**Appendix ‘’X’’ Item No. 43**

**PHARMACEUTICAL SCIENCES**

Regulations and Syllabus Four semester pattern

With effect from 2020-21

**M.PHARM (2020) REGULATIONS AND SYLLABUS**

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1. Admission, instruction and attendance

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**1. Admission, instruction and attendance**

The degree of Master of Pharmacy of the Andhra University will be conferred on a candidate who has satisfied the following conditions:

1.1 The candidate must have passed the B.Pharm. Degree examination of this University or B.Pharm. Degree examinations of any other University recognized by the Academic Council as equivalent thereto in First or Second class; and must have qualified in any entrance examination, if prescribed.

1.2 Every student, selected for admission to PG 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.

1.3 The candidate should have undergone a regular course of study as prescribed hereunder extending over a period of four semesters, ordinarily consecutive, and satisfied the academic requirements as prescribed hereinafter. The course of instruction and periods of study shall be as given in the scheme of instruction and in the syllabus.

1.4 The subjects of specializations for Master of Pharmacy Course shall be as follows:

1. Pharmaceutical Analysis

2. Pharmaceutical Chemistry

3. Pharmaceutics

4. Pharmaceutical Biotechnology

5. Pharmacology

6. Pharmacognosy

7. Pharmaceutical Regulatory Affairs

8. Pharmaceutical Quality Assurance

 9. Industrial Pharmacy

10. Pharmacy Practice

1.5 Instruction and examination in each academic year is spread over two semesters with a minimum of 96 working days in each semester (192 in any given academic year). The odd semesters shall be conducted from the month of July to November and the even semesters shall be conducted from the month of December to April.

1.6 Each period of instruction is of 45 minutes duration. Eight periods of instruction are provided on each day and there are six working days in a week (Monday to Saturday).

1.7 Attendance Requirements: A regular course of study during an academic semester means a minimum of average attendance of 80% of all the courses of the semester computed by totaling the number of periods of lectures and practicals, as the case may be, held in every course. In special cases where sufficient causes were shown, the Vice-Chancellor may on the recommendation of the Principal concerned condone the deficiency in the average attendance to an extent of 9% for reasons such as ill health, if the application for condonation is submitted at the time of actual illness and is supported by certificate of; authorized Medical officer approved by the Principal. However, in the case of students, who participate in activities like N.S.S., N.C.C., Inter-Collegiate tournaments conducted by Andhra University, Inter-University tournaments conducted by Inter-university Board and any such other activities involving the representation of the College/University with the prior approval of the principal, the candidate may be deemed to have attended the college during the period solely for the purpose of the examination.

1.7 A candidate who cannot satisfy the attendance requirements in clause 1.5 because of late admission under special circumstances reasonable and acceptable to the University on the basis of document, shall fulfill the following conditions; Average attendance: A candidate shall have attended at least a total of 90% of the periods-lectures/practicals as the case may be held from the date of admission and also shall attend at least 50% of the total working days during that academic semester (Late admission means, admissions made after 45 days from date of commencement of the academic semester for the course).

1.8 If any candidate fails to satisfy the regulation under 1.5 or 1.6 she/he shall not be allowed for the University Examinations at the end of the semester, and he/she shall not be allowed for promotion to the next higher class of study. He/she shall be required to repeat the regular course of study of that academic semester along with the next regular batch.

1.9 A regular record of attendance 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.

**2. Examinations - Sessional and Semester-end**

2.1 Assessment for the award of degree shall consists of (a) internal evaluation for 30 marks in each of the theory and practical courses separately. (b) Semester-end examination as detailed in the scheme of examination for 70 marks in each of the theory and practical.

2.2 Regulations concerning sessional examination: (a) There shall be two sessional examinations in each theory course and the average of the two shall be taken; (b) The marks for the internal evaluation for the practical are awarded based on the continuous assessment of the performance of the candidate at the practical classes and the records. (c) The teacher who teaches the subject shall ordinarily to be the internal examiner (d) There shall be no provision for the improvement of the sessional marks. There is no minimum mark prescribed for sessional examination.

**2.2.1 Guidelines for Internal assessment**

Scheme for awarding internal assessment: Continuous mode

Theory-Criteria Marks

Attendance & Student-Teacher Interaction 10

Total 10

Practical-Criteria Practical I Practical II

Attendance 10 10

Record + DDA (Assignment/Seminars/Viva-Voce etc.,) 5 5

Internal Practical Examination 15 15

Total 30 30

2.2.2 Guidelines for the allotment of marks for attendance

 Percentage of Attendance Theory/Practical

 95 -100 10

 90-94 8

 85-89 6

 80-84 4

 Less than 80 0

2.3. Regulations concerning M.Pharm I and II semester evaluation pattern:

2.3.1. There shall be one semester end examination in each theory course based on the question paper set by an external paper setter and there shall be single valuation. There shall be one semester end examination in each practical course as per the scheme of examination and valuation shall be done by examiner. The duration of the practical examination is of 6 hours as prescribed.

2.3.2. However the student may apply for revaluation of any subject in theory papers after declaring the results as per University examination guide lines.

2.3.3 Journal Club

In case of Journal Club, based on the research proposal, each student shall collect a minimum of 5 research papers (published in a reputed journal with impact factor of Thomson & Reuters of not less than 1.0) and should discuss in a Programme Committee (consisting of Head of the Department, Research Supervisor and other Senior faculty members) and documented separately for record in a Journal Club Register.

2.3.4 Seminar

A seminar at the end of first and second semesters is separately conducted keeping in view of the enrichment of required communication, presentation and explanatory skills. A minimum of four seminars shall be given during the semester before the Program Committee and other students and documented separately for record in a Semester Seminar Register.

2.3.5 A student shall be eligible to carry forward all the courses of I, II semesters. However, he/she shall not be eligible to attend the courses of IV semester until the candidate clears III semester Midterm Project Review.

2.4. Regulations concerning M. Pharm. III and IV Semester evaluation pattern:

2.4.1. Evaluation of the seminar on the objectives and work plan of the proposed project is to be completed within one month from the commencement of the project date with three examiners from the same college consisting of research guide, another teacher in the concerned specialization and third teacher from different specialization. These teachers must fulfill the eligibility criteria laid down in Section 3.

2.4.2. Evaluation of the M.Pharm III Semester Mid-term project review and seminar on selected topic will be done by the research guide and external examiner. The seminar on the selected topic shall not be one connected with the topic of the thesis work but should be related to concerned specialization.

2.4.3. A candidate shall submit four copies of his/her thesis either printed or typed, embodying the results of research work done by him under direction of an approved research director following the specific guidelines as stipulated under Section 5. All the candidates must submit their thesis within the prescribed date as per the academic calendar.

2.4.4. The thesis submitted by the candidate shall be examined by a Board of Examiners consisting of an External Examiner and the research director and shall have to be approved after holding a viva voce examination to test the knowledge of the candidate in the subject. The thesis will be evaluated independently by the external examiner and research director and in case the difference between examiners is more than 20%, the thesis shall be sent to a second external examiner whose award shall be the final. The viva-voce examination will be jointly conducted both by the external examiner and research director. A candidate can re-submit the thesis in a revised form after further work, if required to do so.

2.4.5. A candidate desires of improving his/her class shall take either or both of the first two semesters as a whole.

2.5. Guidelines for writing the thesis

The thesis should have the following pages in order:

1. Title page highlighting the title, name of the candidate, reg. no., guide name, college name and month and year of submission.

2. The inner title page containing the same details on white background.

3. Certificate from the Head of the institution

4. Certificate from the Research Director

5. Certificate from the ethical committees for approval of study, if any

6. Declaration by the student

7. Acknowledgements

8. Index highlighting chapter titles and sections titles

9. Index for tables, figures and plates, if any

10. Abbreviations and symbols

11. Materials used in the investigation with their procurement details like name of the company, batch number etc.

12. Equipment used in the study with the model number and other details

13. The thesis should contain the following chapters:

a) Aim and objectives of the investigation

b) Introduction and literature survey

c) Description: Methods and Materials, etc.

d) Experimental work

e) Results and discussion

f) Summary and conclusions

g) References (The references may be included at the end of each chapter or at the end of the thesis according to the convenience)

2.5.1. The thesis should be typed in times new roman in 12 font size with 1.5 line spacing from the beginning of the thesis including titles to the chapters and sections. Bold font may be used wherever necessary. The students are expected to follow scientific grammar for writing *in vivo* etc. which should be in italics.

2.5.2. The citation of references should be done carefully by citing the complete reference i.e. name of all the authors. Usage of et al. is not allowed in the citation of reference. The students are expected to give the primary references rather than secondary or higher levels of references. The presentation of reference must be in Vancouver style.

2.5.3. No code names or numbers are allowed to be written in the thesis for the materials used in the project.

2.5.4. The examiners of thesis evaluation are expected to verify all this and appropriate corrections are to be made before conducting the viva-voce examination.

2.5.5 Project Work/IV Semester Assessment – Division of Marks:

Course 402 -Thesis Evaluation (Max. Marks – 150)

Criteria of Evaluation Marks

Seminar/Presentation of work 20

Objective(s) of the work done 20

Methodology adopted 40

Results and Discussion 40

Conclusions and Outcomes 30

Total 150

The division of marks shall be clearly indicated for every candidate in the marks statement being sent to the University.

2.6 End Semester examinations

The End Semester examination for each theory, practical and other courses through semesters I to IV shall be conducted by the University except for the subject with asterisk symbol (\*) in the tables of the each specialization courses (Non University Examinations) for which examinations shall be conducted by the subject experts at college level and the marks/grades shall be submitted to the University. In case of theory examinations, the question paper of the corresponding subject shall be mailed (Official mail id) to the Controller of Examinations and Chairman, BOS with signature of the Head of the Institute in PDF format within twenty four hours after completion of the examination.

**3. Eligibility criteria for appointment as examiner for M.Pharm examination**

3.1. In order to eligible to be appointed as an internal examiner for the semester end examination in the respective specialization, a teacher shall have M. Pharm. or Ph.D. in the respective specialization with at least three years of M.Pharm teaching experience for the course concerned.

3.2. The eligibility of a teacher for guiding the M.Pharm III and IV semester project is as follows:

3.2.1. The teacher must have M.Pharm/Ph.D. in the respective specialization with an experience of minimum 3 years of Post Graduate teaching in the respective specialization.

3.2.2. The eligibility of such teachers qualified for guiding M.Pharm projects must be ratified by the Board of Studies before commencement of M.Pharm guidance.

3.2.3. The recognised M.Pharm guides are not eligible to guide more than 6 students in one academic year including joint guidance.

**4. Regulations for pursuing M.Pharm III and IV Semester project**

4.1. Students desirous of pursuing M.Pharm III and IV semester projects outside college are required to get the approval from the college before one month from the commencement of the project work. The research work can be carried out in a GMP compliant industry (as approved by WHO, USFDA etc.) and Central research laboratories like IICT, CDRI, NIH etc. or DSIR and Drug Control Administration recognized laboratories. A certificate to that effect must be incorporated in the M.Pharm thesis indicating the duration of stay. If the duration of stay is less than nine months the remaining period of stay in the college should be certified by the research supervisor and the Principal.

4.2. All the students should present a seminar on the objectives of their work, work plan, etc. within one month from the commencement of the project. The students should attend a mid-term review seminar in the presence of a committee consisting of one external examiner, research director. The suggestions made by the committee are to be taken into consideration for further work and should be presented in the thesis.

**5. Declaration of results and classification:**

5.1. A candidate shall be declared to have passed the examination held at the end of each semester if obtains i) not less than 40% in the each theory and 50% in each practical, seminar, comprehensive viva, thesis and thesis viva-voce at the end of each semester end examination and ii) an aggregate of 50% of all examinations of that semester including sessoinals. There are no minimum marks prescribed for sessional examination.

5.2. A candidate who has successfully completed the examination in a course by securing not less than 50% of marks shall not be permitted to retake the examination in that course.

5.3. A candidate who fails to secure 50% of marks on the aggregate but secures 50% or more in some courses and between 40-49% in the other courses, he/she shall be required to retake the semester and supplementary examination in one or more of the courses in which he/she secures less than 50% of marks as per his/her choice to satisfy the requirement of 50% aggregate.

5.4 Declaration of class

The classes 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

**6. Grading system:**

6.1. Appropriate letter grades are awarded in each theory and practical subject to only such candidates who have passed in the university examinations. Internal assessment marks and university examination marks put together will be taken into account for the letter grading system in each subject separately.

6.2. A candidate registered for the university examination but fails to appear or fails to score the minimum required 40% marks in the university examination will get a grade ‘F’, indicating failure or grade of incompletion.

6.3. A subject successfully completed cannot be repeated. Final evaluation of each subject (theory and practical separately) will be carried out on a 10- point grading system corresponding to the marks obtained in that subject. Each subject letter grade is converted into a specific grade value associated with the letter grade as given below (Table).

6.4. The credits allotted to each course is given in the respective specialization courses tables from 1 to 10.

**Table: 10-Point grading system**

 Percentage of marks Grade Grade points

 90.00 - 100 O 10.0

 80.00 - 89.99 A 9.0

 70.00 – 79.99 B 8.0

 60.00 – 69.99 C 7.0

 50.00 – 59.99 D 6.0

 40.00 – 49.99 E 5.0

 < 40.00 F(Fail) 0.0

 The grade W represents failure
 due to insufficient attendance in
 the semester or year W 0.0

Incomplete (subsequently to be
 changed into pass or E or O or
 F grade in the same semester) I 0.0

6.5 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:

 C1G1 + C2G2 + C3G3 + C4G4

SGPA = -—————————————

 C1 + C2 + C3 + C4

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

 C1G1 + C2G2 + C3G3 + C4\* ZERO

SGPA = ————————————————

 C1 + C2 + C3 + C4

6.6. 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:

 C1S1 + C2S2 + C3S3 + C4S4

 CGPA = ———————————————

 C1 + C2 + C3 + C4

Where C1,C2,C3,….is the total number of credits for semester I, II, III,….and S1, S2, S3, is the SGPA of semester I, II, III,…

**7. Guidelines for paper setting and model papers.**

7.1. Guidelines for theory paper setting

7.1.1. The semester end question paper in each theory course is to be set for a total of 70 marks by an external paper setter as per the general model given below.

7.1.2. Question paper consists of 5 questions each carrying 5 marks out of which 4 questions are to be answered by the candidate and 7 questions each carrying 10 marks out of which 5 questions are to be answered by the candidate for a total of 70 marks. Each main question may contain subsections like a, b, c etc.

7.1.3. The questions given should be spread over the entire syllabus in an even manner covering all the units as per the pattern of the question paper given below.

7.1.4. Model question paper for theory course:

Course No. Specialization Name:

Title of the course:

Time : 3Hrs Max.Marks:70

Part A

Answer any four questions out of five questions 4X5=20

One question has to be set from each unit.

Part B

Answer any five questions out of seven questions 5X10=50

Five questions are to be set from five units and the remaining two should cover at least four out of five units. The main questions may contain sub question like 1(a), 1(b) etc.

7.2. Guidelines for practical paper setting

7.2.1 The question paper in each semester end practical examination is to be set jointly by two examiners and evaluated, one external and one internal as per the general model provided below.

7.2.2. Model question paper for practical course:

Course No.

Title of the course

Time: 6 hrs.

1. Synopsis 10 marks

2. Major experiment 30 marks

3. Minor experiment 20 marks

4. Viva voce 10 marks

 Total: 70 marks

*The subjects of each specialization for M.Pharmacy course are as follows:*

**Table 1: Pharmaceutical Analysis (MPA) - I, II, III and IV Semesters**

 Code Course A B IA SEE Total Marks

***I SEMESTER***

MPA 101T Modern Pharmaceutical Analytical Techniques 4 4 30 70 100

MPA 102T Advanced Pharmaceutical Analysis 4 4 30 70 100

MPA 103T Pharmaceutical Validation 4 4 30 70 100

MPA 104T Food Analysis 4 4 30 70 100

MPA 105P Pharmaceutical Analysis Practical I 2 6 30 70 100

MPA 106P Pharmaceutical Analysis Practical II 2 6 30 70 100

MPA 107 Seminar\* 2 4 50 — 50

 Total 22 32 — — 650

***II SEMESTER***

 MPA 201T Advanced Instrumental Analysis 4 4 30 70 100

 MPA 202T Modern Bio-Analytical Techniques 4 4 30 70 100

 MPA 203T Quality Control and Quality Assurance 4 4 30 70 100

 MPA 204T Herbal and Cosmetic Analysis 4 4 30 70 100

 MPA 205P Pharmaceutical Analysis Practical III 2 6 30 70 100

 MPA 206 Comprehensive Viva 2 — — — 50

 MPA 207 Seminar\* 2 2 50 — 50

 Total 22 26 —- —- 600

***III SEMESTER***

 MPA 301T Research Methodology and Biostatistics\* 2 4 30 70 100

 MPA 302 Journal Club\* 2 2 50 —- 50

 MPA 303 Discussion /Presentation (Dissertation Title &
 Project Proposal)\* 2 — 50 —- 50

 MPA 304 Seminar on Selected Topic # 4 4 —- 100 100

 MPA 305 Research Work Progress (Mid Term Report) 10 20 —- 200 100

 Total: 20 30 —- —- 400

***IV SEMESTER***

 MPA 401 Journal Club\* 2 2 50 —- 50

 MPA 402 Thesis evaluation 12 20 —- 150 150

 MPA 403 Thesis viva 4 —- —- 50 50

 Total: 20 22 —- —- 250

***A***: Credit Points; ***B***: Hrs/wk; ***IA***-Internal Assessment Marks; ***SEE***—Sem End Examn Marks; ***IA: 10 (DDA) + 20 (average of I & II Mids each 30 M and 2 hr duration)***. ***DDA*** (Day to Day Assessment). \* Non-University Examination. Semester End Examination duration for Theory : **3 hrs** ; Practical : **6 hrs**

# Seminar on Selected Topic - To be evaluated by both External and Internal examiners for 100 Marks with 4 credit points.

**Table 2: Pharmaceutical Chemistry - (MPC) - I, II, III and IV
Semesters**

 Code Course A B IA SEE Total Marks

***I SEMESTER***

MPC 101T Modern Pharmaceutical Analytical Techniques 4 4 30 70 100

MPC 102T Advanced Organic Chemistry I 4 4 30 70 100

MPC 103T Advanced Medicinal Chemistry 4 4 30 70 100

MPC 104T Chemistry of Natural Products 4 4 30 70 100

MPC 105P Pharmaceutical Chemistry Practical I 2 6 30 70 100

MPC 106P Pharmaceutical Chemistry Practical II 2 6 30 70 100

MPC 107 Seminar\* 2 4 50 — 50

 Total 22 32 — — 650

**II SEMESTER**

 MPC 201T Advanced Spectral Analysis 4 4 30 70 100

 MPC 202T Advanced Organic Chemistry II 4 4 30 70 100

 MPC 203T Computer Aided Drug Design (CADD) 4 4 30 70 100

 MPC 204T Pharmaceutical Process Chemistry 4 4 30 70 100

 MPC 205P Pharmaceutical Chemistry Practical III 2 6 30 70 100

 MPC 206 Comprehensive Viva 2 — — — 50

 MPC 207 Seminar\* 2 2 50 — 50

 Total 22 26 — — 650

**III SEMESTER**

 MPC 301T Research Methodology and Biostatistics\* 2 4 30 70 100

 MPC 302 Journal Club\* 2 2 50 —- 50

 MPC 303 Discussion /Presentation (Dissertation Title &
 Project Proposal)\* 2 — 50 —- 50

 MPC 304 Seminar on Selected Topic # 4 4 —- 100 100

 MPC 305 Research Work Progress (Mid Term Report) 10 20 —- 200 100

 Total 20 30 — — 400

**IV SEMESTER**

 MPC 401 Journal Club\* 2 2 50 —- 50

 MPC 402 Thesis evaluation 12 20 —- 150 150

 MPC 403 Thesis viva 4 —- —- 50 50

 Total 20 22 — — 250

***A***: Credit Points; ***B***: Hrs/wk; ***IA***-Internal Assessment Marks; ***SEE***—Sem End Examn Marks; ***IA: 10 (DDA) + 20 (average of I & II Mids each 30 M and 2 hr duration)***. ***DDA*** (Day to Day Assessment). \* Non-University Examination. Semester End Examination duration for Theory : **3 hrs** ; Practical : **6 hrs**

# Seminar on Selected Topic - To be evaluated by both External and Internal examiners for 100 Marks with 4 credit points.

**Table 3: Pharmaceutics (MPH) - I, II, III and IV Semesters**

 Code Course A B IA SEE Total Marks

***I SEMESTER***

MPH 101T Modern Pharmaceutical Analytical Techniques 4 4 30 70 100

MPH 102T Advanced Biopharmaceutics &
 Pharmacokinetics 4 4 30 70 100

MPH 103T Modern Pharmaceutics 4 4 30 70 100

MPH 104T Regulatory Affairs 4 4 30 70 100

MPH 105P Pharmaceutics Practical I 2 6 30 70 100

MPH 106P Pharmaceutics Practical II 2 6 30 70 100

MPH 107 Seminar\* 2 4 50 — 50

 Total 22 32 — — 650

**\II SEMESTER**

MPH 201T Molecular Pharmaceutics (Nano Tech and
 Targeted DDS) 4 4 30 70 100

MPH 202T Drug Delivery Systems (DDS) 4 4 30 70 100

MPH 203T Computer Aided Drug Development (CADD) 4 4 30 70 100

MPH 204T Pharmaceutical and Cosmetic Product
 Development 4 4 30 70 100

MPH 205P Pharmaceutics Practical III 2 6 30 70 100

MPH 206 Comprehensive Viva 2 — — — 50

MPH 207 Seminar\* 2 2 50 — 50

 Total 22 26 — — 600

**III SEMESTER**

MPH301T Research Methodology and Biostatistics\* 2 4 30 70 100

MPH 302 Journal Club\* 2 2 50 —- 50

MPH 303 Discussion /Presentation (Dissertation Title &
 Project Proposal)\* 2 — 50 —- 50

MPH 304 Seminar on Selected Topic # 4 4 —- 100 100

MPH 305 Research Work Progress (Mid Term Report) 10 20 —- 200 100

 Total 20 30 — — 400

**IV SEMESTER**

MPH 401 Journal Club\* 2 2 50 —- 50

MPH 402 Thesis evaluation 12 20 —- 150 150

MPH 403 Thesis viva 4 —- —- 50 50

 Total 20 22 — — 250

***A***: Credit Points; ***B***: Hrs/wk; ***IA***-Internal Assessment Marks; ***SEE***—Sem End Examn Marks; ***IA: 10 (DDA) + 20 (average of I & II Mids each 30 M and 2 hr duration)***. ***DDA*** (Day to Day Assessment). \* Non-University Examination. Semester End Examination duration for Theory : **3 hrs** ; Practical : **6 hrs**

# Seminar on Selected Topic - To be evaluated by both External and Internal examiners for 100 Marks with 4 credit points.

**Table 4: Pharmaceutical Biotechnology (MPB) - I, II, III and IV Semesters**

 Code Course A B IA SEE Total Marks

***I SEMESTER***

MPB 101T Modern Pharmaceutical Analytical Techniques 4 4 30 70 100

MPB 102T Microbial Genetics and Cellular Biology 4 4 30 70 100

MPB 103T Bioprocess Engineering and Technology 4 4 30 70 100

MPB 104T Advanced Pharmaceutical Biotechnology 4 4 30 70 100

MPB 105P Pharmaceutical Biotechnology Practical I 2 6 30 70 100

MPB 106P Pharmaceutical Biotechnology Practical II 2 6 30 70 100

MPB 107 Seminar\* 2 4 50 — 50

 Total 22 32 — — 650

**II SEMESTER**

MPB 201T Proteins and Protein Formulation 4 4 30 70 100

MPB 202T Immunotechnology 4 4 30 70 100

MPB 203T Bioinformatics and Computer Technology 4 4 30 70 100

MPB 204T Biological Evaluation of Drug Therapy 4 4 30 70 100

MPB 205P Pharmaceutical Biotechnology Practical III 2 6 30 70 100

MPB 206 Comprehensive Viva 2 — — — 50

MPB 207 Seminar\* 2 2 50 — 50

 Total 22 26 — — 600

**III SEMESTER**

MPB 301T Research Methodology and Biostatistics\* 2 4 30 70 100

MPB 302 Journal Club\* 2 2 50 —- 50

MPB 303 Discussion /Presentation (Dissertation Title &
 Project Proposal)\* 2 — 50 —- 50

MPB 304 Seminar on Selected Topic # 4 4 —- 100 100

MPB 305 Research Work Progress (Mid Term Report) 10 20 —- 200 100

 Total 20 30 — — 400

**IV SEMESTER**

MPB 401 Journal Club\* 2 2 50 —- 50

MPB 402 Thesis evaluation 12 20 —- 150 150

MPB 403 Thesis viva 4 —- —- 50 50

 Total 20 22 — — 250

***A***: Credit Points; ***B***: Hrs/wk; ***IA***-Internal Assessment Marks; ***SEE***—Sem End Examn Marks; ***IA: 10 (DDA) + 20 (average of I & II Mids each 30 M and 2 hr duration)***. ***DDA*** (Day to Day Assessment). \* Non-University Examination. Semester End Examination duration for Theory : **3 hrs** ; Practical : **6 hrs**

# Seminar on Selected Topic - To be evaluated by both External and Internal examiners for 100 Marks with 4 credit points.

**Table 5: Pharmacology (MPL) - I, II, III and IV Semesters**

 Code Course A B IA SEE Total Marks

***I SEMESTER***

MPL 101T Modern Pharmaceutical Analytical Techniques 4 4 30 70 100

MPL 102T Advanced Pharmacology-I 4 4 30 70 100

MPL 103T Pharmacological and Toxicological Screening
 Methods-I 4 4 30 70 100

MPL 104T Cellular and Molecular Pharmacology 4 4 30 70 100

MPL 105P Pharmacology Practical I 2 6 30 70 100

MPL 106P Pharmacology Practical II 2 6 30 70 100

MPL 107 Seminar\* 2 4 50 — 50

 Total 22 32 — — 650

**II SEMESTER**

MPL 201T Advanced Pharmacology II 4 4 30 70 100

MPL 202T Pharmacological and Toxicological
 Screening Methods-II 4 4 30 70 100

MPL 203T Principles of Drug Discovery 4 4 30 70 100

MPL 204T Clinical Research and Pharmacovigilance 4 4 30 70 100

MPL 205P Pharmacology Practical III 2 6 30 70 100

MPL 206 Comprehensive Viva 2 — — — 50

MPL 207 Seminar\* 2 2 50 — 50

 Total 22 26 — — 600

**III SEMESTER**

MPL 301T Research Methodology and Biostatistics\* 2 4 30 70 100

MPL 302 Journal Club\* 2 2 50 —- 50

MPL 303 Discussion /Presentation (Dissertation Title &
 Project Proposal)\* 2 — 50 —- 50

MPL 304 Seminar on Selected Topic # 4 4 —- 100 100

MPL 305 Research Work Progress (Mid Term Report) 10 20 —- 200 100

 Total 20 30 — — 400

**IV SEMESTER**

MPL 401 Journal Club\* 2 2 50 —- 50

MPL 402 Thesis evaluation 12 20 —- 150 150

MPL 403 Thesis viva 4 —- —- 50 50

 Total 20 22 — — 250

***A***: Credit Points; ***B***: Hrs/wk; ***IA***-Internal Assessment Marks; ***SEE***—Sem End Examn Marks; ***IA: 10 (DDA) + 20 (average of I & II Mids each 30 M and 2 hr duration)***. ***DDA*** (Day to Day Assessment). \* Non-University Examination. Semester End Examination duration for Theory : **3 hrs** ; Practical : **6 hrs**

# Seminar on Selected Topic - To be evaluated by both External and Internal examiners for 100 Marks with 4 credit points.

**Table 6: Pharmacognosy (MPG) - I, II, III and IV Semesters**

 Code Course A B IA SEE Total Marks

***I SEMESTER***

MPG 101T Modern Pharmaceutical Analytical Techniques 4 4 30 70 100

MPG 102T Advanced Pharmacognosy I 4 4 30 70 100

MPG 103T Phytochemistry 4 4 30 70 100

MPG 104T Industrial Pharmacognostical Technology 4 4 30 70 100

MPG 105P Pharmacognosy Practical I 2 6 30 70 100

MPG 106P Pharmacognosy Practical II 2 6 30 70 100

MPG 107 Seminar\* 2 4 50 — 50

 Total 22 32 — — 650

**II SEMESTER**

MPG 201T Medicinal Biotechnology 4 4 30 70 100

MPG 202T Advanced Pharmacognosy II 4 4 30 70 100

MPG 203T Indian System of Medicine 4 4 30 70 100

MPG 204T Herbal Cosmetics 4 4 30 70 100

MPG 205P Pharmacognosy Practical III 2 6 30 70 100

MPG 206 Comprehensive Viva 2 — — — 50

MPG 207 Seminar\* 2 2 50 — 50

 Total 22 28 — — 600

**III SEMESTER**

MPG 301T Research Methodology and Biostatistics\* 2 4 30 70 100

MPG 302 Journal Club\* 2 2 50 —- 50

MPG 303 Discussion /Presentation (Dissertation Title &
 Project Proposal)\* 2 — 50 —- 50

MPG 304 Seminar on Selected Topic # 4 4 —- 100 100

MPG 305 Research Work Progress (Mid Term Report) 10 20 —- 200 100

 Total 20 30 — — 400

**IV SEMESTER**

MPG 401 Journal Club\* 2 2 50 —- 50

MPG 402 Thesis evaluation 12 20 —- 150 150

MPG 403 Thesis viva 4 —- —- 50 50

 Total 20 22 — — 250

***A***: Credit Points; ***B***: Hrs/wk; ***IA***-Internal Assessment Marks; ***SEE***—Sem End Examn Marks; ***IA: 10 (DDA) + 20 (average of I & II Mids each 30 M and 2 hr duration)***. ***DDA*** (Day to Day Assessment). \* Non-University Examination. Semester End Examination duration for Theory : **3 hrs** ; Practical : **6 hrs**

# Seminar on Selected Topic - To be evaluated by both External and Internal examiners for 100 Marks with 4 credit points.

**Table 7: Pharmaceutical Regulatory Affairs (MRA) - I, II, III and IV Semesters**

 Code Course A B IA SEE Total Marks

***I SEMESTER***

MRA101T Good Regulatory Practices 4 4 30 70 100

MRA 102T Documentation and RegulatoryWriting 4 4 30 70 100

MRA 103T Clinical Research Regulations 4 4 30 70 100

MRA 104T Regulations and Legislation for Drugs &
 Cosmetics, Medical Devices, Biologicals,
 Herbals & Food and Neutraceuticals in India &
 Intellectual Property Rights 4 4 30 70 100

MRA 105P Regulatory Affairs Practical I 2 6 30 70 100

MRA 106P Regulatory Affairs Practical II 2 6 30 70 100

MRA 107 Seminar\* 2 4 50 — 50

 Total 22 32 — — 650

**II SEMESTER**

MRA 201T Regulatory Aspects of Drugs & Cosmetics 4 4 30 70 100

MRA 202T Regulatory Aspects of Herbal & Biologicals 4 4 30 70 100

MRA 203T Regulatory Aspects of Medical Devices 4 4 30 70 100

MRA 204T Regulatory Aspects of Food & Neutraceuticals 4 4 30 70 100

MRA 205P Regulatory Affairs Practical III 2 6 30 70 100

MRA 206 Comprehensive Viva 2 — — — 50

MRA 207 Seminar\* 2 2 50 — 50

 Total 22 26 — — 600

**III SEMESTER**

MRA 301T Research Methodology and Biostatistics\* 2 4 30 70 100

MRA 302 Journal Club\* 2 2 50 —- 50

MRA 303 Discussion /Presentation (Dissertation Title &
 Project Proposal)\* 2 — 50 —- 50

MRA 304 Seminar on Selected Topic # 4 4 —- 100 100

MRA 305 Research Work Progress (Mid Term Report) 10 20 —- 200 100

 Total 20 30 — — 400

**IV SEMESTER**

MRA 401 Journal Club\* 2 2 50 —- 50

MRA 402 Thesis evaluation 12 20 —- 150 150

MRA 403 Thesis viva 4 —- —- 50 50

 Total 20 22 — — 250

***A***: Credit Points; ***B***: Hrs/wk; ***IA***-Internal Assessment Marks; ***SEE***—Sem End Examn Marks; ***IA: 10 (DDA) + 20 (average of I & II Mids each 30 M and 2 hr duration)***. ***DDA*** (Day to Day Assessment). \* Non-University Examination. Semester End Examination duration for Theory : **3 hrs** ; Practical : **6 hrs**

# Seminar on Selected Topic - To be evaluated by both External and Internal examiners for 100 Marks with 4 credit points.

**Table 8: Pharmaceutical Quality Assurance (MQA) - I, II, III and IV Semesters**

 Code Course A B IA SEE Total Marks

***I SEMESTER***

MQA 101T Modern Pharmaceutical Analytical Techniques 4 4 30 70 100

MQA 102T Quality Management System 4 4 30 70 100

MQA 103T Pharmaceutical Validation 4 4 30 70 100

MQA 104T Product Development and Technology Transfer 4 4 30 70 100

MQA 105P Pharmaceutical Quality Assurance Practical I 2 6 30 70 100

MQA 106P Pharmaceutical Quality Assurance Practical II 2 6 30 70 100

 MQA 107 Seminar\* 2 4 50 — 50

 Total 22 32 — — 650

**II SEMESTER**

MQA 201T Hazards and Safety Management 4 4 30 70 100

MQA 202T Audits and Regulatory Compliance 4 4 30 70 100

MQA 203T Quality Control and Quality Assurance 4 4 30 70 100

MQA 204T Pharmaceutical Manufacturing Technology 4 4 30 70 100

MQA 205P Pharmaceutical Quality Assurance Practical III 2 6 30 70 100

MQA 206 Comprehensive Viva 2 — — — 50

MQA 207 Seminar\* 2 2 50 — 50

 Total 22 26 — — 600

**III SEMESTER**

MQA 301T Research Methodology and Biostatistics\* 2 4 30 70 100

 MQA 302 Journal Club\* 2 2 50 —- 50

 MQA 303 Discussion /Presentation (Dissertation Title &
 Project Proposal)\* 2 — 50 —- 50

 MQA 304 Seminar on Selected Topic # 4 4 —- 100 100

 MQA 305 Research Work Progress (Mid Term Report) 10 20 —- 200 100

 Total 20 30 — — 400

**IV SEMESTER**

MQA 401 Journal Club\* 2 2 50 —- 50

MQA 402 Thesis evaluation 12 20 —- 150 150

MQA 403 Thesis viva 4 —- —- 50 50

 Total 20 22 — — 250

***A***: Credit Points; ***B***: Hrs/wk; ***IA***-Internal Assessment Marks; ***SEE***—Sem End Examn Marks; ***IA: 10 (DDA) + 20 (average of I & II Mids each 30 M and 2 hr duration)***. ***DDA*** (Day to Day Assessment). \* Non-University Examination. Semester End Examination duration for Theory : **3 hrs** ; Practical : **6 hrs**

# Seminar on Selected Topic - To be evaluated by both External and Internal examiners for 100 Marks with 4 credit points.

**Table 9: Industrial Pharmacy (MIP) - I, II, III and IV Semesters**

 Code Course A B IA SEE Total Marks

***I SEMESTER***

MIP 101T Modern Pharmaceutical Analytical Techniques 4 4 30 70 100

MIP 102T Advanced Biopharmaceutics &
 Pharmacokinetics 4 4 30 70 100

MIP 103T Novel Drug Delivery Systems 4 4 30 70 100

MIP 104T Intellectual Property Rights 4 4 30 70 100

MIP 105P Industrial Pharmacy Practical I 2 6 30 70 100

MIP 106P Industrial Pharmacy Practical II 2 6 30 70 100

MIP 107 Seminar\* 2 4 50 — 50

 Total 22 32 — — 650

**II SEMESTER**

MIP 201T Scale Up and Technology Transfer 4 4 30 70 100

MIP 202T Pharmaceutical Production Technology 4 4 30 70 100

MIP 203T Entrepreneurship Management 4 4 30 70 100

MIP 204T Pharmaceutical Formulation Development 4 4 30 70 100

MIP 205P Industrial Pharmacy Practical III 2 6 30 70 100

MIP 206 Comprehensive Viva 2 — — — 50

MIP 207 Seminar\* 2 2 50 — 50

 Total 22 26 — — 600

**III SEMESTER**

MIP 301T Research Methodology and Biostatistics\* 2 4 30 70 100

MIP 302 Journal Club\* 2 2 50 —- 50

MIP 303 Discussion /Presentation (Dissertation Title &
 Project Proposal)\* 2 — 50 —- 50

MIP 304 Seminar on Selected Topic # 4 4 —- 100 100

MIP 305 Research Work Progress (Mid Term Report) 10 20 —- 200 100

 Total 20 30 — — 400

**IV SEMESTER**

MIP 401 Journal Club\* 2 2 50 —- 50

MIP 402 Thesis evaluation 12 20 —- 150 150

MIP 403 Thesis viva 4 —- —- 50 50

 Total 20 22 — — 250

***A***: Credit Points; ***B***: Hrs/wk; ***IA***-Internal Assessment Marks; ***SEE***—Sem End Examn Marks; ***IA: 10 (DDA) + 20 (average of I & II Mids each 30 M and 2 hr duration)***. ***DDA*** (Day to Day Assessment). \* Non-University Examination. Semester End Examination duration for Theory : **3 hrs** ; Practical : **6 hrs**

# Seminar on Selected Topic - To be evaluated by both External and Internal examiners for 100 Marks with 4 credit points.

**Table 10: Pharmacy Practice - I, II, III and IV Semesters**

 Code Course A B IA SEE Total Marks

***I SEMESTER***

MPP 101T Clinical Pharmacy Practice 4 4 30 70 100

MPP 102T Pharmacotherapeutics I 4 4 30 70 100

MPP 103T Hospital & Community Pharmacy 4 4 30 70 100

MPP 104T Clinical Research 4 4 30 70 100

MPP 105P Pharmacy Practice Practical I 2 6 30 70 100

MPP 106P Pharmacy Practice Practical II 2 6 30 70 100

MPP 107 Seminar\* 2 4 50 — 50

 Total 22 32 — — 650

**II SEMESTER**

MPP 201T Principles of Quality Use of Medicines 4 4 30 70 100

MPP 202T Pharmacotherapeutics II 4 4 30 70 100

MPP 203T Clinical Pharmacokinetics and Therapeutic
 Drug Monitoring 4 4 30 70 100

MPP 204T Pharmacoepidemiology & Pharmacoeconomics 4 4 30 70 100

MPP 205P Pharmacy Practice Practical III 2 6 30 70 100

MPP 206 Comprehensive Viva 2 — — — 50

MPP 207 Seminar\* 2 2 50 — 50

 Total 22 26 — — 600

**III SEMESTER**

MPP 301T Research Methodology and Biostatistics\* 2 4 30 70 100

MPP 302 Journal Club\* 2 2 50 —- 50

MPP 303 Discussion /Presentation (Dissertation Title &
 Project Proposal)\* 2 — 50 —- 50

MPP 304 Seminar on Selected Topic # 4 4 —- 100 100

MPP 305 Research Work Progress (Mid Term Report) 10 20 —- 200 100

 Total: 20 30 —- —- 400

**IV SEMESTER**

MPP 401 Journal Club\* 2 2 50 —- 50

MPP 402 Thesis evaluation 12 20 —- 150 150

MPP 403 Thesis viva 4 —- —- 50 50

 Total 20 22 — — 250

***A***: Credit Points; ***B***: Hrs/wk; ***IA***-Internal Assessment Marks; ***SEE***—Sem End Examn Marks; ***IA: 10 (DDA) + 20 (average of I & II Mids each 30 M and 2 hr duration)***. ***DDA*** (Day to Day Assessment). \* Non-University Examination. Semester End Examination duration for Theory : **3 hrs** ; Practical : **6 hrs**

# Seminar on Selected Topic - To be evaluated by both External and Internal examiners for 100 Marks with 4 credit points