CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

Scheme of Teaching and Examination

Master of Pharmacy (M. Pharm)

(Pharmaceutics)

I Semester

S. No.	Board of Study	Subject Code	Subject	Periods per Week			Scheme of Examination			Total Marks	Credit L+(T+P)/ 2
							Theory / Practical				
				L	T	P	ESE	CT	TA		
1	Pharmacy	565111(41)	Advanced Research Methods	4	1	-	100	20	20	140	
2	Pharmacy	565112(41)	Pharmacology and Biostatistics	4	1	-	100	20	20	140	
3	Pharmacy	565113(41)	Drug Regulatory Affairs and Quality Assurance	4	1	-	100	20	20	140	
4	Pharmacy	565114(41)	Formulation Development	4	1	-	100	20	20	140	
5	Pharmacy	565121(41)	Advanced Research Methods Lab	-	-	6	100	-	50	150	
6	Pharmacy	565122(41)	Pharmacology and Biostatistics Lab	-	-	6	100	-	50	150	
7	Pharmacy	565123(41)	Formulation Development Lab	-	-	6	100	-	40	140	
Total				**16**	**4**	**18**	**700**	**80**	**220**	**1000**	

L – Lecture, T – Tutorial, P - Practical,

Duration of Theory Paper 3 Hours

ESE – End Semester Examination, CT – Class Test, TA – Teacher Assessment

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

Semester: **M-Pharm. 1st Semester** Branch: **Pharmacy**
Subject: **Advance Research Methods** Code: 565111(41)
Total Theory period: **50** Total Tutorial period : **12**
Total marks in the end Semester: **100**
Minimum of class test to be conducted: **2**

Unit - 1 :

Spectroscopic Method – Introduction, application structure elucidation using UV, IR, NMR, Mass spectrometry with examples.

Unit – 2 :

Separation Techniques – Theory, Instrumentation and application of GLC, HPLC, HPTLC, Chiral chromatography, Ion Pair Chromatography.

Unit – 3 :

Thermal Analysis – Theory, Instrumentation and application of thermo-gravimentric analysis, differential thermal thermal analysis.

Unit – 4 :

Calorimetric analysis – theory, instrumentation, chemical application and structural elucidation, differential scanning calorimetric (DSC), Isothermal titration.

Unit – 5 :

Immunochemical techniques – Immunelectrophoresis, immunoprecipation, ELISA, radioimmunoassay.

Books Recommended:

1. Practical Pharmaceutical Chemistry, Backett, and Stenlake.
2. Spectrophotometric identification of organic compound, Silverstein.
3. Vogel's Text book of Quality analysis, 5th and 6th edition, Svehla.
4. Textbook of Pharmaceutical chemistry, L. G. Chatten.
5. Instrumental Method of Chemical Analysis.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

Semester: **M-Pharm. 1st Semester** Branch: **Pharmacy**
Subject: **Pharmacology and Bioastatisis** Code: 565112(41)
Total Theory period: **50** Total Tutorial period: **12**
Total marks in the end Semester: **100**
Minimum of class test to be conducted: **2**

Unit – 1 :

Drug dependence, tolerance, abuse drug allergy and resistance.

Unit – 2 :

Genetics, gene cloning, gene delivery and recombinant DNA.

Unit – 3:

Molecular pharmacology, receptor theories, receptor isolation radio- ligand binding studies, Signal transduction mechanism of the cell.

Unit – 4 :

Therapeutics regimens – therapeutics response and toxicity, dosage regimens, clinical trial studies, ADME – Pharmacokinetics, Drug – drug interaction and bioassay.

Unit – 5:

Biological screening of new compounds and New drug discovery.

Unit – 6 :

Bio-statistics – Student "t" test, chi-square test, correlation probit analysis, analysis of variances.

Books Recommended:

1. The Pharmacological basis of therapeutics-Goodman and Gill man's
2. Pharmacology- Rang & Dale.
3. Pharmacology-Katzung.
4. Fundamentals of experimental Pharmacology-By M.N.Ghosh
5. Hand book of Experimental Pharmacology-S.K.Kulakarni
6. Text book of in vitro practical Pharmacology by Ian Kitchen
7. Pharmacological Experiments on intact preparations by Churchill Living stone.
8. Hand book of Clinical Pharmacokinetics Gibaldi and Prescott.
9. Indian Pharmacopoeia and other Pharmacopeias.
10. Screening methods in Pharmacology by Robert Turner.A
11. Clinical trials and tribulations by Allien E.Cato
12. Drug discovery and Evaluation by Vogel H.G.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

Semester: **M-Pharm. 1st Semester** Branch: Pharmacy
Subject: **Drug Regulatory Affairs and Quality Assurance** Code: 565113(41)
Total Theory period: **50** Total Tutorial period: **12**
Total marks in the end Semester: **100**
Minimum of class test to be conducted: **2**

Unit – 1 :

Requirement of GMP, CGMP, GLP, USFDA, WHO guidelines and ISO 9000 series.

Drug and cosmetics acts and rules. Drug regulatory affairs.

Unit – 2 :

Documentation – Protocols, forms and maintenance of record in Pharmaceuticals industry.

Unit – 3 :

Preparation of documentation of new drug approval and export registration, processing and its application intellectual property rights (patent, copyright and trade marks)

Sewage disposal and pollution control.

Unit – 4 :

Concept in validation of manufacturing, analytical and process, validation and its application.

Unit – 5 :

Basic concept of quality control and quality assurance system, source and control of quality variation of raw material, containers, closures personnel, environmental etc.

Unit – 6 :

In process quality control test, IPQC problem in pharmaceutical industries, ICH guidelines.

Unit – 7 :

Sampling plans, Sampling and characteristics curves, Master formula generation and maintenance, standard operating procedure (SOP) for different dosage forms.

Book Recommended:

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.
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 – Rawbins.
10. Good manufacturing practices for Pharmaceuticals: A plan 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.
14. Pharmaceutical Process Validation; By Fra. R. Berry and Robert A. Nash.
15. Pharmaceutical Preformulations; By J.J. Wells.
16. Applied production and operations management; By Evans, Anderson, Sweeney and Williams.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

Semester: **M-Pharm. 1st Semester** Branch: **Pharmacy**
Subject: **Formulation Development** Code: 565114(41)
Total Theory period: **50** Total Tutorial period: **12**
Total marks in the end Semester: **100**
Minimum of class test to be conducted: **2**

Unit – 1:

Stability, solubility, Pka, Dissolution rate, Partition Coefficient. In Vitro and In Vivo evaluation techniques, product formulation and CGMP.

Unit –2:

Designing of Pharmaceuticals - Tablets formulation, special tablets and preparation of components for compression. Characterization of granulation, Coating of tablets, evaluation of tablets. Equipment and processing problem in tablets.

Unit – 3:

Topical and rectal absorption of drug, formulations and evaluations.

Unit – 4:

Formulation consideration of oral liquids, suspension, emulsion, development of various products.

Unit – 5:

Formulation consideration of parenteral ophthalmic, depot products, large volume and small volume parenteral, environmental control and quality assurance in parenteral drug manufacturing.

Unit – 6:

Stability in pharmaceuticals and study of stability kinetics.

Unit – 7:

Introduction to controlled and novel drug delivery system, Sustained release dosage form, prodrug concept, Nanoparticals, Liposomes, Resealed erythrocytes, Transdermal and other Novel drug delivery systems.

Unit – 8:

Types of container and closures, packaging and stability assessment.

Optimization techniques in pharmaceutical formulations and processing.

Pilot plant and scale up techniques.

Book Recommended :

1. Controlled Drug Delivery System, J.R. Robinson and V.H.S.L. Lee.
2. Physical Pharmacy, 4th edition, A. Martin, J.C. Swarbrick.
3. Pharmaceutical analysis, 'Ramington' A. R. Gennaro.
4. The theory and practice of Industrial pharmacy, IIIrd edition, L. Lachman, H. A. Liberman.
5. Modern Pharmaceutics, IInd edition, G. S. Banker, C.T. Rhodes.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

Semester: **M-Pharm. 1st Semester**
Branch: **Pharmacy**
Subject: **Advance Research Methods (Lab)**
Code: 565121(41)
Total practical period: **72**
Total Tutorial period: **12**
Total marks in the end Semester**: 100**
Minimum of class test to be conducted: **2**

List of Experiment:

1. Determination of α_{max} and Linearity of methylene blue by spectroscopic method.
2. To determine the absorption curve of aromatic hydrocarbons and the analysis of binary mixture.
3. Estimation of Aspirin by colorimetry.
4. Assay of Paracetamol tablet by UV spectroscopy.
5. Determination of the active constituents in a medicinal preparation by derivative spectroscopy.
6. Estimation of Paracetamol by HPLC.
7. Identification of given sample by paper chromatography.
8. Identification of drug's by TLC.
9. To determine the purity of commercial benzoic acid using compressed discs (IR).
10. Interpretation of given sample by IR spectra.

Books Recommended:

1. Practical Pharmaceutical Chemistry, Backett, and Stenlake.
2. Spectrophotometric identification of organic compound, Silverstein.
3. Vogel's Text book of Quality analysis, 5th and 6th edition, Svehla.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

Semester: **M-Pharm. 1st Semester**
Subject: **Pharmacology and Biostatics (Lab)**
Total practical period: **72**
Total marks in the end Semester: **100**
Minimum of class test to be conducted: **2**

Branch: **Pharmacy**
Code: 565122(41)
Total Tutorial period: **12**

List of Practicals:

1. To Study the maintenance of common laboratory animals.
2. Bioassay of the more important biogenic agents by various methods.
3. Pharmacological Screening methods used for CNS, Local anesthetics, Endocrine and In-vitro microbial screening.
4. Protocol design of Clinical Trials.
5. Biostatical study of given data.

Books Recommended:

1. The Pharmacological basis of therapeutics-Goodman and Gill man's
2. Pharmacology- Rang & Dale.
3. Pharmacology-Katzung.
4. Fundamentals of experimental Pharmacology-By M.N.Ghosh
5. Hand book of Experimental Pharmacology-S.K.Kulakarni
6. Text book of in vitro practical Pharmacology by Ian Kitchen
7. Pharmacological Experiments on intact preparations by Churchill Living stone.
8. Hand book of Clinical Pharmacokinetics Gibaldi and Prescott.
9. Indian Pharmacopoeia and other Pharmacopeias.
10. Screening methods in Pharmacology by Robert Turner.A
11. Clinical trials and tribulations by Allien E.Cato
12. Drug discovery and Evaluation by Vogel H.G.

JOURNALS

1. Indian Journal of Pharmacology.
2. Indian Journal of Physiology and Pharmacology.
3. Indian Journal of Experimental Biology.
4. Pharmacological research.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

Semester**: M-Pharm. 1st Semester**
Subject: **Formulation Development (Lab)**
Total practical period: **72**
Total marks in the end Semester: **100**
Minimum of class test to be conducted: **2**

Branch: **Pharmacy**
Code: 565123(41)
Total Tutorial period: **12**

1. To prepare and evaluate aspirin tablets by wet granulation method.
2. To evaluate and compare at least three marketed Paracetamol tablets.
3. To study the effect of various binders on the hardness and dissolution rate of ascorbic acid tablets, at different concentration.
4. To prepare 10gm of sustained release granules of ascorbic acid by Microencapsulation method.
5. To perform the pre-formulation studies of the given sample of ascorbic acid.
6. To study the dissolution profile of marketed sustained release products of aspirin.
7. To prepare and evaluate partially flocculated suspension of Paracetamol by using electrolyte.
8. To prepare and evaluate suspension of aspirin.
9. To study the effect of various suspending agents on sedimentation rate at different concentration.

Book Recommended :

1. Controlled Drug Delivery System, J.R. Robinson and V.H.S.L. Lee.
2. Physical Pharmacy, 4th edition, A. Martin, J.C. Swarbrick.
3. Pharmaceutical analysis, 'Ramington' A. R. Gennaro.
4. The theory and practice of Industrial pharmacy, IIIrd edition, L. Lachman, H. A. Liberman.
5. Modern Pharmaceutics, IInd edition, G. S. Banker, C.T. Rhodes.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

Scheme of Teaching and Examination

Master of Pharmacy (M. Pharm)

(Pharmaceutics)

II Semester

S. No.	Board of Study	Subject Code	Subject	Periods per Week			Scheme of Examination			Total Marks	Credit L+(T+P)/ 2
							Theory / Practical				
				L	T	P	ESE	CT	TA		
1	Pharmacy	565211(41)	Pharmaceutics – I	4	1	-	100	20	20	140	
2	Pharmacy	565212(41)	Pharmaceutics – II	4	1	-	100	20	20	140	
3	Pharmacy	565213(41)	Pharmaceutics – III	4	1	-	100	20	20	140	
4	Pharmacy	565214(41)	Pharmaceutics – IV	4	1	-	100	20	20	140	
5	Pharmacy	565221(41)	Pharmaceutics – I Lab	-	-	6	100	-	50	150	
6	Pharmacy	565222(41)	Pharmaceutics – II Lab	-	-	6	100	-	50	150	
7	Pharmacy	565223(41)	Pharmaceutics – III Lab	-	-	6	100	-	40	140	
Total				**16**	**4**	**18**	**700**	**80**	**220**	**1000**	

L – Lecture, T – Tutorial, P - Practical,

Duration of Theory Paper 3 Hours

ESE – End Semester Examination, CT – Class Test, TA – Teacher Assessment

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

Semester: **M-Pharm. 2nd Semester** Branch: **Pharmacy**
Subject: **Pharmaceutics – I** Code: 565211(41)
Total Theory period: **50** Total Tutorial period: **12**
Total marks in the end Semester: **100**
Minimum of class test to be conducted: **2**

Unit -1:
Recent advances in tablet technology. Parenteral and Microencapsulation. Process automation in pharmaceutical manufacturing, role of GMP, Quality assurance and validation.

Unit -2:
Formulation and development of vitamins and antibiotic products.

Unit -3:
Disperse system, Molecular dispersion, solubilization theory methods of solubility enhancement, factor enfluencing solubility.

Unit - 4:
Coarse dispersion – Physical stability of suspension and emulsion, role of Zeta potential in stability of coarse dispersion, theory of emulsification, micro and multiple emulsion, rheology of suspension and emulsion, rheology of suspensions and emulsions. Drug kinetics in coarse disperse systems, drug diffusion in coarse disperse systems.

Unit -5:
Stability indicating assays, Advances in pharmaceutical packaging, Advances in polimer sciences and application in pharmacy.

Unit -6:
Collection ans classification of experimental data and its statistical treatment, Probability definition and laws of probability, Regression and correction, method of least squares, correlation coefficient and multiple regression, test of significance and t-test, Statistical quality control process control, control chart, acceptance sampling plans.

Book recommended:

1. Controlled Drug Delivery System, J.R. Robinson and V.H.S.L. Lee.
2. Physical Pharmacy, 4th edition, A. Martin, J.C. Swarbrick.
3. Pharmaceutical analysis, 'Ramington' A. R. Gennaro.
4. The theory and practice of Industrial pharmacy, IIIrd edition, L. Lachman, H. A. Liberman.
5. Modern Pharmaceutics, IInd edition, G. S. Banker, C.T. Rhodes.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

Semester: **M-Pharm. 2nd Semester** Branch: **Pharmacy**
Subject: **Pharmaceutics – II** Code: 565212(41)
Total Theory period: **50** Total Tutorial period: **12**
Total marks in the end Semester: **100**
Minimum of class test to be conducted: **2**

Unit -1:
Fundamentals of controlled release drug delivery influence of drug properties and routes of drug administration on the design of sustained and controlled release systems.

Unit -2:
Pharmacokinetic / Pharmacodynamic basis of drug delivery, Dosing considerations and bioavailability assessment, Regulatory assessment.

Unit -3:
Design and fabrication of Oral controlled release drug delivery systems.

Unit - 4:
Parenteral products and Ocular drug delivery systems.

Unit -5:
Implantable products, Transdermal therapeutic system.

Unit -6:
Prodrugs as sustained chemical delivery system, Biochemical and Molecular approach to Controlled Drug delivery.

Book recommended:

1. Controlled Drug Delivery System, J.R. Robinson and V.H.S.L. Lee.
2. Physical Pharmacy, 4th edition, A. Martin, J.C. Swarbrick.
3. Pharmaceutical analysis, 'Ramington' A. R. Gennaro.
4. The theory and practice of Industrial pharmacy, IIIrd edition, L. Lachman, H. A. Liberman.
5. Modern Pharmaceutics, IInd edition, G. S. Banker, C.T. Rhodes.
6. Controlled and novel drug delivery system, N. K. Jain.
7. Microencapsulation, J. R. Nixon.
8. J. R. Robinson.
9. Controlled and drug delivery, fundamental and application IInd edition N. K. Jain, V. H. L. C. Lee.
10. Novel Drug delivery system, N. J. Khandre, G. Madhvi

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

Semester: **M-Pharm. 2nd Semester** Branch: **Pharmacy**
Subject: **Pharmaceutics – III** Code: 565213(41)
Total Theory period: **50** Total Tutorial period: **12**
Total marks in the end Semester: **100**
Minimum of class test to be conducted: **2**

Unit -1:
Transport of drugs through membranes and barriers other than GI Tract, Buccal absorption, Salivary excretion of drugs, excreting of drugs via sweat, excretion of drugs in to milk, penetration of drugs into eye, transfer across placenta, passage of drugs into and out of cerebrospinal and brain.

Unit -2:
Measurement and Interpretation of in-vivo rates of dissolution, intrinsic rates of dissolution, dissolution of drugs from solid dosage forms, various modern methods and models for testing dissolution rate, factor and kinetics of dissolution.

Unit -3:
Bioavailability and bioequivalence, Bioequivalence and its determination, study design for the assessment of bioavailability and bioequivalence, factors influencing bioavailability and bioequivalence, Correlation of in- vitro Dissolution and in- vivo bioavailability, Statistical concept in estimation of bioavailability and bioequivalence.

Unit - 4:
Consideration of one, two and multiple compartment model on Intravenous administration, Intravenous infusion and first order absorption of single dose, Kinetics of reversible pharmacological effects – Direct and Indirect.

Unit - 5:
Clinical pharmacokinetics concept, absorption, Distribution and read clearance and elimination disposition and absorption kinetics, intravenous dose contain infusion, extra vascular dose, metabolite kinetics.

Unit - 6:
Physiological pharmacokinetic model, Concept, physiologic pharmacokinetic model with binding block flow – Limited versus diffusion limited model, application and limitation of physiologic pharmacokinetic models, mean residence time (MRT) Statistical moment theory, mean absorption time (MAT), mean residence time (MRT), Statistical moments theory, mean absorption time (MAT), Mean dissolution time (MDT).

Unit -7:
Non-linear Pharmacokinetics, Recognition of non-linearity, one two compartment open model with Michalis Menton Kinetic, Determination of Km and Vm, non-linear tissue binding constants.

Book recommended:

1. Applied Biopharmaceutics and pharmacokinetics. Mc-Graw Hill. Leon Shargel.
2. Biopharmaceutics and pharmacokinetics : A treatise. Vallabh prakashan. D.M. Brahmankar.
3. Biopharmaceutics and clinical pharmacokinetics. Marcel dekker Inc. New York. R.E. Notari.
4. Biopharmaceutics. Himalaya Publishing House Pvt. Ltd. India. S.N. Jogdand.
5. Biopharmaceutics and pharmacokinetics. Himalaya Publishing House Pvt. Ltd. India. G.R. Chatwal.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

Semester: **M-Pharm. 2nd Semester** Branch: **Pharmacy**
Subject: **Pharmaceutics – IV** Code: 565214(41)
Total Theory period: **50** Total Tutorial period: **12**
Total marks in the end Semester: **100**
Minimum of class test to be conducted: **2**

Unit - 1:

Package protection and its functions, Materials and pack selection - Factors, mechanical and physiochemical properties, Influence of Packaging components on dosage from stability and drug plastic consideration,

Unit - 2:

Various materials for containers and closures, classification, types, additives, processing, allowance and norms, Closures, Safety closures, tampers – Evident packing.

Unit - 3:

Drug package insert, Compliance, packaging, labeling for various pharmaceutical products.

Unit - 4:

Packaging of tablets, capsules, powder, ointments, Parenteral, ophthalmic.

Unit – 5:

Standardization of packaging material, bar code, colour codes, evaluation of package, standard for packaging, quality assurance systems, quality control consideration, regulatory requirements.

Unit – 6:

Trends in security packaging for monitoring effective storage condition for drug, Equipment for auto packaging, Environmental consideration in disposal.

Book recommended:

1. Controlled Drug Delivery System, J.R. Robinson and V.H.S.L. Lee.
2. Physical Pharmacy, 4th edition, A. Martin, J.C. Swarbrick.
3. Pharmaceutical Sciences, 'Ramington' A. R. Gennaro.
4. The theory and practice of Industrial pharmacy, IIIrd edition, L. Lachman, H. A. Liberman.
5. Modern Pharmaceutics, IInd edition, G. S. Banker, C.T. Rhodes.
6. Controlled and novel drug delivery system, N. K. Jain.
7. Microencapsulation, J. R. Nixon.
8. J. R. Robinson.
9. Controlled and drug delivery, fundamental and application IInd edition N. K. Jain, V. H. L. C. Lee.
10. Novel Drug delivery system, N. J. Khandre, G. Madhvi

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

Semester: **M-Pharm. 2nd Semester**
Subject: **Pharmaceutics – I Lab**
Total Theory period: **72**
Total marks in the end Semester: **100**
Minimum of class test to be conducted: **2**

Branch: **Pharmacy**
Code: 565221(41)
Total Tutorial period: **12**

List of Experiments

1. Preparation and evaluation of solid dispersion of aspirin/ other drug by fusion method.
2. Preparation and evaluation of solid dispersion of aspirin/other drug by solvent evaporation method.
3. Preparation and evaluation of multiple emulsion.
4. Microencapsulation of aspirin/other drug by emulsion solvent evaporation method.
5. Preparation and evaluation of antacid suspension.
6. Preparation of liquid paraffin emulsion I.P. and determination of effect of homogenization time on globule size distribution.
7. Preparation and evaluation of floating tablets of aspirin.
8. Preparation and evaluation of hydrodynamically balanced system (HBS) tablet of Riboflavin.
9. Preparation and evaluation of microemulsion.
10. Preparation and evaluation of buccal tablets and study on the effect of binding agents on disintegration.

Book Recommended :

1. Controlled Drug Delivery System, J.R. Robinson and V.H.S.L. Lee.
2. Physical Pharmacy, 4th edition, A. Martin, J.C. Swarbrick.
3. Pharmaceutical analysis, 'Ramington' A. R. Gennaro.
4. The theory and practice of Industrial pharmacy, IIIrd edition, L. Lachman, H. A. Liberman.
5. Modern Pharmaceutics, IInd edition, G. S. Banker, C.T. Rhodes.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,

BHILAI (C.G.)

Semester **: M-Pharm. 2nd Semester**
Subject : **Pharmaceutics – II Lab**
Total Practical period: **72**
Total marks in the end Semester: **100**
Minimum of class test to be conducted: **2**

Branch : **Pharmacy**
Code : 565222(41)
Total Tutorial period : **12**

List of Experiments

1. Preparation and evaluation of ophthalmic preparation.
2. Preparation of ethyl cellulose film as a rate controlling membrane for Paracetamol Transdermal patch.
3. Preparation of matrix embedded system of drug in hydrophobic polymer and its release rate.
4. Comparative study of *in-vitro* release of a drug of sustained release tablets by using HPMC and EC.
5. Preparation and evaluation of 0.3 % gentamycin eye solution.
6. Preparation and evaluation of colon delivery tablets of aspirin.
7. Preparation and evaluation of microcapsules of Isoniazide and Diclofenac sodium.
8. Preparation and evaluation of microspheres of Paracetamol by emulsification method.
9. Preparation and evaluation of liposomes of diclofenac sodium.
10. Preparation and evaluation of niosomes of Isoniazide by hand shaking method.
11. Preparation and evaluation of osmotic pump.
12. Preparation and evaluation of microspheres of ascorbic acid by solvent evaporation method.
13. To study the effect of two different polymers on release pattern of sustained release tablets of Paracetamol in basic buffer.

Book Recommended :

1. Controlled Drug Delivery System, J.R. Robinson and V.H.S.L. Lee.
2. Physical Pharmacy, 4th edition, A. Martin, J.C. Swarbrick.
3. Pharmaceutical analysis, 'Ramington' A. R. Gennaro.
4. The theory and practice of Industrial pharmacy, IIIrd edition, L. Lachman, H. A. Liberman.
5. Modern Pharmaceutics, IInd edition, G. S. Banker, C.T. Rhodes.
6. Controlled and novel drug delivery system, N. K. Jain.
7. Microencapsulation, J. R. Nixon.
8. J. R. Robinson.
9. Controlled and drug delivery, fundamental and application IInd edition N. K. Jain, V. H. L. C. Lee.
10. Novel Drug delivery system, N. J. Khandre, G. Madhvi.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,

BHILAI (C.G.)

Semester : **M-Pharm. 2nd Semester**
Subject : **Pharmaceutics – III Lab**
Total Practical period: **72**
Total marks in the end Semester: **100**
Minimum of class test to be conducted: **2**

Branch : **Pharmacy**
Code : 565223(41)
Total Tutorial period: **12**

List of Experiments

1. Determination of partition coefficient and effect of pH on partition coefficient.
2. Study on protein binding.
3. Dissolution studies on marketed enteric coated tablets.
4. Evaluation of pharmacodynamics of antihypertensive drugs.
5. *In-vitro* dissolution studies on marketed erythromycin tablets.
6. *In-vitro* dissolution test of marketed sustained release capsules.
7. Comparative study on dissolution rate of Paracetamol tablet by different dissolution apparatus.
8. Determination of various pharmacokinetic parameters of a given drug after single dose oral administration by using urinary excretion method.
9. Study on the effect of various dietary factors on the bioavailability of given drug, administered orally, using urinary excretion data.

Book recommended:

1. controlled Drug Delivery System, J.R. Robinson and V.H.S.L. Lee.
2. Physical Pharmacy, 4th edition, A. Martin, J.C. Swarbrick.
3. Pharmaceutical Sciences, 'Ramington' A. R. Gennaro.
4. The theory and practice of Industrial pharmacy, IIIrd edition, L. Lachman, H. A. Liberman.
5. Modern Pharmaceutics, IInd edition, G. S. Banker, C.T. Rhodes.
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7. Microencapsulation, J. R. Nixon.
8. J. R. Robinson.
9. Controlled and drug delivery, fundamental and application IInd edition N. K. Jain, V. H. L. C. Lee.
10. Novel Drug delivery system, N. J. Khandre, G. Madhvi

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

Scheme of Teaching and Examination

Master of Pharmacy (M. Pharm)

(Pharmaceutics)

III Semester

S. No.	Board of Study	Subject Code	Subject	Periods per Week			Scheme of Examination Theory / Practical			Total Marks	Credit L+(T+P)/2
				L	T	P	ESE	CT	TA		
1	Pharmacy	565321(41)	Minor Dissertation (synopsis submission) Seminar &Viva	-	3	36	300	-	100	300	
Total				**-**	**3**	**36**	**200**	**-**	**100**	**400**	

L – Lecture, T – Tutorial, P - Practical,

ESE – End Semester Examination,

CT – Class Test, TA – Teacher Assessment

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

Scheme of Teaching and Examination

Master of Pharmacy (M. Pharm)

(Pharmaceutics)

IV Semester

S. No.	Board of Study	Subject Code	Subject	Periods per Week			Scheme of Examination			Total Marks	Credit L+(T+P)/ 2
							Theory / Practical				
				L	T	P	ESE	CT	TA		
1	Pharmacy	565421(41)	Major Dissertation (Seminar & Viva)	-	-	36	400	-	200	600	
Total				**-**	**-**	**36**	**400**	**-**	**200**	**600**	

L – Lecture, T – Tutorial, P - Practical,

ESE – End Semester Examination, CT – Class Test, TA – Teacher Assessment