



ರಾಜೀವ್ ಗಾಂಧಿ ಆರೋಗ್ಯ ವಿಜ್ಞಾನಗಳ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಕರ್ನಾಟಕ, ಬೆಂಗಳೂರು
RAJIV GANDHI UNIVERSITY OF HEALTH SCIENCES, KARNATAKA, BENGALURU
4th T Block, Jayanagar, Bengaluru – 560 041

No. RGU/AUTH/CAC/02/2018-19

Date. 05.05.2018

NOTIFICATION

Sub: Amendment to Ordinance relating to Scheme of Examination & award of marks for II semester examination of Master of Pharmacy (M.Pharm) course (Semester Scheme)

- Ref: 1) PCI Notification ref. No. 14-136-2016-PCI,14-154/2015-PCI (53095-55431) dated 21.12.2016
2) RGUHS Notification No. RGU/AUTH/MPHARM/147/2017-18 dated 10.05.2017
3) RGUHS Notification No. RGU/AUTH/128-SYN/187/2017-18 dated 01.09.2017
4) RGUHS Notification No. RGU/AUTH/AC/208/2017-18 dated 14.12.2017
5) Minutes of the meeting of Committee of Academic Council held on 24.04.2018

* * *

As per the PCI Notification referred at (1) above, semester system is introduced for M.Pharm Courses. Accordingly, the Syndicate in its 128th meeting held on 23.08.2017 has approved to adopt the semester system. In the Notification referred at (3) & (4) above, revised scheme of examination and award of marks was published for both the semesters. In view of the practical difficulties in conducting the II semester exams as per the scheme of examination notified in the above notifications, it was decided to amend the scheme of examination and award of marks for the II semester examination of M.Pharm courses. In this regard, the matter was deliberated in the BOS Pharmacy meeting held on 12.03.2018 & 22.03.2018 involving the subject experts. The recommendations for amending the syllabus was placed before the Committee of Academic Council in its meeting held on 24.04.2018. The CAC has recommended for implementing the revised scheme from the academic year 2017-18.

In exercise of the powers conferred under section 13(2) of RGUHS Act, 1994 and subject to ratification by the Syndicate, it is notified that the scheme of examination and award of marks relating to II semester exam of M.Pharm courses notified vide notification dated 01.09.2017 and 14.12.2017 are amended as indicated in the annexures to this notification, in respect of the following subjects only : -

1. M.Pharm in Pharmaceutical Analysis
2. M.Pharm in Pharmaceutics
3. M.Pharm in Pharmaceutical Chemistry
4. M.Pharm in Pharmacology
5. M.Pharm in Pharmacognosy
6. M.Pharm in Industrial Pharmacy
7. M.Pharm in Quality Assurance
8. M.Pharm in Pharmacy Practice
9. M.Pharm in Pharmaceutical Technology

This Notification shall come into force from the academic year 2017-18 and onwards.


REGISTRAR
24

To

The Principals of all Pharmacy Colleges affiliated to RGUHS.

Copy to :-

1. The Secretary to Hon'ble Governor, Governor's Secretariat, Raj Bhavan, Bangalore-560001.
2. The Secretary to Government, Health and Family Welfare Department (Medical Education), Vikasa Soudha Bangalore-560001.
3. The Registrar (Evaluation), RGUHS
4. The Director, Curriculum Development Cell RGUHS Bangalore.
5. PA to Hon'ble Vice Chancellor, Registrar, Registrar (Evaluation), Finance Officer.
6. The System Analyst to host the above Notification in the University website.
7. Guard File/Office Copy.



M.Pharm (Pharmaceutical Analysis)

Semester- II

Pharmaceutical Analysis Practical- I (MPL205P)

(75 Marks)

1. Comparison of absorption spectra by UV and Wood ward- Fiesure rule
2. Interpretation of organic compounds by FT-IR
3. Interpretation of organic compounds by NMR
4. Interpretation of organic compounds by MS
5. Determination of purity by DSC in pharmaceuticals
6. Identification of organic compounds using FT-IR, NMR, CNMR and Mass Spectra
7. Bio molecules separation utilizing various sample preparation techniques and Quantitative analysis of components by gel electrophoresis.
8. Bio molecules separation utilizing various sample preparation techniques and Quantitative analysis of components by HPLC techniques.
9. Quantitative analysis of rancidity in lipsticks and hair oil
10. Determination of aryl amine content and Developer in hair dye
11. Determination of acid value and saponification value.
12. Determination of calcium thioglycolate in depilatories

Pharmaceutical Analysis Practical- II (MPL206P)

(75 Marks)

1. Isolation of analgesics from biological fluids (Blood serum and urine).
2. Protocol preparation and performance of analytical Bio-analytical method validation.
3. Protocol preparation for the conduct of BA/BE studies according to guidelines.
4. In process and finished product quality control tests for tablets, capsules, parenterals and creams
5. Quality control tests for Primary and secondary packing materials
6. Assay of raw materials as per official monographs
7. Testing of related and foreign substances in drugs and raw materials
8. Preparation of Master Formula Record.
9. Preparation of Batch Manufacturing Record.
10. Determination of foam height and SLS content of Shampoo.
11. Determination of total fatty matter in creams (Soap, skin and hair creams)

Credit plan for Semester-II

Course Code	Course	Credit Hours	Credit Points	Hrs/Wk	Marks
MPL205P	Pharmaceutical Analysis -I Practical	06	03	06	75
MPL206P	Pharmaceutical Analysis -II Practical	06	03	06	75

Schemes for internal assessments and end semester examinations

Course Code	Course	Internal Assessment				End Semester Exams		Total Marks
		Continuou s Mode	Sessional Exams		Total	Marks	Duratio n	
			Mark s	Duratio n				
MPL205 P	Pharmaceutica l Analysis -I Practical	10	15	06	25	50	6 Hr	75
MPL206 P	Pharmaceutica l Analysis -II Practical	10	15	06	25	50	6 Hr	75

(Dr. K.P. Choudhary)
22/3/18

(Dr. B. Shivakumar)
22/3/18

(Dr. VAGARAJ)

6

M.Pharm Pharmaceutics

Semester II Pharmaceutics Practical-II: MPH 205P

(75 marks)

1. Improvement of dissolution characteristics of slightly soluble drug by Solid dispersion technique.
2. Comparison of dissolution of two different marketed products /brands
3. Protein binding studies of a highly protein bound drug & poorly protein bound drug
4. Bioavailability studies of Paracetamol.
5. Pharmacokinetic and IVIVC data analysis.
6. In vitro cell studies for permeability and metabolism
7. To develop Clinical Data Collection manual
8. To carry out Sensitivity Analysis, and Population Modeling.
9. Development and evaluation of Creams
10. Development and evaluation of Shampoo and Toothpaste base
11. To Incorporate herbal and chemical actives to develop products
12. To address Dry skin, acne, blemish, Wrinkles, bleeding gums and dandruff.

1) HOK
Dr. K. Manjmath

6) P. Kusum Devi
(Dr. V. KUSUM DEVI)

2) J. Thimmasetty
Dr. J. Thimmasetty

7) Geetha D.
(Dr. A. GEETHALAKSHMI)

3) Narasimha
[Dr. NARENDRA .C]

3) Shankar
(Dr. S. J. Shankar)

4) Manjula
(Dr. MANJULA. TALLURI)

5) V.G. Joshi
C.R. V. G. JOSHI

Molecular Pharmaceutics (Nano Tech and Targeted DDS) MPH206P (75 marks):

1. Quality-by-Design in Pharmaceutical Development
2. DoE Using Design Expert® Software
3. Formulation data analysis Using Design Expert® Software / Excel
4. To study the effect of temperature change, non-solvent addition, incompatible polymer addition in microcapsules preparation.
5. Preparation and evaluation of Alginate beads.
6. Formulation and evaluation of gelatin /albumin microspheres.
7. Formulation and evaluation of liposomes.
8. Formulation and evaluation of niosomes.
9. Formulation and evaluation of spherules.
10. Computer Simulations in Pharmacokinetics
11. Computer Simulations Pharmacodynamics
12. Computational Modeling of Drug Disposition

Credit plan for Semester-II

Course Code	Course	Credit Hours	Credit Points	Hrs./wk	Marks
MPH 205P	Pharmaceutics Practical- II	6	3	6	75
MPH 206P	Molecular Pharmaceutics (Nano Tech and Targeted DDS)	6	3	6	75

Schemes for internal assessments and end semester examinations

Course Code	Course	Internal Assessment				End Semester Exams		Total Marks
		Continuous Mode	Sessional Exams		Total	Marks	Duration	
			Marks	Duration				
MPH 205P	Pharmaceutics Practical -II	10	15	6h	25	50	6h	75
MPH 206P	Molecular Pharmaceutics (Nano Tech and Targeted DDS)	10	15	6h	25	50	6h	75

5

(MPC)

Semester- II

Pharmaceutical Chemistry -II Practical MPC 205 P

(75 marks)

1. Synthesis of organic compounds by adapting different approaches involving (3experiments)
 - a. Oxidation
 - b. Reduction/hydrogenation
 - c. Nitration
2. Comparative study of synthesis of APIs/intermediates by different synthetic routes (2 experiments)
3. Assignments on regulatory requirements in API (2 experiments)
4. Identification of organic compounds using FT -IR, NMR, CNMR and Mass spectra
5. To carry out the preparation of following organic compounds
6. Preparation of 4-chlorobenzhydrylpiperazine. (an intermediate for cetirizine HCl).
7. Preparation of 4-iodotoluene from p-toluidine.
8. NaBH₄ reduction of vanillin to vanillyl alcohol
9. Preparation of umbellifer one by Pechhman reaction
10. Preparation of triphenyl imidazole
11. To perform the Microwave irradiated reactions of synthetic importance (Any two)

Computer Aided Drug Design Practical -MPC203 P**(75 marks)**

1. Determination of log P, MR, hydrogen bond donors and acceptors of selected drugs using softwares
2. Calculation of AD MET properties of drug molecules and its analysis using softwares
3. Pharmacophore modeling
4. 2D-QSAR based experiments
5. 3D-QSAR based experiments
6. Docking study
7. Virtual screening based experiment
8. Comparison of absorption spectra by UV and Woodward-Fieser rule
9. Interpretation of organic compounds by FT-IR
10. Interpretation of organic compounds by NMR
11. Interpretation of organic compounds by MS
12. Determination of purity by DSC in pharmaceuticals

Credit plan for Semester-II

Course Code	Course	Credit Hours	Credit Points	Hrs/Wk	Marks
MPC205P	Pharmaceutical Chemistry -II Practical	06	03	06	75
MPC203P	Computer Aided Drug Design Practical	06	03	06	75

Schemes for internal assessments and end semester examinations

Course Code	Course	Internal Assessment				End Semester Exams		Total Marks
		Continuous Mode	Sessional Exams		Total	Marks	Duration	
			Marks	Duration				
MPC205P	Pharmaceutical Chemistry II Practical	10	15	06	25	50	6 Hr	75
MPC203P	Computer Aided Drug Design Practical	10	15	06	25	50	6 Hr	75

Dr. Saravan
22/3/18

Dr. B. Shival Kumar
22/3/18

Dr. Raga Babu
22/3/18

(Dr. Raga Babu)



M.Pharm (Pharmacology)

SEMESTER II

Pharmacology II Practical MPL 205P

(75 Marks)

1. To study the effects of various drugs on isolated mammalian heart preparations
2. Recording of rat BP, heart rate and ECG.
3. Recording of rat ECG
4. Drug absorption studies by everted rat ileum preparation.
5. Acute oral toxicity studies as per OECD guidelines.
6. Acute dermal toxicity studies as per OECD guidelines.
7. Repeated dose toxicity studies- Serum biochemical, haematological, urine analysis, functional observation tests and histological studies.
8. Drug mutagenicity study using mice bone-marrow chromosomal aberration test.
9. In-silico docking studies.
10. In-silico docking studies.
11. In-silico pharmacophore based screening.
12. In-silico QSAR studies
13. Estimation of PA_2 values of various antagonists using suitable isolated tissue preparations.

Lema Rozda
22/3/18

Mahurkar
22/3/18
Dr. H. An. Mahurkar

Pharmacology III Practical MPL 206P**(75Marks)**

1. To record the DRC of agonist using suitable isolated tissue preparation.
2. To study the effects of antagonist/potentiating agents on DRC of agonist using suitable isolated tissue preparation.
3. To determine the strength of unknown sample by matching bioassay by using suitable tissue preparation.
4. To determine the strength of unknown sample by interpolation bioassay by using suitable tissue preparation
5. To determine the strength of unknown sample by bracketing bioassay by using suitable tissue preparation
6. To determine the strength of unknown sample by multiple point bioassay by using suitable tissue preparation.
7. Protocol design for clinical trial.
8. Protocol design for clinical trial.
9. Protocol design for clinical trial.
10. Design of ADR monitoring protocol.
11. ADR reporting.

Credit plan for Semester-II

Course Code	Course	Credit Hours	Credit Points	Hrs./wk	Marks
MPL205P	Pharmacology -II Practical	6	3	6	75
MPL206P	Pharmacology -III Practical	6	3	6	75

Schemes for internal assessments and end semester examinations

Course Code	Course	Internal Assessment				End Semester Exams		Total Marks
		Continuous Mode	Sessional Exams		Total	Marks	Duration	
			Marks	Duration				
MPL205P	Pharmacology -II Practical	10	15	6h	25	50	6h	75
MPL206P	Pharmacology -III Practical	10	15	6h	25	50	6h	75

Kema Bajdar
22/3/18

Mahajan
22/3/18

Dr. An. Malakar

7



M. PHARM. PHARMACOGNOSY (MPG)

SEMESTER-II

Pharmacognosy Practical-II (MPG 205P)

Marks: 75

1. Herbal cosmetic formulation such as lip balm, lipstick, facial cream, herbal hair and nail care products
2. Evaluation of herbal tablets and capsules
3. Dermatological preparation like sunscreen, UV protection cream, skin care formulations for fungal and dermato reaction
4. Preparation of certain Aromatherapy formulations
5. Formulation of cough syrup
6. Preparation and standardization of various simple dosage forms from Ayurvedic, Siddha, Homoeopathy and Unani formulary

Medicinal plant Biotechnology Practical (MPG206P)

Marks: 50 75

1. Quantitative estimation of DNA
2. Isolation of nucleic acid from cauliflower heads
3. Isolation of RNA from yeast Establishment of callus culture
4. Establishment of suspension culture
5. Immobilization of whole cell
6. Estimation of alkaloid content in herbal raw materials
7. Estimation of flavonoid content in herbal raw materials
8. Estimation of aldehyde
9. Estimation of phenolic content in herbal raw materials

Dr. K. Lakshman
22/5/18

T.S. Roopashree
22/5/18
(Dr. Roopashree T.S.)


Dr. B. Gopalakrishna
22/5/18

Credit plan for Semester-II

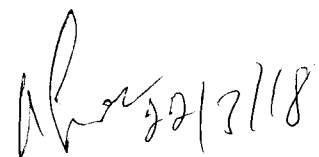
Course Code	Course	Credit Hours	Credit Points	Hrs./wk	Marks
MPG205P'	Pharmacognosy Practical-II	6	3	6	75
MPL206P'	Medicinal plant Biotechnology Practical	6	3	6	75

Schemes for internal assessments and end semester examinations

Course Code	Course	Internal Assessment				End Semester Exams		Total Marks
		Continuous Mode	Sessional Exams		Total	Marks	Duration	
			Marks	Duration				
MPG205P	Phannacognosy Practical -II	10	15	6h	25	50	6h	75
MPL206P	Medicina I plant Biotechn ology Practical	10	15	6h	25	50	6h	75


 22/3/18
 (Dr. K. Lakshman)

T. S. Reddy
 22/3/18
 (Dr. R. S. Reddy)


 22/3/18
 (Dr. B. S. Lakshmi)

2

M.Pharm (Industrial Pharmacy)

SEMESTER II

Industrial Pharmacy Practical-11 -MIP205P

(75 marks)

1. Formulation and evaluation of tablets.
2. Formulation and evaluation of capsules.
3. Formulation and evaluation of injections.
4. Formulation and evaluation of enteric coating tablets.
5. Formulation and evaluation of suspension.
6. Formulation and evaluation of emulsion.

Advanced Biopharmaceutics and Pharmacokinetics -MIP201P

(75 marks)

1. Bioavailability studies of Paracetamol.
2. In vitro cell studies for permeability and metabolism.
3. Pharmacokinetic and IVIVC data analysis by Winnoline software.
4. Comparison of dissolution of two different marketed products /brands.
5. Improvement of dissolution characteristics of slightly soluble drug by Solid dispersion technique.
6. Protein binding studies of a highly protein bound drug & poorly protein bound drug.

Credit plan for Semester-II

Course Code	Course	Credit Hours	Credit Points	Hrs./wk	Marks
MIP205P	Industrial Pharmacy Practical-11	6	3	6	75
MIP206P	Advanced Biopharmaceutics and Pharmacokinetics	6	3	6	75

Schemes for internal assessments and end semester examinations

Course Code	Course	Internal Assessment				End Semester Exams		Total Marks
		Continuous Mode	Sessional Exams		Total	Marks	Duration	
			Marks	Duration				
MIP205P	Industrial Pharmacy Practical -II	10	15	6h	25	50	6h	75
MIP206P	Advanced Biopharmaceutics and Pharmacokinetics	10	15	6h	25	50	6h	75

P. Kusum Devi
(Dr. V. KUSUM DEVI)

Narendrac
(Dr. NARENDRAC)

Manj
(Dr. MANJULA PALLURI)

S. J. Shankar
Dr. S. J. Shankar

Dr. K. Manjunath
Dr. K. Manjunath

U. G. Jyoti
(Dr. U. G. Jyoti)

10

M. PHARM. PHARMACEUTICAL. QUALITY ASSURANCE (MQA)

SEMESTER II

Pharmaceutical QA Practical-11 (MQA205P)-

75 marks

1. Identification of antibiotic residue by TLC
2. Estimation of Hydrogen Sulphide in Air.
3. Estimation of Chlorine in Work Environment.
4. Check list for Bulk Pharmaceutical Chemicals vendors
5. Check list for tableting production.
6. Check list for sterile production area
7. Check list for Water for injection.
8. Design of plant layout: Sterile and non-sterile
9. Case study on application of QbD
10. Case study on application of PAT

Mubeen
22/3/18

[DR. MUBEEN G.]

Roopa
22/3/18

[Dr. Roopa Karki].

Pharmaceutical Validation Practical (MQA206P)-

75 marks

1. Organic contaminants residue analysis by HPLC
2. Estimation of Metallic contaminants by Flame photometer
3. Sampling and analysis of SO₂ using Colorimetric method
4. Qualification of following Pharma equipment
 - a. Autoclave
 - b. Hot air oven
 - c. Powder Mixer (Dry)
 - d. Tablet Compression Machine
5. Validation of an analytical method for a drug
6. Validation of a processing area
7. Qualification of at least two analytical instruments
8. Cleaning validation of one equipment
9. Qualification of Pharmaceutical Testing Equipment (Dissolution testing apparatus, Friability Apparatus, Disintegration Tester)

Credit plan for Semester-II

Course Code	Course	Credit Hours	Credit Points	Hrs./wk	Marks
MQA205P	Pharmaceutical Quality Assurance Practical- II	6	3	6	75
MQA206P	Pharmaceutical Validation Practical	6	3	6	75

Schemes for internal assessments and end semester examinations

Course Code	Course	Internal Assessment				End Semester Exams		Total Marks
		Continuous Mode	Sessional Exams		Total	Marks	Duration	
			Marks	Duration				
MQA205P	Pharmaceutical Quality Assurance Practical -II	10	15	6h	25	50	6h	75
MQA206P	Pharmaceutical Validation Practical	10	15	6h	25	50	6h	75

Thank you
22/3/18

[DR. M V BEEN-G]

Roopa
22/3/18

[Dr. Roopa Karkar]



Pharmacy Practice

SEMESTER II

Pharmacotherapeutics II MPP205P (25 Experiments)

75 Marks

1. Presentation of clinical cases of various disease conditions adopting Pharmaceutical Care Plan Model (25 cases covering diseases mentioned in theory syllabus)

Principles of quality use of medicines MPP206P (25 Experiments)

(75Marks)

1. Causality assessment of adverse drug reactions (five)
2. Detection and management of medication errors (five)
3. Rational use of medicines in special population (five)
4. Calculation of Bioavailability and Bioequivalence from the given data (two)
5. Interpretation of therapeutic drug monitoring reports of a given patient (three)
6. Calculation of various pharmaco-economic outcome analysis for the given data (Five)

Credit plan for Semester-II

Course Code	Course	Credit Hours	Credit Points	Hrs./wk	Marks
MPP205P	Pharmacotherapeutics II	6	3	6	75
MPP206P	Principles of quality use of medicines	6	3	6	75

Schemes for internal assessments and end semester examinations

Course Code	Course	Internal Assessment				End Semester Exams		Total Marks
		Continuous Mode	Sessional Exams		Total	Marks	Duration	
			Marks	Duration				
MPP205P	Pharmacotherapeutics II	10	15	6h	25	50	6h	75
MPP206P	Principles of quality use of medicines	10	15	6h	25	50	6h	75

Dr. Geetha Jayaram
22/3/2018

Meera
[Dr. MEERA M.K.]
22.03.2018

M.PHARM (PHARMACEUTICAL TECHNOLOGY)

SEMESTER-II PRACTICALS

Pharmaceutical Technology Practical- II: MPT205P

(75 MARKS)

1. Protein binding studies of a highly protein bound drug.
2. Protein binding studies of a poorly protein bound drug.
3. Permeation study of drug through biological membrane.
4. Calculation of K_a , K_e , $t_{1/2}$, C_{max} , and T_{max} for two sets of data. -2 experiments
5. Calculation of bioavailability from urinary excretion data for two drugs. -2 experiments
6. Calculation of AUC and bioequivalence from the given data for two drugs. -2 experiments
7. Preparation and evaluation of microcapsules by wax embedded method.
8. Preparation and evaluation of buccal patches.
9. Preparation and evaluation of transdermal films.
10. Evaluation of the effect of various permeation enhancers on transdermal drug delivery.
11. Preparation and evaluation of ocular *insitu* gel.

1) Thirum
(S. Thimmasetty)

2) KKK
(K. Manjunath)

3) enanda
[Dr. NARENDRA C]

3) Prakash
(Dr. S. J. Shankar)

4. Manj
(DR. MANJULA TALLURI)

5. venk
CDR. V. G. JESHI

9) Sunja
(DR. Sunil RajRaga)

6. V. Kusum Devi
(DR. V. KUSUM DEVI)

7. Ganitha D.
(Dr. A. GEETHALAKSHMI)

Advanced Pharmaceutical Technology-2: MPT201P

(75 MARKS)

- 1) Preparation and evaluation of chewable antacid tablets.
- 2) Preparation and evaluation of coated tablets by pan coating.
- 3) Formulation and evaluation of capsules.
- 4) Formulation and evaluation of small volume parenterals.
- 5) Formulation and evaluation of large volume parenterals.
- 6) Evaluation of glass as a pharmaceutical packaging material.
- 7) Evaluation of plastic as a pharmaceutical packaging material.
- 8) Accelerated stability testing, shelf-life determination and expiration dating of pharmaceuticals.
- 9). Preparation and evaluation of buccal tablets.
- 10). Preparation and evaluation of hydrodynamically balanced tablets.

Credit plan for Semester-II

Course Code	Course	Credit Hours	Credit Points	Hrs./wk	Marks
MPT205P	Pharmaceutical Technology Practical- II	6	3	6	75
MPT201P	Advanced Pharmaceutical Technology-2	6	3	6	75

Schemes for internal assessments and end semester examinations

Course Code	Course	Internal Assessment				End Semester Exams		Total Marks
		Continuous Mode	Sessional Exams		Total	Marks	Duration	
			Marks	Duration				
MPT205P	Pharmaceutical Technology Practical-II	10	15	6h	25	50	6h	75
MPT201P	Advanced Pharmaceutical Technology-2	10	15	6h	25	50	6h	75