Revised Regulations for the Master of Pharmacy Degree Program (w.e.f. June 2016)

Credit Based Semester System

M. PHARM. PHARMACOGNOSY (MPG)

Pharmacy Council of India
Combined Council's Building, Kotla Road, Aiwan-E-Ghalib Marg, New Delhi-110 002
CHAPTER – I: REGULATIONS

1. Short Title and Commencement
These regulations shall be called as “The Revised Regulations for the Master of Pharmacy (M. Pharm.) Degree Program - Credit Based Semester System (CBSS) of the Pharmacy Council of India, New Delhi”. They shall come into effect from the Academic Year 2016-17. The regulations framed are subject to modifications from time to time by the authorities of the university.

2. Minimum qualification for admission
A Pass in the following examinations
   a) B. Pharm Degree examination of an Indian university established by law in
      India from an institution approved by Pharmacy Council of India and has
      scored not less than 55% of the maximum marks (aggregate of 4 years of
      B.Pharm.)

      b) Every student, selected for admission to post graduate pharmacy program in
         any PCI approved institution should have obtained registration with the State
         Pharmacy Council or should obtain the same within one month from the date
         of his/her admission, failing which the admission of the candidate shall be
         cancelled.

         Note: It is mandatory to submit a migration certificate obtained from the
         respective university where the candidate had passed his/her qualifying
         degree (B.Pharm.)

3. Duration of the program
The program of study for M.Pharm. shall extend over a period of four semesters (two academic years). The curricula and syllabi for the program shall be prescribed from time to time by Pharmacy Council of India, New Delhi.

4. Medium of instruction and examinations
Medium of instruction and examination shall be in English.

5. Working days in each semester
Each semester shall consist of not less than 100 working days. The odd semesters shall be conducted from the month of June/July to November/December and the even semesters shall be conducted from the month of December/January to May/June in every calendar year.
6. Attendance and progress
A candidate is required to put in at least 80% attendance in individual courses considering theory and practical separately. The candidate shall complete the prescribed course satisfactorily to be eligible to appear for the respective examinations.

7. Program/Course credit structure
As per the philosophy of Credit Based Semester System, certain quantum of academic work viz. theory classes, practical classes, seminars, assignments, 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/per activity.

7.1. Credit assignment
7.1.1. Theory and Laboratory courses
Courses are broadly classified as Theory and Practical. Theory courses consist of lecture (L) and 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 a multiplier of half (1/2) for practical (laboratory) hours. Thus, for example, a theory course having four lectures 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.

The contact hours of seminars, assignments and research work shall be treated as that of practical courses for the purpose of calculating credits. i.e., the contact hours shall be multiplied by 1/2. Similarly, the contact hours of journal club, research work presentations and discussions with the supervisor shall be considered as theory course and multiplied by 1.

7.2. Minimum credit requirements
The minimum credit points required for the award of M. Pharm. degree is 95. However based on the credit points earned by the students under the head of co-curricular activities, a student shall earn a maximum of 100 credit points. These credits are divided into Theory courses, Practical, Seminars, Assignments, Research work, Discussions with the supervisor, Journal club and Co-Curricular activities over the duration of four semesters. The credits are distributed semester-wise as shown in Table V. Courses generally progress in sequence, 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.

8. Academic work
A regular record of attendance both in Theory, Practical, Seminar, Assignment, Journal club, Discussion with the supervisor, Research work presentation and Dissertation shall be maintained by the department / teaching staff of respective courses.

9. Course of study
The specializations in M.Pharm program is given in Table I.

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Specialization</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Cosmeceutics</td>
<td>MCC</td>
</tr>
<tr>
<td>2.</td>
<td>Industrial Pharmacy</td>
<td>MIP</td>
</tr>
<tr>
<td>3.</td>
<td>Pharmaceutical Analysis</td>
<td>MPA</td>
</tr>
<tr>
<td>4.</td>
<td>Pharmaceutical Biotechnology</td>
<td>MPB</td>
</tr>
<tr>
<td>5.</td>
<td>Pharmaceutical Chemistry</td>
<td>MPC</td>
</tr>
<tr>
<td>6.</td>
<td>Pharmaceutics</td>
<td>MPH</td>
</tr>
<tr>
<td>7.</td>
<td>Pharmacognosy</td>
<td>MPG</td>
</tr>
<tr>
<td>8.</td>
<td>Pharmacology</td>
<td>MPL</td>
</tr>
<tr>
<td>9.</td>
<td>Pharmacy Practice</td>
<td>MPP</td>
</tr>
<tr>
<td>10.</td>
<td>Pharmaceutical Quality Assurance</td>
<td>MQA</td>
</tr>
<tr>
<td>11.</td>
<td>Pharmaceutical Regulatory Affairs</td>
<td>MRA</td>
</tr>
</tbody>
</table>

The course of study for M.Pharm specializations shall include Semester wise Theory & Practical as given in Table – II to XIII. The number of hours to be devoted to each theory and practical course in any semester shall not be less than that shown in Table – II to XIII.
### Table – 1: Course of study for M. Pharm. (Pharmacognosy)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course</th>
<th>Credit Hours</th>
<th>Credit Points</th>
<th>Hrs./wk</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semester I</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MPA101T</td>
<td>Modern Pharmaceutical Analytical Techniques</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>100</td>
</tr>
<tr>
<td>MPG101T</td>
<td>Advanced Pharmacognosy-1</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>100</td>
</tr>
<tr>
<td>MPG102T</td>
<td>Phytochemistry</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>100</td>
</tr>
<tr>
<td>MPG103T</td>
<td>Industrial Herbal drug technology</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>100</td>
</tr>
<tr>
<td>MPG104P</td>
<td>Pharmacognosy Practical I</td>
<td>12</td>
<td>6</td>
<td>12</td>
<td>150</td>
</tr>
<tr>
<td>-</td>
<td>Seminar/Assignment</td>
<td>7</td>
<td>4</td>
<td>7</td>
<td>100</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>35</strong></td>
<td><strong>26</strong></td>
<td><strong>35</strong></td>
<td><strong>650</strong></td>
</tr>
<tr>
<td>Semester II</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MPG201T</td>
<td>Medicinal Plant biotechnology</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>100</td>
</tr>
<tr>
<td>MPG102T</td>
<td>Advanced Pharmacognosy-II</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>100</td>
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<tr>
<td>MPG203T</td>
<td>Indian system of medicine</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>100</td>
</tr>
<tr>
<td>MPG204T</td>
<td>Herbal cosmetics</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>100</td>
</tr>
<tr>
<td>MPG205P</td>
<td>Pharmacognosy Practical II</td>
<td>12</td>
<td>6</td>
<td>12</td>
<td>150</td>
</tr>
<tr>
<td>-</td>
<td>Seminar/Assignment</td>
<td>7</td>
<td>4</td>
<td>7</td>
<td>100</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>35</strong></td>
<td><strong>26</strong></td>
<td><strong>35</strong></td>
<td><strong>650</strong></td>
</tr>
</tbody>
</table>
### Table – 2: Course of study for M. Pharm. III Semester
(Common for All Specializations)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course</th>
<th>Credit Hours</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRM101T</td>
<td>Research Methodology and Biostatistics*</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>-</td>
<td>Journal club</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>-</td>
<td>Discussion / Presentation (Proposal Presentation)</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>-</td>
<td>Research Work</td>
<td>28</td>
<td>14</td>
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<tr>
<td></td>
<td>Total</td>
<td>35</td>
<td>21</td>
</tr>
</tbody>
</table>

* Non University Exam

### Table – 14: Course of study for M. Pharm. IV Semester
(Common for All Specializations)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course</th>
<th>Credit Hours</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>Journal Club</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>-</td>
<td>Research Work</td>
<td>31</td>
<td>16</td>
</tr>
<tr>
<td>-</td>
<td>Discussion/Final Presentation</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>35</td>
<td>20</td>
</tr>
</tbody>
</table>

### Table – 15: Semester wise credits distribution

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>26</td>
</tr>
<tr>
<td>II</td>
<td>26</td>
</tr>
<tr>
<td>III</td>
<td>21</td>
</tr>
<tr>
<td>IV</td>
<td>20</td>
</tr>
</tbody>
</table>

Co-curricular Activities
(Attending Conference, Scientific Presentations and Other Scholarly Activities)
Minimum=02
Maximum=07*

Total Credit Points
Minimum=95
Maximum=100*

*Credit Points for Co-curricular Activities
Table – 16: Guidelines for Awarding Credit Points for Co-curricular Activities

<table>
<thead>
<tr>
<th>Name of the Activity</th>
<th>Maximum Credit Points Eligible / Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participation in National Level Seminar/Conference/Workshop/Symposium/Training Programs (related to the specialization of the student)</td>
<td>01</td>
</tr>
<tr>
<td>Participation in international Level Seminar/Conference/Workshop/Symposium/Training Programs (related to the specialization of the student)</td>
<td>02</td>
</tr>
<tr>
<td>Academic Award/Research Award from State Level/National Agencies</td>
<td>01</td>
</tr>
<tr>
<td>Academic Award/Research Award from International Agencies</td>
<td>02</td>
</tr>
<tr>
<td>Research / Review Publication in National Journals (Indexed in Scopus / Web of Science)</td>
<td>01</td>
</tr>
<tr>
<td>Research / Review Publication in International Journals (Indexed in Scopus / Web of Science)</td>
<td>02</td>
</tr>
</tbody>
</table>

Note: International Conference: Held Outside India
    International Journal: The Editorial Board Outside India

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

10. Program Committee

1. The M. Pharm. programme shall have a Programme Committee constituted by the Head of the institution in consultation with all the Heads of the departments.

2. The composition of the Programme Committee shall be as follows:

   A teacher at the cadre of Professor shall be the Chairperson; One Teacher from each M.Pharm specialization and four student representatives (two from each academic year), nominated by the Head of the institution.

3. Duties of the Programme 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 Programme Committee shall meet at least twice in a semester preferably at the end of each sessionalexam and before the end semester exam.

11. Examinations/Assessments
The schemes for internal assessment and end semester examinations are given in Table – XVII.

11.1. End semester examinations
The End Semester Examinations for each theory and practical course through semesters I to IV shall be conducted by the respective university except for the subject 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.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course</th>
<th>Course Code</th>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPA101T</td>
<td>Modern Pharmaceutical Analytical Techniques</td>
<td>MPG101T</td>
<td>Advanced Pharmacognosy-1</td>
</tr>
<tr>
<td>MPG102T</td>
<td>Phytochemistry</td>
<td>MPG103T</td>
<td>Industrial Herbal drug technology</td>
</tr>
<tr>
<td>MPG104P</td>
<td>Pharmacognosy Practical I</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Seminar /Assignment</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SEMESTER I**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course</th>
<th>Continuous Mode</th>
<th>Internal Assessment</th>
<th>End Semester Exams</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mode</td>
<td>Sessional Exams</td>
<td>Total</td>
<td>Marks</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Marks</td>
<td>Duration</td>
<td>Marks</td>
<td>Duration</td>
</tr>
<tr>
<td>MPA101T</td>
<td>Modern Pharmaceutical Analytical Techniques</td>
<td>10</td>
<td>15</td>
<td>1 Hr</td>
<td>25</td>
</tr>
<tr>
<td>MPG101T</td>
<td>Advanced Pharmacognosy-1</td>
<td>10</td>
<td>15</td>
<td>1 Hr</td>
<td>25</td>
</tr>
<tr>
<td>MPG102T</td>
<td>Phytochemistry</td>
<td>10</td>
<td>15</td>
<td>1 Hr</td>
<td>25</td>
</tr>
<tr>
<td>MPG103T</td>
<td>Industrial Herbal drug technology</td>
<td>10</td>
<td>15</td>
<td>1 Hr</td>
<td>25</td>
</tr>
<tr>
<td>MPG104P</td>
<td>Pharmacognosy Practical I</td>
<td>20</td>
<td>30</td>
<td>6 Hrs</td>
<td>50</td>
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<tr>
<td></td>
<td>Seminar /Assignment</td>
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</table>

**SEMESTER II**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course</th>
<th>Continuous Mode</th>
<th>Internal Assessment</th>
<th>End Semester Exams</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mode</td>
<td>Sessional Exams</td>
<td>Total</td>
<td>Marks</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Marks</td>
<td>Duration</td>
<td>Marks</td>
<td>Duration</td>
</tr>
<tr>
<td>MPG201T</td>
<td>Medicinal Plant biotechnology</td>
<td>10</td>
<td>15</td>
<td>1 Hr</td>
<td>25</td>
</tr>
<tr>
<td>MPG202T</td>
<td>Advanced Pharmacognosy-II</td>
<td>10</td>
<td>15</td>
<td>1 Hr</td>
<td>25</td>
</tr>
<tr>
<td>MPG203T</td>
<td>Indian system of medicine</td>
<td>10</td>
<td>15</td>
<td>1 Hr</td>
<td>25</td>
</tr>
<tr>
<td>MPG204T</td>
<td>Herbal cosmetics</td>
<td>10</td>
<td>15</td>
<td>1 Hr</td>
<td>25</td>
</tr>
<tr>
<td>MPG205P</td>
<td>Pharmacognosy Practical II</td>
<td>20</td>
<td>30</td>
<td>6 Hrs</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Seminar /Assignment</td>
<td>-</td>
<td>-</td>
<td>-</td>
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</tbody>
</table>

**Total** 650
### Tables – 28: Schemes for internal assessments and end semester examinations (Semester III& IV)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course</th>
<th>Course Code</th>
<th>Course</th>
<th>Continuous Mode</th>
<th>Sessional Exams</th>
<th>Total Marks</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Course Code</td>
<td>Course</td>
<td>Marks</td>
<td>Duration</td>
<td>Total Marks</td>
<td>Duration</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Research Methodology and Biostatistics*</td>
<td>10</td>
<td>15</td>
<td>25</td>
<td>3 Hrs</td>
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<td>SEMESTER III</td>
<td>- Journal club</td>
<td>Journal club</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>25</td>
<td>-</td>
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<tr>
<td></td>
<td>- Discussion / Presentation</td>
<td>Discussion</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>50</td>
<td>-</td>
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<tr>
<td></td>
<td>(Proposal Presentation)</td>
<td>/ Proposal</td>
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<tr>
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<td>(Proposal Presentation)</td>
<td>Presentation</td>
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<tr>
<td></td>
<td>- Research work*</td>
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<td>-</td>
<td>-</td>
<td>350</td>
<td>1 Hr</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>Total</td>
<td>525</td>
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<tr>
<td>SEMESTER IV</td>
<td>- Journal club</td>
<td>Journal club</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>25</td>
<td>-</td>
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<td>Discussion</td>
<td>-</td>
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<td></td>
<td>- Research work and Colloquium</td>
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<td>-</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Total</td>
<td>500</td>
<td></td>
<td></td>
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</tbody>
</table>

*Non University Examination
11.2. Internal assessment: Continuous mode
The marks allocated for Continuous mode of Internal Assessment shall be awarded as per the scheme given below.

Table – 29: Scheme for awarding internal assessment: Continuous mode

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Maximum Marks</th>
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</thead>
<tbody>
<tr>
<td>Theory</td>
<td></td>
</tr>
<tr>
<td>Attendance (Refer Table – 30)</td>
<td>8</td>
</tr>
<tr>
<td>Student – Teacher interaction</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>10</strong></td>
</tr>
<tr>
<td>Practical</td>
<td></td>
</tr>
<tr>
<td>Attendance (Refer Table – 30)</td>
<td>10</td>
</tr>
<tr>
<td>Based on Practical Records, Regular viva voce, etc.</td>
<td>10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>20</strong></td>
</tr>
</tbody>
</table>

Table – 30: Guidelines for the allotment of marks for attendance

<table>
<thead>
<tr>
<th>Percentage of Attendance</th>
<th>Theory</th>
<th>Practical</th>
</tr>
</thead>
<tbody>
<tr>
<td>95 – 100</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>90 – 94</td>
<td>6</td>
<td>7.5</td>
</tr>
<tr>
<td>85 – 89</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>80 – 84</td>
<td>2</td>
<td>2.5</td>
</tr>
<tr>
<td>Less than 80</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

11.2.1. Sessional Exams
Two sessional exams shall be conducted for each theory / practical course as per the schedule fixed by the college(s). The scheme of question paper for theory and practical sessional examinations is given below. The average marks of two sessional exams shall be computed for internal assessment as per the requirements given in tables – X.

12. Promotion and award of grades
A student shall be declared PASS and eligible for getting grade in a course of M.Pharm.programme if he/she secures at least 50% marks in that particular course including internal assessment.

13. Carry forward of marks
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 Assessment shall be carried over and he/she shall be entitled for grade obtained by him/her on passing.

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

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

Table – 31: Tentative schedule of end semester examinations

<table>
<thead>
<tr>
<th>Semester</th>
<th>For Regular Candidates</th>
<th>For Failed Candidates</th>
</tr>
</thead>
<tbody>
<tr>
<td>I and III</td>
<td>November / December</td>
<td>May / June</td>
</tr>
<tr>
<td>II and IV</td>
<td>May / June</td>
<td>November / December</td>
</tr>
</tbody>
</table>

16. Allowed to keep terms (ATKT):
No student shall be admitted to any examination unless he/she fulfills the norms given in 6. ATKT rules are applicable as follows:

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

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

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

17. Grading of performances
17.1. 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 – 32:
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.

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

\[
SGPA = \frac{C_1G_1 + C_2G_2 + C_3G_3 + C_4G_4}{C_1 + C_2 + C_3 + C_4}
\]

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:

\[
SGPA = \frac{C_1G_1 + C_2G_2 + C_3G_3 + C_4*zero}{C_1 + C_2 + C_3 + C_4}
\]

19. Cumulative Grade Point Average (CGPA)
The CGPA is calculated with the SGPA of all the IV semesters to two decimal points and is indicated in final grade report card/final transcript showing the grades of all IV 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:

\[
\text{CGPA} = \frac{C_1 S_1 + C_2 S_2 + C_3 S_3 + C_4 S_4}{C_1 + C_2 + C_3 + C_4}
\]

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

20. Declaration of class
The class shall be awarded on the basis of CGPA as follows:

First Class with Distinction = CGPA of 7.50 and above
First Class = CGPA of 6.00 to 7.49
Second Class = CGPA of 5.00 to 5.99

21. Project work
All the students shall undertake a project under the supervision of a teacher in Semester III to IV and submit a report. 4 copies of the project report shall be submitted (typed & bound copy not less than 75 pages).

The internal and external examiner appointed by the University shall evaluate the project at the time of the Practical examinations of other semester(s). The projects shall be evaluated as per the criteria given below.
Evaluation of Dissertation Book:

Objective(s) of the work done 50 Marks
Methodology adopted 150 Marks
Results and Discussions 250 Marks
Conclusions and Outcomes 50 Marks

Total 500 Marks

Evaluation of Presentation:

Presentation of work 100 Marks
Communication skills 50 Marks
Question and answer skills 100 Marks

Total 250 Marks

22. 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 M.Pharm program shall not be eligible for award of ranks. Moreover, the candidates should have completed the M. Pharm program in minimum prescribed number of years, (two years) for the award of Ranks.

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

24. 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.

25. Revaluation / Retotaling of answer papers
There is no provision for revaluation of the answer papers in any examination. However, the candidates can apply for retotaling by paying prescribed fee.

26. 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.
M. PHARM. PHARMACOGNOSY (MPG)
SCOPE:
To learn and understand the advances in the field of cultivation and isolation of drugs of natural origin, various phytopharmaceuticals, nutraceuticals and their medicinal use and health benefits.

OBJECTIVES:
Upon completion of the course, the student shall be able to
1. Know the advances in the cultivation and production of drugs
2. Know the various phyto-pharmaceuticals and their source & utilization and medicinal value.
3. Know the various nutraceuticals/herbs and their health benefits

Course Description
THEORY 60 Hours

1. Plant drug cultivation: General introduction to the importance of Pharmacognosy in herbal drug industry, Indian Council of Agricultural Research, Current good agricultural practices, Current good cultivation practices, Current good collection practices, Conservation of medicinal plants- Ex-situ and In-situ conservation of medicinal plants. 12 Hrs

2. Marine natural products: General methods of isolation and purification, Study of Marine toxins, Recent advances in research in marine drugs, Problems faced in research on marine drugs such as taxonomical identification, chemical screening and their solution. 12 Hrs

3. Nutraceuticals: Current trends and future scope, Inorganic mineral supplements, Vitamin supplements, Digestive enzymes, Dietary fibres, Cereals and grains, Health drinks from natural origin, Antioxidants, Polyunsaturated fatty acids, Herbs as functional foods, Formulation and standardization of nutraceuticals, Regulatory aspects, FSSAI guidelines, Sources, name of marker compounds and their chemical nature, medicinal uses and health benefits of following
   i) Spirulina ii) Soya bean iii) Ginseng iv) Garlic v) Broccoli vi) Green and Herbal Tea vii) Flax seeds viii) Black cohosh ix) Turmeric. 12 Hrs

4. Phytopharmaceuticals: Occurrence, isolation and characteristic features (Chemical nature, uses in pharmacy, medicinal and health benefits) of following.
a) Carotenoids – i) α and β - Carotene ii) Xanthophyll (Lutein)
b) Limonoids – i) d-Limonene ii) α – Terpineol
c) Saponins – i) Shatavari

d) Flavonoids – i) Resveratrol ii) Rutin iii) Hesperidin iv) Naringin v) Quercetin
e) Phenolic acids- Ellagic acid
f) Tocotrienols and Tocopherols
g) Andrographolide, glycolipids, gugulipids, withanolides, vascine, taxol

5. **Pharmacovigilance of drugs of natural origin:** WHO and AYUSH guidelines for safety monitoring of natural medicine, Spontaneous reporting schemes for biodrug adverse reactions, bio drug-drug and bio drug-food interactions with suitable examples.

**REFERENCES:**

7) Pharmacognosy-Tyler, Brady, Robbers
8) Modern Methods of Plant Analysis- Peach & M.V. Tracey, Vol. I&II
11) Marine Natural Products-Vol.I to IV.
13) Cultivation and Utilization of Aromatic Plants By C.K. Atal & B.M. Kapoor


17) Text Book of Pharmacognosy by T.E. Wallis
PHYTOCHEMISTRY (MPG102T)

Scope:

Students shall be equipped with the knowledge of natural product drug discovery and will be able to isolate, identify the extract and phyto-constituents.

Objectives:

Upon completion of the course, the student shall be able to

1. know the different classes of phytoconstituents and their properties and general process of natural product drug discovery
2. know the process isolation, purification and identification of phytoconstituents

THEORY

60 Hrs

1. Biosynthetic pathways and Radio tracing techniques: Constituents & their Biosynthesis, Isolation, Characterization and purification with a special reference to their importance in herbal industries of following phyto-pharmaceuticals containing drugs:

   a) Alkaloids: Ephedrine, Quinine, Strychnine, Piperine, Berberine, Taxol, Vincaalkoloids.
   b) Glycosides: Digitoxin, Glycyrrhizin, Sennosides, Bacosides, Ginsenosides, Quercitin, Rutin.
   c) Steroids: Hecogenin, guggulosterone and withanolides
   d) Coumarin: Umbelliferone.
   e) Terpenoids: Cucurbitacins
   f) Carotenoids: Lycopene, β-carotene.
   g) Camphor, Menthol, Eugenol.

   12 Hrs

2. Drug discovery and development: History of herbs as source of drugs and drug discovery, the lead structure selection process, structure development, product discovery process and drug registration, Selection and optimization of lead compounds with suitable examples from anticancer, CNS cardiovascular drugs, antitubercular drugs and immunomodulators, Clinical studies emphasis on phase of clinical trials, protocol design for lead molecules.

   12 Hrs
3. **Extraction and Phytochemical studies:** Recent advances in extractions with emphasis on selection of method and choice of solvent for extraction, successive and exhaustive extraction and other methods of extraction commonly used like microwave assisted extraction, and method of fractionation. Detection of different classes of phytoconstituents by latest CCCET, SCFE techniques including preparative HPLC and Flash column chromatography, AAS.

   **12 Hrs**

4. **Phytochemical finger printing:** HPTLC and LCMS/GCMS characterization of extracts containing alkaloids, saponins, glycosides and flavanoids.

   **12 Hrs**

5. **Pharmacological screening:** In vitro, In vivo screening techniques with reference to antiglycomerate, analgesics, antidiabetic, antilipidemic, anticancer, antiulcer, antiviral, antipsychotic, antilithiatic, Toxicity studies as per OECD guidelines, acute, chronic and clinical toxicity.

   **12 Hrs**

**REFERENCES:**

1) Organic chemistry by I.L. Finar Vol.II  
2) Pharmacognosy by Trease and Evans, ELBS.  
3) Pharmacognosy by Tylor and Brady.  
5) Clark’s isolation and Identification of drugs by A.C. Mottal.  
6) Plant Drug Analysis by Wagner & Bladt.  
9) Natural Products Chemistry Practical Manual by Anees A Siddiqui and Seemi Siddiqui  
11) Chemistry of Natural Products- Vol. 1 onwards IWPAC.  
12) Modern Methods of Plant Analysis- Peach & M.V. Tracey, Vol. I&II
INDUSTRIAL PHARMACOGNOSTICAL TECHNOLOGY (MPG103T)

Scope:
To understand the Industrial and commercial potential of herbal drugs and drugs of natural origin, integrate traditional medicines and systems of India with modern medicine and also to know regulatory and quality policy for the trade of herbals and drugs of natural origin.

Objective:
By the end of the course the student shall be able to:

1. Know the requirements for setting up the herbal/natural drug industry.
2. To know and understand the guidelines for quality of herbal/natural medicines and regulatory issues.
3. To know patenting/IPR of herbals/natural drugs and trade of raw and finished materials.

THEORY
60Hrs

   12 Hrs

   12Hrs

   12 Hrs

4. Testing of natural products and drugs: Effect of herbal medicines on clinical laboratory testing. Regulation and dispensing of herbal drugs. Stability testing of
natural products, protocols.

12 Hrs

5. **Patents:** Indian and international patent laws, proposed amendments as applicable to herbal/natural products and process. Geographical indication, Copyright, Patentable subject matters, novelty, non obviousness, utility, enablement and best mode, procedure for Indian patent filing, patent processing, grant of patents, rights of patents, cases of patents, opposition and revocation of patents, patent search and literature, Controllers of patents.

12 Hrs

**REFERENCES:**

4. The complete technology book on herbal perfumes and cosmetics, by H.Pande, National Institute of Industrial Research, Delhi.
PRACTICALS (MPGI04P)

1. Analysis of pharmacopoeial compounds of natural origin and their formulations by UV Vis spectrophotometer
2. Simultaneous estimation of multi component containing formulations by UV spectrophotometry
3. Analysis of recorded spectra of simple phytoconstituents
4. Experiments based on Gas Chromatography
5. Estimation of sodium/potassium by flame photometry
6. Development of fingerprint of selected medicinal plant extracts commonly used in herbal drug industry viz. ashwagandha, tulsi, bael, amla, ginger, aloe, vidang, senna, lawronia by HPTLC method
7. Method of extraction
8. Phytochemical screening
9. Thin layer chromatography
10. Demonstration of HPLC- estimation of glycyzeizin
11. Monograph analysis of clove oil
13. Identification of bioactive constituents from plant extracts
14. Formulation using qualitative and quantitative methods.
MEDICINAL PLANT BIOTECHNOLOGY (MPG201T)

Scope

To explore the knowledge of Biotechnology and its application in the improvement of quality of medicinal plants

Objectives

Upon completion of the course, the student shall be able to

- Know the process like genetic engineering in medicinal plants for higher yield of Phytopharmaceuticals.
- Use the biotechnological techniques for obtaining and improving the quality of natural products/medicinal plants

THEORY

1. Introduction to Plant biotechnology: Historical perspectives, prospects for development of plant biotechnology as a source of medicinal agents. Applications in pharmacy and allied fields. Genetic and molecular biology as applied to pharmacognosy, study of DNA, RNA and protein replication, genetic code, regulation of gene expression, structure and complicity of genome, cell signaling, DNA recombinant technology.

2 Hrs


12 Hrs


12 Hrs

4. Biotransformation and Transgenesis: Biotransformation, bioreactors for pilot and large scale cultures of plant cells and retention of biosynthetic potential in cell
culture. Transgenic plants, methods used in gene identification, localization and sequencing of genes. Application of PCR in plant genome analysis.

12 Hrs

5. **Fermentation technology**: Application of Fermentation technology, Production of ergot alkaloids, single cell proteins, enzymes of pharmaceutical interest.

12 Hrs

REFERENCES:

1. Plant tissue culture – Bhagwani, Vol 5. (Elsevier)
5. Experiments in plant tissue culture by John H. D and Lorin W. R.
7. Plant cell and tissue culture by Jeffrey W. Pollard and John M Walker.
9. Plant tissue culture by Street.
11. Biotechnology by Purohit and Mathur.
12. Biotechnological applications to tissue culture by Shargool.
ADVANCED PHARMACOGNOSY-II (MPG202T)

Scope:
To know and understand the Adulteration and Deterioration that occurs in herbal/natural drugs and methods of detection of the same. Study of herbal remedies and their validations, including methods of screening

Objectives
Upon completion of the course, the student shall be able to
- Know the validation of herbal remedies
- Know the methods of detection of adulteration and evaluation techniques for the herbal drugs
- To know the methods of screening of herbals for various biological properties

THEORY
60Hrs

   12 Hrs

   12 Hrs

   12 Hrs

   12 Hrs

5. Biological screening of herbal drugs: Introduction and Need for Phyto-Pharmacological Screening, New Strategies for evaluating Natural Products, In vitro evaluation techniques for Antioxidants, Antimicrobial and Anticancer drugs. In vivo evaluation techniques for Anti-inflammatory, Antiulcer, Anticancer,
Wound healing, Antidiabetic, Hepatoprotective, Cardio protective, Diuretics and Antifertility.  **12 Hrs**

REFERENCES:

4. Pharmacognosy-Tyler, Brady, Robbers
5. Modern Methods of Plant Analysis- Peach & M.V. Tracey, Vol. I&II
8. Text Book of Pharmacognosy by T.E. Wallis
INDIAN SYSTEMS OF MEDICINE (MPG203T)

Scope

To make the students understand thoroughly on principles, preparations of medicines of various Indian systems of medicine like Ayurveda, Siddha, Homeopathy and Unani. Also focusing on clinical research of traditional medicines, quality assurance and challenges in monitoring the safety of herbal medicines.

Objective

After completion of the course, student is able to

- To understand the basic principles of various Indian systems of medicine
- To now the clinical research of traditional medicines, Current Good Manufacturing Practice of Indian systems of medicine and formulation.

THEORY

60Hrs

1. Fundamental concepts of Ayurveda, Siddha, Unani, and Homoeopathy systems of medicine:
   Different dosage forms of the ISM-
   Ayurveda: Chronological development of Charak Samhita, Sushrut Samhita and Kashyapa Samhita. Ayurvedic Pharmacopoeia Analysis of Ayurvedic Formulations and crude drugs with references to: Identity, purity and quality of crude drugs.
   Siddha: Gunapadam (Siddha Pharmacology), raw drugs/Dhatu/Jeevam in siddha system of medicine, Purification process (Suddhi).
   12Hrs

2. Naturopathy, Yoga and Aromatherapy practices:
   a) Naturopathy - Introduction, basic principles and treatment modalities.
   b) Yoga - Introduction and Streams of Yoga. Asanas, Pranayama, Meditations and Relaxation techniques.
   c) Aromatherapy – Introduction, aroma oils for common problems, carrier oils.
   12 Hrs

3. Formulation development of various systems of medicine: Salient features of the techniques of preparation of some of the important class of Formulations as per Ayurveda,
   Siddha, Homeopathy and Unani Pharmacopoeia and texts. Standardization,
Shelf life and Stability studies of ISM formulations.

12 Hrs

4. Schedule T – Good Manufacturing Practice of Indian systems of medicine:

Components of GMP (Schedule – T) and its objectives, Infrastructural requirements, working space, storage area, machinery and equipments, standard operating procedures, health and hygiene, documentation and records.

Quality assurance in herbal drug industry of GAP, GMP and GLP in traditional system of medicine. Preparation of documents for new drug application and export registration.

Challenges in monitoring the safety of herbal medicines: Regulation, quality assurance and control, National/regional pharmacopoeias.

12 Hrs

5. TKDL, Geographical indication skill, Government skills in AYUSH, ISM, CCRAS, CCRS, CCRH, CCRU.

12 Hrs

REFERENCES:

8. British Herbal Pharmacopoeia British (1990), Herbal Medicine Association, UK.
10. Indian System of Medicine and Homeopathy in India (2001), Planning and Evaluation Cell, Govt.of India, New Delhi.
11. Essential of Food and Nutrition by Swaminathan (1999), Bappco, Bangalore.
HERBAL COSMETICS (MPG204T)

Scope
This subject deals with the study of preparation and standardization of herbal/natural cosmetics. This subject gives emphasis to various national and international standards prescribed regarding Drug and cosmetic act.

Objective
After completion of the course, student is able to

- Understand the basic principles of various herbal/natural cosmetic preparations
- Current Good Manufacturing Practices of herbal/natural cosmetics as per the regulatory authorities

THEORY
60Hrs


12 Hrs

2. Herbal Cosmetics for the skin: Physiology and chemistry of skin and pigmentation, hairs, scalp, oral and nail, Cleansing cream, Lotions, Vanishing and Foundation creams, Anti- sun burn preparations, Moisturizing cream, deodorants, Face powders, Face packs, Lipsticks, Bath products, soaps and baby product, Preparation and standardisation of the following: Shampoos, Conditioners, Tonic, Bleaches, Colorants, Depilatories and Hair oils, Dentifrices and Mouth washes & Tooth Pastes, Cosmetics for Nails.

12 Hrs


12 Hrs

4. Commonly used herbal cosmetics, raw materials, preservatives, surfactants, humectants, oils, colours, and some functional herbs, preformulation studies, compatibility studies, possible interactions between chemicals and herbs, design of herbal cosmetic formulation.

12 Hrs
5. **Analysis of Cosmetics, Toxicity screening and test methods:** Quality control and toxicity studies as per Drug and Cosmetics acts.

12 Hrs

**REFERENCES:**


PRACTICALS (MPG205P)

1. Isolation of nucleic acid from cauliflower heads
2. Isolation of RNA from yeast
3. Quantitative estimation of DNA
4. Immobilization of whole cell
5. Establishment of callus culture
6. Establishment of suspension culture
7. Estimation of aldehyde
8. Estimation of phenolic content in herbal raw materials
9. Estimation of alkaloid content in herbal raw materials
10. Estimation of flavonoid content in herbal raw materials
11. Preparation and standardization of various simple dosage forms from Ayurvedic, siddha, homoeopathy and Unani formulary
12. Preparation of certain Aromatherapy formulations
13. Herbal cosmetic formulation such as lip balm, lipstick, facial cream, herbal hair and nail care products
14. Evaluation of herbal tablets and capsules
15. Dermatological preparation like sunscreen, UV protection cream, skin care formulations for fungal and dermato reaction
16. Formulation of cough syrup