हिमाचल प्रदेश तकनीकी विश्वविद्यालय

HIMACHAL PRADESH TECHNICAL UNIVERSITY

(A STATE GOVERNMENT UNIVERSITY)

REVISED ACADEMIC CALENDAR FOR EVEN SEMESTER OF ACADEMIC SESSION 2022-2023 (Except B.Pharmacy 1st Year)

[*i.e.*, 2nd Semester of the session 2022-2023]

SN	Event(s)	Date(s)
1	Vacations	13-01-2023 to15-02-2023
2	Reporting of Faculty in respective Colleges	16-02-2023
3	Registration for Post Graduate Courses	21-02-2023 to 23-02-2023
4	Commencement of Post Graduate Classes	22-02-2023
5	Registration for Under Graduate Courses	24-02-2023 to 27-02-2023
6	Commencement of Under- Graduate Classes	25-02-2023
7	Mid Semester Test I (Ist Periodical Examinations)	03-04-2023 to 06-04-2023
8	Sports' Meet	21-04-2023 to 23-04-2023
9	Mid Semester Test II (2nd Periodical Examinations)	29-05-2023 to 01-06-2023
10	End of Classes' Work	20-06-2023
11	Reporting of shortage of attendance cases and display of Internal sessional awards	21-06-2023
12	End Semester Practical Examinations	21-06-2023 to 24-06-2023
13	Start of End Semester Theory Examinations	26-06-2023
14	Vacations	08-07-2023 to 26-07-2023
15	Reporting of Faculty in respective Colleges	27-07-2023

NOTE:

1. All affiliating colleges of HPTU shall follow the academic calendar as above. The working shall be for six days *i.e.*, from Monday to Saturday except Gazetted holidays and Second Saturday of the week.
2. Academic Calendar is tentative and will depend upon the advisory / guidelines issued by different concerned authorities from time to time. Such change, if any, will be communicated accordingly.

03.02.23

Dean (Academic)

Endst. No.:Even Dated:

Copy Forwarded to:

1. The P.S. to Vice-Chancellor, H.P. Technical University, Hamirpur for information please.
2. TheDirector, Technical Education, Vocational &Industrial Training, Himachal Pradesh, Sundernagar, Distt. Mandi (H.P.) for information please. (***Through E-mail***)
3. The Registrar, H.P. Technical University, Hamirpur for information please.
4. The Controller of Examination, H. P. Technical University Hamirpur for information please.
5. The Finance Officer, H. P. Technical University Hamirpur for information please
6. The Dean (USS), H. P. Technical University Hamirpur for information please.
7. All affiliated colleges for information and necessary action please. (***Through E-mail***)
8. The System Analyst, H. P. Technical University Hamirpur to upload the same on University's official website.

Dean - Academic
H.P. Technical University
Hamirpur - 177 001, HP

03.02.23

Dean (Academic)

Dean - Academic
H.P. Technical University
Hamirpur - 177 001, HP

DIRECTOR CUM PRINCIPAL
LAUREATE INSTITUTE OF PHARMACY KATHOG
TEH. JAWALAMUKHI
DISTT. KANGRA (H.P

ACADEMIC CALANDER

Himachal Pradesh Technical University
(A State Government University)
VPO Daruhi, Tehsil & District Hamirpur (H.P.)-177001
Phone :(01972) 226900, 226902, Fax: (01972) 226901
E-mail ID: registrarhimtu@gmail.com, website: www.himtu.ac.in

Academic Calendar for 1st Year B. Pharmacy Course for the Academic Session 2022-2023

Sr. No.	Event	Dated
	FIRST SEMESTER	
1	Commencement of Classes	27.10.2022 (Thursday)
2	1st Periodical Examinations	05.12.2022 to 08.12.2022
3	2nd Periodical Examinations	09.01.2022 to 12.01.2023
4	Dispersal of classes, preparatory leave, and practical examination	20.02.2023 to 25.02.2023
5	Theory Examination	27.02.2023 to 10.03.2023
6	Semester Break	13.03.2023 to 18.03.2023
	SECOND SEMESTER	
1	Commencement of Classes	20.03.2023 (Monday)
2	1st Periodical Examinations	01.05.2023 to 04.05.2023
3	2nd Periodical Examinations	05.06.2023 to 08.06.2023
4	Dispersal of classes, preparatory leave, and practical examination	08.07.2023 to 15.07.2023
5	Theory Examination	17.07.2023 to 31.07.2023

Note: -

1. All affiliating institutions shall follow the academic calendar strictly. The working shall be for six days (Monday to Saturday), except public holidays, from 9.00 a.m. to 5.00 p.m.
2. The Academic Calendar is tentative and will depend upon the advisory and guidelines issued by different concerned authorities from time to time.

15.10.22
Dean (Academic)

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HIMACHAL PRADESH TECHNICAL UNIVERSITY
(A STATE GOVERNMENT UNIVERSITY)

(ACADEMIC CALENDAR FOR THE ACADEMIC SESSION 2022-23)

ODD SEMESTER		
S. N	Events	Date
1	Vacations	08.08.2022 to 28.08.2022
2	Industrial Training of 4 weeks for B.Tech (6th Sem.)	10.8.2022 to 9.9.2022
3	Reporting Date for Faculty & Staff.	29.08.2022
4	Registration:	
	i. For Under- Graduate & Post Graduate classes	01.09.2022 to 08.09.2022
	ii. For B.Tech 7th Sem Students only	12.09.2022 to 15.09.2022
5	Induction Programme (1 week) For 1st Year Students	01.09.2022 to 08.09.2022
6	Commencement of classes:	
	i. For Under- Graduate & Post Graduate classes	01.09.2022
	ii. For B.Tech 7th Sem Students only	12.09.2022
7	1st Periodical Examinations	17.10.2022 to 20.10.2022
8	Mid Semester Break	22.10.2022 to 27.10.2022
9	HPTU Youth Festival	10.11.2022 to 11.11.2022
10	2nd Periodical Examination	14.12.2022 to 17.12.2022
11	End of Classes Work	23.12.2022
12	Reporting of shortage of attendance cases and display of internal sessional awards	24.12.2022
13	End Semester Practical Examinations	26.12.2022 to 29.12.2022
14	Start of End Semester Theory Examinations	02.01.2023

NOTE:

1. All affiliating colleges shall follow the academic calendar strictly. The working shall be for six days i.e. Monday to Saturday except public holidays.
2. Academic Calendar is tentative and will depend upon the advisory and guidelines issued by different concerned authorities from time to time

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w.e.f- 25/09/23

Time-Table

M.Pharm-II Sem (Pharmacology)

Days	9:30AM – 12:30 P.M			12:30PM – 1:30PM	1:30PM – 4:30PM		
	9:30 – 10:30	10:30 – 11:30	11:30 – 12:30		1:30-2:30	2:30-3:30	3:30-4:30
Mon.	Pharmacology practicals (NG)				Pharmacology practicals (NG)		
Tue.	PTSM II (NG)	Advanced Pharmacology (SKK)	Pharmacovigilance (DS)		PTSM II (NG)	Literature review	Drug Discovery (SP)
Wed.	Pharmacology practicals (SKK)			LUNCH BREAK	Pharmacology practicals (SKK)		
Thur.	Advanced Pharmacology (SKK)	Pharmacovigilance (DS)	Advanced Pharmacology (SKK)		Drug Discovery (AD)	Pharmacovigilance (DS)	Drug Discovery (SP)
Fri.	PTSM II (NG)	Pharmacovigilance (DS)	Advanced Pharmacology (SKK)		Drug Discovery (AD)	Library	PTSM II (NG)
Sat.	Pharmacology practicals (SKK)				Pharmacology practicals (SKK)		

SKK: Mr. Shiv Kumar Kushwaha; NG: Mr. Nishant Gautam; DS: Mr. DevRaj Sharma; AD: Ms. Arti Devi;

SP: Ms. Shana Priya

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w.e.f.- 25/02/23

Time-Table

M.Pharm-II Sem (PA & QA)

Days	9:30AM – 12:30 P M			12:30PM – 1:30PM	1:30PM – 4:30PM		
	9:30 – 10:30	10:30 – 11:30	11:30 – 12:30		1:30-2:30	2:30-3:30	3:30-4:30
Mon.	PA & QA Practicals (AD)				PA & QA Practicals (AD)		
Tue.	Pharm. validation (AD)	Adv. Inst. Analysis (AA)	Journal club		Modern Bioanalytical Techniques (AA)	Pharm. validation (AD)	Adv. Inst. Analysis (AA)
Wed.	PA & QA Practicals (Ankit)			LUNCH BREAK	PA & QA Practicals (Ankit)		
Thur.	Pharm. validation (AD)	Modern Bioanalytical Techniques (AA)	Pharm Mfg. Technique(Ankit)		Pharm Mfg. Technique(Ankit)	Adv Inst. Analysis (AA)	Pharm Mfg. Technique(Ankit)
Fri.	PA & QA Practicals (AD)				PA & QA Practicals (AD)		
Sat.	Modern Bioanalytical Techniques (AA)	Literature review Pharm Mfg. Technique(Ankit)	Modern Bioanalytical Techniques (AA)		Pharm. validation (AD)	Literature review	Adv. Inst. Analysis (AA)

AA: Dr. Amardeep; AD: Ms. Arti Devi; Mr. Ankit Sharma

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w.e.f.- 25/02/23

Time-Table

M.Pharm-II Sem (Pharmacology)

Days	9:30AM – 12:30 P M			12:30PM – 1:30PM	1:30PM – 4:30PM		
	9:30 – 10:30	10:30 – 11:30	11:30 – 12:30		1:30-2:30	2:30-3:30	3:30-4:30
Mon.	Pharmacology practicals (NG)	Pharmacology practicals (NG)	Pharmacology practicals (NG)	LUNCH BREAK	Pharmacology practicals (NG)	Pharmacology practicals (NG)	Pharmacology practicals (NG)
Tue.	PTSM II (NG)	Advanced Pharmacology (SKK)	Pharmacovigilance (DS)	LUNCH BREAK	PTSM II (NG)	Literature review	Drug Discovery (SP)
Wed.	Pharmacology practicals (SKK)	Pharmacology practicals (SKK)	Pharmacology practicals (SKK)	LUNCH BREAK	Pharmacology practicals (SKK)	Pharmacology practicals (SKK)	Pharmacology practicals (SKK)
Thur.	Advanced Pharmacology (SKK)	Pharmacovigilance (DS)	Advanced Pharmacology (SKK)	LUNCH BREAK	Drug Discovery (AD)	Pharmacovigilance (DS)	Drug Discovery (SP)
Fri.	PTSM II (NG)	Pharmacovigilance (DS)	Advanced Pharmacology (SKK)	LUNCH BREAK	Drug Discovery (AD)	Library	PTSM II (NG)
Sat.	Pharmacology practicals (SKK)	Pharmacology practicals (SKK)	Pharmacology practicals (SKK)	LUNCH BREAK	Pharmacology practicals (SKK)	Pharmacology practicals (SKK)	Pharmacology practicals (SKK)

SKK: Mr. Shiv Kumar Kushwaha; NG: Mr. Nishant Gautam; DS: Mr. DevRaj Sharma; AD: Ms. Arti Devi;

SP: Ms. Shanu Priya

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w.e.f.- 25/12/23

Time-Table

M.Pharm-II Sem (Pharmaceutics)

Days	9:30AM – 12:30 P M			12:30PM – 1:30PM	1:30PM – 4:30PM		
	9:30 – 10:30	10:30 – 11:30	11:30 – 12:30		1:30-2:30	2:30-3:30	3:30-4:30
Mon.	Biopharmaceutics & P'kinetics (DS)	Literature review	Molecular P'ceutics (SJ)		Biopharmaceutics & P'kinetics (DS)	Computer aided DDS (PK)	Molecular P'ceutics (SJ)
Tue.	Computer aided DDS (PK)/ Biopharmaceutics & P'kinetics (DS)				Computer aided DDS (PK)/ Biopharmaceutics & P'kinetics (DS)		
Wed.	Biopharmaceutics & P'kinetics (DS)	Cosmetics & cosmeceuticals (MSA)	Molecular P'ceutics (SJ)	LUNCH BREAK	Computer aided DDS (PK)	Cosmetics & cosmeceuticals (TS)	Computer aided DDS (PK)
Thur.	Molecular P'ceutics (SJ)				Molecular P'ceutics (SJ)		
Fri.	Cosmetics & cosmeceuticals (TS)				Cosmetics & cosmeceuticals (DS)		
Sat.	Cosmetics & cosmeceuticals (TS)	Biopharmaceutics & P'kinetics (DS)	Molecular P'ceutics (SJ)		Library	Cosmetics & cosmeceuticals (MSA)	Computer aided DDS (PK)

MSA: Dr. M S Arshawat; PK: Dr. Pravin Kumar; SJ: Dr. Shammy Jindal; DS: Mr. DevRaj Sharma; TS: Mr. Tarun Sharma

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Time-Table for 2nd Semester (Section-A)

Days	9:30AM – 12:30PM			12:30PM – 1:30PM	1:30PM – 4:30PM		
	Theory/Practical				Theory		
	A-Batch		B-Batch		1:30-2:30	2:30 – 3:30	3:30 – 4:30
Mon. (Practical)	Computer (SS)		HAP - II (SR)	LUNCH BREAK	Biochem. (PA)	HAP - II (NG)	P'ceutical O. Chemistry-I (SP)
Tue. (Practical)	P'ceutical O. Chemistry-I (Ank[illegible]		Computer (SS)		Env. sci. (DR)	Computer (SS)	Env. sci. (DR)
Wed. (Practical)	HAP - II (SR)		Biochem. (Ankita)		Biochem. (PA)	HAP - II (NG)	P'ceutical O. Chemistry-I (SP)
Thur. (Practical)	Biochem. (Ankita)		P'ceutical O. Chemistry-I (SP)		P'ceutical O. Chemistry-I (SP)	HAP - II (NG)	Pathophysio. (SR)
Fri. (Theory)	9:30 – 10:30	10:30 – 11:30	11:30 – 12:30		P'ceutical O. Chemistry-I (SP)	Library	Biochem. (PA)
	Biochem. (PA)	Computer (SS)	Pathophysio. (NG)				
Sat. (Theory)	HAP - II (NG)	Computer (SS)	Env. sci. (DR)		Pathophysio. (NG)	Computer (SS)	Pathophysio. (SR)

PA: Dr. Pratima Ashawat; NG: Mr. Nishant Gautam; DR: Ms. Dimple Rana; SR: Dr. Swati Rana; Mr. Ankit Sharma; Ms. Ankita; SS: Ms. Shriya Shar

Morning classes: M.Pharma, Room No. 01

Evening classes: Room No. 01

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w.e.f. -

Time-Table for 2nd Semester (Section-B)

Days	9:30AM - 12:30PM			12:30PM - 1:30PM	1:30PM – 4:30PM		
	Theory/Practical				Theory		
	9:30 – 10:30	10:30 – 11:30	11:30 – 12:30		1:30– 2:30	2:30 – 3:30	3:30 – 4:30
Mon. (Theory)	Pathophysio. (VB)	Env. sci. (AG)	P'ceutical O. Chemistry-I (SP)	LUNCH BREAK	HAP - II (SKK)	Computer (SS)	HAP - II (SKK)
Tue. (Theory)	Pathophysio. (VB)	P'ceutical O. Chemistry-I (SP)	Env. sci. (AG)		P'ceutical O. Chemistry-I (SP)	Pathophysio. (VB)	Env. sci. (AG)
Wed. (Practical)	A-Batch: Computer (SS)		B-Batch: HAP - II (NG)		Pathophysio. (VB)	Computer (SS)	Biochem. (PA)
Thur. (Practical)	HAP - II (NG)		Computer (SS)		Biochem. (PA)	Computer (SS)	HAP - II (SKK)
Fri. (Practical)	Biochem. (Ankita)		P'ceutical O. Chemistry-I (SP)		Biochem. (PA)	Computer (SS)	HAP - II (SKK)
Sat. (Practical)	P'ceutical O. Chemistry-I (SP)		Biochem. (Ankita)		P'ceutical O. Chemistry-I (SP)	Library	Biochem. (PA)

PA: Dr. Prafulla Ashawat; SKK: Mr. Shiv Kumar Kushawaha; NG: Mr. Nishant Gautam; SP: Ms. Shanu Priya; VB: Ms. Vandana Bhatia
AG: Ms. Anchal Guleria; Ms. Ankita; SS: Ms. Shriya Sharma

Morning Classes: M. Pharma. ~~B.Pharm~~ Room No. 01

Evening Classes: Room No. 02

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w.e f. - 25/07/23

Time-Table for 4th Semester (Section-A)

Days	9:30AM – 12:30 P M			12:30PM – 1:30PM	1:30PM – 4:30PM		
	Theory				Theory/Practical		
	9:30 – 10:30	10:30 – 11:30	11:30 – 12:30		A-Batch	B-Batch	
Mon.	Physical Pharm (AK)	Org. Chem (AS)	P'cognosy (RR)		Med Chem (AS)	P'Col (VB)	
Tue.	P'cognosy (RR)	Library	P'Col (VB)		1:30-2:30	2:30 – 3:30	3:30 – 4:30
					Org. Chem (AS)	Physical Pharm (AK)	Med. Chem (AS)
Wed.	P'Col (VB)	Org. Chem (AS)	P'cognosy (RR)		Med. Chem (AS)	Library	P'Col (VB)
Thur.	P'cognosy (RR)	Org. Chem (AS)	Sports		A-Batch	B-Batch	
					P'Col (VB)	Physical Pharm (AK)	
Fri.	Physical Pharm (AK)	Library	Med. Chem (AS)		P'cognosy (SK)	Med Chem (AS)	
Sat.	P'Col (VB)	Physical Pharm (AK)	Med. Chem (AS)		Physical Pharm (AK)	P'cognosy (CPS)	

LUNCH BREAK

CPS: Prof. CPS Verma; SK: Dr. Sanjay Kumar; RR: Ms. Rinu Rana; AK: Mr. Ajay Kumar; VB: Ms. Vandana Bhatia; AS: Ms. Astha Sharma

Morning Classes; Room No. 03

Evening Classes; M.Pharma Room No. 01

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w.e.f. - 25/07/23

Time-Table for 4th Semester (Section-B)

Days	9:30AM – 12:30 P M			12:30PM – 1:30PM	1:30PM – 4:30PM		
	Theory				Theory/Practical		
	9:30 – 10:30	10:30 – 11:30	11:30 – 12:30		1:30-2:30	2:30 – 3:30	3:30 – 4:30
Mon.	Med Chem (NS)	Physical Pharmacy (MSA)	P'Col (VB)	LUNCH BREAK	Med Chem (Ankita)	Physical Pharmacy (DR)	Med Chem (Ankita)
Tue.	Org. Chem (AS)	Sports	P'cognosy (RR)		A-Batch		B-Batch
Wed.	P'cognosy (RR)	Library	Physical Pharmacy (DR)		P'cognosy (RR)		Med Chem (Ankit)
Thur.	P'Col (VB)	Physical Pharmacy (DR)	Med Chem (NS)		Physical Pharmacy (DR)		P'cognosy (RR)
Fri.	Org. Chem (AS)	P'Col (VB)	P'cognosy (RR)		1:30-2:30	2:30 – 3:30	3:30 – 4:30
Sat.	Org. Chem (AS)	Library	P'Col (VB)		P'cognosy (RR)	Library	Org. Chem (AS)
					A-Batch		B-Batch
					P'Col (VB)		Physical Pharmacy (DR)
					Med Chem (Ankit)		P'Col (VB)

MSA: Dr. MS Ashawat; RR: Ms. Rinu Rana; DR: Ms. Dimple Rana; AS: Ms. Astha Sharma; VB: Ms. Vandana Bhatia; NS: Mr. Nikhil Sharma; Mr. Ankit Sharma; Ms. Ankita.

Morning class: Room No. 04

Evening class; M.Pharma Room No. 05

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TEH: JAWALAMUKHI
DISTT. KANGRA (H.P.)

w.e.f. - 25/02/23

Time-Table for 6th Semester (Section-A)

Days	9:30AM – 12:30 P M					12:30PM – 1:30PM	1.30PM – 4.30PM		
	Practical/Theory						Theory		
Mon.	9:30 – 10:30		10:30 – 11:30		11:30 – 12:30		1:30-2:30	2:30 – 3:30	3:30 – 4:30
	Quality Assurance (Ankita)		Herbal Drug Technology (CPS)		Med Chem (NS)		Biotech (TS)	Herbal Drug Technology (CPS)	Biopharm (DS)
Tue.	Med Chem (NS)		Quality Assurance (Ankita)		Herbal Drug Technology (CPS)		Quality Assurance (Ankita)	Biotech (TS)	P'cology (SK)
Wed.	A-Batch			D-Batch			Biopharm (DS)	Herbal Drug Technology (CPS)	P'cology (SK)
	HDT (SK)			P'cology (SK)					
Thur.	P'cology (SK)			HDT (SK)			Quality Assurance (Ankita)	Med Chem (NS)	P'cology (SK)
Fri.	Med Chem (NS)			9:30 – 10:30	10:30 – 11:30	11:30 – 12:30	P'cology (SK)	Med Chem (NS)	Biotech (TS)
				Weekly test (PC)	Library	Weekly test (AD)			
Sat.	9:30 – 10:30	10:30 – 11:30	11:30 – 12:30	Med Chem (NS)			Biopharm (DS)	Biotech (TS)	Biopharm (DS)
	Weekly test (AG)	Library	Weekly test (PC)						

LUNCH BREAK

CPS: Prof. CPS Verma; SK: Dr. Sanjay Kumar; DS: Mr. DevRaj Sharma; TS: Mr. Tarun Sharma; AD: Ms. Arti Devi; SK: Ms. Shavinder Kumar
NS: Mr. Nikhil Sharma; AG: Ms. Anchal Guleria; PC: Ms. Pratibha Chaudhary; Ms. Ankita

Morning classes: M.Pharma. Room No. 02
Evening classes: Room No. 03

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w.e.f. - 25/02/23

Time-Table for 6th Semester (B)

Days	9:30AM – 12:30 P M				12:30PM – 1:30PM	1.30PM – 4.30PM		
	Theory/Practical					Theory/Practical		
	A-Batch			B-Batch		A-Batch	B-Batch	
Mon.	Herbal Drug Technology (SK)			9:30 – 10:30 Weekly test (DR)	10:30 – 11:30 Library	11:30 – 12:30 Weekly test (AS)	Med Chem (NS)	P'cology (SR)
Tue.	9:30 – 10:30 Weekly test (AG)	10:30 – 11:30 Library	11:30 – 12:30 Weekly test (TS)	Herbal Drug Technology (SK)			P'cology (SR)	Med Chem (NS)
Wed.	9:30 – 10.30		10:30 – 11:30	11:30 – 12:30	LUNCH BREAK	1:30-2:30	2:30 – 3:30	3:30 – 4:30
	Biotech (DR)		HDT (CPS)	Med Chem (NS)		Med Chem (NS)	P'cology (SR)	Quality Assurance (Ankita)
Thur.	Med Chem (NS)		HDT (CPS)	P'cology (SR)		Biopharm (AG)	Biotech (DR)	QA (Ankita)
Fri.	Biopharm (AG)		Biotech (DR)	HDT (CPS)		P'cology (SR)	QA (Ankita)	Biopharm (AG)
Sat.	Biotech (DR)		HDT (CPS)	P'cology (SR)		QA (Ankita)	Biopharm (AG)	Med Chem (NS)

CPS: Prof. CPS Verma; SK: Dr. Sanjay Kumar; TS: Mr. Tarun Sharma; DR: Ms. Dimple Rana; SR: Dr. Swati Rana; AS: Ms. Astha Sharma;
AG: Ms. Anchal Guleria; NS: Mr. Nikhil Sharma; Ms. Ankita

Morning Classes: M.Pharma. Room No. 02
Evening Classes: Room No. 04

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w.e.f. - 25/02/23

Time-Table for 8th Semester (Section A)

Days	9:30AM – 12:30 P M			12:30PM – 1:30PM	1:30PM – 4:30PM	
	Theory				Practical	
	9:30 – 10:30	10:30 – 11:30	11:30 – 12:30		A-Batch	B-Batch
Mon.	Regulatory affairs (SJ)	Library	Biostat (BD)	LUNCH BREAK	PROJECT WORK	
Tue.	Pharmacovigilance (KD)	Sports	Regulatory affairs (SJ)			
Wed.	Regulatory affairs (SJ)	Biostat (PK)	Social pharmacy (PC)			
Thur.	Pharmacovigilance (KD)	Social pharmacy (PC)	Biostat (PK)			
Fri.	Biostat (BD)	Social pharmacy (PC)	Pharmacovigilance (KD)			
Sat.	Regulatory affairs (SJ)	Social pharmacy (PC)	Pharmacovigilance (KD)			

PK: Dr. Pravin Kumar; SJ: Dr. Shammy Jindal; PC: Ms. Pratibha Chaudhary; KD: Mr. Keshav Dhiman; BD: Ms. Bandana Dhiman

Morning classes: Room No. 01

Principal

DIRECTOR-CUM-PRINCIPAL
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TEH. JAWALAMUKHI
DISTT. KANGRA (H.P.)

w.e.f. - 28/02/23

Time-Table for 8th Semester (Section B)

Days	9:30AM – 12:30 P M			12:30PM – 1:30PM	1:30PM – 4:30PM	
	Theory				Practical	
	9:30 – 10:30	10:30 – 11:30	11:30 – 12:30		A-Batch	B-Batch
Mon.	Regulatory Affairs (TS)	Biostat (PK)	Pharmacovigilance (AT)	LUNCH BREAK	PROJECT WORK	
Tue.	Pharmacovigilance (AT)	Social Pharmacy (AK)	Pharmacovigilance (AT)			
Wed.	Social Pharmacy (AK)	Biostat (BD)	Regulatory Affairs (TS)			
Thur.	Regulatory Affairs (TS)	Social Pharmacy (AK)	Library			
Fri.	Pharmacovigilance (AT)	Sports	Social Pharmacy (AK)			
Sat.	Biostat (BD)	Biostat (PK)	Regulatory Affairs (TS)			

PK: Dr. Pravin Kumar; TS: Mr. Tarun Sharma; AK: Mr. Ajay Kumar; AT: Mr. Akshay Thakur; BD: Ms. Bandana Dhiman

Morning classes; Room No. 02

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Principal

M. Pharm (Pharmaceutical Analysis & Quality Assurance) Sem I

Days	9:30AM – 12:30 P M			12:30PM – 1:30PM	1:30PM – 4:30PM		
Mon	Quality Mgt (RK)	Herbal And Cosmetic Analysis (CPS)	QA & QC (AD)	LUNCH BREAK	Literature review	Herbal And Cosmetic Analysis (CPS)	Quality Mgt (NS)
Tue	MPAT (AA)	QA & QC (AN)	MPAT (AA)		Herbal And Cosmetic Analysis (CPS)	Quality Mgt (NS)	QA & QC (AD)
Wed	MPAT (AA)	QA & QC (AN)	Herbal And Cosmetic Analysis (CPS)		Quality Mgt (RK)	MPAT (AA)	Journal club
Thur	PA & QA Practical (AN)				PA & QA Practical (NS)		
Fri	MPAT Practical (AA)				MPAT Practical (AA)		
Sat	PA & QA Practical (Ankit)				PA & QA Practical (UP)		

CPS: Prof. CPS Verma; AA: Dr. Amardeep; AD: Ms. Arti Devi; UP: Ms. Upasana Thakur; Mr. Ankit Sharma; RK: Mr. Rohit Kumar; AS: Ms. Astha Sharma; NS: Mr. Nikhil Sharma; AN: Ms. Ankita

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Oct 2022

M. Pharm (Pharmacology) Sem I

Days	9:30AM – 12:30 P M			12:30PM – 1:30PM	1:30PM – 4:30PM		
Mon.	Toxicology (NG)	Journal club	Advanced P'cology (KA)	LUNCH BREAK	Cellular P'cology (VB)	Advanced P'cology (KA)	Cellular P'cology (VB)
Tue.	MPAT (AA)	Toxicology (NG)	MPAT (AA)		Cellular P'cology (VB)	Literature review	Cellular P'cology (VB)
Wed.	MPAT (AA)	Advanced P'cology (KA)	Toxicology (NG)		Advanced P'cology (KA)	MPAT (AA)	Toxicology (NG)
Thur	Pharmacology Practicals (NG)				Pharmacology Practicals (NG)		
Fri.	MPAT Practical (AA)				MPAT Practical (AA)		
Sat.	Pharmacology Practicals (SKK)				Pharmacology Practicals (SKK)		

AD: Dr. Amardeep; KA: Dr. Kailash; SKK: Mr. Shiv Kumar Kushwaha; NG: Mr. Nishant Gautam; VB: Ms. Vandana Bhatia

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Oct 2022

M. Pharm (Pharmaceutics) Sem III

M. Pharm (Pharmaceutical Analysis & Quality Assurance) Sem III

M. Pharm (Pharmacology) Sem III

Days	9:30AM – 12:30 P M			12:30PM – 1:30PM	1:30PM – 4:30PM		
	9:30 – 10:30	10:30 – 11:30	11:30 – 12:30		1:30-2:30	2:30-3:30	3:30-4:30
Mon				LUNCH BREAK			
Tue						Research methodology (SJ)	
Wed						Research methodology (SJ)	
Thur							
Fri		Research methodology (SJ)				Research methodology (SJ)	
Sat							

SJ: Dr. Shammy Jindal

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w.e.f. - Oct 2022

Time-Table for 1st Semester (Section-A)

Days	9:30AM – 12:30 P M			12:30PM – 1:30PM	1:30PM – 4:30PM	
	Theory				Practical/Theory	
	9:30 – 10:30	10:30 – 11:30	11:30 – 12:30		A-Batch	B-Batch
Mon.	Human Anatomy & Physiology I (SKK)	Introduction to Pharmaceutics (DR)	P. Analysis I (SP)	LUNCH BREAK	Introduction to Pharmaceutics (DR)	P. Inorganic Chemistry (AS)
Tue.	P. Analysis I (SP)	Human Anatomy & Physiology I (SKK)	Introduction to Pharmaceutics (DR)		P. Inorganic Chemistry (AS)	Introduction to Pharmaceutics (DR)
Wed.	Introduction to Pharmaceutics (DR)	P. Inorganic Chemistry (RK)	Human Anatomy & Physiology I (SKK)		Human Anatomy & Physiology I (VB)	P. Analysis I (SP)
Thur.	P. Inorganic Chemistry (RK)	Introduction to Pharmaceutics (MSA)	P. Analysis I (SP)		P. Analysis I (SP)	Human Anatomy & Physiology I (VB)
Fri.	Rem Bio/ Rem Maths (SR, MK)	P. Inorganic Chemistry (RK)	Human Anatomy & Physiology I (SKK)		1:30-2:30PM	Practical 2:30PM – 4:30PM
					Communication skills (DR)	Communication skills (DR)
Sat.	Rem Bio/ Rem Maths (SR, MK)	P. Analysis I (SP)	P. Inorganic Chemistry (RK)		Communication skills (DR)	Remedial Biology Practical (SR)

SKK: Mr. Shiv Kumar Kushwaha; AD: Ms. Arti Devi; DR: Ms. Dimple Rana; RK: Mr. Rohit Kumar; VB: Ms. Vandana Bhatia;
SP: Ms. Shanu Priya; AS: Ms. Astha Sharma; SR: Dr. Swati Rana; DR: Mr. Devroop; MK: Mr. Manish Kumar

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w.e.f. - Oct 202

Time-Table for 1st Semester (Section-B)

Days	9:30AM – 12:30 P M			12:30PM – 1:30PM	1:30PM – 4:30PM	
	Theory				Practical/Theory	
	9:30 – 10:30	10:30 – 11:30	11:30 – 12:30		A-Batch	B-Batch
Mon.	Introduction to Pharmaceutics (Anisha)	P. Analysis (SP)	Human Anatomy & Physiology I (NG)	LUNCH BREAK	Human Anatomy & Physiology I (SR)	P. Analysis I (RK)
Tue.	P. Inorganic Chemistry (AS)	Introduction to Pharmaceutics (PK)	P. Analysis (SP)		P. Analysis I (RK)	Human Anatomy & Physiology I (KA)
Wed.	P. Analysis (SP)	Human Anatomy & Physiology I (NG)	Introduction to Pharmaceutics (Anisha)		Introduction to Pharmaceutics (Anisha)	P. Inorganic Chemistry (AS)
Thur.	P. Analysis (SP)	Human Anatomy & Physiology I (NG)	P. Inorganic Chemistry (AS)		P. Inorganic Chemistry (AS)	Introduction to Pharmaceutics (Anisha)
Fri.	Rem Bio/ Rem Maths (SR, MK)	Communication skills (DR)	Introduction to Pharmaceutics (Anisha)		1:30-2:30PM	Practical 2:30PM – 4:30PM
					P. Inorganic Chemistry (AS)	Remedial Biology Practical (SR)
Sat.	Rem Bio/ Rem Maths (SR, MK)	Human Anatomy & Physiology I (NG)	Communication skills (DR)		P. Inorganic Chemistry (AS)	Communication skills Practical (DR)

KA: Dr. Kailash; PK: Dr. Pravin Kumar; NG: Mr. Nishant Gautam; Ms. Anisha Rana; RK: Mr. Rohit Kumar; SP: Ms. Shanu Pr
AS: Ms. Astha Sharma; SR: Dr. Swati Rana; DR: Mr. Devroop; MK: Mr. Manish Kumar

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w.e.f. - Oct 2022

Time-Table for 3rd Semester (Section-A)

Days	9:30AM-12:30PM			12:30PM 1:30PM	1:30PM – 4:30PM		
	Practical/Theory				Theory		
	A-Batch	B-Batch			1:30-2:30	2:30-3:30	3:30-4:30
Mon.	Pharm. Engineering (AG)	Physical Pharmacy (TS)			O. Chemistry (NS)	Physical Pharmacy (TS)	Microbiology (PA)
Tue.	Physical Pharmacy (Anisha)	Pharm. Engineering (AG)			Microbiology (PA)	Weekly test (Pharm Eng.)	Physical Pharmacy (TS)
Wed.	Microbiology (Alka)	O. Chemistry (NS)			Microbiology (PA)	Weekly test (Microbiology)	Physical Pharmacy (TS)
Thur.	O. Chemistry (NS)	Microbiology (Alka)		LUNCH BREAK	Microbiology (PA)	Pharm. Engineering (AG)	Physical Pharmacy (TS)
Fri.	9:30 – 10:30	10:30 – 11:30	11:30 – 12:30		Pharm. Engineering (AG)	O. Chemistry (NS)	Weekly test (Physical Pharmacy)
	Pharm. Engineering (AG)	O. Chemistry (NS)	Weekly test (Org Chem)				
Sat.	Pharm. Engineering (AG)	Library	O. Chemistry (NS)				

PA: Dr. Pratima Ashawat; TS: Mr. Tarun Sharma; Ms. Alka Gautam; Ms. Anisha Rana; NS: Ms. Nikhil Sharma; AG: Ms. Anchal Guleria

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Time-Table for 3rd Semester (Section-B)

Days	9:30AM-12:30PM			12:30PM 1:30PM	1:30PM – 4:30PM		
	Practical/Theory				Theory		
	A-Batch		B-Batch				
	9:30 – 10:30	10:30 – 11:30	11:30 – 12:30		1:30-2:30	2:30-3:30	3:30-4:30
Mon.	Pharm. Engineering (AK)	Weekly test (Org Chem)	Microbiology (PA)		Microbiology (PA)	Library	O. Chemistry (UP)
Tue.	Microbiology (PA)	Pharm. Engineering (AK)	O. Chemistry (UP)		Weekly test (Physical Pharmacy)	Pharm. Engineering (AK)	Microbiology (PA)
Wed.	Pharm. Engineering (AK)		Physical Pharmacy (Ankush)	LUNCH BREAK	O. Chemistry (UP)	Weekly test (Pharm Eng.)	Physical Pharmacy (DS)
Thur.	Physical Pharmacy (DS)		Pharm. Engineering (AK)		Physical Pharmacy (DS)	O. Chemistry (UP)	Physical Pharmacy (DS)
Fri.	Microbiology (Ankush)		O. Chemistry (UP)		Physical Pharmacy (DS)	Weekly test (Microbiology)	Pharm. Engineering (AK)
Sat.	O. Chemistry (UP)		Microbiology (AG)				

PA: Dr. Pratima Ashawat; DS: Mr. DevRaj Sharma; AG: Ms. Alka Gautam; UP: Ms. Upasana Thakur; AK: Mr. Ajay Kumar; Mr. Ankush Sharma

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w.e.f. - Oct-2022

Time-Table for 5th Semester (Section-A)

Days	9:30AM – 12:30 P M			12:30PM – 1:30PM	1:30PM – 4:30PM		
	Practical/Theory				Theory		
	A-Batch		B-Batch		1:30-2:30	2:30-3:30	3:30-4:30
Mon.	Industrial Pharmacy (SJ)		Weekly Test (AT/AS)	LUNCH BREAK	Med Chem (UP)	P'cology I (SK)	Industrial Pharmacy (SJ)
Tue.	P. Cognosy (RR)		Industrial Pharmacy (SJ)		Med Chem (Ankit)	P'cology I (SK)	P. Cognosy (CPS)
Wed.	P'cology I (SK)		P. Cognosy (RR)		P. Jurisprudence (Ankush)	P. Cognosy (CPS)	Med Chem (Ankit)
Thur.	Weekly Test (AG/SKK/DR)		P'cology I (SK)		Industrial Pharmacy (SJ)	P'cology I (SK)	P. Jurisprudence (Ankush)
Fri.	9:30 – 10:30	10:30 – 11:30	11:30 – 12:30		P. Jurisprudence (Ankush)	P'cology I (SK)	Med Chem (UP)
	Industrial Pharmacy (SJ)	P. Cognosy (CPS)	Library				
Sat.	Industrial Pharmacy (SJ)	P. Cognosy (CPS)	P. Jurisprudence (Ankush)				

CPS: Prof. CPS Verma; SJ: Dr. Shammy Jindal; RR: Ms. Rinu Rana; DS: Mr. DevRaj Sharma; UP: Ms. Upasana Thakur; Mr. Ankit Sharma; DR: Ms. Dimple Rana; Mr. Ankush Sharma; SK: Ms. Shavinder Kumari

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w.e.f. - Oct 2022

Time-Table for 5th Semester (Section-B)

Days	9:30AM – 12:30 P M			12:30PM – 1:30PM	1:30PM – 4:30PM		
	Practical/Theory				Theory		
	A-Batch		B-Batch		1:30-2:30	2:30-3:30	3:30-4:30
Mon.	P. Cognosy (RR)		P'cology I (AR)	LUNCH BREAK	P'cology I (AR)	P. Jurisprudence (SK)	Industrial Pharmacy (DS)
Tue.	9:30 – 10:30	10:30 – 11:30	11:30 – 12:30		Med Chem (NS)	P. Jurisprudence (SK)	P'cology I (AR)
	Med Chem (RK)	P. Cognosy (SK)	Industrial Pharmacy (DS)				
Wed.	P. Cognosy (SK)	P'cology I (AR)	P'cology I (AR)		Industrial Pharmacy (DS)	Library	Med Chem (RK)
	A-Batch		B-Batch		P. Jurisprudence (SK)	Med Chem (RK)	P. Cognosy (SK)
Thur.	Weekly Test (KD/TS)		P. Cognosy (RR)				
Fri.	Industrial Pharmacy (PC)		Weekly Test (AC/KD/AT)		P'cology I (AR)	P. Cognosy (SK)	Industrial Pharmacy (DS)
Sat.	P'cology I (AR)		Industrial Pharmacy (TS)				

SK: Dr. Sanjay; RR: Ms. Rinu Rana; DS: Mr. DevRaj Sharma; TS: Mr. Tarun Sharma; DR: Ms. Dimple Rana; RK: Mr. Rohit Kumar; NS: Ms. Nikhil Sharma; AR: Ms. Arti Rana; KD: Mr. Keshav Dhiman

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w.e.f. - Oct 202

Time-Table for 7th Semester (Section-A)

Days	9:30AM – 12:30 P M			12:30PM – 1:30PM	1:30PM – 4:30PM	
	Theory				Practical	
	9:30 – 10:30	10:30 – 11:30	11:30 – 12:30		A-Batch	B-Batch
Mon.	P. Practice (VB)	Weekly Test (PK)	NDDS (Anisha)	LUNCH BREAK	Practice school	Practice school
Tue.	P. Practice (VB)	Weekly Test (VB)	NDDS (MSA)		Practice school	Practice school
Wed.	P. Practice (VB)	Industrial Pharmacy II (SJ)	Analysis (AD)		Analysis (AN)	Practice school
Thur.	P. Practice (VB)	Industrial Pharmacy II (SJ)	Analysis (AD)		Practice school	Analysis (Ankit)
Fri.	Industrial Pharmacy II (AK)	NDDS (Anisha)	Analysis (AD)		Practice school	Practice school
Sat.	Industrial Pharmacy II (AK)	Analysis (AD)	NDDS (Anisha)			

MSA: Dr. M S Ashawat; SJ: Dr. Shammy Jindal; PK: Mr. Pravin Kumar; AD: Ms. Arti Devi; Mr. Ankit Sharma; Ms. Anisha Rana; AK: Mr. Ajay Kumar; VB: Ms. Vandana Bhatia; AN: Ms. Ankita

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w.e.f. - Oct 2022

Time-Table for 7th Semester (Section-B)

Days	9:30AM – 12:30 P M			12:30PM – 1:30PM	1:30PM – 4:30PM	
	Theory				Practical	
	9:30 – 10:30	10:30 – 11:30	11:30 – 12:30		A-Batch	B-Batch
Mon.	Analysis (AD)	NDDS (Ankush)	P. Practice (SR)	LUNCH BREAK	Analysis (AN)	Practice school
Tue.	Industrial Pharmacy II (Ankush)	Weekly Test (PK)	Analysis (AD)		Practice school	Analysis (AN)
Wed.	NDDS (AG)	Analysis (AD)	P. Practice (SR)		Practice school	Practice school
Thur.	NDDS (Ankush)	Industrial Pharmacy II (TS)	NDDS (Ankush)		Practice school	Practice school
Fri.	Analysis (AD)	P. Practice (VB)	Weekly Test (VB)		Practice school	Practice school
Sat.	Industrial Pharmacy II (Ankush)	NDDS (MSA)	P. Practice (VB)		**For Lateral entry students:** 1:30-2:30 pm: Comm. Skills lecture (Friday & Saturday) 2:30-4:30 pm: Comm. Skills Practical (Saturday)	

MSA: Dr. M S Ashawat; PK: Mr. Pravin Kumar; TS: Mr. Tarun Sharma; Mr. Ankush Sharma; VB: Ms. Vandana Bhatia; SR: Dr. Swati Ran
AG: Ms. Anchal Guleria; AN: Ms. Ankita; DR: Mr. Devroop

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Oct 2022

M. Pharm (Pharmaceutics) Sem I

Days	9:30AM – 12:30 P M			12:30PM – 1:30PM	1:30PM – 4:30PM		
Mon.	MPAT Practical (Ankit)		Modern P'ceutics (DS)	LUNCH BREAK	MPAT Practical (Ankit/AD)		
Tue.	MPAT (AA)	Library	MPAT (AA)		Regulatory Affair (TS)	Drug Delivery System (PK)	Modern P'ceutics (DS)
Wed.	MPAT (AA)	Regulatory Affair (TS)	Drug Delivery System (PK)		Regulatory Affair (TS)	MPAT (AA)	Drug Delivery System (PK)
Thur.	Modern Pharmaceutics Practical (DR)				Modern Pharmaceutics Practical (AK)		
Fri.	Drug Delivery System (PK)				Drug Delivery System (PK)		
Sat.	Journal club	Drug Delivery System (MSA)	Modern P'ceutics (DS)		Literature review	Modern P'ceutics (DS)	Regulatory Affair (TS)

MSA: Dr. M S Ashawat; AA: Dr. Amardeep; PK: Mr. Pravin Kumar; DS: Mr. DevRaj Sharma; TS: Mr. Tarun Sharma; AD: Ms. Arti Devi; DR: Ms. Dimple Rana; AK: Mr. Ajay Kumar

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WORKLOAD OF PHARMACY FACULTY (Jan to June 2023)

S. N.	Name	Subject	B.Pharm (in Hrs)								Total Workload (in Hrs)
			I		II		III		IV		
			Th.	Pr.	Th.	Pr.	Th.	Pr.	Th.	Pr.	
1.	Dr. M S Ashawat	Physical Pharm. II			01						01
2.	Prof. C P S Verma	HDT					07				07
3.	Dr. Amardeep	-									-
4.	Dr. Kailash Sharma	HAP II Pharmacology	02					03			05
5.	Dr. Suresh Kumar	Pharmacology					02	03			05
6.	Dr. Pravin Kumar	Biostatistics							04		04
7.	Mr. Shiv Kumar Kushwaha	HAP II	02								02
8.	Dr. Shammy Jindal	Regulatory affairs							04		04
9.	Dr. Sanjay	HDT P' Cognosy I				03	01	06			10
10.	Mr. Nishant Gautam	HAP II	04	06							10
11.	Miss Rinu Rana	P' Cognosy I			06	06					12
12.	Mr. Dev Raj Sharma	Biopharm					04				04
13.	Mr. Tarun Sharma	Regulatory affairs Biotech					04		04		08

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14.	**Ms. Arti Devi**	-									-
15.	**Mr. Ankush Sharma**	P'vigilance Biostat. Regulatory affairs							04 02 02		08
16.	**Mr. Ajay Kumar**	Physical Pharmacy II Social Pharmacy				06			04		10
17.	**Ms. Alka Gautam**	Pharmacognosy HDT			02			12			14
18.	**Ms. Dimple Rana**	EVS Physical Pharmacy II Biotech	03		03		04				10
19.	**Mr. Rohit Kumar**	Med Chem. Med. Chem.				03	04				07
20.	**Ms. Shanu Priya**	P. O.C. III	08	06							14
21.	**Ms. Astha Sharma**	P. O.C. III Med. Chem. I			08 04	03					15
22.	**Mr. Ankit Sharma**	P' Org. Chem. I Med chem. I		03				06			09
23.	**Ms. Shavinder**	Pharmacology					04	03			07
24.	**Ms. Madhu Bala**	P' Org. Chem. I Biochem. Med Chem.		03 03			02				08
25.	**Mr. Nikhil**	Med Chem Med Chem			02		04	12			18
26.	**Ms. Anisha**	Physical Pharm.			04	06					10

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27.	**Ms. Vandana Bhatia**	Pathophysiology Pharmacology I	02		06	12					20
28.	**Dr. Swati Rana**	HAP II Pharmacology	02	06			02	03			13
29.	**Ms. Pratibha Chaudhry**	Social Pharmacy							04		04
30.	**Ms. Anchal Guleria**	EVS Biopharm.	03				04				07
31.	**Mr. Akshay Thakur**	Pharmacovigilance							04		04
32.	**Ms. Ankita**	Biochemistry Quality Assurance		09			08				17
33.	**Dr. Pratima Ashawat**	Biochem.	08								08
34.	**Ms. Bandana Dhiman**	Biostatistics							04		04
35.	**Ms. Shriya Sharma**	Computer Science	06	12							18

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M. Pharm

WORKLOAD OF PHARMACY FACULTY (Jan 2023 to June 2023)

Sr. no.	Name	Subject	No. Of hours		Total Workload (in Hrs)
			Theory	Practical	
1	**Dr. M S Ashawat**	Cosmetics & cosmeceuticals	02	-	02
2	**Dr. Amardeep**	Adv. Inst. Analysis	04	-	08
		Modern Bioanalytical Techniques	04		
3	**Dr. Suresh Kumar**	Pharmacology Practicals	-	06	06
4	**Dr. Kailash Sharma**	Adv. P' cology II	02	-	04
		PTSM II	02		
5	**Dr. Pravin Kumar**	Computer aided DDS	04	06	10
6	**Dr. Shammy Jindal**	Molecular P'ceutics	04	06	11
		Journal club	01		
7	**Mr. Shiv Kumar Kushwaha**	Adv. P' cology II	02	09	11
		Pharmacology Practicals			
8	**Mr. Nishant Gautam**	PTSM II	02	03	05
		Pharmacology Practicals			
9	**Mr. Dev Raj Sharma**	Biopharmaceutics	04	03	11
		Pharmacovigilance	04		
10	**Mr. Tarun Sharma**	Cosmetics & cosmeceuticals	02	-	02
11	**Ms. Arti Devi**	Pharm. Validation	04	06	12
		PA & QA Practicals			
		Drug discovery	02		

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12	**Mr. Ankush Sharma**	Cosmetics & cosmeceuticals	-	06	06
13	**Ms. Anisha Rana**	Biopharmaceutics	-	03	03
14	**Mr. Rohit Kumar**	PA & QA Practicals	-	06	06
15	**Mr. Ankit Sharma**	Pharm Mfg. Technique	04	03	07
		PA & QA Practicals			
16	**Ms. Madhu Bala**	PA & QA Practicals	02	03	05
		Drug discovery			

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TEH. JAWALAMUKHI
KANGRA (H.P.)

DIRECTOR CUM PRINCIPAL
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TEH. JAWALAMUKHI
DISTT. KANGRA (H.P.)

B. Pharm

WORKLOAD OF PHARMACY FACULTY (July to Dec 2022)

S. N.	Name	Subject	B.Pharm (in Hrs)								Total Workload (in Hrs)
			I		II		III		IV		
			Th.	Pr.	Th.	Pr.	Th.	Pr.	Th.	Pr.	
1.	Dr. M S Ashawat	Int. to P'ceutics	01	-	-	-	-	-	-	-	02
		NDDS	-	-	-	-	-	-	02	-	
2.	Prof. C P S Verma	P'cognosy & Phytochem. II	-	-	-	-	04	-	-	-	04
3.	Dr. Amardeep	-	-	-	-	-	-	-	-	-	-
4.	Dr. Kailash	HAP I	-	03	-	-	-	-	-	-	03
5.	Dr. Sanjay	P'cognosy & Phytochem. II	-	-	-	-	04	-	-	-	08
		Jurisprudence	-	-	-	-	04	-	-	-	
6.	Mr. Pravin Kumar	Int. to P'ceutics	01	-		-	-	-	-		01
7.	Mr. Shiv Kumar Kushwaha	HAP I	04	-	-	-	-	-	-	-	04
8.	Mr. Shammy Jindal	Industrial Pharmacy	-	-	-	-	04	06	-	-	12
		Industrial Pharmacy II	-	-	-	-	-	-	02	-	
9.	Mr. Nishant Gautam	HAP I	04	-	-	-	-	-	-	-	04
10.	Ms. Rina Rana	P'cognosy & Phytochem. II	-	-	-	-	-	12	-	-	12
11.	Mr. Devraj Sharma	Physical Pharmacy	-	-	04	03	-	-	-	-	11
		Industrial Pharmacy	-	-	-	-	04	-	-	-	
12.	Ms. Archana Chaudhary	-	-	-	-	-	-	-	-	-	-
13.	Mr. Tarun Sharma	Physical Pharmacy	-	-	04	03	-	-	-	-	11
		Indus. Pharm. I	-	-		-	-	03	-	-	
		Indus. Pharm. II	-	-	-	-	-	-	01	-	

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	Ms. Arti Devi	Pharm. Analysis	-	-	-	-	-	-	08	-	08
15.	Ms Upasana Thakur	Org. chemistry	04	06	-	-	-	-	-	-	12
		Med. Chem.	-	-	-	-	02	-	-	-	
16.	Mr. Ankush Sharma	Physical Pharmacy	-	03	-	-	-	-	-	-	15
		Microbiology	-	03	-	-	-	-	-	-	
		P' Jurisprudence	-	-	-	-	04	-	-	-	
		NDDS	-	-	-	-	-	-	02	-	
		Industrial Pharmacy II	-	--	-	-	-	-	03	-	
17.	Ms. Shanu Priya	Pharm. Analysis!	08	06	-	-	-	-	-	-	14
18.	Ms. Alka	- Microbiology	-	09	-	-	-	-		-	09
19.	Ms. Dimple Rana	Int. to P'ceutics	03	06	-	-	-	-	-	-	09
20.	Mr. Rohit Kumar	P. Inorganic chemistry	04	-	-	-	-	-	-	-	13
		Pharm. Analysis	-	06	-	-	-	-	-		
		Med. Chem.	-	-	-	-	03	-	-	-	
21.	Mr. Ajay Kumar	Pharm. Engineering	04	06	-	-	-	-	-	-	12
		Industrial Pharmacy II		-	-	-	-	-	02	-	
22.	Ms. Astha Sharma	Pharm. Inorg. Chem.	04	12	-	-	-	-	-	-	16
23.	Mr. Ankit Sharma	Med. Chem.	-	-	-	-	02	-	-	-	05
		Pharm. Analysis	-	-	-	-	-	-	-	03	
24.	Ms. Shavinder	Pharmacology I	-	-	-	-	04	06		-	10
25.	Mr. Nikhil Sharma	Pharm. Org. Chem.	04	06	-	-	-	-	-	-	11
		Med. Chem.	-	-	-	-	01	-	-	-	
26.	Ms. Arti Rana	Pharmacology I	-	-	-	-	04	06	-	-	10
27.	Ms. Pratibha	Industrial Pharmacy	-	-	-	-	-	03	-	-	03

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	Chaudhary										
28.	Ms. Anchal Guleria	Pharm. Engineering	04	06	-	--	-	-	-	-	11
		NDDS	-	-	-	-	-	-	01	-	
29.	Dr. Swati Rana	Rem. Bio.	02	04	-	-	-	-	-	-	11
		HAP I	-	03	-	-	-	--	-	-	
		Pharm. Practice							02		
30.	Ms. Anisha	Intro to P'ceutics	03	06	-	-	-	-	-	-	15
		NDDS	-	-	-	-	-	-	03	-	
		Physical Pharmacy	-	-	-	03	-	-	-	-	
31.	Ms. Vandana Bhatia	HAP I	-	06	-	-	-	-	-	-	12
		Pharm. Practice	-	-	-	-	-	-	06		
32.	Ms. Ankita	Pharma Analysis	-	-	-	-	-	-	-	09	09
33.	Dr. Pratima Ashawat	Microbiology	08	-	-	-	-	-	-	-	08
34.	Mr. Manish Kumar	Rem. Mathematics	02	-	-	-	-	-	-	-	02
35.	Mr. Dev Roop	Comm. skills	04	04	-	-	-	-	-	-	08

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M. Pharm

WORKLOAD OF PHARMACY FACULTY (July 2022 to Dec 2022)

Sr. no.	Name	Subject	No. Of hours		Total Workload (in Hrs)
			Theory	Practical	
1	Dr. M S Ashawat	Drug delivery system	01	-	01
2	Prof. CPS Verma	Herbal & Cosmetics analysis	04	-	04
3	Dr. Amardeep	MPAT	04	06	10
4	Dr. Kailash	Adv, P'cology	04	-	04
5	Mr. Shiv Kumar Kushwaha	Pharmacology practicals	-	06	06
6	Mr. Shamray Jindal	Research Methodology	04	-	04
7	Mr. Pravin Kumar	Drug delivery system	03	06	09
8	Mr. DevRaj Sharma	Modern P' ceutics	04	-	04
9	Mr. Nishant Gautam	Toxicology	04	-	10
		Pharmacology practicals	-	06	
10	Mr. Tarun Sharma	Regulatory Affairs	04	-	04
11	Ms. Dimple Rana	Modern P' ceutics	-	03	03
12	Mr. Rohit Kumar	Quality Mgt.	02	-	02
13	Ms. Upasana Thakur	PA & QA Practicals	-	03	03
14	Mr. Ankit Sharma	MPAT Practicals	-	06	09
		PA & QA Practicals	-	03	
15	Mr. Ajay Kumar	Modern P' ceutics	-	03	03
16	Ms. Arti Devi	QA & QC	02	-	05
		MPAT Practicals		03	
17	Mr. Nikhil Sharma	Quality Mgt.	02	-	05
		PA & QA Practicals		03	
18	Ms. Vandana Bhatia	Cellular P'cology	04	-	04
19	Ms. Ankita	QA & QC	02	-	05
		PA & QA Practicals	-	03	

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COURSE FILE

DEPARTMENT OF PHARMACEUTICS

ACADEMIC SESSION: FEB. –JUNE 2023

Course Name	B. Pharmacy
Student's Batch	2020-2024
Semester	6th (A)
Name of Subject	Biopharmaceutics and Pharmacokinetics
Subject Code	BP-604T
Faculty Incharge	Mr. Dev Raj

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Ph. : 92184-28040, 92184-05087

Laureate Institute of Pharmacy

(Approved by PCI & AICTE, New Delhi and H.P.Govt.)
Affiliated to Himachal Pradesh Technical University, Hamirpur
V.P.O Kathog, Tehsil Jawalamukhi, Distt. Kangra, H.P. Pin Code 176031

DEPARTMENT OF PHARMACEUTICS

Academic Session: Feb. 2023 –June 2023

Course Name	**: B. Pharmacy**
Student's Batch	**: 2020-2024**
Semester	**: 6th A**
Name of Subject	**: Biopharmaceutics and Pharmacokinetics**
Subject Code	**: BP- 604T**
Faculty Incharge	**: Mr. Dev Raj**

HOD

Director cum Principal

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Course File Index

S. No.	Contents	Remark
1	Academic Calendar	✓
2	Syllabus	✓
3	Master Time Table	✓
4	Individual Time Table	✓
5	Course Objectives	✓
6	Teaching Plan	✓
7	University Question Papers	✓
8	Question Bank (Theory)	✓
9	Attendance Record	Annexure-I
10	Continuous Assessment Record	✓
11	Sessional Exam.-I: Question Paper, Result	✓
12	Sessional Exam.-II: Question Paper, Result	✓
13	Assignments	✓
14	Subject Notes	Annexure-II
15	Result Of Subjects	Result Awaited
16	CO/PO Mapping	✓
17	CO/PO attainments	✓

Devraj

Name and Sign of Faculty

HOD

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हिमाचल प्रदेश तकनीकी विश्वविद्यालय
HIMACHAL PRADESH TECHNICAL UNIVERSITY
(A STATE GOVERNMENT UNIVERSITY)

(ACADEMIC CALENDAR FOR THE ACADEMIC SESSION 2022-23)

ODD SEMESTER		
S. N	**Events**	**Date**
1	Vacations	08.08.2022 to 28.08.2022
2	Industrial Training of 4 weeks for B.Tech (6th Sem.)	10.8.2022 to 9.9.2022
3	Reporting Date for Faculty & Staff.	29.08.2022
4	Registration:	
	i. For Under- Graduate & Post Graduate classes	01.09.2022 to 08.09.2022
	ii. For B.Tech 7th Sem Students only	12.09.2022 to 15.09.2022
5	Induction Programme (1 week) For 1st Year Students	01.09.2022 to 08.09.2022
6	Commencement of classes:	
	i. For Under- Graduate & Post Graduate classes	01.09.2022
	ii. For B.Tech 7th Sem Students only	12.09.2022
7	1st Periodical Examinations	17.10.2022 to 20.10.2022
8.	Mid Semester Break	22.10.2022 to 27.10.2022
9	HPTU Youth Festival	10.11.2022 to 11.11.2022
10	2nd Periodical Examination	14.12.2022 to 17.12.2022
11	End of Classes Work	23.12.2022
12	Reporting of shortage of attendance cases and display of internal sessional awards	24.12.2022
13	End Semester Practical Examinations	26.12.2022 to 29.12.2022
14	Start of End Semester Theory Examinations	02.01.2023

NOTE:

1. All affiliating colleges shall follow the academic calendar strictly. The working shall be for six days i.e. Monday to Saturday except public holidays.
2. Academic Calendar is tentative and will depend upon the advisory and guidelines issued by different concerned authorities from time to time

Dean (Academic)

SYLLABUS (PCI)

BP 604 T. BIOPHARMACEUTICS AND PHARMACOKINETICS (Theory)

Teaching and Examination Scheme:

Teaching Scheme			Credits	Marks			Duration of End Semester Examination
L	T	P	C	Sessional	End Semester Exam	Total	
3	1	0	4	25	75	100	3 hours

Theory (45 Hrs: 4 Hrs / Week)

COURSE CONTENT

UNIT	CONTENT	No. of Hrs.
I	**Introduction to Biopharmaceutics** **Absorption**; Mechanisms of drug absorption through GIT, factors influencing Drug absorption though GIT, absorption of drug from Non per oral extra-vascular routes, **Distribution** Tissue permeability of drugs, binding of drugs, apparent, Volume of drug distribution, plasma and tissue protein binding of drugs, factorsAffecting protein-drug binding. Kinetics of protein binding, Clinical significance of protein binding of drugs	10
II	**Elimination:** Drug metabolism and basic understanding metabolic pathways Renal excretion of drugs, factors affecting renal excretion of drugs, renal clearance, Non renal routes of drug excretion of drugs **Bioavailability and Bioequivalence:** Definition and Objectives of bioavailability, absolute and relative bioavailability, measurement of bioavailability, *in-vitro* drug dissolution models, *in-vitro-in-vivo* correlations, bioequivalence studies, methods to enhance the dissolution rates andbioavailability of poorly soluble drugs.	10
III	**Pharmacokinetics:** Definition and introduction to Pharmacokinetics, Compartment models, Non compartment models, physiological models, One	10

	compartment open model. (a). Intravenous Injection (Bolus) (b). Intravenous infusion and (c) Extravascular administrations. Pharmacokinetics parameters - KE ,t1/2,Vd,AUC,Ka, Clt and CLR- definitions methods of eliminations, understanding of their significance and application	
IV	**Multicompartment models:** Two compartment open model. IV bolus Kinetics of multiple dosing, steady state drug levels, calculation of loading and maintenance doses and their significance in clinical settins.	**8**
V	**Nonlinear Pharmacokinetics:** a. Introduction, b. Factors causing Non-linearity. c. Michaelis-menton method of estimating parameters, Explanation with example of drugs.	**7**

w.e.f. - 25/02/23

Time-Table for 6th Semester (Section-A)

Days	9:30AM – 12:30 P M						12:30PM – 1:30PM	1.30PM – 4.30PM		
	Practical/Theory							Theory		
Mon.	9:30 – 10:30		10:30 – 11:30		11:30 – 12:30			1:30-2:30	2:30 – 3:30	3:30 – 4:30
	Quality Assurance (Ankita)		Herbal Drug Technology (SK)		Med Chem (NS)			Biotech (TS)	Herbal Drug Technology (CPS)	Biopharm (DS)
Tue.	Med Chem (NS)		Quality Assurance (Ankita)		Herbal Drug Technology (CPS)			Quality Assurance (Ankita)	Biotech (TS)	P'cology (SK)
Wed.	A-Batch			B-Batch				Biopharm (DS)	Herbal Drug Technology (CPS)	P'cology (SK)
	HDT (Alka, SK)			P'cology (SK)						
Thur.	P'cology (KS)			HDT (Alka, SK)				Quality Assurance (Ankita)	Med Chem (NS)	P'cology (SK)
Fri.	Med Chem (NS)			9:30 – 10:30	10:30 – 11:30	11:30 – 12:30		P'cology (SK)	Med Chem (NS)	Biotech (TS)
				Weekly test (PC)	Library	Weekly test (AD)				
Sat.	9:30 – 10:30	10:30 – 11:30	11:30 – 12:30	Med Chem (NS)				Biopharm (DS)	Biotech (TS)	Biopharm (DS)
	Weekly test (AG)	Library	Weekly test (PC)							

LUNCH BREAK

CPS: Prof. CPS Verma; KS: Dr. Kailash Sharma; SK: Dr. Sanjay Kumar; DS: Mr. DevRaj Sharma; TS: Mr. Tarun Sharma; Ms. Alka Gautam; AD: Ms. Arti Devi; SK: Ms. Shavinder Kumari; NS: Mr. Nikhil Sharma; AG: Ms. Anchal Guleria; PC: Ms. Pratibha Chaudhary; Ms. Ankita

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Faculty Time-Table for 6th Semester (A)

Days	9:30AM – 12:30 P M			12:30PM – 1:30PM	1.30PM – 4.30PM		
	Theory/Practical				Theory		
					1:30-2:30	2:30 – 3:30	3:30 – 4:30
Mon.							Biopharmaceutics (DS)
Tue.							
Wed.				LUNCH BREAK	Biopharmaceutics (DS)		
Thur.							
Fri.							
Sat.					Biopharmaceutics (DS)		Biopharmaceutics (DS)

DS: Mr. Dev Raj Sharma;

COURSE OBJECTIVES FOR BIOPHARMACEUTICS AND PHARMACOKINETICS

Course Code: BP-604T

Course Title: Biopharmaceutics and Pharmacokinetics

Objectives: Upon completion of the course student shall be able to:

CO1. Understand the basic concepts in Biopharmaceutics and pharmacokinetics and their significance.
CO2. Use of plasma drug concentration-time data to calculate the pharmacokinetic parameters to describe the kinetics of drug absorption, distribution, metabolism, excretion, elimination.
CO3. To understand the concepts of bioavailability and bioequivalence of drug products and their significance.
CO4. Understand various pharmacokinetic parameters, their significance & applications

Laureate Institute of Pharmacy Kathog

TEACHING LESSON PLAN (Session Feb. 2023 – June 2023)

BP 604 T. BIOPHARMACEUTICS AND PHARMACOKINETICS

Theory (45 Hrs: 4 Hrs / Week)

COURSE CONTENT

Unit	Date	Topic to be covered in one Lecture	No. of Hrs. required	Books referred	Teaching Aids
Unit-I	25/02/2023-15/03/2023	Biopharmaceutics and ADME Absorption , Mechanism of absorption Absorption through GIT Absorption through Non oral extra vascular Distribution , tissue permeability of drug Volume of distribution and binding of drug Plasma and tissue binding of drug Factors affecting protein drug binding Kinetics of protein binding Clinical significance of protein binding	10	1.Biopharmaceutics and Pharmacokinetics- A Treatise, By D. M. Brahmankar 2.Biopharmaceutics and Clinical Pharmacokinetics by, Milo Gibaldi.	PPT & Board
Unit-II	17/03/2023-01/04/2023	Elimination, Drug metabolism Metabolic pathway for renal excretion Factors affecting renal excretion of drug Renal clearance and non renal clearance Bioavailability and types Objectives of bioavailability Measurement of Bioavailability Invitro dissolution model IVIVC correlation Bioequavalance studies	10	1.Biopharmaceutics and Pharmacokinetics- A Treatise, By D. M. Brahmankar 2.Biopharmaceutics and Clinical Pharmacokinetics by, Milo Gibaldi.	PPT & Board

Unit-III	**17/04/2023-13/05/2023**	Method to enhance dissolution rate Introduction to pharmacokinetics Compartment model and non compartment model Physiological model One compartment model IV bolus Intravenous infusion Extra vascular administration Pharmacokinetics Parameter KE t1/2 , Vd,AUC,Ka calculation Clearance, Elimination , Rate constant	10	1.Biopharmaceutics and Pharmacokinetics-A Treatise, By D. M. Brahmankar 2.Biopharmaceutics and Clinical Pharmacokinetics by, Milo Gibaldi.	**PPT & White Board**
Unit-IV	**17/05/2023-27/05/2023**	Method of elimination Multicompartment model Two compartment open model IV bolus open model Kinetics of multiple dose Steady state drug level Calculation of loading dose Significance of clinical settins	08	1.Biopharmaceutics and Pharmacokinetics-A Treatise, By D. M. Brahmankar 2.Biopharmaceutics and Clinical Pharmacokinetics by, Milo Gibaldi.	**PPT & White Board**
Unit-V	**03/06/2023-10/06/2023**	Non linear pharmacokinetics Factors affecting non linearity Michaelis Menton Method Parameter of causing non linearity Cause of Non linearity Mean residence time Calculation of elimination rate constants	07	1.Biopharmaceutics and Pharmacokinetics-A Treatise, By D. M. Brahmankar 2.Biopharmaceutics and Clinical Pharmacokinetics by, Milo Gibaldi.	**PPT & White Board**

Faculty Incharge **HOD** **Principal**

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Roll No. .....

Total Pages : 03

J-21-0282

B.Pharmacy EXAMINATION, 2021

Semester VI (PCI)

BIOPHARMACEUTICS AND PHARMACOKINETICS

BP-604T

Time : 2 Hours *Maximum Marks : 75*

The candidates shall limit their answers precisely within 20 pages only (A4 size sheets/assignment sheets), no extra sheet allowed. The candidates should write only on one side of the page and the back side of the page should remain blank. Only blue ball pen is admissible.

Note : The question paper contains three Sections in all, Sections A, B, and C. In Section A, student has to attempt all questions. From Section B student has to attempt any *one* question and from Section C attempt any *five* questions.

Section A **10×2=20**

1. Answer the following :

(i) Differentiate biopharmaceutics and clinical pharmacokinetics.

10. Discuss various factors affecting protein drug binding.

11. Discuss various factors affecting distribution of a drug in human body.

12. Name various physiological barriers to distribution of drug. Discuss capillary endothelial barrier in detail.

13. Write a note on various patient related factors affecting drug absorption.

Roll No. ..... Total Pages : 04

July-22-00086

B.Pharmacy (PCI) EXAMINATION, 2022

Semester VI (PCI)

BIOPHARMACEUTICS AND PHARMACOKINETICS

BP-604T

Time : 3 Hours *Maximum Marks : 75*

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : The question paper contains three Sections in all, Sections A, B and C. In **Section A**, all questions are compulsory. From **Section B** student has to attempt any *two* questions and from **Section C** student has to attempt any *seven* questions.

Section A

(Compulsory Question)

1. Objective type questions (Attempt all the questions) : **10×2=20**

   (i) Define therapeutic equivalence.

(ii) Differentiate between absolute and relative bioavailability.

(iii) Define apparent volume of distribution and write its formula.

(iv) Write about the *two* compartments in a multi-compartment model.

(v) What is Michaelis-Menten Equation ?

(vi) Write various factors causing non-linearity in pharmacokinetics.

(vii) Enlist various characteristics for passive diffusion of drug.

(viii) Name specialized barriers to distribution of drugs.

(ix) Classify the body components to which drug normally binds.

(x) Name various non-renal routes of drug administration.

(Excretion)

Section B

Note : Long answer type questions (Answer any *two* out of three). **2×10=20**

2. Define bioavailability. Discuss various methods for enhancement of ~~distribution~~ Dissolution rate and bioavailability of poorly soluble drugs.

3. Discuss in detail two compartment open model for intravenous bolus administration and extravascular administration.

4. What are pharmacokinetic models and how are they useful ? Write about the different approaches to pharmacokinetic analysis of experimental data. Discuss non-compartment modelling in detail.

Section C

Note : Short answer type questions (Answer any *seven* out of nine). **7×5=35**

5. What process of drug ADME are known to show non-linearity ? Give examples.

6. What are pharmacokinetic models ? What is the importance and utility of developing such model ?

7. Define pharmacokinetics. Discuss the pharmacokinetic parameters that describe a typical plasma level time curve.

8. Compare single dose and multiple dose bioavailability studies.

9. Write a note on renal clearance of a drug.

(ii) Enumerate routes of absorption.

(iii) Define ion pair transport.

(iv) What are Soft Drugs ?

(v) What is Toxicological Activation ?

(vi) Enumerate biological factors affecting biotransformation.

(vii) Enlist bioequivalence study designs.

(viii) Discuss BCS classification.

(ix) What are delayed distribution models ?

(x) Define Statistical Moments.

Section B **1×20=20**

Note : Attempt any *one* of the following questions.

2. Define and differentiate bioavailability and bioequivalence. How bioavailability is measured and enhanced ?

3. Define capacity limited kinetics and discuss Michaelis-Menten equation in detail.

4. Discuss two compartmental open model for IV bolus administration.

Section C

5. Attempt any *seven* of the following :

(i) Define and discuss non-ionic diffusion.

(ii) Classify drug transport mechanisms.

(iii) Discuss volume of distribution.

(iv) Give factors affecting biotransformation.

(v) Explain IVIVC.

(vi) Discuss pharmacokinetic models.

(vii) Discuss concepts of clearance.

(viii) Discuss various PK and PD parameters.

(ix) How are drugs metabolized ?

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Question Bank of Biopharmaceutics and Pharmacokinetics

Sem. 6th, Sec. A, Session: Jan – June 2023

Question Bank-1 (Long Answer Questions)

1. Write a detailed note on active transport process.
2. Discuss in detailed about facilitated diffusion.
3. Write a short note on endocytosis and pore transport.
4. Discuss the different theories of dissolution.
5. Explain how components of GI fluid can affect absorption of drugs.
6. What are the rate limiting steps in absorption of drugs from GI tract? Explain.
7. Explain how excipients affect the drug absorption.
8. Discuss the significance of protein binding.
9. Explain the various methods for determination of protein binding.
10. Explain the factors affecting protein binding.
11. Describe the various barriers to drug distribution present in the body.
12. List the various processes through which drugs can cross the biological membrane. Describe passive diffusion process in detail.
13. Describe the Physico-chemical factors affecting drug absorption from GI tract.
14. Describe the physiological factors affecting drug absorption from GI tract.
15. Describe the pharmaceutical factors affecting drug absorption from GI tract.
16. Describe the process of drug distribution.
17. Discuss the factors affecting drug distribution.
18. Discuss the different methods for measurement of bioavailability.
19. What are the objectives of bioequivalence study? Write the protocol for bioequivalence study.

20. Discuss the regulatory requirements for conduction of bioequivalence study.

21. Explain the terms C-max, t-max and AUC and explain how they can be determined.

22. Discuss how bioavailability can be determined from urinary excretion data.

23. Discuss the different designs for bioequivalence study.

Short Questions

1. Define biopharmaceutics and discuss its role in formulation development.

2. Explain the structure of a biological membrane with neat labeled diagram.

3. List the factors affecting drug absorption from GI tract.

4. List the body components to which drugs can bind.

5.Define the terms: Absolute bioavailability, relative bioavailability, Pharmaceutical equivalence, Therapeutic equivalence and Bioequivalence.

6. Discuss the significance of plasma drug concentration time curve.

7. What is a compartment model? Discuss the various types of compartment models.

8. Write a note on applications and limitations of compartment models.

9. Write a short note on non-compartment models.

10. Explain zero order and first order absorption models.

11. Explain apparent volume of distribution and distribution co-efficient.

12. Define clearance. What is its unit?

13. Write short notes on –a) flip-flop phenomenon b) Lag time

14. Define non linear pharmacokinetics.

Question Bank-2 (Long Answer Questions)

1. Explain determination of pharmacokinetic parameters from plasma concentration data after i.v. bolus administration.
2. Compare and contrast the excretion rate method and sigma-minus method.
3. Discuss the Sigma-minus method.
4. Discuss the method of residuals.
5. Explain in brief about multi-compartment model.
6. Draw and label the plasma concentration-time curve obtained after extra-vascular administration and discuss the various phases of drug absorption.
7. Discuss the Wagner-nelson method along with its advantages and limitations.
8. Discuss the Loo-Riegelman method for determination of absorption rate constant.
9. Explain determination of pharmacokinetic parameters from plasma concentration data after i.v. bolus administration.
10. Define clinical pharmacokinetics and discuss its scope.
11. Discuss design of multiple dosage regimens.
12. Discuss individualization of dosage regimen.
13. Discuss how dosage regimen is adjusted in patients with renal failure.
14. Discuss dosage regimen adjustment in cases of patients with hepatic disease.
15. Discuss the different methods for determination of creatinine clearance. What are the importance of creatinine clearance determination?
16. Discuss how degree of renal failure can be assessed.
17. What do you mean by pharmacokinetic drug interactions and what is its significance in combination therapy?
18. Discuss with clinically significant examples different mechanisms of drug interaction.

CONTINUOUS ASSESSMENT RECORD

Component	Components of Evaluation	Nature of exam
Theory	First sessional exam	MCQ, Short essay and long essay questions
	Second sessional exam	MCQ, Short essay and long essay questions
Practicals	Daily evaluation	Planning, analysis of lab skills, maintaining observation notebook
	Practical examination	Synopsis, viva-voce, major experiment and minor experiment
		Communication, data interpretation
Beyond syllabus	Assignments	Seminar
Overall evaluation	External exam – semester wise	MCQ, Short Answer and Long essay Questions

Laureate Institute of Pharmacy Kathog Jawalaji

First Sessional Theory Exam. April. 2023,

Sem. 6th Sec. (A)

Subject: Biopharmaceutics and Pharmacokinetics (BP604T)

MM.: 30 Time duration: 90 min.

Section A (10×1) All the questions are compulsory

1. Write the equation for Ficks first law of diffusion.
2. Define Active transport
3. Majority of drugs bind to the extravascular tissue, write the increasing order of drug binding for liver, lungs, muscle, kidney.
4. The protein binding site for NSAIDs are.....
5. Phase-I reaction of drug metabolism is also known as
6. A protein bound drug is both pharmacokinetically as well as pharmacodynamically inert. Explain.
7. Define clearance
8. The normal filtration rate of glomeruli is.....ml/min.
9. Write the equation for Hixon Crowell's cubic root law for dissolution.
10. Which form of drug is more soluble either crystalline or amorphous.

Section B (1×10) Attempt any one

1. Explain the factors influencing the drug absorption through GIT.
2. Discuss in detailed about the tissue permeability of drug in body.

Section C (2×5) Attempt any two

1. Discuss the process of renal excretion of drugs.
2. Elaborate the binding of drug to blood protein and blood cells.
3. Define Bioavailability. Discuss the methods for determination of

Laureate Institute of Pharmacy

Kathog (Jawalaji), Teh. Jawalaji, Distt. Kangra (H.P.)

First sessional Theory Exam. Mark Sheet, April 2023

B. Pharm 6th Semester, Section - A

Subject with Code: Biopharmaceutics and Pharmacokinetics (BP604T)

Date: 03/04/2023

Roll No.	Marks out of 30		Roll No.	Marks out of 30	
	Name	Marks		- Name	Marks
20013114002	Aayush	20	20013114034	Ashima Sharma	15
20013114003	Abhay Koundal	15	20013114035	Ashu Samkaria	19
20013114004	Abhay Sharma	11	20013114036	Atul Sharma	ABSENT
20013114005	Abhay Thakur	13	20013114037	Bhart Bhardwaj	10
20013114006	Abhinandan	ABSENT	20013114038	Bhupesh Goswami	20
20013114007	Abhinav Kaushal	08	20013114039	Darpan Sood	19
20013114008	Abhishek Bhardwaj	16	20013114040	Deepak Sharma	17
20013114009	Abhishek Dhiman	14	20013114041	Deepanshi	20
20013114010	Abhishek	18	20013114042	Diksha	25
20013114011	Abhishek Dogra	06	20013114043	Dishant	04
20013114012	Abhishek Kumar	10	20013114044	Divya	26
20013114013	Adit Choudhary	13	20013114045	Divyanshi Sharma	20
20013114014	Aditya Guleria	07	20013114046	Gourav Rana	14
20013114015	Aditya Sharma	05	20013114047	Gourav Thakur	12
20013114016	Akhil Choudhary	13	20013114048	Ishan Sharma	11
20013114017	Akhil Guleria	03	20013114049	Jaideep Chawla	14
20013114019	Akshay Koundal	06	20013114050	Kajal	17
20013114020	Akshita Sharma	23	20013114051	Kajal	17
20013114021	Aman Labra	16	20013114052	Kajal Thakur	20
20013114022	Aman Sood	15	20013114053	Kanish Rana	16
20013114023	Anchit Bahri	10	20013114054	Karan Pathania	14
20013114024	Aniket Sharma	08	20013114055	Kartik Sharma	05
20013114025	Aniket Thakur	10	20013114056	Kashish	21
20013114026	Anmol Koundal	09	20013114057	Kashish Rana	16
20013114027	Ansh Kalia	08	20013114058	Kavita Pathania	19
20013114028	Anshul Sharma	14	21023114001	Anjali	25
20013114029	Anuket	08	21023114002	Ankush Rana	15
20013114030	Anvi Sharma	08	21023114003	Ayush Rana	17
20013114031	Arju	12	21023114004	Diksha	12
20013114033	Aryan Jamwal	10	21023114007	Sachin	16

Subject In-charge Sig.

Laureate Institute of Pharmacy Kathog Jawalaji

Second Sessional Theory Exam. May 2023,

Sem. 6th Sec. (A)

Subject: Biopharmaceutics and Pharmacokinetics (BP604T)

MM.: 30 **Time duration: 90 min.**

Section A (All the questions are compulsory) (5×2=10)

1. Define compartment and Pharmacokinetics model.
2. Classify Pharmacokinetics models
3. List out the drug dissolution models.
4. Define t1/2 and Cl_T.
5. Write the differences between bolus and infusion.

Section B (Attempt any one) (1×10=10 marks)

1. Derive the equation for one compartment open model for extravascular administration. Explain the wagner Nelson method for estimation of Ka.
2. Discuss the methods to enhanced the bioavailability of poorly soluble drugs.

Section C (Attempt any two) (5×2=10 marks)

1. Elaborate the causes of non linearity.
2. Explain the different levels of IVIVC.
3. Summarize the Loo-Riegelman method for estimation of Ka in two compartment model

Laureate Institute of Pharmacy

Kathog (Jawalaji), Teh. Jawalaji, Distt. Kangra (H.P.)

Second sessional Theory Exam. Mark Sheet, May 2023

B. Pharm 6th Semester, Section - A

Subject with Code: Biopharmaceutics and Pharmacokinetics (BP604T)

Date: 04/05/2023

Roll No.	Marks out of 30		Roll No.	Marks out of 30	
	Name	Marks		Name	Marks
20013114002	Aayush	17	20013114034	Ashima Sharma	20
20013114003	Abhay Koundal	09	20013114035	Ashu Samkaria	17
20013114004	Abhay Sharma	ABSENT	20013114036	Atul Sharma	ABSENT
20013114005	Abhay Thakur	07	20013114037	Bhart Bhardwaj	15
20013114006	Abhinandan	05	20013114038	Bhupesh Goswami	22
20013114007	Abhinav Kaushal	13	20013114039	Darpan Sood	17
20013114008	Abhishek Bhardwaj	09	20013114040	Deepak Sharma	16
20013114009	Abhishek Dhiman	06	20013114041	Deepanshi	16
20013114010	Abhishek	12	20013114042	Diksha	26
20013114011	Abhishek Dogra	11	20013114043	Dishant	ABSENT
20013114012	Abhishek Kumar	11	20013114044	Divya	22
20013114013	Adit Choudhary	15	20013114045	Divyanshi Sharma	23
20013114014	Aditya Guleria	ABSENT	20013114046	Gourav Rana	13
20013114015	Aditya Sharma	04	20013114047	Gourav Thakur	14
20013114016	Akhil Choudhary	16	20013114048	Ishan Sharma	08
20013114017	Akhil Guleria	02	20013114049	Jaideep Chawla	12
20013114019	Akshay Koundal	12	20013114050	Kajal	16
20013114020	Akshita Sharma	22	20013114051	Kajal	14
20013114021	Aman Labra	17	20013114052	Kajal Thakur	17
20013114022	Aman Sood	ABSENT	20013114053	Kanish Rana	22
20013114023	Anchit Bahri	10	20013114054	Karan Pathania	11
20013114024	Aniket Sharma	01	20013114055	Kartik Sharma	06
20013114025	Aniket Thakur	15	20013114056	Kashish	24
20013114026	Anmol Koundal	12	20013114057	Kashish Rana	15
20013114027	Ansh Kalia	04	20013114058	Kavita Pathania	20
20013114028	Anshul Sharma	09	21023114001	Anjali	23
20013114029	Anuket	07	21023114002	Ankush Rana	06
20013114030	Anvi Sharma	ABSENT	21023114003	Ayush Rana	17
20013114031	Arju	15	21023114004	Diksha	16
20013114033	Aryan Jamwal	08	21023114007	Sachin	18

Subject In-charge Sig.

Laureate Institute of Pharmacy

Kathog (Jawalaji), Teh. Jawalaji, Distt. Kangra (H.P.)

Third sessional Theory Exam. Mark Sheet, June 2023

B. Pharm 6th Semester, Section - A

Subject with Code: Biopharmaceutics and Pharmacokinetics (BP604T)

Date: 12/06/2023

Roll No.	Marks out of 30		Roll No.	Marks out of 30	
	Name	Marks		Name	Marks
20013114002	Aayush	**	20013114034	Ashima Sharma	**
20013114003	Abhay Koundal	15	20013114035	Ashu Samkaria	**
20013114004	Abhay Sharma	**	20013114036	Atul Sharma	**
20013114005	Abhay Thakur	15	20013114037	Bhart Bhardwaj	10
20013114006	Abhinandan	15	20013114038	Bhupesh Goswami	**
20013114007	Abhinav Kaushal	15	20013114039	Darpan Sood	**
20013114008	Abhishek Bhardwaj	14	20013114040	Deepak Sharma	**
20013114009	Abhishek Dhiman	16	20013114041	Deepanshi	**
20013114010	Abhishek	**	20013114042	Diksha	**
20013114011	Abhishek Dogra	09	20013114043	Dishant	**
20013114012	Abhishek Kumar	15	20013114044	Divya	**
20013114013	Adit Choudhary	**	20013114045	Divyanshi Sharma	**
20013114014	Aditya Guleria	12	20013114046	Gourav Rana	**
20013114015	Aditya Sharma	15	20013114047	Gourav Thakur	**
20013114016	Akhil Choudhary	**	20013114048	Ishan Sharma	15
20013114017	Akhil Guleria	10	20013114049	Jaideep Chawla	15
20013114019	Akshay Koundal	13	20013114050	Kajal	**
20013114020	Akshita Sharma	**	20013114051	Kajal	**
20013114021	Aman Labra	**	20013114052	Kajal Thakur	**
20013114022	Aman Sood	15	20013114053	Kanish Rana	**
20013114023	Anchit Bahri	13	20013114054	Karan Pathania	15
20013114024	Aniket Sharma	10	20013114055	Kartik Sharma	15
20013114025	Aniket Thakur	16	20013114056	Kashish	**
20013114026	Anmol Koundal	15	20013114057	Kashish Rana	**
20013114027	Ansh Kalia	12	20013114058	Kavita Pathania	**
20013114028	Anshul Sharma	15	21023114001	Anjali	**
20013114029	Anuket	11	21023114002	Ankush Rana	**
20013114030	Anvi Sharma	19	21023114003	Ayush Rana	**
20013114031	Arju		21023114004	Diksha	**
20013114033	Aryan Jamwal	16	21023114007	Sachin	**

Subject Incharge Sig.

Laureate Institute of Pharmacy Kathog Jawalaji

Third Sessional Theory Exam. June 2023,

Sem. 6th Sec. (A)

Subject: Biopharmaceutics and Pharmacokinetics (BP604T)

MM.: 30 **Time duration: 90 min.**

Section A (All the questions are compulsory) **(5×2=10)**

1. Define zero and first order reaction.
2. Write the Classification of Pharmacokinetics models
3. List out the drug dissolution apparatus.
4. Define half life and Noncompartment analysis.
5. Compare the differences between catenary and mammillary model.

Section B (Attempt any one) (1×10=10 marks)

1. Derive the equation for one compartment open model for first order extravascular administration. Explain the sigma minus method for estimation of KE.
2. Illustrate the Michaelis menten equation for estimation of Vmax and Km.

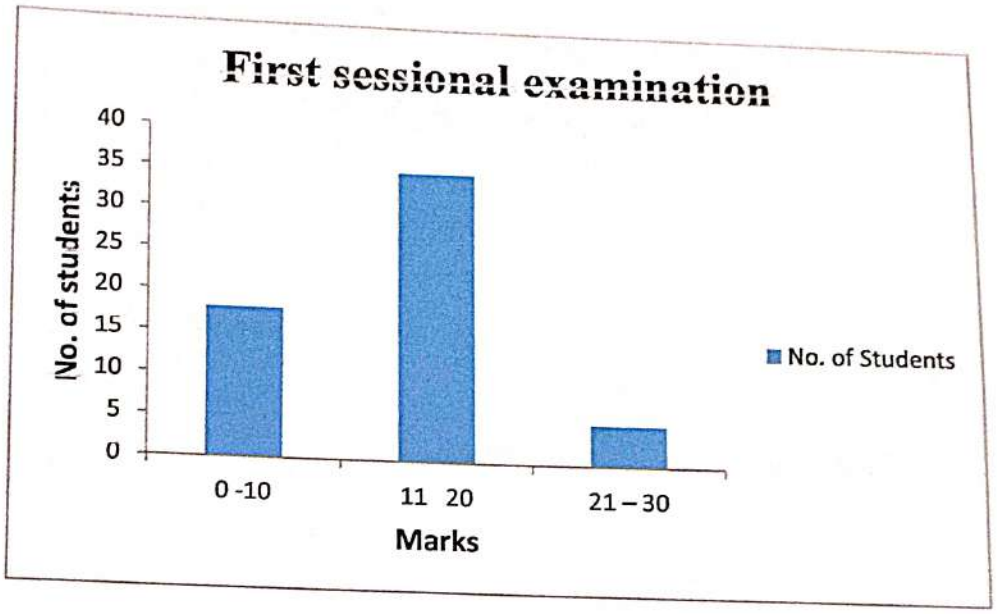
Section C (Attempt any two) (5×2=10 marks)

1. Elaborate the factors for causes of non linearity.
2. Explain the different levels of IVIVC.
3. Summarize the Loo-Riegelman method for estimation of Ka in two compartment model

INTERNAL EXAM RESULT AND RESULT ANALYSIS (Session Feb. 2023-June 2023)

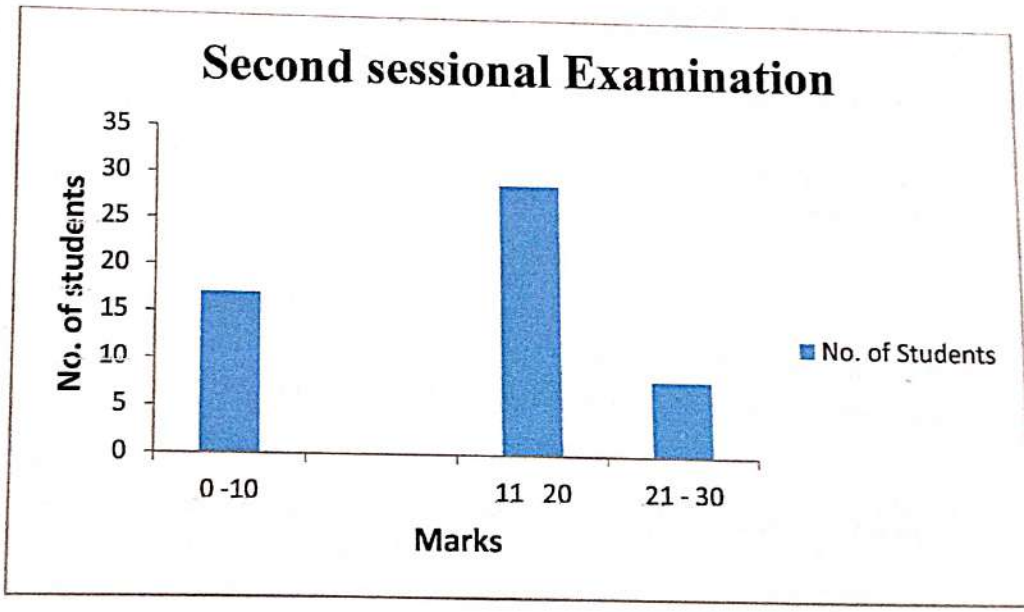
First Sessionai
Total no. of students: 60
Present : 58
Absent : 02

Marks	No. of Students
0 -10	18
11 20	35
21 30	05



Second Sessional
Total no. of students: 60
Present : 54
Absent : 06

Marks	No. of Students
0 -10	17
11 20	29
21 - 30	08



Assignment topic for 6th semester Bio-pharmaceutics and Pharmacokinetics Sec. A

Roll No.	Name	Assignment topic
20013114002	Aayush	Absorption and Mechanisms of drug absorption through GIT
20013114003	Abhay Koundal	Physico–chemical factors affecting drug absorption in GIT
20013114004	Abhay Sharma	AUC and methods to calculate Area under curve
20013114005	Abhay Thakur	Pharmaceutical and Patients factors affecting drug absorption in GIT
20013114006	Abhinandan	absorption of drug from Non per oral extra-vascular routes
20013114007	Abhinav Kaushal	Distribution of drugs, Tissue permeability of drugs
20013114008	Abhishek Bhardwaj	Plasma and tissue protein binding of drugs,
20013114009	Abhishek Dhiman	factors affecting protein-drug binding and Kinetics of protein binding, Clinical significance of protein binding of drugs
20013114010	Abhishek	Drug Metabolism
13114011	Abhishek Dogra	Renal Excretion of Drugs, factors affecting renal excretion of drugs, Renal function and renal failure
20013114012	Abhishek Kumar	Non renal routes of drug excretion of drugs
20013114013	Adit Choudhary	Bioavailability and Bioequivalence: Definition and Objectives of bioavailability, absolute and relative bioavailability, measurement of bioavailability
20013114014	Aditya Guleria	in-vitro drug dissolution models, in-vitro-in-vivo correlations
20013114015	Aditya Sharma	bioequivalence studies,
20013114016	Akhil Choudhary	Methods to enhance the dissolution rates and bioavailability of poorly soluble drugs.
20013114017	Akhil Guleria	Pharmacokinetics: Definition and introduction to Pharmacokinetics, Compartment models, Non compartment models, physiological models,
20013114019	Akshay Koundal	One compartment open model. (a). Intravenous Injection (Bolus)
20013114020	Akshita Sharma	One compartment open model.) (b). Intravenous infusion and (c) Extravascular administrations.
20013114021	Aman Labra	Pharmacokinetics parameters definitions of KE ,t1/2,Vd,AUC,Ka, Clt andCLR- methods of eliminations, understanding of their significance and application
20013114022	Aman Sood	Multicompartment models: Two compartment open model. IV bolus Kinetics of multiple dosing, steady state drug levels,
20013114023	Anchit Bahri	Calculation of loading and maintenance doses and their significance in clinical settins.
20013114024	Aniket Sharma	Nonlinear Pharmacokinetics: a. Introduction, b. Factors causing Non-linearity. Cause of Non linearity
20013114025	Aniket Thakur	Michaelis-menton methods of estimating parameters, Explanation with example of drugs.
20013114026	Anmol Koundal	Absorption and Mechanisms of drug absorption through GIT
20013114027	Ansh Kalia	Physico–chemical factors affecting drug absorption in GIT
20013114028	Anshul Sharma	Pharmaceutical factors affecting drug absorption in GIT

20013114029	Anuket	Patient related factors affecting drug absorption in GIT
20013114030	Anvi Sharma	absorption of drug from Non per oral extra-vascular routes
20013114031	Arju	Distribution of drugs, Tissue permeability of drugs
20013114033	Aryan Jamwal	Plasma and tissue protein binding of drugs,
20013114034	Ashima Sharma	factors affecting protein-drug binding and Kinetics of protein binding, Clinical significance of protein binding of drugs
20013114035	Ashu Samkaria	Drug Metabolism
20013114036	Atul Sharma	Renal Excretion of Drugs, factors affecting renal excretion of drugs, Renal function and renal failure
20013114037	Bhart Bhardwaj	Bioavailability : Definition and Objectives of bioavailability; absolute and relative bioavailability, measurement of bioavailability
20013114038	Bhupesh Goswami	in-vitro drug dissolution models, in-vitro-in-vivo correlations
20013114039	Darpan Sood	bioequivalence studies
20013114040	Deepak Sharma	Methods to enhance the dissolution rates and bioavailability of poorly soluble drugs.
20013114041	Deepanshi	Pharmacokinetics: Definition and introduction to Pharmacokinetics, Compartment models, Non compartment models, physiological models,
20013114042	Diksha	One compartment open model. (a). Intravenous Injection (Bolus)
20013114043	Dishant	One compartment open model.) (b). Intravenous infusion and (c) Extravascular administrations.
20013114044	Divya	Pharmacokinetics parameters definitions of KE ,t1/2,Vd,AUC,Ka, Clt andCLR- methods of eliminations, understanding of their significance and application
20013114045	Divyanshi Sharma	Multicompartment models: Two compartment open model. IV bolus Kinetics of multiple dosing, steady state drug levels,
20013114046	Gourav Rana	Calculation of loading and maintenance doses and their significance in clinical settins.
20013114047	Gourav Thakur	Nonlinear Pharmacokinetics: a. Introduction, b. Factors causing Non-linearity. Cause of Non linearity
20013114048	Ishan Sharma	Michaelis-menton methods of estimating parameters, Explanation with example of drugs.
20013114049	Jaideep Chawla	Absorption and Mechanisms of drug absorption through GIT
20013114050	Kajal	Physico–chemical factors affecting drug absorption in GIT
20013114051	Kajal	AUC and methods to calculate Area under curve
20013114052	Kajal Thakur	Pharmaceutical and Patients factors affecting drug absorption in GIT
20013114053	Kanish Rana	absorption of drug from Non per oral extra-vascular routes
20013114054	Karan Pathania	Distribution of drugs, Tissue permeability of drugs
20013114055	Kartik Sharma	Plasma and tissue protein binding of drugs,
20013114056	Kashish	factors affecting protein-drug binding and Kinetics of protein binding, Clinical significance of protein binding of drugs

20013114057	Kashish Rana	Drug Metabolism
20013114058	Kavita Pathania	Renal Excretion of Drugs, factors affecting renal excretion of drugs, Renal function and renal failure
21023114001	Anjali	Non renal routes of drug excretion of drugs
21023114002	Ankush Rana	Bioavailability and Bioequivalence: Definition and Objectives of bioavailability, absolute and relative bioavailability, measurement of bioavailability
21023114003	Ayush Rana	in-vitro drug dissolution models, in-vitro-in-vivo correlations
21023114004	Diksha	bioequivalence studies,
21023114007	Sachin	Methods to enhance the dissolution rates and bioavailability of poorly soluble drugs.

LAUREATE INSTITUTE OF PHARMACY

Biopharmaceutics & Pharmacokinetics

Submitted To:
Mr. Dev Raj Sharma

Checked
13/04/2023

Submitted by: Diksha
Class: 6th sem (A)
Roll no: 21023114004

Topic: Bioequivalence studies

Bioequivalence Studies

Definition :-

- It refers to the drug substance in two or more identical dosage forms, reaches systemic circulation at the same rate and to the same relative extent.
- **i.e.** Their plasma concentration - time profile will be identical without significant difference

Advantages :-

- Minimizes the effects of inter subject variability.
- It minimizes the carry over effect.
- Requires less number of subjects to get meaningful results.

Disadvantages :-

- Requires longer time to complete the studies
- Completion of studies depends on number of formulations evaluated in the studies.
- Increase in study period leads to high subject dropouts.
- Medical ethics does not allow too many trials on a subject continuously for a longer time.

objectives :-

- If a new product is intended to be a substitute for an approved medicinal product as a pharmaceutical equivalent or alternative, the equivalence with this product should be shown or justified.

In order to ensure clinical performance of such drug products, bioequivalence studies should be performed.

Bioequivalence studies are conducted if there is:

- A risk of bio-inequivalence
- A risk of pharmacotherapeutic failure or diminished clinical safety.

Some of the important terms relevant in this context will be defined.

Equivalence:

It is a relative term that compares drug products with respect to a specific characteristic or function or to a defined set of standards.

» There are several types of equivalences.

A. Chemical Equivalence
B. Pharmaceutical Equivalence.
C. Bioequivalence
D. Therapeutic Equivalence.

A. Chemical Equivalence :-

It indicates that two or more drug products contains the same labelled chemical substance as an active ingredient in the same amount.

B. Pharmaceutical Equivalence :-

This term implies that two or more drug products are identical in strength, quality, purity content uniformity and disintegration and dissolution characteristics. They may, however, differ in containing different excipients.

C. **Bioequivalence** :- It is a relative term which denotes that the drug substance in two or more identical dosage forms, reaches the systemic circulation at the same relative rate and to the same relative extent. i.e. Their plasma concentration- time profiles will be identical without significant statistical differences.

- when statistically significant differences are observed in the bioavailability of two or mor drug products, bio-inequivalance is indicated.

D. **Therapeutic Equivalence** :- This term indicates that two or more drugs products that contain the same therapeutically active ingredient elicit identical pharmacological effect and can control the disease to the same extent.

Types of Bioequivalence Studies :

» Bioequivalence can be demonstrated either :-

- **In vivo**
- **In vitro**

In Vivo Bioequivalence Studies :-

» The following sequence of criteria is useful in assessing the need for in vivo studies:

1. Oral immediate-release products with systemic action :-

- Indicated for serious conditions requiring assured response.
- Narrow therapeutic margin.
- Pharmacokinetics complicated by absorption <70% on absorption window, nonlinear kinetics presystemic elimination >70%.
- unfavorable physiochemical properties e.g. low solubility metastable modification instability, etc.

- Documented evidence for bioavailability problems.
- No relevant data available, unless justification by applicant that invivo study is not necessary.

2. Non-oral immediate-release products.

3. Modified-release product with systemic actions.

- In vivo bioequivalence studies are conducted in the usual manner as discussed for bioavailability studies, i.e the pharmacokinetic and the pharmacodynamic methods.

1. Pharmacokinetic Methods :-
   a) Plasma level-time studies
   b) urinary excretion studies.

2. Pharmacodynamic Methods :-
   a) Acute pharmacological response
   b) Therapeutic response.

In vitro Bioequivalence Studies :-

> If none of the above criteria is applicable comparative in vitro dissolution studies will suffice.

> Invitro studies i.e. dissolution studies can be used in lieu of in vivo bioequivalence under certain circumstances, called as biowaivers.

1. The drug product differs only in strength by the active substance it contains. provided all the following conditions hold

- Pharmacokinetics are linear.
- The qualitative composition is the same.
- The ratio between active substance and the excipients is the same or the ratio between the excipients is the

- Both products are produced by the same manufacture at the same production site.

- A bioavailability or bioequivalence study has been performed with a original product

- under the same test conditions, the in vitro dissolution rate is the same.

2. The drug product has been slightly reformulated on the manufacturing method has been slightly modified by the original manufacturer in ways that can convincingly by argued to be irrelevant for the bioavilability.

3. The drug product meets all of the following requirements -

- The product is in the form of solution or solubilised

- The product contains no excipients known to significanty affect absorption of the active ingredient

4. An acceptable IVIVC and the in vitro dissolution rate of the new product is equivalent with that of the already approved medicine product.

- The product is intended for topical administration for local effect.
- The product is for oral administration but not intended to be absorbed.
- The product is administered by inhalation as a gas or vapour

➢ The criteria for drug product listed above indicate that bioavailability and bioequivalence are self evident.

Bioequivalence Study Designs :

The BE Study should be designed in such a way that the formulation effect can be distinguished from other effects.

A. Standard BE Study design : This is the most common design wherein two formulations are compared in a randomised two period, two-sequence single dose crossover design. The order of treatment administration in a crossover experiment is called a period.

B. Alternative BE Study design : under certain circumstances provides the study design and the statistical analyses are scientifically sound, alternative well-established design could be considered Some of the alternative BE study design are stated below.

1. **Parallel design** is used for drug substances with very long half-life e.g fingolimod.

2. **Replicate design**: e.g for substances with highly variable pharmacokinetic characteristic e.g lansoprazole The advantages of replicate study design may be that they.

- Allow comparisons of within-subject variances for the test and reference products
- Provide more information about the intrinsic factors underlying formulation performance.
- Reduce the number of subjects participating in the BE Study.

Replicate design BE studies can be conducted in one of the two ways

a) **Partial replicate** where in one treatment test or the reference product is administered to the same subject on two separate occasions.

b) **Full replicate** where in both treatment of test and the reference are administered to the same subject on two separate occasions.

Statistical Interpretation of Bioequivalence Data

After the data has been collected Statistical methods must be applied to determine the level of significance of any observed difference in the rate or extent of absorption in order to establish bioequivalence between two or more drug products. The commonly adopted approaches to determine statistical differences are.

1. **Analysis of variance** is a statistical procedure used to test the data for differences within and between treatment and control groups. A statistical difference between the pharmacokinetic parameters obtained from two or more drug product is considered statistically significant if there is a probability of less than 1in 20 or 0.005 ($P \leq 0.05$) The probability p is used to indicate the level of statistical significance. If $P \leq 0.05$ the differences between the two drug product are not considered statistically significant.

2. **Confidence interval approach** – Also called as two one-sided test procedure it is used to demonstrate if the bioavailability from the test product is too low or high in comparison to the

reference product. The 90% confidence limits are estimated for the sample means based on student's t distribution of data. A 90% confidence interval about the ratio of means of the two drug products must be within ± 20% for bioavailability parameters such as a AUC or Cmax ie the difference between the bioavailabilities of the test product should not be greater than ± 20% of the average of reference product when log transformed data are used the 90% confidence interval is set at 80-125%. These confidence limits are also termed as bioequivalence interval.

Reference :-

Brahmankar D.M, Jaiswal Sunil B, "Book of Biopharmaceutics & Pharmacokinetics" A A Treatise Ist ed 2015 reprint 2016, 2017, 2019 Published by Vallabh Prakashan Pvt. Ltd

Mapping of Course outcome and Program outcome

SESSIONAL EXAM – FIRST							
Code: BP 604T **Subject: Biopharmaceutics and Pharmacokinetics** **Semester: VI** **MM:30**							
Date: 03/04/2023 **Duration: 90 Min.** **Staff: Mr. Dev Raj**							
Q. No.	**Questions**	**Marks**	**CO**	**BL**	**PO**		
Section A	**Short Answer questions (Compulsory)**	10	1,2,3,4	L1,L2,L4	1,2,6,7,8,11		
Section B	**Answer any one**	10					
1	Explain the factors influencing the drug absorption through GIT.		1,2,3	L1, L2,L3,L5	1,2,3,5,6,7,9,11		
2	Discuss in detailed about the tissue permeability of drug in body.		1,2,3	L1, L2,L3,L5,L6	1,2,3,5,6,7,9,11		
Section c	**Answer any two**	10					
1	Discuss the process of renal excretion of drugs.		1,2,3	L1, L2,L3,L5	1,2,3,4,5,6,7,9,11		
2	Elaborate the binding of drug to blood protein and blood cells.		1,2,3	L1, L2,L3,L5	1,2,5,6,7,9,11		
3	Define Bioavailability. Discuss the methods for determination of bioavailability.		1,2,3, 4	L1, L2,L3,L4, L5	1,2,3,4,5,6,7,9,11		

CO-Course Outcome:

BP604T.1	Understand the basic concepts in Biopharmaceutics and pharmacokinetics and their significance.
BP604T.2	Use of plasma drug concentration-time data to calculate the pharmacokinetic parameters to describe the kinetics of drug absorption, distribution, metabolism, excretion, elimination.
BP604T.3	To understand the concepts of bioavailability and bioequivalence of drug products and their significance.

BP604T.4	Understand various pharmacokinetic parameters, their significance & applications.

BL: Bloom Taxonomy

L1-Remember	L2- Understand	L3-Apply	L4 -Analyze	L5-Evaluate	L-6- Create

PO-Programme Objectives:

1.	Pharmacy Knowledge	7.	Pharmaceutical Ethics
2.	Planning Abilities	8.	Communication
3.	Problem Analysis	9.	The Pharmacist & Society
4.	Modern Tool Usage	10.	Environment &Sustainability
5.	Leadership Skill	11.	Life Long Learning
6.	Professional Identity		

CO-PO Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP604T.1	3	2	3	2	2	3	2	1	2	-	3
BP604T.2	3	2	3	3	1	3	2	1	1	-	3
BP604T.3	3	2	3	3	2	3	2	1	2	-	3
BP604T.4	3	2	3	3	1	3	2	1	2	-	3
Averages	3	2	3	2.7	1.5	3	2	1	1.7	-	3

Note:

Correlation levels	Slight (Low)	Moderate (Medium)	Substantial (High)	no correlation
	1	2	3	--

CO/PO ATTAINMENTS

Attainments of POs and COs for first Sessional

Table No.1 Assessment of course outcome

Course Outcome	CO1		CO2		CO3		CO4	
	Q. No.	Avg.%	Q. No.	Avg.%	Q. No.	Avg.%	Q. No.	Avg%
Measure	Q1 MCQ	27%	Q1MCQ	27%	Q1 MCQ	27%	Q1 MCQ	27%
	Q1	54%	Q1	54%	Q1	54%	Q1	00%
	Q2	00%	Q2	00%	Q2	00%	Q2	00%
	Q1	43%	Q1	43%	Q1	43%	Q1	00%
	Q2	13%	Q2	13%	Q2	13%	Q2	00%
	Q3	60%	Q3	60%	Q3	60%	Q3	60%
Total Average		33%		33%		33%		15%

Course outcome mapping with Program outcome (PO)

PO1		Level of Mapping	PO's Assessment	PO's Attainment
CO1	33%	3	29%	NO
CO2	33%	3		
CO3	33%	3		
CO4	15%	3		
PO2				
CO1	33%	2	29%	NO
CO2	33%	2		
CO3	33%	2		
	15%	2		
PO3				
CO1	33%	3	29%	NO
CO2	33%	3		
CO3	33%	3		
CO4	15%	3		
PO4				
CO1	33%	3	29%	NO
CO2	33%	3		
CO3	33%	3		
CO4	15%	3		
PO5				
CO1	33%	2	29%	NO
CO2	33%	2		
CO3	33%	2		
CO4	15%	2		
PO6				
CO1	33%	3	29%	NO
CO2	33%	3		
CO3	33%	3		
	15%	3		
PO7				
CO1	33%	2	29%	NO
CO2	33%	2		
CO3	33%	2		
CO4	15%	2		
PO8				
CO1	33%	1	29%	NO
CO2	33%	1		
CO3	33%	1		
CO4	15%	1		

PO9				
CO1	33%	2	**29%**	**NO**
CO2	33%	2		
CO3	33%	2		
	15%	2		
PO11				
CO1	33%	3	**29%**	**NO**
CO2	33%	3		
CO3	33%	3		
CO4	15%	3		

***PO's Attainment=more than 60%=Yes, Less than 60%=No**

PO's Assessment= (33X3+33X3+33X3+15X3)/(3+3+3+3)=29%

Mapping of Course outcome and Program outcome

SESSIONAL EXAM -SECOND

Code: BP 604T **Subject: Biopharmaceutics and Pharmacokinetics** **Semester: VI**
MM:30

Date: 01/06/2023 **Duration: 90 Min.** **Staff : Mr. Dev Raj**

Q. No.	Questions	Marks	CO	BL	PO
Section A	**Short Answer questions (Compulsory)**	10	1,2,3,4	L1,L2, L3	1,2,5,6,7,8,9,11
Section B	**Answer any one**	10			
1	Derive the equation for one compartment open model for first order extravascular administration. Explain the sigma minus method for estimation of KE.		1,2,3,4	L1,L2,L3, L5,L6	1,2,5,6,7,8,9,11
2	Illustrate the Michaelis menten equation for estimation of Vmax and Km.		1,2,4	L1,L2,L3, L4,L6	1,2,4,5,6,7,8,9,11
Section c	**Answer any two**	10			
1	Elaborate the factors for causes of non linearity.		1,2,3,4	L1,L2,L3, L4,L6	1,2,5,6,7,8,9,11
2	Explain the different levels of IVIVC.		1,2,3,4	L1,L2,L3,	1,2,5,6,7,8,9,11
3	Summarize the Loo-Riegelman method for estimation of Ka in two compartment model		1,2,3,4	L1,L2,L3, L4,L5,L6	1,2,4,5,6,7,8,9,11

CO-Course Outcome:

BP604T.1	Understand the basic concepts in Biopharmaceutics and pharmacokinetics and their significance.
BP604T.2	Use of plasma drug concentration-time data to calculate the pharmacokinetic parameters to describe the kinetics of drug absorption, distribution, metabolism, excretion, elimination.
BP604T.3	To understand the concepts of bioavailability and bioequivalence of drug products and their significance.
BP604T.4	Understand various pharmacokinetic parameters, their significance & applications.

BL: Bloom Taxonomy

L1-Remember	L2- Understand	L3-Apply	L4 -Analyze	L5-Evaluate	L-6- Create

PO-Programme Objectives:

1.	Pharmacy Knowledge	7.	Pharmaceutical Ethics
2.	Planning Abilities	8.	Communication
3.	Problem Analysis	9.	The Pharmacist & Society
4.	Modern Tool Usage	10.	Environment &Sustainability
5.	Leadership Skill	11.	Life Long Learning
6.	Professional Identity		

CO-PO Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11
BP604T.1	3	2	3	2	-	2	3	1	2	-	3
BP604T.2	3	2	3	3	-	2	3	1	2	-	3
BP604T.3	3	2	3	2	-	2	3	1	2	-	3
BP604T.4	3	2	3	3	-	2	3	1	2	-	3
Average	3	2	3	2.5	-	2	3	1	2	-	3

Note:

Correlation levels	Slight (Low)	Moderate (Medium)	Substantial (High)	no correlation
	1	2	3	--

CO/PO ATTAINMENTS

Attainments of POs and COs for first Sessional

Table No.1 Assessment of course outcome

Course Outcome	CO1		CO2		CO3		CO4	
	Q. No.	Avg.%	Q. No.	Avg.%	Q. No.	Avg.%	Q. No.	Avg%
Measure	Q1 MCQ	26%	Q1MCQ	26%	Q1 MCQ	26%	Q1 MCQ	26%
	Q1	60%	Q1	60%	Q1	60%	Q1	60%
	Q2	40%	Q2	40%	Q2	00%	Q2	40%
	Q1	76%	Q1	76%	Q1	76%	Q1	76%
	Q2	57%	Q2	57%	Q2	57%	Q2	57%
	Q3	60%	Q3	60%	Q3	60%	Q3	60%
Total Average		53%		53%		47%		53%

Course outcome mapping with Program outcome (PO)

PO1		Level of Mapping	PO's Assessment	PO's Attainment
CO1	53%	3	52%	NO
CO2	53%	3		
CO3	47%	3		
CO4	53%	3		
	PO2			
CO1	53%	2	52%	NO
CO2	53%	2		
CO3	47%	2		
	53%	2		
	PO3			
CO1	53%	3	52%	NO
CO2	53%	3		
CO3	47%	3		
CO4	53%	3		
	PO4			
CO1	53%	3	52%	NO
CO2	53%	3		
CO3	47%	3		
CO4	53%	3		
	PO6			
CO1	53%	2	52%	NO
CO2	53%	2		
CO3	47%	2		
	53%	2		
	PO7			
CO1	53%	3	52%	NO
CO2	53%	3		
CO3	47%	3		
CO4	53%	3		
	PO8			
CO1	53%	1	52%	NO
CO2	53%	1		
CO3	47%	1		
CO4	53%	1		
	PO9			
CO1	53%	2	52%	NO
CO2	53%	2		

CO3	47%	2		
	53%	2		
PO11				
CO1	53%	3	52%	NO
CO2	53%	3		
CO3	47%	3		
CO4	53%	3		

***PO's Attainment=more than 60%=Yes, Less than 60%=No**

PO's Assessment= (53X3+53X3+47X3+53X3)/(3+3+3+3)=52%

First sessional Examination

Roll No.	Sec. A	Sec B		Sec. C			Total
		Q_1	Q_2	Q_1	Q_2	Q_3	
200131140002	7	7	–	3	3	–	20
200131140003	7	7	–	–	1	–	15
200131140004	6	3	–	1	1	–	11
200131140005	3	5	–	3	2	–	13
200131140006							
200131140007	2	3	–	2	1	–	08
200131140008	4·5	6·5	–	2·5	2	–	16
200131140009	4	6	–	2	2	–	14
200131140010	6	6	–	3	–	3	18
200131140011	5	–	–	–	1	–	06
200131140012	3·5	3	–	–	–	3	10
200131140013	3·5	5	–	–	1	3	13
200131140014	2	2	–	–	1	2	07
200131140015	–	2	–	–	1	2	05
200131140016	3·5	5	–	–	2	2·5	13
200131140017	1	2	–	–	–	–	03
200131140019	1	5	–	–	–	–	06
200131140020	7	8	–	–	4	4	23
200131140021	5	6	–	2·5	–	2·5	16
200131140022	4·5	7	–	–	2	2	16
200131140023	3	3	–	2	–	2	10
200131140024	–	6	–	–	1	1	08
200131140025	4	4	–	–	1	2	10+1 = 11
200131140026	3·5	3	–	–	1	1	09
200131140027	1	06	–	–	–	1	08
200131140028	2·5	7	–	–	1	3	14
200131140029	–	5	–	–	–	3	08
200131140030	1	7	–	–	–	–	08
200131140031	2	8	–	–	2	–	12
200131140033	2·5	4	–	–	2	1	10
200131140034	5	3	–	–	2·5	4	15
200131140035	5	7	–	3·5	–	3·5	19

Roll No.	Sec A	Sec B Q1	Sec B Q2	Sec C Q1	Sec C Q2	Sec C Q3	
20013114036							
20013114037	4.5	2	—	2.5	1	—	10
20013114038	5.5	7	—	3.5	—	4	20
20013114039	6	7	—	—	3	3	19
20013114040	5.5	6	—	2.5	—	3	17
20013114041	6.5	7	—	2	—	4	20
20013114042	7.5	8	—	—	4	5	25
20013114043	—	4	—	—	—	—	04
20013114044	8	8	—	4.5	4	—	26
20013114045	5.5	8	—	2	—	4.5	20
20013114046	5	4.5	—	2.5	2	—	14
20013114047	2.5	5	—	—	1	3.5	12
20013114048	3	5	—	—	—	3	11
20013114049	5.5	4	—	—	1	3	14
20013114050	5.5	7	—	—	1	3.5	17
20013114051	6	7	—	—	1	3	17
20013114052	7	7	—	—	2	4	20
20013114053	5	7	—	2	—	2	16
20013114054	4.5	6	—	—	1	3	15
20013114055	1.5	3	—	—	0	0	05
20013114056	4	8	—	5	—	4	21
20013114057	3.5	7	—	3	2.5	—	16
20013114058	4.5	7	—	—	4	3	19
21023114001	9	8	—	3	—	4.5	25
21023114002	6	5	—	2	—	2	15
21023114003	7	5	—	3	—	2	17
21023114004	1.5	6	—	—	2	2.5	12
21023114007	5	6	—	2.5	2.5	—	16
% attainment	16/53	31/57	00/00	10/23	05/37	24/40	
	27%	54%	00%	43%	13%	60%	
% attempt	53/60 = 88	95%		38%	62%	67%	

2nd Sessional Examination

Roll No.	Q.A	Sec. B		Sec. C			Total
		Q_1	Q_2	Q_1	Q_2	Q_3	
20013114002	4	–	6	4	3	–	17
20013114003	–	7	–	–	2	–	9
20013114004							
20013114005	2	–	–	3	2	–	7
20013114006	3	2	–	–	–	–	5
20013114007	5	6	–	2	–	–	13
20013114008	1	3	–	3	2	–	9
20013114009	–	–	–	4	2	–	6
20013114010	3	7	–	2	–	–	12
20013114011	5	–	3	1	2	–	11
20013114012	3	5	–	1	2	–	11
20013114013	3.5	7	–	3	1	–	15
20013114014							
20013114015	0	3	–	–	1	–	4
20013114016	5	5	–	3	3	–	16
20013114017	–	2	–	–	–	0	2
20013114019	4	–	2	3	3	–	12
20013114020	6	8	–	4	4	–	22
20013114021	6	7	–	3	1	–	17
20013114022							
20013114023	4	4	–	2	–	–	10
20013114024	0	1	–	2	0	–	3
20013114025	4	7	–	2	2	–	15
20013114026	2	5	–	2	2	–	12
20013114027	0	3	–	1	–	–	4
20013114028	2	7	–	–	–	–	9
20013114029	0	7	–	–	–	–	7
20013114030							
20013114031	3	7	–	3	2	–	15
20013114033	3	5	–	–	–	–	8
20013114034	6	7	–	4	3	–	20
20013114035	4	6	–	4	–	3	17
20013114036							
20013114037		7	–	4	3	–	17
20013114038	7	7	–	4	4	–	22

Roll No.	Sec. A	Sec. B		Sec. C			Total
		Q_1	Q_2	Q_1	Q_2	Q_3	
200131140039	4	6	–	4	3	–	17
200131140040	4	6	–	3	–	3	16
200131140041	4	7	–	3	–	2	16
200131140042	9	8	–	5	–	4	26
200131140043							
200131140044	7	8	–	4	3		22
200131140045	7	7	–	5	4	–	23
200131140046	4	4	–	3	2	–	13
200131140047	1	6	–	4	3	–	14
200131140048	1	4	–	3	–	–	8
200131140049	3	3	–	3	3	–	12
200131140050	2	7	–	3	4	–	16
200131140051	5	4	–	4	1	–	14
200131140052	6	7	–	4	–	–	17
200131140053	7	8	–	4	3	–	22
200131140054	3	5	–	2	1	–	11
200131140055	2	2	–	1	–	–	5
200131140056	6	8	–	4	4	–	24
200131140057	5	–	2	4	4	–	15
200131140058	5	8	–	3	4	–	20
210231140001	7	–	7	4	5	–	23
210231140002	4	2	–	–	–	–	6
210231140003	6	7	–	4	–	–	17
210231140004	4	6	–	3	3	–	16
210231140007	6	4	–	4	4	–	18
	13/50	28/47	02/05	35/46	20/35	03/05	
% attainment	= 26%	60%	40%	76%	57%	60%	
% attempt	50/60	47/60	05/60	46/60	35/60	05/60	
	83%	= 78%	083%	77%	58%	08%	

CO/PO Attainments

Attainment of Outcomes:
The Program Outcomes (POs) are accomplished through curriculum
Course Outcomes (COs) are defined for each course and they are mapped to Pos in the CO/PO Mapping.
A set of performance evaluation criteria is used for quantitative assessment of COs
Thus the attainment of COs provides an evidence of attainment of POs.

Attainments of POs and Cos for Sessional Papers

1. First Check the CO's Covered by question in sessional exam from Mapping
2. Make the table for assessment of course outcome for each question attempted by the students. For example
   I. Total number of students in the class is 100.
   II. We had given the question no. 1 carrying marks 10. (We had given 08 marks for the successful attempted question.)
   III. 65 students attempted the question no. 1. Out of 65, 60 students carries 08 marks. Then the average percentage will calculated 60/65* 100= 92 % or Calculate the Average percentage by using given formula.

Mechanism for the attainment of CO:

The student performance in continuous assessment exams is verified for each question.

$$CO\ Assessment\ (Direct) = \frac{\text{Number of students reached in answering the question}}{\text{Number of students attempted the question}}$$

e.g of Table No. 1 Assessment of course outcome

Course Outcome	CO1		CO2		CO3	
	Q	Avg. %	Q	Avg. %	Q	Avg. %
Measure	Q1	92	Q1	92	Q1	92
	Q2	75	Q2	75	Q2	75
	Q3	73	Q4	86	Q3	73
	Q4	86	Q5	92	Q5	92
	Q5	92	Q6	65	Q6	65
	Q6	65				
Total Average		91		91.7		91.7

Attainment of PO's

Then make the table of Course outcome mapping with Program outcome with level from CO/PO Correlation table in mapping and calculate PO assessment. If the PO assessment is more than 70%, then PO attainment is achieved.

for example

Attainment of PO's

Course outcome mapping with Program outcome (PO1)

		Level of Mapping	PO's Assessment	PO's Attainment
PO1				
CO1	91	3	91.47 %	Yes
CO2	91.7	3		
CO3	91.7	3		
PO2				
CO1	91	3	91.47 %	Yes
CO2	91.7	3		
CO3	91.7	3		
PO3				
CO1	91	3	91.47 %	Yes
CO2	91.7	3		
CO3	91.7	3		
PO4				
CO1	91	3	91.47 %	Yes
CO2	91.7	3		
CO3	91.7	3		
PO11				
CO1	91	3	91.47 %	Yes
CO2	91.7	3		
CO3	91.7	3		

*** PO's Attainment= more than 70%= Yes, Less than 70%= No**

$$\text{PO1 Direct Assessment} = \frac{\Sigma(\text{level of mapping of PO with CO} * \text{Average of CO attainment})}{\Sigma(\text{level of Mapping of PO with CO})}$$

PO's Assessment = (91X3 + 91.7X3 +91.7X3) / (3+3+3) = 91.47

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