

## Syllabus-2023-2024

### (SOP)(MPharm-PharmaCeutics)

<b>Title of the Course</b>	Regulatory Affairs
<b>Course Code</b>	MPH 104T

#### Part A

Year	1st	Semester	1st	Credits		L	T	P	C
						4	0	0	4
<b>Course Type</b>	Theory only								
<b>Course Category</b>	Discipline Core								
<b>Pre-Requisite/s</b>					<b>Co-Requisite/s</b>				
<b>Course Outcomes &amp; Bloom's Level</b>	<b>CO1-</b> Understand the concepts of innovator and generic drugs, drug development process, regulatory guidance's and guidelines for filing and approval process.( <b>BL2-Understand</b> ) <b>CO2-</b> Know the preparation of dossiers and their submission to regulatory agencies in different countries( <b>BL2-Understand</b> ) <b>CO3-</b> Knowledge on post approval regulatory requirements for actives and drug products, submission of global documents in CTD/ eCTD formats( <b>BL2-Understand</b> ) <b>CO4-</b> Know the Regulatory guidance's and guidelines for filing and approval process in different countries.( <b>BL3-Apply</b> ) <b>CO5-</b> Understand the clinical trials requirements for approvals for conducting clinical trials, pharmacovigilance and process of monitoring in clinical trials( <b>BL3-Apply</b> )								
<b>Courses Elements</b>	Skill Development ✓ Entrepreneurship ✗ Employability ✓ Professional Ethics ✗ Gender ✗ Human Values ✗ Environment ✗			<b>SDG (Goals)</b>	SDG4(Quality education)				

#### Part B

Modules	Contents	Pedagogy	Hours
UNIT-1	1. Documentation in Pharmaceutical industry: Master formula record, DMF (Drug Master File), distribution records. Generic drugs product development Introduction, Hatch- Waxman act and amendments, CFR (CODE OF FEDERAL REGULATION), drug product performance, in-vitro, ANDA regulatory approval process, NDA approval process, BE and drug product assessment, in-vivo, scale up process approval changes, post marketing surveillance, outsourcing BA and BE to CRO. b. Regulatory requirement for product approval: API, biologics, novel, therapies obtaining NDA, ANDA for generic drugs ways and means of US registration for foreign drugs	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	15
UNIT-2	2. CMC, post approval regulatory affairs. Regulation for combination products and medical devices. CTD and ECTD format, industry and FDA liaison. ICH - Guidelines of ICH-Q, S E, M. Regulatory requirements of EU, MHRA, TGA and ROW countries.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	15
UNIT-3	3. Nonclinical drug development: Global submission of IND, NDA, ANDA. Investigation of medicinal products dossier, dossier (IMPD) and investigator brochure (IB).	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	15
UNIT-4	4. Clinical trials: Developing clinical trial protocols. Institutional review board/ independent ethics committee Formulation and working procedures informed Consent process and procedures. HIPAA- new, requirement to clinical study process, pharmacovigilance safety monitoring in clinical trials	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	15

#### Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
UNIT-III	prepare regulatory guidelines for different countries	Seminar	BL3-Apply	10

#### Part D(Marks Distribution)

Theory					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
100	50	75	38	25	13
Practical					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
	0				

#### Part E

<b>Books</b>	1. Generic Drug Product Development, Solid Oral Dosage forms, Leon Shargel and Isader Kaufer, Marcel Dekker series, Vol.143 2. The Pharmaceutical Regulatory Process, Second Edition Edited by Ira R. Berry and Robert P.Martin, Drugs and the Pharmaceutical Sciences, Vol.185, Informa Health care Publishers. 3. New Drug Approval Process: Accelerating Global Registrations By Richard A Guarino, MD, 5th edition, Drugs and the Pharmaceutical Sciences, Vol.190
<b>Articles</b>	<a href="https://regsci-ojs-tamu.tdl.org/regsci/">https://regsci-ojs-tamu.tdl.org/regsci/</a>
<b>References Books</b>	1. Guidebook for drug regulatory submissions / Sandy Weinberg. By John Wiley & Sons. Inc. 2. FDA regulatory affairs: a guide for prescription drugs, medical devices, and biologics/edited By Douglas J. Pisano, David Mantus. 3. Clinical Trials and Human Research: A Practical Guide to Regulatory Compliance By Fay A. Rozovsky and Rodney K. Adams 4. <a href="http://www.ich.org/">www.ich.org/</a> 5. <a href="http://www.fda.gov/">www.fda.gov/</a> 6. <a href="http://europa.eu/index_en.htm">europa.eu/index_en.htm</a> 7. <a href="https://www.tga.gov.au/tga-basics">https://www.tga.gov.au/tga-basics</a>
<b>MOOC Courses</b>	<a href="https://onlinecourses.nptel.ac.in/">https://onlinecourses.nptel.ac.in/</a>
<b>Videos</b>	<a href="https://www.youtube.com/watch?v=xrZl8g70Hol&amp;list=PLpGCFhhV_JSXuh8vFq4MwlnuNj9f6hfRY">https://www.youtube.com/watch?v=xrZl8g70Hol&amp;list=PLpGCFhhV_JSXuh8vFq4MwlnuNj9f6hfRY</a>

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	-	1	1	-	-	2	-	-	3	-	1	-	1
CO2	2	-	-	-	2	1	-	3	-	-	3	-	2	1	2
CO3	1	2	-	-	-	-	-	2	-	-	2	-	-	-	-
CO4	3	2	-	1	-	2	-	3	-	-	2	-	-1	2	-
CO5	2	1	-	-	1	1	-	1	-	-	2	-	-	2	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

## Syllabus-2023-2024

(SOP)(MPharm-PharmaCeutics)

<b>Title of the Course</b>	Modern Pharmaceutical Analytical Techniques
<b>Course Code</b>	MPH 101T

### Part A

Year	1st	Semester	1st	Credits	L	T	P	C
					4	0	0	4
<b>Course Type</b>	Theory only							
<b>Course Category</b>	Discipline Core							
<b>Pre-Requisite/s</b>					<b>Co-Requisite/s</b>			
<b>Course Outcomes &amp; Bloom's Level</b>	<b>CO1-</b> Investigate the pharmaceutical substance by absorption and emission techniques.( <b>BL2-Understand</b> ) <b>CO2-</b> Investigate the pharmaceutical substance by Nuclear Magnetic spectroscopy techniques.( <b>BL3-Apply</b> ) <b>CO3-</b> Investigate the pharmaceutical substance by Mass spectroscopy techniques.( <b>BL3-Apply</b> ) <b>CO4-</b> Recognize the principle, instrumentation and applications of different chromatographic techniques.( <b>BL4-Analyze</b> ) <b>CO5-</b> Apprehend the fundamentals of immunological assays.( <b>BL4-Analyze</b> )							
<b>Courses Elements</b>	Skill Development ✓ Entrepreneurship ✗ Employability ✗ Professional Ethics ✗ Gender ✗ Human Values ✗ Environment ✗		<b>SDG (Goals)</b>	SDG4(Quality education)				

### Part B

Modules	Contents	Pedagogy	Hours
UNIT-1	a. UV-Visible spectroscopy: Introduction, Theory, Laws, Instrumentation associated with UV-Visible spectroscopy, Choice of solvents and solvent effect and Applications of UV-Visible spectroscopy. b. IR spectroscopy: Theory, Modes of Molecular vibrations, Sample handling, Instrumentation of Dispersive and Fourier - Transform IR Spectrometer, Factors affecting vibrational frequencies and Applications of IR spectroscopy c. Spectrofluorimetry: Theory of Fluorescence, Factors affecting fluorescence, Quenchers, Instrumentation and Applications of fluorescence spectrophotometer	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT-2	NMR spectroscopy: Quantum numbers and their role in NMR, Principle, Instrumentation, Solvent requirement in NMR, Relaxation process, NMR signals in various compounds, Chemical shift, Factors influencing chemical shift, Spin-Spin coupling, Coupling constant, Nuclear magnetic double resonance, Brief outline of principles of FT-NMR and <sup>13</sup> CNMR. Applications of NMR spectroscopy	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	12
UNIT-3	Mass Spectroscopy: Principle, Theory, Instrumentation of Mass Spectroscopy, Different types of ionization like electron impact, chemical, field, FAB and MALDI, APCI, ESI, APPI Analyzers of Quadrupole and Time of Flight, Mass fragmentation and its rules, Meta stable ions, Isotopic peaks and Applications of Mass spectroscopy	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	8
UNIT-4	Chromatography: Principle, apparatus, instrumentation, chromatographic parameters, factors affecting resolution and applications of the following: a) Paper chromatography b) Thin Layer chromatography c) Ion exchange chromatography d) Column chromatography e) Gas chromatography f) High Performance Liquid chromatography g) Affinity chromatography	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	12
UNIT-5	a. Electrophoresis: Principle, Instrumentation, working conditions, factors affecting separation and applications of the following: a) Paper electrophoresis b) Gel electrophoresis c) Capillary electrophoresis d) Zone electrophoresis e) Moving boundary electrophoresis f) Iso electric focusing b. X ray Crystallography: Production of X rays, Different X ray diffraction methods, Bragg's law, Rotating crystal technique, X ray powder technique, Types of crystals and applications of X- ray diffraction.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	12
UNIT-6	Immunological assays: RIA (Radio immunoassay), ELISA, Bioluminescence assays.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	8

### Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
UNIT-4	High Performance Liquid chromatography	PBL	BL4-Analyze	10

### Part D(Marks Distribution)

Theory					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
100	50	75	38	25	13
Practical					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
	0				

### Part E

<b>Books</b>	Spectrometric Identification of Organic compounds - Robert M Silverstein, Sixth edition, John Wiley & Sons, 2004. 2.Principles of Instrumental Analysis - Douglas A Skoog, F. James Holler, Timothy A. Niemar Pharmaceutical Chemistry – Beckett and Stenlake, Vol II, 4th edition, CBS Publishers, New Delhi, 1997.
<b>Articles</b>	<a href="https://www.sciencedirect.com/journal/journal-of-pharmaceutical-analysis">https://www.sciencedirect.com/journal/journal-of-pharmaceutical-analysis</a>
<b>References Books</b>	1. Organic Spectroscopy - William Kemp, 3rd edition, ELBS, 1991. 2. Quantitative Analysis of Drugs in Pharmaceutical formulation - P D Sethi, 3rd Edition, CBS Publishers, New Delhi, 1997. 3. Pharmaceutic
<b>MOOC Courses</b>	<a href="https://onlinecourses.nptel.ac.in/">https://onlinecourses.nptel.ac.in/</a>
<b>Videos</b>	<a href="https://www.udemy.com/course/modern-analytical-techniques/?utm_source=adwords-pmax&amp;utm_medium=udemyads&amp;utm_campaign=PMax_la.EN_cc.INDIA&amp;utm_content=deal4584&amp;utm_term=__ag__kw__ad__de_c__dm__pl__ti__li_1007795__pd__&amp;gad_source=2&amp;gclid=">https://www.udemy.com/course/modern-analytical-techniques/?utm_source=adwords-pmax&amp;utm_medium=udemyads&amp;utm_campaign=PMax_la.EN_cc.INDIA&amp;utm_content=deal4584&amp;utm_term=__ag__kw__ad__de_c__dm__pl__ti__li_1007795__pd__&amp;gad_source=2&amp;gclid=</a>

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	3	-	3	-	-	-	-	-	3	-	1	-	1
CO2	3	2	3	-	2	1	-	-	-	-	3	-	2	1	2
CO3	3	1	1	-	1	2	-	-	-	-	3	-	2	-	1
CO4	3	1	1	2	2	2	-	-	-	-	3	-	1	2	2
CO5	2	1	2	-	2	2	-	-	-	-	3	-	-	1	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

## Syllabus-2023-2024

(SOP)(MPharm-PharmaCeutics)

<b>Title of the Course</b>	Drug Delivery System
<b>Course Code</b>	MPH 102T

### Part A

Year	1st	Semester	1st	Credits	L	T	P	C
					4	0	0	4
<b>Course Type</b>	Theory only							
<b>Course Category</b>	Discipline Core							
<b>Pre-Requisite/s</b>					<b>Co-Requisite/s</b>			
<b>Course Outcomes &amp; Bloom's Level</b>	<b>CO1-</b> Explain drug delivery systems which give detailed information on transporting a pharmaceutical compound in the body as needed to safely achieve its desired therapeutic effect. Also about the approaches, formulations, technologies, and systems for transporting a pharmaceutical compound in the body as needed to safely achieve its desired therapeutic effect with suitable drug delivery <b>(BL2-Understand)</b> <b>CO2-</b> Know vaccine delivery and different mode of application approach for clinical use. <b>(BL2-Understand)</b> <b>CO3-</b> Ability to communicate different types of Drug carrier used in the process of drug delivery which serves to improve the selectivity, effectiveness, and/or safety of drug administration <b>(BL3-Apply)</b> <b>CO4-</b> Apply latest drug delivery knowledge and think to develop new formulation based on the individual requirement <b>(BL3-Apply)</b> <b>CO5-</b> Create recent developments in protein and peptide for parenteral delivery approaches will give new dimension of drug deliver for antibiotics, insulin, etc <b>(BL4-Analyze)</b>							
<b>Coures Elements</b>	Skill Development ✓ Entrepreneurship ✗ Employability ✓ Professionnal Ethics ✗ Gender ✗ Human Values ✗ Environment ✗			<b>SDG (Goals)</b>	SDG1(No poverty) SDG3(Good health and well-being) SDG4(Quality education) SDG17(Partnerships for the goals)			

### Part B

Modules	Contents	Pedagogy	Hours
UNIT-1	1.Sustained Release (SR) and Controlled Release (CR) formulations: Introduction & basic concepts, advantages/ disadvantages, factors influencing, Physicochemical & biological approaches for SR/CR formulation, Mechanism of Drug Delivery from SR/CR formulation. Polymers: introduction, definition, classification, properties and application Dosage Forms for Personalized Medicine: Introduction, Definition, Pharmacogenetics, Categories of Patients for Personalized Medicines: Customized drug delivery systems, Bioelectronic Medicines, 3D printing of pharmaceuticals, Telepharmacy	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	12
UNIT-2	2. Rate Controlled Drug Delivery Systems: Principles & Fundamentals, Types, Activation; Modulated Drug Delivery Systems; Mechanically activated, pH activated, Enzyme activated, and Osmotic activated Drug Delivery Systems Feedback regulated Drug Delivery Systems; Principles & Fundamentals.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT-3	3. Gastro-Retentive Drug Delivery Systems: Principle, concepts advantages and disadvantages, Modulation of GI transit time approaches to extend GI transit. Buccal Drug Delivery Systems: Principle of muco-adhesion, advantages and disadvantages, Mechanism of drug permeation, Methods of formulation and its evaluations	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	6
UNIT-4	4. Ocular Drug Delivery Systems: Barriers of drug permeation, Methods to overcome barriers. Rate Controlled Drug Delivery Systems: Principles & Fundamentals, Types, Activation; Modulated Drug Delivery Systems; Mechanically activated, pH activated, Enzyme activated, and Osmotic activated Drug Delivery Systems Feedback regulated Drug Delivery Systems; Principles & Fundamentals.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	6
UNIT-5	5, Gastro-Retentive Drug Delivery Systems: Principle, concepts advantages and disadvantages, Modulation of GI transit time approaches to extend GI transit	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	6
UNIT-6	6. Buccal Drug Delivery Systems: Principle of muco-adhesion, advantages and disadvantages, Mechanism of drug permeation, Methods of formulation and its evaluations	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	6
UNIT-7	7.Ocular Drug Delivery Systems: Barriers of drug permeation, Methods to overcome barriers	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board/PPT	4
UNIT-8	8. Transdermal Drug Delivery Systems: Structure of skin and barriers, Penetration enhancers, Transdermal Drug Delivery Systems, Formulation and evaluation	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	3

### Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
UNIT-1	3D PRINTING TECHNOLOGY	PBL	BL4-Analyze	10

### Part D(Marks Distribution)

Theory					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
100	50	75	38	25	13
Practical					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
	0				

## Part E

<b>Books</b>	1.N.K. Jain, Controlled and Novel Drug Delivery, CBS Publishers & Distributors, New Delhi, First edition 1997 (reprint in 2001). 2. S. P. Vyas and R. K. Khar, Controlled Drug Delivery- concepts and advances, Vallabh Prakashan, New Delhi, First edition 2002
<b>Articles</b>	2. Indian Journal of Pharmaceutical Sciences (IPA) 3. Indian drugs (IDMA) 4. Journal of controlled release (Elsevier Sciences) desirable 4. Drug Development and Industrial Pharmacy (Marcel & Decker) desirable
<b>References Books</b>	5. Y W. Chien, Novel Drug Delivery Systems, 2nd edition, revised and expanded, Marcel Dekker, Inc., New York, 1992. 2. Robinson, J. R., Lee V. H. L., Controlled Drug Delivery Systems, Marcel Dekker, Inc., New York, 1992. 3. Encyclopedia of controlled delivery, Editor- Edith Mathiowitz, Published by Wiley Interscience Publication, John Wiley and Sons, Inc, New York! Chichester/Weinheim
<b>MOOC Courses</b>	<a href="https://onlinecourses.nptel.ac.in/">https://onlinecourses.nptel.ac.in/</a>
<b>Videos</b>	<a href="https://www.youtube.com/watch?v=1Jk08tf1Gh8">https://www.youtube.com/watch?v=1Jk08tf1Gh8</a>

## Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	3	-	3	1	-	-	-	-	3	-	1	-	1
CO2	3	-	2	-	1	2	-	-	-	-	3	-	2	1	-
CO3	3	1	3	-	2	-	-	-	-	-	3	-	-	-	2
CO4	3	-	1	-	2	1	-	-	-	-	3	-	-	1	2
CO5	2	2	3	1	1	-	-	-	-	-	3	-	1	2	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

## Syllabus-2023-2024

### (SOP)(MPharm-PharmaCeutics)

<b>Title of the Course</b>	Modern Pharmaceutics
<b>Course Code</b>	MPH 103T

#### Part A

Year	1st	Semester	1st	Credits	L	T	P	C
					4	0	0	4
<b>Course Type</b>	Theory only							
<b>Course Category</b>	Discipline Core							
<b>Pre-Requisite/s</b>					<b>Co-Requisite/s</b>			
<b>Course Outcomes &amp; Bloom's Level</b>	<b>CO1-</b> Apply the concepts of preformulation and optimization techniques during formulation development. <b>(BL3-Apply)</b> <b>CO2-</b> Recognize the importance of validation of methods, equipments and processes during pharmaceutical manufacturing <b>(BL2-Understand)</b> <b>CO3-</b> Describe current good manufacturing practices guidelines and industrial management <b>(BL2-Understand)</b> <b>CO4-</b> Analyze the importance of tablet compression and compaction studies. <b>(BL4-Analyze)</b> <b>CO5-</b> Understand different consolidation parameters employed in formulation development and evaluation. <b>(BL5-Evaluate)</b>							
<b>Courses Elements</b>	Skill Development ✓ Entrepreneurship ✗ Employability ✓ Professional Ethics ✗ Gender ✗ Human Values ✗ Environment ✗		<b>SDG (Goals)</b>		SDG1(No poverty) SDG3(Good health and well-being) SDG4(Quality education) SDG17(Partnerships for the goals)			

#### Part B

Modules	Contents	Pedagogy	Hours
UNIT-I	a. Preformation Concepts – Drug Excipient interactions - different methods, kinetics of stability, Stability testing. Theories of dispersion and pharmaceutical Dispersion (Emulsion and Suspension, SMEDDS) preparation and stability Large and small volume parental – physiological and formulation consideration, Manufacturing and evaluation. b. Optimization techniques in Pharmaceutical Formulation: Concept and parameters of optimization, Optimization techniques in pharmaceutical formulation and processing. Statistical design, Response surface method, Contour designs, Factorial designs and application in formulation	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	14
UNIT-II	2. Validation: Introduction to Pharmaceutical Validation, Scope & merits of Validation, Validation and calibration of Master plan, ICH & WHO guidelines for calibration and validation of equipments, Validation of specific dosage form, Types of validation. Government regulation, Manufacturing Process Model, URS, DQ, IQ, OQ & P.Q. of facilities.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	14
UNIT-III	3. cGMP & Industrial Management: Objectives and policies of current good manufacturing practices, layout of buildings, services, equipments and their maintenance Production management: Production organization, , materials management, handling and transportation, inventory management and control, production and planning control, Sales forecasting, budget and cost control, industrial and personal relationship. Concept of Total Quality Management.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	12
UNIT-IV	4. Compression and compaction: Physics of tablet compression, compression, consolidation, effect of friction, distribution of forces, compaction profiles. Solubility	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	8
UNIT-V	5. Study of consolidation parameters; Diffusion parameters, Dissolution parameters and Pharmacokinetic parameters, Heckel plots. Similarity factors – f2 and f1, Higuchi and Peppas plot, Linearity Concept of significance, Standard deviation, Chi square test, students T-test, ANOVA test.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	12

#### Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
UNIT-V	study of diffusion and dissolution parameters	PBL	BL4-Analyze	10

#### Part D(Marks Distribution)

Theory					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
100	50	75	38	25	13
Practical					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation

#### Part E

<b>Books</b>	1.Theory and Practice of Industrial Pharmacy By Lachmann and Libermann 2. Pharmaceutical dosage forms: Tablets Vol. 1-3 by Leon Lachmann. 3.Pharmaceutical Dosage forms: Disperse systems, Vol, 1-2; By Leon Lachmann. 4. Pharmaceutical Dosage forms: Parenteral medications Vol. 1-2; By Leon Lachmann. 5. Modern Pharmaceutics; By Gillbert and S. Banker. 6. Remington's Pharmaceutical Sciences
<b>Articles</b>	<a href="https://www.ijmponline.com/">https://www.ijmponline.com/</a>
<b>References Books</b>	7.Advances in Pharmaceutical Sciences Vol. 1-5; By H.S. Bean & A.H. Beckett. 8. Physical Pharmacy; By Alfred martin 9. Bentley's Textbook of Pharmaceutics – by Rawlins. 10. Good manufacturing practices for Pharmaceuticals: Aplan for total quality control, Second edition; By Sidney H. Willig. 11. Quality Assurance Guide; By Organization of Pharmaceutical producers of India. 12. Drug formulation manual; By D.P.S. Kohli and D.H.Shah. Eastern publishers, New Delhi. 13.How to practice GMPs; By P. P. Sharma. Vandhana Publications, Agra. 12. Pharmaceutical Process Validation; By Fra. R. Berry and Robert A. Nash. 13.Pharmaceutical Preformulations; By J.J. Wells. 14. Applied production and operations management; By Evans, Anderson, Sweeney and Williams. 15. Encyclopedia of Pharmaceutical technology, Vol I – III
<b>MOOC Courses</b>	<a href="https://swayam.gov.in/nc_details/NPTEL">https://swayam.gov.in/nc_details/NPTEL</a>
<b>Videos</b>	<a href="https://www.youtube.com/watch?v=mRJvss9bMVc&amp;list=PL0o-kamDFTumhseOKF-6OCrHdhBySNkAA">https://www.youtube.com/watch?v=mRJvss9bMVc&amp;list=PL0o-kamDFTumhseOKF-6OCrHdhBySNkAA</a>

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	-	3	-	1	-	-	-	-	-	3	-	1	-	1
CO2	3	1	1	-	2	-	-	-	-	-	3	-	-	1	-
CO3	2	2	2	1	2	-	-	-	-	-	3	-	2	2	2
CO4	2	1	1	-	2	-	-	-	-	-	3	-	1	-	2
CO5	2	2	2	2	-	1	-	-	-	-	3	-	1	-	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



## Syllabus-2023-2024

### (SOP)(MPharm-PharmaCeutics)

<b>Title of the Course</b>	Pharmaceutics Practical I
<b>Course Code</b>	MPH 105P

#### Part A

Year	1st	Semester	1st	Credits	L	T	P	C
					0	0	6	6
<b>Course Type</b>	Lab only							
<b>Course Category</b>	Discipline Core							
<b>Pre-Requisite/s</b>					<b>Co-Requisite/s</b>			
<b>Course Outcomes &amp; Bloom's Level</b>	<b>CO1-</b> Chemicals and Excipients( <b>BL4-Analyze</b> ) <b>CO2-</b> The analysis of various drugs in single and combination dosage forms( <b>BL5-Evaluate</b> ) <b>CO3-</b> Theoretical and practical skills of the instruments( <b>BL3-Apply</b> )							
<b>Coures Elements</b>	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professional Ethics ✗ Gender ✗ Human Values ✗ Environment ✗			<b>SDG (Goals)</b>	SDG1(No poverty) SDG3(Good health and well-being) SDG4(Quality education) SDG17(Partnerships for the goals)			

#### Part B

Modules	Contents	Pedagogy	Hours
UNIT-1	1.Sustained Release (SR) and Controlled Release (CR) formulations: Introduction & basic concepts, advantages/ disadvantages, factors influencing, Physicochemical & biological approaches for SR/CR formulation, Mechanism of Drug Delivery from SR/CR formulation. Polymers: introduction, definition, classification, properties and application Dosage Forms for Personalized Medicine: Introduction, Definition, Pharmacogenetics, Categories of Patients for Personalized Medicines: Customized drug delivery systems, Bioelectronic Medicines, 3D printing of pharmaceuticals, Telepharmacy	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	12

#### Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	1. Analysis of pharmacopoeial compounds and their formulations by UV Vis spectrophotometer 2. Simultaneous estimation of multi component containing formulations by UV spectrophotometry	Experiments	BL4-Analyze	8
2	3. Experiments based on HPLC 4. Experiments based on Gas Chromatography	Experiments	BL3-Apply	8
3	5. Estimation of riboflavin/quinine sulphate by fluorimetry 6. Estimation of sodium/potassium by flame photometry	Experiments	BL4-Analyze	8
4	7. To perform In-vitro dissolution profile of CR/ SR marketed formulation 8. Formulation and evaluation of sustained release matrix tablets	Experiments	BL5-Evaluate	8
5	9. Formulation and evaluation osmotically controlled DDS 10. Preparation and evaluation of Floating DDS- hydro dynamically balanced DDS	Experiments	BL6-Create	8
6	11. Formulation and evaluation of Muco adhesive tablets. 12. Formulation and evaluation of trans dermal patches	Experiments	BL6-Create	8
7	13. To carry out preformulation studies of tablets. 14. To study the effect of compressional force on tablets disintegration time.	Experiments	BL3-Apply	8
8	15. To study Micromeritic properties of powders and granulation. 16. To study the effect of particle size on dissolution of a tablet	Experiments	BL3-Apply	8

#### Part D(Marks Distribution)

Theory					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
Practical					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
150	0	100	50	50	25

#### Part E

<b>Books</b>	PRACTICAL MANUAL
<b>Articles</b>	JOURNALS
<b>References Books</b>	LAB MANUAL
<b>MOOC Courses</b>	SWAYAM NPTEL
<b>Videos</b>	YOUTUBE

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	3	1	1	-	-	-	-	-	3	-	1	-	1
CO2	3	1	2	2	2	-	-	-	-	-	3	-	2	1	2
CO3	3	2	3	-	1	-	-	-	-	-	3	-	3	-	2
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

## Syllabus-2023-2024

### (SOP)(MPharm-PharmaCeutics)

<b>Title of the Course</b>	Assignments
<b>Course Code</b>	MPH 106A

#### Part A

Year	1st	Semester	1st	Credits	L	T	P	C
					7	0	0	7
<b>Course Type</b>	Project							
<b>Course Category</b>	Discipline Core							
<b>Pre-Requisite/s</b>					<b>Co-Requisite/s</b>			
<b>Course Outcomes &amp; Bloom's Level</b>	<b>CO1-</b> To understand modern pharmaceutical techniques( <b>BL4-Analyze</b> ) <b>CO2-</b> To understand various pharmaceutical formulations() <b>CO3-</b> To understand the IPR in pharmacy()							
<b>Coures Elements</b>	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professional Ethics ✗ Gender ✗ Human Values ✗ Environment ✗			<b>SDG (Goals)</b>	SDG4(Quality education)			

#### Part B

Modules	Contents	Pedagogy	Hours
1	Different Analytical techniques	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	7
2	Various approaches for development of NDDS	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	7
3	Optimization techniques and pilot plant scale up	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	7
4	write about various Pharmaceutical regulatory bodies across the globe	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	

#### Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	1. Analysis of pharmacopoeial compounds and their formulations by UV Vis spectrophotometer 2. Simultaneous estimation of multi component containing formulations by UV spectrophotometry	Experiments	BL4-Analyze	8

#### Part D(Marks Distribution)

Theory					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
Practical					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
100	50	75	38	25	13

#### Part E

<b>Books</b>	REFERENCE BOOKS
<b>Articles</b>	INTERNET SOURCES
<b>References Books</b>	REFERENCE BOOKS
<b>MOOC Courses</b>	SWAYAM
<b>Videos</b>	YOUTUBE

#### Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	1	-	-	-	-	-	-	-	1	-	1	-	1
CO2	2	2	2	-	-	-	-	-	-	-	1	-	-	2	-
CO3	1	1	-	-	-	-	1	-	-	-	1	-	-	-	1
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

## Syllabus-2023-2024

(SOP)(MPharm-PharmaCeutics)

<b>Title of the Course</b>	Online Certificate Course
<b>Course Code</b>	MPH 107ET

### Part A

Year	1st	Semester	1st	Credits	L	T	P	C
					1	0	0	1
<b>Course Type</b>	Online course							
<b>Course Category</b>	Skill Enhancement Courses							
<b>Pre-Requisite/s</b>	ELECTIVES				<b>Co-Requisite/s</b>			
<b>Course Outcomes &amp; Bloom's Level</b>	<b>CO1- TO INCREASE CREATIVE AND TECHNICAL SKILLS(BL4-Analyze)</b>							
<b>Courses Elements</b>	Skill Development ✓ Entrepreneurship ✗ Employability ✓ Professional Ethics ✗ Gender ✗ Human Values ✗ Environment ✗			<b>SDG (Goals)</b>	SDG4(Quality education)			

### Part B

Modules	Contents	Pedagogy	Hours
UNIT	REGULATORY AFFAIRS	ONLINE COURSES	10

### Part D(Marks Distribution)

Theory					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
50	25	25	12	25	13
Practical					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
	0				

### Part E

<b>Books</b>	NA
<b>Articles</b>	NA
<b>References Books</b>	NA
<b>MOOC Courses</b>	1. <a href="https://www.coursera.org/courses?query=regulatory%20affairs">https://www.coursera.org/courses?query=regulatory%20affairs</a> 2. <a href="https://www.igmpi.ac.in/RAprograms.html">https://www.igmpi.ac.in/RAprograms.html</a>
<b>Videos</b>	NA

### Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	-	-	-	-	3	-	-	3	-	3	1	2
CO2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

## Syllabus-2023-2024

### (SOP)(MPharm-PharmaCeutics)

<b>Title of the Course</b>	Good Manufacturing in Pharma
<b>Course Code</b>	MPH 108ET

#### Part A

Year	1st	Semester	1st	Credits	L	T	P	C
					3	1	0	4
<b>Course Type</b>	Theory only							
<b>Course Category</b>	Discipline Specific Elective							
<b>Pre-Requisite/s</b>					<b>Co-Requisite/s</b>			
<b>Course Outcomes &amp; Bloom's Level</b>	<b>CO1-</b> Meaning and importance of GMP in the manufacturing and pharmaceutical industries.( <b>BL1-Remember</b> ) <b>CO2-</b> General and specific requirements for documentation and records( <b>BL2-Understand</b> ) <b>CO3-</b> The role of Production, Quality Control (QC), Quality Assurance (QA) and the Qualified Person (QP) in GMP( <b>BL3-Apply</b> ) <b>CO4-</b> To apply the GMP certification in industry ( <b>BL3-Apply</b> ) <b>CO5-</b> To learn the documentation and GMP SOPs ( <b>BL3-Apply</b> )							
<b>Courses Elements</b>	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professional Ethics ✓ Gender ✓ Human Values ✓ Environment ✓		<b>SDG (Goals)</b>		SDG1(No poverty) SDG3(Good health and well-being) SDG4(Quality education) SDG6(Clean water and sanitation) SDG8(Decent work and economic growth) SDG12(Responsible consumption and production) SDG17(Partnerships for the goals)			

#### Part B

Modules	Contents	Pedagogy	Hours
UNIT 1	Introduction What is Good Manufacturing Practice? Why is GMP important? Official GMP Directives. the basic requirements of Good Manufacturing Practice., Pharmaceutical Quality System Principle and overview of the Pharmaceutical Quality System. Major updates. Development, content and implementation of PQS.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	8
UNIT 2	Personnel Key personnel. Background and duties of the Qualified person. Duties of the Head of production department. Duties of the Head of quality control. Person releasing the batch. Consultants. Personnel training and hygiene, Premises and Equipment Production area. Storage area. Quality control areas. Ancillary areas. Equipment.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	8
UNIT 3	Documentation Premises. Generation and control of documentation. Types of documents and specifications. Manufacturing formula and processing instructions. Packaging instructions. Procedures and records., Production General principles. Prevention of cross-contamination in production. Guidelines for starting materials. Processing operations. Packaging materials and operations. Guidelines for finished products.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	8
UNIT4	Quality Control General principles. Main tasks of the Quality control department. Technical transfer of testing methods. Transfer protocol., Complaints and Recalls GMP Guidelines related to complaints. Classification of defects. Product Recalls.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	8

#### Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	GMP	Seminar	BL3-Apply	2

#### Part D(Marks Distribution)

Theory					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
100	50	75	38	25	13
Practical					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation

#### Part E

<b>Books</b>	Karmacharya JB. Good manufacturing practices (GMP) for medicinal products. Promising Pharmaceuticals. 2014;101.
<b>Articles</b>	Patel KT, Chotai NP. Pharmaceutical GMP: past, present, and future—a review. Die Pharmazie-An International Journal of Pharmaceutical Sciences. 2008 Apr 1;63(4):251-5.
<b>References Books</b>	Durivage MA, editor. The Certified Pharmaceutical GMP Professional Handbook. Quality Press; 2016 May 23.
<b>MOOC Courses</b>	UDEMY, COURSERA, PHARMASTATE ACADEMY
<b>Videos</b>	You tube

#### Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	1	-	1	1	2	-	3	-	1	1	1
CO2	1	-	-	1	1	-	1	1	2	-	3	-	1	1	1
CO3	1	-	-	-	1	-	2	1	2	-	3	-	2	1	1
CO4	2	-	-	1	1	-	1	2	2	-	2	-	1	-	3
CO5	1	-	-	1	1	-	2	2	2	-	2	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



## Syllabus-2023-2024

### (SOP)(MPharm-PharmaCeutics)

<b>Title of the Course</b>	Molecular Pharmaceutics (Nano Tech and Targeted DDS)
<b>Course Code</b>	MPH 201T

#### Part A

Year	1st	Semester	2nd	Credits	L	T	P	C
					4	0	0	4
<b>Course Type</b>	Theory only							
<b>Course Category</b>	Discipline Core							
<b>Pre-Requisite/s</b>	Upon completion of the course student shall be able to understand The various approaches for development of novel drug delivery systems. • The criteria for selection of drugs and polymers for the development of NTDS The formulation and evaluation of novel drug delivery systems				<b>Co-Requisite/s</b>			
<b>Course Outcomes &amp; Bloom's Level</b>	<b>CO1-</b> Recall the basic aspects and approaches of targeted drug delivery systems( <b>BL2-Understand</b> ) <b>CO2-</b> Describe methods for the preparation and evaluation of polymeric nanoparticles and liposome's( <b>BL3-Apply</b> ) <b>CO3-</b> Outline the preparation methods and applications of monoclonal antibodies and vesicular nanocarriers. ( <b>BL3-Apply</b> ) <b>CO4-</b> Discuss the different aspects of pulmonary drug delivery systems( <b>BL4-Analyze</b> ) <b>CO5-</b> Choose components of nucleic acid based therapeutic delivery systems( <b>BL5-Evaluate</b> )							
<b>Courses Elements</b>	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professional Ethics X Gender X Human Values X Environment X			<b>SDG (Goals)</b>		SDG3(Good health and well-being) SDG4(Quality education)		

#### Part B

Modules	Contents	Pedagogy	Hours
UNIT-1	Targeted Drug Delivery Systems: Concepts, Events and biological process involved in drug targeting. Tumor targeting and Brain specific delivery.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	12
UNIT-2	Targeting Methods: introduction preparation and evaluation. Nano Particles & Liposomes: Types, preparation and evaluation.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	12
UNIT-3	Micro Capsules / Micro Spheres: Types, preparation and evaluation, Monoclonal Antibodies; preparation and application, preparation and application of Niosomes, Aquasomes, Phytosomes, Electrosomes	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	12
UNIT-4	Pulmonary Drug Delivery Systems: Aerosols, propellants, Containers Types, preparation and evaluation, Intra Nasal Route Delivery systems; Types, preparation and evaluation	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	12
UNIT-5	5 Nucleic acid based therapeutic delivery system: Gene therapy, introduction (ex-vivo & in- vivo gene therapy). Potential target diseases for gene therapy (inherited disorder and cancer). Gene expression systems (viral and nonviral gene transfer). Liposomal gene delivery systems. Biodistribution and Pharmacokinetics. knowledge of therapeutic antisense molecules and aptamers as drugs of future.	white board/ppt	12

#### Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
UNIT-2	PREPARATION OF NANOSOMES	PBL	BL4-Analyze	8

#### Part D(Marks Distribution)

Theory					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
100	50	75	38	25	13
Practical					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
	0				

#### Part E

<b>Books</b>	Y W. Chien, Novel Drug Delivery Systems, 2nd edition, revised and expanded, Marcel Dekker, Inc., New York, 1992. 2. S. P. Vyas and R. K. Khar, Controlled Drug Delivery - concepts and advances, Vallabh Prakashan, New Delhi, First edition 2002. N.K. Jain, Controlled and Novel Drug Delivery, CBS Publishers & Distributors, New Delhi, First edition 1997 (reprint in 2001).
<b>Articles</b>	<a href="https://pubs.acs.org/journal/mpohbp">https://pubs.acs.org/journal/mpohbp</a>
<b>References Books</b>	Y W. Chien, Novel Drug Delivery Systems, 2nd edition, revised and expanded, Marcel Dekker, Inc., New York, 1992. 2. S. P. Vyas and R. K. Khar, Controlled Drug Delivery - concepts and advances, Vallabh Prakashan, New Delhi, First edition 2002. N.K. Jain, Controlled and Novel Drug Delivery, CBS Publishers & Distributors, New Delhi, First edition 1997 (reprint in 2001).
<b>MOOC Courses</b>	<a href="https://onlinecourses.nptel.ac.in/">https://onlinecourses.nptel.ac.in/</a>
<b>Videos</b>	<a href="https://www.youtube.com/watch?v=rGP7KZOTkzE">https://www.youtube.com/watch?v=rGP7KZOTkzE</a>

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	3	3	3	-	-	-	-	-	3	-	3	-	3
CO2	2	2	2	3	2	-	-	-	-	-	3	-	2	1	2
CO3	2	1	3	2	1	-	-	-	-	-	3	-	2	-	1
CO4	3	2	3	2	3	-	-	-	-	-	3	-	3	2	2
CO5	1	1	3	2	2	-	-	-	-	-	2	-	2	2	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



## Syllabus-2023-2024

### (SOP)(MPharm-PharmaCeutics)

<b>Title of the Course</b>	Advanced Biopharmaceutics & Pharmacokinetics
<b>Course Code</b>	MPH 202T

#### Part A

Year	1st	Semester	2nd	Credits	L	T	P	C
								4
<b>Course Type</b>	Theory only							
<b>Course Category</b>	Discipline Core							
<b>Pre-Requisite/s</b>					<b>Co-Requisite/s</b>			
<b>Course Outcomes &amp; Bloom's Level</b>	<b>CO1-</b> Understand basic concepts in biopharmaceutics and pharmacokinetics ( <b>BL2-Understand</b> ) <b>CO2-</b> Explain design and evaluation of dosage regimens of the drugs using pharmacokinetic and biopharmaceutics parameters( <b>BL2-Understand</b> ) <b>CO3-</b> Analyze raw data and derive the pharmacokinetic models and parameters the best describe the process of drug absorption, distribution, metabolism and elimination( <b>BL3-Apply</b> ) <b>CO4-</b> Know critical evaluation of biopharmaceutics studies involving drug product equivalency( <b>BL5-Evaluate</b> ) <b>CO5-</b> Identify potential clinical pharmacokinetic problems and apply basic pharmacokinetic principles to solve them( <b>BL5-Evaluate</b> )							
<b>Courses Elements</b>	Skill Development ✓ Entrepreneurship ✗ Employability ✓ Professional Ethics ✗ Gender ✗ Human Values ✗ Environment ✗		<b>SDG (Goals)</b>		SDG3(Good health and well-being) SDG4(Quality education)			

#### Part B

Modules	Contents	Pedagogy	Hours
UNIT-I	drug absorption, Factors affecting drug absorption, pH-partition theory of drug absorption. Formulation and physicochemical factors: Dissolution rate, Dissolution process, Noyes- Whitney equation and drug dissolution, Factors affecting the dissolution rate. Gastrointestinal absorption: role of the dosage form: Solution (elixir, syrup and solution) as a dosage form , Suspension as a dosage form, Capsule as a dosage form, Tablet as a dosage form ,Dissolution methods , Formulation and processing factors, Correlation of in vivo data with in vitro dissolution data. Transport model: Permeability-Solubility-Charge State and the pH Partition Hypothesis, Properties of the Gastrointestinal Tract (GIT), pH Microclimate Intracellular pH Environment, Tight-Junction Complex.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	12
UNIT-II	Biopharmaceutic considerations in drug product design and In Vitro Drug Product Performance: Introduction, biopharmaceutic factors affecting drug bioavailability, rate-limiting steps in drug absorption, physicochemical nature of the drug formulation factors affecting drug product performance, in vitro: dissolution and drug release testing, compendial methods of dissolution, alternative methods of dissolution testing, meeting dissolution requirements, problems of variable control in dissolution testing performance of drug products. In vitro-in vivo correlation, dissolution profile comparisons, drug product stability, considerations in the design of a drug product.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	12
UNIT-III	Pharmacokinetics: Basic considerations, pharmacokinetic models, compartment modeling: one compartment model- IV bolus, IV infusion, extra-vascular. Multi compartment model: two compartment - model in brief, non-linear pharmacokinetics: cause of non-linearity, Michaelis – Menten equation, estimation of k <sub>max</sub> and v <sub>max</sub> . Drug interactions: introduction, the effect of protein- binding interactions, the effect of tissue-binding interactions, cytochrome p450- based drug interactions, drug interactions linked to transporters	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT-IV	Drug Product Performance, in vivo: Bioavailability and Bioequivalence: drug product performance, purpose of bioavailability studies, relative and absolute availability. methods for assessing bioavailability, bioequivalence studies, design and evaluation of bioequivalence studies, study designs, crossover study designs, evaluation of the data, bioequivalence example, study submission and drug review process. biopharmaceutics classification system, methods. Permeability: In-vitro, in-situ and In-vivo methods. Generic biologics (biosimilar drug products),clinical significance of bioequivalence studies, special concerns in bioavailability and bioequivalence studies, generic substitution.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	14
UNIT-V	Application of Pharmacokinetics: Modified-Release Drug Products, Targeted Drug Delivery Systems and Biotechnological Products. Introduction to Pharmacokinetics and pharmacodynamic, drug interactions. Pharmacokinetics and pharmacodynamics of biotechnology drugs. Introduction, Proteins and peptides, Monoclonal antibodies, Oligonucleotides, Vaccines (immunotherapy), Gene therapies.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	12

#### Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
EXPERIMENT	PREPARATIONS OF TARGETED DRUG DELIEVERY SYSTEM	PBL	BL3-Apply	10

#### Part D(Marks Distribution)

Theory					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
100	50	75	38	25	13
Practical					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
	0				

## Part E

<b>Books</b>	1. Biopharmaceutics and Clinical Pharmacokinetics, An Introduction, 4th edition, revised and expanded by Robert. E. Notari, Marcel Dekker Inc, New York and Basel, 1987. 2. Biopharmaceutics and Relevant Pharmacokinetics by John. G Wagner and M.Pemarowski, 1st edition, Drug Intelligence Publications, Hamilton, Illinois, 1971. 3. Encyclopedia of Pharmaceutical Technology, Vol 13, James Swarbrick, James. G. Boylan, Marcel Dekker Inc, New York, 1996. 12. Basic Pharmacokinetics, 1st edition, Sunil S Jambhekar and Philip J Breen, pharmaceutical press, RPS Publishing, 2009. 13. Absorption and Drug Development- Solubility, Permeability, and Charge State, Alex Avdeef, John Wiley & Sons, Inc, 2003. 9. Biopharmaceutics and Clinical Pharmacokinetics, An Introduction, 4th edition, revised and expanded by Robert. E. Notari, Marcel Dekker Inc, New York and Basel, 1987. 10. Biopharmaceutics and Relevant Pharmacokinetics by John. G Wagner and M.Pemarowski, 1st edition, Drug Intelligence Publications, Hamilton, Illinois, 1971. 11. Encyclopedia of Pharmaceutical Technology, Vol 13, James Swarbrick, James. G. Boylan, Marcel Dekker Inc, New York, 1996. 12. Basic Pharmacokinetics, 1st edition, Sunil S Jambhekar and Philip J Breen, pharmaceutical press, RPS Publishing, 2009. 13. Absorption and Drug Development- Solubility, Permeability, and Charge State, Alex Avdeef, John Wiley & Sons, Inc, 2003.
<b>Articles</b>	JOURNAL OF PHARMACEUTICS JOURNAL OF MOLECULAR PHARMACEUTICS
<b>References Books</b>	1. Biopharmaceutics and Clinical Pharmacokinetics by Milo Gibaldi, 4th edition, Philadelphia, Lea and Febiger, 1991 2. Biopharmaceutics and Pharmacokinetics, A Treatise, D .M. Brahmkar and Sunil B. Jaiswal., VallabPrakashan, Pitampura, Delhi 3. Applied Biopharmaceutics and Pharmacokinetics by Shargel. Land YuABC, 2nd edition, Connecticut Appleton Century Crofts, 1985 4. Textbook of Biopharmaceutics and Pharmacokinetics, Dr. Shobha Rani R. Hiremath, Prism Book 5. Pharmacokinetics by Milo Gibaldi and D. Perrier, 2nd edition, Marcel Dekker Inc, New York, 1982 6. Current Concepts in Pharmaceutical Sciences: Biopharmaceutics, Swarbrick, J, Lea and Febiger, Philadelphia, 1970 7. Clinical Pharmacokinetics, Concepts and Applications 3rd edition by Malcolm Rowland and Thom~ N. Tozer, Lea and Febiger, Philadelphia, 1995 8. Dissolution, Bioavailability and Bioequivalence, Abdou. H.M, Mack Publishing Company, Pennsylvania 1989
<b>MOOC Courses</b>	NPTEL
<b>Videos</b>	<a href="https://www.youtube.com/watch?v=hXrniai9ZR0">https://www.youtube.com/watch?v=hXrniai9ZR0</a>

## Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	3	1	3	-	-	-	-	3	-	1	1	1
CO2	2	1	2	2	2	2	-	-	-	-	2	-	2	2	2
CO3	2	2	3	1	2	1	-	-	-	-	2	-	1	2	2
CO4	3	-	1	2	2	2	-	-	-	-	3	-	2	-	2
CO5	3	1	3	2	3	2	-	-	-	-	2	-	1	1	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

## Syllabus-2023-2024

### (SOP)(MPharm-PharmaCeutics)

<b>Title of the Course</b>	Computer Aided Drug Delivery System
<b>Course Code</b>	MPH 203T

#### Part A

Year	1st	Semester	2nd	Credits	L	T	P	C
					4	0	0	4
<b>Course Type</b>	Theory only							
<b>Course Category</b>	Discipline Core							
<b>Pre-Requisite/s</b>					<b>Co-Requisite/s</b>			
<b>Course Outcomes &amp; Bloom's Level</b>	<b>CO1-</b> Describe statistical modeling and quality by design in pharmaceutical research and development ( <b>BL2-Understand</b> ) <b>CO2-</b> Discuss the descriptors of drug disposition utilized in computational modeling( <b>BL2-Understand</b> ) <b>CO3-</b> Understand the ethics and legal protection of computing in pharmaceutical research( <b>BL2-Understand</b> ) <b>CO4-</b> Defend in silico approaches for biopharmaceutical characterization( <b>BL3-Apply</b> ) <b>CO5-</b> Recognize the importance of automation in pharmaceutical development( <b>BL4-Analyze</b> )							
<b>Courses Elements</b>	Skill Development ✓ Entrepreneurship ✗ Employability ✓ Professional Ethics ✗ Gender ✗ Human Values ✗ Environment ✗		<b>SDG (Goals)</b>		SDG3(Good health and well-being) SDG4(Quality education) SDG7(Affordable and clean energy) SDG9(Industry Innovation and Infrastructure)			

#### Part B

Modules	Contents	Pedagogy	Hours
UNIT-I	a. Computers in Pharmaceutical Research and Development: A General Overview: History of Computers in Pharmaceutical Research and Development. Statistical modeling in Pharmaceutical research and development: Descriptive versus Mechanistic Modeling, Statistical Parameters, Estimation, Confidence Regions, Nonlinearity at the Optimum, Sensitivity Analysis, Optimal Design, Population Modeling b. Quality-by-Design In Pharmaceutical Development: Introduction, ICH Q8 guideline, Regulatory and industry views on QbD, Scientifically based QbD - examples of application.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	12
UNIT-II	2 Computational Modeling Of Drug Disposition: Introduction ,Modeling Techniques: Drug Absorption, Solubility, Intestinal Permeation, Drug Distribution ,Drug Excretion, Active Transport; P-gp, BCRP, Nucleoside Transporters, hPEPT1, ASBT, OCT, OATP, BBB-Choline Transporter	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	12
UNIT-III	3 Computer-aided formulation development: Concept of optimization, Optimization parameters, Factorial design, Optimization technology & Screening design. Computers in Pharmaceutical Formulation: Development of pharmaceutical emulsions, microemulsion drug carriers Legal Protection of Innovative Uses of Computers in R&D, The Ethics of Computing in Pharmaceutical Research, Computers in Market analysis	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	15
UNIT-IV	4 a. Computer-aided biopharmaceutical characterization: Gastrointestinal absorption simulation. Introduction, Theoretical background, Model construction, Parameter sensitivity analysis, Virtual trial, Fed vs. fasted state, Invitro dissolution and in vitro- in vivo correlation, Biowaiver considerations b. Computer Simulations in Pharmacokinetics and Pharmacodynamics: Introduction, Computer Simulation: Whole Organism, Isolated Tissues, Organs, Cell, Proteins and Genes. c. Computers in Clinical Development: Clinical Data Collection and Management, Regulation of Computer Systems	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	12
UNIT-V	5 Artificial Intelligence (AI), Robotics and Computational fluid dynamics: General overview, Pharmaceutical Automation, Pharmaceutical applications, Advantages and Disadvantages. Current Challenges and Future Directions	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	9

#### Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	ARTIFICIAL INTELLIGENCE IN HEALTH CARE	Seminar	BL4-Analyze	2

#### Part D(Marks Distribution)

Theory					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
100	50	75	38	25	13
Practical					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation

#### Part E

<b>Books</b>	1. Computer Applications in Pharmaceutical Research and Development, Sean Ekins, 2006, John Wiley & Sons. 2. Computer-Aided Applications in Pharmaceutical Technology, 1st Edition, Jelena Djuris, Woodhead Publishing 3. Encyclopediaof Pharmaceutical Technology, Vol 13, James Swarbrick, James. G. Boylan, Marcel Dekker Inc, New York, 1996.
<b>Articles</b>	1. Computer Applications in Pharmaceutical Research and Development, Sean Ekins, 2006, John Wiley & Sons. 2. Computer-Aided Applications in Pharmaceutical Technology, 1st Edition, Jelena Djuris, Woodhead Publishing 3. Encyclopediaof Pharmaceutical Technology, Vol 13, James Swarbrick, James. G. Boylan, Marcel Dekker Inc, New York, 1996.
<b>References Books</b>	1. Computer Applications in Pharmaceutical Research and Development, Sean Ekins, 2006, John Wiley & Sons. 2. Computer-Aided Applications in Pharmaceutical Technology, 1st Edition, Jelena Djuris, Woodhead Publishing 3. Encyclopediaof Pharmaceutical Technology, Vol 13, James Swarbrick, James. G. Boylan, Marcel Dekker Inc, New York, 1996.
<b>MOOC Courses</b>	nptel
<b>Videos</b>	pharmawins

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	3	-	3	-	1	-	-	-	3	-	1	-	1
CO2	2	2	3	-	3	-	-	-	-	-	3	-	-	1	2
CO3	1	-	2	-	2	-	-	-	-	-	3	-	2	2	2
CO4	3	1	2	-	3	-	1	-	-	-	2	-	1	-	-
CO5	3	-	1	-	3	-	1	-	-	-	2	-	-	2	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

## Syllabus-2023-2024

### (SOP)(MPharm-PharmaCeutics)

<b>Title of the Course</b>	Cosmetics and Cosmeceuticals
<b>Course Code</b>	MPH 204T

#### Part A

Year	1st	Semester	2nd	Credits	L	T	P	C
					4	0	0	4
<b>Course Type</b>	Theory only							
<b>Course Category</b>	Discipline Core							
<b>Pre-Requisite/s</b>								
<b>Co-Requisite/s</b>								
<b>Course Outcomes &amp; Bloom's Level</b>	<b>CO1-</b> Gain information on key ingredients used in cosmetics and cosmeceuticals ( <b>BL1-Remember</b> ) <b>CO2-</b> Understand key building blocks of cosmetics for various formulations ( <b>BL2-Understand</b> ) <b>CO3-</b> Know the current technologies in the market( <b>BL2-Understand</b> ) <b>CO4-</b> Understand the scientific principles to develop cosmetics and cosmeceuticals with desired safety( <b>BL2-Understand</b> ) <b>CO5-</b> Understand the regulatory aspects in cosmetics( <b>BL4-Analyze</b> )							
<b>Courses Elements</b>	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professional Ethics ✗ Gender ✗ Human Values ✗ Environment ✗	<b>SDG (Goals)</b>	SDG3(Good health and well-being) SDG4(Quality education) SDG9(Industry Innovation and Infrastructure)					

#### Part B

Modules	Contents	Pedagogy	Hours
UNIT-I	Cosmetics – Regulatory: Definition of cosmetic products as per Indian regulation. Indian regulatory requirements for labeling of cosmetics Regulatory provisions relating to import of cosmetics., Misbranded and spurious cosmetics. Regulatory provisions relating to manufacture of cosmetics – Conditions for obtaining license, prohibition of manufacture and sale of certain cosmetics, loan license, offences and penalties.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	12
UNIT-II	Cosmetics - Biological aspects: Structure of skin relating to problems like dry skin, acne, pigmentation, prickly heat, wrinkles and body odor. Structure of hair and hair growth cycle. Common problems associated with oral cavity. Cleansing and care needs for face, eye lids, lips, hands, feet, nail, scalp, neck, body and under-arm.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	12
UNIT-III	Formulation Building blocks: Building blocks for different product formulations of cosmetics/cosmeceuticals. Surfactants – Classification and application. Emollients, rheological additives: classification and application. Antimicrobial used as preservatives, their merits and demerits. Factors affecting microbial preservative efficacy. Building blocks for formulation of a moisturizing cream, vanishing cream, cold cream, shampoo and toothpaste. Soaps and syndetbars. Perfumes; Classification of perfumes. Perfume ingredients listed as allergens in EU regulation	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	14
UNIT-IV	Design of cosmeceutical products: Sun protection, sunscreens classification and regulatory aspects. Addressing dry skin, acne, sun-protection, pigmentation, prickly heat, wrinkles, body odor., dandruff, dental cavities, bleeding gums, mouth odor and sensitive teeth through cosmeceutical formulations	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	12
UNIT-V	Herbal Cosmetics: Herbal ingredients used in Hair care, skin care and oral care. Review of guidelines for herbal cosmetics by private bodies like cosmos with respect to preservatives, emollients, foaming agents, emulsifiers and rheology modifiers. Challenges in formulating herbal cosmetics.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10

#### Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
UNIT-4	COSMETIC PREPARATIONS	PBL	BL3-Apply	12

#### Part D(Marks Distribution)

Theory					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
100	50	75	38	25	13
Practical					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
	0				

#### Part E

<b>Books</b>	Harry's Cosmeticology. 8th edition. Poucher'sperfumecosmeticsandSoaps,10th edition. 3. Cosmetics - Formulation, Manufacture and quality control, PP.Sharma,4th edition Handbook of cosmetic science and Technology A. O. Barel, M. Payeand H.I. Maibach. 3rd edition 5. Cosmetic and Toiletries recent suppliers catalogue. CTFA directory.
<b>Articles</b>	<a href="https://onlinelibrary.wiley.com/journal/14682494">https://onlinelibrary.wiley.com/journal/14682494</a>
<b>References Books</b>	Harry's Cosmeticology. 8th edition. Poucher'sperfumecosmeticsandSoaps,10th edition. Cosmetics - Formulation, Manufacture and quality control, PP.Sharma,4th edition Handbook of cosmetic science and Technology A. O. Barel, M. Payeand H.I. Maibach. 3rd edition Cosmetic and Toiletries recent suppliers catalogue. CTFA directory.
<b>MOOC Courses</b>	<a href="https://nptel.ac.in/">https://nptel.ac.in/</a>
<b>Videos</b>	<a href="https://www.youtube.com/watch?v=bcCkQ1liaKA">https://www.youtube.com/watch?v=bcCkQ1liaKA</a>

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	-	-	-	2	-	-	-	-	-	3	-	1	1	1
CO2	3	1	-	-	2	-	-	-	-	-	3	-	2	2	2
CO3	2	2	-	-	2	-	-	-	-	-	1	-	1	-	2
CO4	1	2	-	-	1	-	-	-	-	-	2	-	1	-	3
CO5	3	-	-	-	-	-	-	-	-	-	1	-	-	2	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

## Syllabus-2023-2024

(SOP)(MPharm-Pharmaceuticals)

<b>Title of the Course</b>	Pharmaceutics Practical II
<b>Course Code</b>	MPH 205P

### Part A

Year	1st	Semester	2nd	Credits	L	T	P	C
						7	0	0
<b>Course Type</b>	Lab only							
<b>Course Category</b>	Discipline Core							
<b>Pre-Requisite/s</b>	TO GAIN EXPERIMENTAL KNOWLEDGE				<b>Co-Requisite/s</b>			
<b>Course Outcomes &amp; Bloom's Level</b>	<b>CO1-</b> To understand and apply the practical knowledge( <b>BL2-Understand</b> ) <b>CO2-</b> To understand the concepts of bioavailability and bioequivalence of drug products and their significance( <b>BL2-Understand</b> ) <b>CO3-</b> To prepare several herbal and cosmetic formulations( <b>BL3-Apply</b> ) <b>CO4-</b> Hands training on new drug development softwares( <b>BL3-Apply</b> )							
<b>Course Elements</b>	Skill Development ✓ Entrepreneurship ✗ Employability ✓ Professional Ethics ✗ Gender ✗ Human Values ✗ Environment ✗			<b>SDG (Goals)</b>	SDG3(Good health and well-being) SDG4(Quality education)			

### Part B

Modules	Contents	Pedagogy	Hours
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### Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	1. To study the effect of temperature change, non-solvent addition, incompatible polymer addition in microcapsules preparation	Experiments	BL4-Analyze	4
2	2. Preparation and evaluation of Alginate beads	PBL	BL6-Create	4
3	3. Formulation and evaluation of gelatin /albumin microspheres	PBL	BL6-Create	4
4	4. Formulation and evaluation of liposomes/niosomes	PBL	BL6-Create	4
5	5. Formulation and evaluation of spherules	PBL	BL6-Create	4
6	6. Improvement of dissolution characteristics of slightly soluble drug by Solid dispersion technique.	PBL	BL4-Analyze	4
7	7. Comparison of dissolution of two different marketed products /brands	PBL	BL5-Evaluate	4
8	8. Protein binding studies of a highly protein bound drug & poorly protein bound drug	PBL	BL4-Analyze	4

### Part D(Marks Distribution)

Theory					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
Practical					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
150	75	100	50	50	25

### Part E

<b>Books</b>	7. Pharmaceutics- The science of dosage form design by M.E.Aulton, Churchill Livingstone, Latest edition
<b>Articles</b>	<a href="https://www.ipinnovative.com/journal-name/JPBS">https://www.ipinnovative.com/journal-name/JPBS</a>
<b>References Books</b>	1 Modern Pharmaceutics by Gilbert S. Banker & C.T. Rhodes, 3rd Edition 2.Remington: The Science and Practice of Pharmacy, 20th edition 3. Pharmaceutical Science (RPS) 3. Theory and Practice of Industrial Pharmacy by Liberman & Lachman
<b>MOOC Courses</b>	<a href="https://nptel.ac.in/">https://nptel.ac.in/</a>
<b>Videos</b>	NA

### Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	-	-	3	-	1	-	1
CO2	3	-	1	1	-	-	-	-	-	-	3	-	-	1	2
CO3	2	-	2	2	-	-	-	-	-	-	3	-	2	-	3
CO4	3	-	-	1	-	-	-	-	-	-	3	-	-	-	2
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

## Syllabus-2023-2024

(SOP)(MPharm-PharmaCeutics)

<b>Title of the Course</b>	Seminars
<b>Course Code</b>	MPH 206S

### Part A

Year	1st	Semester	2nd	Credits	L	T	P	C
					0	0	7	7
<b>Course Type</b>	Lab only							
<b>Course Category</b>	Discipline Core							
<b>Pre-Requisite/s</b>					<b>Co-Requisite/s</b>			
<b>Course Outcomes &amp; Bloom's Level</b>	<b>CO1-</b> The purpose of a seminar is to enable students to improve their knowledge and understanding of a topic by engaging with key issues( <b>BL3-Apply</b> ) <b>CO2-</b> To Focus on sharing the knowledge( <b>BL3-Apply</b> ) <b>CO3-</b> To improve the communicative ,presentation and understanding skills in students( <b>BL3-Apply</b> )							
<b>Coures Elements</b>	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professional Ethics ✗ Gender ✗ Human Values ✗ Environment ✗		<b>SDG (Goals)</b>		SDG3(Good health and well-being) SDG4(Quality education) SDG7(Affordable and clean energy)			

### Part B

Modules	Contents	Pedagogy	Hours
UNIT-I	a. Computers in Pharmaceutical Research and Development: A General Overview: History of Computers in Pharmaceutical Research and Development. Statistical modeling in Pharmaceutical research and development: Descriptive versus Mechanistic Modeling, Statistical Parameters, Estimation, Confidence Regions, Nonlinearity at the Optimum, Sensitivity Analysis, Optimal Design, Population Modeling b. Quality-by-Design In Pharmaceutical Development: Introduction, ICH Q8 guideline, Regulatory and industry views on QbD, Scientifically based QbD - examples of application.	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	12

### Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Polymers in NDDS	Seminar	BL2-Understand	12
2	Gene therapy	Seminar	BL2-Understand	10
3	PKPD studies	Research Paper Presentation	BL4-Analyze	12
4	Insilico drug designing	Simulation	BL3-Apply	8

### Part D(Marks Distribution)

Theory					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
Practical					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
100	50	75	38	25	13

### Part E

<b>Books</b>	NA
<b>Articles</b>	NA
<b>References Books</b>	NA
<b>MOOC Courses</b>	NA
<b>Videos</b>	NA

### Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	1-	-	-	-	-	-	-	3	3	1	1	-	3
CO2	-	2	2	-	-	-	-	-	-	3	3	2	-	-	1
CO3	2	-	1	-	-	-	-	-	-	3	3	1	2	-	2
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



## Syllabus-2023-2024

### (SOP)(MPharm-PharmaCeutics)

<b>Title of the Course</b>	Online Certificate Course
<b>Course Code</b>	MPH 207ET

#### Part A

Year	1st	Semester	2nd	Credits	L	T	P	C
					2	0	0	2
<b>Course Type</b>	Online course							
<b>Course Category</b>	Skill Enhancement Courses							
<b>Pre-Requisite/s</b>	Pharmaceutical background				<b>Co-Requisite/s</b>			
<b>Course Outcomes &amp; Bloom's Level</b>	<b>CO1-</b> Why QbD, what is QbD? FDA objectives, the QbD approach() <b>CO2-</b> QbD and continuous processing: FDA perspective, advantages, challenges() <b>CO3-</b> Determining CPPs and CMAs, CQA,QTPP,RISK ASSESSMENT()							
<b>Coures Elements</b>	Skill Development ✓ Entrepreneurship ✗ Employability ✓ Professional Ethics ✗ Gender ✗ Human Values ✗ Environment ✗		<b>SDG (Goals)</b>		SDG3(Good health and well-being) SDG4(Quality education) SDG9(Industry Innovation and Infrastructure)			

#### Part B

Modules	Contents	Pedagogy	Hours
UNIT-I	As per recommended Course provider	PEER TUTORIAL	60

#### Part D(Marks Distribution)

Theory					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
50	25	35	18	15	8
Practical					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
	0				

#### Part E

<b>Books</b>	NA
<b>Articles</b>	NA
<b>References Books</b>	NA
<b>MOOC Courses</b>	1. <a href="https://ispe.org/training/course/qbd">https://ispe.org/training/course/qbd</a> 2. <a href="https://www.udemy.com/course/quality-by-design-qbd-in-pharmaceutical-development/?--=&amp;utm_source=adwords&amp;utm_medium=udemyads&amp;utm_campaign=LongTail_la.EN_cc.INDIA&amp;utm_content=deal4584&amp;utm_term=__ag_118445032537__ad_618853564450__kw__de_c__dm__pl__1212271230479__li_1007795__pd__&amp;matchtype=&amp;gad_source=1&amp;gclid=Cj0KCQjwztOwBhD7ARIsAPDKnkBXWZvoPEBACFjanUEyfigFRV8AJSdYMY2AH1tTLjXCBcpyt7DSYX8aAsvOEALw_wcB&amp;co">https://www.udemy.com/course/quality-by-design-qbd-in-pharmaceutical-development/?--=&amp;utm_source=adwords&amp;utm_medium=udemyads&amp;utm_campaign=LongTail_la.EN_cc.INDIA&amp;utm_content=deal4584&amp;utm_term=__ag_118445032537__ad_618853564450__kw__de_c__dm__pl__1212271230479__li_1007795__pd__&amp;matchtype=&amp;gad_source=1&amp;gclid=Cj0KCQjwztOwBhD7ARIsAPDKnkBXWZvoPEBACFjanUEyfigFRV8AJSdYMY2AH1tTLjXCBcpyt7DSYX8aAsvOEALw_wcB&amp;co</a> 3. <a href="https://www.6sigma.us/quality-by-design/">https://www.6sigma.us/quality-by-design/</a>
<b>Videos</b>	NA

#### Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	-	-	-	-	-	-	-	3	-	1	1	1
CO2	2	2	2	-	-	-	-	-	-	-	3	-	2	2	2
CO3	3	-	-	-	-	-	-	-	-	-	3	-	1	1	1
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

## Syllabus-2023-2024

(SOP)(MPharm-PharmaCeutics)

<b>Title of the Course</b>	Introduction to intellectual property rights
<b>Course Code</b>	MPH 208ET

### Part A

Year	1st	Semester	2nd	Credits	L	T	P	C
						3	1	0
<b>Course Type</b>	Theory only							
<b>Course Category</b>	Skill Enhancement Courses							
<b>Pre-Requisite/s</b>					<b>Co-Requisite/s</b>			
<b>Course Outcomes &amp; Bloom's Level</b>	<b>CO1-</b> To create awareness of IPR among pharmacy students. <b>(BL2-Understand)</b> <b>CO2-</b> To make the pharmacy students aware about the pharmaceutical R & D and the activities therein. <b>(BL2-Understand)</b> <b>CO3-</b> Develop the understanding of the Intellectual Property Rights necessary for research activities in the pharmaceutical industry. <b>(BL3-Apply)</b> <b>CO4-</b> To know the database of intellectual property and TKDL <b>(BL2-Understand)</b> <b>CO5-</b> To apply the Knowledge of IPR in drafting and filling of IPR <b>(BL3-Apply)</b>							
<b>Courses Elements</b>	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professional Ethics ✓ Gender ✗ Human Values ✓ Environment ✗		<b>SDG (Goals)</b>		SDG1(No poverty) SDG3(Good health and well-being) SDG4(Quality education) SDG6(Clean water and sanitation) SDG8(Decent work and economic growth) SDG17(Partnerships for the goals)			

### Part B

Modules	Contents	Pedagogy	Hours
UNIT 1	The pharmaceutical business and The pharmaceutical R & D	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT 2	Module 3 – Intellectual Property Rights: Introduction about patents, copyright, trademark, Industrial Designs, Geographical Indications, Trade Secrets, Module 4 – IPR: With specific reference to pharma	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT 3	IPR: Indian patent scenario and Patent commercialization and licensing	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	10
UNIT 4	Patent drafting and Patent searches, patent filing, registration, granting World Intellectual Property Organization (WIPO) and its functions	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	08
UNIT 5	IP in Traditional Knowledge, TKDL database in medicinal plants, INDIAN WEB-PORTALS FOR PATENTS AND TECHNOLOGIES	Lecture based learning, interactive class, Peer tutorial, Class using ICT tool/PPT/white board	07

### Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	patent drafting and filing	Case Study	BL3-Apply	5

### Part D(Marks Distribution)

Theory					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
100	50	75	38	25	13
Practical					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation

### Part E

<b>Books</b>	Cockburn IM. Intellectual property rights and pharmaceuticals: challenges and opportunities for economic research. The economics of intellectual property. 2009 Jan:150.
<b>Articles</b>	Savale SK, Savale VK. Intellectual property rights (IPR). World J Pharm Pharm Sci. 2016 Apr 22;5:2559-92.
<b>References Books</b>	Prabu SL, Tnk S, editors. Intellectual property rights. BoD–Books on Demand; 2017 Jun 21.
<b>MOOC Courses</b>	NEPTEL
<b>Videos</b>	NA

### Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	2	-	1	-	-	-	3	-	2	3	-	1	1	1
CO2	-	1	-	-	-	-	-	3	-	-	2	-	1	-	1
CO3	-	1	-	-	-	-	-	2	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	2	-	-	2	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-





## Syllabus-2023-2024

(SOP)(MPharm-PharmaCeutics)

<b>Title of the Course</b>	Research Methodology and Biostatistics
<b>Course Code</b>	MPH 301T

### Part A

Year	2nd	Semester	3rd	Credits	L	T	P	C
					4	0	0	4
<b>Course Type</b>	Theory only							
<b>Course Category</b>	Discipline Core							
<b>Pre-Requisite/s</b>				<b>Co-Requisite/s</b>				
<b>Course Outcomes &amp; Bloom's Level</b>	<b>CO1-</b> Develop the ability to apply the methods while working on a research project work( <b>BL2-Understand</b> ) <b>CO2-</b> Describe the appropriate statistical methods required for a particular research design ( <b>BL2-Understand</b> ) <b>CO3-</b> Choose the appropriate research design and develop appropriate research hypothesis for a research project( <b>BL3-Apply</b> ) <b>CO4-</b> Develop an appropriate framework for research studies( <b>BL4-Analyze</b> )							
<b>Courses Elements</b>	Skill Development ✓ Entrepreneurship ✗ Employability ✓ Professional Ethics ✗ Gender ✗ Human Values ✗ Environment ✗		<b>SDG (Goals)</b>	SDG3(Good health and well-being) SDG4(Quality education)				

## Part B

Modules	Contents	Pedagogy	Hours
UNIT-I	General Research Methodology: Research, objective, requirements, practical difficulties, review of literature, study design, types of studies, strategies to eliminate errors/bias, controls, randomization, crossover design, placebo, blinding techniques	WHITEBOARD	12
UNIT-II	Biostatistics: Definition, application, sample size, importance of sample size, factors influencing sample size, dropouts, statistical tests of significance, type of significance tests, parametric tests (students "t" test, ANOVA, Correlation coefficient, regression), non-parametric tests (wilcoxon rank tests, analysis of variance, correlation, chi square test), null hypothesis, P values, degree of freedom, interpretation of P values.	WHITE BOARD	12
UNIT-III	Medical Research: History, values in medical ethics, autonomy, beneficence, non- maleficence, double effect, conflicts between autonomy and beneficence/non- maleficence, euthanasia, informed consent, confidentiality, criticisms of orthodox medical ethics, importance of communication, control resolution, guidelines, ethics committees, cultural concerns, truth telling, online business practices, conflicts of interest, referral, vendor relationships, treatment of family members, sexual relationships, fatality.	WHITE BOARD	12
UNIT-IV	CPCSEA guidelines for laboratory animal facility: Goals, veterinary care, quarantine, surveillance, diagnosis, treatment and control of disease, personal hygiene, location of animal facilities to laboratories, anesthesia, euthanasia, physical facilities, environment, animal husbandry, record keeping, SOPs, personnel and training, transport of lab animals	WHITE BOARD	12
UNIT-V	Declaration of Helsinki: History, introduction, basic principles for all medical research, and additional principles for medical research combined with medical care	WHITE BOARD	12

## Part D(Marks Distribution)

Theory					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
100	50	75	37	25	12
Practical					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
	0				

## Part E

<b>Books</b>	1. Pharmaceutical statistics- Practical and clinical applications, Sanford Bolton, publisher Marcel Dekker Inc. NewYork. 2. Fundamental of Statistics – Himalaya Publishing House- S.C.Guptha
<b>Articles</b>	NA
<b>References Books</b>	1. Design and Analysis of Experiments –PHI Learning Private Limited, R. Pannerselvam. 2. Design and Analysis of Experiments – Wiley Students Edition, Douglas and C. Montgomery
<b>MOOC Courses</b>	<a href="https://www.coursera.org/search?query=biostatistics%20in%20public%20health">https://www.coursera.org/search?query=biostatistics%20in%20public%20health</a>
<b>Videos</b>	<a href="https://www.youtube.com/watch?v=UtivXLO7c9A">https://www.youtube.com/watch?v=UtivXLO7c9A</a>

## Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	3	3	3	-	-	-	-	-	-	3	-	1	1	1
CO2	-	2	2	1	-	-	-	-	-	-	3	-	2	2	2
CO3	-	3	1	2	-	-	-	-	-	-	2	-	1	2	1
CO4	-	3	3	3	-	-	-	-	-	-	2	-	2	-	2
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

## Syllabus-2023-2024

### (SOP)(MPharm-PharmaCeutics)

<b>Title of the Course</b>	Journal Club
<b>Course Code</b>	MPH 302P

#### Part A

Year	2nd	Semester	3rd	Credits	L	T	P	C
					0	0	1	1
<b>Course Type</b>	Lab only							
<b>Course Category</b>	Discipline Core							
<b>Pre-Requisite/s</b>					<b>Co-Requisite/s</b>			
<b>Course Outcomes &amp; Bloom's Level</b>	<b>CO1-</b> To acquire communication skills,group discussion, team work and to gain new knowledge( <b>BL2-Understand</b> ) <b>CO2-</b> o critically evaluate recent articles in the academic literature ( <b>BL3-Apply</b> )							
<b>Coures Elements</b>	Skill Development ✓ Entrepreneurship ✗ Employability ✓ Professsonal Ethics ✓ Gender ✗ Human Values ✗ Environment ✗		<b>SDG (Goals)</b>	SDG4(Quality education) SDG17(Partnerships for the goals)				

#### Part B

Modules	Contents	Pedagogy	Hours
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#### Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	To understand the recent literature in Pharmaceutical sciences	Research Paper Presentation	BL3-Apply	12
2	To prepare review articles	Case Study	BL5-Evaluate	5
3	To present review articles	Research Paper Presentation	BL3-Apply	2

#### Part D(Marks Distribution)

Theory					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
Practical					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
25	13	25	12	0	0

## Part E

<b>Books</b>	NA
<b>Articles</b>	
<b>References Books</b>	NA
<b>MOOC Courses</b>	NA
<b>Videos</b>	NA

## Course Articulation Matrix

<b>COs</b>	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	-	1	-	-	-	-	-	-	3	-	1	2	3
CO2	1	2	-	2	-	-	-	-	-	-	3	-	-	3	1
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



## Syllabus-2023-2024

### (SOP)(MPharm-PharmaCeutics)

<b>Title of the Course</b>	Discussion Presentation (Proposal Presentation)
<b>Course Code</b>	MPH 303P

#### Part A

Year	2nd	Semester	3rd	Credits	L	T	P	C
					0	0	2	2
<b>Course Type</b>	Lab only							
<b>Course Category</b>	Projects and Internship							
<b>Pre-Requisite/s</b>	Selection and discussion of project proposal			<b>Co-Requisite/s</b>				
<b>Course Outcomes &amp; Bloom's Level</b>	<b>CO1-</b> To know how to frame a research problem () <b>CO2-</b> to know how to set a hypothesis() <b>CO3-</b> can able to perform literature survey, and prepare a proposal of thesis()							
<b>Coures Elements</b>	Skill Development ✓ Entrepreneurship ✗ Employability ✗ Professsonal Ethics ✗ Gender ✗ Human Values ✗ Environment ✗		<b>SDG (Goals)</b>	SDG3(Good health and well-being) SDG4(Quality education) SDG17(Partnerships for the goals)				

#### Part B

Modules	Contents	Pedagogy	Hours
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#### Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	General Research Methodology: Research, objective, requirements, practical difficulties, review of literature, study design, types of studies, strategies to eliminate errors/bias, controls, randomization, crossover design, placebo, blinding techniques	Research Paper Presentation	BL3-Apply	12

#### Part D(Marks Distribution)

Theory					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
Practical					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
50	25	50	25	0	0

## Part E

<b>Books</b>	NA
<b>Articles</b>	NA
<b>References Books</b>	NA
<b>MOOC Courses</b>	NA
<b>Videos</b>	NA

## Course Articulation Matrix

<b>COs</b>	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	2	2	-	-	-	-	-	-	3	-	1	2	2
CO2	3	1	1	1	-	-	-	-	-	-	3	-	2	2	1
CO3	1	2	2	3	-	-	-	-	-	-	2	-	1	1	1
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

## Syllabus-2023-2024

### (SOP)(MPharm-PharmaCeutics)

<b>Title of the Course</b>	Research Work
<b>Course Code</b>	MPH 304P

#### Part A

Year	2nd	Semester	3rd	Credits	L	T	P	C
					0	0	14	14
<b>Course Type</b>	Lab only							
<b>Course Category</b>	Projects and Internship							
<b>Pre-Requisite/s</b>				<b>Co-Requisite/s</b>				
<b>Course Outcomes &amp; Bloom's Level</b>	<b>CO1-</b> To know how to conduct a research( <b>BL2-Understand</b> ) <b>CO2-</b> To know about different research methodologies( <b>BL2-Understand</b> ) <b>CO3-</b> Application of research principles and statistical principles( <b>BL3-Apply</b> )							
<b>Courses Elements</b>	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professional Ethics ✓ Gender ✗ Human Values ✓ Environment ✗		<b>SDG (Goals)</b>	SDG4(Quality education)				

#### Part B

Modules	Contents	Pedagogy	Hours
UNIT-I			

#### Part D(Marks Distribution)

Theory					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
	175				
Practical					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
350	175	200	100	150	75

#### Part E

<b>Books</b>	NA
<b>Articles</b>	NA
<b>References Books</b>	NA
<b>MOOC Courses</b>	NA
<b>Videos</b>	NA

## Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	2	2	-	-	-	-	3	-	1	3	3
CO2	3	2	3	2	2	1	-	-	-	-	3	-	2	1	3
CO3	3	3	3	2	2	1	-	-	-	-	3	-	3	1	3
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

## Syllabus-2023-2024

### (SOP)(MPharm-PharmaCeutics)

<b>Title of the Course</b>	Research Presentation in Seminar/ Conference/Symposium
<b>Course Code</b>	MPH 305P

#### Part A

Year	2nd	Semester	3rd	Credits	L	T	P	C
					0	0	2	2
<b>Course Type</b>	Lab only							
<b>Course Category</b>	Projects and Internship							
<b>Pre-Requisite/s</b>	know about preparation of presentation			<b>Co-Requisite/s</b>				
<b>Course Outcomes &amp; Bloom's Level</b>	<b>CO1-</b> develop the communication skills( <b>BL2-Understand</b> ) <b>CO2-</b> develop presentation skills( <b>BL3-Apply</b> )							
<b>Courses Elements</b>	Skill Development ✓ Entrepreneurship ✗ Employability ✗ Professional Ethics ✗ Gender ✗ Human Values ✗ Environment ✗		<b>SDG (Goals)</b>	SDG4(Quality education)				

#### Part B

Modules	Contents	Pedagogy	Hours
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#### Part D(Marks Distribution)

Theory					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
Practical					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
50	25	50	25	0	0

#### Part E

<b>Books</b>	NA
<b>Articles</b>	NA
<b>References Books</b>	NA
<b>MOOC Courses</b>	NA
<b>Videos</b>	NA

## Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	-	-	-	-	-	-	-	-	3	3	3	1	2	3
CO2	1	1	1	-	-	-	-	-	-	3	3	3	2	2	2
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



## Syllabus-2023-2024

### (SOP)(MPharm-PharmaCeutics)

<b>Title of the Course</b>	Journal Club
<b>Course Code</b>	MPH 401P

#### Part A

Year	2nd	Semester	4th	Credits	L	T	P	C
					0	0	1	1
<b>Course Type</b>	Lab only							
<b>Course Category</b>	Projects and Internship							
<b>Pre-Requisite/s</b>	In a journal club, a group of participants who have common practice or research interests meet regularly for a defined pedagogical purpose. The club often discusses current research articles and the appropriateness of the study design, the data analysis, the conclusions drawn, and the potential applications or implications of the research to practice and patient care. In pharmacy, these clubs allow pharmacists to understand the current drug research to help make evidence-based recommendations. The goals of journal clubs in education and research.				<b>Co-Requisite/s</b>			
<b>Course Outcomes &amp; Bloom's Level</b>	<b>CO1-</b> To acquire communication skills,group discussion, team work and to gain new knowledge( <b>BL2-Understand</b> ) <b>CO2-</b> To critically evaluate recent articles in the academic literature ( <b>BL3-Apply</b> )							
<b>Coures Elements</b>	Skill Development ✓ Entrepreneurship ✗ Employability ✗ Professsional Ethics ✗ Gender ✗ Human Values ✗ Environment ✗		<b>SDG (Goals)</b>		SDG4(Quality education)			

#### Part B

Modules	Contents	Pedagogy	Hours
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#### Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	To understand the recent literature in Pharmaceutical sciences	Internships	BL3-Apply	8

#### Part D(Marks Distribution)

Theory					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
Practical					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
25	12	25	13	0	0



## Part E

<b>Books</b>	NA
<b>Articles</b>	NA
<b>References Books</b>	NA
<b>MOOC Courses</b>	NA
<b>Videos</b>	NA

## Course Articulation Matrix

<b>COs</b>	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	-	-	-	-	-	-	-	-	3	-	1	-	3
CO2	3	-	1	-	-	-	-	-	-	-	3	-	-	-	1
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

## Syllabus-2023-2024

### (SOP)(MPharm-PharmaCeutics)

<b>Title of the Course</b>	Discussion/Presentation (Proposal Presentation)
<b>Course Code</b>	MPH 402P

#### Part A

<b>Year</b>	2nd	<b>Semester</b>	4th	<b>Credits</b>	L	T	P	C
					0	0	4	4
<b>Course Type</b>	Lab only							
<b>Course Category</b>	Projects and Internship							
<b>Pre-Requisite/s</b>	Selection and Discussion of project proposal			<b>Co-Requisite/s</b>				
<b>Course Outcomes &amp; Bloom's Level</b>	<b>CO1-</b> 1.To know how to frame a research problem( <b>BL2-Understand</b> ) <b>CO2-</b> 2. To know how to set a hypothesis ( <b>BL3-Apply</b> ) <b>CO3-</b> 3. can able to perform literature survey and prepare project proposal( <b>BL4-Analyze</b> )							
<b>Coures Elements</b>	Skill Development ✓ Entrepreneurship ✗ Employability ✗ Professsonal Ethics ✗ Gender ✗ Human Values ✗ Environment ✗		<b>SDG (Goals)</b>	SDG4(Quality education)				

#### Part B

Modules	Contents	Pedagogy	Hours
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#### Part D(Marks Distribution)

Theory					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
Practical					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
75	38	75	38	0	0

#### Part E

<b>Books</b>	NA
<b>Articles</b>	NA
<b>References Books</b>	NA
<b>MOOC Courses</b>	NA
<b>Videos</b>	NA

## Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	3	-	-	-	-	-	-	3	-	1	-	2
CO2	3	3	1	3	-	-	-	-	-	-	3	-	2	-	1
CO3	3	3	2	2	-	-	-	-	-	-	2	-	2	2	2
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

## Syllabus-2023-2024

### (SOP)(MPharm-PharmaCeutics)

<b>Title of the Course</b>	Discussion/Final Presentation
<b>Course Code</b>	MPH 403P

#### Part A

Year	2nd	Semester	4th	Credits	L	T	P	C
					0	0	3	3
<b>Course Type</b>	Lab only							
<b>Course Category</b>	Projects and Internship							
<b>Pre-Requisite/s</b>				<b>Co-Requisite/s</b>				
<b>Course Outcomes &amp; Bloom's Level</b>	<b>CO1-</b> To know how to conduct a research ( <b>BL2-Understand</b> ) <b>CO2-</b> To know about different research methodologies( <b>BL2-Understand</b> ) <b>CO3-</b> Application of research principles and statistical principles( <b>BL3-Apply</b> )							
<b>Courses Elements</b>	Skill Development ✓ Entrepreneurship ✗ Employability ✗ Professional Ethics ✗ Gender ✗ Human Values ✗ Environment ✗		<b>SDG (Goals)</b>	SDG4(Quality education)				

#### Part B

Modules	Contents	Pedagogy	Hours
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#### Part D(Marks Distribution)

Theory					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
	200				
Practical					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
400	200	200	100	200	100

#### Part E

<b>Books</b>	NA
<b>Articles</b>	NA
<b>References Books</b>	NA
<b>MOOC Courses</b>	NA
<b>Videos</b>	NA

## Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	3	3	3	1	-	-	-	-	-	3	-	1	-	3
CO2	-	2	3	3	1	-	-	-	-	-	3	-	-	-	1
CO3	-	3	3	3	-	-	-	-	-	-	2	-	1	-	3
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

## Syllabus-2023-2024

### (SOP)(MPharm-PharmaCeutics)

<b>Title of the Course</b>	Research Publication /Report
<b>Course Code</b>	MPH 404T

#### Part A

Year	2nd	Semester	4th	Credits	L	T	P	C
					0	0	2	2
<b>Course Type</b>	Lab only							
<b>Course Category</b>	Projects and Internship							
<b>Pre-Requisite/s</b>					<b>Co-Requisite/s</b>			
<b>Course Outcomes &amp; Bloom's Level</b>	<b>CO1-</b> students should improve thier publication writing skills( <b>BL2-Understand</b> ) <b>CO2-</b> Improve their communication skills ( <b>BL3-Apply</b> ) <b>CO3-</b> should get sound knowledge of various databases ,referencing styles and softwares( <b>BL3-Apply</b> )							
<b>Coures Elements</b>	Skill Development ✗ Entrepreneurship ✗ Employability ✗ Professsonal Ethics ✓ Gender ✗ Human Values ✓ Environment ✗		<b>SDG (Goals)</b>	SDG4(Quality education)				

#### Part B

Modules	Contents	Pedagogy	Hours
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#### Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	presenting research/review papers in various seminars ,conferences or symposiums	PBL		

#### Part D(Marks Distribution)

Theory					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
	25				
Practical					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
50	0	50	25	0	0

#### Part E

<b>Books</b>	NA
<b>Articles</b>	NA
<b>References Books</b>	NA
<b>MOOC Courses</b>	NA
<b>Videos</b>	NA

## Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	3	2	2	1	-	-	-	-	-	3	-	1	1	3
CO2	1	1	2	2	-	-	-	-	-	-	2	-	2	2	3
CO3	1	3	3	2	1	-	-	-	-	-	3	-	1	2	1
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

