				<u> </u>				
COs	PO1	PO2	P03	PO4	P05	P06	P07	PO8	PO9	PC	D10	PO11	PO12	PSO	1	PSO2	PSO3
CO1	1	1	1-	-	-	-	-	-	-	3		3	1	1		-	3

	1 1 - 3
CO2 - 2 2 3 3	2 - 1
CO3 2 - 1 3 3	1 2 - 2
CO4	· · · · ·
CO5	· · · · ·
CO6	· · · · ·



Title of th	e Course	Online Certificate Course	9										
Cours	e Code	MPH 207ET											
					Part A								
			2		0			L T		Р	С		
Te	d	TSL	Semester	2110			Credits		2 0		0	2	
Cours	е Туре	Online course											
Course	Category	Skill Enhancement Courses											
Pre-Rec	uisite/s	Pharmaceutical backgroup	und				Co-Requisite/s						
Course C & Bloon	Outcomes I's Level	C01-To define and select the method for preparation of drugs and intermediates(BL1-Remember) C02-To explain principle underlying the preparation of drugs(BL2-Understand) C03-To choose the method for assay of drugs by quantitative analysis(BL3-Apply)											
Coures I	Elements	Skill Development ✓ Entrepreneurship X Employability ✓ Professsonal Ethics X Gender X Human Values X Environment X		SDO	G (Goals)	SDG3(Good health and 1 SDG4(Quality education) SDG9(Industry Innovatio	well-being) I n and Infrastructi	ure)					
	Dart B												
Мо	dules		Co	ntents				Pedag	ogy		Hou	ırs	
<u>.</u>													
				F	Part D(Marks Distribu	ition)							
-					Theory			1					
Total Marks	Minimum Pi	assing Marks	External Evaluati	on	Mir	h. External Evaluation		Internal Evaluation			Min. Internal Evaluation		
50	25		35		18			15		8			
					Practical								
Iotal Marks	Minimum Pi	assing marks	External Evaluati	ion	Mir	h. External Evaluation		internal	rnal Evaluation		Min. Internal Eval	uation	
	0												
	Part E												
Во	oks	NA											
Arti	cles	NA											
Referenc	es Books	NA											
MOOC	Courses	1. https://ispe.org/training =&utm_source=adwords/ 1212271230479li_100	g/course/qbd 2. https://www.udemy.com/cou &utm_medium=udemyads&utm_campaign= 07795pd&matchtype=&gad_source=	rse/quality-by-desig LongTail_la.EN_cc. 1&gclid=Cj0KCQjw	n-qbd-in-pharmaceutica INDIA&utm_content=de ztOwBhD7ARIsAPDKnk	I-development/? al4584&utm_term=ag_1 BXWZvoPEBACFjanUEyfij	18445032537 FRV8AJSdYMY	ad_618853564450kw /2AH1tTLjXCBcpyt7DSY2	de_cdmpl K8aAsvOEALw_wcB&cou	_ti_dsa- ponCode=IND21	1PM 3. https://www.6sigm	a.us/quality-by-design/	
Videos		NA											

	Course Articulation Matrix														
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	-		-	-	-	-	-	3	-	1	1	1
CO2	2	2	2	-	-	-	-	-	-	-	3	-	2	2	2
CO3	3	-		-		-	-	-	-	-	3	-	1	1	1
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-		-		-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Title of the Course	Introduction to intelle	ctual property rights							
Course Code	MPH 208ET	0867							
Yoar	1ct	Somester	and	Credite	L	т	Р	с	
iea:	101	Semester	2110	Cieuts	3	1	0	4	
Course Type	Theory only		•	·					
Course Category	Skill Enhancement C	hancement Courses							
Pre-Requisite/s									
Course Outcomes & Bloom's Level	CO1- To define and CO2- To explain prin CO3- To choose the CO4- To compare th CO5- To predict the	select the method for preparation of drugs and inter iciple underlying the preparation of drugs (BL2-Uno- method for assay of drugs by quantitative analysis e advantages of microwave technique over conver relation between physicochemical properties and t	ermediates(BL1-Remember) derstand) s(BL3-Apply) titional synthesis of drugs(BL5-Evaluate) piological activity(BL3-Apply)						
Coures Elements	Skil Development ✓ Entreprenurstip ✓ Entreprenurstip ✓ Employability ✓ Professional Efficis ✓ SDG (Goals) Gender X Human Values ✓ Human Values ✓ Environment ×			SDC1(No ponety) SDC3(Goch health and well-being) SDC4(Quality education) SDC4(Clean water and sanitation) SDC3(Recent wark and economic growth) SDC3(Picent wark and economic growth) SDC3(Picent wark and economic growth)					

Part B

Pedagogy

Hours

Contents

Modules

Γ

	Part D(Marks Distribution)									
	Theory									
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation					
100	50	75	38	25	13					
			Practical							
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation					

Part E							
Books	Cookburn IM. Intellectual property rights and pharmaceuticals: challenges and opportunities for economic research. The economics of intellectual property. 2009 Jan: 150.						
Articles	Savale SK, Savale VK. Intellectual property rights (IPR). World J Pharm Pharm Sci. 2016 Apr 22;5:2559-92.						
References Books	Prabu SL, Tnk S, editors. Intellectual property rights. BoD–Books on Demand: 2017 Jun 21.						
MOOC Courses	NEPTEL						
Videos	NA						

	Course Articulation Matrix														
COs	PO1	PO2	PO3	PO4	P05	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	2	-	1	•		-	3	-	2	3	-	1	1	1
CO2	-	1	-	-	-	-	-	3	-	-	2	-	1	-	1
CO3	-	1	-	-	•		-	2	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	2	-	-	2	-	-	-	-
CO5	-	•	-	-	•		-	-	-	-	1	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Title of the Course	Research Methodology a	nd Biostatistics								
Course Code	MPH 301T	01T								
	Part A									
Yee	0-4	Compating	2-1	Condito	L	т	Р	с		
Year	2nd	Semester	3rd	Credits	4	0	0	4		
Course Type	Theory only	nh								
Course Category	Discipline Core	e Core								
Pre-Requisite/s			Co-Requisite/s							
Course Outcomes & Bloom's Level	CO1- To define and select CO2- To explain principle CO3- To choose the meth CO4- To compare the adv	ct the method for preparation of drugs and intermedial underlying the preparation of drugs(BL2-Understan hod for assay of drugs by quantitative analysis(BL3-A vantages of microwave technique over conventional s	es(BL1-Remember) i) pply) ynthesis of drugs(BL5-Evaluate)							
Coures Elements	Skil Development V Entrepreneumship X Entrepreneumship X Employability V Professional Elinis X Gender X Human Values X Environment X			SDG3(Good health and well-being) SDG4(Gualify education)						

Part B

Hours

Pedagogy

Contents

Modules

Γ

	Part D(Marks Distribution)									
	Theory									
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation					
100	50	75	37	25	12					
			Practical							
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation					
	0									

Part E								
Books	1. Pharmaceutical statistics - Practical and clinical applications, Sanford Bolton, publisher Marcel Dekker Inc. NewYork. 2. Fundamental of Statistics - Himalaya Publishing House- S.C.Guptha							
Articles	NA							
References Books	1. Design and Analysis of Experiments – PHI Learning Private Limited, R. Pannerselvam. 2. Design and Analysis of Experiments – Wiley Students Edition, Douglas and C. Montgomery							
MOOC Courses	https://www.coursera.org/search?query=biostatistics%20in%20public%20health							
Videos	https://www.youtube.com/watch?v=UtivXLO7c3A							

	Course Articulation Matrix														
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	3	3	3	-	-	-	-	-	-	3	-	1	1	1
CO2	-	2	2	1	-	-	-	-	-	-	3	-	2	2	2
CO3	-	3	1	2	-	-	-	-	-	-	2	-	1	2	1
CO4	-	3	3	3	-	-	-	-	-	-	2	-	2	-	2
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Title of th	e Course	Research Work	rch Work								
Course	e Code	MPH 304P									
				Part A							
Ye	ar	2nd	Semester	3rd		Credits	L 0	T 0	P 14	C 14	
Course	е Туре	Lab only	abonly								
Course 0	Category	Projects and Internship									
Pre-Req	quisite/s	Co-Requisite/s									
Course O & Bloom	Dutcomes n's Level	CO1- To define and select the CO2- To explain principle unde CO3- To choose the method for	O1- To define and select the method for preparation of drugs and intermediates(BL1-Remember) 02- To explain principle underlying the preparation of drugs(BL2-Understand) 03- To choose the method for assay of drugs by quantitative analysis(BL3-Appty)								
Coures E	Elements	Skill Development V Entrepreneurship V Employability V Professional Ethics V Gender X Human Values V Environment X	II Development / traperseurship / ployability / SbG (Goals) SDG4(Quality education) Afer X man Values / womment X								
				Part B							
Mo	dules		Contents		Pedagogy Hours						
<u> </u>				Part D(Marks Distribution)							
	1			Theory							
Total Marks	Minimum Pa	ssing Marks	External Evaluation	Min. External Evaluation		Internal Evaluation		Min. Inte	rnal Evaluation		
175											
				Practical							
I OTAI MARKS MINIMUM Passing Marks External Evaluation				Min. External Evaluation		Internal Evaluation		Min. Inte	rnal Evaluation		
350	175		200	100	150		75				
				Part E							
Boo	oks	NA									

Articles	NA
References Books	NA
MOOC Courses	NA
Videos	NA
	Course Articulation Matrix

COs	PO1	PO2	P03	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	2	2	-	-	-	-	3	-	1	3	3
CO2	3	2	3	2	2	1	-	-	-	-	3	-	2	1	3
CO3	3	3	3	2	2	1	-	-	-	-	3	-	3	1	3
CO4	•	-	•	•	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Title of the Course				Research Publication /Report															
Course Code				MPH 404T															
Part A																			
							FallA				L			т	Р		с		
Year			2nd		Seme	ster	4th			Credits			0	0	2		2		
	Course	Туре	Lab o	Labonly															
Course Category				Projects and Internatio															
Pre-Requisite/s				Co-Requisite/s															
	Course Ou & Bloom's	tcomes Level	CO1- CO2- CO3-	CO1-To define and valect the method for preparation of drugs and intermediates(BL1-Remember) CO2-To explain principle underlying the preparation of drugs(BL2-Understand) CO3-To choose the method for assay of drugs by qualified and and the method for assay of drugs by qualified and and the state of the s															
Coures Elements			Skill D Entrej Emplo Profes Gend Huma Enviro	Skill Development J Enterprenurship X Employability A Professional Ethics J Gender X Human Values X Environment X				SDG (Goals)			SDG4(Quality education)								
	Mod	lles		Contents								Pedagogy					Hours		
					Contents						ravagogy nours								
Modules					Title			Part C Inc Exp			dicative-ABCA/PBL/ periments/Field work/				Bloom's Le	Hours			
1		presenting research/r	view papers in v	ers in various seminars, conferences or symposiums PRI															
	Part D(Marks Distribution) Theory																		
Total Marks			imum Passing	Marks		External Evaluation			Min. External Evaluation		Internal Evaluation			n		min. Internal Evaluation			
		25						Dra ati											
Total Marke Minimum				assing Marks External Evaluation			Min. External			nal Evaluation Internal Evaluation					Min. Internal Eva	luction			
50 0		inium rassing i			External Evaluation		25	MIII. EX			0			0	0				
Part E																			
	Book	s	NA																
Articles				NA															
	References	Books	NA	NA															
MOOC Courses				NA															
Videos				NA															
Course Articulation Matrix																			
COs	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10		P011	PO12	PS	01	PSO2	PSO3		
CO1	1	3	2	2	1	-	-	-	-	-		3	-	1		1	3		
CO2	1	1	2	2	-	-	-	-	-	-		2	-	2		2	3		
CO3	1	3	3	2	1	-	-	-	-	-		3	-	1		2	1		
CO4	-	-	-	-	-	-	-	-	-	-		-	-	-		-	-		
CO5	-	-	-	-	-	-	-	-	-	-		-	-	-		-	-		
CO6	-	-	-	-	-	-	-	-	-	-		-	-	-		-	-		