



ANNAMACHARYA COLLEGE OF PHARMACY

New Boyanapalli, Rajampet, YSR KadapaDist, A.P.,
India



Course Outcomes (CO's) R 21 M. Pharmacy

DEPARTMENT OF PHARMACEUTICAL QUALITY ASSURANCE

SUBJECT NAME & CODE	CODE	COURSE OUTCOMES
Modern Pharmaceutical Analytical Techniques 1101 T	C1101.1	Understand the basic knowledge on assay of single and multiple component pharmaceuticals by using various analytical instruments.
	C1101.2	Develop the theoretical knowledge on various instrumental techniques available for analysis of organic substances by using analytical instruments.
	C1101.3	Improve skills in selecting the suitable techniques for analysis of drugs and pharmaceuticals.
	C1101.4	Interpret spectra of UV-visible, IR, NMR and Mass to identify the given compound.
	C1101.5	Describe the general methods for separation and purification of components from a mixture and their application to pharmaceutical industry.
	C1101.6	Apply the knowledge learnt in developing new procedures of their own design.
Quality Management System 4101 T	C4101.1	Understand the importance of quality.
	C4101.2	Learning about ISO management systems and Tools for quality improvement.
	C4101.3	Analysis of issues in quality.
	C4101.4	Provide comprehensive knowledge Quality evaluation of pharmaceuticals.
	C4101.5	Stability testing of drug and drug substances.
	C4101.6	Statistical approaches for quality.
Quality Control & Quality Assurance 4102 T	C4102.1	Understand the responsibilities of QA & QC departments.
	C4102.2	Explain the cGMP aspects in a pharmaceutical industry.
	C4102.3	Apply the knowledge learnt in quality control tests for pharmaceuticals and containers.
	C4102.4	Appreciate the importance of documentation.
	C4102.5	Develop skills in Manufacturing operations and controls.
Produce Development & Technology Transfer	C4103.1	Explain the new product (drug) development process.



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4103 T	C4103.2	Summarize the concept of Pre-Formulation Studies.
	C4103.3	Understand the necessary information to transfer technology from R&D to actual manufacturing by sorting out various information obtained during R&D.
	C4103.4	Apply the knowledge learnt in quality control tests for pharmaceutical packaging materials.
	C4103.5	Elucidate necessary information to transfer technology of existing products between various manufacturing places.
	C1105.1	Recall and relate the principle of spectroscopy, chromatography and other commonly used instrumental methods of analysis.
Modern Pharmaceutical Analytical Techniques 1105 P	C1105.2	Train the students and to give hands on training on these sophisticated instruments.
	C1105.3	Perform quantitative & qualitative analysis of drugs using various analytical instruments like UV-visible and IR spectrophotometer and HPLC.
	C1105.4	Plan and select lab experiments using appropriate analytical skills. Evaluate the quantity of a drug in a given formulation.
	C1105.5	Practice them on solving spectral problems and generate a comprehensive analytical report on the findings.
	C1105.6	Interpret spectra of UV-visible, IR, NMR and Mass to identity the given compound.
	Quality control & Quality Assurance Lab 4104 P	C4104.1
C4104.2		Develop of Stability study protocol.
C4104.3		Perform in-process and finished product quality control tests for tablets, capsules, parenterals and semisolid dosage forms.
C4104.4		Carry out pre-formulation study for tablets, parenterals.
C4104.5		Perform quality control tests for Primary and secondary packaging materials.
C4104.6		Perform the solubility enhancement techniques for improvement of drug release of poorly water soluble drugs.



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Disaster Management C101b	C101b.1	Analyze the vulnerability of an area to natural and man-made disasters/hazards as per the guidelines to solve complex problems using appropriate techniques ensuring safety, environment and sustainability.
	C101b.2	Propose appropriate mitigation strategies for earthquake and tsunami impacts as per code of practice using suitable techniques ensuring safety, environment and sustainability besides communicating effectively in graphical form.
	C101b.3	Analyze the causes and impacts of floods, cyclones and droughts using appropriate tools and techniques and suggest mitigation measures ensuring safety, environment and sustainability besides communicating effectively in graphical form.
	C101b.4	Analyze the causes and impacts of landslides using appropriate tools and techniques and suggest mitigation measures ensuring safety, environment and sustainability.
	C101b.5	Design disaster management strategies to solve pre, during and post disaster problems using appropriate tools and techniques following the relevant guidelines and latest developments ensuring safety, environment and sustainability besides communicating effectively in graphical form
Hazard and safety Management 4201 T	C4201.1	Understand about environmental problems among learners and impart basic knowledge about the environment and its allied problems.
	C4201.2	Develop an attitude of concern for the industry environment.
	C4201.3	Ensure safety standards in pharmaceutical industry.
	C4201.4	Provide comprehensive knowledge on the safety management.
	C4201.5	Empower an idea to clear mechanism and management in different kinds of hazard management system.
	C4201.6	Teach the method of Hazard assessment,



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		procedure, methodology for provide safe industrial atmosphere.
Pharmaceutical Manufacturing Technology 4202 T	C4202.1	The common practice in the pharmaceutical industry developments, plant layout and production planning.
	C4202.2	Will be familiar with the principles and practices of aseptic process technology.
	C4202.3	Ensure an idea about non-sterile manufacturing technology.
	C4202.4	Provides clear information regarding packaging technology.
	C4202.5	Have a better understanding of principles and implementation of Quality by design (QbD).
	C4202.6	Understand the principles and implementation of process analytical technology (PAT) in pharmaceutical manufacturing.
Pharmaceutical validation 21SO301a	C301a.1	Explain the aspect of Qualification, Validation and Calibration.
	C301a.2	Carryout validation of manufacturing processes and analytical instruments.
	C301a.3	Validate the manufacturing facilities.
	C301a.4	Apply the knowledge of validation to analytical methods.
	C301a.5	Distinguish and Explain various forms of IPRs & apply statutory provisions to protect particular form of IPRs.
Audits and Regulatory Compliance 4203 T	C4203.1	Understand the importance of auditing in pharmaceutical industries.
	C4203.2	Understand the methodology of auditing process of different in pharmaceutical industries.
	C4203.3	Evaluate the bulk pharmaceutical chemicals and manufacturing process of tablets, capsules, sterile products and packaging in pharmaceutical industries.
	C4203.4	Summarize auditing reports for vendor, warehouse, weighing process and manufacturing process in pharmaceutical industries.
	C4203.5	Organize the check list for auditing of HVAC, water, water for Injection systems and ETP.



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Pharmaceutical Manufacturing Technology Lab 4204 P	C4204.1	Prepare and evaluate the different types of semisolid dosage forms.
	C4204.2	Compare the results of evaluation tests for different marketed pharmaceutical products.
	C4204.3	Performs the Stability study testing of tablet dosage forms.
	C4204.4	Implement of Quality by design (QbD) to Product & Procedure Development.
	C4204.5	Design the plant lay-out & Prepare the check list for sterile production area & water for injection.
Pharmaceutical validation 205 P	C4205.1	Perform the validation of analytical methods.
	C4205.2	Validate the manufacturing area & facilities
	C4205.3	Carryout validation of manufacturing and testing equipment's.
	C4205.4	Carryout validation of analytical instruments.
	C4205.5	Prepare the MFR and BMR.
Padagogy Studies 201a	C201a.1	Recognize the theories underlying methodology, searching, and learning.
	C201a.2	Describe the pedagogical approaches of teachers in formal and informal classrooms in developing countries practice.
	C201a.3	Analysis of pedagogical practices effectiveness.
	C201a.4	Describe the teacher's classroom professional development in detail.
	C201a.5	Determine and fill research gaps for future research actions.



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DEPARTMENT OF PHARMACOLOGY

SUBJECT NAME & CODE	CODE	COURSE OUTCOMES
Modern Pharmaceutical Analytical Techniques 1101 T	C1101.1	Understand the basic knowledge on assay of single and multiple component pharmaceuticals by using various analytical instruments.
	C1101.2	Develop the theoretical knowledge on various instrumental techniques available for analysis of organic substances by using analytical instruments.
	C1101.3	Improve skills in selecting the suitable techniques for analysis of drugs and pharmaceuticals.
	C1101.4	Interpret spectra of UV-visible, IR, NMR and Mass to identify the given compound.
	C1101.5	Describe the general methods for separation and purification of components from a mixture and their application to pharmaceutical industry.
	C1101.6	Apply the knowledge learnt in developing new procedures of their own design.
Advanced Pharmacology - I 1102 T	C1102.1	Discuss the pathophysiology and pharmacotherapy of certain diseases.
	C1102.2	Explain the mechanism of drug actions at cellular and molecular level.
	C1102.3	Understand the adverse effects, contraindications and clinical uses of drugs used in treatment of diseases.
	C1102.4	Study the General aspects and steps involved in neurotransmission.



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	C1102.5	Demonstrate the physiological and pathological role of hormones in the human body.
Clinical Pharmacology and Pharmacotherapeutics 1103 T	C1103.1	Understand the pathophysiology of selected disease states and the rationale for drug therapy.
	C1103.2	Outline the importance of preparation of individualized therapeutic plans based on diagnosis.
	C1103.3	Identify the needs to the patient-specific parameters relevant in initiating drug therapy.
	C1103.4	Study the drug therapy of pediatric, geriatrics and pregnant women's.
	C1103.5	Summarize the therapeutic approach to management of various diseases.
Cellular and Molecular Pharmacology 1104 T	C1104.1	Understand the interaction of cellular components with drugs.
	C1104.2	Describe the receptor signal transduction processes.
	C1104.3	Study of the molecular pathways affected by drugs.
	C1104.4	Explain the applicability of molecular pharmacology and biomarkers in drug discovery process.
	C1104.5	Illustrate molecular biology techniques as applicable for pharmacology.
Modern Pharmaceutical Analytical Techniques 1105 P	C1105.1	Recall and relate the principle of spectroscopy, chromatography and other commonly used instrumental methods of analysis.
	C1105.2	Train the students and to give hands on training on these sophisticated instruments.
	C1105.3	Perform quantitative & qualitative analysis of drugs using various analytical instruments like UV-visible and IR spectrophotometer and HPLC.
	C1105.4	Plan and select lab experiments using appropriate analytical skills. Evaluate the quantity of a drug in a given formulation.
	C1105.5	Practice them on solving spectral problems and generate a comprehensive analytical report on



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		the findings.
	C1105.6	Interpret spectra of UV-visible, IR, NMR and Mass to identify the given compound.
Advanced Pharmacology - I Lab 1106 P	C1106.1	Demonstrate the various routes of drug administration in experimental animals.
	C1106.2	Compute various techniques of blood sampling in experimental animals.
	C1106.3	Employ different bio assay techniques in isolated preparations of experimental animals.
	C1106.4	Practice anaesthetic techniques in experimental animals.
	C1106.5	Operate dose response curve of Ach using isolated ileum/rectus abdominis muscle preparation.
Disaster Management C101b	C101b.1	Analyze the vulnerability of an area to natural and man-made disasters/hazards as per the guidelines to solve complex problems using appropriate techniques ensuring safety, environment and sustainability.
	C101b.2	Propose appropriate mitigation strategies for earthquake and tsunami impacts as per code of practice using suitable techniques ensuring safety, environment and sustainability besides communicating effectively in graphical form.
	C101b.3	Analyze the causes and impacts of floods, cyclones and droughts using appropriate tools and techniques and suggest mitigation measures ensuring safety, environment and sustainability besides communicating effectively in graphical form.
	C101b.4	Analyze the causes and impacts of landslides using appropriate tools and techniques and suggest mitigation measures ensuring safety, environment and sustainability.
	C101b.5	Design disaster management strategies to solve pre, during and post disaster problems using appropriate tools and techniques following the



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		relevant guidelines and latest developments ensuring safety, environment and sustainability besides communicating effectively in graphical form.
Advanced Pharmacology - II 1201 T	C1201.1	Explain the mechanism of drug actions at cellular and molecular level.
	C1201.2	Discuss the Pathophysiology and pharmacotherapy of certain diseases.
	C1201.3	Understand the adverse effects, contraindications and clinical uses of drugs used in treatment of diseases.
	C1201.4	Understand the chemotherapy strategies of various diseases in the human body.
	C1201.5	Demonstrate the free radical pharmacology in the treatment of diseases.
Pharmacological Screening Methods & Toxicology 1202 T	C1202.1	Describe the regulations and ethical requirement for the usage of experimental animals.
	C1202.2	Describe the various animals used in the drug discovery process and good laboratory.
	C1202.3	Reproduce the practices in maintenance and handling of experimental animals.
	C1202.4	Describe the various newer screening methods involved in the drug discovery process.
	C1202.5	Compare and correlate the preclinical data to humans.
Principles of Drug Discovery 1203 T	C1203.1	Explain the various stages of drug discovery.
	C1203.2	Summarize the importance of the role of genomics, proteomics and bioinformatics in drug discovery.
	C1203.3	Describe various targets for drug discovery.
	C1203.4	Explain various lead seeking method and lead optimization.
	C1203.5	Memorize the importance of the role of computer aided drug design in drug discovery.
Clinical research and Pharmacovigilance 1204 T	C1204.1	Understand the regulatory requirements for conducting clinical trial.
	C1204.2	Describe the types of clinical trial designs.



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	C1204.3	Discuss the responsibilities of key players involved in clinical trials.
	C1204.4	Explain the principles of Pharmacovigilance.
	C1204.5	Detect new adverse drug reactions and their assessment.
Advanced Pharmacology - II Lab 1205 P	C1205.1	Isolation and identification of DNA from various sources like Bacteria, Cauliflower, onion and Goat liver.
	C1205.2	Analysis of enzyme based <i>in-vitro</i> assays.
	C1205.3	Examine DNA fragmentation assay by agarose gel electrophoresis.
	C1205.4	Identify Enzyme inhibition and induction activity using virtual software's.
Pharmacological Screening Methods and Toxicology Lab 1206 P	C1206.1	Recall the various newer screening methods involved in the drug discovery process.
	C1206.2	Identify and correlate the preclinical data to humans.
	C1206.3	Identify the regulations and ethical requirement for the usage of experimental animals.
	C1206.4	List the various animals used in the drug discovery process and good laboratory.
	C1206.5	Demonstrate the practices in maintenance and handling of experimental animals.
Pedagogy Studies 201a	C201a.1	Recognize the theories underlying methodology, searching, and learning.
	C201a.2	Describe the pedagogical approaches of teachers in formal and informal classrooms in developing countries practice.
	C201a.3	Analysis of pedagogical practices effectiveness.
	C201a.4	Describe the teacher's classroom professional development in detail.
	C201a.5	Determine and fill research gaps for future research actions.
Research Methodology and Intellectual Property Rights 21DRM101	CM101.1	Understand Research Problem formulation.
	CM101.2	Analyze research Related information.
	CM101.3	Follow research ethics.
	CM101.4	Understand that today's world is controlled by



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		computer, Information technology, but tomorrow world will be ruled by ideas, concept, and creativity.
	CM101.5	Understand that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.
	CM101.6	Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.

DEPARTMENT OF PHARMACEUTICS

SUBJECT NAME & CODE	CODE	COURSE OUTCOMES
Modern Pharmaceutical Analytical Techniques 1101 T	C1101.1	Understand the basic knowledge on assay of single and multiple component pharmaceuticals by using various analytical instruments.
	C1101.2	Develop the theoretical knowledge on various instrumental techniques available for analysis of organic substances by using analytical instruments.
	C1101.3	Improve skills in selecting the suitable techniques for analysis of drugs and pharmaceuticals.
	C1101.4	Interpret spectra of UV-visible, IR, NMR and Mass to identity the given compound.
	C1101.5	Describe the general methods for separation and purification of components from a mixture and their application to pharmaceutical industry.
	C1101.6	Apply the knowledge learnt in developing new procedures of their own design.
Advanced Physical	C3101.1	Describe the particle size analysis method, solid



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Pharmaceutics 3101 T		dispersion, physics of tablets, polymer classification and its applications.
	C3101.2	Explain the stability calculations, shelf life calculations and accelerated stability studies.
	C3101.3	Explain the rheology, absorption related to liquids and semi-solid dosage forms.
	C3101.4	State the factors affecting the dissolution and solubility in related to <i>in-vitro/in-vivo</i> correlations.
Modern Pharmaceutics - I 3102 T	C3102.1	Explain the Preformulation parameters, apply ICH guidelines and evaluate drug, drug excipients compatibility.
	C3102.2	Explain about formulation and development, use of excipients in various solid dosage form.
	C3102.3	Describe the tablets, powders, micro-encapsules and coating techniques.
	C3102.4	Describe the capsules, advances in capsule manufacture, machines, processing and control including pharmaceutical aspects.
	C3102.5	Apply the statistical design in different formulations.
Advanced Biopharmaceutics & Pharmacokinetics 3103 T	C3103.1	Understand the various factors affecting drug absorption and apply the various regulations related to developing the BA-BE study protocol for the new drug molecule.
	C3103.2	Determine the various pharmacokinetic parameters from either plasma concentration or urinary excretion data of the drug following one and multi compartment models.
	C3103.3	Determine the various pharmacokinetic parameters of a drug after oral administration.
	C3103.4	Summarize the concept of non-linear and clinical pharmacokinetics and their significance.
	C3103.5	Understand the various causes of the pharmacokinetics and drug interactions.
Modern Pharmaceutical Analytical Techniques 1105 P	C1105.1	Recall and relate the principle of spectroscopy, chromatography and other commonly used instrumental methods of analysis.
	C1105.2	Train the students and to give hands on training



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		on these sophisticated instruments.
	C1105.3	Perform quantitative & qualitative analysis of drugs using various analytical instruments like UV-visible and IR spectrophotometer and HPLC.
	C1105.4	Plan and select lab experiments using appropriate analytical skills. Evaluate the quantity of a drug in a given formulation.
	C1105.5	Practice them on solving spectral problems and generate a comprehensive analytical report on the findings.
	C1105.6	Interpret spectra of UV-visible, IR, NMR and Mass to identity the given compound.
Modern Pharmaceutics - I 3104 P	C3104.1	Perform Preformulation studies for development of various dosage forms.
	C3104.2	Perform the effect of compressional force on tablet disintegration time.
	C3104.3	Perform the effect of particle size and binders on dissolution of tablets.
	C3104.4	Compare the dissolution efficiency of various marketed pharmaceutical products.
	C3104.5	Perform the Accelerated stability testing of different tablets.
	C3104.6	Determine the beta cyclodextrin complexes of new drugs and rate order constants.
Disaster Management C101b	C101b.1	Analyze the vulnerability of an area to natural and man-made disasters/hazards as per the guidelines to solve complex problems using appropriate techniques ensuring safety, environment and sustainability.
	C101b.2	Propose appropriate mitigation strategies for earthquake and tsunami impacts as per code of practice using suitable techniques ensuring safety, environment and sustainability besides communicating effectively in graphical form.
	C101b.3	Analyze the causes and impacts of floods, cyclones and droughts using appropriate tools and techniques and suggest mitigation measures ensuring safety, environment and sustainability besides communicating effectively in graphical



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		form.
	C101b.4	Analyze the causes and impacts of landslides using appropriate tools and techniques and suggest mitigation measures ensuring safety, environment and sustainability.
	C101b.5	Design disaster management strategies to solve pre, during and post disaster problems using appropriate tools and techniques following the relevant guidelines and latest developments ensuring safety, environment and sustainability besides communicating effectively in graphical form.
Modern Pharmaceutics - II 3201 T	C3201.1	Understand the planning of pilot plant techniques used for all pharmaceutical dosage forms such as tablets, capsules, parenterals, aerosols, cosmetics and neutraceuticals.
	C3201.2	Describe the formulation development of parenteral dosage forms.
	C3201.3	Outline the principles and formulation aspects of various aerosol dosage forms.
	C3201.4	Explain the principles and formulation aspects of cosmetics and neutraceuticals.
	C3201.5	Understand the concept of aseptic processing and HVAC system.
Advanced Drug Delivery System 3202 T	C3202.1	Explain fundamentals of controlled drug delivery system.
	C3202.2	Describe design, fabrication, evaluation and applications of controlled drug delivery system.
	C3202.3	Summarize on transdermal drug delivery system, ocular drug delivery system.
	C3202.4	Explain bioadhesive drug delivery system and nasal drug delivery system.
	C3202.5	Explain on vaccine delivery for immunization.
	C3202.6	Generalize on liposomes, niosomes, microspheres and nanoparticles.
Industrial Pharmacy 3203 T	C3203.1	Explain the machinery involved in mixing, milling, filtration and drying.
	C3203.2	Describe packaging material constructions used in the production of pharmaceutical materials.



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	C3203.3	Represent the salient features of GMP, TQM applicable in industry.
	C3203.4	Explain the effluent treatment and prevention of pollution.
	C3203.5	Evaluate the validation of analytical methods and processes.
Nano Drug Delivery System 3204 T	C3204.1	Identify the right material for the nanoformulations.
	C3204.2	Apply the knowledge to develop nano formulations with appropriate technologies.
	C3204.3	Evaluate the product related test and for identified diseases.
	C3204.4	Understand the toxicological aspects of nanosized surfaces, particle size and stability for release of drugs.
Modern Pharmaceutics - II 3205 P	C3205.1	Develop and evaluate mouth washes, cold cream, vanishing cream, calamine lotion, foundation creams and cleansing creams.
	C3205.2	Design and evaluate antiseptic cream, Film coated tablets, floating, fast dissolving and chewable tablets.
	C3205.3	Illustrate the effect of surfactants on drug release.
	C3205.4	Develop and evaluate oral rehydration solution, calcium carbonate tablets
Advanced Drug Delivery System 3206 P	C3206.1	Develop formulation and evaluate sustained release oral matrix tablets.
	C3206.2	Develop formulation and evaluate microspheres.
	C3206.3	Develop formulation and evaluate transdermal films.
	C3206.4	Develop formulation and evaluate mucoadhesive system.
	C3206.5	Develop formulation and evaluate enteric coated tablets.
Pedagogy Studies 201a	C201a.1	Recognize the theories underlying methodology, searching and learning.
	C201a.2	Describe the pedagogical approaches of teachers in formal and informal classrooms in developing



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		countries practice.
	C201a.3	Analysis of pedagogical practices effectiveness.
	C201a.4	Describe the teacher's classroom professional development in detail.
	C201a.5	Determine and fill research gaps for future research actions.
Research Methodology and Intellectual Property Rights 21DRM101	CM101.1	Understand Research Problem formulation.
	CM101.2	Analyze research Related information.
	CM101.3	Follow research ethics.
	CM101.4	Understand that today's world is controlled by computer, Information technology, but tomorrow world will be ruled by ideas, concept, and creativity.
	CM101.5	Understand that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.
	CM101.6	Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.

DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

SUBJECT NAME & CODE	CODE	COURSE OUTCOMES
Modern Pharmaceutical Analytical Techniques 1101 T	C1101.1	Understand the basic knowledge on assay of single and multiple component pharmaceuticals by using various analytical instruments.
	C1101.2	Develop the theoretical knowledge on various instrumental techniques available for analysis of organic substances by using analytical instruments.



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	C1101.3	Improve skills in selecting the suitable techniques for analysis of drugs and pharmaceuticals.
	C1101.4	Interpret spectra of UV-visible, IR, NMR and Mass to identify the given compound.
	C1101.5	Describe the general methods for separation and purification of components from a mixture and their application to pharmaceutical industry.
	C1101.6	Apply the knowledge learnt in developing new procedures of their own design.
Advanced Organic Chemistry - I 2101 T	C2101.1	Apply the knowledge learnt in assymmetric synthesis.
	C2101.2	Understand the concepts of aromaticity and reaction intermediates.
	C2101.3	Gain detailed knowledge regarding the reactions, mechanisms and their relative reactivity
	C2101.4	Learn mechanism of electrocyclic and pericyclic reactions.
	C2101.5	Enhances the knowledge on various reactions and synthetic applications.
Advanced Medicinal Chemistry - I 2102 T	C2102.1	Application of basic knowledge of pharmaceutical chemical aspects of drugs that are in clinical use in defining, analyzing and proposing actions related to the research and implementation of new laboratory methods for detecting and monitoring diseases and effects or efficacy of the therapy.
	C2102.2	Learn the discovery of lead molecules and rational drug discovery models.
	C2102.3	Development of enzyme inhibitors.
	C2102.4	Provide insight knowledge on prodrug design and analog design.
	C2102.5	Gain advanced knowledge on enzyme inhibitors.
Chemistry of Natural Products 2103 T	C2103.1	Learn to explore the natural lead compounds for the treatment of diseases like cancer.
	C2103.2	Understand various principles of extraction methods and factors influencing the choice of extraction.
	C2103.3	Describe the extraction of plant drugs by microwave assisted synthesis, their merits and



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		demerits.
	C2103.4	Gain advanced knowledge on importance and structural elucidation of steroids, terpenoids and antibiotics.
	C2103.5	Determination of structure of amino acids, peptides, proteins, alkaloids and purines.
	C2103.6	Summary of natural pigments and plant hormones.
Modern Pharmaceutical Analytical Techniques 1105 P	C1105.1	Recall and relate the principle of spectroscopy, chromatography and other commonly used instrumental methods of analysis.
	C1105.2	Train the students and to give hands on training on these sophisticated instruments.
	C1105.3	Perform quantitative & qualitative analysis of drugs using various analytical instruments like UV-visible and IR spectrophotometer and HPLC.
	C1105.4	Plan and select lab experiments using appropriate analytical skills. Evaluate the quantity of a drug in a given formulation.
	C1105.5	Practice them on solving spectral problems and generate a comprehensive analytical report on the findings.
	C1105.6	Interpret spectra of UV-visible, IR, NMR and Mass to identify the given compound.
Advanced Medicinal Chemistry - I 2104 P	C2104.1	Learn advanced techniques for synthesis of various classes of drugs.
	C2104.2	Learn Synthesis of CVS drugs.
	C2104.3	Perform the isolation of various plant products.
	C2104.4	Characterization of various plant products by IR, NMR and Mass.
	C2104.5	Identification of degraded intermediates by microTLC.
Disaster Management C101b	C101b.1	Analyze the vulnerability of an area to natural and man-made disasters/hazards as per the guidelines to solve complex problems using appropriate techniques ensuring safety, environment and sustainability.
	C101b.2	Propose appropriate mitigation strategies for earthquake and tsunami impacts as per code of



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India



Course Outcomes (CO's) R 21 M. Pharmacy

		practice using suitable techniques ensuring safety, environment and sustainability besides communicating effectively in graphical form.
	C101b.3	Analyze the causes and impacts of floods, cyclones and droughts using appropriate tools and techniques and suggest mitigation measures ensuring safety, environment and sustainability besides communicating effectively in graphical form.
	C101b.4	Analyze the causes and impacts of landslides using appropriate tools and techniques and suggest mitigation measures ensuring safety, environment and sustainability.
	C101b.5	Design disaster management strategies to solve pre, during and post disaster problems using appropriate tools and techniques following the relevant guidelines and latest developments ensuring safety, environment and sustainability besides communicating effectively in graphical form.
Advanced Organic Chemistry - II 2201 T	C2201.1	Memorize the applications of synthetic reagents.
	C2201.2	Understand various types of catalysis like homogenous catalysis and heterogeneous catalysis.
	C2201.3	Understand molecular arrangements and their applications.
	C2201.4	Gain the sound knowledge on chemistry of peptides.
	C2201.5	Learn the principles of green chemistry.
Advanced Medicinal Chemistry - II 2202 T	C2202.1	Understand the basic knowledge of pharmaceutical-chemical aspects of drugs that are in clinical use.
	C2202.2	Detailed knowledge on enzyme inhibitors.
	C2202.3	Gain advanced knowledge on enzyme inhibitors
	C2202.4	Understand role of receptors and their pharmacokinetics.
	C2202.5	Summarize the therapeutic values of peptidomimetics and design of peptidomimetics.
Computer Aided Drug Design	C2203.1	Understand Role of CADD in drug discovery.
	C2203.2	Learn Different CADD techniques and their



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2203 T		applications.
	C2203.3	Apply various strategies to design and develop new drug like molecules.
	C2203.4	Working with molecular modeling software's to design new drug molecules.
	C2203.5	Illustrate the <i>insilico</i> virtual screening protocols, pharmacophore modeling and mapping.
Pharmaceutical Process Chemistry 2204 T	C2204.1	Understand various strategies of scale up process of APIs and intermediates.
	C2204.2	Summarize unit operations like extraction, filtration and crystallization.
	C2204.3	Learn kinetics and mechanism of nitration, halogenation and oxidation.
	C2204.4	Analysis of case studies on industrial reduction process.
	C2204.5	Differentiate Aerobic and Anaerobic fermentation.
	C2204.6	Understand the industrial safety process chemistry.
Advanced Organic Chemistry - II 2205 P	C2205.1	Analysis of pharmacopoeial compounds and their formulations by UV Vis Spectrophotometer.
	C2205.2	Understand principles of spectroscopy in determination of organic compound.
	C2205.3	Understand structural elucidation of organic and natural compounds by IR and UV spectral data.
	C2205.4	Apply principles of melting point, boiling point and chromatographic techniques in identification of organic compound.
	C2205.5	Analyze various functional groups of organic compounds.
Advanced Medicinal Chemistry - II 2206 P	C2206.1	Understand basic principles involved in Synthesis of active pharmaceutical ingredients and reaction intermediates.
	C2206.2	Evaluation of log P, MR, hydrogen bond donors and acceptors of selected drugs using software's.
	C2206.3	Compute with molecular modeling software's to design new drug molecules.
	C2206.4	Summarize 2D and 3D QSAR studies.
	C2206.5	Understand concept of virtual and docking based



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		experiments.
	C2206.6	Calculation of ADMET properties of drug molecules.
Pedagogy Studies 201a	C201a.1	Recognize the theories underlying methodology, searching, and learning.
	C201a.2	Describe the pedagogical approaches of teachers in formal and informal classrooms in developing countries practice.
	C201a.3	Analysis of pedagogical practices effectiveness.
	C201a.4	Describe the teacher's classroom professional development in detail.
	C201a.5	Determine and fill research gaps for future research actions.
Research Methodology and Intellectual Property Rights 21DRM101	CM101.1	Understand Research Problem formulation.
	CM101.2	Analyze research Related information.
	CM101.3	Follow research ethics.
	CM101.4	Understand that today's world is controlled by computer, Information technology, but tomorrow world will be ruled by ideas, concept, and creativity.
	CM101.5	Understand that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.
	CM101.6	Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.