PARUL UNIVERSITY - Faculty of Pharmacy

Department of Pharmacy

SYLLABUS FOR 2nd Sem M.PHARM 2017-18 PROGRAMME

Molecular Pharmaceutics (Nano Tech and Targeted DDS) (MPH201T)

Type of Course: M.PHARM 2017-18

Prerequisite:

Rationale:

Teaching and Examination Scheme:

Teaching Scheme			Credit	Examination Scheme					Total
				External		Internal			
L Hrs/ Week	T Hrs/	Lab Hrs/		T	P	T	CE	P	
4	-	-	4	75	-	25	-	-	100

L - Lecture, **T** - Tutorial, **Lab** - Lab, **T** - Theory, **P** - Practical, **CE** - CE, **T** - Theory, **P** - Practical

Contents:

Sr.	Topic	Weightage	Teaching Hrs.
1	**Targeted Drug Delivery Systems**: Concepts, Events and biological process involved in drug targeting. Tumor targeting and	%	12
2	**Brain specific delivery. Targeting Methods**: introduction preparation and evaluation. Nano Particles & Liposomes: Types, preparation and evaluation.	%	12
3	**Micro Capsules / Micro Spheres**: Types, preparation and evaluation , Monoclonal Antibodies ; preparation and application, preparation and application of Niosomes, Aquasomes, Phytosomes, Electrosomes.	%	12
4	**Pulmonary Drug Delivery Systems**: Aerosols, propellents, ContainersTypes, preparation and evaluation, Intra Nasal Route Delivery systems; Types, preparation and evaluation.	%	12

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.	%	12

***Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

PARUL UNIVERSITY - Faculty of Pharmacy

Department of Pharmacy

SYLLABUS FOR 2nd Sem M.PHARM 2017-18 PROGRAMME

Advanced Biopharmaceutics & Pharmacokinetics (MPH202T)

Type of Course: M.PHARM 2017-18

Prerequisite:

Rationale:

Teaching and Examination Scheme:

Teaching Scheme			Credit	Examination Scheme					Total
				External		Internal			
L Hrs/ Week	T Hrs/	Lab Hrs/		T	P	T	CE	P	
4	-	-	4	75	-	25	-	-	100

L - Lecture, **T** - Tutorial, **Lab** - Lab, **T** - Theory, **P** - Practical, **CE** - CE, **T** - Theory, **P** - Practical

Contents:

Sr.	Topic	Weightage	Teaching Hrs.
1	**Drug Absorption from the Gastrointestinal Tract**: Gastrointestinal tract, Mechanism of drug absorption, Factors affecting drug absorption, pH–partition theory of drug absorption. Formuulation 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.	%	12
2	**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 testingperformance of drug products. In vitro–in vivo correlation, dissolution profile comparisons, drug product stability,considerations in the design of a drug product.	%	12

3	**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 kmax and vmax. 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.	%	12
4	**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.	%	12
5	**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.	%	12

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PARUL UNIVERSITY - Faculty of Pharmacy

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SYLLABUS FOR 2nd Sem M.PHARM 2017-18 PROGRAMME

Computer Aided Drug Delivery System (MPH203T)

Type of Course: M.PHARM 2017-18

Prerequisite:

Rationale:

Teaching and Examination Scheme:

Teaching Scheme			Credit	Examination Scheme					Total
				External		Internal			
L Hrs/ Week	T Hrs/	Lab Hrs/		T	P	T	CE	P	
4	-	-	4	75	-	25	-	-	100

L - Lecture, **T** - Tutorial, **Lab** - Lab, **T** - Theory, **P** - Practical, **CE** - CE, **T** - Theory, **P** - Practical

Contents:

Sr.	Topic	Weightage	Teaching Hrs.
1	**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	%	12
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	%	12
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	%	12

4	**Computer-aided biopharmaceutical characterization**: Gastrointestinal absorption simulation. Introduction, Theoretical background, Model construction, Parameter sensitivity analysis, Virtual trial, Fed vs. fasted state, In vitro 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	%	12
5	**Artificial Intelligence (AI), Robotics and Computational fluid dynamics**: General overview, Pharmaceutical Automation, Pharmaceutical applications, Advantages and Disadvantages. Current Challenges and Future Directions.	%	12

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SYLLABUS FOR 2nd Sem M.PHARM 2017-18 PROGRAMME

Cosmetic and Cosmeceuticals (MPH204T)

Type of Course: M.PHARM 2017-18

Prerequisite:

Rationale:

Teaching and Examination Scheme:

Teaching Scheme			Credit	Examination Scheme					Total
				External		Internal			
L Hrs/ Week	T Hrs/	Lab Hrs/		T	P	T	CE	P	
4	-	-	4	75	-	25	-	-	100

L - Lecture, **T** - Tutorial, **Lab** - Lab, **T** - Theory, **P** - Practical, **CE** - CE, **T** - Theory, **P** - Practical

Contents:

Sr.	Topic	Weightage	Teaching Hrs.
1	**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.	%	12
2	**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.	%	12
3	**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. Controversial ingredients: Parabens, formaldehyde liberators, dioxane.	%	12

4	**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.	%	12
5	**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.	%	12

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SYLLABUS FOR 2nd Sem M.PHARM 2017-18 PROGRAMME

Pharmaceutics Practical II (MPH205P)

Type of Course: M.PHARM 2017-18

Prerequisite:

Rationale:

Teaching and Examination Scheme:

Teaching Scheme			Credit	Examination Scheme					Total
				External		Internal			
L Hrs/	T Hrs/	Lab Hrs/ Week		T	P	T	CE	P	
-	-	12	6	-	100	-	-	50	150

L - Lecture, **T** - Tutorial, **Lab** - Lab, **T** - Theory, **P** - Practical, **CE** - CE, **T** - Theory, **P** - Practical

Contents:

Sr.	Topic	Weightage	Teaching Hrs.
1	**Practicals**: 1.To study the effect of temperature change , non solvent addition, incompatible polymer addition in microcapsules preparation 2. Preparation and evaluation of Alginate beads 3. Formulation and evaluation of gelatin /albumin microspheres 4. Formulation and evaluation of liposomes/niosomes 5. Formulation and evaluation of spherules 6. Improvement of dissolution characteristics of slightly soluble drug by Solid dispersion technique. 7. Comparison of dissolution of two different marketed products /brands 8. Protein binding studies of a highly protein bound drug & poorly protein bound drug 9. Bioavailability studies of Paracetamol in animals. 10. Pharmacokinetic and IVIVC data analysis by WinnolineR software 11. In vitro cell studies for permeability and metabolism 12. DoE Using Design Expert® Software 13. Formulation data analysis Using Design Expert® Software 14. Quality-by-Design in Pharmaceutical Development 15. Computer Simulations in Pharmacokinetics and Pharmacodynamics 16. Computational Modeling Of Drug Disposition 17. To develop Clinical Data Collection manual 18. To carry out Sensitivity Analysis, and Population Modeling. 19. Development and evaluation of Creams 20. Development and evaluation of Shampoo and Toothpaste base 21. To incorporate herbal and chemical actives to develop products 22. To address Dry skin, acne, blemish, Wrinkles, bleeding gums and dandruff	%	

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SYLLABUS FOR 2nd Sem M.PHARM 2017-18 PROGRAMME

Seminar Sem-II (MPHSEM2)

Type of Course: M.PHARM 2017-18

Prerequisite:

Rationale:

Teaching and Examination Scheme:

Teaching Scheme			Credit	Examination Scheme					Total
				External		Internal			
L Hrs/	T Hrs/	Lab Hrs/		T	P	T	CE	P	
7	-	-	4	-	-	-	-	-	100

L - Lecture, **T** - Tutorial, **Lab** - Lab, **T** - Theory, **P** - Practical, **CE** - CE, **T** - Theory, **P** - Practical