

Pimpri Chinchwad Education Trust's

Pimpri Chinchwad University

SCHOOL OF PHARMACY

(Established under Maharashtra Act No V of 2023) Sate, Pune - 412 106. Maharashtra, India

Rules, Structure and Syllabus for First & Second Year (SEM -I to SEM -IV)

BACHELOR OF PHARMACY (2023 PATTERN)

[Framed under Revised Regulations 2016-17 for the B. Pharm. Degree Program (CBCS) of the Pharmacy Council of India, New Delhi].

Choice Based Credit System (CBCS) and Grading System



EFFECTIVE FROM 2023-24 ACADEMIC YEAR



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Preamble

Pimpri Chinchwad University offers Bachelor of Pharmacy (B. Pharm) course. This course is an undergraduate program that aims to provide students with a comprehensive understanding diverse world of Pharmacy as an integral part of healthcare system. The syllabus for Bachelor of Pharmacy at undergraduate level is regulated by Pharmacy Council of India (PCI). Along with this curriculum the students of Pharmacy are offered with audit courses and ability enhancement courses for inculcating the additional abilities and improve proficiency as a pharmacist to serve the society.

The profession of pharmacy is noble in its ideals and pious in its character. Apart from being a career for earning livelihood it has inherent in it the attitude of service and sacrifice in the interests of the suffering humanity. In handling, selling, distributing, compounding and dispensing medical substances including poisons and potent drugs a pharmacist is, in collaboration with medical men and others, charged with the onerous responsibility of safeguarding the health of people. As such he must uphold the interests of his patrons above all things. The lofty ideals set up by Charaka, the ancient Philosopher Physician and Pharmacist in his enunciation: "Even if your own life be in danger, you should not betray or neglect the interests of your patients" should be fondly cherished by all Pharmacist. Government restricts the practice of Pharmacy to those who qualify under regulatory requirements and grant them privileges necessarily denied to others. In return Government expects the Pharmacist to recognize his responsibilities and to fulfill his professional obligations honorably and with due regard for the wellbeing of Society. Standards of professional conduct for pharmacy are necessary in the public interest to ensure an efficient pharmaceutical service. Every pharmacist should not only be willing to play his part in giving such a service but should also avoid any act or omission which would prejudice the giving of the services or impair confidence in any respect for pharmacists as a body. The nature of pharmaceutical practice is such that its demands may be beyond the capacity of the individual to carry out as quickly or as efficiently as the needs of the public require. There should, therefore always, be a readiness to assist colleagues with information or advice. A Pharmacist must, above all be a good citizen and must uphold and defend the laws of the state and the Nation.

The goal of the syllabus is that the students at the end can secure a high ending job. Keeping in mind with the changing nature of the course, passable emphasis has been given on new practices of mapping and understanding of the subject. The syllabus has also been outlined in such a way that the basic skills of course are taught to the students, increasing chances of securing most job opportunities in pharmaceutical industry.

Also, it is recommended that the Project Work and Industrial training is compulsory for all the students as per their respective semester curriculum.



Vision and Mission of Program:

Vision:

• To emerge as a Centre of Excellence in Pharmaceutical Education, Research and Healthcare Services.

Mission:

- To deliver quality Pharmacy education to cater the evolving needs of the students, industries and the society at large.
- To foster and disseminate high quality research and creative work which enhances learning and contributes to the advancement of knowledge.
- To produce highly productive professionals and leaders to serve the healthcare needs of the society.

Program Educational Objectives:

Program Educational Objectives (PEOs) for a B. Pharm program are as follows:

- **PEO 1:** To generate excellent trained undergraduates with state of art knowledge in pharmaceutical technology and allied subjects in an ambience of motivation that could stimulate growth and excellence.
- **PEO 2:** To create professional undergraduates who are trained in sync with the requirements of the pharmaceutical industry spread across the country and the globe and adapt readily to education, research, industry and healthcare programs.
- **PEO 3**: To mold students to emerge as future leaders of the pharmaceutical industry and as entrepreneurs.
- **PEO 4:** To sensitize students to local and global needs of environment protection and sustainability.
- **PEO 5:** To promote the development of trained human resource in Pharmaceutical Sciences for dissemination of quality education with highly professional and ethical attitude, strong communication skills, effective skills to work in a team with a multidisciplinary approach.

Program Outcome

PO	PO Statement
PO1:	Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.
PO2:	Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines



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PO3:	Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice.
PO4:	Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.
PO5:	Leadership skills: Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well-being.
PO6:	Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).
PO7:	Pharmaceutical Ethics: Apply ethical principles in professional and social contexts, honour personal values.
PO8:	Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.
PO9:	The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.
PO10:	
PO11:	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Objectives

PSO1:	Apply fundamental principles of pharmacy in developing entrepreneurial expertise and
	solving community-based problems.
PSO2:	Work competently in various areas of pharmaceutical industry and inter-disciplinary research.
PSO3:	Work effectively and ethically in their professional environment.
PSO4:	Seek constant improvement and develop new skills to enhance the state of their
	pharmaceutical practice.



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1.	Curriculum Framework	
2.	Tentative list of Electives, Open Electives, Life Skill Courses, Proficiency Foundation Courses, HSMC Courses	
3.	Course Code Nomenclature	

Curriculum Structure:

Sr. No.	Type of course	Abbreviations
1	Major	MAJ
2	Elective (Minor Stream/Vocational/Program Specific)	MIN
3	Open Electives	OE
4	Ability Enhancement Courses	AEC
5	Skill Enhancement Courses	SEC
6	Vocational Skill Course	VSC
7	Summer Internship/ On Job Training	SI/OJT
8	Project	PROJ
9	Field Project	FP
10	Indian Knowledge System	IKS
11	Community Engagement Program	CEP
12	Value Education Course	VEC



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Sr. No.	Type of course	No. of	Total	Credits
51.110.	Type of course	Courses	No	%
1	Major	64 [*]	197 [*]	92.92
2	Electives	09	08	3.77
3	Ability Enhancement Courses	04		5 3333 0
4	Summer Internship/On Job Training	01	A	
5	Field Project/Project work	01	06	2.83
6	Indian Knowledge System	01		(222)
7	Co-curricular & extracurricular activities/Community Engagement Program	01	01	0.47
8	Audit course (Value Education Course)	05	Lawara	1-0-0
	Total	86	212	100

^{*} Including the students appearing for remedial mathematics (02) credit/remedial biology (03) credit course

CREDIT DISTRIBUTION: SEMESTER WISE

Sr. No.	Type of course		1	No. of	Credi	ts/Sen	ıester			Total
SI. INU.	Type of course	1	2	3	4	5	6	7	8	TOTAL
1	Major	30	29	26	28	26	26	24	14	203
2	Elective (Minor Stream/Vocational/Program Specific)		1	-	3883	i nc s	155	1===	08	08
3	Ability Enhancement Courses	/	AEC	AEC	AEC	AEC				-
4	Summer Internship/On Job Training		(122)		(22)	0220		SI		
5	Field Project		FP						FP	
6	Indian Knowledge System		AC	1 x==: [1	[.]			
7	Co-curricular extracurricular activities / Community Engagement Program *	CEP	CEP	CEP	CEP	CEP	CEP	CEP	CEP	01*
8	Audit course (Value Education Course)		122	AC	AC	AC	AC	AC	AC	
÷.77	Total	30	29	26	28	26	26	24	22	211/ 212 [*]

 $^{{}^\}star \text{The credit point (01)}$ assigned for extracurricular and/or co-curricular

Curriculum Structure

PROGRAM STRUCTURE SCHOOL PHARMACY BACHELOR OF PHARMACY (B.PHARM) 2023 PATTERN

Effective from the Academic Year 2023 - 2024 TABLE I- COURSE OF STUDY FOR SEMESTER I

Course code	Course Type	Name of the course	No. of hours	Tutorial	Credit points	Continuous		Assessment (C	IA)		emester ent Scheme	Total Marks
					E	Continuous Mode	Sessio Marks	nal Exams Duration (Hrs)	Total	Marks	Duration (Hrs)	
BP101T	Core	Human Anatomy and Physiology I Theory	3	1	4	10	15	1	25	75	3	100
BP102T	Core	Pharmaceutical Analysis I Theory	3	1	4	10	15	1	25	75	3	100
BP103T	Core	Pharmaceutics I - Theory	3	1	4	10	15	1	25	75	3	100
BP104T	Core	Pharmaceutical Inorganic Chemistry - Theory	3	1	4	10	15	1	25	75	3	100
BP105T	Core	Communication skills – Theory *	2	-	2	5	10	1	15	35	1.5	50
BP106RBT BP106RMT	Core	Remedial Biology/ Mathematics - Theory*	2	-	2	5	10	1	15	35	1.5	50
BP107P	Core	Human Anatomy and Physiology - Practical	4	-	2	5	10	4	15	35	4	50
BP108P	Core	Pharmaceutical Analysis I Practical	4		2	5	10	4	15	35	4	50
BP109P	Core	Pharmaceutics I - Practical	4	- 1	2	5	10	4	15	35	4	50
BP110P	Core	Pharmaceutical Inorganic Chemistry - Practical	4	-	2	5	10	4	15	35	4	50
BP111P	Core	Communication skills – Practical*	2	-	1	5	5	2	10	15	2	25
BP112RBP	Core	Remedial Biology – Practical*	2	E .	1	5	5	2	10	15	2	25
		Total	34/36\$/3 8#	4	27/29 \$/30#	70/75 ^{\$} /8 0*	115/12 5 ^{\$} /130*	23/24 ⁸ /26 [#] Hrs	185/2 00 ⁸ /2 10 [#]	490/525 ^{\$} / 540 [#]	31.5/ 33 ^{\$} /35 [#] Hrs	675/725 ^{\$} /750

Abbreviations: Course Abbreviation; Th = Theory, Tut = Tutorial, Pr = Practical, Hrs = Hours, Cr = Credits; CIA = Continuous Internal Assessment, ESA = End Semester Assessment, PR = Practical Exam, OR= Oral Exam

TABLE II: COURSE OF STUDY FOR SEMESTER II

			No. of		C324	Credit	1,5014	ntinuous Inte (CIA)	ernal Assessn	nent	100000	Semester ent Scheme	PF13 VIDE3
Course	Course	Name of the course	No. of	Tutorial		And the second s	Sessio	onal Exams			Domesten	Total	
code	Type	Name of the course	hours	Tutterini	points	Continuous Mode	Marks	Duration (Hrs)	Total	Marks	Duration (Hrs)	Marks	
BP201T	Core	Human Anatomy and PhysiologyII – Theory	3	1	4	10	15	1	25	75	3	100	
BP202T	Core	Pharmaceutical OrganicChemistry-I – Theory	3	1	4	10	15	1	25	75	3	100	
BP203T	Core	Biochemistry - Theory	3	1	4	10	15	1	25	75	3	100	
BP204T	Core	Pathophysiology - Theory	3	1	4	10	15	1	25	75	3	100	
BP205T	Core	Computer Applications inPharmacy – Theory*	3		3	10	15	1	25	50	2	75	
BP206T	Core	Environmental sciences - Theory*	3		3	10	15	1	25	50	2	75	
BP207P	Core	Human Anatomy and PhysiologyII –Practical	4	-	2	5	10	4	15	35	4	50	
BP208P	Core	Pharmaceutical OrganicChemistry I– Practical	4	•	2	5	10	4	15	35	4	50	
BP209P	Core	Biochemistry - Practical	4		2	5	10	4	15	35	4	50	
BP210P	Core	Computer Applications in Pharmacy— Practical	2	-	1	5	5	2	10	15	2	25	
UFL201	AEC#	Foreign Language-I*#	2	S#3	-	7	50			N	A		
		Total	34	4	29	80	125	20	205	520	30	725	

^{*} UFL201A- GERMAN, * UFL201B- JAPANESE, * Ability Enhancement Course Foreign Language

Course Code	Course Type	Subject name
UFLI 201A	AEC	German
UFLI 201 B	AEC	Japanese

TABLE III: COURSE OF STUDY FOR SEMESTER III

Course	220				and the second second	Continuous Int	ternal Asses	ssment (CIA)	211		Semester ent Scheme	
Com sc	Course	Name of the course	No. of	Tutorial	Credit	Continuous	Session	ıal Exams			Duration	Total
code	Туре	ivame of the course	hours	I utor iai	points	Mode	Marks	Duration (Hrs)	Total	Marks	(Hrs)	Marks
BP301T	Core	Pharmaceutical Organic Chemistry II – Theory	3	1	4	10	15	1	25	75	3	100
BP302T	Core	Physical Pharmaceutics I – Theory	3	1	4	10	15	1	25	75	3	100
BP303T	Core	Pharmaceutical Microbiology- Theory	3	1	4	10	15	1	25	75	3	100
BP304T	Core	Pharmaceutical Engineering – Theory	3	1	4	10	15	1	25	75	3	100
BP305P	Core	Pharmaceutical Organic Chemistry II – Practical	4		2	5	10	4	15	35	4	50
BP306P	Core	Physical Pharmaceutics I — Practical	4	-	2	5	10	4	15	35	4	50
RP307P	Core	Pharmaceutical Microbiology -	4		2	5	10	1	15	2.5	1	50
BP308P	Core	Pharmaceutical Engineering – Practical	4	-	2	5	10	4	15	35	4	50
ACUHV101	AC	Universal Human Values-I (UHV-I)	2	-			50	1.01			NA	
UFL202	AEC#	Foreign Language-II*#	2	100		7	50		_		NA	
		Total	30	4	24	60	100	20	160	440	28	600

* UFL201A- GERMAN, * UFL201B- JAPANESE, ^a Ability Enhancement Course Foreign Language

Course Code	Course Type	Subject name
UFLI 201A	AEC	German
UFLI 201 B	AEC	Japanese

TABLE IV: COURSE OF STUDY FOR SEMESTER IV

	Course		No. of		Credit-	Continuous Internal Assessment (CL		A)	End Semester Assessment Schem			
Course	Type	Name of the course	hours	Tutorial	points	C	Sessional Exams				D	Total
code	13P		nours			Continuous Mode	Marks	Duration (Hrs)	Total	Marks	Duration (Hrs)	Marks
BP401T	Core	Pharmaceutical Organic Chemistry II – Theory	3	1	4	10	15	1	25	75	3	100
BP402T	Core	Medicinal Chemistry I – Theory	3	1	4	10	15	1	25	75	3	100
BP403T	Core	Physical Pharmaceutics II – Theory	3	1	4	10	15	1	25	75	3	100
BP404T	Core	Pharmacology I - Theory	3	1	4	10	15	1	25	75	3	100
BP405T	Core	Pharmacognosy & Phytochemistry I – Theory	3	1	4	10	15	1	25	75	3	100
BP406P	Core	Medicinal Chemistry I - Practical	4	•	2	5	10	4	15	35	4	50
BP407P	Core	Physical Pharmaceutics II – Practical	4		2	5	10	4	15	35	4	50
BP408P	Core	Pharmacology I – Practical	4	: * :	2	5	10	4	15	35	4	50
BP409P	Core	Pharmacognosy & Phytochemistry I – Practical	4		2	5	10	4	15	35	4	50
ACIKSSP101	AC	Indian Knowledge System (IKS) – Indian Health Science	2	-	24		50			1	NΑ	
UFL301	AEC#	Foreign Language-III*#	2				50			1	NA.	
	্ৰ	Fotal	33	5	28	70	115	21	185	515	31	700

^{*} UFL202A- GERMAN, * UFL202B- JAPANESE, * Ability Enhancement Course

Foreign Language

Course Code	Course Type	Subject name
UFLI 201A	AEC	German
UFLI 201 B	AEC	Japanese

TABLE V: COURSE OF STUDY FOR SEMESTER V

						Continuo	us Internal	Assessment (C	IA)	End Semester Assessment Scheme			
Course	Course	Name of the course	No. of	Tutorial	Credit	Continuous	Sessional Exams				Duration	Total	
code	Type		hours	14101111	points	points	Mode	Marks	Duration (Hrs)	Total	Marks	(Hrs)	Marks
BP501T	Core	Medicinal Chemistry II – Theory	3	ı	4	10	15	1	25	75	3	100	
BP502T	Core	Industrial Pharmacy I— Theory	3	1	4	10	15	1	25	75	3	100	
BP503T	Core	Pharmacology II - Theory	3	1	4	10	15	1	25	75	3	100	
BP504T	Core	Pharmacognosy & Phytochemistry II-Theory	3	1	4	10	15	1	25	75	3	100	
BP505T	Core	Pharmaceutical Jurisprudence —Theory	3	1	4	10	15	1	25	75	3	100	
BP506P	Core	Industrial Pharmacy I— Practical	4		2	5	10	4	15	35	4	50	
BP507P	Core	Pharmacology II – Practical	4	-	2	5	10	4	15	35	4	50	
BP508P	Core	Pharmacognosy & Phytochemistry II- Practical	4	-	2	5	10	4	15	35	4	50	
ACUHV 201	AC	Universal Human Values- II (UHV-II)	2	82	321	∇T	50				NA		
UFL302	AEC#	Foreign Language-IV⁴#	2	92	320		50				NA		
		Total	29	5	6	65	105	17	170	480	27	650	

^{*} UFL301A- GERMAN, * UFL301B- JAPANESE, * Ability Enhancement Course

Foreign Language

Course Code	Course Type	Subject name
UFLI 201A	AEC	German
UFLI 201 B	AEC	Japanese

TABLE VI: COURSE OF STUDY FOR SEMESTER VI

			N6		G12	Continuous Internal Assessment (CIA)					End Semester Assessment Scheme	
Course	Course	Name of the course	No. of	Tutorial	Credit	Continuous	Sessi	onal Exams	Total	Marks	Duration	Total
code	ode Type Name of the cours	Name of the course	hours	1 410.7111	points	Mode	Marks	Duration (Hrs)	Total	Marks	(Hrs)	Marks
BP601T	Core	Medicinal Chemistry III - Theory	3	1	4	10	15	1	25	75	3	100
BP602T	Core	Pharmacology III – Theory	3	1	4	10	15	1	25	75	3	100
BP603T	Core	Herbal Drug Technology – Theory	3	1	4	10	15	1	25	75	3	100
BP604T	Core	Biopharmaceutics and Pharmacokinetics – Theory	3	1	4	10	15	1	25	75	3	100
BP605T	Core	Pharmaceutical Biotechnology-Theory	3	1	4	10	15	1	25	75	3	100
BP606T	Core	Quality Assurance- Theory	3	1	4	10	15	1	25	75	3	100
BP607P	Core	Medicinal chemistry III – Practical	4	12	2	5	10	4	15	35	4	50
BP608P	Core	Pharmacology III - Practical	4	-	2	5	10	4	15	35	4	50
BP609P	Core	Herbal Drug Technology – Practical	4	.5	2	5	10	4	15	35	4	50
ACCOI 201	AC	Constitution of India (COI)	2	350	7-1		50				NA	
	-	Total	32	6	30	75	120	18	195	555	30	750

Foreign Language

Course Code	Course Type	Subject name
UFLI 201A	AEC	German
UFLI 201 B	AEC	Japanese

TABLE VII: COURSE OF STUDY FOR SEMESTER VII

			No. of		Credit	Continuous Internal Assessment (CIA)			End Semester Assessment (CIA) Assessment Scheme			
Course	Course Type	Name of the course	THE REAL PROPERTY.	Tutorial	points	Continuous	Sessional Exams				Duration	Total
code	Турс	TVAILE OF the Course	hours	Mode Marks	Duration (Hrs)	Total	Marks	(Hrs)	Marks			
BP701T	Core	Instrumental Methods of Analysis - Theory	3	1	4	10	15	1	25	75	3	100
BP702T	Core	Industrial Pharmacy – Theory	3	1	4	10	15	1	25	75	3	100
BP703T	Core	Pharmacy Practice - Theory	3	1	4	10	15	1	25	75	3	100
BP704T	Core	Novel Drug Delivery System – Theory	3	1	4	10	15	1	25	75	3	100
BP705 P	Core	Instrumental Methods of Analysis- Practical	4		2	5	10	4	15	35	4	50
BP706 PS	Core	Practice School*	12	-	6	25	/ -	/	25	125	5	150
ACALR301	AC	Aptitude and Logical Reasoning	2	-		7/	50				NA	00
otal			28	5	24	70	70	8	140	460	21	600

TABLE VIII: COURSE OF STUDY FOR SEMESTER VIII

Cours e	Course Type	Name of the course	No. of hours	Tutor ial	Credit points	Continuous I	nternal Asse	essment (CL	A)	End Semester Assessment Scheme		Total Marks
code						Continuou sMode	Session Mark	Duratio	Total	Mar ks	Duration	
BP801T	Core	Biostatistics and Research Methodology – Theory	3	1	4	10	15	1 Hr	25	75	3 Hrs	100
BP802T	Core	Social and Preventive Pharmacy— Theory	3	1	4	10	15	1 Hr	25	75	3 Hrs	100
BP803ET	Core	Pharmaceutical Marketing –										
BP804ET	Core	Pharmaceutical Regulatory Science – Theory										
BP805ET	Core	Pharmacovigilance - Theory					1					
BP806ET	Core	Quality Control and Standardization of Herbals -Theory	3 +	1 + 1 =	4+4							
BP807ET	Core	Computer Aided Drug Design – Theory	3 =	2	8	10 + 10 = 20	15 + 15 = 30	1 + 1 = 2 Hrs	25 + 25 = 50	75 + 75	3 + 3 = 6	100 + 100 =
BP808ET	Core	Cell and Molecular Biology-			· A							
BP809ET	Core	Cosmetic Science - Theory	1									
BP810ET	Core	Experimental Pharmacology-				N. A. San						
BP811ET	Core	Advanced Instrumentation Techniques – Theory										
BP812PW	Core	Project Work	12		6	1	5.	-	ē.	15 0	4 Hrs	150
ACAIP301	AC	Artificial Intelligence in Pharmaceuticals	2	-	-	50				NA		
Total		Last to be provided to the control of the Provided State of the Control of the Co	24	4	22	40	60	4 Hrs	100	450	16 Hrs	550

Minor course (Open Electives) offered by School of Pharmacy

"Drugs and Healthcare"

Course Code	Name of Commo		Evaluation Scheme			
Course Code	Name of Course	SEM	Credits	Hours	CIA	ESA
USPDH101	DH Minor 1: Health and hygiene	Ш	2	2	20	30
USPDH102	DH Minor 2: Know your drugs	Ш	2	2	20	30
USPDH103	DH Minor 3: Complementary and alternative medicine	IV	2	2	20	30
USPDH104	DH Minor 4: Drug discovery	V	2	2	20	30
USPDH105	DH Minor 5: Forensic science	VI	2	2	20	30

1. Short Title and Commencement

These regulations shall be called as "The Revised Regulations for the B. Pharm. Degree Program CBCS) of the Pharmacy Council of India, New Delhi". They shall come into effect from the Academic Year 2016-17. The regulations framed are subject to modifications from time to time by Pharmacy Council of India.

2. Minimum qualification for admission

2.1 First year B. Pharm:

Candidate shall have passed 10+2 examination conducted by the respective state/central government authorities recognized as equivalent to 10+2 examination by the Association of Indian Universities (AIU) with English as one of the subjects and Physics, Chemistry, Mathematics (P.C.M) and or Biology (P.C.B / P.C.M.B.) as optional subjects individually. Any other qualification approved by the Pharmacy Council of India as equivalent to any of the above examinations.

2.2. B. Pharm lateral entry (to third semester):

A pass in D. Pharm. course from an institution approved by the Pharmacy Council of India under section 12 of the Pharmacy Act.

3. Duration of the program

The course of study for B. Pharm shall extend over a period of eight semesters (four academic years) and six semesters (three academic years) for lateral entry students. The curricula and syllabi for the program shall be prescribed from time to time by Pharmacy Council of India, New Delhi.

4. Medium of instruction and examinations

Medium of instruction and examination shall be in English.

5. Working days in each semester

Each semester shall consist of not less than 100 working days. The odd semesters shall be conducted from the month of June/July to November/December and the even semesters shall be conducted from December/January to May/June in every calendar year

6. Attendance and progress

A candidate is required to put in at least 80% attendance in individual courses considering theory and practical separately. The candidate shall complete the prescribed course satisfactorily to be eligible to appear for the respective examinations.

7.1. Credit assignment

7.1.1. Theory and Laboratory courses

Courses are broadly classified as Theory and Practical. Theory courses consist of lecture (L) and /or tutorial (T) hours, and Practical (P) courses consist of hours spent in the laboratory. Credits (C) for a course is dependent on the number of hours of instruction per week in that course, and is obtained by using a multiplier of one (1) for lecture and tutorial

hours, and a multiplier of half (1/2) for practical (laboratory) hours. Thus, for example, a theory course having three lectures and one tutorial per week throughout the semester carries a credit of 4. Similarly, a practical having four laboratory hours per week throughout semester carries a credit of 2.

7.2. Minimum credit requirements

The minimum credit points required for award of a B. Pharm. degree is 208. These credits are divided into Theory courses, Tutorials, Practical, Practice School and Project over the duration of eight semesters. The credits are distributed semester-wise as shown in Table IX. Courses generally progress in sequences, building competencies and their positioning indicates certain academic maturity on the part of the learners. Learners are expected to follow the semester-wise schedule of courses given in the syllabus. The lateral entry students shall get 52 credit points transferred from their D. Pharm program. Such students shall take up additional remedial courses of 'Communication Skills' (Theory and Practical) and 'Computer Applications in Pharmacy' (Theory and Practical) equivalent to 3 and 4 credit points respectively, a total of 7 credit points to attain 59 credit points, the maximum of I and II semesters.

8. Academic work

A regular record of attendance both in Theory and Practical shall be maintained by the teaching staff of respective courses.

9. Course of study

The course of study for B. Pharm shall include Semester Wise Theory & Practical as given in Table -I to VIII. The number of hours to be devoted to each theory, tutorial and practical course in any semester shall not be less than that shown in Table -I to VIII.

Semester **Credit Points** I 27/29^{\$}/30[#] II 29 Ш 26 IV 28 V 26 VI 26 VII 24 VIII 01* Extracurricular/ Co-curricular activities 209/211^S/212[#] Total credit points for the program

Table - X Semester wise credits distribution

10. Program Committee

- 1. The B. Pharm. program shall have a Program Committee constituted by the Head of the institution in consultation with all the Heads of the departments.
- 2. The composition of the Program Committee shall be as follows:

A senior teacher shall be the Chairperson; One Teacher from each department handling B. Pharm courses; and four student representatives of the program (one from each academic year), nominated by the Head of the institution.

^{*} The credit points assigned for extracurricular and or co-curricular activities shall be given by the Principals of the colleges and the same shall be submitted to the University. The criteria to acquire this credit point shall be defined by the colleges from time to time.

SApplicable ONLY for the students studied Physics / Chemistry / Botany / Zoology at HSC and appearing for Remedial Mathematics course.

^{*}Applicable ONLY for the students studied Mathematics / Physics / Chemistry at HSC and appearing for Remedial Biology course.

3. Duties of the Program Committee:

- i. Periodically reviewing the progress of the classes.
- ii. Discussing the problems concerning curriculum, syllabus and the conduct of classes.
- iii. Discussing with the course teachers on the nature and scope of assessment for the course and the same shall be announced to the students at the beginning of respective semesters.
- iv. Communicating its recommendation to the Head of the institution on academic matters.
- v. The Program Committee shall meet at least thrice in a semester preferably at the end of each Sessional exam (Internal Assessment) and before the end semester exam.

11. Examinations/Assessments

The scheme for internal assessment and end semester examinations is given in Table -X.

11.1. End semester examinations

The End Semester Examinations for each theory and practical course through semesters I to VIII shall be conducted by the university except for the subjects with asterix symbol (*) in table I and II for which examinations shall be conducted by the subject experts at college level and the marks/grades shall be submitted to the university.

11.2. Internal assessment: Continuous mode

The marks allocated for Continuous mode of Internal Assessment shall be awarded as per the scheme given below.

Table-XI: Scheme for awarding internal assessment: Continuous mode

Theory		
Criteria	Maximu	m Marks
Attendance (Refer Table – XII)	4	2
Academic activities (Average of any 3 activities e.g. quiz, assignment, open book test, field work, group discussion and seminar)	3	1.5
Student – Teacher interaction	3	1.5
Total	10	5
Practical		
Attendance (Refer Table – XII)	2	
Based on Practical Records, Regular viva voce, etc.	3	
Total	5	

Table- XII: Guidelines for the allotment of marks for attendance

Percentage of Attendance	Theory	Practical
95 – 100	4	2
90 – 94	3	1.5
85 – 89	2	1
80 – 84	1	0.5
Less than 80	0	0

11.3. Sessional exams

- Two Sessional exams shall be conducted for each theory / practical course as per the schedule fixed by the college(s).
 The scheme of question paper for theory and practical Sessional examinations is given below. The average marks of two Sessional exams shall be computed for internal assessment as per the requirements given in tables X.
- Sessional exam shall be conducted for 30 marks for theory and shall be computed for 15 marks. Similarly Sessional
 exam for practical shall be conducted for 40 marks and shall be computed for 10 marks.

Question paper pattern for theory Sessional examinations

For subjects having University examination

=	10 x 1 = 10 OR
-	05 x 2 = 10
=	1 x 10 = 10
,#J	$2 \times 5 = 10$
//=	30 marks
	= = =

For subjects having Non-University examination

I. Long Answers (Answer 1 out of 2)	(=	$1 \times 10 = 10$
II. Short Answers (Answer 4 out of 6)	=	$4 \times 5 = 20$
Total	=	30 marks

Question paper pattern for practical Sessional examinations

	10
-	25
V =	05
===	40 marks
	=

11.4. Promotion and award of grades

A student shall be declared PASS and eligible for getting grade in a course of B. Pharm program if he/she secures at least 50% marks in that particular course including internal assessment. For example, to be declared as PASS and to get grade, the student has to secure a minimum of 50 marks for the total of 100 including continuous mode of assessment and end semester theory examination and has to secure a minimum of 25 marks for the total 50 including internal assessment and end semester practical examination.

11.5. Carry forward of marks

In case a student fails to secure the minimum 50% in any Theory or Practical course as specified in above, then he/she shall reappear for the end semester examination of that course. However his/her marks of the Internal Assessment shall be carried over and he/she shall be entitled for grade obtained by him/her on passing.

11.6. Improvement of internal assessment

A student shall have the opportunity to improve his/her performance only once in the Sessional exam component of the internal assessment. The re-conduct of the Sessional exam shall be completed before the commencement of next end semester theory examinations.

11.7. Re-examination of end semester examinations

Reexamination of end semester examination shall be conducted as per the schedule given in table XIII. The exact dates of examinations shall be notified from time to time.

Table-XIII: Tentative schedule of end semester examinations

Semester	For Regular Candidates	For Failed Candidates
I, III, V and VII	November / December	May / June
II, IV, VI and VIII	May / June	November / December

Question paper pattern for end semester theory examinations For 75 marks paper

I. Multiple Choice Questions (MCQs) OR	20 x 1 = 20 OR
Objective Type Questions (10 x 2) (Answer all the questions)	10 x 2 = 20
II. Long Answers (Answer 2 out of 3)	2 x 10 = 20
III. Short Answers (Answer 7 out of 9)	$7 \times 5 = 35$
Total	75 marks

For 50 marks paper

I. Long Answers (Answer 2 out of 3)	=	2 x 10 = 20
II. Short Answers (Answer 6 out of 8)	=	$6 \times 5 = 30$
Total	=	50 marks

For 35 marks paper

I. Long Answers (Answer 1 out	of $2) =$	$1 \times 10 = 10$
II. Short Answers (Answer 5 out	of 7) =	5 x 5 = 25
Total	=	35 marks

Question paper pattern for end semester practical Sessional examinations

=	05
==	25
=	05
	35 marks
	=

12. Academic progression

No student shall be admitted to any examination unless he/she fulfills the norms given in 6. Academic progression rules are applicable as follows:

A student shall be eligible to carry forward all the courses of I, II and III semesters till the IV semester examinations. However, he/she shall not be eligible to attend the courses of V semester until all the courses of I and II semesters are successfully completed.

A student shall be eligible to carry forward all the courses of III, IV and V semesters till the VI semester examinations. However, he/she shall not be eligible to attend the courses of VII semester until all the courses of I, II, III and IV semesters are successfully completed.

A student shall be eligible to carry forward all the courses of V, VI and VII semesters till the VIII semester examinations. However, he/she shall not be eligible to get the course completion certificate until all the courses of I, II, III, IV, V and VI semesters are successfully completed.

A student shall be eligible to get his/her CGPA upon successful completion of the courses of I to VIII semesters within the stipulated time period as per the norms specified in 26.

A lateral entry student shall be eligible to carry forward all the courses of III, IV and V semesters till the VI semester examinations. However, he/she shall not be eligible to attend the courses of VII semester until all the courses of III and IV semesters are successfully completed.

A lateral entry student shall be eligible to carry forward all the courses of V, VI and VII semesters till the VIII semester examinations. However, he/she shall not be eligible to get the course completion certificate until all the courses of III, IV, V and VI semesters are successfully completed.

A lateral entry student shall be eligible to get his/her CGPA upon successful completion of the courses of III to VIII semesters within the stipulated time period as per the norms specified in 26.

Any student who has given more than 4 chances for successful completion of I / III semester courses and more than 3 chances for successful completion of II / IV semester courses shall be permitted to attend V / VII semester classes ONLY during the subsequent academic year as the case may be. In simpler terms there shall NOT be any ODD BATCH for any semester.

Note: Grade AB should be considered as failed and treated as one head for deciding academic progression. Such rules are also applicable for those students who fail to register for examination(s) of any course in any semester.

13. Grading of performances

Letter grades and grade points allocations:

Based on the performances, each student shall be awarded a final letter grade at the end of the semester for each course. The letter grades and their corresponding grade points are given in Table -XIV.

Table – XIV: Letter grades and grade points equivalent to Percentage of marks and performances

Percentage of Marks Obtained	Letter Grade	Grade Point	Performance
90.00 – 100	0	10	Outstanding
80.00 - 89.99	A	9	Excellent
70.00 – 79.99	В	8	Good
60.00 - 69.99	C	7	Fair
50.00 - 59.99	D	6	Average
Less than 50	F	0	Fail
Absent	AB	0	Fail

A learner who remains absent for any end semester examination shall be assigned a letter grade of AB and a corresponding grade point of zero. He/she should reappear for the said evaluation/examination in due course.

14. The Semester grade point average (SGPA)

The performance of a student in a semester is indicated by a number called 'Semester Grade Point Average' (SGPA). The SGPA is the weighted average of the grade points obtained in all the courses by the student during the semester. For example, if a student takes five courses(Theory/Practical) in a semester with credits C1, C2, C3, C4 and C5 and the student's grade points in these courses are G1, G2, G3, G4 and G5, respectively, and then students' SGPA is equal to:

$$SGPA = \frac{(C1G1 + C2G2 + C3G3 + C4G4 + C5G5)}{(C_1 + C_2 + C_3 + C_4 + C_5)}$$

The SGPA is calculated to two decimal points. It should be noted that, the SGPA for any semester shall take into consideration the F and AB grade awarded in that semester. For example if a learner has an F or ABS grade in course 4, the SGPA shall then be computed as:

$$SGPA = (C1G1 + C2G2 + C3G3 + C4Zero + C5G5)/(C_1 + C_2 + C_3 + C_4 + C_5)$$

15. Cumulative Grade Point Average (CGPA)

The CGPA is calculated with the SGPA of all the VIII semesters to two decimal points and is indicated in final grade report card/final transcript showing the grades of all VIII semesters and their courses. The CGPA shall reflect the failed status in case of F grade(s), till the course(s) is/are passed. When the course(s) is/are passed by obtaining a pass grade on subsequent examination(s) the CGPA shall only reflect the new grade and not the fail grades earned earlier. The CGPA is calculated as:

$$CGPA = \frac{(C1S1 + C2S2 + C3S3 + C4S4 + C5S5 + C6S6 + C7S7 + C8S8)}{(C1 + C2 + C3 + C4 + C5 + C6 + C7 + C8)}$$

where C_1 , C_2 , C_3 ,... is the total number of credits for semester I,II,III,... and S_1 , S_2 , S_3 ,... is the SGPA of semester I,II,III,...

16. Declaration of results

The class shall be awarded on the basis of CGPA as follows: First Class with Distinction = CGPA of. 7.50 and above, First Class = CGPA of 6.00 to 7.49, Second Class = CGPA of 5.00 to 5.99,

17. Project work

All the students shall undertake a project under the supervision of a teacher and submit a report. The area of the project shall directly relate any one of the elective subject opted by the student in semester VIII. The project shall be carried out in group not exceeding 5 in number. The project report shall be submitted in triplicate (typed & bound copy not less than 25 pages). The internal and external examiner appointed by the University shall evaluate the project at the time of the Practical examinations of other semester(s). Students shall be evaluated in groups for four hours (i.e., about half an hour for a group of five students). The projects shall be evaluated as per the criteria given below.

Evaluation of Dissertation books

Objective(s) of the work done	15 Marks
Methodology adopted	20 Marks
Results and Discussions	20 Marks
Conclusions and Outcomes	20 Marks
Total	75 marks
	250 10 00 00 00 00 00 00 00 00 00 00 00 00

Evaluation of presentation

Total	75 marks
Question and answer skills	30 Marks
Communication skills	20 Marks
Presentation of work	25 Marks

Explanation: The 75 marks assigned to the dissertation book shall be same for all the students in a group. However, the 75 marks assigned for presentation shall be awarded based on the performance of individual students in the given criteria.

18. Industrial training (Desirable)

Every candidate shall be required to work for at least 150 hours spread over four weeks in a Pharmaceutical Industry/Hospital. It includes Production unit, Quality Control department, Quality Assurance department, Analytical laboratory, Chemical manufacturing unit, Pharmaceutical R&D, Hospital (Clinical Pharmacy), Clinical Research Organization, Community Pharmacy, etc. After the Semester – VI and before the commencement of Semester – VII, and shall submit satisfactory report of such work and certificate duly signed by the authority of training organization to the head

of the institute.
19. Practice School
In the VII semester, every candidate shall undergo practice school for a period of 150 hours evenly distributed throughout the semester. The student shall opt any one of the domains for practice school declared by the program committee from time to time. At the end of the practice school, every student shall submit a printed report (in triplicate) on the practice school he/she attended (not more than 25 pages). Along with the exams of semester VII, the report submitted by the student, knowledge and skills acquired by the student through practice school shall be evaluated by the subject experts at college level and grade point shall be awarded.
20. Award of ranks
Ranks and Medals shall be awarded on the basis of final CGPA. However, candidates who fail in one or more courses during the B. Pharm program shall not be eligible for award of ranks. Moreover, the candidates should have completed the B. Pharm program in minimum prescribed number of years, (four years) for the award of Ranks.
21. Award of Degree
Candidates who fulfill the requirements mentioned above shall be eligible for award of degree during the ensuing convocation.
22. Duration for completion of the program of study
The duration for the completion of the program shall be fixed as double the actual duration of the program and the students have to pass within the said period, otherwise they have to get fresh Registration.
23. Re-admission after break of study
Candidate who seeks re-admission to the program after break of study has to get the approval from the university by paying a condemnation fee. No condemnation is allowed for the candidate who has more than 2 years of break up period and he/she has to rejoin the
program by paying the required fees.
▼

24. Tutorial (15 hours, 01 Credit)

*The tutorials are to be conducted as an Academic Activity from any of the options given here like

(a) Quiz

(b) Assignment

(c) Open book test

(d) Fieldwork

(e) Group discussion

(f) Seminar

(g) Viva

(h) Small projects

(i) Presentation

(j) Scientific model

Sr. No.	Tutorial	CLO	Hours
1	Tutorial Number 1 (UNIT-I)	CL01	01
2	Tutorial Number 2 (UNIT-I)	CL01	01
3	Tutorial Number 3 (UNIT-I)	CL01	01
4	Tutorial Number 4 (UNIT-II)	CLO2	01
5	Tutorial Number 5 (UNIT-II)	CLO2	01
6	Tutorial Number 6 (UNIT-II)	CLO2	01
7	Tutorial Number 7 (UNIT-III)	CLO3	01
8	Tutorial Number 8 (UNIT-III)	CLO3	01
9	Tutorial Number 9 (UNIT-III)	CLO3	01
10	Tutorial Number 10 (UNIT-IV)	CLO4	01
11	Tutorial Number 11 (UNIT-IV)	CLO4	01
12	Tutorial Number 12 (UNIT-IV)	CLO4	01
13	Tutorial Number 13 (UNIT-V)	CLO5	01
14	Tutorial Number 14 (UNIT-V)	CLO5	01
15	Tutorial Number 15 (UNIT-V)	CLO5	01
	Total		15

COURSE CURRICULUM

Name of the Program: Course Name		am:		Semester	: I	Level: UG		
		Human A And Phys (Theory)		Course Co Type	ode/ Course	BP101T /Core		
Course I		2023		Version		1.0		
Teaching	g Scheme		<i>y</i>			Assessment Sch		
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral	
3	- \	1	4	45	25	75	==	
Pre-Req	uisite:				**			
Course L	earning Out	comes (CL)	O):	variou 2. To rec imbala 3. To ide system 4. To per and ne 5. To stu each system 1. Apply cells/ti the variou 2. Identifi variou 3. Explai lymph 4. Performand ne 5. Evalua	s organs of the hognize the various noces. entify the various of human body form the various rvous system. dy coordinated vaystem. Tould be able to: knowledge of ssues of differentious homeostaticy the gross more systems of the nother roles and in atic system. In the various entrous entrous system.	uman body. us homeostatic me us tissues and or y. experiments relate vorking pattern of of identification nt systems of hum c mechanisms and rphology, structure human body. mportance of various xperiments related	re and functions of chanisms and their regans of different ed to special senses different organs of of the various an body and study their imbalances. The end functions of our body fluids and to special senses pattern of different	

Course Contents/Syllabus:

(All the units carry equal weightage in Summative Assessment and equal engagement)

Descriptors/Topics	CLO	Hours
UNIT I		
Introduction to human body	CLO 1	10
Definition and scope of anatomy and physiology, levels of structural organization and body		
systems, basic life processes, homeostasis, basic anatomical terminology.		
Cellular level of organization		
Structure and functions of cell, transport across cell membrane, cell division, cell junctions.		
General principles of cell communication, intracellular signaling pathway activation by		
$extracellular\ signal\ molecule, Forms\ of\ intracellular\ signaling:\ a)\ Contact-dependent\ b)\ Paracrine$		
c) Synaptic d) Endocrine		
Tissue level of organization		
Classification of tissues, structure, location and functions of epithelial, muscular and nervous		
and connective tissues.		
UNIT II		
Integumentary system	CLO 2	10
Structure and functions of skin		
Skeletal system		
Divisions of skeletal system, types of bone, salient features and functions of bones of axial and		
appendicular skeletal system		
Organization of skeletal muscle, physiology of muscle contraction, neuromuscular junction.		
Joints: Structural and functional classification, types of joints movements and its articulation		
UNIT III	CT O 2	10
Body fluids and blood	CLO 3	10
Body fluids, composition and functions of blood, hemopoeisis, formation of hemoglobin,		
anemia, mechanisms of coagulation, blood grouping, Rh factors, transfusion, its significance and		
disorders of blood, Reticulo endothelial system.		
Lymphatic system		
Lymphatic organs and tissues, lymphatic vessels, lymph circulation and functions of lymphatic system		
UNIT IV		
Peripheral nervous system	CLO 4	08
Classification of peripheral nervous system: Structure and functions of sympathetic and		
parasympathetic nervous system. Origin and functions of spinal and cranial nerves.		
Special senses		
Structure and functions of eye, ear, nose and tongue and their disorders.		
UNIT V		
Cardiovascular system	CLO 5	07
Heart – anatomy of heart, blood circulation, blood vessels, structure and functions of artery, vein		
and capillaries, elements of conduction system of heart and heartbeat, its regulation by autonomic		
nervous system, cardiac output, cardiac cycle. Regulation of blood pressure, pulse,		
electrocardiogram and disorders of heart.		
Total Hours		45

^{*} The total 15 tutorials should be conducted as per the format mentioned above

Learning resources

Textbooks:

- 1. Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypee Brother's medical publishers, New Delhi.
- 2. Textbook of Human Histology by Inderbir Singh, Jaypee brothers medical publishers, New Delhi.
- 3. Textbook of Practical Physiology by C.L. Ghai, Jaypee brothers medical publishers, New Delhi.
- 4. Text book of Medical Physiology- Arthur C, Guyton and John.E. Hall. Miamisburg, OH.

Reference Books:

- 1. Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York.
- 2. Principles of Anatomy and Physiology by Tortora Grabowski. Palmetto, GA, U.S.A.
- 3. Human Physiology (vol 1 and 2) by Dr. C.C. Chatterrje, Academic Publishers Kolkata.

Online Resources/E-Learning Resources

1.	Nervous system:	i.	https://en.wikipedia.org/wiki/Nervous system
		ii.	https://training.seer.cancer.gov/anatomy/nervous/tissue.html
2	Digestive	i.	https://www.niddk.nih.gov/health-information/digestive-diseases/digestive-system-
	system:		how-it-works
	(E)	ii.	https://www.britannica.com/science/human-digestive-system
3	Respiratory	i.	https://www.nhlbi.nih.gov/health/lungs/respiratory-system
	System:	ii.	https://www.lung.org/lung-health-diseases/how-lungs-work
4	Urinary System:	i.	https://www.niddk.nih.gov/health-information/urologic-diseases/urinary-tract-how-it-works
		ii.	https://www.stanfordchildrens.org/en/topic/default?id=anatomy-of-the-urinary-system-85-P01468
5	Endocrine	i.	https://www.healthline.com/health/the-endocrine-system
	System:	ii.	https://www.medicalnewstoday.com/articles/endocrine-system-function#organs-and-glands
6	Reproductive System:	i.	https://www.cancer.gov/publications/dictionaries/cancer-terms/def/reproductive-system
7	Introduction to	i.	https://www.ncbi.nlm.nih.gov/books/NBK115568/
**	Genetics	ii.	https://www.cliffsnotes.com/study-guides/biology/biology/classical-mendelian-genetics/introduction-to-genetics

COURSE CURRICULUM

Name of the Program: Course Name		B. PHARM		Semester:	I	Level: UG	Level: UG		
		Pharmaco Analysis		Course Co Type	ode/ Course	BP102T/Core			
Course 1	Pattern	2023		Version		1.0			
Teachin	g Scheme	10				Assessment S	Scheme		
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral		
3	_	1	4	45	25	75			
Pre-Reg	uisite: Objectives (C					eutical Analysis-I			
				 To recall definitions and scope of analytical techniques. To recognize need of various titrations methods like acid-base titration, non-aqueous titration, Precipitation titration, complexometric titrations, redox titration. To identify sources of errors, sources of impurities and methods to minimize errors and impurities. To perform volumetric and electrochemical titrations To study and develop analytical skills in conductometry, potentiometry, polarography. 					
Course I	earning Out	comes (CL	O):	 Students would be able to: Identify sources of impurities, errors and methods to determine the impurities, minimizing errors in pharmacopoeia. Explain theory involved in titrations of acids and bases by various titration methods Apply different methods for the estimation of various salts like sodium chloride, magnesium sulphate, calcium gluconate, barium sulphate Perform various types of redox titrations Evaluate the samples using electrochemical methods of analysis. 					

Course Contents/Syllabus: (All the units carry equal weightage in Summative Assessment and equal engagement)

Descriptors/Topics	CLO	Hours
UNIT I		
Pharmaceutical analysis	CLO1	10
Definition and scope	3912.3	*******
i) Different techniques of analysis		
ii) Methods of expressing concentration		
iii) Primary and secondary standards.		
iv) Preparation and standardization of various molar and normal solutions-Oxalic acid, sodium		
hydroxide, hydrochloric acid, sodium thiosulphate, sulphuric acid, potassium permanganate and ceric ammonium sulphate		
Errors		
Sources of errors, types of errors, methods of minimizing errors, accuracy, precision and		

significant figures		
(c) Pharmacopoeia, Sources of impurities in medicinal agents, limit tests.		
UNIT II		
Acid base titration Theories of acid base indicators, classification of acid base titrations and theory involved in titrations of strong, weak, and very weak acids and bases, neutralization curves Non aqueous titration Solvents, acidimetry and alkalimetry titration and estimation of Sodium benzoate and Ephedrine HCl	CLO2	10
UNIT III		
Precipitation titrations Mohr's method, Volhard's, Modified Volhard's, Fajans method, estimation of sodium chloride. Complexometric titration Classification, metal ion indicators, masking and demasking reagents, estimation of Magnesium sulphate, and calcium gluconate. Gravimetry Principle and steps involved in gravimetric analysis. Purity of the precipitate: co-precipitation and post precipitation, Estimation of barium sulphate.	CLO3	10
Basic Principles, methods and application of diazotisation titration.		
UNIT IV		
Redox titrations Concepts of oxidation and reduction, Types of redox titrations (Principles and applications) Cerimetry, Iodimetry, Iodometry, Bromatometry, Dichrometry, Titration with potassium iodate UNIT V	CLO4	08
Electrochemical methods of analysis Conductometry-Introduction, Conductivity cell, Conductometric titrations, applications. Potentiometry - Electrochemical cell, construction and working of reference (Standard hydrogen, silver chloride electrode and calomel electrode) and indicator electrodes (metal electrodes and glass electrode), methods to determine end point of potentiometric titration and applications. Polarography - Principle, Ilkovic equation, construction and working of dropping mercury electrode and rotating platinum electrode, applications	CLO5	07
Total Hours		45

^{*} The total 15 tutorials should be conducted as per the format mentioned above

Learning resources

Textbooks:

- 1. Bentley and Driver's Textbook of Pharmaceutical Chemistry
- 2. A.I. Vogel, Text Book of Quantitative Inorganic analysis
- Handbook of Modern Pharmaceutical Analysis, edited by Satinder Ahuja, Stephen Scypinski, 1st Edition, Volume July 26, 2001, Elesevier Publication

Reference Books:

- A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, Stahlone Press of University of London
- 2. John H. Kennedy, Analytical chemistry principles
- 3. P. Gundu Rao, Inorganic Pharmaceutical Chemistry

Online Resources/E-Learning Resources

- 1. Acid Base Titration-Working Principle, Process, Types And Indicators (themasterchemistry.com)
- 2. Acid-base titration Wikipedia
- 3. Complexometric Titration: Definition, Examples, and Applications (chemistrylearner.com)
- 4. Electrochemical method of analysis [PDF Document] (vdocument.in)

COURSE CURRICULUM

Name of the Program: B. PHARM				Semester :	I	Level: UG		
Course Name		Pharmaceutics-I		Course Co	de/ Course	BP102T/Core		
		(Theory)		Туре				
Course Patte	rn	2023		Version	*	1.0		
Teaching Sch	neme				A	ssessment Schen	me	
Theory	Practical	Tutorial	Total	Hours	CIA	ESA	Practical/	
50 2 400 40 - 40 46 3 4 0 4		1880/1000/00 1400 00.80 00.480	Credits	0-8 56.20 -0.000.000.000.5	(Continuous	(End	Oral	
					Internal	Semester		
	Α				Assessment)	Assessment)		
3	-	1	4	45	25	75		
Pre-Requisit	e:	,						
Course Learn		es (CLO):		1. To Kno 2. To lea pharmac calculat 3. To sturp prescrip 4. To study forms 5. To acque Students we 1. Outline the prof 2. Recogniformula calculat 3. Know to monoph 4. Identify suppositincompa	rn the basics reutical incomposes on the profession. The profession of the professi	profession of phate of different patibilities and sional way of an of various convedge of semisolic profession of phare handling the present owledge of power forms with the degree of dosage.	dosage forms, pharmaceutical handling the rentional dosage dosage form macy and know cription. Valers and liquid pharmaceutical e forms namely sage forms viz pharmaceutical	

Course Contents/Syllabus:

(All the units carry equal weightage in Summative Assessment and equal engagement)

Descriptors/Topics	CLO	Hours
UNIT I		
Historical background and development of profession of pharmacy History of profession of Pharmacy in India in relation to pharmacy education, industry and organization, Pharmacy as a career, Pharmacopoeias: Introduction to IP, BP, USP and Extra Pharmacopoeia.	CLO 1	10
Dosage forms	A .	
Introduction to dosage forms, classification and definitions		
Prescription		
Definition, Parts of prescription, handling of Prescription and Errors in prescription.	7	
Posology Definition, Factors affecting posology. Paediatric dose calculations based on age, body weight and body surface area.		
UNIT II		
Pharmaceutical calculations	CLO 2	10
Weights and measures – Imperial & Metric system, Calculations involving percentage solutions, alligation, proof spirit and isotonic solutions based on freezing point and molecular weight. Powders		
Definition, classification, advantages and disadvantages, Simple & compound powders –		
official preparations, dusting powders, effervescent, efflorescent and hygroscopic powders,		
eutectic mixtures. Geometric dilutions.		
□Liquid dosage forms		
Advantages and disadvantages of liquid dosage forms. Excipients used in formulation of		
liquid dosage forms. Solubility enhancement techniques.		
UNIT III		
Monophasic liquids	CLO 3	10
Definitions and preparations of Gargles, Mouthwashes, Throat Paint, Eardrops, Nasal drops, Enemas, Syrups, Elixirs, Liniments and Lotions.		
Biphasic liquids: Suspensions		
Definition, advantages and disadvantages, classifications, Preparation of suspensions; Flocculated and Deflocculated suspension & stability problems and methods to overcome.		
Emulsions		
Definition, classification, emulsifying agent, test for the identification of type of Emulsion,		
Methods of preparation & stability problems and methods to overcome.		
UNIT IV		
Suppositories	CLO 4	08
Definition, types, advantages and disadvantages, types of bases, methods of preparations.		
Displacement value & its calculations, evaluation of suppositories.		
Pharmaceutical incompatibilities		
Definition, classification, physical, chemical and therapeutic incompatibilities with		
examples		
UNIT V	To participate or construction	yaasana.
Semisolid dosage forms	CLO 5	07
Definitions, classification, mechanisms and factors influencing dermal penetration of drugs.		

Preparation of ointments, pastes, creams and gels. Excipients used in semi solid dosage forms. Evaluation of semi solid dosages forms	8	(
forms. Evaluation of semi solid dosages forms		
Total Hours		45

^{*} The total 15 tutorials should be conducted as per the format mentioned above

Learning resources

Textbooks:

- 1. A textbook of pharmaceutics-I by Dr. B.S. Venkateswarlu mr. j. Jayaprakash)
- 2. A textbook of pharmaceutics-I by Dr Atamaram .P. Pawar)

Reference Books:

- 1. H.C. Ansel et al., Pharmaceutical Dosage Form and Drug Delivery System, Lippincott Williams and Walkins, New Delhi.
- 2. Carter S.J., Cooper and Gunn's-Dispensing for Pharmaceutical Students, CBS publishers, New Delhi.
- 3. M.E. Aulton, Pharmaceutics, The Science Dosage Form Design, Churchill Livingstone, Edinburgh.
- 4. Indian pharmacopoeia.
- 5. British pharmacopoeia.
- 6. Lachmann. Theory and Practice of Industrial Pharmacy, Lea& Febiger Publisher, The University of Michigan.
- 7. Alfonso R. Gennaro Remington. The Science and Practice of Pharmacy, Lippincott Williams, New Delhi.
- 8. Carter S.J., Cooper and Gunn's. Tutorial Pharmacy, CBS Publications, New Delhi.
- 9. E.A. Rawlins, Bentley's Text Book of Pharmaceutics, English Language Book Society, Elsevier Health Sciences, USA.
- 10. Isaac Ghebre Sellassie: Pharmaceutical Pelletization Technology, Marcel Dekker, INC, New York.
- 11. Dilip M. Parikh: Handbook of Pharmaceutical Granulation Technology, Marcel Dekker, INC, New York.
- 12. Françoise Nieloud and Gilberte Marti-Mestres: Pharmaceutical Emulsions and Suspensions, Marcel Dekker, INC, New York.

Online Resources/E-Learning Resources

- 1. https://www.carewellpharma.in/bpharmacy/notes/1st-sem/pharmaceutics-1/unit-
- 2. https://rxpharma-edu.com/unit-1-notes-pharmaceutics-1/
- 3. https://imperfectpharmacy.shop/b-pharmacy-all-semester-notes/
- https://pharmdbm.com/pharmaceutics-1-notes-free-download/

COURSE CURRICULUM

Name of the Pro	Name of the Program:				Semester :	I	Level: UG		
Course Name		Pharmaceutical Inorganic Chemistry (Theory)			Course Co Type	de/ Course	BP104T/Core		
Course Pattern 2023					Version	·	1.0		
Teaching Scheme						A	ssessment Sch	_	
Theory	Practical	Tutorial	Cre	tal edits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral	
3	-	1		4	45	25	75	_	
Pre-Requisite:							1		
Course Learning Outcomes (CLO):				pharmace 2. To undo importance 3. To know medicina. 4. To know 5. To apply pharmace Students wo 1. Develop impurities various r inorganic 2. Analyze 3. Demonstr inorganic 4. Assess compoun 5. Apply va	enticals. erstand the rece of inorganic of the preparate of the preparate of their diagnostic of the knowledge enticals. The principles invented of the control of the drugs and pharmaceutical the quality ds.	applications. applications. applications. applications. be to prepare very very court the source very colved in the line determination maceuticals. all methods of is. of inorganic	pharmaceutical axis of inorganic arious inorganic as and types of mit test; to apply of impurities in al compounds preparation of		

Course Contents/Syllabus: (All the units carry equal weightage in Summative Assessment and equal engagement)

the units carry equal weightage in Summative Assessment and equal engagement) Descriptors/Topics	CLO	Hours
UNIT I	5.55	
Impurities in pharmaceutical substances	CLO 1	10
History of Pharmacopoeia, Sources and types of impurities, principle involved in the limit		
test for Chloride, Sulphate, Iron, Arsenic, Lead and Heavy metals, modified limit test for		
Chloride and Sulphate		
General methods of preparation, assay for the compounds superscripted with asterisk (*),		
properties and medicinal uses of inorganic compounds belonging to the following classes.		
UNIT II		
Acids, Bases and Buffers	CLO 2	10
Buffer 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 extra and intracellular electrolytes	7	
Functions of major physiological ions, Electrolytes used in the replacement therapy:	7	
Sodium chloride*, Potassium chloride, Calcium gluconate* and Oral Rehydration Salt		
(ORS), Physiological acid base balance.	4	
Dental products		
Dentifrices, role of fluoride in the treatment of dental caries, Desensitizing agents,	/	
Calcium carbonate, Sodium fluoride, and Zinc eugenol cement.	/	
UNIT III		_
Gastrointestinal agents	CLO 3	10
Acidifiers		
Ammonium chloride* and Dil. HCl Antacid: Ideal properties of antacids, combinations		
of antacids, Sodium40Bicarbonate*, Aluminium hydroxide gel, Magnesium hydroxide		
mixture		
Cathartics		
Magnesium sulphate, Sodium orthophosphate, Kaolin and Bentonite		
Antimicrobials		
Mechanism, classification, Potassium permanganate, Boric acid, Hydrogen peroxide*,		
Chlorinated lime*, Iodine and its preparations		
UNIT IV		
Miscellaneous compounds	CLO 4	08
Expectorants Potassium iodide, Ammonium chloride*.		
Emetics Copper sulphate*, Sodium potassium tartarate		
Haematinics Ferrous sulphate*, Ferrous gluconate		
Poison Antidote Sodium thiosulphate*, Activated charcoal, Sodium nitrite333		
Astringents Zinc Sulphate, Potash Alum		
UNIT V		
Radiopharmaceuticals	CLO 5	07
Radio activity, Measurement of radioactivity, Properties of α , β , γ radiations, Half-life,		
radio isotopes and study of radio isotopes - Sodium iodide I131, Storage conditions,		
precautions & pharmaceutical application of radioactive substances.		
Total Hours		45

^{*} The total 15 tutorials should be conducted as per the format mentioned above

Textbooks:

- 1. A Textbook of Pharmaceutical Inorganic Chemistry by Mayuresh K. Raut, Everest Publishing House Pune.
- 2. Textbook of Pharmaceutical Inorganic Chemistry-Theory & Practical by V.N. Rajasekaran, CBS Publishers & Distributors, Second Edition.

Reference Books:

- 1. A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, CBS Publishers & Distributors Pvt Ltd, 4th edition.
- 2. A.I. Vogel, Text Book of Quantitative Inorganic analysis, Longman Sc & Tech; 4th edition
- 3. P. Gundu Rao, Inorganic Pharmaceutical Chemistry, Vallabh Prakashan
- 4. Bentley and Driver's Textbook of Pharmaceutical Chemistry, Oxford University Press; Eighth edition
- 5. John H. Kennedy, Analytical Chemistry Principles
- 6. Indian Pharmacopoeia.

- 1. https://www.youtube.com/watch?v=cA0fGIfALxI
- 2. https://www.youtube.com/watch?v=ruKyDMKqsXc
- 3. https://www.youtube.com/watch?v=yrvV85H7370

Name of the Program: Course Name		B. Pharm	l	Semester	:I	Level: UG	Level: UG		
		Communication Skills		Course C Type	ode/ Course	BP105T			
Course 1	Course Pattern 2023			Version		1.0			
Teachin	g Scheme		Assessment Scheme			eme			
Theory	Practical Tutorial		Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral		
2	-	-	2	30	15	35	-		
	Objectives (C			1.Understa function Operation 2. Commund 3. Effective 4. Develop 5. Develop	micate effectively vely manage the to interview skills to Leadership qua	e areas of pharm y (Verbal and Noteam as a team p it. ilities and essent	harmacist to acceutical on Verbal). layer.		
Course Learning Outcomes (CLO):				Students would be able to: 1.Define & interpret Importance of Communication in life and its process. 2.Learn how to write Business Correspondence. 3.Know Importance of Listening. 4.Understand how to speak, and how to face Interviews and Group Discussion. 5.To learn Pronunciation of English.					

Course Contents/Syllabus:

(All the units carry equal weightage in Summative Assessment and equal engagement)

Descriptors/Topics	CLO	Hours
UNIT I		
• Communication Skills: Introduction, Definition, The Importance of Communication, The Communication Process — Source, Message,	CLO 1	07
Encoding, Channel, Decoding, Receiver, Feedback, Context		
□ Barriers to communication: Physiological Barriers, Physical Barriers,		
Cultural Barriers, Language Barriers, Gender Barriers, Interpersonal		
Barriers, Psychological Barriers, Emotional barriers		
□ Perspectives in Communication: Introduction, Visual Perception,		
Language, Other factors affecting our perspective - Past Experiences, Prejudices, Feelings, Environment	1	
UNIT II		
• Elements of Communication: Introduction, Face to Face Communication - Tone of Voice, Body Language (Non-verbal communication), Verbal Communication, Physical Communication □ Communication Styles: Introduction, The Communication Styles	CLO 2	07
Matrix with example for each -Direct Communication Style, Spirited		
Communication Style, Systematic Communication Style, Considerate		
Communication Style		
UNIT III		!
• Basic Listening Skills: Introduction, Self-Awareness, Active Listening, Becoming an Active Listener, Listening in Difficult Situations □ Effective Written Communication: Introduction, When and When	CLO 3	07
Not		
to Use Written Communication - Complexity of the Topic, Amount of Discussion' Required, Shades of Meaning, Formal Communication Writing Effectively: Subject Lines, Put the Main Point First, Know		
Your		
Audience, Organization of the Message		
UNIT IV		
• Interview Skills: Purpose of an interview, Do's and Dont's of an interview	CLO 4	05
☐ Giving Presentations: Dealing with Fears, Planning your Presentation, Structuring Your Presentation, Delivering Your Presentation, Techniques of Delivery		
UNIT V		
• Group Discussion: Introduction, Communication skills in group discussion, Do's and Dont's of group discussion	CLO 5	04
Total Hours		30

Textbooks:

- 1. Basic communication skills for Technology, Andreja. J. Ruther Ford, 2nd Edition, Pearson Education, 2011
- 2. Communication skills, Sanjay Kumar, Pushpalata, 1st Edition, Oxford Press, 2011
- 3. Organizational Behaviour, Stephen .P. Robbins, 1stEdition, Pearson, 2013
- 4. Brilliant- Communication skills, Gill Hasson, 1stEdition, Pearson Life, 2011

Reference Books:

- 1. The Ace of Soft Skills: Attitude, Communication and Etiquette for success, Gopala Swamy Ramesh, 5th Edition, Pearson, 2013.
- 2. Developing your influencing skills, Deborah Dalley, Lois Burton, Margaret, Green hall, 1st Edition Universe of Learning LTD, 2010
- 3. Communication skills for professionals, Konar nira, 2ndEdition, New arrivals PHI, 2011
- 4. Personality development and soft skills, Barun K Mitra, 1stEdition, Oxford Press, 2011
- 5. Soft skill for everyone, Butter Field, 1st Edition, Cengage Learning india pvt. ltd, 2011
- 6. Soft skills and professional communication, Francis Peters SJ, 1stEdition, Mc Graw Hill Education, 2011
- 7. Effective communication, John Adair, 4thEdition, Pan Mac Millan, 2009
- 8. Bringing out the best in people, Aubrey Daniels, 2ndEdition, Mc Graw Hill, 1999

- 1. https://ncert.nic.in/vocational/pdf/kees101.pdf
- 2. https://sgc.edu.in/assets/docs/e-resources/communication-skills.pdf
- 3. https://nou.edu.ng/coursewarecontent/LIS%20211%20LEARNING%20AND%20COMMUNICATION%20SKILLS.pdf



Course Contents/Syllabus:

(All the units carry equal weightage in Summative Assessment and equal engagement)

Name of the Program:	B. PHARM		Semester	:1	Level: UG	
Course Name	Remedial Biology (Theory)		Course Code/ Course Type		BP106RBT/C	ore
Course Pattern	2023		Version		1.0	
Teaching Scheme			**************************************		Assessment	Scheme
Theory Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral
2 -		2	30	15	35	
Pre-Requisite: Course Objectives (C			igs		***	
Course Learning Out	comes (CL	O):	life 2. To un respir 3. To struct with s 4. To str 5. To str 1. Recal life 2. Under respir 3. Study specia 4. Study 5. Under	aderstand the biologication by plants. Undy the basic conspecial reference and the process of any the basic common would be able to: I the classification by plants. If the basic comports of the process of pierstand the basic comports of the process of pierstand the basic constant the basic comports of the process of pierstand the basic	mponents of anatoto human. If plant photosynthe ponents of anatoto on and salient featers of body fluids, ments of anatomy iman. Interpolation photosynthesis	atures of five kingdoms of s, process of digestion and omy & physiology animal hesis and nutrition intake. my & physiology of plant tures of five kingdoms of process of digestion and & physiology animal with is and nutrition intake. anatomy & physiology of velopment.

Descriptors/Topics	CLO	Hours
UNIT I		
Living world	CLO 1	07
Definition and characters of living organisms		
Diversity in the living world		
Binomial nomenclature		
Five kingdoms of life and basis of classification. Salient features of Monera, Potista, Fungi, Animalia and Plantae, Virus		
Morphology of Flowering plants		
Morphology of different parts of flowering plants - Root, stem, inflorescence, flower, leaf,		
fruit, seed. General Anatomy of Root, stem, leaf of monocotyledons & Dicotylidones.		
UNIT II		
Body fluids and circulation	CLO 2	07

Composition of blood, blood groups, coagulation of blood		
Composition and functions of lymph		
Human circulatory system		
Structure of human heart and blood vessels		
Cardiac cycle, cardiac output and ECG		
Digestion and Absorption		
Human alimentary canal and digestive glands		
Role of digestive enzymes		
Digestion, absorption and assimilation of digested food		
Breathing and respiration		
Human respiratory system		
Mechanism of breathing and its regulation		
Exchange of gases, transport of gases and regulation of respiration	4	
Respiratory volumes		
UNIT III	CLO 3	07
Excretory products and their elimination	CLO 3	0,
Modes of excretion		
Human excretory system- structure and function		
Urine formation		
Rennin angiotensin system		
Neural control and coordination		
Definition and classification of nervous system		
Structure of a neuron		
Generation and conduction of nerve impulse		
Structure of brain and spinal cord		
Functions of cerebrum, cerebellum, hypothalamus and medulla oblongata		
Chemical coordination and regulation		
Endocrine glands and their secretions		
Functions of hormones secreted by endocrine glands		
Human reproduction		
Parts of female reproductive system		
Parts of male reproductive system		
Spermatogenesis and Oogenesis		
Menstrual cycle	19	
UNIT IV		programme .
Plants and mineral nutrition	CLO 4	05
Essential mineral, macro and micronutrients		
Nitrogen metabolism, Nitrogen cycle, biological nitrogen fixation		
Photosynthesis		
Autotrophic nutrition, photosynthesis, Photosynthetic pigments, Factors affecting		
photosynthesis.		
UNIT V	OT 0.	
Plant respiration	CLO 5	04
Respiration, glycolysis, fermentation (anaerobic).		
Plant growth and development		
Phases and rate of plant growth, Condition of growth, Introduction to plant growth regulators		
Cell - The unit of life		

Structure and functions of cell and cell organelles, Cell division	
Tissues	
Definition, types of tissues, location and functions.	
Total Hours	30

Textbooks:

- 1. Text book of Biology by S. B. Gokhale
- 2. A Text book of Biology by Dr. Thulajappa and Dr. Seetaram.

Reference Books:

- 1. A Text book of Biology by B.V. Sreenivasa Naidu
- 2. A Text book of Biology by Naidu and Murthy
- 3. Botany for Degree students By A.C.Dutta.
- 4. 4. Outlines of Zoology by M. Ekambaranatha ayyer and T. N. Ananthakrishnan.
- 5. A manual for pharmaceutical biology practical by S.B. Gokhale and C. K. Kokate

- 1. https://www.toppr.com/guides/biology/diversity-in-living-organisms/five-kingdom-classification/
- 2. https://www.khanacademy.org/science/in-in-class-11-biology-india/x9d1157914247c627:body-fluids-and-circulation

Name of the Program:		B. PHAR	M	Semester	:1	Level: UG		
Course Name Course Pattern		Remedial Mathematics – (Theory*)		Course Code/ Course Type		BP106RMT/Core		
		2023		Version		1.0		
Teaching So	cheme					Assessment Scheme		
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral	
3	-	-	2,	30	15	35		
Pre-Requisi	ite:							
Course Obje	ectives (CO):			1. To Kno 2. To Solv 3. To App Pharmacy 4. To und 5. To expl	we the theory and the the different typereciate the importerstand analytical lore the Laplace to	their application pes of problems leads application I geometry. cransformation.	oy applying theory of mathematics in	
Course Lear	ning Outcomes	(CLO):		Upon completion of the course the student shall be able to: 1. Identify the theory and their application in Pharmacy 2. Explain the different types of problems by applying theor 3. Appreciate the important application of mathematics in Pharmacy 4. Understand analytical geometry. 5. Explore the Laplace transformation.				

Course Contents/Syllabus:

(All the units carry equal weightage in Summative Assessment and equal engagement)

Descriptors/Topics	CLO	Hours
UNIT I		
Partial fraction	CLO 1	06
Introduction, Polynomial, Rational fractions, Proper and Improper fractions,		
Partial fraction, Resolving into Partial fraction, Application of Partial		
Fraction in Chemical Kinetics and Pharmacokinetics		
Logarithms		
Introduction, Definition, Theorems/Properties of logarithms, Common		
logarithms, Characteristic and Mantissa, worked examples, application of		
logarithm to solve pharmaceutical problems.		
Function		
Real Valued function, Classification of real valued functions,		
Limits and continuity		
Introduction, Limit of a function, Definition of limit of a function ($\Box\Box$ - $\Box\Box\Box$ n n \Box definition)		
$\lim x \square \square a \square \square nan \square 1$, $\lim \sin \square \square \square \square \square 1$,		
UNIT II		
Matrices and Determinant:	CLO 2	06
Introduction matrices, Types of matrices, Operation on matrices,		
Transpose of a matrix, Matrix Multiplication, Determinants, Properties of determinants, Product		
of determinants, Minors and co-Factors, Adjoint or adjugate of a square matrix, Singular and		

	10 01	
non-singular matrices, Inverse of a matrix, Solution of system of linear of equations using matrix		
method, Cramer's rule, Characteristic equation and roots of a square matrix, Cayley-Hamilton		
theorem, Application of Matrices in solving Pharmacokinetic equations		
UNIT III		
Calculus	CLO 3	06
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 the		
product of two functions (product formula), Derivative of the quotient of two functions (Quotient		
formula) – Without Proof, Derivative of xn $w.r.tx$, where n is any rational number, Derivative of		
ex,, Derivative of loge x , Derivative of ax , Derivative of trigonometric functions from first		
principles (without Proof), Successive Differentiation, Conditions for a function to be a		
maximum or a minimum at a point. Application		
UNIT IV		
Analytical Geometry	CLO 4	06
Introduction		
Signs of the Coordinates, Distance formula,		
Straight Line		
Slope or gradient of a straight line, Conditions for parallelism and perpendicularity of two lines,		
Slope of a line joining two points, Slope – intercept form of a straight line		
Integration		
Introduction, Definition, Standard formulae, Rules of integration, Method of substitution,		
Method of Partial fractions, Integration by parts, definite integrals, application		
UNIT V		31500000
Differential Equations	CLO 5	06
Some basic definitions, Order and degree, Equations in separable form, Homogeneous equations,		
Linear Differential equations, Exact equations,		
Application in solving		
Pharmacokinetic equations		
Laplace Transform		
Introduction, Definition, Properties of Laplace transform, Laplace Transforms of elementary		
functions, Inverse Laplace transforms, Laplace transform of derivatives, Application to solve		
Linear differential equations,		
Application in solving Chemical kinetics and Pharmacokinetics equations		6970.00
Total Hours		30

- 1. Differential Calculus by Shanthinarayan
- 2. Pharmaceutical Mathematics with application to Pharmacy by Panchaksharappa Gowda D.H.

Reference Books:

- 1. Integral Calculus by Shanthinarayan
- 2. Higher Engineering Mathematics by Dr.B.S.Grewal

- 1. https://www.youtube.com/results?search_query=remedial+mathematics+for+pharmacy+1st+year+pdf
- 2. https://www.youtube.com/watch?v=cMzEapXkCLE&list=PLdhH6lJ5Nz1ek73kxDpBnOmXPaQGlt54t
- 3. https://www.youtube.com/watch?v=yCpAhHukJA0&list=PLfdcY3cg NfbdanWnqwqRuybQizA1zJUK

Course Contents/Syllabus

(All the Practical's carry equal weightage in Summative Assessment and equal engagement)

Program: Course Name Hu An (Pr		B. Pharm Human Anatomy And Physiology-I (Practical)			Semester :	I	Level: UG	
					Course Coo Type	le/ Course	BP107P/Core	
		2023	-		Version		1.0	
Teachin	g Scheme					Ass	sessment Schem	ie.
Theory Practical Tuto Total rial Credit		Hours		CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral		
-	4	-	2		60	15	35	-
				2. 3. 3. 4. 5. 5. 5. 5. 5. 5. 5. 5. 5. 5. 5. 5. 5.	Fo study the organs of hus Fo identify the Fo perform t	man body. he various organ he various exper	gy, structure and as of skeletal syst riments related to	functions of various em of human body. the blood. ated to cardiovascular
Course Learning Outcomes (CLO):				1. U		he working of m		and functions of various

Assignme nt/Practic al/Activity Number	Assignment/Practical/ Activity Title	Week Number/Turn	Details	CLO	Hours
1	Practical 1: Compound microscope.	Week1/ Turn 1	1.1 Study of compound microscope.	CLO1	04
2.	Practical 2: Microscopic study	Week 2/ Turn 1	2.1 Microscopic study of epithelial and connective tissue	CLO 2	04
3	Practical 3: Microscopic study	Week 3/ Turn 1	3.1 Microscopic study of muscular and nervous tissue	CLO 2	04
4	Practical 4: Identification of bones	Week 4 / Turn 1	4.1 Identification of axial bones	CLO 3	04
5	Practical 5: Identification of bones	Week 5/ Turn 1	5.1 Identification of appendicular bones	CLO 3	04
6	Practical 6: Introduction to haemocytometer	Week 6 / Turn 1	6.1 Introduction to haemocytometer	CLO 4	04
7	Practical 7: Enumeration of white blood cell (WBC) count	Week 7 / Turn 1	7.1 Enumeration of white blood cell (WBC) count	CLO 4	04
8	Practical 8: Total RBC count	Week 8 /	8.1 Enumeration of total red blood	CLO 4	04

	Total hours				60
15	Practical 15: Determination of (ESR)	Week 15 / Turn 1	15.1 Determination of erythrocyte sedimentation rate (ESR)	CLO 5	04
14	Practical 14: Determination of blood groups	Week 14 / Turn 1	14.1 Determination of blood groups	CLO 5	04
13	Practical 13: Recording of blood pressure	Week 13 / Turn 1	13.1 Recording of blood pressure	CLO 5	04
12	Practical 12: Heart rate and pulse rate	Week 12 / Turn 1	12.1 Determination of heart rate and pulse rate	CLO 5	04
11	Practical 11: Haemoglobin content	Week 11 / Turn 1	11.1 Estimation of haemoglobin content	CLO 4	04
10	Practical 10: Clotting time	Week 10 / Turn 1	10.1 Determination of clotting time	CLO 4	04
9	Practical 9: Bleeding time	Week 9 / Turn 1	9.1 Determination of bleeding time	CLO 4	04
		Turn 1	corpuscles (RBC) count		

Textbooks:

- 1. Practical Anatomy and Physiology by R. K. Goyal and N. M. Patel, B. S. Shah Prakashan Ahemedabad.
- 2. Principles of Anatomy and Physiology by Tortora Grabowski. Palmetto, GA, U.S.A.
- 3. Textbook of Practical Physiology by C.L. Ghai, Jaypee brothers medical publishers, New Delhi.
- 4. Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee brother's medical publishers, New Delhi.

Reference Books:

- 1. Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York.
- 2. Principles of Anatomy and Physiology by Tortora Grabowski. Palmetto, GA, U.S.A.
- 3. Human Physiology (vol 1 and 2) by Dr. C.C. Chatterrje, Academic Publishers Kolkata.

- 1. https://www.slideshare.net/slideshow/hap-i-p-lab-manual/178802701
- 2. https://courseware.cutm.ac.in/wp-content/uploads/2020/06/Microscopic-study-of-epithelial-and-connective-tissue.pdf
- 3. https://www.youtube.com/watch?v=aGz-p4u6FU8

Name of Program		B. PHAR	M	Semester:	I	Level: UG		
Course Name		Pharmaceutical Analysis-I (Practical)		Course Code/ Course Type		BP108P/Core		
Course 1	Course Pattern 2023		Version		1.0			
Teachin	g Scheme			00		Assessment	Scheme	
Theory	AND AND THE PROPERTY OF THE PR		Tutorial Total Hours Credits	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral		
1558	4	-	2	60	15	35	-	
Pre-Req	uisite:							
				2. To cond standar 3. To stude percent 4. To perf	duct preparation dize them. ly different analy age purity orm various titri	rtical techniques for	entration of solutions and or determination of	
Course Learning Outcomes (CLO):			To und contam tests To perf develop To stropharma To eval titration volume	from how differed and standardized the utilization occurred drug's pluste and perform as, gain analytically conductoments.	ent concentrations e solutions of titrimetric accentage purity. In a variety of volul skills, and comphemical analysis.	ess the presence of particular ampounds using various limit are expressed and be able to analysis to ascertain the ametric and electrochemical prehend the fundamentals of a titration methods for acid-		

Course Contents/Syllabus:

(All the units carry equal weightage in Summative Assessment and equal engagement)
Practical Plan: (Conduct any 15 Practical)

Assignme nt/Practic al/Activity Number	nt/Practic Title 1/Activity		Details	CLO	Hours
1	Practical 1: Limit test of	Week 01/	To perform the limit test of Chloride	CL01	17.
	Chloride	Turn 1	7950		
2	Practical 2: Limit test of	Week 02/	To perform the limit test of sulphate	CL01]
	Sulphate	Turn 1	2007		04
3	Practical 3: Limit test of Iron	Week 03/	To perform the limit test of Iron	CL01	1
		Turn 1	2530		
4	Practical 4: Limit test of Arsenic	Week 04/	To perform the limit test of Arsenic	CLO2	

		Turn 1			
5	Practical 5: Preparation and standardization	Week 05/ Turn 1	To prepare and standardize sodium hydroxide	CLO2	
6	Practical 6: Preparation and standardization	Week 06/ Turn 1	To prepare and standardize sulphuric acid	CLO2	
7	Practical 7: Preparation and standardization	Week 07/ Turn 1	To prepare and standardize sodium thiosulphate	CLO3	0
8	Practical 8: Preparation and standardization	Week 08/ Turn 1	To prepare and standardize Potassium permanganate	CLO3	
9	Practical 9: Preparation and standardization	Week 09/ Turn 1	To prepare and standardize Cerric ammonium sulphate.	CLO3	
10	Practical 10: Assay by acid base titration	Week 10/ Turn 1	To perform assay of ammonium chloride	CLO4	
11	Practical 11: Assay by Cerimetry	Week 11/ Turn 1	To perform assay of Ferrous sulphate	CLO4	
12	Practical 12: Assay by Iodometry	Week 12/ Turn 1	To perform assay of Copper sulphate	CLO4	
13	Practical13: Assay by complexometry	Week 13/ Turn 1	To perform assay of Calcium gluconate	CLO4	0
14	Practical 14: Assay by Permanganometry	Week 14/ Turn 1	To perform assay of Hydrogen peroxide	CLO5	
15	Practical 15: Assay by non- aqueous titration	Week 15/ Turn 1	To perform assay of Sodium benzoate	CLO5	
16	Practical 16: Assay by precipitation titration	Week 16/ Turn 1	To perform assay of Sodium chloride	CLO5	
17	Practical 17: Conductometric titration of strong acid against strong base	Week 17/ Turn 1	Determination of Normality by electro- analytical methods	CLO4	
18	Practical 18: Conductometric titration of strong acid and weak acid against strong base	Week 18/ Turn 1	Determination of Normality by electro- analytical methods	CLO4	0
19	Practical 19: Potentiometric titration of strong acid against strong base	Week 19/ Turn 1	Determination of Normality by electro- analytical methods	CLO4	
	Total hours				6

Practical Text Book:

- 1. A.I. Vogel, Text Book of Quantitative Inorganic analysisText book of practical organic chemistry- A.I. Vogel.
- 2. A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, Stahlone Press of University of London Reference Books:
 - 1. Martindale's extra pharmacopoeia.
 - 2. Indian Pharmacopoeia.

- 1. https://www.youtube.com/watch?v=FbRLLdbbjFQ
- 2. https://www.youtube.com/watch?v=FAkbYY9Y vQ
- 3. https://www.youtube.com/watch?v=0cKRCNO0c9M
- 4. https://www.youtube.com/watch?v=4RNYDSJrFXo
- 5. https://www.youtube.com/watch?v=FfWTBV5lE4c
- 6. https://www.youtube.com/watch?v=9vPqVDPfJ7k
- 7. https://www.youtube.com/watch?v=amFOhvc6p74

Course Contents/Syllabus: (All the units carry equal weightage in Summative Assessment and equal engagement)

The state of the s	e Program:	B. PHAR		Semester:		Level: UG		
Course Name		Pharmaceutics-I (Practical)		Course Co Type	Course Code/ Course Type			
Course Pat	tern	2023	*	Version		1.0		
Teaching Scheme						Assessment Sch	eme	
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral	
£ ≅ 3	4	C =	2	60	15	35	-	
	ectives (CO):			1. To impharma 2. To known convention 3. To evaluation	part fundamenta icy ow arts and so tional dosage fo luate different de	ience of prepar rms. osage forms.	l are: n the preparatory ring the different	
Course Learning Outcomes (CLO):				The Students shall be able to: 1.Prepare and evaluate monophasic liquid dosage forms 2.Prepare and evaluate Biphasic liquid dosage forms 3. Prepare and evaluate Solid dosage forms 4. Prepare and evaluate unit dosage forms. 5. Prepare and evaluate Semisolid dosage forms an suppositories.				

Practical Plan

Assignment/ Practical/ Activity Number	Assignment/ Practical/ Activity Title	Week Number/Turn	Details	CLO	Hours
1	Practical 1: Syrup	Week 1/ Turn 1	1.1 Syrup IP'66 1.2 Compound syrup of Ferrous Phosphate BPC'68	CLO1	04
2.	Practical 2: Elixir	Week 2/ Turn 1	2.1 Piperazine citrate elixir 2.2 Paracetamol pediatric elixir	CLO1	04
3.	Practical 3: Linetus	Week 3/ Turn 1/	3.1 Terpin Hydrate Linctus IP'66 3.2 Iodine Throat Paint (Mandles Paint)	CLO1	04
4	Practical 4: Solutions	Week 4/ Turn 1	4.1 Strong solution of ammonium acetate 4.2 Cresol with soap solution 4.3 Lugol's solution	CLO1	04
5	Practical 5: Lotions	Week 5/ Turn 1	5.1 Calamine lotion 5.2Magnesium Hydroxide mixture 5.3Aluminium Hydroxide gel	CLO2	04
6	Practical 6: Emulsion	Week 6/ Turn 1	6.1 Turpentine Liniment 6.2 Liquid paraffin emulsion	CLO2	04
7	Practical 7:	Week 7/	7.1 ORS powder (WHO)	CLO3	04

Total hours			/	
Practical 15: Mouthwash	Week 15/ Turn 1	Chlorhexidine mouthwash	CLO5	(
Practical 14: Iodine gargle	Week 14/ Turn 1	Iodine gargle	CLO5	(
Practical 13: Carbopol gel	Week 13/ Turn 1	Carbopol gel CL		(
Practical 12: Ointment	Week 12/ Turn 1	Non staining-iodine ointment with methyl salicylate	CLO5	(
Practical 11: Ointment	Week 11/ Turn 1	Sulphur ointment	CLO5	(
Practical 10: Suppository	Week 10/ Turn 1	Zinc Oxide suppository	CLO5	(
Suppository	Turn 1	9.1 Glycero getatin suppository 9.2Coca butter suppository		(
Powders	Turn 1	8.2 Divided powders	GI OF	
Practical 8:	Week 8/		CLO4	- (
	Powders Practical 9: Suppository Practical 10: Suppository Practical 11: Ointment Practical 12: Ointment Practical 13: Carbopol gel Practical 14: Iodine gargle Practical 15: Mouthwash	Practical 8: Powders Practical 9: Suppository Practical 10: Suppository Practical 11: Ointment Practical 12: Ointment Practical 13: Carbopol gel Practical 14: Iodine gargle Practical 15: Mouthwash Week 8/ Turn 1 Week 9/ Turn 1 Week 10/ Suppository Turn 1 Week 11/ Turn 1 Week 12/ Turn 1 Week 13/ Turn 1 Practical 14: Week 14/ Turn 1 Practical 15: Mouthwash Turn 1	Practical 8: Powders Practical 9: Suppository Practical 10: Suppository Practical 11: Ointment Practical 12: Ointment Practical 13: Carbopol gel Practical 14: Iodine gargle Practical 15: Mouthwash Practical 15: Practical 15: Practical 16: Practical 17: Ointment Practical 18: Practical 18: Practical 19: Suppository Practical 11: Ointment Practical 11: Ointment Practical 12: Ointment Practical 13: Carbopol gel Practical 14: Iodine gargle Practical 15: Meek 15/ Mouthwash Practical 15: Chlorhexidine mouthwash Chlorhexidine mouthwash	Practical 8:

Textbook

- 1. Practical handbook of Pharmaceutics Dr Atamaram Pawar
- 2. Practical handbook of Pharmaceutics Dr P.D . Choudhari

Reference Books:

- 1. H.C. Ansel et al., Pharmaceutical Dosage Form and Drug Delivery System, Lippincott Williams and Walkins, New Delhi.
- 2. Carter S.J., Cooper and Gunn's-Dispensing for Pharmaceutical Students, CBS publishers, New Delhi.
- 3. M.E. Aulton, Pharmaceutics, The Science Dosage Form Design, Churchill Livingstone, Edinburgh.
- 4. Indian pharmacopoeia.
- 5. British pharmacopoeia.
- 6. Lachmann. Theory and Practice of Industrial Pharmacy, Lea& Febiger Publisher, The University of Michigan.
- 7. Alfonso R. Gennaro Remington. The Science and Practice of Pharmacy, Lippincott Williams, New Delhi.
- 8. Carter S.J., Cooper and Gunn's. Tutorial Pharmacy, CBS Publications, New Delhi.
- 9. E.A. Rawlins, Bentley's Text Book of Pharmaceutics, English Language Book Society, Elsevier Health Sciences, USA.
- 10. Isaac Ghebre Sellassie: Pharmaceutical Pelletization Technology, Marcel Dekker, INC, New York.
- 11. Dilip M. Parikh: Handbook of Pharmaceutical Granulation Technology, Marcel Dekker, INC, New York.
- 12. Francoise Nieloud and Gilberte Marti-Mestres: Pharmaceutical Emulsions and Suspensions, Marcel Dekker, INC, New York.

- 1. https://jru.edu.in/studentcorner/lab-manual/dpharm/1st-year/Pharmaceutics.p
- 2. https://pharmacyinfoline.com/bp109p-pharmaceutics-i-practical/
- 3. https://drive.google.com/file/d/1azhRS42lMfbot8HYqCHT5Dq6Cu0vOMOD/view

Course Contents/Syllabus: (All the Practical's carry equal weightage in Summative Assessment and equal engagement) Practical Plan

Name of Program		B. Pharm	1	Semeste	r : I	Level: UG			
Course Name		Pharmac Inorganic Chemistr (Practica	y	Course Type	Code/ Course	BP110P/Core	3		
Course 1	Course Pattern 2023		-	Version		1.0			
Teaching	Scheme	Laceron		- 12. SOMEONIC STREET		1			
	***	<u> </u>				Assessment Sc			
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/C)ral	
(1 7. 16	4	-	2	60	15	35		i Zad	
Pre-Req	Requisite: se Objectives (CO):								
Course L	earning Out	comes (CL	O):	neut ioda 4. To p Students 1. Expl 2. App 3. Performance comp 4. Eval	ralizing capaci te and iodine in prepare various in would be able ain the limit test by knowledge of orm swelling in bounds uate the data of	t/modified limit fidentification to ndex and neuti	n hydroxide de. naceuticals. tests. est for various ralization cap	gel and p	ds.
Assignme / Practica Activity Numbe	ol/ y	ment/Pract ctivity Title		Week Number/Tur	n	Details		CLO	Hours
1		al 1: Limit te le	est for V	Veek 1/Turn	perform Lin	nit test for Chlor	ide on given	CL01	04
2	10.000000000000000000000000000000000000	al 2: Limit t	est	Week 2/Turn		Limit test for Sulp	hate on given	CL01	04
3		al 3: Limit t	est	Week 3/Turn		Limit test for In	ron on given	CL01	04
4		al 4: Limit t	est for	Week 4/Turn		Limit test for Hea	vy Metals on	CL01	04
5		al 5: Limit t	est for	Week 5/Turn		Limit test for Ars	enic on given	CL01	04
		al 6: Identifi	January 1	Week 6/Turn 1 To perform sulphate		Identification too	t for Ferrous	CLO2	04

7	Practical 7: Identification test for sodium bicarbonate	Week 7/Turn 1	To perform Identification test for sodium bicarbonate	CLO2	04
8	Practical 8: Identification test for calcium gluconate	Week 8/Turn 1	To perform Identification test for calcium gluconate	CLO2	04
9	Practical 9: Identification test for copper sulphate	Week 9/Turn 1	To perform Identification test for copper sulphate	CLO2	04
10	Practical 10: Test for purity of Bentonite	Week10/Turn1	To perform Swelling power of Bentonite	CLO3	04
11	Practical 11: Test for purity aluminum hydroxide gel	Week11/Turn1	To perform Neutralizing capacity of aluminum hydroxide gel	CLO3	04
12	Practical 12: Determination of potassium iodate and iodine in potassium Iodide	Week12/Turn1	To Determine potassium iodate and iodine in potassium Iodide	CLO4	04
13	Practical 13: Preparation of inorganic pharmaceutical	Week13/Turn1	To prepare Boric acid	CLO5	04
14	Practical 14: Preparation of inorganic pharmaceutical	Week14/Turn1	To prepare Potash alum	CLO5	04
15	Practical 15: Preparation of inorganic pharmaceutical	Week15/Turn1	To prepare Ferrous sulphate	CLO5	04
	Total hours				60

Textbooks:

- 1. Laboratory Manual of Pharmaceutical Inorganic Chemistry by Dr. Vidhya K. Bhusari, Dr. Rajesh B. Patil, Dr. Sanjay D. Sawant Pritam Publications.
- 2. Inorganic Pharmaceutical Chemistry (Practical) by D.P. Belsare, A.S. Dhake Career Publication.

Reference Books:

- 1.A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, Stahlone Press of University of London, 4th edition.
- 2. A.I. Vogel, Text Book of Quantitative Inorganic analysis
- 3. P. Gundu Rao, Inorganic Pharmaceutical Chemistry, 3rd Edition
- 4. M.L Schroff, Inorganic Pharmaceutical Chemistry
- 5. Bentley and Driver's Textbook of Pharmaceutical Chemistry
- 6. Anand & Chatwal, Inorganic Pharmaceutical Chemistry
- 7. Indian Pharmacopoeia

- 1. Limit test for Chlorides: https://www.youtube.com/watch?v=WcVH1wD3HiE
- 2. Swelling Power of Bentonite: https://www.youtube.com/watch?v=sNXuRCd1KRw
- 3. Neutralization of Antacid: https://www.youtube.com/watch?v=dgQloQvMGfE
- 4. Preparation of Boric acid: https://www.youtube.com/watch?v=W7sL2Sbu0EQ
- 5. Preparation of Ferrous Sulphate: https://www.youtube.com/watch?v=34vKBF4VryU
- 6. Preparation of Ferrous Sulphate: https://www.youtube.com/watch?v=hQ3YwDnYdYk
- 7. Preparation of Alum: https://www.youtube.com/watch?v=bhoMvPJKc24

Name of Progran		B. Pharm	L	Semeste	er : I	Level: UG		
Course I	Name	Communication Skills (Practical)		Course Course		BP111P		
Course 1	Pattern	2023		Version	L	1.0		
Teaching Scheme				,	Assessment S	cheme		
Theory Practical		l Tutorial Total Credits		Hours	CIA (Continuou s Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral	
_	2	-	1	30	10	15		
Course C	uisite: Objectives (C	CO):		1. To de langua 2. To lea 3. To im softwa 4. To de preser langua	levelop basic age lab softwar un and practice aprove advance are. levelop writin atation skills ar age lab softwar	re. e different types ed learning usin g skills, inter nd group discuss re.	lls are: a skills using English of pronunciations. g English language lab view handling skills, ion skills using English	
Course I	earning Out	comes (CL	O):	1.Under function Operated 2. Communication 3. Effect 4. Development	on effectively i tion. nunicate effect	vioural needs for in the areas of plantively (Verbal ar the team as a teat kills.	nd Non Verbal).	

Course Contents/Syllabus:

(All the Practical's carry equal weightage in Summative Assessment and equal engagement)

Practical Plan

Assignmen t/ Practical /Activity Number	Assignment/Practical/ Activity Title	Week Number/Turn	Details	CLO	Hours
1	Practical 1: Basic communication	Week 1/Turn 1	sic communication while Meeting People	CLO1	02
2	Practical 2: Basic communication	Week 2/Turn 1	Basic communication regarding asking Questions	CL01	02
3	Practical 3: Basic communication	Week 3/Turn 1	Basic Communication for Making Friends	CL01	02
4	Practical 4: Basic communication	Week 4/Turn 1	Basic communication: What did you do?	CL01	02
5	Practical 5: Basic communication	Week 5/Turn 1	Do's and Dont's of Basic communication	CL01	02
6	Practical 6:	Week 6/Turn 1	Pronunciation (Consonant Sounds)	CLO2	02

	Pronunciations				
7	Practical 7: Pronunciations	Week 7/Turn 1	Pronunciation and Nouns	CLO2	02
8	Practical 8: Pronunciations	Week 8/Turn 1	Pronunciation (Vowel Sounds)	CLO2	02
9	Practical 9: Advanced Learning	Week 9/Turn 1	Listening Comprehension / Direct and Indirect Speech	CLO3	02
10	Practical 10: Advanced Learning	Week10/Turn1	Figures of Speech	CLO3	02
11	Practical 11: Advanced Learning	Weekl 1/Turn1	Effective Communication	CLO3	02
12	Practical 12: Advanced Learning	Week12/Turn1	Writing Skills, Effective Writing	CLO4	02
13	Practical 13: Advanced Learning	Week13/Turn1	Interview Handling Skills	CLO4	02
14	Practical 14: Advanced Learning	Week14/Turn1	E-Mail etiquette	CLO5	02
15	Practical 15: Advanced Learning	Week15/Turn1	Presentation Skills	CLO5	02
	Total hours				30

Textbooks:

- 4. Basic communication skills for Technology, Andreja. J. Ruther Ford, 2nd Edition, Pearson Education, 2011
- 5. Communication skills, Sanjay Kumar, Pushpalata, 1st Edition, Oxford Press, 2011
- 6. Organizational Behaviour, Stephen .P. Robbins, 1stEdition, Pearson, 2013
- 4. Brilliant- Communication skills, Gill Hasson, 1stEdition, Pearson Life, 2011

Reference Books:

- 9. The Ace of Soft Skills: Attitude, Communication and Etiquette for success, Gopala Swamy Ramesh, 5th Edition, Pearson, 2013.
- 10. Developing your influencing skills, Deborah Dalley, Lois Burton, Margaret, Green hall, 1st Edition Universe of Learning LTD, 2010
- 11. Communication skills for professionals, Konar nira, 2ndEdition, New arrivals PHI, 2011
- 12. Personality development and soft skills, Barun K Mitra, 1stEdition, Oxford Press, 2011
- 13. Soft skill for everyone, Butter Field, 1st Edition, Cengage Learning india pvt. ltd, 2011
- 14. Soft skills and professional communication, Francis Peters SJ, 1stEdition, Mc Graw Hill Education, 2011
- 15. Effective communication, John Adair, 4thEdition, Pan Mac Millan, 2009
- 16. Bringing out the best in people, Aubrey Daniels, 2ndEdition, Mc Graw Hill, 1999

- 1. https://www.manage.gov.in/studymaterial/EC.pdf
- 2. https://www.fip.org/files/ypg/Project%20Documents/career%20development/CareerDevelopment-Interviews.pdf
- 3. https://www.icsi.edu/media/webmodules/CSEET/BUSINESS COMMUNICATION printable.pdf

Course Contents/Syllabus

(All the Practical's carry equal weightage in Summative Assessment and equal engagement)

Practical Plan

Name of the Program:	B. Pharm	Semester : I	Level: UG	
Course Name	Remedial Biology (Practical)	Course Code/ Course Type	BP112RBP/Core	
Course Pattern	2023	Version	1.0	

Teaching Scheme

	-				Assessment Scheme				
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral		
	2	_	1	30	10	15	225		

Pre-Requisite:

Course Objectives	(CO):
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The objectives of Tools for Remedial Biology are:

- 1. To understand the experiments in biology.
- 2. To study the gross morphology, structure and functions of cells and study the system of frog
- 3. To identify the gross morphology, structure and functions of Stem, Root, Leaf, seed, fruit, flower.
- 4. To perform the various experiments related to the bones and blood.
- 5. To determine the tidal volume.

Course Learning Outcomes (CLO):

Students would be able to:

- 1. Understand the experiments in biology.
- 2. Understand the gross morphology, structure and functions of cells and study the system of frog
- 3. Identify the gross morphology, structure and functions of Stem, Root, Leaf, seed, fruit, flower
- 4. Perform the various experiments related to the bones and blood
- 5. Determine the tidal volumes.

Assignment/ Practical/ Activity Number	Assignment/Practical/ Activity Title	Week Number/Turn	Details	CLO	Hours
1	Practical 1: Introduction to experiments in biology	Week1/ Turn 1	1.1 Study of microscope.	CLO1	02
2.	Practical 2: Introduction to experiments in biology	Week 2/ Turn 1	2.1 To study Section cutting techniques	CLO1	02
3	Practical 3: Introduction to experiments in biology	Week 3/ Turn 1	3.1 To study Mounting and staining	CLO1	02
4	Practical 4: Introduction to experiments in biology	Week 4 / Turn 1	4.1 To study Permanent slide preparation	CLO1	02
5	Practical 5: Study of cell and its inclusions	Week 5/ Turn 1	5.1 To study cell and its inclusions	CLO2	02
6	Practical 6: Study of Stem, Root, Leaf	Week 6 / Turn 1	6.1 To study Stem, Root, Leaf	CLO3	02

8	Practical 8: Detailed study of frog by using computer models	Week 8 / Turn 1	8.1 To study frog by using computer models	CLO2	02
9	Practical 9: Microscopic study and identification of tissues pertinent to Stem, Root	Week 9 / Turn 1	9.1 To study microscopy and identification of tissues pertinent to Stem, Root	CLO3	02
10	Practical 10: Microscopic study and identification of tissues pertinent to leaf and seed	Week 10 / Turn 1	10.1 To study microscopy and identification of tissues pertinent to leaf and seed	CLO3	02
11	Practical 11: Microscopic study and identification of tissues pertinent to flower and fruit	Week 11 / Turn 1	11.1 To study microscopy and identification of tissues pertinent to flower and fruit	CLO3	02
12	Practical 12: Identification of bones	Week 12 / Turn 1	12.1 To study identification of bones	CLO4	02
13	Practical 13: Determination of blood group	Week 13 / Turn 1	13.1 Determination of blood group	CLO4	02
14	Practical 14: Determination of blood pressure	Week 14 / Turn 1	14.1 To study determination of blood pressure	CLO4	02
15	Practical 15 Determination of tidal volume	Week 15 / Turn 1	15.1 Determination of tidal volume	CLO5	02
	Total hours				30

Textbooks:

- 1. Text book of Biology by S. B. Gokhale
- 2. A Text book of Biology by Dr. Thulajappa and Dr. Seetaram
- 3. Practical Anatomy and Physiology by R. K. Goyal and N. M. Patel, B. S. Shah Prakashan Ahemedabad.
- 4. Practical human anatomy and physiology. by S.R.Kale and R.R.Kale.

Reference Books:

- 1. Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York.
- 2. A Manual of pharmaceutical biology practical by S.B. Gokhale, C.K.Kokate and S.P.Shriwastava.
- 3. Biology practical manual according to National core curriculum Biology forum of Karnataka. Prof. M.J.H.Shafi

- https://www.scribd.com/document/442114456/To-understand-the-method-of-Section-Cutting-Technique-Staining-Mounting-and-Observation-of-pdf
- 2. https://courseware.cutm.ac.in/wp-content/uploads/2020/06/Microscopic-study-of-epithelial-and-connective-tissue.pdf
- 3. https://www.slideshare.net/BikashAdhikari26/parts-of-plant-plant-tissues-microscopy-and-morphology



Name of the Program:	B. PHARM Human Anatomy And Physiology-II (Theory)		Semester : II		Level: UG		
Course Name			Course Co Type	de/ Course	BP201T/Core		
Course Pattern	2023		Version		1.0		
Teaching Scheme					Assessment Scho	eme	
Theory Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral	
3 - 🛕	1	4	45	25	75		
Pre-Requisite:				,			
Course Learning Out	comes (CL	O):	various 2. To recommodate 3. To ide systems 4. To per record volume 5. To students we 1. Identify various 2. Explain imbalan 3. Apply lorgans 4. Perform record respirat 5. Evaluate	organs of the himognize the various of the human beform various he blood pressure. It is the coordinate system. The gross more organs of the himogen is the various he had be a coordinate of different system. The various he had be too of different system in the various he had be recorded by the procesure of the various he had be recorded by the procesure of the various he had be recorded by the procesure of the various he had be recorded by the procesure of the various he had be recorded by the procesure of the various he had be recorded by the process of the various he had be recorded by the process of the various he had be recorded by the process of the various he had be recorded by the process of the various he had be recorded by the process of the process	uman body. us homeostatic medus tissues and or oody. ematological expended working pattern phology, structure uman body. nomeostatic mechanistic mechanistic of the ems of human body. ematological expended pressure, hear	e, and functions of chanisms and their rgans of different eriments and also e, and respiratory of different organs e and functions of nanisms and their various tissues and dy. eriments and also rt rate, pulse and pattern of different	

Course Contents/Syllabus:

(All the units carry equal weightage in Summative Assessment and equal engagement)

Descriptors/Topics"	CLO	Hour
UNIT I		
Nervous system Organization of nervous system, neuron, neuroglia, classification and properties of nerve fiber, electrophysiology, action potential, Nerve impulse, receptors, synapse, neurotransmitters. Central nervous system: Meninges, ventricles of brain, and Cerebrospinal fluid. structure and functions of brain (cerebrum, brain stem, cerebellum), spinal cord (gross structure, functions of afferent and efferent nerve tracts, reflex activity)	CLO 1	10
UNIT II	Ana Sal Anna Sal Anna Sal	
Digestive system Anatomy of GI Tract with special reference to anatomy and functions of stomach, (Acid production in the stomach, regulation of acid production through parasympathetic nervous system, pepsin role in protein digestion) small intestine, and large intestine, anatomy and functions of salivary glands, pancreas and liver, movements of GIT, digestion and absorption of nutrients and disorders of GIT. Energetics Formation and role of ATP, Creatinine Phosphate and BMR.	CLO 2	06
UNIT III		
Respiratory system Anatomy of respiratory system with special reference to anatomy of lungs, mechanism of respiration, regulation of respiration. Lung Volumes and capacities transport of respiratory gases, artificial respiration and resuscitation methods. Urinary system Anatomy of urinary tract with special reference to anatomy of kidney and nephrons, functions of kidney and urinary tract, physiology of urine formation, micturition reflex and role of kidneys in acid base balance, role of RAS in kidney and disorders of kidney.	CLO 1, CLO 2	10
UNIT IV		
Endocrine system Classification of hormones, mechanism of hormone action, structure and functions of pituitary gland, thyroid gland, parathyroid gland, adrenal gland, pancreas, pineal gland, thymus and their disorders.	CLO2	10
UNIT V		
Reproductive system Anatomy of male and female reproductive system, Functions of male and female reproductive system, sex hormones, physiology of menstruation, fertilization, spermatogenesis, oogenesis, pregnancy and parturition. Introduction to genetics Chapters are general DNA pretain synthesis, genetic nettern of inheritance.	CLO5	09
Chromosomes, genes and DNA, protein synthesis, genetic pattern of inheritance		
Total Hours		45

^{*} The total 15 tutorials should be conducted as per the format mentioned above

Textbooks:

- 1. Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypee Brothers Medical Publishers, New Delhi.
- 2. Textbook of Human Histology by Inderbir Singh, Jaypee brothers medical publishers, New Delhi.
- 3. Textbook of Medical Physiology- Arthur C, Guyton, and John. E. Hall. Miamisburg, OH, U.S.A.

Reference Books:

- 1. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co, Riverview, MI USA
- 2. Textbook of Medical Physiology- Arthur C, Guyton, and John. E. Hall. Miamisburg, OH, U.S.A.
- 3. Human Physiology (vol 1 and 2) by Dr. C.C. Chatterrje, Academic Publishers Kolkata

- 1. https://training.seer.cancer.gov/anatomy/nervous/
- 2. https://www.ncbi.nlm.nih.gov/books/NBK542179/
- 3. https://www.youtube.com/watch?v=44B0ms3XPKU
- 4. https://www.betterhealth.vic.gov.au/health/conditionsandtreatments/nervous-system

Name of the Program: Course Name		n:		Semester	: II	Level: UG BP202T/Core		
				Course C Type	ode/ Course			
Course	Pattern	2023		Version	20	1.0		
Teachin	g Scheme					Assessment	Scheme	
Theory	Practical	Tutorial Total Credits		Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral	
3	<u> </u>	1	4	45	25	75	EATH	
Pre-Requisite: Course Objectives (CO): Course Learning Outcomes (CLO):				The objectives of Pharmaceutical Organic Chemistry-I are: 1. To write the structure, name and type of isomerism of the organic compound. 2. To state the name of reaction and orientation of reaction. 3. To account for reactivity/stability of compounds. 4. To identify/confirm the identification of organic compound. 5. To know medicinal and pharmaceutical applications. Students would be able to: 1. Solve the nomenclature of simple organic compounds by analyzing chemical structure and vice versa; and classify structural Isomerism 2. Find the mechanism and orientation of important name reaction of organic compounds 3. Interpret reactivity/stability of organic compounds 4. Synthesize organic compounds by different methods; and to relate the structure of organic compounds with their physical Properties 5. Apply the knowledge for the identification of organic compounds				

Course Contents/Syllabus:

(All the units carry equal weightage in Summative Assessment and equal engagement)

Descriptors/Topics	CLO	Hours
UNIT I		
Classification, nomenclature and isomerism	CLO 1	07
Classification of Organic Compounds		
Common and IUPAC systems of nomenclature of organic compounds (up to 10 Carbons open		
chain and carbocyclic compounds)		
Structural isomerism's in organic compounds		
UNIT II		
Alkanes*, Alkenes* and Conjugated dienes*	CLO 2	10
SP3 hybridization in alkanes, Halogenation of alkanes, uses of paraffins.		- Control
Stabilities of alkenes, SP2 hybridization in alkenes		
E1 and E2 reactions - kinetics, order of reactivity of alkyl halides, rearrangement of		
carbocations, Saytzeffs orientation and evidences. E1 verses E2 reactions, Factors affecting E1		
and E2 reactions. Ozonolysis, electrophilic addition reactions of alkenes, Markownikoff's		
orientation, free radical addition reactions of alkenes, Anti Markownikoff's orientation.		
Stability of conjugated dienes, Diel-Alder, electrophilic addition, free radical addition reactions		
of conjugated dienes, allylic rearrangement		
UNIT III		
Alkyl halides*	CLO 3	10
SN1 and SN2 reactions - kinetics, order of reactivity of alkyl halides, stereochemistry and	CLOU	10
rearrangement of carbocations.		
SN1 versus SN2 reactions, Factors affecting SN1 and SN2 reactions		
Structure and uses of ethyl chloride, Chloroform, trichloroethylene, tetrachloroethylene,		
dichloromethane, tetrachloromethane and iodoform.		
Alcohols*- Qualitative tests, Structure and uses of Ethyl alcohol, Methyl alcohol,		
chlorobutanol, Cetosteryl alcohol, Benzyl alcohol, Glycerol, Propylene glycol		
UNIT IV		
Carbonyl compounds* (Aldehydes and ketones)	CLO 4	10
	CLO 4	10
Nucleophilic addition, Electromeric effect, aldol condensation, Crossed Aldol condensation,		
Cannizzaro reaction, Crossed Cannizzaro reaction, Benzoin condensation, Perkin		
condensation, qualitative tests, Structure and uses of Formaldehyde, Paraldehyde, Acetone,		
Chloral hydrate, Hexamine, Benzaldehyde, Vanillin, Cinnamaldehyde.		
UNIT V	CLO 5	06
Carboxylic acids*	CLOS	08
Acidity of carboxylic acids, effect of substituents on acidity, inductive effect and qualitative		
tests for carboxylic acids, amide and ester.		
Structure and Uses of Acetic acid, Lactic acid, Tartaric acid, Citric acid, Succinic acid, Oxalic		
acid, Salicylic acid, Benzoic acid, Benzyl benzoate, Dimethyl phthalate, Methyl salicylate and		
Acetyl salicylic acid.		
Aliphatic amines* - Basicity, effect of substituent on Basicity. Qualitative test, Structure and		
uses of Ethanolamine, Ethylene diamine, Amphetamine		
Total Hours		45

^{*} The total 15 tutorials should be conducted as per the format mentioned above

Textbooks:

- 1. Pharmaceutical Organic Chemistry-I Theory and Practical by Anees Ahmad Siddiqui, Seemi Siddiqui, CBS Publishers & Distributors Pvt Ltd.
- 2. Pharmaceutical Organic Chemistry-I by P. S. Kalsi, New Age International Publishers, Second Edition.

Reference Books:

- 1. Organic Chemistry by Morrison and Boyd
- 2. Organic Chemistry by I.L. Finar, Volume-I
- 3. Textbook of Organic Chemistry by B.S. Bahl & Arun Bahl.
- 4. Organic Chemistry by P.L.Soni
- 5. Practical Organic Chemistry by Mann and Saunders.
- 6. Vogel's text book of Practical Organic Chemistry
- 7. Advanced Practical organic chemistry by N.K. Vishnoi.
- 8. Introduction to Organic Laboratory techniques by Pavia, Lampman and Kriz.
- 9. Reaction and reaction mechanism by Ahluwaliah/Chatwal.

- 1. https://www.youtube.com/watch?v=cA0fGIfALxI
- 2. https://www.youtube.com/watch?v=ruKyDMKqsXc
- 3. https://www.youtube.com/watch?v=yrvV85H737o

Name of the Program: Course Name		B. PHARM		Semeste	г : П	Level: UG		
		Biochemis (Theory)	try	Course C Type	Code/ Course	BP203T/Core		
Course P	attern	2023		Version	20	1.0		
Teaching	Scheme	93				Assessment Sch	ieme	
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral	
3	9 = 1	1	4	45	25	75		
				enzydiagr 2. To u physi 3. To u genon prote	me inhibitors in deposition applications anderstand the mological and path understand the me and functions ins.	esign of new drugs s of enzymes. netabolism of nu ological condition genetic organizat of DNA in the sys	atrient molecules in s. ion of mammalian nthesis of RNAs and	
Course L	earning Outco	mes (CLO):		4. To simpo 5. To st Students 1. Describer 2. Illust physis 3. Illust physis 4. Explasion funct 5. Outli applied applied to the simple of the student	understand diagratance of enzyme udy Lipid and am would be able to ribe the biomole ical process associate metabolism tological and path rate metabolism tological and path ain the genetic orgions of DNA in the the catalytic	inhibitors in the daino acid metabolistical condition of Carbohydrological condition of Lipid and amirological condition ganization of manue synthesis of RN corole, therapeue and importance	ergetics involved in cells. rate molecules in s. no acid molecules in s. mmalian genome and	

Course Contents/Syllabus:

(All the units carry equal weightage in Summative Assessment and equal engagement)

Descriptors/Topics	CLO	Hours
UNIT I		
Biomolecules Introduction, classification, chemical nature and biological role of carbohydrate lipids, nucleic acids, amino acids and proteins. Bioenergetics	CLO1	08
Concept of free energy, endergonic and exergonic reaction, Relationship between free energy, enthalpy and entropy; Redox potential energy rich compounds; classification; biological significances of ATP and cyclic AMP		
UNIT II		
Carbohydrate metabolism Glycolysis – Pathway, energetics and significance Citric acid cycle- Pathway, energetics and significance HMP shunt and its significance; Glucose-6-Phosphate dehydrogenase (G6PD) deficiency Glycogen metabolism Pathways and glycogen storage diseases (GSD) Gluconeogenesis- Pathway and its significance, Hormonal regulation of blood glucose level and Diabetes mellitus Biological oxidation Electron transport chain (ETC) and its mechanism. Oxidative phosphorylation & its mechanism and substrate phosphorylation Inhibitors ETC and oxidative phosphorylation/Uncouplers	CLO2	10
UNIT III		
Lipid metabolism β-Oxidation of saturated fatty acid (Palmitic acid) Formation and utilization of ketone bodies; ketoacidosis De novo synthesis of fatty acids (Palmitic acid), Biological significance of cholesterol and conversion of cholesterol into bile acids, steroid hormone and vitamin D Disorders of lipid metabolism: Hypercholesterolemia, atherosclerosis, fatty liver and obesity. Amino acid metabolism General reactions of amino acid metabolism: Transamination, deamination & decarboxylation, urea cycle and its disorders, Catabolism of phenylalanine and tyrosine and their metabolic disorders (Phenyketonuria, Albinism, alkeptonuria, tyrosinemia) Synthesis and significance of biological substances; 5-HT, melatonin, dopamine, noradrenaline, adrenaline Catabolism of heme; hyperbilirubinemia and jaundice	CLO3	10
UNIT IV		
Nucleic acid metabolism and genetic information transfer Biosynthesis of purine and pyrimidine nucleotides, Catabolism of purine nucleotides and Hyperuricemia and Gout disease Organization of mammalian genome Structure of DNA and RNA and their functions DNA replication (semi conservative model) Transcription or RNA synthesis Genetic code, Translation or Protein synthesis and inhibitors	CLO4	10
UNIT V		
Enzymes Introduction, properties, nomenclature and IUB classification of enzymes Enzyme kinetics (Michaelis plot, Line Weaver Burke plot), Enzyme inhibitors with examples Regulation of enzymes: enzyme induction and repression, allosteric enzymes regulation, Therapeutic and diagnostic applications of enzymes and isoenzymes, Coenzymes –Structure and biochemical functions	CLO5	07
Total Hours		45

^{*} The total 15 tutorials should be conducted as per the format mentioned above

Textbooks:

- 1. Essential of Pharmaceutical Biochemistry (B.PHARM 1ST SEM by Harbans lal)
- 2. Pharmaceutical Biochemistry A Comprehensive Approach G. Saravanan, V. Alagarsamy

Reference 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.
- 4. Biochemistry by D. Satyanarayan and U.Chakrapani
- 5. Textbook of Biochemistry by Rama Rao.
- 6. Textbook of Biochemistry by Deb.
- 7. Outlines of Biochemistry by Conn and Stumpf
- 8. Practical Biochemistry by R.C. Gupta and S. Bhargavan.
- 9. Introduction of Practical Biochemistry by David T. Plummer. (3rd Edition)
- 10. Practical Biochemistry for Medical students by Rajagopal and Ramakrishna.
- 11. Practical Biochemistry by Harold Varley

- 1. https://www.carewellpharma.in/bpharmacy/notes/2nd-sem/biochemistr
- 2. https://www.brightmedico.com/free-best-handwritten-notes/b-pharmacy-notes-pdf-free-download/2nd-semester-biochemistry-notes/
- 3. https://rxpharma-edu.com/unit-1-notes-biochemistry/
- 4. https://www.lastbenchpharmacist.in/post/b-pharm-biochemistry-unit-1-pdf-notes

Name of the Program: Course Name		B. PHARM Pathophysiology (Theory)		Semester : II		Level: UG		
				Course Co Type	ode/ Course	BP204T/Core		
Course 1	Pattern	2023		Version		1.0		
Teachin	g Scheme					Assessment	Scheme	
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral	
3	2	1	4	45	25	75		
Pre-Req	uisite: Objectives (C	.O).		The object	ives of Pathophy	vsiology are		
				 To describe the etiology and pathogenesis of the selected disease states. To study the pathogenesis of hematological, endocrine, nervous and gastrointestinal system. To identify and study the signs and symptoms of the diseases related to bones/joints and cancer. To study the pathophysiology of infectious and sexually transmitted diseases. 				
Course I	earning Out	comes (CL	O):	 Students would be able to: Understand the basic principles of cell injury and inflammation. Identify the etiology and pathogenesis of the selected disease states. Explain the pathogenesis of hematological, endocrine, nervous and gastrointestinal system. Study the signs and symptoms of the diseases related to bones/joints and cancer. Study the pathophysiology of infectious and sexually transmitted diseases. 				

Course Contents/Syllabus: (All the units carry equal weightage in Summative Assessment and equal engagement)

Descriptors/Topics	CLO	Hours
UNIT I		
Basic principles of Cell injury and Adaptation	CLO 1	10
Introduction, definitions, Homeostasis, Components and Types of Feedback systems, Causes of cellular injury, Pathogenesis (Cell membrane damage, Mitochondrial damage, Ribosome damage, Nuclear damage), Morphology of cell injury — Adaptive changes (Atrophy, Hypertrophy, hyperplasia, Metaplasia, Dysplasia), Cell swelling, Intra cellular accumulation, Calcification, Enzyme leakage and Cell Death Acidosis & Alkalosis, Electrolyte imbalance. Basic mechanism involved in the process of inflammation and repair		
Introduction, Clinical signs of inflammation, Different types of Inflammation, Mechanism of		
Inflammation - Alteration in vascular permeability and blood flow, migration of WBC's,		
Mediators of inflammation, Basic principles of wound healing in the skin, Pathophysiology of		
Atherosclerosis.		

UNIT II					
Cardiovascular System					
Hypertension, congestive heart failure, ischemic heart disease (angina, myocardial infarction, atherosclerosis and arteriosclerosis).					
Respiratory system					
Asthma, Chronic obstructive airways diseases.					
Renal system					
Acute and chronic renal failure					
UNIT III					
Hematological Diseases	CLO 3	10			
Iron deficiency, megaloblastic anemia (Vit B12 and folic acid), sickle cell anemia, thalassemia, hereditary acquired anemia, hemophilia.					
Endocrine system					
Diabetes, thyroid diseases, disorders of sex hormones					
Nervous system					
Epilepsy, Parkinson's disease, stroke, psychiatric disorders: depression, schizophrenia and Alzheimer's disease.					
Gastrointestinal system					
Peptic Ulcer					
UNIT IV					
Inflammatory bowel diseases, jaundice, hepatitis (A, B, C, D, E, F) alcoholic liver disease.	CLO 4	08			
Disease of bones and joints					
Rheumatoid arthritis, osteoporosis and gout					
Principles of cancer					
Classification, etiology and pathogenesis of cancer.					
UNIT V					
Infectious diseases	CLO 5	07			
Meningitis, Typhoid, Leprosy, Tuberculosis Urinary tract infections.					
Sexually transmitted diseases:					
AIDS, Syphilis, Gonorrhea.					
Total Hours		45			

^{*} The total 15 tutorials should be conducted as per the format mentioned above

Textbooks:

- Text book of Pathology by Harsh Mohan; 10th edition; India; Jaypee Publications.
- Textbook of Medical Physiology; by Guyton A, John .E Hall 12th edition; WB Saunders Company; 2010.

Reference Books

- Vinay Kumar, Abul K. Abas, Jon C. Aster; Robbins & Cotran Pathologic Basis of Disease; South Asia edition; India; Elsevier, 2014.
- Laurence B, Bruce C, Bjorn K.; Goodman Gilman's The Pharmacological Basis of Therapeutics; 12th edition; New York; McGraw-Hill; 2011.
- 3. Best, Charles Herbert 1899-1978; Taylor, Norman Burke 1885-1972; West, John B (John Burnard); Best and Taylor's Physiological basis of medical practice; 12th ed; united states;
- Nicki R. Colledge, Brian R. Walker, Stuart H. Ralston; Davidson's Principles and Practice of Medicine; 21st edition; London; ELBS/Churchill Livingstone; 2010.
- Joseph DiPiro, Robert L. Talbert, Gary Yee, Barbara Wells, L. Michael Posey; Pharmacotherapy: A Pathophysiological Approach; 9th edition; London; McGraw-Hill Medical; 2014.
- V. Kumar, R. S. Cotran and S. L. Robbins; Basic Pathology; 6th edition; Philadelphia; WB Saunders Company; 1997.
- 7. Roger Walker, Clive Edwards; Clinical Pharmacy and Therapeutics; 3rd edition; London; Churchill Livingstone publication; 2003.

- https://medicine.nus.edu.sg/pathweb/wp-content/uploads/2022/07/Study-notes Inflammation-and-repair.pdf
- 2. https://www.urmc.rochester.edu/encyclopedia/content.aspx?ContentTypeID=85&ContentID=P00799
- 3. https://www.intechopen.com/chapters/84638
- 4. https://www.physio-pedia.com/Respiratory Disorders
- 5. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9405799/

Name of the Program: Course Name		B. PHARM Computer Applications In Pharmacy (Theory) 2023		Semester: II Course Code/ Course Type Version		Level: UG BP205T/Core										
								Teaching Scheme						Assessment Scheme		
								Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/ Oral	
3	-	-	3	30	25	50										
Pre-Requisite: Course Objectives (CO):				 The objectives of Computer Applications in Pharmacy are: To demonstrate and make use of MS Office, MS Word, MS Excel, MS Access, and MS Power point To understand the paradigms of program language from each model C and SQL. To summarize the report and printing the report from patient database. To design questionnaire using a word processing package to gather information about a particular disease. To create HTML web page to show personal information and to create mailing labels using label wizard, generating label in MS Word 												
Course Learning Outcomes (CLO):				 Students would be able to: Identify use of MS Office, MS Word, MS Excel, MS Access and MS PowerPoint. Explain paradigms of program language from each model C and SQL Apply questionnaire designed to obtain the patient database Perform word processing charges to create questionnaire for collection of patient database. Evaluate web pages created and personal information filled 												

Course Contents/Syllabus:

(All the units carry equal weightage in Summative Assessment and equal engagement)

Descriptors/Topics	CLO	Hours
UNIT I		
Number system	CL01	06
Binary number system, Decimal number system, Octal number system, Hexadecimal number systems, conversion decimal to binary, binary to decimal, octal to binary etc, binary addition, binary subtraction – One's complement, Two's complement method, binary multiplication, binary division.		
Concept of Information Systems and Software		
Information gathering, requirement, and feasibility analysis, data flow diagrams, process		
specifications, input/output design, process life cycle, planning and managing the project		
UNIT II	CT O2	0.6
Web technologies Introduction to HTML, XML, CSS and Programming languages, introduction to web servers and Server Products Introduction to databases, MYSQL, MS ACCESS, Pharmacy Drug	CLO2	06
database	/ -	
UNIT III	CT O2	0.0
Application of computers in Pharmacy Drug information storage and retrieval, Pharmacokinetics, Mathematical model in Drug design, Hospital and Clinical Pharmacy, Electronic Prescribing and discharge (EP) systems, barcode medicine identification and automated dispensing of drugs, mobile technology and adherence monitoring Diagnostic System, Lab-diagnostic System, Patient Monitoring System, Pharma Information System	CLO3	06
UNIT IV	CLOA	06
Bioinformatics Introduction, Objective of Bioinformatics, Bioinformatics Databases, Concept of Bioinformatics, Impact of Bioinformatics in Vaccine Discovery	CLO4	06
UNIT V		
Computers as data analysis in Preclinical development Chromatographic data analysis(CDS), Laboratory Information management System (LIMS), and Text Information Management System(TIMS)	CLO5	06
Total Hours		30

Learning resources

Textbooks:

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

Reference Books:

- 1. Bioinformatics (Concept, Skills and Applications) S.C.Rastogi-CBS Publishers and Distributors, 4596/1- A, 11 Darya Gani, New Delhi 110 002(INDIA)
- 2. 4. Microsoft office Access 2003, Application Development Using VBA, SQL Server, DAP and Infopath Cary N.Prague Wiley Dreamtech India (P) Ltd., 4435/7, Ansari Road, Daryagani, New Delhi 110002

- 1. BP205T.pdf (sathyabama.ac.in)
- 2. https://pharmacyinfoline.com/computer-applications-in-pharmacy/
- 3. PowerPoint Presentation (teachntest.org)

Environmental Cours			ster: I	I	Level: UG	
				de/ Course	BP206T/Core	
2023					1.0	
					Assessment	Scheme
Tutorial	Total Credits	Hour	s	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral
=	3	30)	25	50	V=0
Credits					importance of Ennatural resources importance of economental science saster managements about envirous to participate in able to: ret their knowled owledge regardinal Resources.	osystems and biodiversity. cknowledge on solid waste ent and EIA process. nmental problems among an environment protection. dge about different Natural eg problems associated with
	Environm Sciences (2023 Tutorial	Environmental Sciences (Theory) 2023 Tutorial Total Credits - 3	Environmental Sciences (Theory) 2023 Versi Tutorial Total Credits - 3 30 CO):	Environmental Sciences (Theory) 2023 Version Tutorial Total Credits - 3 30 CO): The 1. U CO 2. U 3. A mm 4. C lee 5. M mm 4. C lee 5. M mm 6. C lee 6. C	Environmental Sciences (Theory) 2023 Version Tutorial Total Credits Hours CIA (Continuous Internal Assessment) - 3 30 25 CO): The objectives of E 1. Understand the i conservation of i 2. Understand the i 3. Apply the environmanagement, dia 4. Create awarene learners. 5. Motivate learner tcomes (CLO): Students would be 1. Define & interpr Resources. 2. Expand their know different Natura 3. Describe problem	Environmental Sciences (Theory) 2023 Version 1.0 Assessment Tutorial Total Credits Hours CIA (Continuous Internal Assessment) - 3 30 25 50 The objectives of Environmental Sciences conservation of natural resources 2. Understand the importance of ecc 3. Apply the environmental sciences management, disaster management 4. Create awareness about environ learners. 5. Motivate learners to participate in tcomes (CLO): Students would be able to: 1. Define & interpret their knowled

Course Contents/Syllabus:

(All the units carry equal weightage in Summative Assessment and equal engagement)

Descriptors/Topics	CLO	Hours
UNIT I		
The Multidisciplinary nature of environmental studies	CLO1,	10
Natural Resources	CLO2	
Renewable and non-renewable resources:		
• Natural resources and associated problems a) Forest resources; b) Water resources; c)		
Mineral resources; d) Food resources; e) Energy resources; f) Land resources: Role of an		
individual in conservation of natural resources.		
UNIT II		
Ecosystems:	CLO3,	10
Concept of an ecosystem.	CLO4	
Structure and function of an ecosystem.		
• Introduction, types, characteristic features, structure and function of the ecosystems: Forest	X.	
ecosystem; Grassland ecosystem; Desert ecosystem; Aquatic ecosystems (ponds, streams,		
lakes, rivers, oceans, estuaries)		
UNIT III		
Environmental Pollution:	CLO 5	10
Air pollution; Water pollution; Soil pollution		
Total Hours		30

Learning resources

Textbooks:

- 1. Anubha Kaushik, C.P.Kaushik, "Environmental Studies", New Age International, (2007).
- 2. Benny Joseph, "Environmental Studies", Tata McGraw-Hill companies, New Delhi, (2009).

Reference Books:

- 1. Y.K. Sing, Environmental Science, New Age International Pvt, Publishers, Bangalore
- 2. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
- 3. Bharucha Erach, The Biodiversity of India, Mapin Pu blishing Pvt. Ltd., Ahmedabad 380 013, India, 4. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
- 5. Clark R.S., Marine Pollution, Clanderson Press Oxford
- 6. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumbai, 1196p.
- 7. De A.K., Environmental Chemistry, Wiley Eastern Ltd.
- 8. Down of Earth, Centre for Science and Environment

Online Resources/E-Learning Resources

1. https://www.youtube.com/watch?v=LE9KTG9PFho

Name of the Program: Course Name		B. Pha	arm	Semester : 2		Level: UG BP207P/Core	
		And P	n Anatomy hysiology- actical)	Course Code/ Type	Course		
Course l	Pattern	2023		Version		1.0	
Teachin	g Scheme				Δς	sessment Schem	ie.
Theory	Practical	Tuto rial	Total Credits		CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/ Oral
-	4		2	60	15	35	f .5 18
Pre-Req	uisite:					7	10
rial Credits				functions of 2. To recogn different signs of 4. To estimate the blood/of 5. To identify gonads. Students would 1. Explain functions of 2. Identify the systems of 3. Evaluate physiological human book 4. Estimate the blood/its of the systems of 4. Estimate the blood/its of the systems of 5.	the gross of various organize the various organize the various of human body the the various organize the gross of various organize various organized parametrity.	at diagnostic tool as experimental d atts. Hent slides of vita amorphology, st gans of human bo assues and organs	ody. d organs of s of different ata related to al organs and ructure and ody. s of different tools/vital systems of

Course

Contents/Syllabus (All the Practical's carry equal weightage in Summative Assessment and equal engagement)

Practical Plan

Assignment /Practical/ Activity Number	Assignment/Practical/ Activity Title	Week Number/ Turn	Details	CLO	Hours
1	Practical 1: Integumentary and special senses using specimen, models.	Week1/ Turn 1	To study the integumentary and special senses using specimen, models etc	CLO1	04
2.	Practical 2: Nervous system	Week 2/ Turn 1	2.1 To study the nervous system using specimen, models, etc.	CLO1	04

6	Practical 6: Basal mass index	Week 6/	6.1 To record the basal mass index	CLO3	04
5	Practical 5: Body temperature	Week 5/	models, charts and specimens 5.1 To record the body temperature	CLO3	04
90.	behande de transferance de la color de la	Turn 1	Thurst-objective Codemic Americans (1) promisional set (1) on 1 style ♣ for the above objective (1)	-12121111111111111111111111111111111111	8828
6	Practical 6: Basal mass index	Week 6/ Turn 1	6.1 To record the basal mass index	CLO3	04
7	Practical 7: General neurological examination	Week 7/ Turn 1	7.1 To demonstrate the general neurological examination	CLO3	04
8	Practical 8: Function of olfactory nerve	Week 8/ Turn 1	8.1 To demonstrate the function of olfactory nerve	CLO3	04
9	Practical 9: Different types of taste.	Week 9/ Turn 1	9.1 To examine the different types of taste.	CLO3	04
10	Practical 10: Visual and reflex acuity.	Week10 /Turn 1	10.1 To demonstrate the visual and reflex acuity.	CLO3	04
11	Practical 11: Positive and negative feedback mechanism.	Week 11 / Turn 1	11.1 To demonstrate positive and negative feedback mechanism.	CLO3	04
12	Practical 12: Tidal volume and vital capacity.	Week12 / Turn 1	12.1 To determine the tidal volume and vital capacity.	CLO3	04
13	Practical 13: Family planning devices and pregnancy diagnosis test.	Week13 / Turn 1	13.1 To study family planning devices and pregnancy diagnosis test.	CLO3	04
14	Practical 14: Total blood count / differential Leucocyte count.	Week14 / Turn 1	14.1 To determine the total blood count / differential Leucocyte count.	CLO4	04
15	Practical 15: Permanent slides of vital organs and gonads	Week15 / Turn 1	15.1 To study permanent slides of vital organs and gonads.	CLO5	04
Total					60

Textbooks:

- 1. Principles of Anatomy and Physiology by Tortora Grabowski. Palmetto, GA, U.S.A.
- 2. Textbook of Practical Physiology by C.L. Ghai, Jaypee brothers' medical publishers, New Delhi.
- 3. Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee brother's medical publishers, New Delhi.

Reference Books:

- 1. Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York.
- 2. Principles of Anatomy and Physiology by Tortora Grabowski. Palmetto, GA, U.S.A.
- 3. Human Physiology (vol 1 and 2) by Dr. C.C. Chatterrje, Academic Publishers Kolkata.

- https://nurseslabs.com/special-senses-anatomy-physiology/
- 2. <a href="https://bio.libretexts.org/Learning-Objects/Laboratory-Experiments/General Biology Labs/BIOL 1108%3A Principles of Biology II Lab Manual (Burran and DesRochers)/Lab 04%3A Nervous System
- 3. https://www.youtube.com/watch?v=aGz-p4u6FU8

Course Contents/Syllabus:

(All the Practical's carry equal weightage in Summative Assessment and equal engagement) Practical Plan

Program:	B. Pharm			Semester	r: II	Level: UG			
Course Na	ıme	Pharmace Organic C (Practical)	hemistry-I	Course Code/ Course Type		BP208P/Core			
Course Pa	ttern	2023		Version		1.0			
Teaching S	Scheme					1			
					Assessment Scheme				
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)		Practi	cal/Oral	
-	4	-	2	60	15	35	7	(-)	
Pre-Requi	site:						/		
Course Lea	arning Outc	omes (CLO)		3. Constr Students 1. Under organi 2. Able	ounds. Tuction of molection would be able to stand steps invoce compound. To prepare suit	MANAGE PROPERTY OF THE PROPERT	cation	of unkn	own
				3. Devel		oare stereo model	s conta	ining var	
				3. Develo			s conta	ining var	
Assignment /Practical/ Activity Number	t Assignm	nent/Practical	/Activity Title	3. Develo	op skills to prep onal groups	pare stereo model: Details	s conta	cLO	
/Practical/	Practical	1: Systematic	qualitative	3. Develor function Week Number	perform qualitumknown sam	Details tative analysis of g	iven		ious
/Practical/ Activity Number	Practical analysis o compoun Practical analysis o compoun	1: Systematic of unknown or ds 2: Systematic of unknown or ds	qualitative ganic qualitative ganic	3. Develor function Week Number / Turn	perform qualitumknown sam	Details tative analysis of g ple qualitative analysi	iven	CLO	ious Hours
/Practical/ Activity Number	Practical analysis of compoun Practical analysis of compoun Practical	1: Systematic of unknown or ds 2: Systematic of unknown or ds 3: Systematic of unknown or ds	qualitative qualitative qualitative eganic	3. Develor functions Week Number / Turn Week 1 Turn 1 Week 2	perform qualitumknown sam To perform given unknown To perform	Details tative analysis of g ple qualitative analysi n sample qualitative analysi	iven s of	CLO CLO1	Hours 04
Practical/ Activity Number 1	Practical analysis of compound Practical analysis of compound Practical analysis of compound Practical Systematical Systematical Analysis of compound Practical Analysis of compound Prac	1: Systematic of unknown or ds 2: Systematic of unknown or ds 3: Systematic of unknown or ds	qualitative qualitative qualitative qualitative qualitative qualitative qualitative	3. Develor functions Week Number /Turn Week 1 Turn 1 Week 2 Turn 1 Week 3	perform qualitumknown sam To perform given unknow To perform given unknow To perform given unknow	Details tative analysis of g ple qualitative analysi n sample qualitative analysi n sample qualitative analysi	s of	CLO1	Hours 04
/Practical/ Activity Number 1 2	Practical analysis of compound Practical analysis of compound Practical analysis of compound Practical Systemat unknown Practical Systemat Systemat	1: Systematic of unknown or ds 2: Systematic of unknown or ds 3: Systematic of unknown or ds 4: ic qualitative a organic comp 5: ic qualitative a	qualitative	3. Develor functions Week Number /Turn Week 1 Turn 1 Week 2 Turn 1 Week 3 Turn 1	perform qualitunknown sam To perform given unknow To perform given unknow To perform given unknow	Details tative analysis of g ple qualitative analysi n sample qualitative analysi n sample qualitative analysi n sample qualitative analysi n sample	s of s of	CLO1 CLO1	04 04 04
/Practical/ Activity Number 1 2 3	Practical analysis of compoun Practical analysis of compoun Practical analysis of compoun Practical Systemat unknown Practical Systemat unknown Practical Systemat unknown Practical Systemat Systemat Systemat Systemat	1: Systematic of unknown or ds 2: Systematic of unknown or ds 3: Systematic of unknown or ds 4: ic qualitative a organic comp 5: ic qualitative a organic comp 6: ic qualitative a organic comp	qualitative rganic qualitative rganic qualitative rganic qualitative rganic analysis of counds analysis of counds	3. Development of the function	perform qualit unknown sam To perform given unknow To perform given unknow	Details tative analysis of g ple qualitative analysis rn sample qualitative analysis rn sample qualitative analysis rn sample qualitative analysis rn sample qualitative analysis rn sample qualitative analysis	s of s of s of s of	CLO1 CLO1 CLO1	04 04 04

	Systematic qualitative analysis of unknown organic compounds	Turn 1	given unknown sample		
8	Practical 8: Preparation of suitable solid derivatives from organic compounds	Week 8/ Turn 1	To prepare suitable solid derivatives of given organic compounds	CLO2	04
9	Practical 9: Preparation of suitable solid derivatives from organic compounds	Week 9/ Turn 1	To prepare suitable solid derivatives of given organic compounds	CLO2	04
10	Practical 10: Preparation of suitable solid derivatives from organic compounds	Week10/ Turn1	To prepare suitable solid derivatives of given organic compounds	CLO2	04
11	Practical 11: Preparation of suitable solid derivatives from organic compounds	Week11/ Turn 1	To prepare suitable solid derivatives of given organic compounds	CLO2	04
12	Practical 12: Preparation of suitable solid derivatives from organic compounds	Week12/ Turn1	To prepare suitable solid derivatives of given organic compounds	CLO2	04
13	Practical 13: Construction of molecular models	Week13/ Turn 1	To construct molecular models of ethane	CLO3	0-
14	Practical 14: Construction of molecular models	Week14/ Turn 1	To construct molecular models of butane	CLO3	04
15	Practical 15: Construction of molecular models	Week15/ Turn 1	To construct molecular models of cyclohexane	CLO3	04
	Total hours				60

Textbooks:

- 1. Vogel's text book of Practical Organic Chemistry
- 2. Introduction to Organic Laboratory techniques by Pavia, Lampman and Kriz.

Reference Books:

- 1. Organic Chemistry by Morrison and Boyd
- 2. Organic Chemistry by I.L. Finar, Volume-I
- 3. Textbook of Organic Chemistry by B.S. Bahl & Arun Bahl.
- 4. Organic Chemistry by P.L.Soni
- 5. Practical Organic Chemistry by Mann and Saunders.
- 6. Advanced Practical organic chemistry by N.K. Vishnoi.
- 8. Reaction and reaction mechanism by Ahluwaliah/Chatwal.

- 1. https://vlab.amrita.edu/index.php?brch=63&cnt=1&sim=1094&sub=3
- 2. https://vlab.amrita.edu/?sub=3&brch=63&sim=631&cnt=2
- 3. https://www.youtube.com/watch?v=OsdhNtNNNds

Course Contents/Syllabus:

(All the units carry equal weightage in Summative Assessment and equal engagement)

Practical Plan

Name of the Program: Course Name		B. PHAR	M	Semester:	2	Level: UG			
		Biochemistry (Practical)		Course Co Type	Course Code/ Course Type		BP209P/Core		
Course	Pattern	2023		Version		1.0			
Teachin	g Scheme	<u> </u>		566 566		Assessmen	t Scheme	e	
Theory		Tutorial	Total Credits	Hours			Practical/Oral		
:=:	4	-	2	60	15	35			
Pre-Requisite: Course Objectives (CO):				1. To qual block 2. To it 3. To it 4. To s 5. To stard	design and implitative and quantle, urine and salidentify different anow Quantitative tudy blood consunderstand prepch and the saliva	atitative analysis iva. It samples of carboute analysis of restituents. It samples of carboute analysis of restituents. It samylase active amylase active	tal praction of biocomohydrates ducing su	ical knowledge on astituents present in a and proteins. Igars and Proteins matic hydrolysis of	
Course Learning Outcomes (CLO):			 Ident Ident Perfo Deter Study 	Students would be able to: 1. Identify the different samples of carbohydrates. 2. Identify the different samples of Proteins. 3. Perform the Quantitative analysis of reducing sugars and Proteins 4. Determine different blood constituents. 5. Study the preparation of buffer, enzymatic hydrolysis of starch and the salivary amylase activity.					

Assignment /Practical/ Activity Number	Assignment/Practical/Activity Title	Week Number/ Turn	Details	CLO	Hours		
1	Practical 1: Qualitative analysis of carbohydrates	Week 1/Turn 1	Qualitative analysis of carbohydrates (Glucose, Fructose)	CLO1	04		
2.	Practical 2: Qualitative analysis of carbohydrates		Qualitative analysis of carbohydrates (Lactose, Maltose)	CLO1	04		
3.	Practical 3: Qualitative analysis of carbohydrates				Qualitative analysis of carbohydrates (Sucrose and starch)	CLO1	04
4	Practical 4: Identification tests for Proteins	Week 4/Turn 1	Identification tests for Proteins (albumin and Casein)	CLO2	04		
5	Practical 5: Quantitative analysis of reducing sugars	Week 5/Turn 1	Quantitative analysis of reducing sugars (DNSA method)	CLO2	04		
6			Quantitative analysis of Proteins (Biuret method)	CLO2	04		
7	Practical 7: Qualitative analysis of urine	Week 7/Turn l	Qualitative analysis of urine for abnormal constituents	CLO3	04		

otal					60
15	Practical 15: Study the effect of substrate concentration on salivary amylase activity.	Week 15/Turn 1	Study the effect of substrate concentration on salivary amylase activity.	CLO5	04
14	Practical 14: Study the effect of Temperature on Salivary amylase activity.	Week 14/Turn 1	Study the effect of Temperature on Salivary amylase activity.	CLO5	04
13	Practical 13: Determination of Salivary amylase activity	Week 13/Turn 1	Determination of Salivary amylase activity	CLO5	04
12	Practical 12: Study of enzymatic hydrolysis of starch	Week 12/Turn 1	Study of enzymatic hydrolysis of starch	CLO4	04
11	Practical 11: Preparation of buffer solution	Week 11/Turn 1	Preparation of buffer solution and measurement of pH	CLO4	04
10	Practical 10: Determination of serum total cholesterol	Week 10/Turn 1	Determination of serum total cholesterol	CLO4	04
9	Practical 9: Determination of blood sugar	Week 9/Turn 1	Determination of blood sugar	CLO3	04
8	Practical 8: Determination of blood creatinine	Week 8/Turn 1	Determination of blood creatinine	CLO3	04

Text Book

- 1. Practical Biochemistry by R.C. Gupta and S. Bhargavan.
- 2. Introduction of Practical Biochemistry by David T. Plummer. (3rd Edition)
- 3. Practical Biochemistry for Medical students by Rajagopal and Ramakrishna.
- 4. Practical Biochemistry by Harold Varley.

Reference 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.
- 4. Biochemistry by D. Satyanarayan and U.Chakrapani
- 5. Textbook of Biochemistry by Rama Rao.
- 6. Textbook of Biochemistry by Deb.
- 7. Outlines of Biochemistry by Conn and Stumpf

- 1. https://www.youtube.com/watch?v=uFahV8HBKr4&list=PLcVgXSU9gf3s-a7s7QKvbvACTquUkH 7N
- 2. https://www.youtube.com/watch?v=Adxcntdwsb8
- 3. https://www.youtube.com/watch?v=YcywZjzOxlo

Practical Plan: (Conduct any 10 Practical)

Name of the Program: Course Name				Semester: I	I	Level: UG		
				Course Coo	le/ Course Type	BP210P/Core	BP210P/Core	
Course Pa	ttern	2023		Version		1.0		
Teaching	Scheme					Assessment Sch	eme	
Theory	Practical	Tutorial	Total Credits	Hours CIA (Continuous Internal Assessment)		ESA (End Semester Assessment)	Practica	l/Oral
3 00	2		1	30	05	10	87753	
Pre-Requi	site:			-	7.	1	A.	
				2. To give applicat 3. To quot platform 4. To recit bioinfor vacancie 5. To describe field	brief idea about we ion of pharmacy for and illustrate the original of pharmacy in a set the utilization of matics in addition es development arribe the process of	veb Technology & field. technologies beind dition to some la computer in the facto database, scoped its limitations f separation technicalies and to summa	data base a ag applied v bel of softv ield of e, application	and its within the ware. on,
Assignme	Assignm	ent/Practical/	Activity Title	Wee	k	Details	CLO	Hours
nt/Practic al/Activity Number				Number	Turn			
1	a word pr	Design a que ocessing paci about a partic	kage to gath			n of questionnaire d file format	CL01	02
2	Practical 2:	Create a HTM	ML web page	to Week 02/		HTML web page ation display	CL01	02
3				2000 ATT 6 ATT 1 A	Turn1 To gather	the information of g online tools	CL01	02
4		Creating mail rd ,	ing labels Usin	ng Week 04/	Turn1 To create	mailing tab	CLO2	02
5		5: generating	label in M	IS Week 05/	Turn1 To create	mailing tab	CLO2	02

Week 06/Turn1

To create database in MS

Access

Create a database in MS Access to store

the patient information with the required fields Using acces

02

CLO3

7	Practical 6: Design a form in MS Access to view, add, delete and modify the patient record in the database	Week 07/Turn1	To design the form in MS Access	CLO3	02
8	Practical 7: Generating report and printing the report from the patient database	Week 08/Turn1	To generate report and printing from patient database.	CLO4	02
9	Practical 8: Creating invoice table using – MS Accesss	Week 09/Turn1	To create invoice using MS Access	CLO4	02
10	Practical 9: Drug information storage using MS Access	Week 10/Turn1	To study drug information storage	CLO3	02
11	Drug information retrieval using MS Access	Week 11/Turn1	To study drug information storage	CLO3	02
12	Practical 10: Creating and working with queries in MS Access	Week 12/Turn1	To analyze the queries and obtain the solution	CLO5	02
13	Practical 11: Exporting Tables, Queries and Forms	Week 13/Turn1	To export the queries forms, reports of web page	CLO5	02
14	Exporting Tables, Queries, Forms and Reports to web pages	Week 14/Turn1	To export the queries forms, reports of web page	CLO5	02
15	Practical 12: Exporting Tables, Queries, Forms and Reports to XML pages	Week 15/Turn1	To export tables, queries and report to XML pages	CLO5	02

Textbooks:

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

Reference Books:

- 1. Bioinformatics (Concept, Skills and Applications) S.C.Rastogi-CBS Publishers and Distributors, 4596/1- A, 11 Darya Gani, New Delhi 110 002(INDIA)
- 4. Microsoft office Access 2003, Application Development Using VBA, SQL Server, DAP and Infopath Cary N.Prague Wiley Dreamtech India (P) Ltd., 4435/7, Ansari Road, Daryagani, New Delhi 110002

- 1. BP205T.pdf (sathyabama.ac.in)
- 2. https://pharmacyinfoline.com/computer-applications-in-pharmacy/
- 3. PowerPoint Presentation (teachntest.org)

Name of the Program: Course Name		B. Pharm		Semester	: II	Level: UG/PG			
		Foreign Language (German)		Course C Type	ode/ Course	UFL201A/AEC			
Course Pattern 2023				Version	FW	1.0			
Teaching	g Scheme				As	sessment Schen	ıe		
Theory	Practical	Tutorial	Orial Total Hours CIA (Continuous Internal Assessment)		ESA (End Semester Assessment)	Practical/ Oral			
2	-	-	-	30	20	30	16		
Pre-Req	TOTAL CONTRACT CONTRA						~~		
Course C	Objectives (C	CO):		 To ren To uno To app To uno 	nember new word derstand the new	b and grammar c nan text.	ngs.		
Course L	earning Out	comes (CL	O):	Students would be able to:					
Course Learning Outcomes (CLO):			 Can ur Able to Can in 	troduce themselv	ay expressions. entences in Germa	an language.			

Course

Contents/Syllabus:

(All the units carry equal weightage in Summative Assessment and equal engagement)

Descriptors/Topics	CLO	Hours
UNIT I		
Guten Tag	CLO 1	06
Speak about yourself and others, Speak about Countries and Languages		
Grammar – Sentence formation and verbs usage		
UNIT II		
Freunde, Kollegen und Ich	CLO 2	06
Speak about your Hobbys, To fix a meeting, Speak about work and		
Profession, To creat a profile on Internet		
Grammar - How to use 'The' in german, Singular and plural forms of		
Nouns		
UNIT III		
In der Stadt	CLO3	06
To get to know about Cities and Places, how to find way and understand		
directions, learn international words		
Grammar – Negations (how to use NO in german),		
Definite articles, indefinite articles		
UNIT IV		

Guten Appetit	CLO4	06
To speak about food and food habits, to have a discussion about shopping,		
Grammar – introduction of cases		
UNIT V		
Tag für Tag & Zeit mit Freunden	CLO5	06
Clock timings, To speak about family and friends, Daily routine To speak		
about free time activity, to understand the specific information from the		
text, to order and to pay in a restaurant		
Grammar – Possessivarticle, Modalverbs, use of on,,at,,from, till, separable		
verbs and past tence		
Total Hours		30

Textbooks:

- 1. Netzwerk A1, Ernst klett Verlag & Goyal Publishers & Distributors Pvt. Ltd.
- 2. Studio d A1, Cornelesen Verlag & Goyal Publishers & Distributors Pvt. Ltd.
- 3. Netzwerk Neu A1, Ernst klett Verlag & Goyal Publishers & Distributors Pvt. Ltd

Reference Books:

- 1. Hallo Deutsch Al, Ernst Klett Verlag, Goyal Publishers & Distributors Pvt. Ltd
- 2. Themen Aktuell 1, Hueber verlag
- 3. Maximal Ernst klett Verlag & Goyal Publishers & Distributors Pvt. Ltd.

- 1. https://youtube.com/@LearnGermanwithAnja?si=BkJYDPi7TS0fT4lr
- 2. https://youtube.com/@deutschlernenmitheidi?si=TkICIabzioaU0roZ
- 3. instagram.com/learngermanwithanja

Name of the Program: Course Name		B. Pham		Semester : II		Level: UG/PG		
		Foreign Language (Japanese		Course Co Type	de/Course	UFL201B/AEC		
Course l	Pattern	2023		Version	Sec	1.0		
Teaching Scheme				Į A	Assessment Scho	eme		
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/ Oral	
2	-2 / / /	<u> </u>		30	50	1920	===	
Pre-Rec	uisite: Des	sire to get a	acquainte	with the Io				
Course C	Dbjectives (C	CO):		The objecti 1. To mee respect 2. To get through	et the needs of e to language su introduced to J n language.	anguage-I (Japan ever growing inc	dustry, with and culture	

Course Contents/Syllabus:

(All the units carry equal weightage in Summative Assessment and equal engagement)

Descriptors/Topics	CLO	Hours
UNIT I		
Introduction to Japanese Language	CLO 1	02
Introduction of script, culture, History of script ,Speaking: Self introduction,		
listening short video skit on self-introduction		
UNIT II		
Introduction of Hiragana Script	CLO 2	18
Writing: Hiragana script, Speak: Basic sentences, General vocabulary:	A	
Months, Days of the week, Basic numbers, colours	A	
UNIT III		
Basic Sentence formation	CLO 3	04
Basic sentence structure: Affirmative and Negative, General vocabulary: about	y .	
family,		8
UNIT IV		
Time and verbs	CLO 4	04
Speaking: Talking about routine, Writing: routine using verbs and time, reading:		
A clock		
UNIT V		
Introduction of Katakana and basic kanji	CLO 5	02
Reading: English words, country names		
Writing: Basic Kanji		
Total Hours		30

Learning resources

Textbook:

1. Minna no Nihongo, "Japanese for everyone", Elementary Main Textbook, Goyal Publishers & Distributors Pvt. Ltd.

Reference books:

1. Shyoho Volume 1.

Online Resources/E-Learning Resources:

1. YouTube links

- 1. https://www.youtube.com/watch?v=shdlEapDsP4
- 2. https://youtu.be/K-nw5EUxDz0?feature=shared
- 3. https://youtu.be/o9sP-vaCEa0?si=18yOvVKaItBQWXNu
- 4. https://youtu.be/JnoZE51WZg4?si=9uq68USOz5plBk2n
- 5. https://youtu.be/shdlEapDsP4?si=tC6RGaMtwDJgVu2d
- 6. https://youtu.be/9paXgC2U8L0?si=btS1G4mvrkG5C9zi

2. Apps

- A) Learn Japanese Hiragana APP available on Google play.
- B) Hiragana Pro



Program: Course Name		n:		Semester:	Ш	The state of the s			
		Pharmac Organic Chemistr (Theory)		Course Co Type	de/ Course	BP301T/Core			
Course	ourse Pattern 2023			Version	e).	1.0			
Teaching Scheme						Assessment	\$GSGCCCC WORKS CO		
Theory			Credits (Co	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral			
3		1	4	45	25	75	151		
Pre-Rec	uisite:				100				
			 orientation of substituents on benzene ring. To account for reactivity/stability of compounds, Demonstrate understanding of the composition of fats and oils, chemistry and reactions of fatty acids. To explain the stability, reactivity and mechanism involved in synthesis and reactions of Polynuclear hydrocarbons and their derivatives. Understand the theory of cycloalkanes. 						
Course Learning Outcomes (CLO):				Students w 1. Describ	ould be able to:				

Course Contents/Syllabus:

(All the units carry equal weightage in Summative Assessment and equal engagement)

Descriptors/Topics	CLO	Hours
UNIT I		
Benzene and its derivatives	CLO 1	10
a. Analytical, synthetic and other evidences in the derivation of structure of benzene, Orbital		
picture, resonance in benzene, aromatic characters, Huckel's rule		
b. Reactions of benzene - nitration, sulphonation, halogenation reactivity, Friedel crafts		
alkylation- reactivity, limitations, Friedel crafts acylation.		
c. Substituents, effect of substituents on reactivity and orientation of mono substituted benzene		
compounds towards electrophilic substitution reaction		
d. Structure and uses of DDT, Saccharin, BHC and Chloramine		
UNIT II		

		\ \frac{1}{2}
Phenols* - Acidity of phenols, effect of substituents on acidity, qualitative tests, Structure and uses of phenol, cresols, resorcinol, naphthol's	CLO 2	10
Aromatic Amines* - Basicity of amines, effect of substituents on basicity and synthetic uses of		
aryl diazonium salts		
Aromatic Acids* -Acidity, effect of substituents on acidity and important reactions of benzoic		
acid.		
UNIT III		
Fats and Oils	CLO 3	10
a. Fatty acids - reactions.		
b. Hydrolysis, Hydrogenation, Saponification and Rancidity of oils, Drying oils.		
c. Analytical constants - Acid value, Saponification value, Ester value,		
Iodine value, Acetyl value, Reichert Meissl (RM) value – significance and		
principle involved in their determination.		
UNIT IV		
Polynuclear hydrocarbons:	CLO 4	08
Synthesis, reactions, Structure and medicinal uses of Naphthalene, Phenanthrene, Anthracene,		
Diphenylmethane, Triphenylmethane and their derivatives		
UNIT V		
Cycloalkanes*	CLO 5	07
Stabilities – Baeyer's strain theory, limitation of Baeyer's strain theory, Coulson and Moffitt's	100000-100 CLV3	
modification, Sachse Mohr's theory (Theory of strainless rings), reactions of cyclopropane and		
cyclobutane only		
Total Hours		45

^{*} The total 15 tutorials should be conducted as per the format mentioned above

Textbooks:

- 1. A textbook of Organic Chemistry by Arun Bahl, B.S. Bahl.
- 2. A Textbook of Pharmaceutical Organic Chemistry-II by Prashik B Dudhe, Mayuresh K. Raut, Everest Publishing House, Pune.
- 3. Pharmaceutical Organic Chemistry-III by Mayuresh Raut, Everest Publishing House, Pune.
- 4. Pharmaceutical Organic Chemistry-IV by Mayuresh Raut, Everest Publishing House, Pune.

Reference Books:

- 1. Organic Chemistry by I.L. Finar, Volume-I.
- 2. Organic Chemistry by Morrison and Boyd
- 3. Organic Chemistry by P.L.Soni
- 5. Practical Organic Chemistry by Mann and Saunders.
- 6. Vogel's text book of Practical Organic Chemistry
- 7. Advanced Practical organic chemistry by N.K. Vishnoi.

- 1. Fats & Oils: https://youtu.be/C1pJJSsk06g
- 2. Naphthalene: https://youtu.be/Lknf986JC5M
- 3. Anthracene: https://youtu.be/MlsZIotkpvk
- 4. Phenanthrene: https://youtu.be/THPjP0xofao
- 5. Diphenylmethane: https://youtu.be/qeRHMCzyFuY
- 6. Triphenylmethane: https://youtu.be/HWIiYKFh0ZY
- 7. R & S configuration: https://youtu.be/BPys76MC2tw
- 8. E & Z configuration: https://youtu.be/mGtiBZy7XG4
- 9. Cis/Trans isomerism: https://youtu.be/Zg-EV3zgQbg

Name of the Program:		B. PHARM		Semester : I	П	Level: UG		
Course 1	Name	Physical Pharmaco – (Theory		Course Code Type	e/ Course	BP302T/Core		
Course 1	Course Pattern 2023			Version		1.0		
Teachin	Геаching Scheme					ssessment Sch	eme	
Theory	Practical	Tutorial	Total Credit s	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment	Practical/Oral	
3		1	4	45	25	75		
Pre-Req	uisite: Objectives (C					ourse student sh		
Course I	earning Out	comes (CL	O):	molecules 2. To Know for stabili 3. To detern 4. To demo formulati 5. To evalua	s in designing the the principles of the principles of the principles of the principles of the principles of the principles of the principles of the principles of the principles of the principles of the principles of the principles of the principles of the princip	te dosage forms of chemical kinet of formulations ohysicochemical	properties of drug ics & to use them properties in the	
	Course Learning Outcomes (CLO):				various physics in the designing rate the under tion and types of and differential the drug action a	cochemical programmers of the dosage for lying principle finterfaces. Ite the types of the protein binding.	es of solubility of operties of drug m. s of adsorption f complexes and	

Course Contents/Syllabus:

(All the units carry equal weightage in Summative Assessment and equal engagement)

Descriptors/Topics	CLO	Hours
UNIT I		
Solubility of drugs	CLO 1	10
Solubility expressions, mechanisms of solute solvent interactions, ideal solubility parameters, solvation & association, quantitative approach to the factors influencing solubility of drugs, diffusion principles in biological systems. Solubility of gas in liquids, solubility of liquids in liquids, (Binary solutions, ideal solutions) Raoult's law, real solutions. Partially miscible liquids, Critical solution temperature and applications. Distribution law, its limitations and applications.		

UNIT II		
States of Matter and properties of matter	CLO 2	10
State of matter, changes in the state of matter, latent heats, vapour pressure,		
sublimation critical point, eutectic mixtures, gases, aerosols – inhalers, relative		
humidity, liquid complexes, liquid crystals, glassy states, solid crystalline, amorphous & polymorphism		
Physicochemical properties of drug molecules		
Refractive index, optical rotation, dielectric constant, dipole moment,		
dissociation constant, determinations and applications		
UNIT III		
Surface and interfacial phenomenon	CLO 3	10
Liquid interface, surface & interfacial tensions surface free energy,		
measurement of surface & interfacial tensions, spreading coefficient,		
adsorption at liquid interfaces, surface active agents, HLB Scale,	A .	
solubilisation, detergency, adsorption at solid interface		
UNIT IV		
Complexation and protein binding	CLO 4	08
Introduction, Classification of Complexation, Applications, methods of		
analysis, protein binding, Complexation and drug action, crystalline structures		
of complexes and thermodynamic treatment of stability constants		
UNIT V		
pH, buffers and Isotonic solutions	CLO 5	07
Sorensen's pH scale, pH determination (electrometric and calorimetric),		
applications of buffers, buffer equation, buffer capacity, buffers in		
pharmaceutical and biological systems, buffered isotonic solutions		
Total Hours		45

^{*} The total 15 tutorials should be conducted as per the format mentioned above

Textbooks:

- 1. Test book of Physical Phramacy, by Gaurav Jain & Roop K. Khar
- 2. Physical Pharmaceutics by C.V.S. Subramanyam

Reference Books:

- 1. Physical Pharmacy by Alfred Martin
- 2. Experimental Pharmaceutics by Eugene, Parott.
- 3. Tutorial Pharmacy by Cooper and Gunn.
- 4. Stocklosam J. Pharmaceutical Calculations, Lea & Febiger, Philadelphia.
- 5. Liberman H.A, Lachman C., Pharmaceutical Dosage forms, Tablets, Volume-1 to
- 3, MarcelDekkar Inc.
- 6. Liberman H.A, Lachman C, Pharmaceutical Dosage forms. Disperse systems, volume 1, 2, 3. Marcel Dekkar Inc.
- 7. Physical Pharmaceutics by Ramasamy C and Manavalan R.

- 1. https://www.iptsalipur.org/wp-content/uploads/2020/08/BP302T_PYP_UNIT_IV.pdf
- 2. https://www.iptsalipur.org/wp-content/uploads/2020/08/BP302T_PYP_UNIT_II.pdf
- 3. https://www.carewellpharma.in/bpharmacy/notes/3rd-sem/physical-pharmaceutics-1#google_vignette

Name of the Program: Course Name		:		Semeste	r : III	Level: UG BP303T/Core	
				Course Type	Code/ Course		
Course	Pattern	2023		Version	8	1.0	
Teachin	g Scheme	VI)				Assessment So	cheme
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment	Practical/Oral
3	133	1	4	45	25	75	7
Pre-Req	uisite:						1970
				2. To steri 3. To 1 4. To Phan 5. To	lization in pharma earn sterility testin perform the mi maceuticals.	inportance and iceutical processing of pharmaceuterobiological	implementation of sing and industry itical products. standardization of echnology and its
Course I	earning Out	comes (CL	O):	 Und pres Und steri Lear Perf Phar Und 	ervation of various erstand the imp lization in pharma in sterility testing of	of identifications microorganism ortance and incentical process of pharmaceutic obiological statements.	implementation of sing and industry cal products. tandardization of thrology and its

Course Contents/Syllabus:

(All the units carry equal weightage in Summative Assessment and equal engagement)

Descriptors/Topics	CLO	Hours
UNIT I		
Introduction History of microbiology, its branches, scope and its importance. Introduction to Prokaryotes and Eukaryotes. Study of ultra-structure and morphological classification of bacteria, nutritional requirements, raw materials used for culture media and physical parameters for growth, growth curve, isolation and preservation methods for pure cultures, cultivation of anaerobes, quantitative measurement of bacterial growth (total & viable count). Study of different types of phase contrast microscopy, dark field microscopy and electron microscopy.	CLO 1	10

Identification of bacteria using staining techniques simple, Gram's & Acid fast staining) and biochemical tests (IMViC). Study of principle, procedure, merits,	CLO 2	10
demerits and applications of physical, chemical gaseous, radiation and mechanical		
method of sterilization. Evaluation of the efficiency of sterilization methods.		
Equipment employed in large scale sterilization.		
Sterility indicators.		
UNIT III		
Study of morphology, classification, reproduction/replication and cultivation of Fungi and Viruses. Classification and mode of action of disinfectants. Factors influencing disinfection, antiseptics and their evaluation for bacteriostatic and bactericidal actions. Evaluation of bactericidal & Bacteriostatic. Sterility testing of products (solids, liquids, ophthalmic and other sterile products) according to IP, BP and USP.	CLO 3	10
UNIT IV		
Designing of aseptic area, laminar flow equipment; study of different sources of contamination in an aseptic area and methods of prevention, clean area classification. Principles and methods of different microbiological assay. Methods for standardization of antibiotics, vitamins and amino acids. Assessment of a new antibiotic.	CLO 4	08
UNIT V		
Types of spoilage, factors affecting the microbial spoilage of pharmaceutical products, sources and types of microbial contaminants, assessment of microbial contamination and spoilage. Preservation of pharmaceutical products using antimicrobial agents, evaluation of microbial stability of formulations. Growth of animal cells in culture, general procedure for cell culture, Primary, established and transformed cell cultures. Application of cell cultures in pharmaceutical industry and research.	CLO 5	07
Total Hours		45

^{*} The total 15 tutorials should be conducted as per the format mentioned above

Textbooks:

- 1. Text Book of Microbiology, by Ananthnarayan Orient-Longman, Chennai
- Edward: Fundamentals of Microbiology.
- 3. N.K. Jain: Pharmaceutical Microbiology, Vallabh Prakashan, Delhi

Reference Books:

- 1. W.B. Hugo and A.D. Russel: Pharmaceutical Microbiology, Blackwell Scientific publications, Oxford London.
- 2. Prescott and Dunn., Industrial Microbiology, 4th edition, CBS Publishers & Distributors, Delhi.
- 3. Pelczar, Chan Kreig, Microbiology, Tata McGraw Hill edn.
- 4. Malcolm Harris, Balliere Tindall and Cox: Pharmaceutical Microbiology.
- 5. Rose: Industrial Microbiology.
- 6. Probisher, Hinsdill et al: Fundamentals of Microbiology, 9th ed. Japan
- 7. Cooper and Gunn's: Tutorial Pharmacy, CBS Publisher and Distribution.
- 8. Peppler: Microbial Technology.
- 9. I.P., B.P., U.S.P.- latest editions.

- 1. https://www.slideshare.net/JagrutiMarathe2/introduction-to-microbiology-252918158
- 2. https://www.pharmaguideline.com/2007/02/identification-of-bacteria-using-staining-techniques.html
- https://www.slideshare.net/DRxPoojaBhandare/classification-and-mode-of-action-of-disinfectants-pharmaceutical-microbiologybp303t-unitiii-part3
- https://www.slideshare.net/DRxPoojaBhandare/designing-of-aseptic-area-laminar-flow-equipment-study-of-different-source-ofcontamination-in-aseptic-area-and-methods-of-prevention-clean-area-classification-pharmaceutical-microbiology-bp303tunitivpart1
- 5. https://www.slideshare.net/DRxPoojaBhandare/types-of-spoilage-factors-affecting-the-microbial-spoilage-of-pharmaceutical-products-source-and-type-of-contaminants-pharmaceutical-microbiology-bp303tunity-part1

Name of the Program: Course Name		B. PHAR	M	Semester : III	[Level: UG	
		Pharmaceutical Engineering (Theory)		Course Code	Course Type	BP304T/Core	
Course Pa	attern	2023		Version		1.0	
Teaching	Scheme				A	Assessment Scho	eme
Theory	Practical	Tutorial	Tota l Cred its	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Or al
3	, -	1	4	. 45	25	75	
Pre-Requ	isite: ojectives (C					cal Engineering	
Course Le	earning Out	comes (CLC	O):	industries 2. To recogenvironm 3. To identify pharmace 4. To perform of plant le 5. To study a used for of Students woul 1. Identify vest separation material le 2. Explain prodistillation 3. Apply vest manufact 4. Perform plant lay centrifugates	s and material had and carry and perform entical manufactor and appreciate and appreciate the corrosion control be able to: arious unit open and appreciate in used in Panandling technical arious processed uring processed appreciate and out design an ation	various processeturing processeturing processes and comprehender optimum uses the various prevol in Pharmaceurations like size tharmaceutical ques. The involved in the ike mixing and decomprehended processes like	ses involved in end significance of resources. Tentive methods attical industries. The reduction, size industries and evaporation and pharmaceutical

Course Contents/Syllabus:

(All the units carry equal weightage in Summative Assessment and equal engagement)

Descriptors/Topics"	CLO	Hours
UNIT I		
Flow of fluids Types of manometers, Reynolds number and its significance, Bernoulli's theorem and its applications, Energy losses, Orifice meter, Venturimeter, Pitot tube and Rotometer. Size Reduction: Objectives, Mechanisms & Laws governing size reduction, factors affecting size reduction, principles, construction, working, uses, merits and demerits of Hammer mill, ball mill, fluid energy mill, Edge runner mill & end runner mill. Size Separation Objectives, applications & mechanism of size separation, official standards of powders, sieves, size separation Principles, construction, working, uses, merits and demerits of Sieve shaker, cyclone separator, Air separator, Bag filter & elutriation tank.	CLO 1	10
UNIT II Heat Transfer	CLO	10
Objectives, applications & Heat transfer mechanisms. Fourier's law, Heat transfer by conduction, convection & radiation. Heat interchangers & heat exchangers. Evaporation Objectives, applications and factors influencing evaporation, differences between evaporation and other heat process. principles, construction, working, uses, merits and demerits of Steam jacketed kettle, horizontal tube evaporator, climbing film evaporator, forced circulation evaporator, multiple effect evaporator& Economy of multiple effect evaporator. Distillation Basic Principles and methodology of simple distillation, flash distillation, fractional distillation, distillation under reduced pressure, steam distillation & molecular distillation UNIT III	2	10
	CT O1	00
Objectives, applications & mechanism of drying process, measurements & applications of Equilibrium Moisture content, rate of drying curve. principles, construction, working, uses, merits and demerits of Tray dryer, drum dryer spray dryer, fluidized bed dryer, vacuum dryer, freeze dryer. Mixing Objectives, applications & factors affecting mixing, Difference between solid and liquid mixing, mechanism of solid mixing, liquids mixing and semisolids mixing. Principles, Construction, Working, uses, Merits and Demerits of Double cone blender, twin shell blender, ribbon blender, Sigma blade mixer, planetary mixers, Propellers, Turbines, Paddles & Silverson Emulsifier,	CLO3	08
UNIT IV		
Objectives, applications, Theories & Factors influencing filtration, filter aids, filter medias. Principle, Construction, Working, Uses, Merits and demerits of plate & frame filter, filter leaf, rotary drum filter, Meta filter & Cartridge filter, membrane filters and Seidtz filter. Centrifugation Objectives, principle & applications of Centrifugation, principles, construction, working, uses, merits and demerits of Perforated basket centrifuge, Non-perforated basket centrifuge, semi continuous centrifuge & super centrifuge.	CLO4	08

UNIT V	ĺ	
Materials of pharmaceutical plant construction, Corrosion and its Prevention: Factors affecting during materials selected for Pharmaceutical plant construction, Theories of corrosion, types of corrosion and there prevention. Ferrous and nonferrous metals, inorganic and organic non-metals, basic of material handling systems.	CLO5	07
Total Hours		45

^{*} The total 15 tutorials should be conducted as per the format mentioned above

Textbooks:

- 1. Introduction to chemical engineering Walter L Badger & Julius Banchero, Latest edition.
- 2. Solid phase extraction, Principles, techniques and applications by Nigel J.K. Simpson-Latest edition.
- 3. Unit operation of chemical engineering Mcabe Smith, Latest edition.
- 4. Physical pharmaceutics- C.V.S Subrahmanyam et al., Latest edition.

Reference Books:

- 1. Pharmaceutical engineering principles and practices C.V.S Subrahmanyam et al., Latest edition.
- 2. Remington practice of pharmacy- Martin, Latest edition.
- 3. Theory and practice of industrial pharmacy by Lachmann., Latest edition.
- 4. Cooper and Gunn's Tutorial pharmacy, S.J. Carter, Latest edition.

Online Resources/E-Learning Resources:

- https://www.sips.org.in/wp-content/uploads/2020/03/Size-reduction-SIze-separation.pdf
- 2. https://www.iptsalipur.org/wp-content/uploads/2020/08/BP304T PE UNIT II.pdf
- 3. https://www.chips.ac.in/pages/downloads/PPTs/Pceutics/EVAPORATION.pdf
- 4. https://www.sips.org.in/wp-content/uploads/2020/03/Distillation.pdf
- 5. https://www.iptsalipur.org/wp-content/uploads/2020/08/BP304T PE UNIT III.pdf
- 6. https://www.iptsalipur.org/wp-content/uploads/2020/08/BP304T_PE_UNIT_IV.pdf
- 7. https://www.iptsalipur.org/wp-content/uploads/2020/08/BP304T PE UNIT V.pdf
- 8. http://103.47.12.35/bitstream/handle/1/6573/77.pdf?sequence=1&isAllowed=y

COURSE CURRICULUM

Name of the Program:				Semester: III		Level: UG	
Course I	Course Name		Pharmaceutical Organic Chemistry-II (Practical)		Code/ Course	BP305P/Core	
Course l	Pattern	2023		Version	L _a	1.0	
Teachin	g Scheme					Assessment S	cheme
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral
-	4	-	2	60	15	35	-
Pre-Req	uisite:						4
Course C	Objectives (C	CO):		are: 1. To de 2. To de 3. To sy		stallization and values of given ferent organic o	compounds and
Course I	earning Out	comes (CL	O):	1.Perfor 2.Deterror value 3.Synth 4.Expla	and perform states are size of various in the mechanistate the physic	ion and steam of value, acid value, acid value, acid value, acid value of ndardization of organic composing involved in t	lue, saponification f NaOH/ KOH. ounds

Contents/Syllabus:

(All the Practical's carry equal weightage in Summative Assessment and equal engagement)

Course

Assignment/ Practical/ Activity Number	Assignment/Practical /Activity Title	Week Number/Turn	Details	CLO	Hours
1	Practical 1: Laboratory techniques	Week 1/Turn 1	perform recrystallization of given sample.	CLO1	04
2	Practical 2: Laboratory Week 2/Turn 1 To perform Steam Distance techniques sample.		To perform Steam Distillation of given sample.	CLO1	04
3	Practical 3: Estimation of Oils and fats	Week 3/Turn 1	To determine acid value of given oil/fat		04
4	Practical 4: Estimation Week 4/Turn 1 of Oils and fats		To determine saponification value of given oil/fat	CLO2	04
5	Practical 5: Week Estimation of Oils and fats		To determine iodine value of given oil/fat	CLO2	04
6	Practical 6:	Week 6/Turn 1	To synthesize Benzanilide/Phenyl benzoate/Acetanilide from Aniline/	CLO3	04

	Preparation of organic compounds		Phenol/Aniline by acylation reaction.		
7	Practical 7: Preparation of compounds	Week 7/Turn 1	To synthesize 2,4,6-Tribromo aniline/ p-bromo acetanilide from aniline (bromination reaction)	CLO3	04
8	Practical 8: Preparation of organic compounds	Week 8/Turn 1	To synthesize 5-Nitro salicylic acid/Meta di nitro benzene from Salicylic acid /Nitro benzene by nitration reaction.	CLO3	04
9	Practical 9: Preparation of organic compounds	Week 9/Turn 1	To synthesize Benzoic acid from Benzyl chloride by oxidation reaction.	CLO3	04
10	Practical 10: Preparation of organic compounds	Week10/Turn1	To synthesize Benzoic acid/ Salicylic acid from alkyl benzoate/ alkyl salicylate by hydrolysis reaction.	CLO3	04
11	Practical 11: Preparation of organic compounds	Week11/Turn1	To synthesize 1-phenyl-azo-2-naphthol from aniline by diazotization and coupling reaction	CLO3	04
12	Practical 12: Preparation of organic compounds	Week12/Turn1	To synthesize Benzil from Benzoin by oxidation reaction	CLO3	04
13	Practical 13: Preparation of organic compounds	Week13/Turn1	To synthesize Dibenzalacetone from Benzaldehyde by Claisen Schmidt reaction.	CLO3	04
14	Practical 14: Preparation of organic compounds	Week14/Turn1	To synthesize Cinnamic acid from Benzaldehyde by Perkin reaction	CLO3	04
15	Practical 15: Preparation of organic compounds	Week15/Turn1	To synthesize p-iodo benzoic acid from p- amino benzoic acid	CLO3	04
	Total hours				60

Textbooks:

- 1. Vogel's text book of Practical Organic Chemistry
- 2. Introduction to Organic Laboratory techniques by Pavia, Lampman and Kriz.

Reference Books:

- 1. Organic Chemistry by Morrison and Boyd
- 2. Organic Chemistry by I.L. Finar, Volume-I
- 3. Textbook of Organic Chemistry by B.S. Bahl & Arun Bahl.
- 4. Organic Chemistry by P.L.Soni
- 5. Practical Organic Chemistry by Mann and Saunders.
- 6. Advanced Practical organic chemistry by N.K. Vishnoi.
- 8. Reaction and reaction mechanism by Ahluwaliah/Chatwal.

- 1. Phenyl benzoate: https://www.youtube.com/watch?v=Rc4CdoqBHDk
- 2. Cinnamic acid: https://www.youtube.com/watch?v=oqFGNM4ZmJQ
- 3. Benzanilide: https://www.youtube.com/watch?v=LuA-RP8tgHQ
- 4. Dibenzalacetone: https://www.youtube.com/watch?v= BuntAh2Xog
- 5. 1-phenyl-azo-2-naphthol: https://www.youtube.com/watch?v=gVh6Mn2IAB8
- 6. Benzoic acid: https://www.youtube.com/watch?v=0rJ7Q_AwNk0

Name of the Program: Course Name		B. PHARM		Semester	: III	Level: UG	
		Physical Pharmaco (Practical		Course C Type	Code/ Course	BP306P/Core	•
Course 1	Pattern	2023		Version		1.0	
	Scheme					Assessment Sch	neme
Theory	Practical	Tutorial	Total	Hours	CIA	ESA (End	Practical/Oral
•			Credits		(Continuous Internal Assessment)	Semester Assessment)	
	4		2	60	15	35	_
Pre-Req	uisite:	201					
Course	earning Out	tromes (CI)	0):	chemi therap 2. To us determ and fo 3. To ca charac 4. To d param formu 5. To es solubi	cally stable do reutic safety and enderstand the principal principal commutations. The commutation of drawn of	posage forms a defficacy. orinciples and pus physical paraphysical tests ags. testing of the control of the c	ign physically and and ensure their methods for the rameters of drugs involved in the various physical formulation and of complexes by
		comes (c)	9).	 Detern solubi Apply interp. Detern conce. Detern count isother using Deduction of a second solution. 	mine the signification that the particular the particular that the surface and drop weight and determinant that the particular	of dosage forms Hasselbalch alue of drugs on coefficient, on by CST metho tension of samp t methods and e ne Freundlich-L al. and critical mice stimate the stab	sodium chloride od le liquids by drop explain adsorption angmuir constant ellar concentration oility constants of

Course Contents/Syllabus: (All the units carry equal weightage in Summative Assessment and equal engagement) Practical Plan

Assignme nt/Practic al/Activity Number	Assignment/Practic al/Activity Title	Week Number/Turn	Details	CLO	Hours
1	Practical 1: solubility of drug	Week 1/Turn 1	Determination the solubility of drug at room temperature	CLO1	04
2.	Practical 2: solubility of drug	Week 2/Turn 1	Determination the solubility of drug at room temperature	CLO1	04
3.	Practical 3: solubility of drug	Week 3/Turn 1	Determination the solubility of drug at room temperature	CLO1	04
4	Practical 4: pKa value	Week 4/Turn 1	Determination of pKa value by Half Neutralization/ Henderson Hasselbalch equation.	CLO2	04
5	Practical 5: pKa value	Week 5/Turn 1	Determination of pKa value by Half Neutralization/ Henderson Hasselbalch equation.	CLO2	04
6	Practical 6: pKa value	Week 6/Turn 1	Determination of pKa value by Half Neutralization/ Henderson Hasselbalch equation.	CLO2	04
7	Practical 7: Partition co- efficient Week 7/Turn 1 Determination of Partition co- efficient of benzoic acid in benzene and water		CLO3	04	
8	Practical 8: Partition co- efficient			CLO3	04
9	Practical 9: % composition			CLO3	04
10	Practical 10: surface tension	Week 10/Turn 1	Determination of surface tension of given liquids by drop count and drop weight method	CLO4	04
11	Practical 11: HLB number	Week 11/Turn 1	Determination of HLB number of a surfactant by saponification method	CLO4	04
12	Practical 12: Week 12/Turn Freundlich and Langmuir constants Langmuir constants Langmuir constants Week 12/Turn Using activated char coal			CLO4	04
13	Practical 13: critical micellar concentration	cal 13: critical Week 13/Turn Determination of critical micellar concentration of surfactants		CLO5	04
14	Practical 14: stability constant	Week 14/Turn 1	Turn Determination of stability constant and donor acceptor ratio of PABA-Caffeine complex by solubility method		04
15	Practical 15: Week 15/Turn Determination of stability constant and do acceptor ratio of Cupric-Glycine complex		Determination of stability constant and donor acceptor ratio of Cupric-Glycine complex by pH titration method	CLO5	04
	Total hours				60

Practical Text Book

1. Laboratory Manual of Physical Pharmaceutics, C.V.S. Subramanyam, J. Thimma settee.

Reference Books:

- 1. Physical Pharmacy by Alfred Martin
- 2. Experimental Pharmaceutics by Eugene, Parott.
- 3. Tutorial Pharmacy by Cooper and Gunn.
- 4. Stocklosam J. Pharmaceutical Calculations, Lea & Febiger, Philadelphia.
- 5. Liberman H.A, Lachman C., Pharmaceutical Dosage forms, Tablets, Volume-1 to
- 3, MarcelDekkar Inc.
- 6. Liberman H.A, Lachman C, Pharmaceutical Dosage forms. Disperse systems, volume 1, 2, 3. Marcel Dekkar Inc.
- 7. Physical Pharmaceutics by Ramasamy C and ManavalanR.

- 1. https://www.youtube.com/watch?v=hk2hFaYCHyA&list=PLQnNyE1lxfVI7MOdKtjyJyxotjCwZ5w5y
- 2. https://www.youtube.com/watch?v=a23kVT6yaW0
- 3. https://www.studocu.com/in/document/chitkara-university/physical-pharmacy/med-chem-practicals-notes/61190401

Program: Course Name Pharm Micro		B. Pha	ırm	Semester :	Semester : III		
		- La		Course Co Type	de/ Course	BP307P/Core	
Course 1	Pattern	2023	37	Version		1.0	
Teachin	g Scheme				Ass	sessment Schem	e
Theory	Practical	Tuto rial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/ Oral
9 100	4		2	60	15	35	==
		**	Ale		1	Pharmaceutical M	3.0
\$10.0 Med. Oxford (10.0 Med. Med. Med. Med. Med. Med. Med. Med.				processi 2. To stud and med 3. To performethods 4. To carry microbia 5. To performethods biochem Students wo 1. Explain processi 2. Study the media. 3. Performethods various componed 4. Carry of assay and 5. Performent	ng. y the sterilization lia. orm the sub cult and isolation of y out the various al assay and steri orm the bacteriol cical tests. uld be able to: the different ng. he sterilization of the sub cultur and isolation experimental dents. ut the various exi d sterility testing	experiments related to the periments related t	preparations es, stationing ted to f water and and thereby parations and s, stationing Estimate the the blood/its to microbial

Course Contents/Syllabus (All the Practical's carry equal weightage in Summative Assessment and equal engagement)

Practical Plan

Assignm ent/ Practical / Activity Number	Assignment/Practical/ Activity Title	Week Number/ Turn	Details	CLO	Hou rs
1	Practical 1: Introduction and study of different equipment and processing, of B.O.D. incubator.	Week1/ Turn 1	1.1To study the different equipment and processing, of B.O.D. incubator.	CLO1	04
2.	Practical 2: Introduction and study of different equipment and processing, of laminar flow, and aseptic hood.	Week 2/ Turn 1	2.1 To study the different equipment and processing, of laminar flow, and aseptic hood.	CLO 1	04
3	Practical 3: Introduction and study of different equipment and processing, of autoclave, and hot air sterilizer.	3.1 To study the different equipment and processing, of autoclave, and hot air sterilizer	CLO 1	04	
4	Practical 4: Introduction and study of different equipment and processing, of deep freezer, refrigerator, and microscopes used in experimental microbiology Week 4 / 4.1 To study different equipment and processing, of deep freezer, refrigerator, microscopes used in experimental microbiology			CLO 1	04
5	Practical 5: Sterilization of glassware, preparation and sterilization of media	Week 5/ Turn 1	5.1 To study Sterilization of glassware, preparation and sterilization of media	CLO 2	04
6	Practical 6: Sub culturing of bacteria and fungus. Nutrient stabs and slants preparations.	Week 6 / Turn 1	6.1 To study Sub culturing of bacteria and fungus. Nutrient stabs and slants preparations.	CLO 3	04
7	Practical 7: Staining methods- Simple, Grams staining and acid fast staining.	Week 7 / Turn 1	7.1 To demonstrate the Staining methods- Simple, Grams staining and acid fast staining.	CLO 3	04
8	Practical 8: Isolation of pure culture of micro-organisms by multiple streak plate technique	Week 8 / Turn 1	8.1 To demonstrate the Isolation of pure culture of micro-organisms by multiple streak plate technique	CLO 3	04
9	Practical 9: Isolation of pure culture of micro-organisms by other techniques	Week 9 / Turn 1	9.1 To demonstrate the Isolation of pure culture of micro-organisms by other techniques	CLO 3	04
10	Practical 10: Microbiological assay of antibiotics by cup plate method and other methods	Week 10 / Turn 1	10.1 To demonstrate the Microbiological assay of antibiotics by cup plate method and other methods	CLO 4	04
11	Practical 11: Microbiological assay of antibiotics by other methods	Week 11/ Turn 1	11.1 To demonstrate the Microbiological assay of antibiotics other methods	CLO 4	04
12	Practical 12: Motility determination by Hanging drop method.	Week 12/ Turn 1	12.1 To demonstrate the motility determination by Hanging drop method.	CLO 4	04
13	Practical 13: Sterility testing of pharmaceuticals	Week 13/ Turn 1	13.1 To study Sterility testing of pharmaceuticals	CLO 4	04
14	Practical 14: Bacteriological analysis of water	Week 14/ Turn 1	14.1 To study Bacteriological analysis of water	CLO 5	04
15	Practical 15: Biochemical test	Week 15/ Turn 1	15.1 To study Biochemical test.	CLO 5	04
	Total hours				60

Textbooks:

- 1. Text Book of Microbiology, by Ananthnarayan Orient-Longman, Chennai
- 2. Edward: Fundamentals of Microbiology.
- 3. N.K. Jain: Pharmaceutical Microbiology, Vallabh Prakashan, Delhi

Reference Books:

- 1. W.B. Hugo and A.D. Russel: Pharmaceutical Microbiology, Blackwell Scientific publications, Oxford London.
- 2. Prescott and Dunn, Industrial Microbiology, 4th edition, CBS Publishers & Distributors, Delhi.
- 3. Pelczar, Chan Kreig, Microbiology, Tata McGraw Hill edn.
- 4. Malcolm Harris, Balliere Tindall and Cox: Pharmaceutical Microbiology.
- 5. Rose: Industrial Microbiology.
- 6. Probisher, Hinsdill et al: Fundamentals of Microbiology, 9th ed. Japan
- 7. Cooper and Gunn's: Tutorial Pharmacy, CBS Publisher and Distribution.
- 8. Peppler: Microbial Technology.
- 9. I.P., B.P., U.S.P.- latest editions.

- 1. https://www.slideshare.net/EknathAhire/exp-no-01-study-of-apparatus-used-in-experimental-microbiology
- https://www.slideshare.net/DRxPoojaBhandare/designing-of-aseptic-area-laminar-flow-equipment-study-of-different-source-of-contamination-in-aseptic-area-and-methods-of-prevention-clean-area-classification-pharmaceutical-microbiology-bp303tunitiv-part1
- 3. https://www.slideshare.net/benazeerfathaima/preparation-of-media-sterilization-technique
- 4. https://www.rlsycollegebettiah.ac.in/wp-content/uploads/2023/02/file_63ec78c09cd16.pdf
- 5. https://www.slideshare.net/monnask/microbiological-assay-of-antibiotics
- 6. https://www.slideshare.net/ARUNGOPALAKRISHNAN18/sterility-testing-of-pharmaceutical-products

Name of the Program: Course Name		B. PHARM Pharmaceutical Engineering (Practical)		Semester: III Course Code/ Course Type		Level: UG BP308P/Core		
Teaching S	cheme	10 Oc				Assessment Scheme		
Theory P	ractical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral	
	4		4	60	15	35	-	
4 4 Pre-Requisite: Course Objectives (CO): Course Learning Outcomes (CLO):				 The objectives for Pharmaceutical Engineering are To impart a fundamental knowledge of science for various unit operations used in pharmaceutical industry. To perform various process in manufacturing process To illustrate the construction material used to build various machineries To explain the principles of size reduction, size separation in unit operations To comprehend the functioning of equipment used in manufacturing process of pharmaceuticals Students would be able to To comprehend the material handling techniques. To perform various process involved in pharmaceutical manufacturing processes To study the construction material of pharmaceutical industry To evaluate size reduction using different of tablet granulation by different techniques. To demonstrate colloid mill, planetary mixer, fluidized bed dryer, freeze dryer and factor affecting pharmaceutical processes 				

Course Contents/Syllabus:

(All the units carry equal weightage in Summative Assessment and equal engagement)

Practical Plan

Assignment/ Practical/ Activity Number	Assignment/ Practical/ Activity Title	Week Number/ Turn	Details	CLO	Hours
1	Practical 1: Radiation constant	ation Turn1		CLO1	04
2.	Practical 2: Radiation constant	Week2/ Turn1	Determination of radiation constant of unpainted and painted glass.	CLO1	04
3.	Practical 3: Steam distillation	Week3/ Turn1	Steam distillation – To calculate the efficiency of steam distillation	CLO2	04
4	Practical 4: Heat transfer	Week 4/ Turn1	To determine the overall heat transfer coefficient by heat exchanger	CLO2	04
5	Practical 5: Drying curves	Week5/ Turn1	Construction of drying curves (for calcium carbonate and starch).	CLO2	04
6	Practical 6: Moisture content	Week 6/ Turn1	Determination of moisture content and loss on drying	CLO2	04
7	Practical 7: Humidity of air	Week 7/ Turn1	Determination of humidity of air – i) From wet and dry bulb temperatures –use of Dew point method.	CLO3	04
8	Practical 8: Construction working	Week8/ Turn1	Description of Construction working and application of Pharmaceutical Machinery such as rotary tablet machine, fluidized bed coater, fluid energy mill, dehumidifier.	CLO3	04
9	Practical 9: Size analysis	Week 9/ Turn1	Size analysis by sieving – To evaluate size distribution of tablet granulations – Construction of various size frequency curves including arithmetic and logarithmic probability plots	CLO4	04
10	Practical 10: Size reduction	Week10/ Turn1	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.	CLO4	04
11	Practical 11: Demonstration	Week11/ Turn1	Demonstration of colloid mill, planetary mixer, fluidized bed dryer, freeze dryer and such other major equipment.	CLO4	04
12	Practical 12: Filtration and Evaporation	Week12/ Turn1	Factors affecting Rate of Filtration and Evaporation (Surface area, Concentration and Thickness/ viscosity	CLO4	04
13	Practical 13: Crystallization	Week 13/ Turn1	To study the effect of time on the Rate of Crystallization	CLO5	04
14	Practical 14: Uniformity Index	Week 14/ Turn1	To calculate the uniformity Index for given sample (Paracetamol) by using Double Cone Blender.	CLO5	04
15	Practical 15: Uniformity Index	Week 15/ Turn1	To calculate the uniformity Index for given sample (Aceclofenac) by using Double Cone Blender.	CLO5	04
	Total hours	-		(##4)	60

Practical Text Book:

- 1. Theory and practice of industrial pharmacy by Lachmann, Latest edition.
- 2. Dr. Vishwajeet Ghorpade, Dr. Remeth J. Dias, Dr. Kailas K. Mali, Vijay D. Havaldar, Laboratory manual of Pharmaceutical Engineering, Trinity publishing house, Satara
- 3. Cooper and Gunn's Tutorial pharmacy, S.J. Carter, Latest edition.

Reference Books:

- 1. Remington practice of pharmacy- Martin, Latest edition.
- 2. Theory and practice of industrial pharmacy by Lachmann., Latest edition.
- 3. Unit operation of chemical engineering Mcabe Smith, Latest edition.

- 1. https://www.researchgate.net/publication/375000374 Laboratory Manual of Pharmaceutical Engineering
- 2. https://www.scribd.com/document/643690149/Pharmacutical-Engineering-Practical-lab-Mannual-kT-docx
- 3. https://content.kopykitab.com/ebooks/2014/07/3495/sample/sample 3495.pdf

Name of the Program: Course Name UHV-II: Understanding Harmony			Semester:	Ш	Level: UG		
				Course Co Type	Course Code/ Course Type		ACUHV201/AC
	Course Pattern 2023 Feaching Scheme				T.	1.0	
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Theory	Practical Tutorial Total Credits		Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/ Oral	
2 Pre-Req	144	1,		30	50	- 1	
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(All the units carry equal weightage in Summative Assessment and equal engagement)

UNIT I Course Introduction - Need, Basic Guidelines, Content and Process for Value Education Purpose and motivation for the course, recapitulation from Universal Human Values-I, Self-Exploration—what is it? - Its content and process; Personality Traits- Self Excellence, "Natural Acceptance" and Experiential Validation—as the process for self-exploration, Adaptability, Belief and Understanding—Self-discipline, Continuous Happiness and Prosperity—A look at basic Human Aspirations, Right understanding, Relationship and Physical Facility—the basic requirements for fulfilment of aspirations of every human being with their correct priority, Understanding Happiness and Prosperity correctly—A critical appraisal of the current scenario, Method to fulfil the above human aspirations: understanding and living in harmony at various levels. UNIT II Understanding Harmony in the Human Being—Harmony in Myself Understanding human being as a co-existence of the sentient "I" and the material "Body", Understanding the needs of Self ("I") and "Body"—happiness and physical facility, Understanding the Body as an instrument of "If" (I being the doer, seer and enjoyer)—Habits and Hobbies, SWOT Analysis (Activity), "Understanding the characteristics and activities of "I" and harmony in "I"—Dalai Lamas" Tibetan Personality Test—Dr. Menninger"s Psychometric Test., Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail UNIT III Understanding Harmony in the Family and Society—Harmony in Human-Human Relationship Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship, Understanding the meaning of Trust; Difference between intention and competence, Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship, Friends and Foe	08
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UNIT IV Understanding Harmony in the Nature and Existence, Whole existence as CLO 4	0.5
Understanding Harmony in the Nature and Existence - Whole existence as CLO 4 Coexistence	05
Understanding the harmony in the Nature and its Equanimity, Respect for all,	
Nature as Teacher, Interconnectedness and mutual fulfillment among the four	
orders of nature- recyclability and self-regulation in nature, Understanding	
Existence as Co-existence of mutually interacting units in all- pervasive space,	
Holistic perception of harmony at all levels of existence.	
UNIT V	

Implications of the above Holistic Understanding of Harmony on	CLO 5	07
Professional Ethics		
Natural acceptance of human values, Definitiveness of Ethical Human		
Conduct, Basis for Humanistic Education, Humanistic Constitution and		
Humanistic Universal Order, Vision for the Holistic alternatives, UHVs for		
entrepreneurship		
Total Hours		30

Textbooks:

- 1. _Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi, 2010
- 2. Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
- 3. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.

Reference Books:

- 1. The Story of Stuff (Book).
- 2. The Story of My Experiments with Truth by Mohandas Karamchand Gandhi
- 3. Small is Beautiful E. F Schumacher
- 4. Slow is Beautiful Cecile Andrews

Online Resources/E-Learning Resources

- https://www.studocu.com/in/document/jss-science-and-technology-university/human-values/uhv-handout-2- harmony-in-the-human-being/
- 2. https://vvce.ac.in/wp-content/uploads/2021/04/Realising-Aspirations-of-NEP2020-UHV.pdf
- 3. https://vemu.org/uploads/lecture notes/22 12 2022 1850871704.pdf

CIA Guidelines

Online Quiz (Based on MCQ)- 20 marks

Activity (with short Report Submission) - 20 Marks

Academic Sincerity - 10 marks

Few of suggested activities are Assignments, Debates, Poster presentations, Model making, Group presentation, Field visits and Group Discussions.

Few of suggested topics related to UHVII-Understand Harmony are:

Debate Topics

- Materialistic things make you happy
- Happiness in individualism and family
- Spirituality vs Materialistic
- Satisfaction of Body and self (Soul)

Assignment

Students maintain a reflective account of the times they felt happy and prosperous and the causes of that happiness and prosperity for them.

Name of the Program: Course Name Foreign Language-II (German)		60	Semester : III		Level: UG		
			Course Co Type	de/ Course	UFL202A/AEC		
Course Pattern 2023			Version		1.0		
Teaching Scheme			<u> </u>			sessment Schem	
Theory	ory Practical Tutorial Total Credits			Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/ Oral
2	-	_	<u></u>	2	20	30	(<u>-</u>
Pre-Requisite: Course Objectives (CO): Course Learning Outcomes (CLO):			 To get 2. To und Can co. To be a about f. To desc Students w. Comm. Able to convers Transla German Construbasic Interpretation 	along with a baserstand German mmunicate in ro- able to have a dir- amiliar matters. cribe own surrou- ould be able to: unicate in the ar- oframe simple se- sation. It e simple senter in language and va- ict a dialogue, in uman interaction art in an interact	day to day cultur butine situations. rect exchange of i undings. eas of immediate entences in forma	importance. to the guage, for ext.	

(All the units carry equal weightage in Summative Assessment and equal engagement)

Descriptors/Topics	CLO	Hours
UNIT I		
Kontakte Letter writing and understanding, discussion about language learning, find information from texts, understand conversations on various topics, texts related to office life	CLO 1	05
Grammar – Usage of Articles and Prepositions UNIT II	,	
Meine Wohnung Understand home advertisements, describe house, how to reply invitations, how to express 'likes and dislikes', speak about different forms of living, how to write a text on house Grammar – Adjectives	CLO 2	05
UNIT III		
Alles Arbeit? Talk about daily routine, talk about past, understand job advertisements, understand blogs on jobs, express opinions about jobs, prepare telephonic dialogues, speak about jobs Grammar – Past tense, Sentence connectors	CLO3	05
UNIT IV		
Kleidung und Mode Speak about cloths and shopping, lead a discussion during cloths shopping, discussion in departmental store, understand and research information about Berlin, Grammar — Seprable and non seprable verbs	CLO4	05
UNIT V		
Gesund und munter & Ab in den Urlaub Learn body parts, Health related dialogue, City orientation, Travel reports, discussion regarding different travel destinations and weather Grammar – Imperative, Time adverbs	CLO5	05
Total Hours		30

Learning resources

Textbooks:

- 1. Netzwerk A1, Ernst klett Verlag & Goyal Publishers & Distributors Pvt. Ltd.
- 2. Studio d A1, Cornelesen Verlag & Goyal Publishers & Distributors Pvt. Ltd.
- 3. Netzwerk Neu A1, Ernst klett Verlag & Goyal Publishers & Distributors Pvt. Ltd

Reference Books:

- 1. Hallo Deutsch A1, Ernst Klett Verlag, Goyal Publishers & Distributors Pvt. Ltd
- 2. Themen Aktuell 1, Hueber verlag
- 3. Maximal Ernst klett Verlag & Goyal Publishers & Distributors Pvt. Ltd.

- 1. https://youtube.com/@LearnGermanwithAnja?si=BkJYDPi7TS0fT4lr
- 2. https://youtube.com/@deutschlernenmitheidi?si=TkICIabzioaU0roZ
- 3. instagram.com/learngermanwithanja

Name of the B. P Program:		B. Pham		Semester	Ш	Level: UG/PG	
Course Name		Foreign Language-II (Japanese)		Course Code/Course Type		UFL202B/AEC	
Course l	Pattern	2023		Version			
Teachin	Teaching Scheme				As	sessment Schem	e
Theory	Total Control of the			Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/ Oral
2	0.242	322	(2222)	30	50	- 412	
Pre-Requisite: Desire to get acquainted wit Katakana. Course Objectives (CO):			The objectives of Foreign Language-II (Japanese) are: 1. To meet the needs of ever growing industry, wit respect to language support. 2. To get introduced to Japanese society and cultur through language.				
Course Learning Outcomes (CLO):			After learning the course, the students will be able to: 1. Katakana Script / Kanji 2. Minna no Nihongo lesson no. 1, 2 & 3 3. Minna no Nihongo lesson no. 4 4. Listen and speak basic conversation with basic particles 5. Speak and write about Routine				

(All the units carry equal weightage in Summative Assessment and equal engagement)

Descriptors/Topics	CLO	Hours
UNIT I		
Katakana Script	CLO 1	8
Katakana Script / Writing Kanji		
UNIT II		
System of demonstrative words:	CLO 2	6
Minna no Nihongo lesson no. 1,2 & 3		
UNIT III		
Minna na Nihanga laggan na 4	CLO 3	8
Minna no Nihongo lesson no. 4 (Write and Speak basic sentences in correct tenses)	CLO3	0
(write and speak basic sentences in correct tenses)		
UNIT IV		
Reading : Basic conversation using particles	CLO 4	4
Listening : conversation related to particles		
Speaking: Sentences about give, lend, teach, receive		
UNIT V		
Tenses:	CLO 5	4
Writing: Affirmative present, past & future		
Negative present ,past,& future sentences		
Writing : About Routine		
Total Hours		30

Learning resources

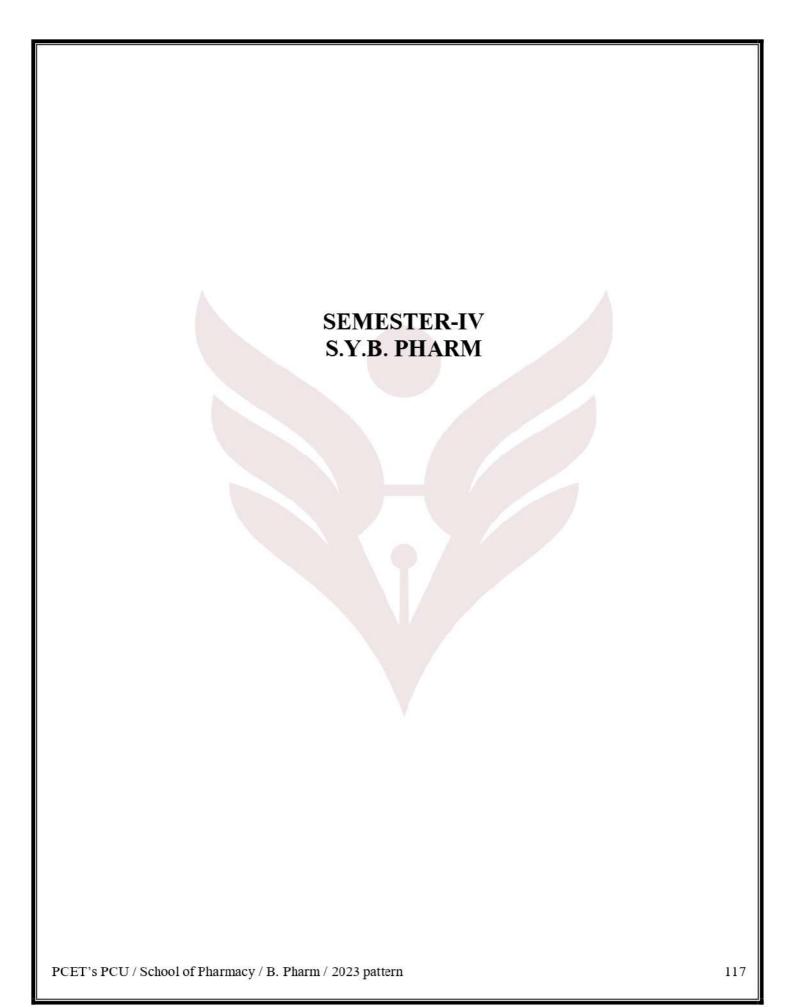
Textbooks:

1. Minna no Nihongo, "Japanese for everyone", Elementary Main Textbook, Goyal Publishers & Distributors Pvt. Ltd.

Reference books:

1. Shyoho Volume 1

- 1. https://youtu.be/1JephUxTHxg?si=ouCwTXZc fYgY9Kh
- 2. https://youtu.be/9EfbkBkF2ag?si=rLNzc55 REacMoGu
- 3. https://youtu.be/DpEolYasgyg?si=dya9ue-YMSHO3VOG
- 4. https://youtu.be/itccOS1_LSk?si=hvPqILKlviuncMvA



Name of the Program:	B. Pharm	L	Semester:	IV	Level: UG	: UG	
Course Name	Pharmaceutical Organic Chemistry-III (Theory)		Course Co Type	de/ Course	BP401T/Core	,	
Course Pattern	2023		Version		1.0		
Teaching Scheme		£7/		A	ssessment Sch	eme	
Theory Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral	
3	1	4	45	25	75	-	
Pre-Requisite:			1				
Course Learning Out	comes (CL	O):	compour 2. To under geometr 3. To under of heter 4. To knot heterocy 5. To find of organ Students w 1. Determinand to co 2. Clarify reaction 3. Solve translysing heterocy with the control of the contro	ands and stereocerstand the theorerical isomerism erstand the methocyclic compounds with emechanism compounds. The mechanism compounds ould be able to: ne stereochemical emonstrate steres the concept of its. The nomenclaturing chemical structure of he size heterocyclic loying name read other application.	chemical reaction by of cycloalkane of organic completes of preparations. It uses and others of important characteristic and aspects of organical aspects of organical reacted stereospecific and the compounds of the compounds by octions and appraisons of heterocycloalkane of heterocyclos of heterocyclo	es and explain the ounds. On and properties or applications of nemical reactions danic compounds tions. It is compounded to the compounds by versa to classify hysical properties ounds. It ifferent methods ise the medicinal	

(All the units carry equal weightage in Summative Assessment and equal engagement)

Descriptors/Topics	CLO	Hours
UNIT I		
Stereo isomerism Optical isomerism-Optical activity, enantiomerism, diastereoisomerism, meso compounds. Elements of symmetry, chiral and achiral molecules, DL system of nomenclature of optical isomers, sequence rules, RS system of nomenclature of optical isomers. Reactions of chiral molecules, Racemic modification and resolution of racemic mixture. Asymmetric synthesis: partial and absolute.	CLO 1	10
UNIT II	CT C 4	
Geometrical isomerism Nomenclature of geometrical isomers (Cis Trans, EZ, Syn Anti systems) Methods of determination of configuration of geometrical isomers. Conformational isomerism in Ethane, n-Butane and Cyclohexane. Stereoisomerism in biphenyl compounds (Atropisomerism) and conditions for optical activity. Stereospecific and stereoselective reactions	CLO 2	10
UNIT III		
Heterocyclic compounds Nomenclature and classification. Synthesis, reactions and medicinal uses of following compounds/derivatives Pyrrole, Furan, and Thiophene. Relative aromaticity and reactivity of Pyrrole, Furan and Thiophene	CLO 3	10
UNIT IV		
Synthesis, reactions and medicinal uses of following compounds/ derivatives Pyrazole, Imidazole, Oxazole and Thiazole, Pyridine, Basicity of pyridine, Quinoline, Isoquinoline, Acridine and Indole. Synthesis and medicinal uses of Pyrimidine, Purine, azepines and their derivatives	CLO 4	08
UNIT V		
Reactions of synthetic importance Metal hydride reduction (NaBH4 and LiAlH4), Clemmensons reduction, Birch reduction, Wolff Kishner reduction, Oppenauer-oxidation and Dakin reaction, Beckmann's rearrangement and Schmidt rearrangement, Claisen-Schmidt condensation	CLO 5	07
Total Hours		45

^{*} The total 15 tutorials should be conducted as per the format mentioned above

Learning resources

Textbooks:

- 1. A textbook of Organic Chemistry by Arun Bahl, B.S. Bahl.
- 2. A Textbook of Pharmaceutical Organic Chemistry-III by Mayuresh Raut, Prashik Dudhe, Everest Publishing House, Pune.
- 3. Pharmaceutical Organic Chemistry-III by Mayuresh Raut, Everest Publishing House, Pune.
- 4. Pharmaceutical Organic Chemistry-IV by Mayuresh Raut, Everest Publishing House, Pune.

Reference Books:

- 1. Organic chemistry by I.L. Finar, Volume-I & II.
- 2. Heterocyclic Chemistry by Raj K. Bansal
- 3. Organic Chemistry by Morrison and Boyd
- 4. Heterocyclic Chemistry by T.L. Gilchrist

- 1. Schmidt rearrangement: https://youtu.be/AeBoyy1X6vU
- 2. Beckmann rearrangement: https://youtu.be/y2y_gikj3U8
- 3. Hoffmann rearrangement: https://youtu.be/-02EKjiEdkc
- 4. Pinacol-pinacolon rearrangement: https://youtu.be/SZXPd2sK9Ms
- 5. Benzil-Benzilic acid rearrangement: https://youtu.be/ALs8ECOW95k
- 6. Birch reduction: https://youtu.be/YIdjlN Z1RQ
- 7. Claisen condensation: https://youtu.be/2Kkr6pgm3tw
- 8. Bayer Villiger Oxidation: https://youtu.be/BkMQ8nP8PCc
- 9. Dakin Oxidation: https://youtu.be/nRpU_e6-sG8
- 10. Resolution of racemic mixture: https://youtu.be/eM-ZrJwxIDc

Name of the	B. PHAR	M	Semester :	IV	Level: UG	
Program: Course Name	Medicina Chemistr (Theory)		Course Co Type	ode/ Course	BP402T/Core	
Course Pattern	2023		Version		1.0	
Teaching Scheme	(1)			A	Assessment Sche	me
Theory Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/ Oral
3	1	4	45	25	75	
Pre-Requisite: Course Objectives (Course Learning Out		O):	1. To recepharma 2. To receand the 3. To identified differe 4. To periodrugs 5. To struction Students w 1. Identified biolog 2. Explaint with mean value of 3. Apply includi 4. Perform System and and 5. Evalua	all the chemis acological activity ognize drug me erapeutic value of attify the Structural of the writing and Structural ogical /therapeutical action. In drugs acting of drugs acting of drugs. SAR of different parasympathm the study of a consisting of sticonvulsants. The general anaest actions action of the study of a consisting of sticonvulsants.	etabolic pathways of drugs. ral Activity Relati of the chemical s influences on p	in respect to their s, adverse effect sionship (SAR) of synthesis of some pharmacologic / in relation to linear to the system t and therapeutic neurotransmitters colinolytics. Central Nervous s, antipsychotics and non-narcotic

(All the units carry equal weightage in Summative Assessment and equal engagement)

Introduction to Medicinal Chemistry History and development of medicinal chemistry Physicochemical properties in relation to biological action Ionization, Solubility, Partition Coefficient, Hydrogen bonding, Protein binding, Chelation, Bioisosterism, Optical and Geometrical isomerism. Drug metabolism Drug metabolism Drug metabolism principles- Phase I and Phase II. Factors affecting drug metabolism including stereo chemical aspects. UNIT II Drugs acting on Autonomic Nervous System Adrenergic Neurotransmitters Biosynthesis and catabolism of catecholamine. Adrenergic receptors (Alpha & Beta) and their distribution. Sympathomimetic agents: SAR of Sympathomimetic agents Direct acting: Nor-epinephrine, Epinephrine, Phenylephrine*, Dopamine, Methyldopa, Clonidine, Dobutamine, Isoproterenol, Terbutaline, Salbutamol*, Bitolterol, Naphazoline, Oxymetazoline and Xylometazoline. Indirect acting agents: Hydroxyamphetamine, Pseudoephedrine, Propylhexedrine. Agents with mixed mechanism: Ephedrine, Metaraminol. Adrenergic Antagonists Alpha adrenergic blockers: Tolazoline*, Phentolamine, Phenoxybenzamine, Prazosin, Dihydroergotamine, Methysergide. Beta adrenergic blockers: SAR of beta blockers, Propranolol*, Metibranolol, Atenolol, Betazolol, Bisoprolol, Esmolol, Metoprolol, Labetolol, Carvedilol. UNIT III Cholinergic neurotransmitters Biosynthesis and catabolism of acetylcholine. Cholinergic receptors (Muscarinic & Nicotinic) and their distribution. Parasympathomimetic agents: SAR of Parasympathomimetic agents Direct acting agents: Acetylcholine, Carbachol*, Bethanechol, Methacholine, Pilocarpine. Indirect acting/ Cholinesterase inhibitors (Reversible & Irreversible): Physostigmine, Neostigmine*, Pyridostigmine, Edrophonium chloride, Tacrine hydrochloride, Ambenonium chloride, Isofluorphate, Echothiophate iodide, Parathione, Malathion. Cholinesterase reactivator: Pralidoxime chloride. Cholinergic Blocking agents: SAR of cholinolytic agents Solanaceous alkaloids and analogues: Atropine sulphate, Hyoscyamine sulphate, S	Descriptors/Topics"	CLO	Hours
History and development of medicinal chemistry Physicochemical properties in relation to biological action Ionization, Solubility, Partition Coefficient, Hydrogen bonding, Protein binding, Chelation, Bioisosterism, Optical and Geometrical isomerism. Drug metabolism Drug metabolism principles- Phase I and Phase II. Factors affecting drug metabolism including stereo chemical aspects. UNIT II Drugs acting on Autonomic Nervous System Adrenergic Neurotransmitters Biosynthesis and catabolism of catecholamine. Adrenergic receptors (Alpha & Beta) and their distribution. Sympathomimetic agents: SAR of Sympathomimetic agents Direct acting: Nor-epinephrine, Epinephrine, Phenylephrine*, Dopamine, Methyldopa, Clonidine, Dobutamine, Isoproterenol, Terbutaline, Salbutamol*, Bitolterol, Naphazoline, Oxymetazoline and Xylometazoline. Indirect acting agents: Hydroxyamphetamine, Pseudoephedrine, Propylhexedrine. Agents with mixed mechanism: Ephedrine, Metaraminol. Adrenergic Antagonista Alpha adrenergic blockers: Tolazoline*, Phentolamine, Phenoxybenzamine, Prazosin, Dihydroergotamine, Methysergide. Beta adrenergic blockers: SAR of beta blockers, Propranolol*, Metibranolol, Atenolol, Betazolol, Bisoprolol, Esmolol, Metoprolol, Labetolol, Carvedilol. UNIT III Cholinergic neurotransmitters Biosynthesis and catabolism of acetylcholine. Cholinergic receptors (Muscarinic & Nicotinic) and their distribution. Parasympathomimetic agents: SAR of Parasympathomimetic agents Direct acting / Cholinesterase inhibitors (Reversible & Irreversible): Physostigmine, Neostigmine*, Pyridostigmine, Edrophonium chloride, Tacrine hydrochloride, Ambenonium chloride, Isofluorphate, Echothiophate iodide, Parathione, Malathion. Cholinergic Blocking agents: SAR of cholinolytic agents Solanaccous alkalolds and analogues: Atropine sulphate, Hyoscyamine sulphate, Scopolamine hydrobromide, Homatropine hydrobromide, Ipratropium bromide*. Synthetic cholinergic blocking agents: Tropicamide, Cyclopeatolate hydrochloride, Clidinium bromide, Dicyclomine	UNIT I		
Physicochemical properties in relation to biological action Ionization, Solubility, Partition Coefficient, Hydrogen bonding, Protein binding, Chelation, Bioisosterism, Optical and Geometrical isomerism. Drug metabolism principles- Phase I and Phase II. Factors affecting drug metabolism including stereo chemical aspects. UNIT II Drugs acting on Autonomic Nervous System Adrenergic Neurotransmitters Biosynthesis and catabolism of catecholamine. Adrenergic receptors (Alpha & Beta) and their distribution. Sympathomimetic agents: SAR of Sympathomimetic agents Direct acting; Nor-epinephrine, Epinephrine, Phenylephrine*, Dopamine, Methyldopa, Clonidine, Dobutamine, Isoproterenol, Terbutaline, Salbutamol*, Bitolterol, Naphazoline, Oxymetazoline and Xylometazoline. Indirect acting agents: Hydroxyamphetamine, Pseudoephedrine, Propylhexedrine. Agents with mixed mechanism: Ephedrine, Metaraminol. Adrenergic Antagonists Alpha adrenergic blockers: Tolazoline*, Phentolamine, Phenoxybenzamine, Prazosin, Dihydroergotamine, Methysergide. Beta adrenergic blockers: SAR of beta blockers, Propranolol*, Metibranolol, Atenolol, Betazolol, Bisoprolol, Esmolol, Metoprolol, Labetolol, Carvedilol. UNIT III Cholinergic neurotransmitters Biosynthesis and catabolism of acetylcholine. Cholinergic receptors (Muscarinic & Nicotinic) and their distribution. Parasympathomimetic agents: SAR of Parasympathomimetic agents Direct acting agents: Acetylcholine, Carbachol*, Bethanechol, Methacholine, Pilocarpine. Indirect acting/ Cholinesterase inhibitors (Reversible & Irreversible): Physostigmine, Neostigmine*, Pyridostigmine, Edrophonium chloride, Tacrine hydrochloride, Ambenonium chloride, Isofluorphate, Echothiophate iodide, Parasthione, Malathion. Cholinergic Blocking agents: SAR of cholinolytic agents Solanaccous alkaloids and analogues: Atropine sulphate, Hyoscyamine sulphate, Scopolamine hydrobromide, Homatropine hydrobromide, Ipratropium bromide*. Synthetic cholinergic blocking agents: Tropicamide, Cyclopentolate hydrochloride, Clidin	Introduction to Medicinal Chemistry	CLO1	10
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Tropicamide, Cyclopentolate hydrochloride, Clidinium bromide, Dicyclomine			
hydrochloride* Glyconyrrolate Methantheline bromide Propantheline bromide	hydrochloride*, Glycopyrrolate, Methantheline bromide, Propantheline bromide,		

Procyclidine hydrochloride*, Tridihexethyl chloride, Isopropamide iodide, Ethopropazine hydrochloride.		
UNIT IV		
Drugs acting on Central Nervous System	CLO4	08
A. Sedatives and Hypnotics:		
Benzodiazepines		
SAR of Benzodiazepines, Chlordiazepoxide, Diazepam*, Oxazepam,		
Chlorazepate, Lorazepam, Alprazolam, Zolpidem		
Barbiturtes		
SAR of barbiturates, Barbital*, Phenobarbital, Mephobarbital, Amobarbital,		
Butabarbital, Pentobarbital, Secobarbital		
Miscelleneous		
Amides & imides: Glutethmide. Alcohol & their carbamate derivatives:		
Meprobomate, Ethchlorvynol. Aldehyde & their derivatives: Triclofos sodium,		
Paraldehyde.	A	
B. Antipsychotics		
Phenothiazeines		
SAR of Phenothiazeines - Promazine hydrochloride, Chlorpromazine		
hydrochloride*, Triflupromazine, Thioridazine hydrochloride, Piperacetazine	1	
hydrochloride, Prochlorperazine maleate, Trifluoperazine hydrochloride.		
Ring Analogues of Phenothiazeines		
Chlorprothixene, Thiothixene, Loxapine succinate, Clozapine.	1	
Fluro buterophenones		
Haloperidol, Droperidol, Risperidone.	/	
Beta amino ketones		
Molindone hydrochloride.		
Benzamides		
Sulpieride.		
C. Anticonvulsants: SAR of Anticonvulsants, mechanism of anticonvulsant		
action		
Barbiturates: Phenobarbitone, Methabarbital. Hydantoins: Phenytoin*,		
Mephenytoin, Ethotoin Oxazolidine diones: Trimethadione, Paramethadione		
Succinimides: Phensuximide, Methsuximide, Ethosuximide* Urea and		
monoacylureas: Phenacemide, Carbamazepine* Benzodiazepines: Clonazepam		
Miscellaneous: Primidone, Valproic acid, Gabapentin, Felbamate		
UNIT V		
Drugs acting on Central Nervous System	CLO5	07
General anesthetics:	CLOC	٠.
Inhalation anesthetics		
Halothane*, Methoxyflurane, Enflurane, Sevoflurane, Isoflurane, Desflurane.		
Ultra-short acting barbitutrates		
Methohexital sodium*, Thiamylal sodium, Thiopental sodium.		
Dissociative anaesthetics: Ketamine hydrochloride.*		
Narcotic and non-narcotic analgesics		
Morphine and related drugs		
SAR of Morphine analogues, Morphine sulphate, Codeine, Meperidine		
hydrochloride, Anilerdine hydrochloride, Diphenoxylate hydrochloride,		
Loperamide hydrochloride, Fentanyl citrate*, Methadone ydrochloride*,		
Propoxyphene hydrochloride, Pentazocine, Levorphanol tartarate.		
Narcotic antagonists		
Nalorphine hydrochloride, Levallorphan tartarate, Naloxone hydrochloride.		
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Anti-inflammatory agents		

Sulindac, Tolmetin, Zomepriac, Diclofenac, Ketorolac, Ibuprofen*, Naproxen,	
Piroxicam, Phenacetin, Acetaminophen, Antipyrine, Phenylbutazone.	
Total Hours	45

^{*} The total 15 tutorials should be conducted as per the format mentioned above

Textbooks:

- 1. Introduction to principles of drug design-Smith and Williams.
- 2. Organic Chemistry by I.L. Finar, Vol. II.
- 3. The Organic Chemistry of Drug Synthesis by Lednicer, Vol. 1-5.
- 4. Text book of practical organic chemistry- A. I. Vogel

Reference Books:

- 1. 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.
- 4. Remington's Pharmaceutical Sciences.
- 5. Martindale's extra pharmacopoeia.
- 6. Indian Pharmacopoeia.
- 7. Thomas L. Lemke, David A. Williams, Victoria F. Roche, S. William Zito, Foye's Principles of Medicinal Chemistry, 7th Ed., Lippincott Williams & Wilkins, 2012 (30 copies in the library).
- 8. Graham L. Patrick, "An Introduction to Medicinal Chemistry", 5th Ed. Oxford University Press 2013

- https://uogqueensmcf.com/wpcontent/uploads/2020/BA%20Modules//Pharmacy/Year%20II%20(semester%202)/Medicinal%20Chemistry%20I/Reference%20books/An%20Introduction%20to%20Medicinal%20Chemistry%205th%20ed%20-%20Graham%20L.%20Patrick%20(OUP,%202013).pdf
- 2. https://utkaluniversity.ac.in/wp-content/uploads/2023/03/Unit-I Intro Med-Chem-Drug-Metabolism.pdf
- 3. https://basu.org.in/wp-content/uploads/2020/04/Drugs acting on ANS .pdf
- 4. https://jiwaji.edu/pdf/ecourse/pharmaceutical/Cholinergic%20neurotransmitters.pdf
- https://utkaluniversity.ac.in/wp-content/uploads/2023/03/Unit-V Drugs-acting-on-Central-Nervous-System.pdf
- 6. https://basu.org.in/wp-content/uploads/2020/07/Unit III Drugs acting on CNS .pdf
- 7. https://www.jiwaji.edu/pdf/ecourse/pharmaceutical/NON-NARCOTIC%20ANALGESICS.pdf
- 8. https://www.jiwaji.edu/pdf/ecourse/pharmaceutical/Narcotic%20Agents.pdf

Name Progran	Name of the B. PHARM Program:		Semester:	IV	Level: UG		
Course I	Name	Physical Pharmaceutics II– (Theory)		Course Code/ Course Type		BP403T/Core	
Course 1		2023		Version		1.0	
1.1111111111111111111111111111111111111	ching Scheme Assessment Scheme						
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral
3	(222)	1	4	45	25	75) <u>(1.20</u> 2)
Pre-Req	uisite:						7
	Objectives (C			Underst molecul Know to for stab. determined to Demonstrate formula	es in the designing the principles of ility testing. The expiry date of the expiry date of the expiry date of the expiry date.	rsicochemical p ng the dosage for chemical kineti f formulations sysicochemical nt.	roperties of drug
Course I	earning Out	comes (CL)	0):	Categor properti Interpre the phys Formula rheolog Describ properti optimize	es and application the rheological sics of tablet contact and evaluate ical and electroke, analyze and es of particle are the flow of power the principles of the principles of the table to the table to the table to the table tab	ed systems and one of colloidal of behaviour of fluoression coarse dispersion inetic properties distinguish and develop an ovders.	d understand the dispersions. uids and illustrate ons making use of

Descriptors/Topics	CLO	Hours
UNIT I		
Colloidal dispersions Classification of dispersed systems & their general characteristics, size & shapes of colloidal particles, classification of colloids & comparative account of their general properties. Optical, kinetic & electrical properties. Effect of electrolytes, coacervation, peptization& protective action.	CLO 1	05
UNIT II		77.116.27
Rheology Newtonian systems, law of flow, kinematic viscosity, effect of temperature, non-Newtonian systems, pseudoplastic, dilatant, plastic, thixotropy, thixotropy in formulation, determination of viscosity, capillary, falling Sphere, rotational viscometers Deformation of solids Plastic and elastic deformation, Heckel equation, Stress, Strain, Elastic Modulus	CLO 2	10
UNIT III		
Coarse dispersion Suspension, interfacial properties of suspended particles, settling in suspensions, formulation of flocculated and deflocculated suspensions. Emulsions and theories of emulsification, microemulsion and multiple emulsions; Stability of emulsions, preservation of emulsions, rheological properties of emulsions and emulsion formulation by HLB method	CLO 3	10
UNIT IV		
Micromeretics Particle size and distribution, mean particle size, number and weight distribution, particle number, methods for determining particle size by different methods, counting and separation method, particle shape, specific surface, methods for determining surface area, permeability, adsorption, derived properties of powders, porosity, packing arrangement, densities, bulkiness & flow properties	CLO 4	10
UNIT V		
Drug stability Reaction kinetics: zero, pseudo-zero, first & second order, units of basic rate constants, determination of reaction order. Physical and chemical factors influencing the chemical degradation of pharmaceutical product: temperature, solvent, ionic strength, dielectric constant, specific & general acid base catalysis, Simple numerical problems. Stabilization of medicinal agents against common reactions like hydrolysis & oxidation. Accelerated stability testing in expiration dating of pharmaceutical dosage forms. Photolytic degradation and its prevention	CLO 5	10
Total Hours		45

^{*} The total 15 tutorials should be conducted as per the format mentioned above

Textbooks:

- 1. Test book of Physical Phramacy, by Gaurav Jain & Roop K. Khar
- 2. Physical Pharmaceutics by C.V.S. Subramanyam

Reference Books:

- 1. Physical Pharmacy by Alfred Martin
- 2. Experimental Pharmaceutics by Eugene, Parott.
- 3. Tutorial Pharmacy by Cooper and Gunn.
- 4. Stocklosam J. Pharmaceutical Calculations, Lea & Febiger, Philadelphia.
- 5. Liberman H.A, Lachman C., Pharmaceutical Dosage forms, Tablets, Volume-1 to 3, MarcelDekkar Inc.
- 6. Liberman H.A, Lachman C, Pharmaceutical Dosage forms. Disperse systems, volume 1, 2, 3. Marcel Dekkar Inc.
- 7. Physical Pharmaceutics by Ramasamy C and ManavalanR.

- 1. https://www.carewellpharma.in/bpharmacy/notes/4th-sem/physical-pharmaceutics-2
- https://www.copbela.org/downloads/2020/SELF%20LEARNING%20MATERIAL%20BPHARMA/semester%204/BP403T/MOD ULE%2002.pdf
- 3. https://copbela.org/downloads/2020/SELF%20LEARNING%20MATERIAL%20BPHARMA/semester%204/BP403T/MODULE%2004.pdf

Name of Program		B. PHAR	M	Semester :	Semester : IV				
Course I	Name	Pharmacology-I		Course Code/ Course		BP404T			
		(Theory)		Type	Type				
Course 1	Pattern	2023		Version		1.0			
Teaching	g Scheme			-di	A	ssessment Sch	eme		
Theory	r	Tutorial	Total	Hours	CIA	ESA (End	Practical/Oral		
661.280.000.000.000.000.000.000.000.000.000			Credits	Commence of several contents	(Continuous	Semester			
					Internal	Assessment)			
	A .				Assessment)				
3		1	4	45	25	75			
Pre-Req	uisite:								
				To study to Pharmaliscove To study nervous To study nervous	rmacodynamics, ery. ly the pharmaco s system, w.r.t. A ly the pharmaco s system, w.r.t.	eneral pharmace ADR, drug into logy of drugs ac ANS, local anest logy of drugs ac	ting on peripheral rs agents, general		
Course L	earning Out	comes (CL	O):	5. To stud nervous CNS st Students we	ly the pharmaco s system, w.r.t. imulants, analge ould be able to:	logy of drugs ac psychopharma sics, drug addict	ting on peripheral cological agents, tion.		
				2. Study to Pharma discover 3. Study to nervous 4. Study to nervous anesthe 5. Study to nervous anesthe 6. Study	he basics of gen acodynamics, A ery. the pharmacolog s system, w.r.t. the pharmacolog s system, w.r.t. etics, sedatives, a the pharmacolog s system, w.r.t.	DR, drug inter gy of drugs acti ANS, local anest gy of drugs acti neurotransmitter anti-epileptics, al- gy of drugs acti	d its action. gy with respect to raction and drug ing on peripheral hetics etc. ing on peripheral is agents, general lcohols etc. ing on peripheral cological agents,		

Course Contents/Syllabus: (All the units carry equal weightage in Summative Assessment and equal engagement)

Descriptors/Topics	CLO	Hours
UNIT I		
General Pharmacology	CLO 1	10
Introduction to Pharmacology		
Definition, historical landmarks and scope of pharmacology, nature and source of drugs, essential drugs concept and routes of drug administration, Agonists, antagonists (competitive and non-competitive), spare receptors, addiction, tolerance, dependence, tachyphylaxis, idiosyncrasy, allergy. Pharmacokinetics	1	
Membrane transport, absorption, distribution, metabolism and excretion of drugs		
.Enzyme induction, enzyme inhibition, kinetics of elimination	1	
UNIT II		
General Pharmacology Pharmacodynamics Principles and mechanisms of drug action. Receptor theories and classification of receptors, regulation of receptors drug receptors interactions signal transduction	CLO 2	10
mechanisms, G-protein-coupled receptors, ion channel receptor, transmembrane enzyme linked receptors, transmembrane JAK-STAT binding receptor and receptors that regulate transcription factors, dose response relationship, therapeutic index, combined effects of drugs and factors modifying drug action.		
Adverse drug reactions Drug interactions (pharmacokinetic and pharmacodynamics)		
Drug discovery and clinical evaluation of new drugs- Drug discovery phase, preclinical evaluation phase, clinical trial phase, phases of clinical trials and pharmacovigilance.		
UNIT III		
Pharmacology of drugs acting on peripheral nervous system	CLO 3	10
Organization and function of ANS. Neurohumoral transmission, co-transmission and classification of neurotransmitters. Parasympathomimetics, Parasympatholytics, Sympathomimetic, sympatholytic. Neuromuscular blocking agents and skeletal muscle relaxants (peripheral). Local anesthetic agents. Drugs used in myasthenia gravis and glaucoma		
UNIT IV		
Pharmacology of drugs acting on central nervous system Neurohumoral transmission in the C. N. S. special emphasis on importance of various neurotransmitters like with GABA, Glutamate, Glycine, serotonin, dopamine. General anesthetics and pre-anesthetics. Sedatives, hypnotics and centrally acting muscle relaxants. Anti-epileptics Alcohols and disulfiram	CLO 4	08
UNIT V		
Pharmacology of drugs acting on central nervous system	CLO 5	07
Psychopharmacological agents: Antipsychotics, antidepressants, anti-anxiety agents, anti-manics and hallucinogens. Drugs used in Parkinson's disease and Alzheimer's disease. CNS stimulants and nootropics. Opioid analgesics and antagonists. Drug addiction, drug abuse, tolerance and dependence.		
Total Hours		45

^{*} The total 15 tutorials should be conducted as per the format mentioned above

Textbooks:

- 1. Modern Pharmacology with clinical Applications, by Charles R.Craig & Robert.
- 2. Sharma H. L., Sharma K. K., Principles of Pharmacology, Paras medical publisher
- 3. K.D.Tripathi. Essentials of Medical Pharmacology, JAYPEE Brothers Medical Publishers (P) Ltd, New Delhi.

Reference Books:

- 1. Mycek M.J, Gelnet S.B and Perper M.M. Lippincott's Illustrated Reviews- Pharmacology
- 2. Marry Anne K. K., Lloyd 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 & Wilkins
- 3. Goodman and Gilman's, The Pharmacological Basis of Therapeutics.
- 4. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill
- 5. Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology, Churchil Livingstone Elsevier

- https://jiwaji.edu/pdf/ecourse/pharmaceutical/General%20Pharmacology%20(B.Pharmacy%203%20Year%20Pharmacology%20I II%203T4)%20By%20Dr.%20Bhagat%20Singh%20Jaiswal.pdf
- 2. https://www.ncbi.nlm.nih.gov/books/NBK507791/
- 3. https://www.ncbi.nlm.nih.gov/books/NBK554534/
- 4. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3522494/
- 5. https://www.youtube.com/playlist?list=PLtEqsPSBZIXu UkZF1sdE341ebm7G-xsN
- 6. https://remixeducation.in/drugs-acting-on-central-nervous-system/
- 7. https://egyankosh.ac.in/bitstream/123456789/38330/1/Unit%209.pdf
- 8. https://pubmed.ncbi.nlm.nih.gov/6130574/
- 9. https://www.copbela.org/downloads/2020/SELF%20LEARNING%20MATERIAL%20BPHARMA/semester%204/BP404T/MO DULE%205.pdf

Name of Progran	n:							
Course I		Pharmacognosy & Phytochemistry – I (Theory)				BP405T/Core		
Course 1	Pattern	2023		Version	3	1.0		
Teachin	g Scheme				A	Assessment Scheme		
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment	Practical/Oral	
3	, - -:	1	4	45	25	75		
Pre-Req	uisite:						7.	
				3. To kno 4. To ca evaluat 5. Explair	w the crude drug w the evaluation rry out the r ion of crude drug	techniques for nicroscopic an gs	d chemical nature the herbal drugs ad morphological dic drugs, marine	
Course I	earning Out	comes (CL	0):	Illustra crude d Elabora polyplo plants. Describ medicin Explair	rugs. Ate the application App	ons of advanced and hybridizate rmacognosy in econdary metabo	development of sing and storage of I technologies like ion in medicinal various systems of olites. lic drugs, marine	

(All the units carry equal weightage in Summative Assessment and equal engagement)

Descriptors/Topics	CLO	Hours
UNIT I		
Introduction to Pharmacognosy (a) Definition, history, scope and development of Pharmacognosy (b) Sources of Drugs – Plants, Animals, Marine & Tissue culture (c) Organized drugs, unorganized drugs (dried latex, dried juices, dried extracts, gums and mucilages, oleoresins and oleo- gum -resins). Classification of drugs Alphabetical, morphological, taxonomical, chemical, pharmacological, chemo and serotaxonomical classification of drugs Quality control of Drugs of Natural Origin Adulteration of drugs of natural origin. Evaluation by organoleptic, microscopic, physical, chemical and biological methods and properties. Quantitative microscopy of crude drugs including lycopodium spore method, leaf constants, camera lucida and diagrams of microscopic objects to scale with camera lucida. UNIT II	CLO 1	10
Cultivation, Collection, Processing and storage of drugs of natural origin Cultivation and Collection of drugs of natural origin. Factors influencing cultivation of medicinal plants. Plant hormones and their applications. Polyploidy, mutation and hybridization with reference to medicinal plants Conservation of medicinal plants UNIT III	CLO 2	10
Plant tissue culture Historical development of plant tissue culture, types of cultures, Nutritional requirements, growth and their maintenance. Applications of plant tissue culture in pharmacognosy. Edible vaccines	CLO 3	07
Pharmacognosy in various systems of medicine Role of Pharmacognosy in allopathy and traditional systems of medicine namely, Ayurveda, Unani, Siddha, Homeopathy and Chinese systems of medicine. Introduction to secondary metabolites Definition, classification, properties and test for identification of Alkaloids, Glycosides, Flavonoids, Tannins, Volatile oil and Resins UNIT V	CLO 4	10
Study of biological source, chemical nature and uses of drugs of natural origin containing following drugs Plant Products Fibers - Cotton, Jute, Hemp Hallucinogens, Teratogens, Natural allergens Primary metabolites General introduction, detailed study with respect to chemistry, sources, preparation, evaluation, preservation, storage, therapeutic used and commercial utility as Pharmaceutical Aids and/or Medicines for the following Primary	CLO 5	08

Lipids (Waxes, fats, fixed oils) Castor oil, Chaulmoogra oil, Wool Fat, Bees Wax	
urokinase, streptokinase, pepsin).	
Gelatin, casein, proteolytic enzymes (Papain, bromelain, serratiopeptidase,	
Proteins and Enzymes	
Acacia, Agar, Tragacanth, Honey	
metabolites: Carbohydrates	

^{*} The total 15 tutorials should be conducted as per the format mentioned above

Textbook

- 1. A textbook on Pharmacognosy and Phytochemistry by Biren N. Shah and A.K. Seth
- 2. Textbook of Pharmacognosy and Phytochemistry I- By MD Rafiul Haque
- 3. Text Book of Pharmacognosy by T.E. Wallis
- 4. Mohammad Ali. Pharmacognosy and Phytochemistry, CBS Publishers & Distribution, New Delhi.
- 5. Text book of Pharmacognosy by C.K. Kokate, Purohit, Gokhale (2007), 37th Edition, Nirali Prakashan, New Delhi.

Reference Books:

- 1. W.C.Evans, Trease and Evans Pharmacognosy, 16th edition, W.B. Sounders & Co., London, 2009.
- 2. Tyler, V.E., Brady, L.R. and Robbers, J.E., Pharmacognosy, 9th Edn., Lea and Febiger, Philadelphia, 1988.
- 3. Herbal drug industry by R.D. Choudhary (1996), Ist Edn, Eastern Publisher, New Delhi.
- 4. Essentials of Pharmacognosy, Dr.S H. Ansari, IInd edition, Birla publications, New Delhi, 2007
- 5. Practical Pharmacognosy: C.K. Kokate, Purohit, Gokhale
- 6. Anatomy of Crude Drugs by M.A. Iyengar

Online Resources/E-Learning Resources

- 1. https://www.cbspd.co.in/textbook-of-pharmacognosy-and-phytochemistry-i-theory-and-practical
- 2. https://pharmabookbank.files.wordpress.com/2019/03/14.2.pharmacognosy-by-biren-shahavinash-seth-1.pdf
- 3. https://scholar.google.co.in/scholar?q=textbook+on+Pharmacognosy+and+Phytochemistry+%E2%80%93+I+(Theory&hl=en&assdt=0&asvis=1&oi=scholart
- 4. https://scholar.google.co.in/scholar?q=textbook+on+Pharmacognosy+and+Phytochemistry+%E2%80%93+I+(Theory&hl=en&assdt=0&assvis=1&oi=scholart

Program: Course Name		B. PHARM Medicinal Chemistry-I (Practical)		Semester:	IV	Level: UG	
				Course Code/ Course Type		BP406P/Core	
Course 1	Pattern	2023		Version		1.0	
Teachin	g Scheme				A	ssessment Sch	eme
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	
	4		2	60	15	35	
Pre-Requisite: Course Objectives (CO):			1. Impart a Chemis 2. Learn th 3. Learn th 4. Comprete the drug interme	ne preparation of ne preparation of thend the basic p as to identify the	nowledge of Med f drugs f reaction interm principles of assa purity of the dru	dicinal ediates ny procedure of ngs or drug	
Course Learning Outcomes (CLO):				1. Perform 2. Perform 3. Determine point/box procedu 4. Identify compout 5. Determine	oiling point re. the purity of nds by using ass	of drug intermetal constants sand perform the selected drug procedures.	

Course Contents/Syllabus: (All the units carry equal weightage in Summative Assessment and equal engagement) (Students have to perform any 15 Practicals)

Assignment/ Practical/ Activity Number	Assignment/Practical/ Activity Title			CLO	Hours					
I		Preparation	of drugs/ intermediates							
1	Practical 1:Preparation of intermediate	Week 1/Turn 1	Preparation of 1,3-pyrazole.	CLO1						
2.	Practical 2: Preparation of intermediate	Week 2/ Turn 1	Preparation of 1,3-oxazole.	CLO1						
3.	Practical 3: Preparation of intermediate	Week 3/ Turn 1	Preparation of Benzimidazole.	CLO2						
4	Practical 4: Preparation of intermediate	Week 4/ Turn 1	Preparation of Benztriazole.	CLO2						
5	Practical 5: Preparation of intermediate	Week 5/ Turn 1	Preparation of 2,3- diphenyl quinoxaline.	CLO2	04 Hrs/ Practical					
6	Practical 6: Preparation of drug	Week 6/ Turn 1	Preparation of Benzocaine.	CLO2						
7	Practical 7: Preparation of drug	Week 7/ Turn 1	Preparation of Phenytoin.	CLO3						
8	Practical 8: Preparation of drug	Week 8/ Turn 1	Preparation of Phenothiazine.	CLO3						
9	Practical 9: Preparation of drug	Week 9/ Turn 1	Preparation of Barbiturate.	CLO4						
II		A	ssay of drugs							
10	Practical 10: Assay of drugs	Week 10/ Turn 1	Assay of Chlorpromazine	CLO4						
11	Practical 11: Assay of drugs	Week 11/ Turn 1	Assay of Phenobarbitone	CLO4						
12	Practical 12: Assay of drugs	Week 12/ Turn 1	Assay of Atropine	CLO4	04 Hrs/					
13	Practical 13: Assay of drugs	Week 13/ Turn 1	Assay of Ibuprofen	CLO5	Practical					
14	Practical 14:	Week 14/ Turn 1	Assay of Aspirin	CLO5						
15	Practical 15:	Week 15/ Turn 1	Assay of Furosemide	CLO5						
Ш	Dete	rmination of Parti	ition coefficient for any two dru	gs	- 28					
16	Practical 16	Week 16/ Turn 1	Determination of Partition coefficient	CLO5	04 Hrs/ Practical					
17	Practical 17	Week 17/ Turn 1	Determination of Partition coefficient	CLO5						
	Total		5 55 8	575	60					

Practical Text Book:

- 1. Remington's Pharmaceutical Sciences.
- 2. Text book of practical organic chemistry- A. I. Vogel.

Reference Books:

- 1. Martindale's extra pharmacopoeia.
- 2. Indian Pharmacopoeia.

- 1. https://www.miperknlapindia.ac.in/BP406P-medicinal-chemistryl.pdf
- 2. https://jru.edu.in/studentcorner/lab-manual/bpharm/4th-sem/Medicinal%20Chemistry-I.pdf
- 3. https://www.youtube.com/watch?v=h54XyEnYZDA
- 4. https://www.youtube.com/watch?v=59jG3I7wRpQ
- 5. https://www.youtube.com/watch?v=7hopSX26qqA
- 6. https://www.youtube.com/watch?v=zyoOmLCX6qM
- 7. https://www.youtube.com/watch?v=auwvTlQNuM4
- 8. https://www.bellevuecollege.edu/wpcontent/uploads/sites/140/2014/06/aspirin_tablets_titration.pdf
- 9. https://www.youtube.com/watch?v=DPcNSn22ayc
- Experimental Determination of Octanol-Water Partition Coefficients of Selected Natural Toxins, Carina D. Schönsee and Thomas D. Bucheli, *Journal of Chemical & Engineering Data* 2020 65 (4), 1946-1953, DOI: 10.1021/acs.jced.9b01129

Name of the B. PHA Program:		B. PHAR	M	Semester: IV Course Code/ Course Type Level: UG BP407P/Core		Level: UG	
Course I	urse Name Physical Pharmaceutics – I (Practical)					BP407P/Core	
Course 1	Pattern	2023		Version		1.0	
Teaching	g Scheme	90		750 27		Assessment Sch	eme
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral
1554	15	-	2	60	15	35	===
	earning Out		O):	1. Cover physica 2. Design ensure 3. Perform 4. Determine chemic 5. Compressingler Students w 1. Determine particle 2. Determine viscom 3. Select a suspens 4. Conclustive conclustion 5. Interpresentation 5. Interpresentation	experiments to all pharmacy neously and of their therapeution optimization of their therapeution optimization of the reactions. The second the second the second dealer to the signification optimize and density the the viscosity eterm and optimize sussion de the reaction of the second optimize sussion optimize sussion de the reaction of the second optimize sussion optimize	essary chemically stable c safety and effic of suspending age on rate constant helf life of lerated stability s ance of physical y in the design of y using Ostwald's pending agent to rate constants as ife of a given	ental principles of dosage forms and acy. ents ent depending on formulation by studies.

Course Contents/Syllabus:

(All the units carry equal weightage in Summative Assessment and equal engagement)

Practical Plan

PCET's PCU / School of Pharmacy / B. Pharm / 2023 pattern

Assignme nt/Practic al/Activity Number	Assignment/Pra ctical/Activity Title	Week Number/Turn	Details	CLO	Hour s
1	Practical 1: Particle size	Week 1/Turn1	Determination of particle size, particle size distribution using sieving method	CL01	04
2.	Practical 2: Particle size	Week 2/ Turn1	Determination of particle size, particle size distribution using Microscopic method	CL01	04
3.	Practical 3:Density	Week 3/ Turn1	Determination of bulk density, true density and porosity	CL01	04
4	Practical 4: angle of repose	Week 4/ Turn1	Determine the angle of repose and influence of lubricant on angle of repose.	CL01	04
5	Practical 5: Viscosity	Week 5/ Turn1	Determination of viscosity of liquid using Ostwald's viscometer	CLO2	04
6	Practical 6: Viscosity	Week 6/ Turn1	Determination of viscosity of liquid using Ostwald's viscometer	CLO2	04
7	Practical 7: Sedimentation	Week 7/ Turn1	Determination sedimentation volume with effect of different suspending agent	CLO3	04
8	Practical 8: Sedimentation	Week 8/ Turn1	Determination sedimentation volume with effect of different suspending agent	CLO3	04
9	Practical 9: Sedimentation	Week 9/ Turn1	Determination sedimentation volume with effect of different concentration of single suspending agent	CLO3	04
10	Practical 10: Viscosity	Week 10/ Turn1	Determination of viscosity of semisolid by using Brookfield viscometer	CLO2	04
11	Practical 11: Viscosity	Week 11/ Turn1	Determination of viscosity of semisolid by using Brookfield viscometer	CLO2	04
12	Practical 12: Kinetics	Week 12/ Turn1	Determination of reaction rate constant first order	CLO4	04
13	Practical 13: Kinetics	Week 13/ Turn1	Determination of reaction rate constant second order	CLO4	04
14	Practical 14: Stability studies	Week 14/ Turn1	Accelerated stability studies	CLO5	04
15	Practical 15: Stability studies	Week 15/ Turn1	Accelerated stability studies	CLO5	04
			Total		60

Practical Text Book

Laboratory Manual of Physical Pharmaceutics, C.V.S. Subramanyam, J. Thimma settee.

Reference Books:

- 1. Physical Pharmacy by Alfred Martin
- 2. Experimental Pharmaceutics by Eugene, Parott.
- 3. Tutorial Pharmacy by Cooper and Gunn.
- 4. Stocklosam J. Pharmaceutical Calculations, Lea & Febiger, Philadelphia.
- 5. Liberman H.A, Lachman C., Pharmaceutical Dosage forms, Tablets, Volume-1 to 3, Marcel Dekkar Inc.
- 6. Liberman H.A, Lachman C, Pharmaceutical Dosage forms. Disperse systems, volume 1, 2, 3. Marcel Dekkar Inc.

7. Physical Pharmaceutics by Ramasamy C and ManavalanR.

- 1. https://jru.edu.in/studentcorner/lab-manual/bpharm/4th-sem/Physical%20Pharmaceutics-II.pdf
- 2. http://www.sarajapharmacycollege.com/downloads/PP2.pdf
- 3. https://mlrip.ac.in/wp-content/uploads/2022/03/PHYSICAL-PHARMACEUTICS-II-LAB-MANUAL.pdf



Name of the	B. Pharm			mester : I	V	Level: UG		
Program: Course Name	e Pharmacology-I			ourse Code	/ Course	BP408P/Core		
	(Pract	ical)	T	уре				
Course Pattern	2023		V	ersion		1.0		
Teaching Scheme					Asses	sment Scheme		
Theory Practical	Tuto	Total	H	ours	CIA	ESA (End	Practical/	
	rial	Credits			(Continuous Internal Assessment)	Semester Assessment)	Oral	
- 4	-	2	1 /	60	15	35	_	
Pre-Requisite:						<i>y</i>		
rial Credits (Continuous Internal Assessment Assessment) - 4 - 2 60 15 35 Pre-Requisite: Course Objectives (CO): The objectives of Tools for Pharmacolo 1. To study the introduction to							experimental numents in as along with and different s. e effects of a laboratory e effects of tems of the software. Inarmacology y laboratory, ong with the ary techniques istrations to as of different tory animals as of different soft different	

Course Contents/Syllabus (All the Practical's carry equal weightage in Summative Assessment and equal engagement)

Practical Plan

Assignme nt/Practic al/Activity Number	Assignment/Practical/ Activity Title	Week Number/Turn	Details	CLO	Hour s
1	Practical 1: Introduction	Week1/ Turn 1	1.1To study the introduction to experimental pharmacology.	CLO1	04
2.	Practical 2: Commonly used instruments	Week 2/ Turn 1	2.1 To study the commonly used instruments in experimental pharmacology.	CLO 1	04
3	Practical 3: Study of common laboratory animals.	Week 3/ Turn 1	3.1 To study of common laboratory animals.	CLO 2	04
4	Practical 4: Maintenance of laboratory animals as per CPCSEA guidelines.	Week 4 / Turn 1	4.1 To study maintenance of laboratory animals as per CPCSEA guidelines.	CLO 2	04
5	Practical 5: Common laboratory techniques. Blood withdrawal, serum and plasma separation, anesthetics and euthanasia used for animal studies	actical 5: Common laboratory chniques. Blood withdrawal, rum and plasma separation, lesthetics and euthanasia used for laboratory techniques. Blood withdrawal, serum and plasma separation, anesthetics and euthanasia used for laboratory techniques. Blood withdrawal, serum and plasma separation, anesthetics and euthanasia used for animal studies		CLO 3	04
6			6.1 To study of different routes of drugs administration in mice/rats.	CLO 3	04
7	Practical 7: Study of effect of Week 7/ 7.1 To st hepatic microsomal enzyme Turn 1 microsoma		7.1 To study of effect of hepatic microsomal enzyme inducers on the phenobarbitone sleeping time in mice.	CLO 4	04
8	Practical 8: Effect of drugs on ciliary motility of frog oesophagus	Week 8 / Turn 1	8.1 To demonstrate the effect of drugs on ciliary motility of frog oesophagus	CLO 4	04
9	Practical 9: Effect of drugs on rabbit eye.	Week 9 / Turn 1	9.1 To examine the effect of drugs on rabbit eye.	CLO 4	04
10	Practical 10: Effects of skeletal muscle relaxants using rota-rod apparatus.	Week 10 / Turn 1	10.1 To demonstrate the effects of skeletal muscle relaxants using rota-rod apparatus	CLO 4	04
11	Practical 11: Effect of drugs on locomotor activity using actophotometer.	Week 11 / Turn 1	11.1 To demonstrate effect of drugs on locomotor activity using actophotometer.	CLO 5	04
12	Practical 12: Anticonvulsant effect of drugs by MES and PTZ method.	Week 12 / Turn 1	12.1 To evaluate the anticonvulsant effect of drugs by MES and PTZ method.	CLO 5	04
13	Practical 13: Study of stereotype and anti-catatonic activity of drugs on rats/mice			CLO 5	04
14	Practical 14: Study of anxiolytic activity of drugs using rats/mice.			CLO 5	04
15	Practical 15: Study of local anesthetics by different methods	Week 15 / Turn 1	15.1 To study local anesthetics by different methods	CLO 5	04
	Total hours				60

Note: All laboratory techniques and animal experiments are demonstrated by simulated experiments by softwares and videos

Textbooks:

- 1. Ghosh MN. Fundamentals of Experimental Pharmacology. Hilton & Company, Kolkata.
- 2. Kulkarni SK. Handbook of experimental pharmacology. Vallabh Prakashan

Reference Books:

- K.D.Tripathi. Essentials of Medical Pharmacology, JAYPEE Brothers Medical Publishers (P) Ltd, New Delhi.
- 2. Sharma H. L., Sharma K. K., Principles of Pharmacology, Paras medical publisher
- 3. Modern Pharmacology with clinical Applications, by Charles Craig& Robert

- https://www.researchgate.net/profile/Kailas
 Mali/publication/378286842 Laboratory Manual of Pharmacology I/links/65d0cbe5e51f606f99799948/Laboratory-Manual-of-Pharmacology-I.pdf
- 2. https://www.slideshare.net/AmitChaudhari39/laboratory-animal-used-in-pharmacological-experiment
- 3. https://www.ndvsu.org/images/StudyMaterials/LPM/Laboratory-animals.pdf
- 4. https://care.edu.in/wp-content/uploads/2020/03/cpcsea.pdf
- 5. https://www.slideshare.net/clickforanwar/expt-9-effect-of-drugs-on-rabbit-eye
- 6. https://www.slideshare.net/clickforanwar/expt-11-effect-of-drugs-on-locomotor-activity-using-actophotometer
- 7. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4527063/

Program: Course Name Pha Phy		B. Pharm	B. Pharm		er: IV	Level: UG	
		Pharmacognosy & Phytochemistry-I (Practical)		Course Code/ Course Type		BP409P/Core	
Course 1	Pattern	2023	50	Version	ì	1.0	
Teaching	g Scheme				-	Assessment Sch	eme
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/Oral
1.5	4	-	2	60	15	35	8 - .
Pre-Requisite: Course Objectives (CO):			1. To char 2. To it 3. To Phyt 4. To correlev 5. To co	understand a acteristics of crudentify unorganiconduct extra toconstituents. elaborate qualita vance. lecide staining re	norphology, in de drugs. zed drugs by che raction and d ative, quantitative ragents required f		
Course Learning Outcomes (CLO):				 Perf Perf data Den Phyt Exp. relev 	orm leaf consta nonstrate extra toconstituents. lain of qualitati vance.	nluation of crude ints and generate action and e ive, quantitative	drugs. e quantitative microscopic estimation of different microscopy & its social for specific part of plant.

(All the Practical's carry equal weightage in Summative Assessment and equal engagement)

Practical Plan

Assignment/ Practical/ Activity Number	Assignment/Practical/ Activity Title	Week Number/Turn	Details	CLO	Hour
1	Practical 1: Analysis of crude drugs by chemical tests	Week 1/Turn 1	identify the chemical characters of given sample (Tragacanth).	CL01	04
2	Practical 2: Analysis of crude drugs by chemical tests	Week 2/Turn 1	To identify the chemical characters of given sample (Acacia).	CL01	04
3	Practical 3: Analysis of crude drugs by chemical tests	Week 3/Turn 1	To identify the chemical characters of given sample (Agar).	CL01	04
4	Practical 4: Analysis of crude drugs by chemical tests	Week 4/Turn 1	To identify the chemical characters of given sample (Gelatin).	CLO2	04
5	Practical 5: Analysis of crude drugs by chemical tests	Week 5/Turn 1	To identify the chemical characters of given sample (Starch).	CLO2	04
6	Practical 6: Analysis of crude drugs by chemical tests	Week 6/Turn 1	To identify the chemical characters of given sample (Honey).	CLO2	04
7	Practical 7: Determination of stomatal number and index	Week 7/Turn 1	To determine stomatal number and stomatal index	CLO3	04
8	Practical 8: Determination of vein islet number, vein islet termination and palisade ratio.	Week 8/Turn 1	To determine vein islet number, vein islet termination and palisade ratio.	CLO3	04
9	Practical 9: Determination of size of starch grains, calcium oxalate crystals	Week 9/Turn 1	To determine size of starch grains, calcium oxalate crystals by eye piece micrometer.	CLO3	04
10	Practical 10: Determination of Fiber length and width	Week10/Turn1	To determine Fiber length and width	CLO4	04
11	Practical 11: Determination of number of starch grains	Weekl 1/Turn1	To determine number of starch grains by Lycopodium spore method	CLO4	04
12	Practical 12: Determination of Ash value	Week12/Turn1	To determine Ash value	CLO4	04
13	Practical 13: Determination of Extractive values of crude drugs	Week13/Turn1	To determine Extractive values of crude drugs	CLO5	04
14	Practical 14: Determination of moisture content of crude drugs	Week14/Turn1	To determine moisture content of crude drugs	CLO5	04
15	Practical 15:Determination of swelling index and foaming	Weekl 5/Turn1	To determine swelling index and foaming	CLO5	04
	Total hours				60

Textbooks:

- 1. Practical Pharmacognosy by Kokate CK., 4th edition, Vallabh Prakashan. Delhi;
- 2. Practical Pharmacognosy by Khandewal K.R, Nirali Prakashan

Reference Books:

- 1. W.C.Evans, Trease and Evans Pharmacognosy, 16th edition, W.B. Sounders & Co. London, 2009.
- 2. Tyler, V.E., Brady, L.R. and Robbers, J.E., Pharmacognosy, 9th Edn, Lea and Febiger, Philadelphia, 1988.
- 3. Text Book of Pharmacognosy by T.E. Wallis
- 4. Mohammad Ali. Pharmacognosy and Phytochemistry, CBS Publishers & Distribution, New Delhi.
- 5. Text book of Pharmacognosy by C.K. Kokate, Purohit, Gokhale (2007), 37th Edition, Nirali Prakashan,
- 6. Herbal drug industry by R.D. Choudhary (1996), Ist Edn, Eastern Publisher, New Delhi.
- 7. Essentials of Pharmacognosy, Dr.S H.Ansari, IInd edition, Birla publications, New Delhi, 2007
- 8. Practical Pharmacognosy: C.K. Kokate, Purohit, Gokhlae
- 9. Anatomy of Crude Drugs by M.A. Iyengar

- 1. Stomatal number: https://www.youtube.com/watch?v=v53Zf2MhrwE
- 2. Ash vale: https://www.youtube.com/watch?v=n2Qwb8Pw8YE
- 3. Vein termination number: https://www.youtube.com/watch?v=wvTEelupZMU
- 4. Starch grain: https://www.youtube.com/watch?v=Bf-t9jduefc

Name of the Program: Course Name		B. Pharm Constitution of India (Theory)		Semester :	3/4	Level: UG	
				Course Co Type	de/ Course	ACCOI201/AC	
Course I	Pattern	2023	5375	Version	17	1.0	
Teaching	g Scheme		8		Ass	sessment Schen	ıe
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/ Oral
2	13-25		9 == 9	30	50	1/40	
	earning Out		O):	1. To fame the India 2. To ena provision 3. To accommodate instituti 4. To make and citiz 5. To make and citiz 5. Analyze 2. Remement Fundam 3. know structur 4. Understandia. 5. Access	iliarize the stude an constitution. able students ons and values. quaint the students ons. the students under the students under the basic structure their Fundamental Duties (Flabout our Under the Codes, proceand our State Extra the Amendmental Extra the Extra the Amendmental Extra the Amendmental Extra the Amendmental Extra the Extra	to grasp the constitutional erstand the basic erstand the role of asures in a democrature of Indian Commental Rights, D's) of our constitutional edures. Secutive & Elections given by the constitution of the	powers and offices and premises of f constitution cracy nstitution. DPSP's and tution. nt, political ons system of y Provisions,

(All the units carry equal weightage in Summative Assessment and equal engagement)

Descriptors/Topics	CLO	Hours
UNIT I		
Introduction to Indian Constitution The Necessity of the Constitution, The Societies before and after the Constitution adoption. Introduction to the Indian constitution, The Making of the Constitution, The Role of the Constituent Assembly. The Preamble of Indian Constitution & Key concepts of the Preamble. Salient features of India Constitution. UNIT II	CLO 1	08
FR's, FD's and DPSP's Fundamental Rights and its Restriction and limitations in different Complex Situations. Directive Principles of State Policy (DPSP) and its present relevance in our society with examples. Fundamental Duties and its Scope and significance in Nation building UNIT III	CLO 2	05
Governance and Constitution Federalism in India - Features , Local Government -Panchayats —Powers and functions; 73rd and 74th amendments, Election Commission — Composition, Powers and Functions; Electoral Reforms, Citizen oriented measures — RTI and PIL — Provisions and significance	CLO 3	05
Union Executive Parliamentary System, Union Executive – President, Prime Minister, Union Cabinet, Parliament - LS and RS, Parliamentary Committees, Important Parliamentary Terminologies. Supreme Court of India, Judicial Reviews and Judicial Activism.	CLO 4	05
State Executive & Elections, Amendments and Emergency Provisions State Executive, Election Commission, Elections & Electoral Process. Amendment to Constitution (How and Why) and Important Constitutional Amendments till today. Emergency Provisions.	CLO 5	07
Total Hours		30

Text Books

- 1. "Constitution of India" (for Competitive Exams) Published by Naidhruva Edutech Learning Solutions, Bengaluru. 2022.
- 2. "Engineering Ethics", M.Govindarajan, S.Natarajan, V.S.Senthilkumar, Prentice -Hall, 2004

Reference Books:

- 1. "SamvidhanaOdu" for Students & Youths by Justice HN NagamohanDhas, Sahayana, kerekon.
- 2. "Constitution of India, Professional Ethics and Human Rights" by Shubham Singles, Charles E. Haries, and et al: published by Cengage Learning India, Latest Edition 2019.
- 3. "Introduction to the Constitution of India", (Students Edition.) by Durga Das Basu (DD Basu): Prentice -Hall, 2008.
- 4. "The Constitution of India" by Merunandan K B: published by Merugu Publication, Second Edition, Bengaluru.

- https://indianexpress.com/article/explained/the-preamble-what-does-it-say-andwhat-does-it-mean-to-india-and-its-constitution-6232014/
- 2. http://egyankosh.ac.in/bitstream/123456789/57869/1/Unit3.pdf
- 3. https://www.nios.ac.in/media/documents/srsec317newE/317EL5.pdf
- 4. https://nios.ac.in/media/documents/SecSocSciCour/English/Lesson-15.pdf
- 5. http://www.ignou.ac.in/upload/bswe-02-block6-unit-27-small%20size.pdf
- 6. https://blog.ipleaders.in/the-preamble-of-the-indian-constitution/
- 7. http://www.legalservicesindia.com/article/2003/Is-Preamble-a-Part of- Constitution.html
- 8. https://youtu.be/LYHAy68pQWA
- 9. https://www.youtube.com/watch?v=PHdnrWngzKo
- 10. https://youtu.be/tmaLT-IV1-0
- 11. https://www.youtube.com/watch?v=4tnsblfv8y0
- 12. https://unacademy.com/lesson/preamble/VBQ38VLX

Name of the Program:	B. Pharm		Semeste	Semester : IV			
Course Name	IKS: India Science	an Health	Course Type	Code/ Course	ACIKSSP101		
Course Pattern	2024		Version		1.0		
Teaching Scheme				A	ssessment Sc	heme	
	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessme nt)	Practical/Oral	
2 -	<u> </u>	-	30	50	+ /	<u></u>	
Pre-Requisite:	Nil		<i>X</i> -				
Course Learning Outcon	nes (CLO):		heal 2. To red dise 3. Fam chood 4. To know 5. To Know Students 1. Und heal 2. Examain 3. Accelerated incood 4. Evaluation of the control of	th systems. make students a maintaining the ases. maintaining the ases. maintaining the ases. maintaining the right li understand min whedge of Ayury enable students whedge system where would be able to erstand the fun th systems and it mine the signi- maining the phy ess our unique to reporating the he hate the variou a for wellbeing	ware about the internal background bod festyle and and its of the internal price of the internal price of the internal price of the internal and mermind and bod althy lifestyles parameters of mind and it	entation of Indian yle. inciples of Indian s. raditional way of atal balance. dy constitution for e. of Ayurveda and	

Course Contents/Syllabus: (All the units carry equal weightage in Summative Assessment and equal engagement)

Descriptors/Topics	CLOs	Hrs
Unit I		
Understanding human body	CLO 1	06
Introduction to Ayurveda, health and treatment aspects in ayurveda, influence of		
Pancha maha bhuta on internal environment of human body, understanding		
composition of human body through the concept of dosha, dhatu mala. Understanding		
Prakruthi, the Mind – Body Constitution.		16
Unit II		
Basic concepts of Ayurveda	CLO 2	06
The three gunas and three doshas, Pancha-mahabhuta and Sapta-dhatu. The		
importance of Agni (digestion). Six Rasas and their relation to Doshas. Ayurvedic view		
of the cause of diseases.		
Unit III		
Literatures in Ayurveda Study of selected extracts from <i>Astāngahrdaya</i> (selections from <i>Sūtrasthāna</i>) and <i>Suśruta-Samhitā</i> (sections on plastic surgery, cataract surgery and anal fistula), pharmacopeia of Ayurveda, Charaka's description of a hospital, hospitals in ancient and medieval India. Ayurveda in 18/19th centuries, surgical practices, inoculation. Current revival of Ayurveda and Yoga.	CLO 3	06
Unit IV		
Introduction to Yoga Definition, meaning and objectives of Yoga, relevance of yoga in modern age. Brief introduction of Hatha yoga, Raja yoga, Karma yoga, Gyana Yoga, Bhakti yoga. Understanding eight steps of Ashtanga yoga, Understanding Shatkriyas, the six cleansing procedures of Yoga	CLO 4	06
Unit V		
Importance of IKS in life science: Ethnic Studies, Life science in plants, Äyurveda, integrated approach to healthcare, medicine and yoga, etc	CLO 5	06
Total		30

Text Reading:

- 1. Introduction to Indian Knowledge System Concepts and applications by B. Mahadevan, Vinayak Bhat, Nagendra Pavana R. N.; 2022 (Prentice Hall of India).
- Indian Knowledge Systems: Vol I and II, Kapil Kapoor and A. K. Singh; 2005 (D. K. Print World Ltd.).

Reference books:

- 1. The Charaka Samhita
- 2. The Susruta Samhita
- 3. Teh Ashtanga Hridaya
- 4. Dr Deepak Chopra, Perfect Health--Revised and Updated: The Complete Mind Body Guide, Harmony publication, 2001
- 5. Vasant lad, Ayurveda, the Science of Self-healing: A Practical Guide: Science of Self-healing, lotus press, 1984. The Hatha yoga pradipika
- 7. The Patanjali yoga sutras
- 8. The Gheranda samhita
- 9. BKS Iyengar, Light on Yoga: The Classic Guide to Yoga by the World's Foremost Authority, thronson publication, 2006
- Swamy Satyananda Saraswati, Asana, Pranayama, Mudra and Bandha, Bihar School of Yoga, 2002.

Online resource/ E-learning resource

- 1. https://swayam.gov.in/explorer?searchText=iks
- 2. https://iksindia.org/book-list.php
- Indian Knowledge Systems Vol 1 https://iks.iitgn.ac.in/wp-content/uploads/2016/01/Indian-Knowledge-Systems-Kapil-Kapoor.pdf

CIA Guidelines

- Online Quiz (Based on MCQ)- 20 marks
- Activity (with short Report Submission) 20 Marks
- Academic Sincerity 10 marks

Few of the suggested activities are Assignments, Debates, Group presentation, and Group discussions.

Few of suggested topics related to IKS-Indian Health System:

Debate

Activity

Assignment

Name of the Program: Course Name		B. Pharm Foreign Language-III (German)		Semester :	Semester : IV		:
				Course Co Type	de/ Course	UFL301A/AEC	
Course l	Pattern	2024		Version	180	1.0	
Teachin	g Scheme				Ass	sessment Schem	e
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/ Oral
2	4.1	_	2	30	(=)	-	9=9
Pre-Req	uisite:					1	2
Course (Objectives (C	CO):		 To unde To appl To anal To eval 	erstand the new	grammar conceptedge.	
Course Learning Outcomes (CLO):			Students would be able to: 1. Understand day to day vocabulary. 2. Enhance writing skills in German language. 3. Enhance professional speaking skills of German language. 4. Construct a dialogue, in the German language, for basic human interactions in a social context. 5. Take part in an interaction relating to format conversation				

Course Contents/Syllabus:

(All the units carry equal weightage in Summative Assessment and equal engagement)

Descriptors/Topics	CLO	Hours
UNIT I		
Rund ums Essen	CLO 1	06
Kitchen and cooking, Food habits, Emotions and assumptions		
Grammar – Possessive articles, reflexive verbs		
UNIT II		
Nach der Schulzeit	CLO 2	06
Daily activities and experiences during school time, school subjects,		
school types		
Grammar – Changing prepositions		

UNIT III		
Medien in Alltag	CLO3	06
Media, activities in media, film		
Grammar – Degree of comparison		
UNIT IV		
Groβe und kleine Gefühle	CLO4	06
Festivals and celebrations, invitation cards, thanksgiving cards,		
Grammar – Adjective ending		
UNIT V		
Was machen Sie beruflich? & Ganz schon mobil	CLO5	06
Daily activities in the working world, different professions, public		
transport and travelling towards working place		
Grammar – Clauses, Modalverbs in past tense		
Total Hours		30

Textbook

- 1. Netzwerk A1, Ernst klett Verlag & Goyal Publishers & Distributors Pvt. Ltd.
- 2. Studio d A1, Cornelesen Verlag & Goyal Publishers & Distributors Pvt. Ltd.
- 3. Netzwerk Neu A1, Ernst klett Verlag & Goyal Publishers & Distributors Pvt. Ltd

Reference Books:

- 1. Hallo Deutsch A1, Ernst Klett Verlag, Goyal Publishers & Distributors Pvt. Lt
- 2. Themen Aktuell 1, Hueber verlag
- 3. Maximal Ernst klett Verlag & Goyal Publishers & Distributors Pvt. Ltd.

- 1. https://youtube.com/@LearnGermanwithAnja?si=BkJYDPi7TS0fT4lr
- 2. https://youtube.com/@deutschlernenmitheidi?si=TkICIabzioaU0roZ
- 3. instagram.com/learngermanwithanja

Name of the B. F		B. Pharm		Semester	· IV	Level: UG/PG		
Program:		D. 1 1m1 m		Schiester		Zevel. CG/1G		
	Course Name		Foreign Language-III (Japanese)		ode/Course	UFL301B/AEC		
Course l	Pattern	2024)	Version		1.0		
	g Scheme				As	sessment Schem	e	
Theory	Practical	Tutorial	Total Credits	Hours	CIA (Continuous Internal Assessment)	ESA (End Semester Assessment)	Practical/ Oral	
2	(344	2	30	50	-4		
Pre-Requisite: Desire to get acquair Hiragana and Katakana. Reading & writ Course Objectives (CO):				The object 1. To be the opp 2. To dev speakir 3. To end 4. To und 5. To intel langua	tives of Foreign I fluent in an add portunities in a c velop students' b ng, reading and value the listening ock career poten expret a variety o ge from a critica	Language-III (Japa itional language, vompetitive job ma asic abilities such writing. g skills and memo tial with language f cultural products l perspective.	will increase rket. as listening, ory. skills. in the target	
Course Learning Outcomes (CLO):			 After learning the course, the students will be able to: Read & write days / dates using Kanji. Write and Speak basic sentences with adverb. Identify relations, make sentences using adjectives Illustrate the location of particle and living things Conversation in the question answer format Express ambition appetite aspiration craving 					

(All the units carry equal weightage in Summative Assessment and equal engagement)

Descriptors/Topics	CLO	Hours
UNIT I	i i	
Minna no Nihongo lesson no.5 & 6	CLO 1	06
Express Days and dates using kanji. Speaking: days in month with		
kanji, Particals / Introduction to calender		
Writing sentences using Verbs / Adverbs		
Speaking: want to invite someone to do something		
UNIT II		
Minna no Nihongo lesson no. 7 & 8	CLO 2	06
Writing: Verbs / method of an action /family members		
Speaking: Reference word & Information regarding family		
Introduction of Adjectives /tenses of adjectives		
UNIT III		
Minna no Nihongo lesson no. 9 & 10	CLO 3	06
Adverbs & Preposition		
UNIT IV		
Minna no Nihongo lesson no. 11 & 12	CLO 4	06
Counters, Adjectives / tenses of adjective		
UNIT V		
Minna no Nihongo lesson no. 13	CLO 5	06
Desire/phrases	1	
Total Hours		30

Learning resources

Textbooks:

1. Minna no Nihongo, "Japanese for everyone", Elementary Main Textbook, Goyal Publishers & Distributors Pvt. Ltd.

Reference books:

- 1. Shyoho Volume 1
- 2. Genki Japan
- 3. Haru Vol. 1 & 2

- 1. https://www.youtube.com/watch?v=p9PEIsOzJ5E
- 2. https://www.youtube.com/watch?v=RJ1ZdIDJqoY
- 3. https://www.youtube.com/watch?v=Lo5 5k7EPIM
- 4. https://www.youtube.com/watch?v=W0n-ODPwtzA