M.PHARMACY – I YEAR I SEMESTER (PCI)			
S.No	**Course**	**Course code and number**	**Course outcome**
01	**Modern Pharmaceutical Analytical Techniques Theory (MPH101T)**	$C_{(MPH101T)}1$	To **recall and relate** the instrumental methods of analysis such as electrochemical, spectroscopic, chromatographic and electrophoretic techniques with volumetric methods of analysis. (**UNDERSTAND**, **ANALYSE**)
		$C_{(MPH101T)}2$	To **demonstrate** the interaction of **EMR** with matter and its phenomenon in various spectroscopic techniques; affinity of matter with stationary and mobile phase; temperature induced physical & chemical changes in matter; potential differences in sample solutions and to study various factors affecting the analysis. (**REMEMBER**, **UNDERSTAND**, **EVALUATE**)
		$C_{(MPH101T)}3$	To **identify and categorise** organic and inorganic compounds with different functional groups and to understand their structure at atomic, ionic, group and molecular level to recommend an appropriate spectroscopic technique for analysis. (**UNDERSTAND**, **EVALUATE**, **APPLY**)
		$C_{(MPH101T)}4$	To **demonstrate** the theory, principle, construction and working of instrument components and the methodology employed for the analysis of drugs in various samples. (**UNDERSTAND**)
		$C_{(MPH101T)}5$	To **gain** knowledge on X-ray crystallographic techniques, immunological assays and thermal methods of analysis.
		$C_{(MPH101T)}6$	To **summarize** the applications of various analytical techniques in relation to characterization of polymers, designing formulation and evaluation of formulation. (**REMEMBER**, **APPLY**, **ANALYSE**)
02	**Drug Delivery System Theory (MPH102T)**	$C_{(MPH102T)}1$	To **describe** about the basic concepts of Sustained release and Controlled release formulations.(**REMEMBER**)
		$C_{(MPH102T)}2$	To **discuss** about the Dosage forms for personalized Medicine and categories of patients for personalized medicines.(**REMEMBER**)
		$C_{(MPH102T)}3$	To **explain** about the Rate controlled drug delivery systems and feedback regulated drug delivery systems.(**UNDERSTAND**)
		$C_{(MPH102T)}4$	To **explain** about the methods of formulation and its evaluations of Gastro-Retentive Drug Delivery Systems and Buccal Drug Delivery Systems.(**UNDERSTAND**)
		$C_{(MPH102T)}5$	To **describe** the barriers of drug permeation in

			Occular Drug Delivery Systems, formulation and Evaluation of Transdermal Drug Delivery Systems.(**REMEMBER**)
		$C_{(MPH102T)}6$	To **explain** about the Formulation and Evaluation of delivery systems of proteins and vaccines Delivery Systems.(**UNDERSTAND**)
03	**Modern Pharmaceutics Theory (MPH103T)**	$C_{(MPH103T)}1$	To **describe** about the basic concepts of preformulation studies(**REMEMBER**)
		$C_{(MPH103T)}2$	To **discuss** about the dispersion systems, parenterals and optimization process(**UNDERSTAND**)
		$C_{(MPH103T)}3$	To **explain** about the validation of process, equipment and product (**UNDERSTAND**)
		$C_{(MPH103T)}4$	To **describe** the c**GMP** concepts of layout of building, services and their maintenance &about the production management (**UNDERSTAND**)
		$C_{(MPH103T)}5$	To **describe** the concepts of compression and compaction (**REMEMBER**)
		$C_{(MPH103T)}6$	To **explain** about the parameters of consolidation and their applications (**UNDERSTAND**)
04	**Regulatory Affair Theory (MPH104T)**	$C_{(MPH104T)}1$	To **explain** the Documentation in Pharmaceutical industry and Generic drugs product development (**UNDERSTAND**)
		$C_{(MPH104T)}2$	To **develop** knowledge on Regulatory requirements for product approval(**CREATE**)
		$C_{(MPH104T)}3$	Interpret the post approval regulatory affairs and ICH-Guidelines of ICH- Q, S, E, M (**UNDERSTAND**)
		$C_{(MPH104T)}4$	To **discuss** the Regulatory requirements of EU, MHRA, TGA and ROW countries (**UNDERSTAND**)
		$C_{(MPH104T)}5$	To **develop** knowledge on Non clinical drug development and Investigation of medicinal products dossier (**CREATE**)
		$C_{(MPH104T)}6$	To **explain** the developing clinical trial protocols and institutional review board, pharmacovigilance safety monitoring in clinical trials(**UNDERSTAND**)
05	**Pharmaceutics Practical I MPH105PA**	$C_{(MPH105PA)}1$	To **evaluate** the drug(s) by various analytical techniques (**EVALUATE**)
		$C_{(MPH105PA}2$	To **demonstrate** the working of Gas Chromatography(**UNDERSTAND**)
		$C_{(MPH105PA)}3$	To **demonstrate** of HPLC (**UNDERSTAND**)
		$C_{(MPH105PA)}4$	To **determine** pre-formulation studies of the

			given drug(**APPLY**)
		$C_{(MPH105PA)}5$	To **analyze** the effect of binder on disintegration of tablet(**ANALYZE**)
		$C_{(MPH105PA)}6$	To **determine** the flow properties of given drug (**APPLY**)
06	**Pharmaceutical Practical II MPH105PB**	$C_{(MPH105PB)}1$	To **discuss** the effect of various factors on drug dissolution (**UNDERSTAND**)
		$C_{(MPH105PB}2$	To **demonstrate** the powder characteristics by constructing heckle plots(**UNDERSTAND**)
		$C_{(MPH105PB)}3$	To **characterize** the comparative dissolution studies between various dosage forms (**ANALYZE**)
		$C_{(MPH105PB)}4$	To **evaluate** the different dosage forms(**EVALUATE**)
		$C_{(MPH105PB)}5$	To **design** and **evaluate** different oral dosage forms(**CREATE**)
		$C_{(MPH105PB)}6$	To **design** and **evaluate** of different trasdermaldosage forms(**CREATE**)
07	**Seminar/Assignment**	$C_{(SEMINAR)}$ 1	To recall the technical knowledge gained in the design and development of various formulations (**REMEMBER**)
		$C_{(SEMINAR)}$ 2	To **compare** and **differentiate** various pharmaceutical techniques involved in the nanotechnology and targeted drug delivery systems (**ANALYZE**)
		$C_{(SEMINAR)}$ 3	To **develop** communication skills and build various models basing on the knowledge acquired in the molecular pharmaceutics (**CREATE**)
		$C_{(SEMINAR)}$ 4	To **test** various hypothesis and develop problem solving skills in pilot development process (**APPLY**)
		$C_{(SEMINAR)}$ 5	To **evaluate** the pharmacokinetic parameters and synthesize modelling techniques based on the information available (**EVALUATE**)
		$C_{(SEMINAR)}$ 6	To **create** open minded environment in accepting the challenges and opportunities for designing the formulations (**CREATE**)

M.PHARMACY – I YEAR II SEMESTER (PCI)			
S.No	**Course**	**Course code and number**	**Course outcome**
01	**MOLECULAR PHARMACEUTICS (NANO TECH AND TARGETED DDS)- THEORY MPH201T**	$C_{(MPH201T)}$ 1	To **define** the concepts involved in targeting drug delivery specific to tumor and brain. (**REMEMBER**)
		$C_{(MPH201T)}$ 2	To **review** the formulation, optimization and evaluation of microcapsules, nanoparticles, liposomes and multiparticulate drug carrier systems. (**UNDERSTAND**)
		$C_{(MPH201T)}$ 3	To **develop** nanoparticles, liposomes and multiparticulate and other drug delivery systems for drug delivery. (**CREATE**)
		$C_{(MPH201T)}$ 4	To **determine** the formulation of pulmonary drug delivery systems and their evaluation. (**APPLY**)
		$C_{(MPH201T)}$ 5	To **discuss** the concepts of gene therapy and liposomal gene delivery (**UNDERSTAND**)
		$C_{(MPH201T)}$ 6	To **differentiate** the concepts of therapeutic antisense molecules, gene therapy and gene expression systems. (**ANALYZE**)
02	**ADVANCED BIOPHARMACEUTICS & PHARMACOKINETICS- THEORY MPH202T**	$C_{(MPH202T)}$ 1	To **recall** the basic concepts of absorption, distribution, metabolism and excretion of drugs. (**REMEMBER**)
		$C_{(MPH202T)}$ 2	To **understand** the mechanisms, interpret various factors affecting drug absorption, distribution, metabolism and excretion of drugs (**UNDERSTAND**)
		$C_{(MPH202T)}$ 3	To **apply** the knowledge of pharmacokinetic models for the determination of pharmacokinetic parameters (**APPLY**)
		$C_{(MPH202T)}$ 4	To **analyze** the drug product performance by in-vitro, in-vivo and in-situ models (**ANALYZE**)
		$C_{(MPH202T)}$ 5	To **determine** the bioavailability testing protocol of a drug and compare the bioequivalence among marketed products (**APPLY**)
		$C_{(MPH202T)}$ 6	To **predict** pharmacokinetic and pharmacodynamic drug interactions of modified release drug products, targeted drug delivery systems (**EVALUATE**)
03	**COMPUTER AIDED DRUG DELIVERY SYSTEM - THEORY MPH203T**	$C_{(MPH203T)}$ 1	To **recall** the basics of computers in pharmaceutical research and development, population modelling, and sensitivity analysis (**REMEMBER**)
		$C_{(MPH203T)}$ 2	To **illustrate** the quality by design principles, computational modeling of drug disposition,

			application of drug transporters (**UNDERSTAND**)
		$C_{(MPH203T)}$ 3	To **determine** the concepts for computer-aided formulation development, ethics of computing in pharmaceutical research (**APPLY**)
		$C_{(MPH203T)}$ 4	To **justify** the pharmacokinetic and pharmacodynamic characteristics of drugs by simulations (**EVALUATE**)
		$C_{(MPH203T)}$ 5	To **assess** the applications of computers in clinical datamanagement (**EVALUATE**)
		$C_{(MPH203T)}$ 6	To **discuss** the impact of artificial intelligence, robotics and computational fluid dynamics (**UNDERSTAND**)
04	**Formulation Development of Pharmaceutical and Cosmetic Products -THEORY MPH204T**	$C_{(MPH204T)}$ 1	To **remember** the principles of pre-formulation studies, drug-excipient incompatibility (**REMEMBER**)
		$C_{(MPH204T)}$ 2	To **summarize** the important concepts of formulation additives, design of experiments and process development (**UNDERSTAND**)
		$C_{(MPH204T)}$ 3	To **apply** the principles of solubility, micellar solubilization, and invitro in vivo correlation (**APPLY**)
		$C_{(MPH204T)}$ 4	To **develop** the product stability protocols and **ICH** guidelines for long term testing of the products (**CREATE**)
		$C_{(MPH204T)}$ 5	To **justify** the formulation and evaluation of cosmetic products (**EVALUATE**)
		$C_{(MPH204T)}$ 6	To **differentiate** the regulatory guidelines for herbal cosmetics, herbal ingredients used in hair care, skin care and oral care (**ANALYZE**)
05	**PHARMACEUTICS PRACTICAL III MPH205PA**	$C_{(MPH205PA)}$ 1	To **recall** the basic principles of analytical techniques and their instrumentation used for drug formulation and characterization (**REMEMBER**)
		$C_{(MPH205PA)}$ 2	To **summarize** the preformulation studies and basic excipients used for various controlled/sustained drug delivery systems (**UNDERSTAND**)
		$C_{(MPH205PA)}$ 3	To **infer** the use of various analytical instruments for estimation of drugs in various formulations (**ANALYZE**)
		$C_{(MPH205PA)}$ 4	To **justify** the formulation techniques, prepare matrix tablets, floating tablets and cosmetics (**EVALUATE**)
		$C_{(MPH205PA)}$ 5	To **assess** the drug release from sustained and controlled drug delivery systems (**EVALUATE**)

		$C_{(MPH205PA)}$ 6	To **apply** the knowledge of dosage forms, construct kinetic plots and determine similarity factor (**CREATE**)
06	**PHARMACEUTICS PRACTICAL IV MPH205PB**	$C_{(MPH205PB)}$ 1	To **recall** the basic techniques for using design of experiment software (**REMEMBER**)
		$C_{(MPH205PB)}$ 2	To **compare** the data analysis techniques, and quality by design principles, sensitivity analysis, population modelling (**ANALYZE**)
		$C_{(MPH205PB)}$ 3	To **develop** various cosmetic products like creams, shampoos, toothpaste bases (**CREATE**)
		$C_{(MPH205PB)}$ 4	To **test** for drug binding characteristics, cell permeation and bioavailability of the formulations (**APPLY**)
		$C_{(MPH205PB)}$ 5	To **evaluate** the novel drug delivery systems (**EVALUATE**)
		$C_{(MPH205PA)}$ 6	To **design** formulations by QbD concept, use simulations for estimation of pharmacokinetics and pharmacodynamics (**CREATE**)
07	**SEMINAR/ ASSIGNMENT**	$C_{(SEMINAR)}$ 1	To **recall** the technical knowledge gained in the design and development of various formulations (**REMEMBER**)
		$C_{(SEMINAR)}$ 2	To **compare** and differentiate various pharmaceutical techniques involved in the nanotechnology and targeted drug delivery systems (**ANALYZE**)
		$C_{(SEMINAR)}$ 3	To **develop** communication skills and build various models basing on the knowledge acquired in the molecular pharmaceutics (**CREATE**)
		$C_{(SEMINAR)}$ 4	To **test** various hypothesis and develop problem solving skills in pilot development process (**APPLY**)
		$C_{(SEMINAR)}$ 5	To **evaluate** the pharmacokinetic parameters and synthesize modelling techniques based on the information available (**EVALUATE**)
		$C_{(SEMINAR)}$ 6	To **create** open minded environment in accepting the challenges and opportunities for designing the formulations (**CREATE**)

M.PHARMACY – III SEMESTER (PCI)			
S.No	**Course**	**Course code and number**	**Course outcome**
01	**Research Methodology & Biostatistics (MRM301T)**	$C_{(MRM301T)}1$	To **demonstrate** the general research methodology including, study design and strategies to eliminate errors/bias (**UNDERSTAND**)
		$C_{(MRM301T)}2$	To **explain** the importance of biostatistics in pharmacy: statistical tests of significance, non-parametric tests, null hypothesis, P values and degree of freedom (**UNDERSTAND**)
		$C_{(MRM301T)}3$	To **discuss** the Medical Research regarding values in medical ethics, conflicts between autonomy and beneficence and criticisms of orthodox medical ethics (**UNDERSTAND**)
		$C_{(MRM301T)}4$	To **describe** the ethics committees, online business practise, conflicts of interest and vendor relationships (**UNDERSTAND**)
		$C_{(MRM301T)}5$	To **explain** the **CPCSEA** guidelines for laboratory animal facility (**UNDERSTAND**)
		$C_{(MRM301T)}6$	To **explain** about the Declaration of Helsinki regarding basic principles for all medical research and medical research combined with medical care (**UNDERSTAND**)
02	**Journal club**	C.1	To **select** the scientific concept based on literature and define the objectives of research (**ANALYZE**)
		C.2	To **summarize** the hypothesis and summarize the concept for presentation (**UNDERSTAND**)
		C.3	To **discuss** in a meeting, discuss **SWOT** analysis, the design and methods used in concept (**UNDERSTAND**)
		C.4	To **analyze** the variables and their inter relationships (**ANALYZE**)
		C.5	To conclude the results and to discuss its significance (**EVALUATE**)
		C.6	To **appraise** the concept for societal needs, acknowledge and improve presentation skills (**EVALUATE**)
03	**Discussion / Presentation (Proposal Presentation)**	C.1	To **recall** the technical knowledge gained in the design and development of various formulations (**REMEMBER**)
		C.2	To **compare** and **differentiate** various pharmaceutical techniques involved in the nanotechnology and targeted drug delivery systems (**ANALYZE**)
		C.3	To **develop** communication skills and build various models basing on the knowledge

			acquired in the molecular pharmaceutics (**CREATE**)
		C.4	To **test** various hypothesis and develop problem solving skills in pilot development process (**APPLY**)
		C.5	To **evaluate** the pharmacokinetic parameters and synthesize modelling techniques based on the information available (**EVALUATE**)
		C.6	To **create** open minded environment in accepting the challenges and opportunities for designing the formulations (**CREATE**)
04	**Research Work**	C.1	To **recall** the fundamentals, carry out literature review on proposed research topic and identify research problem (**REMEMBER**)
		C.2	To **summarize** the requirements as per the proposed research (**UNDERSTAND**)
		C.3	To **construct** the research hypothesis (**CREATE**)
		C.4	To **design** research experiments meticulously and documentation as per format (**CREATE**)
		C.5	To **evaluate** and **conclude** the results using statistical analysis (**EVALUATE**)
		C.6	To **appraise** societal application and appreciation (**EVALUATE**)

M.PHARMACY – IV SEMESTER (PCI)			
S.No	**Course**	**Course code and number**	**Course outcome**
01	**Journal club**	C.1	To **select** the scientific concept based on literature and define the objectives of research (**ANALYZE**)
		C.2	To **summarize** the hypothesis and summarize the concept for presentation (**UNDERSTAND**)
		C.3	To **discuss** in a meeting, discuss **SWOT** analysis, the design and methods used in concept (**UNDERSTAND**)
		C.4	To **analyze** the variables and their inter relationships (**ANALYZE**)
		C.5	To **conclude** the results and to discuss its significance (**EVALUATE**)
		C.6	To **appraise** the concept for societal needs, acknowledge and improve presentation skills (**EVALUATE**)
02	**Research Work**	C.1	To **recall** the fundamentals, carry out literature review on proposed research topic and identify research problem (**REMEMBER**)
		C.2	To **summarize** the requirements as per the proposed research (**UNDERSTAND**)
		C.3	To **construct** the research hypothesis (**CREATE**)
		C.4	To **design** research experiments meticulously and documentation as per format (**CREATE**)
		C.5	To **evaluate** and conclude the results using statistical analysis (**EVALUATE**)
		C.6	To **appraise** societal application and appreciation (**EVALUATE**)
03	**Discussion / Final Presentation**	C.1	To **recall** the technical knowledge gained in the design and development of various formulations (**REMEMBER**)
		C.2	To **compare** and **differentiate** various pharmaceutical techniques involved in the nanotechnology and targeted drug delivery systems (**ANALYZE**)
		C.3	To **develop** communication skills and build various models basing on the knowledge acquired in the molecular pharmaceutics (**CREATE**)
		C.4	To **test** various hypothesis and develop problem solving skills in pilot development process (**APPLY**)
		C.5	To **evaluate** the pharmacokinetic parameters and synthesize modeling techniques based on the information available (**EVALUATE**)
		C.6	To **create** open minded environment in accepting the challenges and opportunities for designing the formulations (**CREATE**)