



पं. रविशंकर शुक्ल विश्वविद्यालय, रायपुर (छ.ग.)

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रायपुर, दिनांक : 05/02/2021

II अधिसूचना II

छत्तीसगढ़ शासन, उच्च शिक्षा विभाग, मंत्रालय के पत्र क्रमांक एफ 3-30/2020/38-2 दिनांक 11.01.2021 में प्राप्त अनुमोदन अनुसार विश्वविद्यालय के अध्यादेश क्रमांक-131 - Bachelor of Pharmacy में निम्नानुसार संशोधन अधिसूचित किया जाता है -

क्र.	अध्यादेश क्रमांक	वर्तमान में प्रचलित प्रावधान	प्रस्तावित संशोधन/नवीन प्रावधान
	B. Pharm.	<p>Pt. Ravishankar Shukla University, Raipur Ordinance for Bachelor of Pharmacy (4 Year Degree Course) Ordinance 131 (New Semester)</p> <p>1.0 The first degree in Pharmacy of four year (Eight semester) course hereinafter called four Year Degree course shall be designate as Bachelor in Pharmacy in short B. Pharm.</p> <p>1.1 The duration of four year degree course of B. Pharm course shall extend over a period of four years consisting of eight semesters named below:</p> <p>(i) B. Pharm. I Semester.</p> <p>(ii) B. Pharm. II Semester.</p> <p>(iii) B. Pharm. III Semester.</p> <p>(iv) B. Pharm. IV Semester.</p> <p>(v) B. Pharm. V Semester.</p> <p>(vi) B. Pharm. VI Semester.</p> <p>(vii) B. Pharm. VII Semester.</p> <p>(viii) B. Pharm. VIII Semester.</p> <p>1.2 Each semester shall be spread over for not less than sixteen weeks.</p> <p>2.0 ACADEMIC QUALIFICATIONS FOR ADMISSIONS:</p> <p>2.1 The minimum qualification for admission to first semester of Bachelor of Pharmacy four years (Eight semester) course shall be</p>	<p>Ordinance & SYLLABUS</p> <p>1. Short Title and Commencement These regulations shall be called as "The Revised Ordinance for the B. Pharm. Degree Program (CBCS) of the Pharmacy Council of India, New Delhi". They shall come into effect from the Academic Year 2018-19. The Ordinance framed are subject to modifications from time to time by Pharmacy Council of India.</p> <p>2. Minimum qualification for admission</p> <p>2.1 First year B. Pharm: Candidate shall have passed 10+2 examination conducted by the respective state/central government authorities recognized as equivalent to 10+2 examination by the Association of Indian Universities (AIU) with English as one of the subjects and Physics, Chemistry, Mathematics (P.C.M) and or Biology (P.C.B / P.C.M.B.) as optional subjects individually. Any other qualification approved by the Pharmacy Council of India as equivalent to any of the above examinations.</p> <p>2.2. B. Pharm lateral entry (to third semester): A pass in D. Pharm. course from an institution approved by the Pharmacy Council of India under section 12 of the Pharmacy Act.</p> <p>3. Duration of the program The course of study for B.Pharm shall extend over a period of eight semesters (four academic years) and six semesters (three academic years) for lateral entry students. The curricula and syllabi for the program shall be prescribed from time to time by Pharmacy Council of India, New Delhi.</p> <p>4. Medium of instruction and examinations Medium of instruction and examination shall be in English.</p> <p>5. Working days in each semester Each semester shall consist of not less than 100 working days. The odd semesters shall be conducted from the month of June/July to November/December</p>

		<p>the passing of 10+2 examination or any other equivalent examination with Physics, Chemistry, Mathematics or Biology conducted by the Chhattisgarh Board of Secondary Education or any other board or university examination recognized as equivalent by the State Government of Chhattisgarh.</p> <p>2.2 Minimum qualification for direct admission to second year of B. Pharma shall be first division in Diploma in Pharmacy from any institution approved by the Pharmacy Council of India, New Delhi (PCI) / All India Council for Technical Education, New Delhi (AICTE)</p> <p>3.0 SESSIONALS:</p> <p>3.1 Thirty percent of the marks for each theory and practical subject/paper shall be allotted for Sessionals.</p> <p>3.1.1 Theory: Two Sessional examinations shall be held during the semester for each theory paper/ subject from which one best answered by the candidate shall be considered for the award of Sessional marks.</p> <p>3.1.2 Practical: Marks shall be awarded on the basis of the experiments performed by the students, prior preparation for the experiment, conduct in the laboratory, result of the experiments, day-to-day completion of the records and viva-voce.</p> <p>4.0 EXAMINATIONS:</p> <p>4.1 There shall be one university examination at the end of each semester. These examinations will be designated as follows: (a) During first year: B. Pharm. I semester, B. Pharm. II semester. (b) During second year: B. Pharm. III semester, B. Pharm. IV semester. (c) During third year: B. Pharm. V semester, B. Pharm. VI semester. (d) During fourth year: B. Pharm. VII semester, B. Pharm. VIII semester.</p> <p>4.2 There will be a full examination at the end of each semester consisting of the theory papers and the laboratory practicals.</p> <p>4.3 A candidate who fails to secure the minimum pass marks in any subject may improve the same at the next semester.</p> <p>4.4 There will be no</p>	<p><i>and the even semesters shall be conducted from December/January to May/June in every calendar year.</i></p> <p>6. Attendance and progress <i>A candidate is required to put in at least 80% attendance in individual courses considering theory and practical separately. The candidate shall complete the prescribed course satisfactorily to be eligible to appear for the respective examinations.</i></p> <p>7. Program/Course credit structure <i>As per the philosophy of Credit Based Semester System, certain quantum of academic work viz. theory classes, tutorial hours, practical classes, etc. are measured in terms of credits. On satisfactory completion of the courses, a candidate earns credits. The amount of credit associated with a course is dependent upon the number of hours of instruction per week in that course. Similarly, the credit associated with any of the other academic, co/extra-curricular activities is dependent upon the quantum of work expected to be put in for each of these activities per week.</i></p> <p>Credit assignment Theory and Laboratory courses <i>Courses are broadly classified as Theory and Practical. Theory courses consist of lecture (L) and /or tutorial (T) hours, and Practical (P) courses consist of hours spent in the laboratory. Credits (C) for a course is dependent on the number of hours of instruction per week in that course, and is obtained by using a multiplier of one (1) for lecture and tutorial hours, and a multiplier of half (1/2) for practical (laboratory) hours. Thus, for example, a theory course having three lectures and one tutorial per week throughout the semester carries a credit of 4. Similarly, a practical having four laboratory hours per week throughout semester carries a credit of 2.</i></p> <p>Minimum credit requirements <i>The minimum credit points required for award of a B. Pharm. degree is 208. These credits are divided into Theory courses, Tutorials, Practical, Practice School and Projectover the duration of eight semesters. The credits are distributed semester-wise as shown in Table IX. Courses generally progress in sequences, building competencies and their positioning indicates certain academic maturity on the part of the learners. Learners are expected to follow the semester-wise schedule of courses given in the syllabus.</i></p> <p><i>The lateral entry students shall get 52 credit points transferred from their D. Pharm program. Such students shall take up additional remedial courses of 'Communication Skills' (Theory and Practical) and 'Computer Applications in Pharmacy' (Theory and Practical) equivalent to 3 and 4 credit points respectively, a total of 7 credit points to attain 59 credit points, the maximum of I and II semesters.</i></p> <p>8. Academic work <i>A regular record of attendance both in Theory and Practical shall be maintained by the teaching staff of respective courses.</i></p> <p>9. Course of study</p>
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		<p>supplementary examination.</p> <p>5.0 STANDARD OF PASSING:</p> <p>5.1 In each subject (theory and practical):</p> <p>5.1.1 Minimum 40% in Sessional and Semester examination taken together.</p> <p>5.1.2 Each theory paper and practical will be treated as separate subject for passing.</p> <p>5.1.3 A candidate who has been admitted in B.Pharm. 1st semester will be promoted to the higher class in accordance with the following sub-rules:</p> <p>5.1.3 (a) A candidate shall not be admitted in the fifth or higher semester classes unless he/she has fully passed/cleared the first and second semester examinations. Likewise candidates shall not be admitted in seventh or higher semester classes unless he/she has fully passed/cleared the first four semester examinations. For promotion to the higher semester the sequence shall be adhered to.</p> <p>5.1.3 (b) No candidate will be awarded degree of Bachelor of Pharmacy unless he/she has passed all the eight semester examinations. If any previous semesters, paper/practical remain as backlog to be cleared by him/her, the result will be withheld till he passes the backlog.</p>	<p><i>The course of study for B. Pharm shall include Semester Wise Theory & Practical as given in Table – I to VIII. The number of hours to be devoted to each theory, tutorial and practical course in any semester shall not be less than that shown in Table – I to VIII.</i></p>																					
		<p>6.0 DIVISION AND MERIT LIST:</p> <p>6.1 The division shall be awarded only after VIII semester examination and shall be based on the aggregate marks obtained by the candidate at his/her successful attempts at the I, II, III, IV, V, VI, VII, VIII semesters</p>	<p>Table-I: Course of study for semester I</p> <table border="1"> <thead> <tr> <th rowspan="2">Course code</th> <th rowspan="2">Name of the course</th> <th colspan="3">Internal Assessment</th> <th colspan="2">End Semester Exams</th> <th rowspan="2">Total Marks</th> </tr> <tr> <th>Continuous</th> <th>Sessional Exams</th> <th>Total</th> <th>Mark</th> <th>Duration</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	Course code	Name of the course	Internal Assessment			End Semester Exams		Total Marks	Continuous	Sessional Exams	Total	Mark	Duration								
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	<p>examinations i.e. full examination of B.Pharm. However, the division of the students from direct entry to Second year shall be based on the aggregate marks obtained by the candidates at his/ her successful attempt at III, IV, V, VI, VII, VIII semesters examinations. There shall be only four divisions as follows: First Division with Honors 75% and above. First Division 60% and above but below 75%. Second Division Not less than 50%. Pass Division Below 50%</p> <p>6.2.1 The merit shall be declared by the University after the main examination of the eighth semester of B.Pharm. on the basis of the integrated performance of all the four years i.e., I, II, III, IV, V, VI, VII and VIII Semester.</p> <p>6.2.2 The merit of the students from direct entry to Second year B. Pharm. i.e., III Semester shall be determined after the eight Semester examined on the basis of the integrated performance of all the three years i.e., III, IV, V, VI, VII and VIII Semester.</p> <p>6.2.3 The merit list shall include the first ten candidates securing at least first division and passing all semester examinations in single attempts.</p>	<table border="1"> <thead> <tr> <th></th> <th></th> <th></th> <th>Mark</th> <th>Durat ion</th> <th></th> <th></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>BP201T</td> <td>Human Anatomy and Physiology -II – Theory</td> <td>10</td> <td>15</td> <td>1 Hr</td> <td>25</td> <td>75</td> <td>3 Hrs</td> <td>100</td> </tr> <tr> <td>BP202T</td> <td>Pharmaceutical Organic Chemistry - I – Theory</td> <td>10</td> <td>15</td> <td>1 Hr</td> <td>25</td> <td>75</td> <td>3 Hrs</td> <td>100</td> </tr> <tr> <td>BP203T</td> <td>Biochemistry – Theory</td> <td>10</td> <td>15</td> <td>1 Hr</td> <td>25</td> <td>75</td> <td>3 Hrs</td> <td>100</td> </tr> <tr> <td>BP204T</td> <td>Pathophysiology – Theory</td> <td>10</td> <td>15</td> <td>1 Hr</td> <td>25</td> <td>75</td> <td>3 Hrs</td> <td>100</td> </tr> <tr> <td>BP205T</td> <td>Computer Applications in Pharmacy – Theory*</td> <td>10</td> <td>15</td> <td>1 Hr</td> <td>25</td> <td>50</td> <td>2 Hrs</td> <td>75</td> </tr> <tr> <td>BP206T</td> <td>Environmental Sciences – Theory*</td> <td>10</td> <td>15</td> <td>1 Hr</td> <td>25</td> <td>50</td> <td>2 Hrs</td> <td>75</td> </tr> <tr> <td>BP207P</td> <td>Human Anatomy and Physiology - II – Practical</td> <td>5</td> <td>10</td> <td>4 Hrs</td> <td>15</td> <td>35</td> <td>4 Hrs</td> <td>50</td> </tr> <tr> <td>BP208P</td> <td>Pharmaceutical Organic Chemistry -I– Practical</td> <td>5</td> <td>10</td> <td>4 Hrs</td> <td>15</td> <td>35</td> <td>4 Hrs</td> <td>50</td> </tr> <tr> <td>BP209P</td> <td>Biochemistry – Practical</td> <td>5</td> <td>10</td> <td>4 Hrs</td> <td>15</td> <td>35</td> <td>4 Hrs</td> <td>50</td> </tr> <tr> <td>BP210P</td> <td>Computer Applications in Pharmacy – Practical*</td> <td>5</td> <td>5</td> <td>2 Hrs</td> <td>10</td> <td>15</td> <td>2 Hrs</td> <td>25</td> </tr> <tr> <td>Total</td> <td></td> <td>80</td> <td>125</td> <td>20 Hrs</td> <td>205</td> <td>520</td> <td>30 Hrs</td> <td>725</td> </tr> </tbody> </table> <p>#Applicable ONLY for the students who have studied Mathematics / Physics / Chemistry at HSC and appearing for Remedial Biology (RB)course. §Applicable ONLY for the students who have studied Physics / Chemistry / Botany / Zoology at HSC and appearing for Remedial Mathematics (RM)course. * Non University Examination (NUE)</p>				Mark	Durat ion					BP201T	Human Anatomy and Physiology -II – Theory	10	15	1 Hr	25	75	3 Hrs	100	BP202T	Pharmaceutical Organic Chemistry - I – Theory	10	15	1 Hr	25	75	3 Hrs	100	BP203T	Biochemistry – Theory	10	15	1 Hr	25	75	3 Hrs	100	BP204T	Pathophysiology – Theory	10	15	1 Hr	25	75	3 Hrs	100	BP205T	Computer Applications in Pharmacy – Theory*	10	15	1 Hr	25	50	2 Hrs	75	BP206T	Environmental Sciences – Theory*	10	15	1 Hr	25	50	2 Hrs	75	BP207P	Human Anatomy and Physiology - II – Practical	5	10	4 Hrs	15	35	4 Hrs	50	BP208P	Pharmaceutical Organic Chemistry -I– Practical	5	10	4 Hrs	15	35	4 Hrs	50	BP209P	Biochemistry – Practical	5	10	4 Hrs	15	35	4 Hrs	50	BP210P	Computer Applications in Pharmacy – Practical*	5	5	2 Hrs	10	15	2 Hrs	25	Total		80	125	20 Hrs	205	520	30 Hrs	725
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	<p>7.0 MEDIUM OF INSTRUCTION AND EXAMINATION: The medium of instruction and examination shall be English throughout the course of study.</p> <p>8.0 The subjects to be studied in different semesters of B.Pharm shall be as per the schemes.</p> <p>9.0 CONDONATION OF DEFICIENCY IN MARKS:</p> <p>9.1 With a view to moderate hard line cases in the examination the</p>	<p>Table-II: Course of study for semester II</p> <table border="1"> <thead> <tr> <th>Course Code</th> <th>Name of the course</th> <th>No. of hours</th> <th>Tutorial</th> <th>Credit points</th> </tr> </thead> <tbody> <tr> <td>BP201T</td> <td>Human Anatomy and Physiology- II – Theory</td> <td>3</td> <td>1</td> <td>4</td> </tr> <tr> <td>BP202T</td> <td>Pharmaceutical Organic Chemistry- I – Theory</td> <td>3</td> <td>1</td> <td>4</td> </tr> <tr> <td>BP203T</td> <td>Biochemistry – Theory</td> <td>3</td> <td>1</td> <td>4</td> </tr> </tbody> </table>	Course Code	Name of the course	No. of hours	Tutorial	Credit points	BP201T	Human Anatomy and Physiology- II – Theory	3	1	4	BP202T	Pharmaceutical Organic Chemistry- I – Theory	3	1	4	BP203T	Biochemistry – Theory	3	1	4																																																																																								
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		<p>9.1.1 following rules shall be observed: Deficiency up to 5 marks be condoned to the best advantage of the candidate for passing the examination, provided the candidate fails in maximum of two theory or one theory and one practical or two practicals.</p> <p>9.1.2 While declaring result of the candidate no marks shall be added to or subtracted from the aggregate for the deficiency condoned as above. However, he/she will pass the subjects cleared through clause 6.1. After condoning the deficiency the candidate's result shall be declared in the division, which the aggregate entitled him/her.</p> <p>9.1.3 One grace mark will be given to the candidate who is failing/missing distinction/missing first division by one mark, on behalf of the Vice-Chancellor in the B. Pharm examination. This benefit will not, however, be available to a candidate getting advantage under clause 10.1.1.</p> <p>10.0 If a candidate has passed a semester examination in full he/she shall not be permitted to reappear in that examination for improvement of division/marks or any other purpose.</p>	<table border="1"> <tr> <td>BP204T</td> <td>Pathophysiology – Theory</td> <td>3</td> <td>1</td> <td>4</td> </tr> <tr> <td>BP205T</td> <td>Computer Applications in Pharmacy – Theory *</td> <td>3</td> <td>-</td> <td>3</td> </tr> <tr> <td>BP206T</td> <td>Environmental Sciences – Theory *</td> <td>3</td> <td>-</td> <td>3</td> </tr> <tr> <td>BP207P</td> <td>Human Anatomy and Physiology- II – Practical</td> <td>4</td> <td>-</td> <td>2</td> </tr> <tr> <td>BP208P</td> <td>Pharmaceutical Organic Chemistry- I – Practical</td> <td>4</td> <td>-</td> <td>2</td> </tr> <tr> <td>BP209P</td> <td>Biochemistry – Practical</td> <td>4</td> <td>-</td> <td>2</td> </tr> <tr> <td>BP210P</td> <td>Computer Applications in Pharmacy – Practical*</td> <td>2</td> <td>-</td> <td>1</td> </tr> <tr> <td>Total</td> <td></td> <td>32</td> <td>4</td> <td>29</td> </tr> </table> <p>*Non University Examination (NUE)</p>	BP204T	Pathophysiology – Theory	3	1	4	BP205T	Computer Applications in Pharmacy – Theory *	3	-	3	BP206T	Environmental Sciences – Theory *	3	-	3	BP207P	Human Anatomy and Physiology- II – Practical	4	-	2	BP208P	Pharmaceutical Organic Chemistry- I – Practical	4	-	2	BP209P	Biochemistry – Practical	4	-	2	BP210P	Computer Applications in Pharmacy – Practical*	2	-	1	Total		32	4	29										
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Sr. No.	Subject	Teaching Hrs /Week	Maximum Marks			Minimum Marks for Passing	Time Allowed for Examination Hrs.
			Sessional	Paper	Total		
1-T-1	Introduction to Pharmaceutics	3	30	70	100	40	3
1-P-1	Introduction to Pharmaceutics	3	30	70	100	40	4
1-T-2	Pharmaceutical Chemistry Physical	3	30	70	100	40	3
1-P-2	Pharmaceutical Chemistry Physical	3	30	70	100	40	4
1-T-3	Pharmaceutical Chemistry Inorganic	3	30	70	100	40	3
1-P-3	Pharmaceutical Chemistry Inorganic	3	30	70	100	40	4
1-T-4	Pharmaceutical Biology	3	30	70	100	40	3
1-P-4	Pharmaceutical Biology	3	30	70	100	40	4
1-T-5	Computer Application	3	30	70	100	40	3
1-P-5	Computer Application	3	30	70	100	40	4

Second Semester Examination for the Degree of Bachelor of Pharmacy
SCHEME OF PAPERS

Sr. No.	Subject	Teaching Hrs / Week	Maximum Marks			Minimum Marks for Passing	Time Allowed for Examination Hrs.
			Sessional	Paper	Total		
2-T-1	Physical Pharmacy	3	30	70	100	40	3
2-P-1	Physical Pharmacy	3	30	70	100	40	4
2-T-2	Pharmaceutical Engineering	3	30	70	100	40	3

			g-I						
2-T-3	Pharmaceutical Engineering- II	3	30	70	100	40	3		
2-P-3	Pharmaceutical Engineering- II	3	30	70	100	40	4		
2-T-4	Pharmaceutical Jurisprudence	3	30	70	100	40	3		
2-T-5	Human Anatomy and Physiology -I	3	30	70	100	40	3		
2-P-5	Human Anatomy and Physiology -I	3	30	70	100	40	4		

Third Semester Examination for the Degree of Bachelor of Pharmacy
SCHEME OF PAPERS

Sr. No.	Subject	Teaching Hrs./Week	Maximum Marks			Minimum Marks for Passing	Time Allowed for Examination Hrs.
			Sessional	Paper	Total		
3-T-1	Modern Dispensing Pharmacy	3	30	70	100	40	3
3-P-1	Modern Dispensing Pharmacy	3	30	70	100	40	4
3-T-2	Pharmaceutical Chemistry Organic-I	3	30	70	100	40	3
3-T-3	Pharmaceutical Chemistry Organic-II	3	30	70	100	40	3
3-P-3	Pharmaceutical Chemistry Organic-II	3	30	70	100	40	4

Table-IV: Course of study for semester IV

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP401T	Pharmaceutical Organic Chemistry- III – Theory	3	1	4
BP402T	Medicinal Chemistry- I – Theory	3	1	4
BP403T	Physical Pharmaceutics- II – Theory	3	1	4
BP404T	Pharmacology- I – Theory	3	1	4
BP405T	Pharmacognosy and Phytochemistry- I – Theory	3	1	4
BP406P	Medicinal Chemistry- I – Practical	4	-	2
BP407P	Physical Pharmaceutics- II – Practical	4	-	2
BP408P	Pharmacology- I – Practical	4	-	2
BP409P	Pharmacognosy and Phytochemistry- I – Practical	4	-	2
Total		31	5	28

		3-T-4	Pharmaceutical Analysis-I	3	30	70	100	40	3
		3-P-4	Pharmaceutical Analysis-I	3	30	70	100	40	4
		3-T-5	Human Anatomy and Physiology-II	3	30	70	100	40	3
		3-P-5	Human Anatomy and Physiology-II	3	30	70	100	40	4

Fourth Semester Examination for the Degree of Bachelor of Pharmacy
SCHEME OF PAPERS

Sr. No.	Subject	Teaching Hrs./Week	Maximum Marks			Minimum Marks for Passing	Time Allowed for Examination Hrs.
			Sessional	Paper	Total		
4-T-1	Pharmaceutical Technology-I	3	30	70	100	40	3
4-P-1	Pharmaceutical Technology-I	3	30	70	100	40	4
4-T-2	Pharmaceutical Analysis-II	3	30	70	100	40	3
4-P-2	Pharmaceutical Analysis-II	3	30	70	100	40	4
4-T-3	Pharmaceutical Bio-Chemistry	3	30	70	100	40	3
4-P-3	Pharmaceutical Bio-Chemistry	3	30	70	100	40	4

Table-V: Course of study for semester V

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP501 T	Medicinal Chemistry-II – Theory	3	1	4
BP502 T	Industrial Pharmacy-I– Theory	3	1	4
BP503 T	Pharmacology- II – Theory	3	1	4
BP504 T	Pharmacognosy and Phytochemistry- II– Theory	3	1	4
BP505 T	Pharmaceutical Jurisprudence – Theory	3	1	4
BP506 P	Industrial Pharmacy-I – Practical	4	-	2
BP507 P	Pharmacology- II – Practical	4	-	2
BP508 P	Pharmacognosy and Phytochemistry- II – Practical	4	-	2
Total		27	5	26

		stry							
4-T-4	Pharmacology-I	3	30	70	100	40	3		
4-P-4	Pharmacology-I	3	30	70	100	40	4		
4-T-5	Applied Mathematics	3	30	70	100	40	3		

Fifth Semester Examination for the Degree of Bachelor of Pharmacy
SCHEME OF PAPERS

Sr. No	Subject	Teaching Hrs./ Week	Maximum Marks			Minimum Marks for Passing	Time Allowed for Examination Hrs.
			Sessional	Paper	Total		
-1	Pharmaceutical Technology- II	3	30	70	100	40	3
-1	Pharmaceutical Technology- II	3	30	70	100	40	4
-2	Pharmaceutical Microbiology	3	30	70	100	40	3
-2	Pharmaceutical Microbiology	3	30	70	100	40	4
-3	Pharmaceutical Analysis-III	3	30	70	100	40	3
-3	Pharmaceutical Analysis-III	3	30	70	100	40	4
-4	Medicinal Chemistry-I	3	30	70	100	40	3
-4	Medicinal Chemistry-I	3	30	70	100	40	4
-5	Pharmacology-I	3	30	70	100	40	3
-5	Pharmacology-I	3	30	70	100	40	4

Table-VI: Course of study for semester VI

Course code	Name of the course	No. of hours	Tutorials	Credit points
BP601 T	Medicinal Chemistry- III – Theory	3	1	4
BP602 T	Pharmacology- III – Theory	3	1	4
BP603 T	Herbal Drug Technology – Theory	3	1	4
BP604 T	Biopharmaceutics and Pharmacokinetics –Theory	3	1	4
BP605 T	Pharmaceutical Biotechnology – Theory	3	1	4
BP606 T	Quality Assurance – Theory	3	1	4
BP607 P	Medicinal Chemistry- III – Practical	4	-	2
BP608 P	Pharmacology- III – Practical	4	-	2
BP609 P	Herbal Drug Technology – Practical	4	-	2
Total		30	6	30

Sixth Semester Examination for the Degree of Bachelor of Pharmacy

Table-VII: Course of study for semester VII

SCHEME OF PAPERS								Course code	Name of the course	No. of hours	Tutorial	Credit points
Sr. No.	Subject	Teaching Hrs./Week	Maximum Marks			Minimum Marks for Passing	Time Allowed for Examination Hrs.					
			Sessional	Paper	Total							
T-	Pharmaceutical Technology-III	3	30	70	100	40	3	BP70 1T	Instrumental Methods of Analysis – Theory	3	1	4
6-P-1	Pharmaceutical Technology-III	3	30	70	100	40	4	BP70 2T	Industrial Pharmacy-II – Theory	3	1	4
6-T-2	Medicinal Chemistry-II	3	30	70	100	40	3	BP70 3T	Pharmacy Practice – Theory	3	1	4
6-P-2	Medicinal Chemistry-II	3	30	70	100	40	4	BP70 4T	Novel Drug Delivery System – Theory	3	1	4
6-T-3	Pharmacology – II	3	30	70	100	40	3	BP70 5P	Instrumental Methods of Analysis – Practical	4	-	2
6-P-3	Pharmacology – II	3	30	70	100	40	4	BP70 6PS	Practice School*	12	-	6
6-T-4	Pharmacognosy –II	3	30	70	100	40	3	Total		28	5	24
6-P-4	Pharmacognosy –II	3	30	70	100	40	4	* Non University Examination (NUE)				
6-T-5	Hospital And Community Pharmacy	3	30	70	100	40	3					
6-P-5	Project Work	--	0	--	0	40	--					

Seventh Semester Examination for the Degree of Bachelor of Pharmacy								Table-VIII: Course of study for semester VIII				
SCHEME OF PAPERS								Course code	Name of the course	No. of hours	Tutorial	Credit points
Sr. No.	Subject	Teaching Hrs./Week	Maximum Marks			Minimum Marks for Passing	Time Allowed for Examination Hrs.					
			Sessional	Paper	Total							
1	Bio-Pharmaceutics	3	30	70	100	40	3	BP80 1T	Biostatistics and Research Methodology – Theory	3	1	4
T-2	Medicinal	3	30	70	100	40	3	BP80 2T	Social and Preventive Pharmacy– Theory	3	1	4
								BP80 3ET	Pharma Marketing Management –Theory			
								BP80 4ET	Pharmaceutical Regulatory Science–			

			IV				0		
	8-P-4	Pharmacognosy – IV	3	30	70	100	40		4
	8-T-5	Industrial Management and Accountancy	3	30	70	100	40		3
		B. Pharm. First Semester							
		1-T-1 Introduction to Pharmaceutics							
		1. Pharmacy profession: History, code of pharmaceutical ethics. Pharmacy as a career, pharmacy in relation to allied health professions. Introduction to pharmacopoeias.							
		2. Routes of drug administration, Classification of pharmaceutical dosage forms. Definition of solid, liquid, semisolid, gaseous dosage forms and introduction to novel drug delivery systems.							
		3. Definitions, general formulations, manufacturing procedures and official products of- Aromatic waters, syrups, spirit, elixirs, glycerites, lotion, liniments, Jellies, mucilages, emulsions, suspensions, milks.							
		4. Extraction and Galenical Products: Principle and method of extraction, preparation of infusion, tinctures, dry and soft liquid extracts.							
		6. Pharmaceutical arithmetic: Dilution and concentration of solutions, calculation by allegation, proof spirits, isotonic solutions.							
		7. Study of following pharmaceutical aids with their application: Colouring agent, flavouring agents, sweetening agents.							
		1-P-1 Introduction to Pharmaceutics (Practical)							
		Experiments based on Theory topics.							
		9. Program Committee							
		1. The B. Pharm. program shall have a Program Committee constituted by the Head of the institution in consultation with all the Heads of the departments.							
		2. The composition of the Program Committee shall be as follows: A senior teacher shall be the Chairperson; One Teacher from each department handling B.Pharm courses; and four student representatives of the program (one from each academic year), nominated by the Head of the institution.							
		3. Duties of the Program Committee:							
		i. Periodically reviewing the progress of the classes.							
		ii. Discussing the problems concerning curriculum, syllabus and the conduct of classes.							
		iii. Discussing with the course teachers on the nature and scope of assessment for the course and the same shall be announced to the students at the beginning of respective semesters.							
		iv. Communicating its recommendation to the Head of the institution on academic matters.							
		v. The Program Committee shall meet at least thrice in a semester preferably at the end of each Sessionalexam (Internal Assessment) and before the end semester exam.							
		10. Examinations/Assessments							
		The scheme for internal assessment and end semester examinations is given in Table – X.							
		End semester examinations							
		The End Semester Examinations for each theory and practical coursethrough semesters I to VIII shall be conducted by the university except for the subjects with asterix symbol (*) in table I and II for which examinations shall be conducted by the subject experts at college level and the marks/grades shall be submitted to the university.							
		1-T-2 Pharmaceutical Chemistry Physical							
		1. Introduction							
		2. Behaviour of Gases: Kinetic theory of gases, deviation from ideal behaviour and explanation.							
		3. The liquid state: Physical properties- surface tension, parachor, viscosity, refractive index, optical rotation, dipole moments and chemical constituents.							
		4. Solutions: Ideal and real solutions,							
		Tables-X: Schemes for internal assessments and end semester examinations semester wise							
		Semester I							
			Course code	Name of the course	Internal Assessment			End Semester Exams	Total Marks
					Conti nuou s Modes	Sessional Exams Mark	Durati on	Total Marks	Duratio n
			BP101T	Human Anatomy and Physiology- I – Theory	10	15	1 Hr	25	75
								3	100

	<p>solution of gases in liquid, colligative properties, partition coefficient, conductance and its measurements, Debye Huckel theory. Expression of concentration, ebulliscope and cryoscopic methods for determination of molecular weight. Osmosis, Liquid-liquid system, critical solution temperature.</p> <ol style="list-style-type: none"> Thermodynamics: First, second and third laws of thermodynamics. Zeroth law, absolute temperature scale, thermochemical equations, free energy functions and applications. Chemical equilibrium: Homogeneous and Heterogeneous Law of mass action, Le Chatelier's principle. Hydrolysis of salts. Henderson Hasselbalch's equation. Phase rule: - One and two component system of pharmaceutical interest. Chemical kinetics: Order of reaction, first and second order of reaction, determination of order of reaction. Theories of reaction kinetics, characteristics of homogeneous and heterogeneous catalysis, acid base and enzyme catalysis. Quantum Mechanics: Postulate of quantum mechanics, operators in quantum mechanics, the Schrödinger wave equation. Nuclear and Radiation Chemistry: Nuclear radiopharmaceutical, Clinical Application and dosage, hazards & precautions. <p>1-P-2 Pharmaceutical Chemistry Physical (Practical) Experiments based on Theory topics.</p>	<table border="1"> <tr> <td>BP102T</td> <td>Pharmaceutical Analysis- I – Theory</td> <td>10</td> <td>15</td> <td>1 Hr</td> <td>25</td> <td>75</td> <td>3 Hrs</td> <td>100</td> </tr> <tr> <td>BP103T</td> <td>Pharmaceutics - I – Theory</td> <td>10</td> <td>15</td> <td>1 Hr</td> <td>25</td> <td>75</td> <td>3 Hrs</td> <td>100</td> </tr> <tr> <td>BP104T</td> <td>Pharmaceutical Inorganic Chemistry – Theory</td> <td>10</td> <td>15</td> <td>1 Hr</td> <td>25</td> <td>75</td> <td>3 Hrs</td> <td>100</td> </tr> <tr> <td>BP105T</td> <td>Communication skills –Theory *</td> <td>5</td> <td>10</td> <td>1 Hr</td> <td>15</td> <td>35</td> <td>1.5 Hrs</td> <td>50</td> </tr> <tr> <td>BP106R BT</td> <td>Remedial Biology/</td> <td>5</td> <td>10</td> <td>1 Hr</td> <td>15</td> <td>35</td> <td>1.5 Hrs</td> <td>50</td> </tr> <tr> <td>BP106R MT</td> <td>Mathematics – Theory*</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>BP107P</td> <td>Human Anatomy and Physiology – Practical</td> <td>5</td> <td>10</td> <td>4 Hrs</td> <td>15</td> <td>35</td> <td>4 Hrs</td> <td>50</td> </tr> <tr> <td>BP108P</td> <td>Pharmaceutical Analysis- I – Practical</td> <td>5</td> <td>10</td> <td>4 Hrs</td> <td>15</td> <td>35</td> <td>4 Hrs</td> <td>50</td> </tr> <tr> <td>BP109P</td> <td>Pharmaceutics- I – Practical</td> <td>5</td> <td>10</td> <td>4 Hrs</td> <td>15</td> <td>35</td> <td>4 Hrs</td> <td>50</td> </tr> <tr> <td>BP110P</td> <td>Pharmaceutical Inorganic Chemistry – Practical</td> <td>5</td> <td>10</td> <td>4 Hrs</td> <td>15</td> <td>35</td> <td>4 Hrs</td> <td>50</td> </tr> <tr> <td>BP111P</td> <td>Communication skills – Practical*</td> <td>5</td> <td>5</td> <td>2 Hrs</td> <td>10</td> <td>15</td> <td>2 Hrs</td> <td>25</td> </tr> <tr> <td>BP112R BP</td> <td>Remedial Biology – Practical*</td> <td>5</td> <td>5</td> <td>2 Hrs</td> <td>10</td> <td>15</td> <td>2 Hrs</td> <td>25</td> </tr> <tr> <td colspan="2">Total</td> <td>70/75[§]/80[#]</td> <td>115/125[§]/130[#]</td> <td>23/24[#] Hrs</td> <td>185/200[§]</td> <td>490/540[§]</td> <td>31.5[§]/35[#] Hrs</td> <td>675/725[§]/750[#]</td> </tr> </table> <p># Applicable ONLY for the students studied Mathematics / Physics / Chemistry at HSC and appearing for Remedial Biology (RB)course. § Applicable ONLY for the students studied Physics / Chemistry / Botany / Zoology at HSC and appearing for Remedial Mathematics (RM)course. * Non University Examination (NUE)</p>	BP102T	Pharmaceutical Analysis- I – Theory	10	15	1 Hr	25	75	3 Hrs	100	BP103T	Pharmaceutics - I – Theory	10	15	1 Hr	25	75	3 Hrs	100	BP104T	Pharmaceutical Inorganic Chemistry – Theory	10	15	1 Hr	25	75	3 Hrs	100	BP105T	Communication skills –Theory *	5	10	1 Hr	15	35	1.5 Hrs	50	BP106R BT	Remedial Biology/	5	10	1 Hr	15	35	1.5 Hrs	50	BP106R MT	Mathematics – Theory*								BP107P	Human Anatomy and Physiology – Practical	5	10	4 Hrs	15	35	4 Hrs	50	BP108P	Pharmaceutical Analysis- I – Practical	5	10	4 Hrs	15	35	4 Hrs	50	BP109P	Pharmaceutics- I – Practical	5	10	4 Hrs	15	35	4 Hrs	50	BP110P	Pharmaceutical Inorganic Chemistry – Practical	5	10	4 Hrs	15	35	4 Hrs	50	BP111P	Communication skills – Practical*	5	5	2 Hrs	10	15	2 Hrs	25	BP112R BP	Remedial Biology – Practical*	5	5	2 Hrs	10	15	2 Hrs	25	Total		70/75[§]/80[#]	115/125[§]/130[#]	23/24[#] Hrs	185/200[§]	490/540[§]	31.5[§]/35[#] Hrs	675/725[§]/750[#]
BP102T	Pharmaceutical Analysis- I – Theory	10	15	1 Hr	25	75	3 Hrs	100																																																																																																															
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	<p>1-T-3 Pharmaceutical Chemistry Inorganic</p> <p>An outline of methods of preparation, uses and assays of the following classes of pharmaceuticals included in pharmacopoeia:</p> <ol style="list-style-type: none"> Acid & Bases, Buffers, water Gastrointestinal Agents: Acidifying agents, antacids, protective & adsorbents, cathartics. Major Intra- & Extracellular electrolytes: Physiological ions, Electrolytes used in replacement Theory of acid base balance and combination therapy. Essential & trace elements: Transition elements & their compounds of pharmaceutical importance; Ion & haematinics, mineral supplements Cationic & Anionic components of Inorganic drugs useful for systemic effects. 	<p>Semester II</p> <table border="1"> <thead> <tr> <th rowspan="3">Course code</th> <th rowspan="3">Name of the course</th> <th colspan="4">Internal Assessment</th> <th colspan="2">End Semester Exams</th> <th rowspan="3">Total Marks</th> </tr> <tr> <th rowspan="2">Continu-ous Mode</th> <th colspan="2">Session- al Exams</th> <th rowspan="2">Tota- l</th> <th rowspan="2">M-arks</th> <th rowspan="2">Du-ration</th> </tr> <tr> <th>Ma- rks</th> <th>Du-ration</th> </tr> </thead> <tbody> <tr> <td>BP2 01T</td> <td>Human Anatomy and Physiology- II – Theory</td> <td>10</td> <td>15</td> <td>1 Hr</td> <td>25</td> <td>75</td> <td>3 Hrs</td> <td>100</td> </tr> <tr> <td>BP2 02T</td> <td>Pharmaceut- ical Organic Chemistry- I – Theory</td> <td>10</td> <td>15</td> <td>1 Hr</td> <td>25</td> <td>75</td> <td>3 Hrs</td> <td>100</td> </tr> <tr> <td>BP2 03T</td> <td>Biochemistr- y – Theory</td> <td>10</td> <td>15</td> <td>1 Hr</td> <td>25</td> <td>75</td> <td>3 Hrs</td> <td>100</td> </tr> <tr> <td>BP2 04T</td> <td>Pathophysio-logy – Theory</td> <td>10</td> <td>15</td> <td>1 Hr</td> <td>25</td> <td>75</td> <td>3 Hrs</td> <td>100</td> </tr> </tbody> </table>	Course code	Name of the course	Internal Assessment				End Semester Exams		Total Marks	Continu-ous Mode	Session- al Exams		Tota- l	M-arks	Du-ration	Ma- rks	Du-ration	BP2 01T	Human Anatomy and Physiology- II – Theory	10	15	1 Hr	25	75	3 Hrs	100	BP2 02T	Pharmaceut- ical Organic Chemistry- I – Theory	10	15	1 Hr	25	75	3 Hrs	100	BP2 03T	Biochemistr- y – Theory	10	15	1 Hr	25	75	3 Hrs	100	BP2 04T	Pathophysio-logy – Theory	10	15	1 Hr	25	75	3 Hrs	100																																																																
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BP2 04T	Pathophysio-logy – Theory	10	15	1 Hr	25	75	3 Hrs	100																																																																																																															

	<p>6. Topical Agents: Protective, Astringents, Ant infective</p> <p>7. Inhalants, Expectorant and Respiratory stimulants</p> <p>8. Complexing & Chelating agents use in Therapy</p> <p>9. Antidotes in poisoning</p> <p>10. Miscellaneous Agents - Antioxidant</p> <p>1-P-3 Pharmaceutical Chemistry Inorganic (Practical) Experiments based on Theory topics.</p>	<table border="1"> <tbody> <tr> <td>BP2 05T</td> <td>Computer Applications in Pharmacy – Theory*</td> <td>10</td> <td>15</td> <td>1 Hr</td> <td>2 5</td> <td>5 0</td> <td>2 Hrs</td> <td>75</td> </tr> <tr> <td>BP2 06T</td> <td>Environmental Sciences – Theory*</td> <td>10</td> <td>15</td> <td>1 Hr</td> <td>2 5</td> <td>5 0</td> <td>2 Hrs</td> <td>75</td> </tr> <tr> <td>BP2 07P</td> <td>Human Anatomy and Physiology-II –Practical</td> <td>5</td> <td>10</td> <td>4 Hrs</td> <td>1 5</td> <td>3 5</td> <td>4 Hrs</td> <td>50</td> </tr> <tr> <td>BP2 08P</td> <td>Pharmaceutical Organic Chemistry-I – Practical</td> <td>5</td> <td>10</td> <td>4 Hrs</td> <td>1 5</td> <td>3 5</td> <td>4 Hrs</td> <td>50</td> </tr> <tr> <td>BP2 09P</td> <td>Biochemistry – Practical</td> <td>5</td> <td>10</td> <td>4 Hrs</td> <td>1 5</td> <td>3 5</td> <td>4 Hrs</td> <td>50</td> </tr> <tr> <td>BP2 10P</td> <td>Computer Applications in Pharmacy – Practical*</td> <td>5</td> <td>5</td> <td>2 Hrs</td> <td>1 0</td> <td>1 5</td> <td>2 Hrs</td> <td>25</td> </tr> <tr> <td>Total</td> <td></td> <td>80</td> <td>125</td> <td>20 Hrs</td> <td>2 0 5</td> <td>5 2 0</td> <td>30 Hrs</td> <td>725</td> </tr> </tbody> </table> <p>* The subject experts at college level shall conduct examinations</p>	BP2 05T	Computer Applications in Pharmacy – Theory*	10	15	1 Hr	2 5	5 0	2 Hrs	75	BP2 06T	Environmental Sciences – Theory*	10	15	1 Hr	2 5	5 0	2 Hrs	75	BP2 07P	Human Anatomy and Physiology-II –Practical	5	10	4 Hrs	1 5	3 5	4 Hrs	50	BP2 08P	Pharmaceutical Organic Chemistry-I – Practical	5	10	4 Hrs	1 5	3 5	4 Hrs	50	BP2 09P	Biochemistry – Practical	5	10	4 Hrs	1 5	3 5	4 Hrs	50	BP2 10P	Computer Applications in Pharmacy – Practical*	5	5	2 Hrs	1 0	1 5	2 Hrs	25	Total		80	125	20 Hrs	2 0 5	5 2 0	30 Hrs	725
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	<p>1-T-4 Pharmaceutical Biology</p> <ol style="list-style-type: none"> Modern concepts of Biology viz. molecular, Physiological and biochemical aspects. Biological classification, species and population, Biotic community, Biosphere Method of classification of plants Plant cell: It's structure and non-living inclusion, mitosis and meiosis, different types of plant tissues and their functions. Morphology of root, stem, bark, wood, leaf, flower, fruit and seed, modification of root and stem. General structure and life history of parasites as illustrated by amoeba. Entamoeba, trypanosome, plasmodium, taenia, and ascaris. General structure and life history of insects like mosquito, housefly, silkworm and mites. Plant Taxonomy: Study of the following families with special reference to medicinal important plants: Papaveraceae, Ranunculaceae, Cruciferaceae, Apocyanaceae, Rutaceae, Umbelliferae, Rubiaceae, Solanaceae, Convolvulaceae, Scrophylariaceae, Labiaceae, Euphorbiaceae, Liliaceae, Amarylidaceae, Zingiberaceae, Dioscoraceae.. Introduction to microscopy (optical, electron, phase contrast, etc.) Micro-chemical tests for cell wall and cell inclusions. General structure, physiological life history and medico economic importance of: Bacteria, Penicillium, Claviceps, Yeast, Mushrooms and Lycopodium. Preparation and preservation of herbarium sheets. 	<p>Semester III</p> <table border="1"> <thead> <tr> <th rowspan="3">Co urs e co de</th> <th rowspan="3">Name of the course</th> <th colspan="4">Internal Assessment</th> <th colspan="2">End Semester Exams</th> <th rowspan="3">Total Marks</th> </tr> <tr> <th rowspan="2">Cont inuo us Mod e</th> <th colspan="2">Session al Exams</th> <th rowspan="2">Tot al</th> <th rowspan="2">M ar ks</th> <th rowspan="2">Du rati on</th> </tr> <tr> <th>M ar ks</th> <th>Du rati on</th> </tr> </thead> <tbody> <tr> <td>BP 30 1T</td> <td>Pharm aceutic al Organi c Chemis try- II – Theory</td> <td>10</td> <td>15</td> <td>1 Hr</td> <td>25</td> <td>75</td> <td>3 Hrs</td> <td>100</td> </tr> <tr> <td>BP 30 2T</td> <td>Physic al Pharm aceutic s-I – Theory</td> <td>10</td> <td>15</td> <td>1 Hr</td> <td>25</td> <td>75</td> <td>3 Hrs</td> <td>100</td> </tr> <tr> <td>BP 30 3T</td> <td>Pharm aceutic al Microbi ology – Theory</td> <td>10</td> <td>15</td> <td>1 Hr</td> <td>25</td> <td>75</td> <td>3 Hrs</td> <td>100</td> </tr> <tr> <td>BP 30 4T</td> <td>Pharm aceutic al Engin ering – Theory</td> <td>10</td> <td>15</td> <td>1 Hr</td> <td>25</td> <td>75</td> <td>3 Hrs</td> <td>100</td> </tr> <tr> <td>BP 30 5P</td> <td>Pharm aceutic al Organi c</td> <td>5</td> <td>10</td> <td>4 Hr</td> <td>15</td> <td>35</td> <td>4 Hrs</td> <td>50</td> </tr> </tbody> </table>	Co urs e co de	Name of the course	Internal Assessment				End Semester Exams		Total Marks	Cont inuo us Mod e	Session al Exams		Tot al	M ar ks	Du rati on	M ar ks	Du rati on	BP 30 1T	Pharm aceutic al Organi c Chemis try- II – Theory	10	15	1 Hr	25	75	3 Hrs	100	BP 30 2T	Physic al Pharm aceutic s-I – Theory	10	15	1 Hr	25	75	3 Hrs	100	BP 30 3T	Pharm aceutic al Microbi ology – Theory	10	15	1 Hr	25	75	3 Hrs	100	BP 30 4T	Pharm aceutic al Engin ering – Theory	10	15	1 Hr	25	75	3 Hrs	100	BP 30 5P	Pharm aceutic al Organi c	5	10	4 Hr	15	35	4 Hrs	50	
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	<p>1-T-5 Computer Applications</p> <ol style="list-style-type: none"> Digital Electronics: Number system, Review of logic gates, Boolean algebra, Combinational circuits, Decoders and Multiplexers, Flip-Flops, Binary Counters, Shift registers, Data representation, fixed point and floating point representation and other binary codes, half adder, full adder, subtracter. Introduction to Computers: Computer System Characteristics and Capabilities: Speed, Accuracy, Reliability, Memory capability, Repeatability. Computer Hardware: Block Diagram of a Computer. Types of Computers: Analog, Digital, Hybrid General and Special Purpose Computers. Computer Generations: Characteristics of Computer Generations Computer Systems – Micros, Minis & Main-frames. Introduction to a PC: The IBM Personal Computer Types of PC systems PC, XT & AT Pentium PC's Limitations of Micro Computer. Computer Software: System software, Application Software, Types of System Software, Introduction and Types of Operating Systems programs, Booting Loader, Diagnostic Tests, Operating Systems Executive, BIOS, Utility Programs, File Maintenance, Language Processors, Assembler, Compiler & Interpreter. Application Software: Types of Application Software- Special 	<p>Semester IV</p> <table border="1"> <thead> <tr> <th rowspan="3">Course code</th> <th rowspan="3">Name of the course</th> <th colspan="4">Internal Assessment</th> <th colspan="2">End Semester Exams</th> <th rowspan="3">Total Marks</th> </tr> <tr> <th rowspan="2">Continuous Mode</th> <th colspan="2">Sessional Exams</th> <th rowspan="2">Total</th> <th rowspan="2">Marks</th> <th rowspan="2">Duration</th> </tr> <tr> <th>Marks</th> <th>Duration</th> </tr> </thead> <tbody> <tr> <td>BP4 01T</td> <td>Pharmaceutical Organic Chemistry- III – Theory</td> <td>10</td> <td>15</td> <td>1 Hr</td> <td>25</td> <td>75</td> <td>3 Hrs</td> <td>100</td> </tr> <tr> <td>BP4 02T</td> <td>Medicinal Chemistry-I – Theory</td> <td>10</td> <td>15</td> <td>1 Hr</td> <td>25</td> <td>75</td> <td>3 Hrs</td> <td>100</td> </tr> <tr> <td>BP4 03T</td> <td>Physical Pharmaceutics-II – Theory</td> <td>10</td> <td>15</td> <td>1 Hr</td> <td>25</td> <td>75</td> <td>3 Hrs</td> <td>100</td> </tr> <tr> <td>BP4 04T</td> <td>Pharmacology - I – Theory</td> <td>10</td> <td>15</td> <td>1 Hr</td> <td>25</td> <td>75</td> <td>3 Hrs</td> <td>100</td> </tr> <tr> <td>BP4 05T</td> <td>Pharmacognosy and Phytochemistry-I – Theory</td> <td>10</td> <td>15</td> <td>1 Hr</td> <td>25</td> <td>75</td> <td>3 Hrs</td> <td>100</td> </tr> <tr> <td>BP4 06P</td> <td>Medicinal Chemistry- I – Practical</td> <td>5</td> <td>10</td> <td>4 Hr</td> <td>15</td> <td>35</td> <td>4 Hrs</td> <td>50</td> </tr> <tr> <td>BP4 07P</td> <td>Physical Pharmaceutics -II – Practical</td> <td>5</td> <td>10</td> <td>4 Hrs</td> <td>15</td> <td>35</td> <td>4 Hrs</td> <td>50</td> </tr> </tbody> </table>	Course code	Name of the course	Internal Assessment				End Semester Exams		Total Marks	Continuous Mode	Sessional Exams		Total	Marks	Duration	Marks	Duration	BP4 01T	Pharmaceutical Organic Chemistry- III – Theory	10	15	1 Hr	25	75	3 Hrs	100	BP4 02T	Medicinal Chemistry-I – Theory	10	15	1 Hr	25	75	3 Hrs	100	BP4 03T	Physical Pharmaceutics-II – Theory	10	15	1 Hr	25	75	3 Hrs	100	BP4 04T	Pharmacology - I – Theory	10	15	1 Hr	25	75	3 Hrs	100	BP4 05T	Pharmacognosy and Phytochemistry-I – Theory	10	15	1 Hr	25	75	3 Hrs	100	BP4 06P	Medicinal Chemistry- I – Practical	5	10	4 Hr	15	35	4 Hrs	50	BP4 07P	Physical Pharmaceutics -II – Practical	5	10	4 Hrs	15	35	4 Hrs	50
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	<p>emphasis on application of MS-Office software. Difference between Program and Packages. Disk Operating System: Internal & External Commands, Unix Commands.</p> <p>4. Networking Concepts: Types of networks design structures; LAN/MAN/WAN; Advantages and limitations. Internet and its Basic Concepts; The Mechanism of the Internet. HTML Basics & Web Site Design.</p> <p>1-P-5 Computer Applications (Practical) Experiments based on Theory topics.</p>	<table border="1"> <tr> <td>BP4 08P</td> <td>Pharmacology-I – Practical</td> <td>5</td> <td>10</td> <td>4 Hrs</td> <td>15</td> <td>35</td> <td>4 Hrs</td> <td>50</td> </tr> <tr> <td>BP4 09P</td> <td>Pharmacognosy and Phytochemistry-I – Practical</td> <td>5</td> <td>10</td> <td>4 Hrs</td> <td>15</td> <td>35</td> <td>4 Hrs</td> <td>50</td> </tr> <tr> <td>Total</td> <td></td> <td>70</td> <td>115</td> <td>21 Hrs</td> <td>185</td> <td>515</td> <td>31 Hrs</td> <td>700</td> </tr> </table>	BP4 08P	Pharmacology-I – Practical	5	10	4 Hrs	15	35	4 Hrs	50	BP4 09P	Pharmacognosy and Phytochemistry-I – Practical	5	10	4 Hrs	15	35	4 Hrs	50	Total		70	115	21 Hrs	185	515	31 Hrs	700																																																																							
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	<p>B. Pharm. Second Semester</p> <p>2-T-1 Physical Pharmacy</p> <ol style="list-style-type: none"> States of Matter:- Gases & Liquids-Introduction, Real gases, Liquefaction of gases, Solids- Crystallisation, Polymorphism: Definition, different shapes of polymorphs, examples and its applications to Pharmacy, Physical Properties of Drug Molecule - Additive, constitutive and colligative properties; Dielectric constant, its significance to pharmacy. Solutions of non electrolytes- Properties and types of solutions, boiling point and boiling point diagrams, Lowering of vapour pressure, osmotic pressure-Semi permeable membrane and osmotic pressure, measurement of osmotic pressure, Solutions of electrolytes - Electrolysis; Conductance : Equivalent and specific conductance. Solubility and Distribution Phenomenon - General principles, types of solvents; solubility of salts ; solubility of slightly soluble electrolyte, solubility of weak electrolyte-influence of pH, influence of surfactants; distribution coefficient (Nernst coefficient) ,co-solvency. Application of Chemical Kinetics: Arrhenius equation and shelf life determination, Theories of reaction rate, Accelerated stability studies: Introduction, conditions used in studying and purpose of studying. Interfacial Phenomenon- Surface tension and surface free Energy ; measurement of surface and interfacial tension, spreading of liquids; adsorption at liquid interfaces, HLB-determination and importance with respect to suspension and emulsion, adsorption on solid surfaces, measurement of surface free area, its significance and importance, electrical double layer, Nernst and 	<p>Semester V</p> <table border="1"> <thead> <tr> <th rowspan="3">Course code</th> <th rowspan="3">Name of the course</th> <th colspan="4">Internal Assessment</th> <th colspan="2">End Semester Exams</th> <th rowspan="3">Total Marks</th> </tr> <tr> <th rowspan="2">Continuous Mode</th> <th colspan="2">Sessional Exams</th> <th rowspan="2">Total</th> <th rowspan="2">Marks</th> <th rowspan="2">Duration</th> </tr> <tr> <th>Marks</th> <th>Duration</th> </tr> </thead> <tbody> <tr> <td>BP50 1T</td> <td>Medicinal Chemistry- II – Theory</td> <td>10</td> <td>15</td> <td>1 Hr</td> <td>25</td> <td>75</td> <td>3 Hrs</td> <td>100</td> </tr> <tr> <td>BP50 2T</td> <td>Industrial Pharmacy-I– Theory</td> <td>10</td> <td>15</td> <td>1 Hr</td> <td>25</td> <td>75</td> <td>3 Hrs</td> <td>100</td> </tr> <tr> <td>BP50 3T</td> <td>Pharmacology- II – Theory</td> <td>10</td> <td>15</td> <td>1 Hr</td> <td>25</td> <td>75</td> <td>3 Hrs</td> <td>100</td> </tr> <tr> <td>BP50 4T</td> <td>Pharmacognosy and Phytochemistry- II– Theory</td> <td>10</td> <td>15</td> <td>1 Hr</td> <td>25</td> <td>75</td> <td>3 Hrs</td> <td>100</td> </tr> <tr> <td>BP50 5T</td> <td>Pharmaceutical Jurisprudence – Theory</td> <td>10</td> <td>15</td> <td>1 Hr</td> <td>25</td> <td>75</td> <td>3 Hrs</td> <td>100</td> </tr> <tr> <td>BP50 6P</td> <td>Industrial Pharmacy-I– Practical</td> <td>5</td> <td>10</td> <td>4 Hr</td> <td>15</td> <td>35</td> <td>4 Hrs</td> <td>50</td> </tr> <tr> <td>BP50 7P</td> <td>Pharmacology- II – Practical</td> <td>5</td> <td>10</td> <td>4 Hr</td> <td>15</td> <td>35</td> <td>4 Hrs</td> <td>50</td> </tr> <tr> <td>BP50 8P</td> <td>Pharmacognosy and Phytochemistry- II – Practical</td> <td>5</td> <td>10</td> <td>4 Hr</td> <td>15</td> <td>35</td> <td>4 Hrs</td> <td>50</td> </tr> <tr> <td>Total</td> <td></td> <td>65</td> <td>105</td> <td>17 Hr</td> <td>170</td> <td>480</td> <td>27 Hrs</td> <td>650</td> </tr> </tbody> </table>	Course code	Name of the course	Internal Assessment				End Semester Exams		Total Marks	Continuous Mode	Sessional Exams		Total	Marks	Duration	Marks	Duration	BP50 1T	Medicinal Chemistry- II – Theory	10	15	1 Hr	25	75	3 Hrs	100	BP50 2T	Industrial Pharmacy-I– Theory	10	15	1 Hr	25	75	3 Hrs	100	BP50 3T	Pharmacology- II – Theory	10	15	1 Hr	25	75	3 Hrs	100	BP50 4T	Pharmacognosy and Phytochemistry- II– Theory	10	15	1 Hr	25	75	3 Hrs	100	BP50 5T	Pharmaceutical Jurisprudence – Theory	10	15	1 Hr	25	75	3 Hrs	100	BP50 6P	Industrial Pharmacy-I– Practical	5	10	4 Hr	15	35	4 Hrs	50	BP50 7P	Pharmacology- II – Practical	5	10	4 Hr	15	35	4 Hrs	50	BP50 8P	Pharmacognosy and Phytochemistry- II – Practical	5	10	4 Hr	15	35	4 Hrs	50	Total		65	105	17 Hr	170	480	27 Hrs	650
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		<p>Zeta potential , effects of electrolytes, importance with respect to suspension emulsions.</p> <p>8. Colloids- Introduction, definition, types size and methods of preparation, differences between true , colloidal and coarse suspensions; optical and Kinetic properties : Electro kinetic phenomenon-electrophoresis, electro-osmosis, Donnan membrane equilibrium and its applications; stability of colloidal systems, sensitisation and protective colloids; solubilisation of colloids</p> <p>9. Rheology- Introduction – Newtonian and Non Newtonian system, viscosity measurements, thixotropy and its pharmaceutical significance; applications of rheology to pharmacy.</p> <p>10. Micromeritics : Introduction to fundamental and derived properties, methods to determine particle size, shape and surface area, density and bulkiness, flow properties, compaction.</p> <p>2-P-1 Physical Pharmacy (Practical) Experiments based on Theory topics.</p>																																																																																
		<p>2-T-2 Pharmaceutical Engineering- I</p> <ol style="list-style-type: none"> 1. Introduction to industrial Processing: Unit Operations and Processes, fundamental concept of material and energy balance Dimensional analysis. 2. Materials of pharmaceutical Plant construction: - Factors affecting the material selection for Pharmaceutical plants. Physical, Chemical and mechanical properties and uses of important materials and their alloys employed in the construction of pharmaceutical plants, heat and corrosion resistant alloys. 3. Corrosion and its prevention: - General considerations, types of corrosion, methods of reducing corrosion. 4. Industrial hazards and safety measures: - Mechanical chemical, electrical, fire and explosive hazards in pharmaceutical process, industries including inflammable gases and dusts. Safety measures in pharmaceutical plants and works. 5. Flow of fluids: Fluid static, manometers, Reynolds number and its significance, distribution of velocities across a pipe, Bernoulli's theorem and its applications. Fluid heads, friction losses, Enlargement and contraction losses, measurement of flow of fluids. 6. Transportation of material: - Solids: Types of conveyors. Belt conveyers, Chain conveyers screw conveyors, pneumatic conveyors and conveying of manufactured materials. Liquid: - pipes, pipe fittings, pumps and valves. Gases: - Fans, blowers, 	<p>Semester VI</p> <table border="1"> <thead> <tr> <th rowspan="3">Course code</th> <th rowspan="3">Name of the course</th> <th colspan="3">Internal Assessment</th> <th colspan="2">End Semester Exams</th> <th rowspan="3">Total Marks</th> </tr> <tr> <th rowspan="2">Continuous Mode</th> <th colspan="2">Sessional Exams</th> <th rowspan="2">Total</th> <th rowspan="2">Marks</th> <th rowspan="2">Duration</th> </tr> <tr> <th>Marks</th> <th>Duration</th> </tr> </thead> <tbody> <tr> <td>BP60 1T</td> <td>Medicinal Chemistry- III – Theory</td> <td>10</td> <td>15</td> <td>1 Hr</td> <td>25</td> <td>75</td> <td>3 Hrs</td> <td>100</td> </tr> <tr> <td>BP60 2T</td> <td>Pharmacology- III – Theory</td> <td>10</td> <td>15</td> <td>1 Hr</td> <td>25</td> <td>75</td> <td>3 Hrs</td> <td>100</td> </tr> <tr> <td>BP60 3T</td> <td>Herbal Drug Technology – Theory</td> <td>10</td> <td>15</td> <td>1 Hr</td> <td>25</td> <td>75</td> <td>3 Hrs</td> <td>100</td> </tr> <tr> <td>BP60 4T</td> <td>Biopharmaceutics and Pharmacokinetics – Theory</td> <td>10</td> <td>15</td> <td>1 Hr</td> <td>25</td> <td>75</td> <td>3 Hrs</td> <td>100</td> </tr> <tr> <td>BP60 5T</td> <td>Pharmaceutical Biotechnology– Theory</td> <td>10</td> <td>15</td> <td>1 Hr</td> <td>25</td> <td>75</td> <td>3 Hrs</td> <td>100</td> </tr> <tr> <td>BP60 6T</td> <td>Quality Assurance– Theory</td> <td>10</td> <td>15</td> <td>1 Hr</td> <td>25</td> <td>75</td> <td>3 Hrs</td> <td>100</td> </tr> <tr> <td>BP60 7P</td> <td>Medicinal Chemistry -III –</td> <td>5</td> <td>10</td> <td>4 Hrs</td> <td>15</td> <td>35</td> <td>4 Hrs</td> <td>50</td> </tr> </tbody> </table>	Course code	Name of the course	Internal Assessment			End Semester Exams		Total Marks	Continuous Mode	Sessional Exams		Total	Marks	Duration	Marks	Duration	BP60 1T	Medicinal Chemistry- III – Theory	10	15	1 Hr	25	75	3 Hrs	100	BP60 2T	Pharmacology- III – Theory	10	15	1 Hr	25	75	3 Hrs	100	BP60 3T	Herbal Drug Technology – Theory	10	15	1 Hr	25	75	3 Hrs	100	BP60 4T	Biopharmaceutics and Pharmacokinetics – Theory	10	15	1 Hr	25	75	3 Hrs	100	BP60 5T	Pharmaceutical Biotechnology– Theory	10	15	1 Hr	25	75	3 Hrs	100	BP60 6T	Quality Assurance– Theory	10	15	1 Hr	25	75	3 Hrs	100	BP60 7P	Medicinal Chemistry -III –	5	10	4 Hrs	15	35	4 Hrs	50
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	<p>compressors and ejectors.</p> <p>7. Process variables and elements of automatic process control, principles and instruments used in measurement of variables like temperature, pressure, flow level, moisture etc. Introduction to process control.</p> <p>8. Filtration:- Mechanism of filtration, factors affecting filtration, selection of filters, study of filter media, and filter aids, classification of filters, filter press, leaf filters, continuous rotary filters, media filter, membrane filters, sterile filtration of liquids.</p> <p>9. Size Reduction: - Mechanism of size reduction, factors affecting size reduction, pharmaceutical application, theory of size reduction. energy requirement, classification of equipment. Study of cutting rolls. Hammer mill, ball mill roller mill fluid energy mill colloid mill, selection of equipment's. Wet grinding, closed circuit grinding.</p>	<table border="1"> <tr> <td></td> <td>Practical</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>BP60 8P</td> <td>Pharmacology-III – Practical</td> <td>5</td> <td>10</td> <td>4 Hrs</td> <td>15</td> <td>35</td> <td>4 Hrs</td> <td>50</td> </tr> <tr> <td>BP60 9P</td> <td>Herbal Drug Technology – Practical</td> <td>5</td> <td>10</td> <td>4 Hrs</td> <td>15</td> <td>35</td> <td>4 Hrs</td> <td>50</td> </tr> <tr> <td>Total</td> <td></td> <td>75</td> <td>120</td> <td>18 Hrs</td> <td>195</td> <td>555</td> <td>30 Hrs</td> <td>750</td> </tr> </table>		Practical								BP60 8P	Pharmacology-III – Practical	5	10	4 Hrs	15	35	4 Hrs	50	BP60 9P	Herbal Drug Technology – Practical	5	10	4 Hrs	15	35	4 Hrs	50	Total		75	120	18 Hrs	195	555	30 Hrs	750																																			
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	<p>2-T-3 Pharmaceutical Engineering -II</p> <p>1. Heat transfer- Heat transfer mechanisms. Heat transfer by conduction. Fourier's law compound resistance in series, heat flow through a cylinder, conduction, convection through fluids, Natural and forced convection. Surface coefficients, overall heat transfer coefficients. Radiation. Concepts of black and gray body, Heaters, heat exchangers, Inductive heating. Introduction to various types of heating media and fuels, steam as heating medium, properties and uses of steam. Steam traps, heating by electricity. Insulations types and selection of insulators.</p> <p>2. Evaporation: - Factors affecting evaporation, types of evaporators, study of evaporating pan, evaporating still, short tube evaporators, forced circulation evaporators, film evaporators, Evaporator accessories, Evaporators capacity, heat and material balances, multiple effect evaporation, capacity of multiple effect evaporators under reduced pressure.</p> <p>3. Distillation: - General theory applied to binary mixtures boiling point and equilibrium diagrams, Raoult's law and Henry's law, constant boiling mixtures. Equilibrium distillations, differential distillations, rectification, construction of rectifying columns. Enthalpy composition diagram, reflux ratio, McCabe-Thiele method for calculation of theoretical plates efficiency, steam distillation, molecular distillation and its applications.</p>	<p>* The subject experts at college level shall conduct examinations</p> <table border="1"> <thead> <tr> <th rowspan="3">Course code</th> <th rowspan="3">Name of the course</th> <th colspan="4">Internal Assessment</th> <th colspan="2">End Semester Exams</th> <th rowspan="3">Total Marks</th> </tr> <tr> <th rowspan="2">Continuous Mode</th> <th colspan="2">Sessional Exams</th> <th rowspan="2">Total</th> <th rowspan="2">Marks</th> <th rowspan="2">Duration</th> </tr> <tr> <th>Marks</th> <th>Duration</th> </tr> </thead> <tbody> <tr> <td>BP7 01T</td> <td>Instrumental Methods of Analysis – Theory</td> <td>10</td> <td>15</td> <td>1 Hr</td> <td>25</td> <td>75</td> <td>3 Hrs</td> <td>100</td> </tr> <tr> <td>BP7 02T</td> <td>Industrial Pharmacy – Theory</td> <td>10</td> <td>15</td> <td>1 Hr</td> <td>25</td> <td>75</td> <td>3 Hrs</td> <td>100</td> </tr> <tr> <td>BP7 03T</td> <td>Pharmacy Practice – Theory</td> <td>10</td> <td>15</td> <td>1 Hr</td> <td>25</td> <td>75</td> <td>3 Hrs</td> <td>100</td> </tr> <tr> <td>BP7 04T</td> <td>Novel Drug Delivery System – Theory</td> <td>10</td> <td>15</td> <td>1 Hr</td> <td>25</td> <td>75</td> <td>3 Hrs</td> <td>100</td> </tr> <tr> <td>BP7 05 P</td> <td>Instrumental Methods of Analysis – Practical</td> <td>5</td> <td>10</td> <td>4 Hrs</td> <td>15</td> <td>35</td> <td>4 Hrs</td> <td>50</td> </tr> <tr> <td>BP7 06 PS</td> <td>Practical School</td> <td>25</td> <td>-</td> <td>-</td> <td>25</td> <td>125</td> <td>5 Hrs</td> <td>150</td> </tr> </tbody> </table>	Course code	Name of the course	Internal Assessment				End Semester Exams		Total Marks	Continuous Mode	Sessional Exams		Total	Marks	Duration	Marks	Duration	BP7 01T	Instrumental Methods of Analysis – Theory	10	15	1 Hr	25	75	3 Hrs	100	BP7 02T	Industrial Pharmacy – Theory	10	15	1 Hr	25	75	3 Hrs	100	BP7 03T	Pharmacy Practice – Theory	10	15	1 Hr	25	75	3 Hrs	100	BP7 04T	Novel Drug Delivery System – Theory	10	15	1 Hr	25	75	3 Hrs	100	BP7 05 P	Instrumental Methods of Analysis – Practical	5	10	4 Hrs	15	35	4 Hrs	50	BP7 06 PS	Practical School	25	-	-	25	125	5 Hrs	150
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		<p>4. Humidity and air conditioning:- Definition of various terms, psychometric charts, wet bulb theory, determination of humidity, methods of increasing and decreasing humidity, air conditioning, cooling towers, importance of humidity and its control.</p> <p>5. Refrigeration:- General considerations, coefficient of performance, capacity of a refrigerating unit, compression and absorption types of refrigeration cycle, choice of refrigerate, application in pharmacy.</p> <p>6. Drying: Introduction, theory of drying rate of drying, classification of dryers, vacuum spray, tray, fluidised bed dryers, Principle of freeze drying and freeze dryers..</p> <p>7. Crystallisation: - Crystal forms and crystal habit solubility curves theory of crystallisation, nucleation and crystal growth material and energy balances, classification, principle underlying the design and operation of tank. Swenson Walker, Crystal and vacuum type crystallizers.</p> <p>8. Gas absorption: - Tower packing properties and types of packing materials for tower, tower construction, pressure drop through packed towers, mass transfer coefficients, HETP.</p> <p>2-P-3 Pharmaceutical Engineering –II (Practical) Experiments based on Theory topics of Pharmaceutical Engineering- I and II.</p>	<table border="1"> <tr> <td></td> <td>*</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Total</td> <td></td> <td>70</td> <td>70</td> <td>8Hrs</td> <td>140</td> <td>460</td> <td>21 Hrs</td> <td>600</td> </tr> </table>		*								Total		70	70	8Hrs	140	460	21 Hrs	600																										
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		<p>2-T-4 Pharmaceutical Jurisprudence</p> <p>1. Introduction</p> <p>a. Pharmaceutical Legislations – A brief review</p> <p>b. Drugs & Pharmaceutical Industry – A brief review</p> <p>c. Pharmaceutical Education – A brief review</p> <p>2. An elaborate (practical oriented) study of the following</p> <p>a. Pharmaceutical Ethics</p> <p>b. Pharmacy Act 1948</p> <p>c. Drugs and Cosmetics Act 1940 and Rules 1945</p> <p>d. Medicinal & Toilet Preparations (Excise Duties)Act 1955</p> <p>e. Narcotic Drugs & Psychotropic Substances Act 1985 & Rules.</p> <p>f. Drugs Price Control Order.</p> <p>3. A brief study of the following with special reference to the main provisions.</p> <p>a. Poisons Act 1919</p>	<p>Semester VIII</p> <table border="1"> <thead> <tr> <th rowspan="3">Course code</th> <th rowspan="3">Name of the course</th> <th colspan="3">Internal Assessment</th> <th colspan="3">End Semester Exams</th> <th rowspan="3">Total Marks</th> </tr> <tr> <th rowspan="2">Continu-ous Mode</th> <th colspan="2">Sessional Exams</th> <th rowspan="2">Total</th> <th rowspan="2">Marks</th> <th rowspan="2">Duration</th> </tr> <tr> <th>Marks</th> <th>Duration</th> </tr> </thead> <tbody> <tr> <td>BP8 01T</td> <td>Biostatistics and Research Methodology – Theory</td> <td>10</td> <td>15</td> <td>1 Hr</td> <td>25</td> <td>75</td> <td>3 Hrs</td> <td>100</td> </tr> <tr> <td>BP8 02T</td> <td>Social and Preventive Pharmacy – Theory</td> <td>10</td> <td>15</td> <td>1 Hr</td> <td>25</td> <td>75</td> <td>3 Hrs</td> <td>100</td> </tr> <tr> <td>BP8 03E T</td> <td>Pharma Marketing Management – Theory</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Course code	Name of the course	Internal Assessment			End Semester Exams			Total Marks	Continu-ous Mode	Sessional Exams		Total	Marks	Duration	Marks	Duration	BP8 01T	Biostatistics and Research Methodology – Theory	10	15	1 Hr	25	75	3 Hrs	100	BP8 02T	Social and Preventive Pharmacy – Theory	10	15	1 Hr	25	75	3 Hrs	100	BP8 03E T	Pharma Marketing Management – Theory							
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		<p>2-T-5 Human Anatomy and Physiology-I</p> <ol style="list-style-type: none"> Scope of anatomy and physiology and basic terminology used. Structure of cell, its components and their functions. Elementary tissue of the human body: Epithelial, connective, muscular and nervous tissues, their sub-type and their characteristics. Osseous system: Structure, composition and functions of skeleton, classification of joints, type 	<p>Internal assessment: Continuous mode <i>The marks allocated for Continuous mode of Internal Assessment shall be awarded as per the scheme given below.</i></p> <p>Table-XI:Scheme for awarding internal assessment: Continuous mode</p> <table border="1"> <thead> <tr> <th colspan="2">Theory</th> </tr> <tr> <th>Criteria</th> <th>Maximum Marks</th> </tr> </thead> <tbody> <tr> <td>Attendance (Refer Table – XII)</td> <td>4 2</td> </tr> </tbody> </table>	Theory		Criteria	Maximum Marks	Attendance (Refer Table – XII)	4 2																																																																																													
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		<p>of movement of joints, disorders of joints.</p> <p>5. Skeletal system: Gross anatomy and physiology of muscle contraction, physiological properties of skeletal muscle and their disorder.</p> <p>6. Haemopoietic system: Composition and functions of blood and its elements, their disorder, blood groups and their significance, mechanism of coagulation.</p> <p>7. The lymphatic system: Composition, formulation and circulation of lymph, disorder of lymph and lymphatic system. Basic Physiology and function of spleen.</p> <p>8. The cardiovascular system: Basic anatomy of the heart. Physiology of heart, blood vessels and circulation. Basic understanding of cardiac cycle, heart sound and electrocardiogram, blood pressure and its regulation. Outline of cardiovascular disorder like hypertension, hypotension, atherosclerosis, angina, myocardial infarction, congestive heart failure and cardiac arrhythmias.</p> <p>2-P-5 Human Anatomy and Physiology-I (Practical) Experiments based on Theory topics</p>	<table border="1"> <tr> <td>Academic activities (Average of any 3 activities e.g. quiz, assignment, open book test, field work, group discussion and seminar)</td> <td>3</td> <td>1.5</td> </tr> <tr> <td>Student – Teacher interaction</td> <td>3</td> <td>1.5</td> </tr> <tr> <td>Total</td> <td>10</td> <td>5</td> </tr> <tr> <td colspan="3">Practical</td> </tr> <tr> <td>Attendance (Refer Table – XII)</td> <td>2</td> <td></td> </tr> <tr> <td>Based on Practical Records, Regular viva voce, etc.</td> <td>3</td> <td></td> </tr> <tr> <td>Total</td> <td>5</td> <td></td> </tr> </table>	Academic activities (Average of any 3 activities e.g. quiz, assignment, open book test, field work, group discussion and seminar)	3	1.5	Student – Teacher interaction	3	1.5	Total	10	5	Practical			Attendance (Refer Table – XII)	2		Based on Practical Records, Regular viva voce, etc.	3		Total	5		
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Practical																									
Attendance (Refer Table – XII)	2																								
Based on Practical Records, Regular viva voce, etc.	3																								
Total	5																								
		<p>B. Pharm. Third Semester</p> <p>3-T-1 Modern Dispensing Pharmacy</p> <p>1. History, definition and scope.</p> <p>2. Prescription: Types and parts of prescription, handling of prescription, source of errors in prescription, compounding of prescription, care required in dispensing procedures, including labelling of dispensed products, precautions while dispensing various dosage forms, prescription refills, prescription pricing.</p> <p>3. Good compounding and dispensing practices: Personnel, house keeping, building, documentations, prescription filling, drug profile PMR, ADR, purchase records, stock records, idiosyncratic cases.</p> <p>4. Latin terms: knowledge of commonly used Latin terms in prescription and their translation into English.</p> <p>5. Principles involved and procedures adopted in dispensing of: Typical prescriptions like mixtures, solutions, emulsions, creams ointments, powders, capsules, pastes, gels, jellies, suppositories, ophthalmic, pastilles, lozenges, pills, lotions, liniments, inhalation, paints, sprays, tablet triturates.</p> <p>6. Incompatibilities in prescription: Definition, types, physical, chemical and therapeutic. Intentional and unintentional, toleration and adjusted incompatibility. Inorganic incompatibilities including those of metals and</p>	<p>Table- XII: Guidelines for the allotment of marks for attendance</p> <table border="1"> <thead> <tr> <th>Percentage of Attendance</th> <th>Theory</th> <th>Practical</th> </tr> </thead> <tbody> <tr> <td>95 – 100</td> <td>4</td> <td>2</td> </tr> <tr> <td>90 – 94</td> <td>3</td> <td>1.5</td> </tr> <tr> <td>85 – 89</td> <td>2</td> <td>1</td> </tr> <tr> <td>80 – 84</td> <td>1</td> <td>0.5</td> </tr> <tr> <td>Less than 80</td> <td>0</td> <td>0</td> </tr> </tbody> </table> <p>Sessional Exams <i>Two Sessional exams shall be conducted for each theory / practical course as per the schedule fixed by the college(s). The scheme of question paper for theory and practical Sessional examinations is given below. The average marks of two Sessional exams shall be computed for internal assessment as per the requirements given in tables – X.</i></p> <p><i>Sessional exam shall be conducted for 30 marks for theory and shall be computed for 15 marks. Similarly Sessional exam for practical shall be conducted for 40 marks and shall be computed for 10 marks.</i></p> <p>Question paper pattern for theory Sessional examinations For subjects having University examination</p> <p><i>I. Multiple Choice Questions (MCQs) OR Objective Type Questions (5 x 2)</i></p> <p><i>(Answer all the questions)</i> <i>I. Long Answers (Answer 1 out of 2)</i></p> <p>$=10 \times 1 = 10$ OR $=05 \times 2 = 10$ $=10 \times 1 = 10$ OR</p>	Percentage of Attendance	Theory	Practical	95 – 100	4	2	90 – 94	3	1.5	85 – 89	2	1	80 – 84	1	0.5	Less than 80	0	0				
Percentage of Attendance	Theory	Practical																							
95 – 100	4	2																							
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85 – 89	2	1																							
80 – 84	1	0.5																							
Less than 80	0	0																							

	<p>their salts, non-metals, acids, alkalis. Organic incompatibilities including purine bases, alkaloids, barbiturates, tannins, pyrazolone derivatives, amino acids, quaternary ammonium compounds, carbohydrates, glycosides, anaesthetics, dyes, surface active agents. Correction of incompatibilities.</p> <p>7. Dispensing calculations. Basis of posology, calculation of doses for infants, children, adults, elderly and renally impaired patients. Detection of overdoses in prescription, knowledge of prophylactic and therapeutic doses with route of administration. Different systems of weight and measurements and their interconversions.</p> <p>8. Surgical products: Definition, primary wound dressing, absorbents, surgical cotton, surgical gauze's etc., bandages, adhesive tape, protective cellulose haemostatics, official dressings, absorbable and non absorbable sutures, ligatures and catgut. Medical prosthetics and organ replacement materials.</p> <p>3-P-1 Modern Dispensing Pharmacy Experiment based on theory topics</p>	<p>II. Short Answers (Answer 2 out of 3) =05 x 2 = 10</p> <p>Total =30 marks</p>																																	
	<p>3-T-2 Pharmaceutical Chemistry Organic-I</p> <p>1. Structure and Properties : Atomic structure, Atomic orbitals, Molecular orbital theory, wave equation, Molecular orbitals, Bonding and Antibonding orbitals, Covalent bond, Hybrid orbitals, Intramolecular forces, Bond dissociation energy, Polarity of bonds, Polarity of molecules, structure and physical properties, Intermolecular forces, Acids and bases.</p> <p>2. Stereochemistry: Isomerism and nomenclature and associated physicochemical properties, optical activity, stereoisomerism, specification of configuration, Reactions involving stereoisomers, chirality, chiral reagents conformations.</p> <p>3. Structure; Nomenclature; Preparation and Reactions of: Alkanes, Alkenes, Alkynes; Cycloalkanes, Dienes, Benzene, Polynuclear aromatic compounds, Arenes, Alkyl halides, Alcohols, Ethers, Epoxides, Amines, Phenols, Aldehydes and ketones, Carboxylic acids, Functional derivatives of carboxylic acids, Reactive intermediates - carbocations, carbanions, carbenes, nitrene and nitrenium ions.</p> <p>3-P-2 Pharmaceutical Chemistry Organic-I Experiment based on theory topics</p>	<p>For subjects having Non University Examination</p> <table border="0"> <tr> <td>I. Long Answers (Answer 1 out of 2)</td> <td>=</td> <td>1 x 10 = 10</td> </tr> <tr> <td>II. Short Answers (Answer 4 out of 6)</td> <td>=</td> <td>4 x 5 = 20</td> </tr> <tr> <td>-</td> <td></td> <td>-----</td> </tr> <tr> <td>Total</td> <td>=</td> <td>30 marks</td> </tr> <tr> <td>-</td> <td></td> <td>-----</td> </tr> </table> <p>Question paper pattern for practical sessional examinations</p> <table border="0"> <tr> <td>I. Synopsis</td> <td>=</td> <td>10</td> </tr> <tr> <td>II. Experiments</td> <td>=</td> <td>25</td> </tr> <tr> <td>III. Viva voce</td> <td>=</td> <td>05</td> </tr> <tr> <td></td> <td></td> <td>-----</td> </tr> <tr> <td>Total</td> <td>=</td> <td>40 marks</td> </tr> <tr> <td></td> <td></td> <td>-----</td> </tr> </table>	I. Long Answers (Answer 1 out of 2)	=	1 x 10 = 10	II. Short Answers (Answer 4 out of 6)	=	4 x 5 = 20	-		-----	Total	=	30 marks	-		-----	I. Synopsis	=	10	II. Experiments	=	25	III. Viva voce	=	05			-----	Total	=	40 marks			-----
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Total	=	40 marks																																	

	<p>3-T-3 Pharmaceutical Chemistry Organic-II</p> <p>1. Nucleophilic and Electrophilic Aromatic Substitution Reactions: Reactivity and orientation; Electrophilic and Nucleophilic Addition Reactions; Rearrangements (Beckman, Hoffman, Benzilic acid, pinacole-pinacolone and Beyer-Villiger);</p> <p>2. Elimination reactions Conservation of orbital</p>	<p>11. Promotion and award of grades A student shall be declared PASS and eligible for getting grade in a course of B.Pharm. program if he/she secures at least 50% marks in that particular course including internal assessment. For example, to be declared as PASS and to get grade, the student has to secure a minimum of 50 marks for the total of 100 including continuous mode of assessment and end semester theory examination and has to secure a minimum of 25 marks for the total 50 including internal</p>																																	

		<p>symmetry and rules: Electrocyclic, Cycloaddition and sigmatropic reactions; Neighbouring group effects; Catalysis by transition metal complexes, Stereoselective and stereospecific reactions; New organic reagents used in drug synthesis.</p> <p>3. Heterocyclic Compounds: Chemistry, preparations and properties of some important heterocyclics containing 3, 4, 5, 6 & 7 atoms with one or two heteroatoms like O, N, S.</p> <p>4. Chemistry of lipids, Carbohydrates, Proteins and Nucleic acids</p> <p>3-P-3 Pharmaceutical Chemistry Organic-II Experiment based on theory topics</p>	<p>assessment and end semester practical examination.</p> <p>12. Carry forward of marks <i>In case a student fails to secure the minimum 50% in any Theory or Practical course as specified in 12, then he/she shall reappear for the end semester examination of that course. However his/her marks of the Internal Assessments shall be carried over and he/she shall be entitled for grade obtained by him/her on passing.</i></p> <p>13. Improvement of internal assessment <i>A student shall have the opportunity to improve his/her performance only once in the Sessional exam component of the internal assessment. The re-conduct of the Sessional exam shall be completed before the commencement of next end semester theory examinations.</i></p> <p>14. Re-examination of end semester examinations <i>Reexamination of end semester examinations shall be conducted as per the schedule given in table XIII. The exact dates of examinations shall be notified from time to time.</i></p> <p>Table-XIII: Tentative schedule of end semester examinations</p> <table border="1" data-bbox="824 940 1393 1115"> <thead> <tr> <th>Semester</th> <th>For Regular Candidates</th> <th>For Failed Candidates</th> </tr> </thead> <tbody> <tr> <td>I, III, V and VII</td> <td>November / December</td> <td>May / June</td> </tr> <tr> <td>II, IV, VI and VIII</td> <td>May / June</td> <td>November / December</td> </tr> </tbody> </table>	Semester	For Regular Candidates	For Failed Candidates	I, III, V and VII	November / December	May / June	II, IV, VI and VIII	May / June	November / December
Semester	For Regular Candidates	For Failed Candidates										
I, III, V and VII	November / December	May / June										
II, IV, VI and VIII	May / June	November / December										
		<p>3-T-4 Pharmaceutical Analysis: I</p> <p>1. Significance of quantitative analysis in quality control, Different techniques of analysis, Preliminaries and definitions, Significant figures, Rules for retaining significant digits, Types of errors, Mean deviation, Standard deviation, Statistical treatment of small data sets, Selection of sample, Precision and accuracy. Fundamentals of volumetric analysis, methods of expressing concentration, primary and secondary standards.</p> <p>2. Acid Base Titrations: Acid base concepts, Role of solvent, Relative strengths of acids and bases, Ionization, Law of mass action, Common ion effect, Ionic product of water, pH, Hydrolysis of salts, Henderson-Hasselbalch equation, Buffer solutions, Neutralization curves, Acid-base indicators, Theory of indicators, Choice of indicators, mixed indicators, Polyprotic system, Polyamine and amino acid systems, Amino acid titration, applications in assay of HIO_4, NaOH, CaCO_3 etc.</p> <p>3. Oxidation Reduction Titrations : Concepts of oxidation and reduction, Redox reactions, Strengths and equivalent weights of oxidizing and reducing agents, Theory of redox titrations, redox indicators, Cell representations, Measurement of electrode potential, Oxidation-reduction curves, Iodimetry and Iodometry,</p>	<p>Question paper pattern for end semester theory examinations</p> <p>For 75 marks paper</p> <p>I. Multiple Choice = 20 x 1 = 20 Questions (MCQs) OR Objective Type Questions 10 x 2 = 20 (10 x 2) (Answer all the questions)</p> <p>II. Long Answers = 2 x 10 = 20 (Answer 2 out of 3)</p> <p>III. Short Answers = 7 x 5 = 35 (Answer 7 out of 9)</p> <p>-----</p> <p>Total = 75 marks</p> <p>-----</p> <p>For 50 marks paper</p> <p>I. Long Answers (Answer = 2 x 10 = 20 2 out of 3)</p> <p>II. Short Answers = 6 x 5 = 30 (Answer 6 out of 8)</p> <p>-----</p> <p>Total = 50 marks</p> <p>-----</p>									

		<p>Titration involving ceric sulphate, potassium iodate, potassium bromate, potassium permanganate; titanous chloride and Sodium 2, 6-dichlorophenol, indophenol.</p> <p>4. Precipitation Titrations: Precipitation reactions, Solubility products, Effect of acids, temperature and solvent upon the solubility of a precipitate. Argentometric titrations and titrations involving ammonium or potassium thiocyanate, mercuric nitrate, and barium sulphate, Indicators, Mohr's method, Volhard's method and Fajan's method.</p> <p>5. Gravimetric Analysis: Precipitation techniques, solubility products; The colloidal state, supersaturation co-precipitation, postprecipitation, digestional washing of the precipitate, filtration, filter papers and crucibles, ignition, thermogravimetric curves, Specific examples like barium sulphate, aluminium as aluminium oxide, calcium as calcium oxalate and magnesium as magnesium pyrophosphate, organic precipitants.</p> <p>3-P-4 Pharmaceutical Analysis: I Experiment based on theory topic</p>	<p>For 35 marks paper</p> <p>I. Long Answers (Answer= 1 x 10 = 10 1 out of 2)</p> <p>II. Short Answers= 5 x 5 = 25 (Answer 5 out of 7)</p> <p style="text-align: right;">-----</p> <p>Total = 35 marks</p> <p style="text-align: right;">-----</p> <p>Question paper pattern for end semester practical examination</p> <p>I. Synopsis = 5</p> <p>II. Experiments = 25</p> <p>III. Viva voce = 5</p> <p style="text-align: right;">-----</p> <p>Total = 35 marks</p> <p style="text-align: right;">-----</p>
		<p>3-T-5 Human Anatomy and Physiology-II</p> <p>1. Digestive System: Gross anatomy of the gastro-intestinal tract, functions of its different parts including those of liver, pancreas and gall bladder, various gastrointestinal secretions and their role in the absorption and digestion of food. Disorders of digestive system.</p> <p>2. Respiratory System: Anatomy of respiratory organs & its functions, respiration, mechanism and regulation of respiration, respiratory volumes and vital capacity.</p> <p>3. Central Nervous System: Functions of different parts of brain and spinal cord. Neurohumoral transmission in the central nervous system, reflex action electroencephalogram, specialized functions of the brain, Cranial nerves and their functions.</p> <p>4. Autonomic Nervous System: Physiology and functions of the autonomic nervous system. Mechanism of neurohumoral transmission in the ANS.</p> <p>5. Urinary System: Various parts, structures and functions of the kidney and urinary tract. Physiology of urine formation and acid-base balance. Diseases of the urinary system.</p> <p>6. Reproductive System: Male and female reproductive systems and their hormones, physiology of menstruation, coitus and fertilization. Sex differentiation, spermatogenesis & oogenesis. Pregnancy its maintenance and parturition.</p> <p>7. Endocrine System: Basic anatomy and physiology of pituitary, thyroid, parathyroid. Adrenals, pancreas, testes and ovary, their hormones and functions.</p> <p>8. Sense Organs: Basic anatomy and physiology of the eye (vision), ear (hearing), taste buds, nose (smell) and skin (superficial receptors).</p>	<p>15. Academic Progression: <i>No student shall be admitted to any examination unless he/she fulfills the norms given in</i></p> <p>6. Academic progression rules are applicable as follows: <i>A student shall be eligible to carry forward all the courses of I, II and III semesters till the IV semester examinations. However, he/she shall not be eligible to attend the courses of V semester until all the courses of I and II semesters are successfully completed.</i> <i>A student shall be eligible to carry forward all the courses of III, IV and V semesters till the VI semester examinations. However, he/she shall not be eligible to attend the courses of VII semester until all the courses of I, II, III and IV semesters are successfully completed.</i> <i>A student shall be eligible to carry forward all the courses of V, VI and VII semesters till the VIII semester examinations. However, he/she shall not be eligible to get the course completion certificate until all the courses of I, II, III, IV, V and VI semesters are successfully completed.</i> <i>A student shall be eligible to get his/her CGPA upon successful completion of the courses of I to VIII semesters within the stipulated time period as per the norms specified in 26.</i> <i>A lateral entry student shall be eligible to carry forward all the courses of III, IV and V semesters till the VI semester examinations. However, he/she shall not be eligible to attend the courses of VII semester until all the courses of III and IV semesters are successfully completed.</i> <i>A lateral entry student shall be eligible to carry forward all the courses of V, VI and VII semesters till the VIII semester examinations. However, he/she shall not be eligible to get the course completion certificate until all the courses of III, IV, V and VI semesters are successfully completed.</i> <i>A lateral entry student shall be eligible to get his/her CGPA upon successful completion of the courses of III to VIII semesters within the stipulated time period as per the norms specified in 26.</i></p> <p><i>Any student who has given more than 4 chances for successful completion of I / III semester courses and more than 3 chances for successful completion of II / IV semester courses shall be permitted to attend V / VII semester classes</i></p>

	<p>9. a. Concepts of health and disease: Disease causing agents and prevention of disease.</p> <p>b. Classification of food requirements: Balanced diet, nutritional deficiency disorders, their treatment and prevention, specifications for drinking water.</p> <p>c. Demography and family planning: Medical termination of pregnancy.</p> <p>d. Communicable diseases: Brief outline, their causative agents, modes of transmission and prevention (Chicken pox, measles, influenza, diphtheria, whooping cough, tuberculosis, poliomyelitis, helminthiasis, malaria, filariasis, rabies, trachoma, tetanus, leprosy, syphilis, gonorrhoea, and AIDS).</p> <p>e. First Aid: Emergency treatment of shock, snake bites, burns, poisoning, fractures and resuscitation methods.</p> <p>3-P-5 Human Anatomy and Physiology-II Experiment based on theory topics</p>	<p>ONLY during the subsequent academic year as the case may be. In simpler terms there shall NOT be any ODD BATCH for any semester.</p> <p>Note: Grade AB should be considered as failed and treated as one head for deciding academic progression. Such rules are also applicable for those students who fail to register for examination(s) of any course in any semester.</p>																																
	<p>B. Pharm. Fourth Semester</p> <p>4-T-1 Pharmaceutical Technology- I</p> <ol style="list-style-type: none"> Centrifugation: - Theoretical consideration, principle of centrifugation, study of laboratory and large scale equipments and their applications. Size Reduction: - Mechanism of size reduction, factors affecting size reduction, pharmaceutical application, theory of size reduction, energy requirement, classification of equipment. Study of cutting rolls. Hammer mill, ball mill, roller mill, fluid energy mill, colloid mill, selection of equipments. Wet grinding, closed circuit grinding. Size separation: - Standards for powders, sieves and sieving equipment fluid classification methods sedimentation, Ceylon separator elutriation particle size distribution and its measurement representation of data. Extraction: - Principles of solid-liquid and liquid-liquid extraction. Theories of extraction of drugs, study of diffusion batteries, Door agitator, continuous counter current extraction system, extraction towers, Podbielniak extractor. Mixing :- Fundamentals, mechanism of mixing, Factors influencing the selection of mixers, study of solid-solid, solid-liquid and liquid- liquid mixers used in pharmaceutical industry, ultrasonic mixers. Compaction and compression:- Measurement of punch forces, transmission of forces through powders distribution of forces, acting within the powder mass, effect of 	<p>17. Grading of performances Letter grades and grade points allocations: Based on the performances, each student shall be awarded a final letter grade at the end of the semester for each course. The letter grades and their corresponding grade points are given in Table – XII.</p> <p>Table – XII: Letter grades and grade points equivalent to Percentage of marks and performances</p> <table border="1" data-bbox="901 989 1437 1465"> <thead> <tr> <th>Percentage of Marks Obtained</th> <th>Letter Grade</th> <th>Grade Point</th> <th>Performance</th> </tr> </thead> <tbody> <tr> <td>90.00 – 100</td> <td>O</td> <td>10</td> <td>Outstanding</td> </tr> <tr> <td>80.00 – 89.99</td> <td>A</td> <td>9</td> <td>Excellent</td> </tr> <tr> <td>70.00 – 79.99</td> <td>B</td> <td>8</td> <td>Good</td> </tr> <tr> <td>60.00 – 69.99</td> <td>C</td> <td>7</td> <td>Fair</td> </tr> <tr> <td>50.00 – 59.99</td> <td>D</td> <td>6</td> <td>Average</td> </tr> <tr> <td>Less than 50</td> <td>F</td> <td>0</td> <td>Fail</td> </tr> <tr> <td>Absent</td> <td>AB</td> <td>0</td> <td>Fail</td> </tr> </tbody> </table> <p>A learner who remains absent for any end semester examination shall be assigned a letter grade of AB and a corresponding grade point of zero. He/she should reappear for the said evaluation/examination in due course.</p>	Percentage of Marks Obtained	Letter Grade	Grade Point	Performance	90.00 – 100	O	10	Outstanding	80.00 – 89.99	A	9	Excellent	70.00 – 79.99	B	8	Good	60.00 – 69.99	C	7	Fair	50.00 – 59.99	D	6	Average	Less than 50	F	0	Fail	Absent	AB	0	Fail
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		<p>pressure on relative volume, Lubrication of the die wall, adhesion and cohesion of particles, strength of granules, factors affecting the strength of tablets.</p> <p>6. Study of principle underlying the design and operation of various machines employed in the small scale and large scale production of tablets, capsules, ointments, liquid orals and parenterals.</p> <p>7. Packaging of Pharmaceutical Products: Packaging components, types, specification and methods of evaluation stability aspects of packaging. Packaging equipment's, factors influencing choice of containers, legal and other official requirements for containers, package testing.</p> <p>8. Pilot plant scale up Techniques: - Concept of pilot plant. Pilot plant-scale up techniques in pharmaceuticals.</p> <p>4-P-1 Pharmaceutical Technology-I Experiment based on theory topics</p>	
		<p>4-T-2 Pharmaceutical Analysis- II</p> <p>Theoretical considerations and application in drug analysis and quality control of the following analytical techniques:</p> <ol style="list-style-type: none"> 1. Non-aqueous titrations 2. Complexometric titrations 3. Miscellaneous Methods of Analysis: Diazotisation titrations, Kjeldahl method of nitrogen estimation, Karl-Fischer titration, Oxygen flask combustion. 4. Extraction procedures including separation of drugs from excipients 5. Chromatography: The following techniques will be discussed with relevant examples of pharmacopoeial products. TLC, HPLC, GLC, HPTLC, paper chromatography and column chromatography. 6. Potentiometry 7. Conductometry 8. Coulometry 9. Polarography 10. Amperometry <p>4-P-2 Pharmaceutical Analysis- II Experiment based on theory topics</p>	<p>18. The Semester grade point average (SGPA) <i>The performance of a student in a semester is indicated by a number called 'Semester Grade Point Average' (SGPA). The SGPA is the weighted average of the grade points obtained in all the courses by the student during the semester. For example, if a student takes five courses (Theory/Practical) in a semester with credits C₁, C₂, C₃, C₄ and C₅ and the student's grade points in these courses are G₁, G₂, G₃, G₄ and G₅, respectively, and then students' SGPA is equal to:</i></p> $SGPA = \frac{C_1G_1 + C_2G_2 + C_3G_3 + C_4G_4 + C_5G_5}{C_1 + C_2 + C_3 + C_4 + C_5}$ <p><i>The SGPA is calculated to two decimal points. It should be noted that, the SGPA for any semester shall take into consideration the F and ABS grade awarded in that semester. For example if a learner has a F or ABS grade in course 4, the SGPA shall then be computed as:</i></p> $SGPA = \frac{C_1G_1 + C_2G_2 + C_3G_3 + C_4 * ZERO + C_5G_5}{C_1 + C_2 + C_3 + C_4 + C_5}$ <p>19. Cumulative Grade Point Average (CGPA) <i>The CGPA is calculated with the SGPA of all the VIII semesters to two decimal points and is indicated in final grade report card/final transcript showing the grades of all VIII semesters and their courses. The CGPA shall reflect the failed status in case of F grade(s), till the course(s) is/are passed. When the course(s) is/are passed by obtaining a pass grade on subsequent examination(s) the CGPA shall only reflect the new grade and not the fail grades earned earlier. The CGPA is calculated as:</i></p> $CGPA = \frac{C_1S_1 + C_2S_2 + C_3S_3 + C_4S_4 + C_5S_5 + C_6S_6 + C_7S_7 + C_8S_8}{C_1 + C_2 + C_3 + C_4 + C_5 + C_6 + C_7 + C_8}$ <p><i>Where, C₁, C₂, C₃, is the total number of credits for semester I,</i></p>

			<p><i>II, III and S₁, S₂, S₃, is the SGPA of semester I,II,III.</i></p> <p>20. Declaration of class <i>The class shall be awarded on the basis of CGPA as follows:</i> First Class with Distinction = CGPA of. 7.50 and above First Class = CGPA of 6.00 to 7.49 Second Class = CGPA of 5.00 to 5.99</p>																		
		<p>4-T-3 Pharmaceutical Biochemistry</p> <p>1. Biochemical organization of the cell and transport processes across cell membrane.</p> <p>2. The concept of free energy, determination of change in free energy - from equilibrium constant and reduction potential, bioenergetics, production of ATP and its biological significance.</p> <p>3. Enzymes: Nomenclature, enzyme kinetics and its mechanism of action, mechanism of inhibition, enzymes and iso-enzymes in clinical diagnosis.</p> <p>4. Co-enzymes: Vitamins as co-enzymes and their significance. Metals as co-enzymes and their significance.</p> <p>5. Carbohydrate Metabolism: Conversion of polysaccharide to glucose-1-phosphate, glycolysis and fermentation and their regulation, Gluconeogenesis and glycogenolysis, metabolism of galactose and galactosemia, role of sugar nucleotides in biosynthesis, and pentose phosphate pathway.</p> <p>6. The Citric Acid Cycle: Significance, reactions and energetic of the cycle, Amphibolic role of the cycle, and Glyoxylic acid cycle.</p> <p>7. Lipids Metabolism: Oxidation of fatty acids, β-oxidation & energetic, α-oxidation, co-oxidation, Biosynthesis of ketone bodies and their utilization. Biosynthesis of saturated and unsaturated fatty acids, control of lipid metabolism, Essential fatty acids & eicosanoids (prostaglandins, thromboxanes and leukotrienes), phospholipids, and sphingolipids.</p> <p>8. Biological Oxidation: Redox-potential, enzymes and co-enzymes involved in oxidation reduction & its control, the respiratory chain, its role in energy capture and its control, Energetics of oxidative phosphorylation, Inhibitors of respiratory chain and oxidative phosphorylation, mechanism of oxidative phosphorylation.</p> <p>9. Nitrogen & Sulphur Cycle: Nitrogen fixation, ammonia assimilation, nitrification and nitrate assimilation, sulphate activation, sulphate reduction. Incorporation of sulphur in organic compounds, release of sulphur from organic compounds.</p> <p>10. Metabolism of Ammonia and Nitrogen Containing Monomers: Nitrogen balance. Biosynthesis of amino acids. Catabolism of amino acids. Conversion of amino acids to specialized products, Assimilation of ammonia. Urea cycle, metabolic disorders of urea cycle. Metabolism of sulphur containing amino acids. Porphyrin biosynthesis. Formation of bile pigments. Hyperbilirubinemia. Purine</p>	<p>21. Project work <i>All the students shall undertake a project under the supervision of a teacher and submit a report. The area of the project shall directly relate any one of the elective subject opted by the student in semester VIII. The project shall be carried out in group not exceeding 5 in number. The project report shall be submitted in triplicate (typed & bound copy not less than 25 pages).</i></p> <p><i>The internal and external examiner appointed by the University shall evaluate the project at the time of the Practical examinations of other semester(s). Students shall be evaluated in groups for four hours (i.e., about half an hour for a group of five students). The projects shall be evaluated as per the criteria given below.</i></p> <p><i>Evaluation of Dissertation Book:</i></p> <table border="0"> <tr> <td>Objective(s) of the work done</td> <td>15 Marks</td> </tr> <tr> <td>Methodology adopted</td> <td>20 Marks</td> </tr> <tr> <td>Results and Discussions</td> <td>20 Marks</td> </tr> <tr> <td>Conclusions and Outcomes</td> <td>20 Marks</td> </tr> <tr> <td>Total</td> <td>75 Marks</td> </tr> </table> <p><i>Evaluation of Presentation:</i></p> <table border="0"> <tr> <td>Presentation of work</td> <td>25 Marks</td> </tr> <tr> <td>Communication skills</td> <td>20 Marks</td> </tr> <tr> <td>Question and answer skills</td> <td>30 Marks</td> </tr> <tr> <td>Total</td> <td>75 Marks</td> </tr> </table> <p><i>Explanation: The 75 marks assigned to the dissertation book shall be same for all the students in a group. However, the 75 marks assigned for presentation shall be awarded based on the performance of individual students in the given criteria.</i></p>	Objective(s) of the work done	15 Marks	Methodology adopted	20 Marks	Results and Discussions	20 Marks	Conclusions and Outcomes	20 Marks	Total	75 Marks	Presentation of work	25 Marks	Communication skills	20 Marks	Question and answer skills	30 Marks	Total	75 Marks
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	<p>biosynthesis. Purine nucleotide interconversion. Pyrimidine biosynthesis and formation of deoxyribonucleotides.</p> <p>11. Biosynthesis of Nucleic Acids: Brief introduction of genetic organization of the mammalian genome, alteration and rearrangements of genetic material, Biosynthesis of DNA and its replication. Mutation. Physical & chemical mutagenesis/ carcinogenesis. DNA repair mechanism. Biosynthesis of RNA.</p> <p>12. Genetic Code and Protein Synthesis: Genetic code. Components of protein synthesis and inhibition of protein synthesis. Brief account of genetic engineering and polymerase chain reactions.</p> <p>13. Regulation of gene expression.</p> <p>4-P-3 Pharmaceutical Biochemistry Experiment based on theory topics</p> <p>4-T-4 Pharmacognosy-I</p> <ol style="list-style-type: none"> 1. Definition, history, scope and development of Pharmacognosy 2. Sources of drugs: Biological, marine, mineral and plant tissue cultures as sources of drugs 3. Classification of drugs: Alphabetical, morphological, taxonomical, chemical and pharmacological classification of drugs. 4. Cultivation, Collection, Processing and storage of crude drugs: Factors influencing cultivation of medicinal plants. Types of soils and fertilizers of common use. Pest management and natural pest control agents. Plant hormones and their applications. Polyploidy, mutation and hybridization with reference to medicinal plants. 5. Quality control of crude drugs: Adulteration of crude drugs and their detection by organoleptic, microscopic, physical, chemical and biological methods and properties. 6. Introduction to active constituents of drugs: their isolation, classification and properties. 7. Systematic pharmacognostic study of following: <ol style="list-style-type: none"> a) Carbohydrates and derived products: agar, guar gum acacia, honey, isabgol, pectin, starch, sterculia and tragacanth. b) Lipids: Bees wax, castor oil, cocoa butter, cod liver oil, lard, linseed oil, rice bran oil, shark liver oil and wool fat. <p>4-P-4 Pharmacognosy-I Experiment based on theory topics</p>	
	<p>4-T-5 Applied Mathematics</p> <p>1. Algebra : Equations reducible to quadratics, simultaneous equations (linear and quadratic), Determinants, properties of solution of simultaneous equations by Cramer's rule, matrices, definition of special kinds of matrices, arithmetic operations on matrices, inverse of a matrix, solution of simultaneous equations by matrices, pharmaceutical applications of determinants and matrices. Evaluation of En1, En2, and En3, mensuration and its pharmaceutical applications.</p>	<p>22. Industrial training (Desirable) <i>Every candidate shall be required to work for at least 150 hours spread over four weeks in a Pharmaceutical Industry/Hospital. It includes Production unit, Quality Control department, Quality Assurance department, Analytical laboratory, Chemical manufacturing unit, Pharmaceutical R&D, Hospital (Clinical Pharmacy), Clinical Research Organization, Community Pharmacy, etc. After the Semester – VI and before the commencement of Semester – VII, and shall submit satisfactory report of such work and certificate duly signed by the authority of training organization to the head of the institute.</i></p>

2. Measures of Central Value: Objectives and pre-requisites of an ideal, measure, mean, mode and median.

3. Trigonometry: Measurement of angle, T-ratios, addition, subtraction and transformation formulae, T-ratios of multiple, submultiple, allied and certain angles. Application of logarithms in pharmaceutical computations.

4. Analytical Plane Geometry: Certain co-ordinates, distance between two points, area of triangle, a locus of point, straight line, slope and intercept from, double- intercept form, normal (perpendicular form), slope-point and two point form, general equation of first degree.

5. Calculus:

Differential: Limits and functions, definition of differential coefficient, differentiation of standard functions, including function of a function (Chain rule). Differentiation of implicit functions, logarithmic differentiation, parametric differentiation, successive differentiation.

Integral: Integration as inverse of differentiation, indefinite integrals of standard forms, integration by parts, substitution and partial fractions, formal evaluation of definite integrals.

B. Pharm. Fifth Semester

5-T-1 Pharmaceutical Technology-II

1. Liquid Dosages Forms: Introduction, types of additives used in formulations, vehicles, stabilisers, preservative, suspending agents, emulsifying agents, solubilizers, colours, flavours and others. Manufacturing, packaging, labelling and evaluation of clear liquids, suspensions and emulsions official in pharmacopoeia.
2. Semisolid Dosage Forms: Definitions, types, mechanisms of drug penetration, factors influencing penetration, semisolid bases and their selection. General formulation of semisolids, clear gels manufacturing procedure, evaluation and packaging.
3. Suppositories: Ideal requirements, bases, displacement value, manufacturing procedure, packaging and evaluation.
4. Capsules: Advantages and disadvantages of capsule dosage form, Material for production of hard gelatin capsule, size of capsule, formulation, method of capsule filling. Soft gelatin

23. Practice School

In the VII semester, every candidate shall undergo practice school for a period of 150 hours evenly distributed throughout the semester. The student shall opt any one of the domains for practice school declared by the program committee from time to time.

At the end of the practice school, every student shall submit a printed report (in triplicate) on the practice school he/she attended (not more than 25 pages). Along with the exams of semester VII, the report submitted by the student, knowledge and skills acquired by the student through practice school shall be evaluated by the subject experts at college level and grade point shall be awarded.

24. Award of Ranks

Ranks and Medals shall be awarded on the basis of final CGPA. However, candidates who fail in one or more courses during the B.Pharm program shall not be eligible for award of ranks. Moreover, the candidates should have completed the B. Pharm program in minimum prescribed number of years, (four years) for the award of Ranks.

25. Award of degree

Candidates who fulfill the requirements mentioned above shall be eligible for award of degree during the ensuing convocation.

26. Duration for completion of the program of study

The duration for the completion of the program shall be fixed as double the actual duration of the program and the students have to pass within the said period, otherwise they have to get fresh Registration.

27. Re-admission after break of study

Candidate who seeks re-admission to the program after break of study has to get the approval from the university by paying a condonation fee.

No condonation is allowed for the candidate who has more than 2 years of break up period and he/she has to rejoin the program by paying the required fees.

28. Condonation of deficiency in marks:

28.1 With a view to moderate hard line cases in the examination the following rules shall be observed:

28.1.1 Deficiency up to 5 marks be condoned to the best advantage of the candidate for passing the examination, provided the candidate fails in maximum of two theory or one theory and one practical or two practicals.

28.1.2 While declaring result of the candidate no marks shall be added to or subtracted from the aggregate for the deficiency condoned as above. However, he/she will pass the subjects cleared through clause 6.1. After condoning the deficiency the candidate's result shall be declared in the division, which the aggregate entitled him/her.

28.1.3 One grace mark will be given to the candidate who is failing/missing distinction/missing first division by one mark, on behalf of the Vice-Chancellor in the B. Pharm examination. This benefit will not, however, be available to a candidate getting advantage under clause 10.1.1.

29. *If a candidate has passed a semester examination in full he/she shall not be permitted to reappear in that examination for improvement of division/marks or any other purpose.*

capsules: Shell and capsule content, manufacture. Importance of base absorption and minimum/gm factors in soft capsules. Quality control, stability testing and storage of capsule dosage forms.

5. Tablets: Advantages and disadvantages of tablets, applications and formulations of different types of tablets, granulation technology on large-scale by various techniques, different types of tablet compression machinery and the equipments employed, evaluation of tablets. Coating of Tablets: Types of coating, film forming materials, formulation of coating solution, equipments for coating, coating process, evaluation of coated tablets. Stability kinetics and quality assurance.
6. Blood Products and Plasma Substitutes: Collection, processing and storage of whole human blood, concentrated human RBCs, dried human plasma, human fibrinogen, human thrombin, human normal immunoglobulin, human fibrin, foam plasma substitutes, ideal requirements, PVP, dextran, etc.
7. Pharmaceutical Aerosols: definition, propellants, general formulation, manufacturing and packaging methods, pharmaceutical applications.
8. Ophthalmic Products: Requirements, types, formulation, methods of preparation, labeling, containers, evaluation.

5-P-1 Pharmaceutical Technology-II (Practical)

Experiments based on Theory topics.

5-T-2 Pharmaceutical Microbiology

1. Scope of Microbiology - Historical development - applications to pharmaceuticals
2. Classification of micro-organisms into bacteria, yeast and fungi, rickettsia and viruses. Stains and types of staining techniques, introduction to microscopy and its techniques.
3. Biology of micro-organisms:
 - a). Bacteria - Size and shape, structure, cell wall, cytoplasm, capsules, spores (properties, formation, germination), locomotion, reproduction (binary fission, reproduction involving genetic exchange, transformation, conjugation and transduction), growth, (growth requirements, culture media, growth curve, measurement of bacterial growth and mean generation time), counting methods (total count and viable count), characteristics of disease causing bacteria (Staphylococcus, Streptococcus, Neisseria, Clostridium, Corynebacterium, Pseudomonas, Vibrio, Hemophilus, Escherichia, Salmonella, Mycobacterium).

b). Yeasts and Fungi - Introduction, classification and characteristics of fungi class with their clinical significance.

c). Rickettsia - Introduction - clinical significance and applications.

d). Viruses - Introduction - general properties (size, nucleic acid content, metabolism) - structure of viruses (helical symmetry and icosahedral symmetry) - effect of chemical and physical agents on viruses - virus-host cell interactions - bacteriophage and its epidemiological uses (lytic growth cycle and lysogeny) – human viruses and their cultivation in cell culture, chick embryo and animal inoculation - multiplication of human viruses - interferon's - HIV - tumor viruses - prions.

4. Sterilisation - Definition - Classification into thermal and non-thermal methods - details of hot air sterilization, autoclaving, gaseous, radiation, sterile filtration - bio burden determination - sterilisation monitors (physical, chemical and biological indicators) - sensitivity of micro organisms, survivor curves, expression of resistance (D-values and z-values), sterility assurance - Applications of autoclaving in hospitals

5. Disinfection and Sanitation - Definition (antiseptics, preservatives and sanitising agents) – Chemical classification (acids and esters, alcohols, etc.) - factors affecting choice of antimicrobial agent (properties of chemical agent and microbiological challenge, environmental factors and toxicity of agent) - factors affecting disinfection process - evaluation of disinfection (RW coefficient, Kelsey-Sykes test) - dynamics of disinfection.

6. Microbial Epidemiology - portal of entry (respiratory tract, intestinal tract, urogenital tract, skin and conjunctiva) - resistance to host defence, inflammatory response, avoidance of phagocytosis – manifestation of disease - damage to tissues.

7. Industrial Microbiology: Preparation, standardization of various antibiotics, vitamins and glycerides.

5-P-2 Pharmaceutical Microbiology (Practical)

Experiments based on Theory topics

5-T-3 Pharmaceutical Analysis- III

1. Introduction, pharmacopoeial monograph, literature collection, data handling and expression of analytical results - Documentation and record keeping.

2. Validation: Validation of analytical Methods and Equipment as defined in USP

3. General physical method- Density, Solubility, Molecular weight, Refractometry, Optical activity, Viscosity, Surface tension.

4. Analysis of Drugs and Excipients in Solid State- Introduction - particle size analysis and scope of methods.

5. Instrumental methods in the development and use of medicines -Introduction, product

characterisation for drug development, product development, production and pharmacopoeial controls, drug metabolism and pharmacokinetics.

6. The basis of spectrophotometry- Introduction, atomic spectra, molecular spectra, instrumentation, spectrophotometer.

7. Ultraviolet-visible absorption spectrophotometry- Introduction, quantitative spectrophotometric assay of medicinal substances, assay of substances in multi-component samples, optimum condition for spectrophotometric measurements, structural analysis.

8. Atomic emission spectrometry and atomic absorption spectrophotometry.

9. Spectrofluorimetry- Introduction, instrumentation, application and quantitative aspects.

10. Radiochemistry - Radio-immuno assay (RIA) and related immunoassay techniques. ELISA- technique - theory, Instrumentation and applications.

11. Nuclear Magnetic resonance spectroscopy- Introduction, instrumentation, application and quantitative aspects, carbon-13 NMR (CMR) spectroscopy.

12. Mass spectrometry- Introduction, instrumentation and practical application.

13. The application of spectroscopic techniques to structural elucidation- Introduction; aids to spectral interpretation, exercise and solutions.

5-P-3 Pharmaceutical Analysis- III

Experiments based on Theory topics

5-T-4 Medicinal Chemistry –I

1. Introduction and History

2. Biopharmaceutical Properties of Drug Substance

3. Structural features and Pharmacological activity

4. Theoretic aspects of drug design

5. Molecular Modelling

6. Receptors and Drug action

7. Physicochemical Properties in relation to biological action.

8. Metabolic changes of drugs and related organic compounds.

9. The synthesis and SAR of the compound, Classification under each class and Biochemical approaches in drug design wherever possible should be discussed.

a. Adrenergic agents: Phenyl ethylamine analogs, Epinephrine, Norepinephrine, Ephedrine, Pseudo-ephedrine HCl, Metaraminol bitartrate, Triminopeptane and Naphazoline HCl.

b. Cholinergic and anticholinergic: Acetylcholine and its analogs, Atropine

c. Neuromuscular Blocking Agents

d. General anaesthetics: - Cyclopropane, halothane, vinyl ether, tribromethanol, Sodium thiopental

e. Local anaesthetics: - Cocaine, Procaine

Hydrochloride, Benzocaine, Butacaine sulphate, Metabutethiamine HCl , Dibucaine HCl, Lignocaine HCl, Dipiperodon HCl.

5-P-4 Medicinal Chemistry –I (Practical)

Experiments based on Theory topics

5-T-5 Pharmacology-I

1- General Pharmacology

- a. Introduction to Pharmacology- Definition, scope and various branches, source of drugs, dosage form and routes of drug administration. Factors affecting absorption from gut
- b. Pharmacodynamics-Mechanism of drug action, Receptors, classification and drug receptors interaction, combined effect of drugs, factors modifying drug action, drug dose and response.
- c. Pharmacokinetics-Mechanism and principle of Absorption, Distribution, Metabolism and Excretion of drugs. Principles of basic and clinical pharmacokinetics. Bioavailability and bioequivalence studies.
- d. Pharmacogenetics
- e. Adverse drug reactions, Drug interactions
- f. Discovery and development of new drugs-Preclinical and clinical studies.

2. Pathophysiology of common diseases

- a. Basic Principles of Cell Injury and Adaptations- Causes of Cellular injury, pathogenesis, morphology of cell injury, adaptations and cell death.
- b. Basic mechanisms involved in the process of inflammation and repair- Vascular and cellular events of acute inflammation, chemical mediators of inflammation, pathogenesis of chronic inflammation, brief outline of the process of repair.
- c. Immunopathophysiology- T and B cells, MHC proteins, antigen presenting cells, immune tolerance, pathogenesis of hypersensitivity reactions, autoimmune diseases, AIDS, Amyloidosis.
- d. Pathophysiology of diseases- Asthma, diabetes, rheumatoid arthritis, gout, ulcerative colitis, neoplasia, psychosis, depression, mania, epilepsy, acute and chronic renal failure, hypertension, angina, congestive heart failure, atherosclerosis, myocardial infarction, congestive heart failure, peptic ulcer, anemias, hepatic disorders, tuberculosis, urinary tract infections and sexually transmitted diseases. Wherever applicable the molecular basis should be discussed.

3. Bioassay

Bioassay of Drugs and Biological Standardization- Principles and methods of bioassay, Bioassay of insulin, oxytocin, vasopressin, ACTH, histamine and 5-HT

4. Principles of Toxicology

- a. Definition for acute, sub acute and

chronic toxicity, genotoxicity, carcinogenicity, teratogenicity and mutagenicity studies.

- b. Definition of poison, general principles of treatment of poisoning with particular reference to barbiturates, opioids, organophosphorous and atropine poisoning.
 - c. Heavy metals and heavy metal antagonists.
5. Classification, Principle of drug action, Receptors, mechanism of action, dynamics of absorption, distribution, metabolism, excretion, doses and side effect of drugs acting on peripheral nervous system:
- a. Neurohumoral transmission (Autonomic and somatic).
 - b. Parasympathomimetics, Parasympatholytics, Sympathomimetics, Sympatholytics, Ganglionic stimulants and blockers.
 - c. **Neuromuscular blocking agents** and skeletal muscle relaxants (peripheral).
 - d. Local anesthetic agents.
 - e. Drugs used in Myasthenia Gravis and Alzheimer's disease.

5-P-5 Pharmacology-I (Practical)

Experiments based on Theory topics

B. Pharm. Sixth Semester

6-T-1 Pharmaceutical Technology-III

1. Preformulation studies:
 - a) Study of physical properties of drug like physical form, particle size, shape, density, wetting, dielectric constant, Solubility, dissolution and organoleptic property and their effect on formulation, stability and bioavailability.
 - b) Study of chemical properties of drugs like hydrolysis, oxidation, reduction, racemization, polymerization, etc., and their influence on formulation and stability of products.
 - c) Study of pro-drugs in solving problems related to stability, bioavailability and elegance of formulations
2. Parenteral Products.
 - a. Pre-formulation factors
 - b. Prefilling treatment, washing of containers and closures, preparation of solution and suspensions, filling and closing of ampoules, vials, infusion fluids, lyophilization & preparation of sterile powders, equipment for

- large-scale manufacture and evaluation of parenteral products.
- c. Aseptic Techniques-source of contamination and methods of prevention, Design of aseptic area, Laminar flow bench services and maintenance
 - d. Sterility testing of pharmaceuticals.
3. Validation: Introduction, types and validation methods for pharmaceutical operations involved in the production of following pharmaceutical products: Capsules, Tablets, Solutions, Suspensions, Emulsions, Ointments and Cream.
 4. Kinetics and drug stability: general consideration and concepts, half-life determination, accelerated stability study and expiration dating.
 5. Microencapsulation: Concept, core material, coating materials, techniques, application.
 6. Controlled/Sustained Released Products: Oral, transdermal and parenteral systems and their evaluation.
 7. Targeted drug delivery: Rationale, drug delivery systems (Microparticles, nanoparticles, liposomes, resealed erythrocytes)
 8. GMP, quality assurance, quality audit, GLP, ISO 9000 series, TQM. Drug Regulatory Affairs, Introduction to WHO and ICH guidelines.

6-P-1 Pharmaceutical Technology-III (Practical)

Experiments based on Theory topics

6-T-2 Medicinal Chemistry-II

The synthesis and SAR of the compound, Classification under each class and biochemical approaches in drug design wherever possible should be discussed.

1. **Hypnotic and Sedatives:** Barbitone sodium, Allobarbitone Hexabarbitone and Glutethimide, Sulfonals.
2. **Tranquilizers:** Reserpine, Benzquinamide, Chlopromazine HCl, Triflupromazine HCl, Chlorcyclizine HCl, Chlordizepoxid and Diazepam.
3. **Anticonvulsants:** Phenobarbital, Diphenhydantoin, Trimethadione, paramethadione, phenoximide.
4. **Antidepressant:** Imipramine, amitriptyline, Doxepine, Trimipramine, clomipramine, Desipramine, Nortriptyline, Maprotilline, Amoxapine, MAO inhibitors, Lithium Compounds
5. **Analgesics, antipyretics and Anti-inflammatory agents:** Morphine HCl,

Mefenamic acid, Indomethacin, Acetaminophen, aminopyrin, Phenylbutazone and Ibuprofen, Analgin, pethidine, Dexpropoxyphen, Ketoprofen.

6. **Antihypertensive:** Piperoxan, Dibenamine, Azapentine phosphate, Tolazoline Hydrochloride, Propranolol hydrochloride, Hexa-methonium Bromide, Pentolinium tartrate. dopa-Guanethidine Sulphate. A study of Rauwolfia veratrum and Ergot alkaloids in general
7. **Analeptics:** Picrotoxin, Pentylenetetrazol, Nikethamide, Caffeine, amphetamine and N-allylmorphine.
8. **Anticoagulants:** Bishydroxy coumarin, Ethyl biscoumacetate, Sodium warfarin, Diphenadione, and Heparin.
9. **Plasma Extenders:** General Survey of important compounds.
10. **Immunosuppressive and immunostimulants**

6-P-2 Medicinal Chemistry-II (Practical)

Experiments based on Theory topics

6-T-3 Pharmacology –II

1. Pharmacology of Central Nervous System

Management of CNS disorders (Epilepsy, parkinsonism, schizophrenias, depression)

- a. Neurohumoral transmission in the C.N.S with special emphasis on pharmacology of various neurotransmitters.
- b. General anesthetics.
- c. Alcohols and disulfiram.
- d. Sedatives, hypnotics and centrally acting muscle relaxants
- e. Psychopharmacological agents: Antipsychotics, antidepressants, anti-anxiety agents, anti-manics and hallucinogens.
- f. Anti-epileptic drugs.
- g. Anti-parkinsonism drugs.
- h. Analgesics, antipyretics, and anti-inflammatory agents.
- i. Management of rheumatic diseases and drugs used in gout.
- j. Narcotic analgesics and antagonists.
- k. C.N.S stimulants.
- l. Drug addiction, drug abuse, tolerance and dependence.

2. Pharmacology of Cardiovascular system

Management of CVS disorders (Hypertension, CCF, Angina, Acute Myocardial Infarction, cardiac Arrhythmias)

- a. Introduction of haemodynamics and Electrophysiology of heart.
- b. Cardiac glycosides: Digitalis & Coronary dilators
- c. Anti-hypertensive drugs.
- d. Anti-anginal drugs.

- e. Anti-arrhythmic drugs.
- f. Drugs used in congestive heart failure & atherosclerosis
- g. Anti-hyperlipidemic drugs.
- h. Vasodilator drugs including calcium channel blockers and beta adrenergic antagonists
- i. Drug used in the therapy of shock.

3. Drugs acting on the Hemopoietic system:

- a. Hematinics and growth hormones
- b. Anticoagulants, Vitamin K and Hemostatic agents
- c. Fibrinolytic and anti-platelet drugs
- d. Blood and plasma volume expanders

4. Peptides and Proteins as Mediators:

- a. General Principles of peptide pharmacology.
- b. Biosynthesis and regulation of peptides.
- c. Peptide antagonists.
- d. Protein and peptide as drugs.

5. Miscellaneous agents

- a. Immunostimulants and immunosuppressants.
- b. Therapeutic Drug Monitoring
- c. Concept of Essential Drugs and Rational Drug use

6-P-3 Pharmacology–II (Practical)

Experiments based on Theory topics

6-T-4 Pharmacognosy –II

1. Resins: Study of Drugs Containing Resins and Resin Combination like Colophony, podophyllum, jalap, cannabis, capsicum, myrrh, asafoetida, balsam of tolu, balsam of peru, benzoin, turmeric, ginger.

2. Tannins: Study of tannins and tannin containing drugs like Gambir, black catechu, gall and myrobalan.

3. Volatile Oils : General methods of obtaining volatile oils from plants, Study of volatile oils of Mentha, Coriander, Cinnamon, Cassia, Lemon peel, Orange peel, Lemon grass, Citronella, Caraway, Dill, Spearmint, Clove, Fennel, Nutmeg, Eucalyptus, Chenopodium, Cardamom, Valerian, Musk, Palmarosa, Gaultheria, Sandal wood.

4. Phytochemical Screening:

- a. Preparation of extracts.
- b. Screening of alkaloids, saponins, cardenolides and bufadienolides, flavonoids and leucoanthocyanidins, tannins and polyphenols, anthraquinones, cynogenetic glycosides, amino acids in plant extracts.

5. Fibres: Study of fibres used in pharmacy such as cotton, silk, wool, nylon, glass wool, polyester and asbestos.

6. Pharmaceutical aids: Study of pharmaceutical aids like talc, diatomite, kaolin, bentonite, gelatin and natural colors.

6-P-4 Pharmacognosy –II (Practical)

Experiments based on Theory topics

		<p>6-T-5 Hospital and Community Pharmacy</p> <p>1. Organization and Structure: Organization of a hospital and hospital pharmacy, Responsibilities of a hospital pharmacist, Pharmacy and therapeutic committee, Budget preparation and Implementation.</p> <p>2. Hospital Formulary: Contents, preparation and revision of hospital formulary.</p> <p>3. Drug Store Management and Inventory Control:</p> <p>(a) Organization of drug store, Types of materials stocked, storage conditions.</p> <p>(b) Purchase and Inventory Control principles, purchase procedures, Purchase order, Procurement and stocking.</p> <p>4. Drug distribution Systems in Hospitals:</p> <p>(a) Out-patient dispensing, methods adopted.</p> <p>(b) Dispensing of drugs to in-patients. Types of drug distribution systems. Charging policy, labeling.</p> <p>(c) Dispensing of drugs to ambulatory patients.</p> <p>(d) Dispensing of controlled drugs.</p> <p>5. Central Sterile Supply Unit and their Management: Types of materials for sterilization, Packing of materials prior to sterilization, sterilization equipments, Supply of sterile materials.</p> <p>6. Manufacture of Sterile and Nonsterile Products: Policy making of manufacturable items, demand and costing, personnel requirements, manufacturing practice, Master formula Card, production control, Manufacturing records.</p> <p>7. Drug Information Services: Sources of information on drugs, disease, treatment schedules, procurement of information, Computerized services (e.g., MEDLINE), Retrieval of information, Medication error.</p> <p>8. Records and Reports: Prescription filling, drug profile, patient medication profile, cases on drug interaction and adverse reactions, idiosyncratic cases, etc.</p> <p>9. Nuclear Pharmacy: Introduction to Radiopharmaceuticals, radio-active half-life, Units of radio-activity Production of radiopharmaceuticals, methods of isotopic tagging, preparation of radio-isotopes in laboratory using radiation dosimetry, radio-isotope generators, Permissible radiation dose level, Radiation hazards and their prevention, specifications for radio-active laboratory.</p> <p>6-P-5 Project work</p> <p>Submission of Project report as Review/ Research/field survey, etc.</p>	
		<p>B. Pharm. Seventh Semester</p> <p>7-T-1 Biopharmaceutics</p> <p>1. Introduction to biopharmaceutics: Passage of drugs across biological barrier (passive diffusion, active transport, facilitated diffusion, ion-pair formation and pinocytosis); Factors</p>	

		<p>influencing absorption- biological, physico-chemical, physiological and pharmaceutical. Drug disposition: Factors affecting distribution and barriers, drug-protein binding in blood and tissue.</p> <p>2. Pharmacokinetics: Significance of plasma drug concentration measurements. Compartment model-definition and scope. Pharmacokinetics of drug absorption-Zero order and first order absorption rate constant using Wagner-Nelson and residual methods. Volume of distribution and distribution coefficient.</p> <p>3. Compartment kinetics – One compartment and two compartment models. Determination of pharmacokinetic parameters from plasma and urine data after drug administration by intravascular and oral route. Clearance concept, Mechanism of renal clearance, clearance ratio, determination of renal clearance. Excretion ratio, hepatic clearance, biliary excretion, Extra-hepatic circulation. Non-linear pharmacokinetics with special reference to one compartment model after I.V. drug administration.</p> <p>4. Clinical Pharmacokinetics: Definition and scope-Dosage adjustment in patients with and without renal and hepatic failure. Design of single dose bio-equivalence study and relevant statistics. Pharmacokinetic drug interactions and their significance in combination therapy.</p> <p>8. Bioavailability and bioequivalence: Measures of bioavailability, C_{max}, t_{max}, K_{el} and Area Under the Curve (AUC); Design of single dose bioequivalence study and relevant statistics; Review of regulatory requirements for conducting bioequivalent studies. Biopharmaceutical Classification System (BCS) of drugs.</p> <p>9. Performance evaluation methods</p> <p>a) In vitro dissolution studies for solid dosage forms, methods, interpretation of dissolution data.</p> <p>b) In vivo methods of evaluation and statistical treatment.</p> <p>8. Software used in biopharmaceutics and pharmacokinetics and its importance.</p>	
		<p>7-T-2 Medicinal Chemistry –III</p> <p>The synthesis and SAR of the compound, Classification under each class and Biochemical approaches in drug design wherever possible should be discussed.</p> <p>1. Diuretics: Mersalyl, Ethacrynic acid Aminophylline, Aminometradine, Triameterene Acetazolamide and Bendroflumethiazide, Chlorthiazide, Chlorthalidone, Furesemide and Spironolactone mercurials, Carbonic anhydrase inhibitors and benzothiadiazines</p> <p>2. Antihistaminic: Ethanolamine derivatives- Diphenhydramine HCl, Dymenhydrinate, Pyrulaminemaleate,</p>	

		<p>Pheniramine maleate, Chlorpheniramine maleate, Promethazine HCl</p> <p>3. Expectorants and Antitussive: Potassium glucosulphonate, Terpene hydrate, Noscapine, Carbetapentane citrate.</p> <p>4. Antineoplastic drugs: Drugs covered in major groups of anticancer drugs viz., alkylating agents, antimetabolites, antitumour antibiotics and plant alkaloids.</p> <p>5. Sulfonamides: Mechanism of action of Sulfonamides, synthesis and uses of Sulphacetamide, Sulphaguandine, Sulphadiazine, Sulphamerazine, Sulphasomidine, Trimethoprim, Phathiazole, Sulphadoxin.</p> <p>6. Antibiotic: Chemistry, Biosynthesis and semi-synthetic penicillin, Chloramphenicol & tetracycline, A study of the properties and use of Ampicillin, Kanamycin, Neomycin, Erythromycin, streptomycin, Nystatin, Bacitracin and Cycloserine. Structural variations in chloramphenicol and Tetracycline.</p> <p>7. Antitubercular drugs: Study of PAS, Isonicotinaldehyde, thiosemicarbazine, Isoniazid, streptomycin, pyrazinamide, Ethambutol, Rifampicin, Ethionamide.</p> <p>8. Antifungal Agents: Drugs covered in major classes of antifungal agents viz., polyene, imidazoles, thiazole, triazole, griseofulvin, tolnaftate.</p> <p>9. Anti-malarial: Structure activity relationship in 4-amino-quinolines and 8- amino-quinolines. Synthesis and uses of Chloroquine, Amodiaquine, pamaquine, primaquine, Quoinacrine , proguanil and pyrimethamine.</p> <p>10. Antiviral including anti HIV agents</p> <p>11. Anthelmintics: A study of santonin, Ascaridol, Filicit, Antimalarial & antibiotics & anthelminitics. Synthesis of Diethyl carbamazine, Mebandazole, Piperazine citrate, Tetramisole, Levamisole</p> <p>12. Anti-amoebics: Factors affecting the efficiency of antiamoebic drugs, Drug combination. A study of Emetine, conesine-9-quinolinal and antibiotics as antiamoebics, synthesis and uses of Bially-lunical, Mantomide and Dihydroxy quinoline, Metronidazole, Tinidazole.</p> <p>7-P-2 Medicinal Chemistry –III (Practical) Experiments based on Theory topics</p>	
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	<p>7-T-3 Pharmacology – III</p> <p>1. Drugs acting on urinary system:</p> <ol style="list-style-type: none"> Diuretics & anti-diuretics Fluid and electrolyte balance <p>2. Autacoids:</p> <ol style="list-style-type: none"> Histamine and Antihistaminic drugs, 5-HT- its agonists and antagonists, drugs used in the treatment of migraine. Prostaglandins, thromboxanes and leukotrienes. Angiotensin, Bradykinin and other vasoactive peptides Non-steroidal anti-inflammatory drugs <p>3. Drugs acting on the respiratory system:</p> <ol style="list-style-type: none"> Anti-asthmatic drugs including bronchodilators, nasal decongestants and mucolytics. Anti-tussive and expectorants. Respiratory stimulants. <p>4. Pharmacology of Drugs acting on the Gastrointestinal Tract</p> <p>Management of Gastrointestinal Disorders- Peptic ulcer, Ulcerative colitis, Hepatitis and Cirrhosis.</p> <ol style="list-style-type: none"> Antacids, anti-secretary and antiulcer drugs. Laxatives and antidiarrhoeal drugs. Appetite stimulants and suppressants. Digestants and carminatives Emetics and anti-emetics. <p>5. Pharmacology of Endocrine system</p> <p>Management of Endocrine Disorders-Diabetes mellitus and Thyroid disorders.</p> <ol style="list-style-type: none"> Basic concepts in endocrine pharmacology. Hypothalamic and pituitary hormones. Thyroid hormones and anti-thyroid drugs, parathormone, calcitonin and vitamin-D. Antidiabetics, Insulin, Oral hypoglycemic agents and glucagon. ACTH and corticosteroids. Androgens and anabolic steroids. Estrogens, progesterone and oral contraceptives. Drugs acting on the uterus. <p>6. Chemotherapy</p> <ol style="list-style-type: none"> General Principles of chemotherapy. Sulfonamides and cotrimoxazole. Antibiotics- Penicillins, Cephalosporins, 	
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		<p>Chloramphenicol, Macrolides, Quinolines and Fluoroquinolones, Quinolones, Tetracyclines, Amino glycosides and Miscellaneous Antibiotics.</p> <p>d. Chemotherapy of tuberculosis, leprosy, fungal diseases, viral diseases, AIDS, protozoal diseases, worm infestations, urinary tract infections and sexually transmitted diseases.</p> <p>e. Chemotherapy of malignancy.</p> <p>f. Anthelmintics and Anti-amoebics</p> <p>7-P-3 Pharmacology – III Experiments based on Theory topics</p>	
		<p>7-T-4 Pharmacognosy –III</p> <p>1. Study of the biological sources, cultivation, collection, commercial varieties, chemical constituents, substitutes, adulterants, uses, diagnostic macroscopic and microscopic features and specific chemical tests of following groups of drugs containing glycosides:</p> <p>(i) Saponins: Liquorice, ginseng, dioscorea, sarsaparilla, and senega.</p> <p>(ii) Cardioactive sterols: Digitalis, squill, strophanthus and thevetia.</p> <p>(iii) Anthraquinone cathartics: Aloe, senna, rhubarb and cascara.</p> <p>(iv) Others: Psoralea, Ammi majus, Ammi visnaga, gentian, saffron, chirata, quassia.</p> <p>2. Studies of traditional drugs, common vernacular names, botanical sources, morphology, chemical nature of chief constituents, pharmacology, categories and common uses and marketed formulations of following indigenous drugs:</p> <p>Amla, Kantkari, Satavari, Tylophora, Bhilawa, Kalijiri, Bach, Rasna, Punarnava, Chitrack, Apamarg, Gokhru, Shankhapushpi, Brahmi, Adusa, Arjuna, Ashoka, Methi, Lahsun, Palash, Guggal, Gymnema, Shilajit, Nagarmotha and Neem.</p> <p>3. The holistic concept of drug administration in traditional systems of medicine. Introduction to ayurvedic preparations like Arishtas, Asvas, Gutikas, Tailas, Churnas, Lehyas and Bhasmas.</p> <p>4. Historical development of plant tissue culture, types of cultures, nutritional requirements, growth and their maintenance. Applications of plant tissue culture in pharmacognosy.</p> <p>5. Marine pharmacognosy, novel medicinal agents from marine sources.</p> <p>6. Natural allergens and photosensitizing agents and fungal toxins.</p> <p>7. Chemotaxonomy of medicinal plants.</p> <p>8. Herbs as health foods.</p> <p>7-P-4 Pharmacognosy –III</p>	

		Experiments based on Theory topics	
		<p>7-T-5 Chemistry of Natural Products</p> <ol style="list-style-type: none"> 1. Chemical and spectral approaches to simple molecules of natural origin 2. Concept of stereoisomerism taking examples of natural products. 3. Chemistry, biogenesis and pharmacological activity of medicinally important monoterpenes, sesquiterpenes, diterpenes, and triterpenoids. 4. Carotenoids: α-carotenoids, β-carotenes, vitamin A, Xanthophylls of medicinal importance. 5. Glycosides: Chemistry and biosynthesis of digitoxin, digoxin, hecogenin, sennosides, diosgenin and sarasapogenin. 6. Alkaloids: Chemistry, biogenesis and pharmacological activity of atropine and related compounds; quinine, reserpine, morphine, papaverine, ephedrine, ergot and vinca alkaloids. 7. Chemistry and biogenesis of medicinally important lignans and quassanoids, flavonoids. 8. Chemistry and therapeutic activity of penicillin, streptomycin and tetracyclines. 	
		<p>B. Pharm. Eighth Semester</p> <p>8-T-1 Cosmetic Technology</p> <ol style="list-style-type: none"> 1. Introduction to cosmetics: Fundamentals, skin anatomy and physiology regarding cosmetics, skin pathology and disorders, Structure and Function of hair 2. Formulation considerations of cosmetics 3. Formulation and analysis of the following cosmetic products <ol style="list-style-type: none"> a. Coloured make up preparations: Lipsticks, facial colouring preparations, rouge, lip liner, lip rouges. b. Face preparations: cosmetic powders, compact, talcum powder c. Baby care products: baby powder, baby oils, baby lotions, baby creams, baby soaps, baby shampoo. d. Dentifrices: Tooth paste, Tooth powders, mouth rinses, denture cleanser, tooth brush. e. Nail products: nail paint, nail lacquer, nail lacquer remover, creams and 	

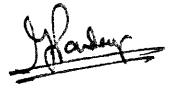
		<p>lotions, nail driers, bleaches.</p> <p>f. Eye preparations: eye shadow, eye liner, eye brow pencil, mascara.</p> <p>g. Hair and Scalp Preparation : Hair colours, shampoo, rinses</p> <p>h. Herbal products with reference to aloe vera and turmeric</p> <p>i. Bleaching preparations</p> <p>j. Facemask.</p> <p>8-P-1 Cosmetic Technology Experiments based on Theory topics</p>	
		<p>8-T-2 Pharmaceutical Biotechnology</p> <p>1. Immunology and Immunological Preparations: Principles, antigens and haptens, immune system, cellular humoral immunity, immunological tolerance, antigen-antibody reactions and their applications. Hypersensitivity, active and passive immunization; Vaccines- their preparation, standardization and storage.</p> <p>2. Genetic Recombination: Transformation, conjugation, transduction, protoplast fusion and gene cloning and their applications. Development of hybridoma for monoclonal antibodies. Study of biotechnology derived drugs such as Activase, Humulin, Humatrope, HB, etc.</p> <p>3. Fermentation: Fermenter, its design, control of different parameters. Isolation of mutants, factors influencing rate of mutation. Design of fermentation process. Isolation of fermentation products with special reference to penicillins, streptomycins, tetracyclines and vitamin B₁₂, etc.</p> <p>4. Microbial Transformation: Introduction and Principle, types of reactions mediated by microorganisms, design of biotransformation processes, selection of organisms, biotransformation process and its improvements with special reference to steroids.</p> <p>5. Enzyme immobilization: Techniques of immobilization, factors affecting enzyme kinetics. Study of enzymes such as hyaluronidase, penicillinase, streptokinase and streptodornase, amylases and proteases etc. Immobilization of bacteria and plant cells.</p> <p>8-P-2 Pharmaceutical Biotechnology Experiments based on Theory topics</p>	
		<p>8-T-3 Medicinal Chemistry –IV</p> <p>The synthesis and SAR of the compound, Classification under each class and Biochemical approaches in drug design wherever possible should be discussed.</p>	

		<ol style="list-style-type: none"> 1. Sex-hormones: Synthesis of testosterone, progesterone & oestrone from diosgenin & cholesterol. Preparation & use of non steroidal estrogens, diethylstilbestrol, Monomesterol, Hexosterol, Ethinyl estradiol, Ethisterone, Testosterone, Propionate and methyl Testosterone. 2. Cortex Hormones: Synthesis of cortisone acetate from diosgenin and cholesterol. Preparation & uses of dexa-corticosterone acetate, hydrocortisone acetate, prednisolone & prednisone, dexamethasone, betamethasone. 3. Non-Steroidal hormones: Adrenaline & Thyroxin. 4. Antidiabetic agents: Insulin, Carbutamide, Chloropamide. Tolbutamide. 5. Vitamins: Constitution & physiological importance, vitamin A, thiamine, riboflavin, ascorbic acid, folic acid, pantothenic acid & pyridoxin. 6. Medicinal Dyes: Synthesis & uses of gentian violet, malachite green, brilliant green, amaranth, resochin brown, 9-aminoacridine, acriflavin, methylene blue and diloxinate furoate. 7. Diagnostic agents: General survey of important compounds. 	
		<p>8-T-4 Pharmacognosy –IV</p> <ol style="list-style-type: none"> 1. Systematic study of source, cultivation, collection, processing, commercial varieties, chemical constituents, substitutes, adulterants, uses, diagnostic macroscopic and microscopic features and specific chemical tests of following alkaloid containing drugs: <ol style="list-style-type: none"> a) Pyridine - piperidine: Tobacco, areca and lobelia. b) Tropane: Belladonna, hyoscyamus, datura, duboisia, coca and withania c) Quinoline and isoquinoline: Cinchona, ipecac, opium. d) Indole: Ergot, rauwolfia, catharanthus, nuxvomica and physostigma e) Imidazole: Pilocarpus f) Steroidal: Veratrum and kurchi g) Alkaloidal amine: Ephedra and colchicum. h) Glycoalkaloid: Solanum. i) Purines: Coffee, tea and cola. 2. Role of medicinal and aromatic plants in national economy. A brief account of plant based industries and institutions involved in work on medicinal and aromatic plants in India. Utilization and production of phytoconstituents such as quinine, calcium sennosides, podophyllotoxin, diosgenin, solasodine, taxol and tropane alkaloids. 3. Biological sources, preparation, identification tests and uses of the following enzymes: 	

		<p>Diastase, papain, pepsin, trypsin, pancreatin.</p> <p>4. General techniques of biosynthetic studies and basic metabolic pathways. Brief introduction to biogenesis of secondary metabolites of pharmaceutical importance.</p> <p>5. Plant bitters and sweeteners.</p> <p>6. Introduction, classification and study of different chromatographic methods and their applications in evaluation of herbal drugs.</p> <p>7. Utilization of aromatic plants and derived products with special reference to sandalwood oil, mentha oil, lemon grass oil, vetiver oil, geranium oil and eucalyptus oil.</p> <p>8. Herbal cosmetics ingredients.</p> <p>8-T-4 Pharmacognosy –IV Experiments based on Theory topics</p>	
		<p>8-T-5 Industrial Management and Accountancy</p> <p>1. Concept of Management: Administrative Management (Planning, organizing, Staffing, Directing and controlling), Entrepreneurship development, operative management (Personnel, Materials, Production, Financial Marketing, Time/space, Margin/Morale), Principles of Management (Co-ordination, Communication, Motivation, Decision making, leadership, Innovation, Creativity, Delegation of Authority/Responsibility, Record Keeping), Identification of key points to give maximum thrust for development and perfection.</p> <p>2. Accountancy: Principles of Accountancy, Ledger posting and book entries, preparation of trial balance, columns of cash book, Bank reconciliation statement, rectification of errors, Profits and loss account, balance sheet, purchase keeping and pricing of stocks, treatment of cheques, bills of exchange promissory notes and hundies, documentary bills.</p> <p>3. Economics: Principles of economics with special reference to the laws of demand and supply, demand schedule, demand curves, labour welfare, general principles of insurance and inland and foreign trade, procedure of exporting and importing goods.</p> <p>4. Pharmaceutical Marketing: Functions, buying, selling, transportation, storage, finance, feedback, information, channels of distribution, wholesale, retail, departmental store, multiple shop and mail order business.</p> <p>5. Salesmanship: Principles of sales promotion, advertising, ethics of sales, merchandising, literature, detailing Recruitment, training, evaluation, compensation to the pharmacist.</p> <p>6. Market Research: Measuring & Forecasting Market demands-Major concept in demand measurement, Estimating current demand,</p>	

	<p>Geodemographic analysis, Estimating industry sales, market share & future demand. Market segmentation & Market Targeting.</p> <p>7. Materials Management: A brief exposure or basic principles of materials management major areas, scope, purchase, stores, inventory control and evaluation of materials management.</p> <p>8. Production Management: A brief exposure of the different aspects of Production Management-Visible and Invisible inputs, Methodology of Activities Performance Evaluation Technique, Process-Flow, Process Know-how maintenance management.</p> <p>9. Financial Management: Budget and its types: financial budget, expenditure budget, performance budgeting.</p> <p style="text-align: center;">Approved in meeting of Board of Studies in Faculty of Technology, Subject: Pharmacy Dt. July 31, 2012</p>	
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आदेशानुसार,




कुलसचिव

पृ.क्रमांक : 1379 /अका./2021

रायपुर, दिनांक : 05 /02/2021

प्रतिलिपि :-

01. माननीय राज्यपाल एवं कुलाधिपति महोदय के अवर सचिव, छत्तीसगढ़ राजभवन, रायपुर
02. सचिव, छत्तीसगढ़ शासन, उच्च शिक्षा विभाग, मंत्रालय, महानदी भवन, अटल नगर, नवा रायपुर
03. सचिव, छत्तीसगढ़ शासन, वित्त विभाग, मंत्रालय, महानदी भवन, अटल नगर, नवा रायपुर
04. आयुक्त, उच्च शिक्षा, ब्लॉक-सी-3, द्वितीय एवं तृतीय तल, इन्द्रावती भवन, अटल नगर, नवा रायपुर
05. अध्यक्ष, समस्त अध्ययनशाला/प्राचार्य, संबद्ध समस्त महाविद्यालय,
06. समस्त विभागीय अधिकारी,
07. कुलपति के सचिव/कुलसचिव के निजी सहायक,
पं. रविशंकर शुक्ल विश्वविद्यालय, रायपुर को सूचनार्थ एवं आवश्यक कार्यवाही हेतु अग्रेषित।


विशेष कर्तव्यस्थ अधिकारी (अका.)