Course Name: C101T: HUMAN ANATOMY AND PHYSIOLOGY-I Theory
Year of Study: 2017-2018

Course code/ Course title	Course outcomes
	Upon the completion of the course student will be able to:
C101.1	**CO1.** Define and explain the anatomy and physiology, various levels of organizations basic homeostatic mechanism.
C101.2	**CO2.** Explain the morphology, physiology of skeletal system along with the physiology of muscle contraction in co-ordination with the joints, their articulation and skin.
C101.3	**CO3.** Explain and describe the composition, function of various body fluids like blood and lymph, their significance and related disorders.
C101.4	**CO4.** Classify the peripheral nervous system, nerves and morphology of special senses.
C101.5	**CO5.** Explain the anatomy and physiology and parameters related to CVS and related disorders.

Course Name: C102: PHARMACEUTICAL CHEMISTRY-I (Inorganic) Theory

Course code/ Course title	Course outcomes
	Upon the completion of the course student shall be able to:
C102.1	**CO1.** Apply the knowledge of sources of impurities and different methods to identify them in inorganic pharmaceuticals.
C102.2	**CO2** Write and explain about methods of preparation of inorganic pharmaceuticals.
C102.3	**CO3.** Write and explain about methods for identification and purity testing of inorganic pharmaceuticals
C102.4	**CO4.** Discuss the role of inorganic pharmaceuticals in diagnosis and treatment of different diseases.
C102.5	**CO5.** Write about uses of inorganic pharmaceuticals treatment of different aliments.

Course name: Inorganic Pharmaceutical Chemistry (Theory)

Course code / course title	Course outcomes
	Upon completion of course student shall be able to:
C104. 1	CO 1. Able to explain the history of Pharmacopoeia.
C104. 2	CO 2. Know the sources of impurities in inorganic drug and pharmaceuticals.
C104. 3	CO 3. Express the role of Acids, Bases and Buffers in pharmaceuticals.
C104. 4	CO 4. Describe the function of major extra ad intra cellular electrolytes.
C104. 5	CO 5. Able to explain the medicinal and pharmaceuticals importance of inorganic compounds.

Course Name: C105: PHARMACOGNOSY AND PHYTOCHEMISTRY Theory

Course code/ Course title	Course outcomes
	Upon the completion of the course student shall be able to:
C105.1	**CO1.** Understand the source of crude drug and classify according sources
C105.2	**CO2.** To know the techniques in the cultivation and production of crude drug
C105.3	**CO3.** To know the crude drugs, their uses and chemical nature
C105.4	**CO4.** To carry out the microscopic and morphological evaluation of crude drugs

Course Name: C107P: HUMAN ANATOMY AND PHYSIOLOGY-I Practical

Course code/ Course title	Course outcomes
	Upon the completion of the course student will be able to:
C107.1	**CO1.** Effectively use the microscope for microscopic study of various tissues.
C107.2	**CO2.** Identify axial and appendicular bones of human skeleton.
C107.3	**CO3.** Explain the gross morphology, structure and functions of various organs of human body.
C107.4	**CO4.** Identify different tissues and organs of different systems of human body.
C107.5	**CO5.** Perform the haematological test like blood cell count, haemoglobin estimation, bleeding/clotting time, etc.
C107.6	**CO6.** Record the blood pressure, heart rate, pulse rate and respiratory volume.

Course name: Inorganic Pharmaceutical Chemistry (Practical)

Course code / course title	Course outcomes
	Upon completion of course student shall be able to:
C108. 1	CO 1. Know the sources of impurities in inorganic drug and pharmaceuticals.
C108. 2	CO 2. Describe the principal of limit test for various inorganic impurities
C108. 3	CO 2. Know the identification test for various inorganic compounds.
C108. 4	CO 3. Express the test for purity for various inorganic compounds.
C108. 5	CO 4. Describe the method of preparation of various inorganic compounds.

Course Name: 2T2: PHARMACEUTICAL CHEMISTRY II (ORGANIC) Theory

Course code/ Course title	Course outcomes
2T2. Pharmaceutical Chemistry II (Organic)	Upon the completion of the course student shall be able to: **CO 1.** Describe Hybridization and physical properties of organic compound. **CO 2.** Determine the elemental proportion of organic compound. **CO 3.** Write the structure, name and the type of isomerism of the organic compound. **CO 4.** Demonstrate the Stereochemistry of Organic compound. **CO 5.** Enumerates the types of Organic Reactions. **CO 6.** Learn factor affecting Organic reactions.

Course Name: 2P2. PHARMACEUTICAL CHEMISTRY II (Organic) Practical

Course code/ Course title	Course outcomes
2P2. Pharmaceutical Chemistry II (Organic)	Upon the completion of the course student shall be able to: **CO 1.** Determine the melting point and boiling point of Organic Compound. **CO 2.** Identify the elemental composition of Organic Compound**.** **CO 3.** Find the Solubility behavior of Organic Compound**.** **CO 4.** Identify functional group of Organic Compound**.** **CO 5.** Propose the reaction mechanism of Benzoylation. **CO 6.** Write Principle involved the in the reaction mechanism.

Course Name: C204: PHARMACEUTICAL ANALYSIS-I Theory

Course code/ Course title	Course outcomes
	Upon the completion of the course student shall be able to:
C204.1	**CO1.** Explain the principles of volumetric and gravimetric methods of analysis.
C204.2	**CO2** Describe about errors, accuracy, precision and outline the steps to minimize the errors.
C204.3	**CO3.** Write and explain about role of indicators in volumetric analysis.
C204.4	**CO4.** Narrate different volumetric analysis in detail.
C204.5	**CO5.** Describe the applications of various volumetric methods of analysis for the pharmaceuticals.

Course Name: C205: PHARMACOGNOSY AND PHYTOCHEMISTRY – V Practical

Course code/ Course title	Course outcomes
	Upon the completion of the course student shall be able to:
C205.1	**CO1.** To carry out the microscopic and morphological evaluation of crude drugs.
C205.2	**CO2.** Know the methods of identification of crude drug
C205.3	**CO3.** Understand isolation techniques.

Course Name: C205: PHARMACOGNOSY AND PHYTOCHEMISTRY Theory

Course code/ Course title	Course outcomes
	Upon the completion of the course student shall be able to:
C205.1	**CO1.** Understand the nature of crude drug
C205.2	**CO2.** To know the crude drugs, their uses and chemical nature
C205.3	**CO3.** To identify chemical nature of drug
C205.4	**CO3.** To understand isolation techniques

Course Name: C205: PHARMACOGNOSY AND PHYTOCHEMISTRY – V Practical

Course code/ Course title	Course outcomes
	Upon the completion of the course student shall be able to:
C205.1	**CO1.** Know the methods of identification of crude drug
C205.2	**CO2.** Understand isolation techniques.
C205.3	**CO3.** Identify the nature of chemical class.

Course Name: C2P2: HUMAN ANATOMY AND PHYSIOLOGY-I Practical

Course code/ Course title	Course outcomes
	Upon the completion of the course student will be able to:
C2P2.1	**CO1.** Effectively use the microscope for microscopic study of various tissues.
C2P2.2	**CO2.** Identify axial and appendicular bones of human skeleton.
C2P2.3	**CO3.** Explain the gross morphology, structure and functions of various organs of human body.
C2P2.4	**CO4.** Identify different tissues and organs of different systems of human body.
C2P2.5	**CO5.** Perform the haematological test like blood cell count, haemoglobin estimation, bleeding/clotting time, blood group determination, etc.
C2P2.6	**CO6.** Record the blood pressure, heart rate, pulse rate and breathing rrate, vital capacity.

Course Name: C2T3: HUMAN ANATOMY AND PHYSIOLOGY-II Theory

Course code/ Course title	Course outcomes
	Upon the completion of the course student will be able to:
C2T3.1	**CO1.** Explain the anatomy and physiology and parameters related to digestive system and related disorders.
C2T3.2	**CO2.** Explain the anatomy and physiology and parameters related to nervous system and ANS.
C2T3.3	**CO3.** Explain the anatomy and physiology and parameters related to Urinary system.
C2T3.4	**CO4.** Explain the morphology of special senses.
C2T3.5	**CO5.**Explain the anatomy and physiology and parameters related to Integumentary system.

Course Name: C2P3: HUMAN ANATOMY AND PHYSIOLOGY-II Practical

Course code/ Course title	Course outcomes
	Upon the completion of the course student will be able to:
C2P3.1	**CO1.** Record the body temperature.
C2P3.2	**CO2.** Identify axial and appendicular bones of human skeleton and joints.
C2P3.3	**CO3.** Explain the gross morphology, structure and functions of various organs of human body.
C2P3.4	**CO4.** Identify different tissues and organs of different systems of human body.
C2P3.5	**CO5.** Perform urine analysis for normal and abnormal constituents.
C2P3.6	**CO6.** Demonstrate the muscle curve using computer software.

Course Name: C213: PHARMACEUTICAL CHEMISTRY-IV (Heterocyclic and Macromolecules) Theory

Course code/ Course title	Course outcomes
	Upon the completion of the course students will be able to:
C213.1	**CO1.**Explain various classes of heterocycles, macromolecules and poly nuclear aromatic compounds**.**
C213.2	**CO2.**draw the structure and write the synthesis.
C213.3	**CO3.**explain mechanism of reaction, properties, stereochemistry and pharmaceutical uses of heterocycles and polynuclear aromatic compounds.
C213.4	**CO4.**describe the isolation, purification and hydrolysis of amino acids and proteins.
C213.5	**CO5.**write the structure, reactions, configuration, mutarotation and conformation of carbohydrates.
C213.6	**CO6.**discuss the properties and characterization of lipids.

Course Name: C219: PHARMACEUTICAL CHEMISTRY-IV (Heterocyclic and Macromolecules) Practical

Course code/ Course title	Course outcomes
	Upon the completion of the course student will be able to:
C219.1	**CO1.** Describe principles and procedures to analyze oil and fats.
C219.2	**CO2.**describe the various reaction mechanisms, and the synthesis of heterocyclic compounds.
C219.3	**CO3.** Perform various physicochemical test to confirm the synthesis of expected heterocyclic compounds.
C219.4	**CO4.**determine the functional groups in organic compounds quantitatively.

Course Name: 3T2. PHARMACEUTICAL CHEMISTRY III (ORGANIC) Theory

Course code/ Course title	Course outcomes
3T2. Pharmaceutical Chemistry III (Organic)	Upon the completion of the course student shall be able to: **CO 1.** Describe the preparation of various Organic Compounds. **CO 2.** Write reactions of various Organic Compounds. **CO 3.** Describe the various reaction mechanisms. **CO 4.** Learn the role stereochemistry in different reaction mechanisms. **CO 5.** Propose the orientation of various reaction mechanisms. **CO 6.** Identify the different classes of Organic Compounds.

Course Name: 3P2. PHARMACEUTICAL CHEMISTRY III (ORGANIC) Practical

Course code/ Course title	Course outcomes
3P2. Pharmaceutical Chemistry III (Organic)	Upon the completion of the course student shall be able to: **CO 1.** Identify the elemental composition of Organic Compounds. **CO 2.** Find the Solubility behavior of Organic Compounds. **CO 3.** Identify functional group of Organic Compounds. **CO 4.** Prepare the derivatives of various classes of Organic Compounds **CO 5.** Propose the reaction mechanism. **CO 6.** Write Principle involved the in the reaction mechanism.

Course Name: C301: PHARMACEUTICS-V (PHYSICAL PHARMACY) Theory

Course code/ Course title	Course outcomes
	Upon the completion of the course student shall be able to:
C301.1	**CO1.** Describe the importance of particle size analysis and their applications in pharmaceutical sciences.
C301.2	**CO2.** Demonstrate the importance and significance of surface and interfacial phenomenon in stabilization of dosage forms.
C301.3	**CO3.** Explain surfactants and its pharmaceutical significance.
C301.4	**CO4.** Apply the knowledge of theoretical and thermodynamic considerations in formulation and manufacturing of Pharmaceutical dispersions.
C301.5	**CO5.** Enumerate properties of colloids and their applications in determination of molecular weight of polymers.

Course Name: C303: Pathophysiology and clinical biochemistry Theory

Course code/ Course title	Course outcomes
	Upon the completion of the course student shall be able to:
C303.1	**CO1.** Describe the etiology and pathogenesis of the selected disease states
C303.2	**CO2.** Name the sign and symptoms of the disease
C303.3	**CO3.** Mention the complication of the disease
C303.4	**CO4.**Understanding of basic path physiological mechanism

Course Name: C303: Pathophysiology and clinical biochemistry practical

Course code/ Course title	Course outcomes
	Upon the completion of the course student shall be able to:
C303.1	**CO1.** Techniques for blood collection for pathological examination
C303.2	**CO2.** Estimation of different abnormal constituents in urine ,serum and blood
C303.3	**CO3.** Qualitative examination of blood

Course Name: C204: PHARMACOLOGY- I Theory

Course code/ Course title	Course outcomes
	Upon the completion of the course student will be able to:
C304.1	**CO1.** Explain various definitions used in pharmacology.
C304.2	**CO2.** Enumerate different routes of drug administration in human beings and animals.
C304.3	**CO3.** Describe various pharmacokinetics parameters related to the fate of drug after administration.
C304.4	**CO4.** Explain general molecular and biochemical aspects of drug action.
C304.5	**CO5.** Enlist various drugs acting on ANS. Explain their mechanism of action. Give rational for their indications, contraindications and adverse effects.
C304.6	**CO6.** Describe principles of bioassay and explain design of official bioassay.

Course Name: C205: PHARMACOLOGY- I Practical

Course code/ Course title	Course outcomes
	Upon the completion of the course student will be able to:
C305.1	**CO1.** Explain the details of experimental pharmacology.
C305.2	**CO2.** Explain use of different laboratory animals for evaluation of various drugs.
C305.3	**CO3.** Describe the role and composition of various components of physiological salt solution.
C305.4	**CO4.** Demonstrate rat dissection and tissue isolation procedure.
C305.5	**CO5.** Explain procedure for recording CDRC on rat tissue preparation.
C305.6	**CO6.** Evaluate the effect of cholinergic, anticholinergic and local anesthetics on rabbit eye.

Course Name: C306: Pharmaceutical Jurisprudence and ethics Theory

Course code/ Course title	Course outcomes
	Upon the completion of the course student shall be able to:
C306.1	**CO1.** the pharmaceutical legislations and their implications in the Development.
C306.2	**CO2.** To study various Indian pharmaceutical acts and laws
C306.3	**CO3.** To identify various regulatory authorities and agencies governing The manufacture and sale of pharmaceuticals.
C306.4	**CO4.** The code of ethics during the pharmaceutical practice

Course Name: C306: Pharmaceutical Jurisprudence and ethics Theory

Course code/ Course title	Course outcomes
	Upon the completion of the course student shall be able to:
C306.1	**CO1.** the pharmaceutical legislations and their implications in the Development.
C306.2	**CO2.** To study various Indian pharmaceutical acts and laws
C306.3	**CO3.** To identify various regulatory authorities and agencies governing The manufacture and sale of pharmaceuticals.
C306.4	**CO4.** The code of ethics during the pharmaceutical practice

Course Name: C307: PHARMACEUTICS-V (PHYSICAL PHARMACY) Practical

Course code/ Course title	Course outcomes
	Upon the completion of the course student shall be able to:
C307.1	**CO1.** Determine surface and interfacial tension of pharmaceutical solvents and find out the CMC and HLB value of surfactants.
C307.2	**CO2.** Determine the particle size of pharmaceutical dispersed systems.
C307.3	**CO3.** Formulate and evaluate pharmaceutical dispersed systems.
C307.4	**CO4.** Describe adsorption behavior in formulation development of pharmaceuticals.
C307.5	**CO5.** Determine fundamental and derived properties of pharmaceutical powders.

Course Name: C311: PHARMACEUTICS-VI (PHYSICAL PHARMACY) Theory

Course code/ Course title	Course outcomes
	Upon the completion of the course student shall be able to:
C311.1	**CO1.** Describe applications of solubility and distribution phenomena in pharmacy.
C311.2	**CO2.** Demonstrate the diffusion and dissolution process and their applications in pharmaceutical sciences.
C311.3	**CO3.** Describe various rheological properties of pharmaceutical dispersed systems.
C311.4	**CO4.** Enumerate principles of chemical kinetics and to use them for stability testing of pharmaceutical formulations.
C311.5	**CO5.** Discuss physicochemical and mechanical properties of polymers and their applications in development of pharmaceutical formulations.

Course Name: C317: PHARMACEUTICS-VI (PHYSICAL PHARMACY) Practical

Course code/ Course title	Course outcomes
	Upon the completion of the course student shall be able to:
C317.1	**CO1.** Determine the solubility and factors influencing solubility of drugs.
C317.2	**CO2.** Determine the distribution coefficient of drugs using phase diagram.
C317.3	**CO3.** Identify the effects of temperature and pH on chemical reactions.
C317.4	**CO4.** Confirm molecular weight of polymers and their usefulness in formulation development.

Course Name: C307: CLINICAL PHARMACY Practical

Course code/ Course title	Course outcomes
	Upon the completion of the course students will be able to:
C307.1	**CO1.** Induced hepatotoxicity and will be able to correlate toxicity with liver related enzyme.
C307.2	**CO2.** Analyzed various parameters related to urine for indicative assessment of pathological condition.
C307.3	**CO3.** Analyzed and study the rationality of the drug prescribed by the
C307.4	physion.
	CO4. Counsel and take interview of the patient and also able to providing
C307.5	useful advice on any theoretical condition.
	CO5. Prepare information material for educating patient about the safe
C307.6	uses of drug and to calculate cost of prescription.
	CO6. Aware about the procedure and centers of reporting the A.D.R

Course Name: C311: CLINICAL PHARMACOTHERAPEUTICS I Theory

Course code/ Course title	Course outcomes
	Upon the completion of the course students will be able to:
C311.1	**CO1.** Explain the concept of essential drug and the rational use of drug formulation.
C311.2	**CO2.** Explain the etiology and pathogenesis of various diseases and disorders.
C311.3	**CO3.** Describe rational pharmacotherapy of various diseases and disorders of various systems of body.
C311.4	**CO4.** Enumerate selected diseases related to selected system such as
C311.5	CVS, CNS, Respiratory system, urogenital system, G.I system and musculoskeletal system.
C311.6	**CO5.** Describe the primary and secondary treatment of various diseases which will disturb the psychological condition of human being.
	CO6. Manage the disease condition and also about the therapy to be given in various disease condition.

Course Name: C317: CLINICAL PHARMACOTHEAPEUTICS I Practical

Course code/ Course title	Course outcomes
	Upon the completion of the course student will be able to: **CO1.** Describe as how some drug affects the neuromuscular junction. **CO2**. Comment on the prescription related patient oriented problem and encounter some problem of GIT, respiratory system, Anemia etc. **CO3.** Manage some painful conditions along with the use of some drugs in emergency such as myocardial infarction, hypertensive emergency etc. **CO4.** Calculate dose of commonly used drugs including drugs for I.V infusions. **CO5.** Collect and analyzed the data related to prescription from patients in terms of cost and effectiveness.

Course Name: C301: BIOCHEMISTRY Theory

Course code/ Course title	Course outcomes
	Upon the completion of the course student shall be able to:
C301.1	**CO1.** Explain the catalytic role of enzymes, importance of enzyme inhibitors in design of new drug, therapeutic and diagnostic application of enzymes.
C301.2	**CO2.** Enumerate the metabolism of nutrient molecules in physiological and pathological conditions.
C301.3	**CO3.** Describe the genetic organization of mammalian genome and functions of DNA in the synthesis of RNAs and proteins.
C301.4	**CO4.** Describe the chemical nature and biological role of carbohydrate, lipid, nucleic acid, amino acids and proteins with the biological
C301.5	significances of ATP and cyclic AMP.
C301.6	**CO5.** Explain amino acid, carbohydrate, lipid and nucleic acid metabolism with their synthesis and significance. **CO6.** Describe the importance and role of cyclic pathway and also the energy generation and utilization phase.

Course Name: C307: BIOCHEMISTRY Practical

Course code/ Course title	Course outcomes
	Upon the completion of the course student shall be able to:
C307.1	**CO1.** Perform the qualitative analysis and determination of biomolecule in body fluids.
C307.2	**CO2.** Identify the test for protein.
C307.3	**CO3.** Estimate normal and abnormal physiological levels in urine and blood samples.
C307.4	**CO4.** Perform qualitative and quantitative analysis of carbohydrates reducing sugars and proteins etc.
C307.5	**CO5.** Prepare buffer solution and measure pH.
C307.6	**CO6.** Determine salivary amylase activity with the effect of temperature and substrate on salivary amylase activity.

Course Name: C301: NOVEL DRUG DELIVERY SYSTEM (DFT II) Theory

Course code/ Course title	Course outcomes
	Upon the completion of the course student shall be able to:
C301.1	**CO1.**Describe the various approach for development of NDDS.
C301.2	**CO2.**Find out various factors influencing the design and performance of sustained/controlled drug delivery system and also able to describe the fundamental concepts in controlled release.
C301.3	**CO3.**Design and fabricate NDDS for oral controlled release and to explain NDDS for oral controlled release.
C301.4	**CO4.** Enumerate the various controlled ocular delivery systems and the devices used in ocular drug delivery.
C301.5	**CO5.** Explain the parental sustained/controlled release dosage forms.
C301.6	**CO6.** Describe targeted parental controlled drug delivery devices with the role of carriers in targeted drug delivery system.
C301.7	**CO7**. Explain the approaches to development of transdermal therapeutic system.

Course Name: C307: NOVEL DRUG DELIVERY SYSTEM (DFT II) Practical

Course code/ Course title	Course outcomes
	Upon the completion of the course student shall be able to:
C307.1	**CO1.** Select drug and polymers for the development of NDDS.
C307.2	**CO2.** Formulate and evaluate the various NDDS.
C307.3	**CO3.** Prepare NDDS like matrix tablet, transdermal patches, floating dosage form etc.
C307.4	**CO4.** Select and Enumerate polymer as per their nature in NDDS such as thermo sensitive polymer, swellable polymer etc.
C307.5	**CO5.** Prepare granules by melt granulation technique.
C307.6	**CO6.** Prepare carbopol gel and carried out effect of pH rheological properties of carbopol gel

Course Name: C301: CLINICAL PHARMACY Theory

Course code/ Course title	Course outcomes
	Upon the completion of the course students will be able to:
C301.1	**CO1.** Explain in detail about clinical pharmacy practice and the role of pharmacist towards the pharmacy profession, institutional short and long term care.
C301.2	**CO2.** Enumerate the mechanism of drug interaction and also the various factors affecting drug interaction
C301.3	**CO3.** Monitor, detect and report A.D.R as well as various factors affecting A.D.R

C301.4	**CO4.** Describe the significance and interference of various clinical laboratory tests.
C301.5	**CO5.** Enumerate the utility of computer in clinical pharmacy practices.
C301.6	**CO6.**Explain the meaning, method, and significance of therapeutic drug monitoring.
C301.7	**CO7**. Analyzed all parameters related to pharmacoeconomic study.
C301.8	**CO8.** Describe in detail about toxicology containing poisons their general treatment and classification, various types of poisoning, toxicity study, drugs and poison information centre etc.

Course Name: C307: CLINICAL PHARMACY Practical

Course code/ Course title	**Course outcomes**
	Upon the completion of the course students will be able to:
C307.1	**CO1.** Induced hepatotoxicity and will be able to correlate toxicity with liver related enzyme.
C307.2	**CO2.** Analyzed various parameters related to urine for indicative assessment of pathological condition.
C307.3	**CO3.** Analyzed and study the rationality of the drug prescribed by the physion.
C307.4	**CO4.** Counsel and take interview of the patient and also able to providing useful advice on any theoretical condition.
C307.5	**CO5.** Prepare information material for educating patient about the safe uses of drug and to calculate cost of prescription.
C307.6	**CO6.** Aware about the procedure and centers of reporting the A.D.R

Course Name: C311: CLINICAL PHARMACOTHERAPEUTICS I Theory

Course code/ Course title	**Course outcomes**
	Upon the completion of the course students will be able to:
C311.1	**CO1.** Explain the concept of essential drug and the rational use of drug formulation.
C311.2	**CO2.** Explain the etiology and pathogenesis of various diseases and disorders.
C311.3	**CO3.** Describe rational pharmacotherapy of various diseases and disorders of various systems of body.
C311.4	**CO4.** Enumerate selected diseases related to selected system such as CVS, CNS, Respiratory system, urogenital system, G.I system and musculoskeletal system.
C311.5	**CO5.** Describe the primary and secondary treatment of various diseases which will disturb the psychological condition of human being.
C311.6	**CO6.** Manage the disease condition and also about the therapy to be given in various disease condition.

Course Name: C317: CLINICAL PHARMACOTHEAPEUTICS I Practical

Course code/ Course title	Course outcomes
	Upon the completion of the course student will be able to:
C317.1	**CO1.** Describe as how some drug affects the neuromuscular junction.
C317.2	**CO2**. Comment on the prescription related patient oriented problem and
C317.3	encounter some problem of GIT, respiratory system, Anemia etc.
C317.4	**CO3.** Manage some painful conditions along with the use of some drugs in emergency such as myocardial infarction, hypertensive emergency etc.
C317. 5	**CO4.** Calculate dose of commonly used drugs including drugs for I.V infusions.
C317 .6	**CO5.** Collect and analyzed the data related to prescription from patients in terms of cost and effectiveness.

Course Name: C301: BIOCHEMISTRY Theory

Course code/ Course title	Course outcomes
	Upon the completion of the course student shall be able to:
C301.1	**CO1.** Explain the catalytic role of enzymes, importance of enzyme inhibitors in design of new drug, therapeutic and diagnostic application of enzymes.
C301.2	**CO2.** Enumerate the metabolism of nutrient molecules in physiological and pathological conditions.
C301.3	**CO3.** Describe the genetic organization of mammalian genome and functions of DNA in the synthesis of RNAs and proteins.
C301.4	**CO4.** Describe the chemical nature and biological role of carbohydrate, lipid, nucleic acid, amino acids and proteins with the biological significances of ATP and cyclic AMP.
C301.5	**CO5.** Explain amino acid, carbohydrate, lipid and nucleic acid metabolism with their synthesis and significance.
C301.6	**CO6.** Describe the importance and role of cyclic pathway and also the energy generation and utilization phase.

Course Name: C307: BIOCHEMISTRY Practical

Course code/ Course title	Course outcomes
	Upon the completion of the course student shall be able to:
C307.1	**CO1.** Perform the qualitative analysis and determination of biomolecule in body fluids.
C307.2	**CO2.** Identify the test for protein.
C307.3	**CO3.** Estimate normal and abnormal physiological levels in urine and blood samples.
C307.4	**CO4.** Perform qualitative and quantitative analysis of carbohydrates reducing sugars and proteins etc.
C307.5	**CO5.** Prepare buffer solution and measure pH.
C307.6	**CO6.** Determine salivary amylase activity with the effect of temperature and substrate on salivary amylase activity.

Course Name: C301: NOVEL DRUG DELIVERY SYSTEM (DFT II) Theory

Course code/ Course title	Course outcomes
	Upon the completion of the course student shall be able to:
C301.1	**CO1.**Describe the various approach for development of NDDS.
C301.2	**CO2.**Find out various factors influencing the design and performance of sustained/controlled drug delivery system and also able to describe the fundamental concepts in controlled release.
C301.3	**CO3.**Design and fabricate NDDS for oral controlled release and to explain NDDS for oral controlled release.
C301.4	**CO4.** Enumerate the various controlled ocular delivery systems and the devices used in ocular drug delivery.
C301.5	**CO5.** Explain the parental sustained/controlled release dosage forms.
C301.6	**CO6.** Describe targeted parental controlled drug delivery devices with the role of carriers in targeted drug delivery system.
C301.7	**CO7**. Explain the approaches to development of transdermal therapeutic system.

Course Name: C317: PHARMACEUTICAL CHEMISTRY-I(Inorganic) Practical

Course code/ Course title	Course outcomes
	Upon the completion of the course student shall be able to:
C317.1	**CO1.** Develop skills for evaluation of impurities in inorganic pharmaceuticals.
C317.2	**CO2.** Prepare and identify inorganic pharmaceuticals.
C317.3	**CO3.**To perform the purity testing of inorganic pharmaceuticals

Course Name: C317: PHARMACEUTICAL ANALYSIS -I Practical

Course code/ Course title	Course outcomes
	Upon the completion of the course student shall be able to:
C317.1	**CO1.** Explain about titration, titre, titrant and indicators.
C317.2	**CO2.** Calculate normality, molarity and percentage purity of the sample under investigation.
C317.3	**CO3.**To performs the assay of the pharmaceuticals as per the monograph.

Course Name: C303: PATHOPHYSIOLOGY AND CLINICAL BIOCHEMISTRY Theory

Course code/ Course title	Course outcomes
	Upon the completion of the course student shall be able to:
C303.1	**CO1.** Explain fundamental concepts and processes of human pathophysiology.
C303.2	**CO2** Describe the etiology and pathogenesis of the selected disease states.
C303.3	**CO3.** Write and explain name the signs and symptoms of the diseases and their treatments.
C303.4	**CO4.** Mention the complications of the diseases and various metabolic disorders.
C303.5	**CO5.** Discuss and write about the diagnostic procedures of human diseases.

Course Name: C302: PHARMACEUTICAL MEDICINAL CHEMISTRY-I Theory

Course code/ Course title	Course outcomes
	Upon the completion of the course students will be able to:
C302.1	**CO1.** Describe the importance of basic principles of medicinal chemistry.
C302.2	**CO2.** Explain the importance and significance of drug absorption, distribution, metabolism pathways and elimination.
C302.3	**CO3.** Relate the knowledge of chemistry of a drug of some specified categories as listed in syllabus with respect to their pharmacological activity, mode of action & adverse effect.
C302.4	**CO4.** Explain the Structural Activity Relationship (SAR) of various classes of drug.
C302.5	**CO5.** Write the chemical synthesis of some drugs
C302.6	**CO6.** Narrate the principles of prodrug design & its application.

Course Name: C307: PHARMACEUTICAL MEDICINAL CHEMISTRY-I Practical

Course code/ Course title	Course outcomes
	Upon the completion of the course student will be able to:
C307.1	**CO1.** Skillfully carry out the evaluation of various solid dosage forms by titerimetric or U.V. spectrophotometric method.
C307.2	**CO2.**Describe the various reaction mechanisms, and the synthesis of therapeutic agents.
C307.3	**CO3.** Perform various physicochemical test to confirm the synthesis of expected therapeutic molecule.

Course Name: C311: PHARMACEUTICAL MEDICINAL CHEMISTRY-II Theory

Course code/ Course title	Course outcomes
	Upon the completion of the course student will be able to:
C311.1	**CO1.** Relate the knowledge of the chemistry of drugs with respect to their pharmacological activity, mode of action & adverse effect.
C311.2	**CO2.** Explain the Structural Activity Relationship (SAR) of different class of drugs
C311.3	**CO3.** Write the chemical synthesis of drugs mentioned in the syllabus.
C311.4	**CO4.** Describe the importance of drug design and various techniques of drug design like CADD, QSAR & Molecular modeling.
C311.5	**CO5.** Write the methods of combinatorial chemistry and its application in pharmacy.
C311.6	**CO6.** Outline the different strategies and application of genetic engineering in pharmacy.

Course Name: C317: PHARMACEUTICAL MEDICINAL CHEMISTRY-II Practical

Course code/ Course title	Course outcomes
	Upon the completion of the course student will be able to:
C317.1	**CO1.** Skillfully carry out the evaluation of various solid dosage forms by titerimetric or U.V. spectrophotometric method.
C317.2	**CO2.**Describe the various reaction mechanisms, and the synthesis of therapeutic agents.
C317.3	**CO3.** Perform various physicochemical test to confirm the synthesis of expected therapeutic molecule.

Course Name: C402: PHARMACEUTICAL MEDICINAL CHEMISTRY-III Practical

Course code/ Course title	Course outcomes
	Upon the completion of the course student will be able to:
C317.1	**CO1.** Skillfully carry out the evaluation of various solid dosage forms by titerimetric or U.V. spectrophotometric method.
C317.2	**CO2.**Describe the various reaction mechanisms, and the synthesis of therapeutic agents.
C317.3	**CO3.** Perform various physicochemical test to confirm the synthesis of expected therapeutic molecule.

Course Name: C307: NOVEL DRUG DELIVERY SYSTEM (DFT II) Practical

Course code/ Course title	Course outcomes
	Upon the completion of the course student shall be able to:
C307.1	**CO1.** Select drug and polymers for the development of NDDS.
C307.2	**CO2.** Formulate and evaluate the various NDDS.
C307.3	**CO3.** Prepare NDDS like matrix tablet, transdermal patches, floating dosage form etc.
C307.4	**CO4.** Select and Enumerate polymer as per their nature in NDDS such as thermo sensitive polymer, swellable polymer etc.
C307.5	**CO5.** Prepare granules by melt granulation technique.
C307.6	**CO6.** Prepare carbopol gel and carried out effect of pH rheological properties of carbopol gel

Course name: C401: Pharmaceutics (DFT I)

Course code/ course title	Course outcome
	Upon the completion of course student shall be able to:
C401.1	CO1. Identify various physicochemical properties of drug to be considered before Preformulation.
C401.2	CO2. Express the influence of pharmaceutical additives on formulation and stability of dosage forms.
C401.3	CO3. Describe the manufacturing and evaluation techniques of various solid, semisolid and sterile dosage forms.
C401.4	CO4. To formulate and evaluate various cosmetic preparations.

Course Name: C402: PHARMACEUTICAL MEDICINAL CHEMISTRY III (Theory)
Year of Study: 2016-17, 2017-18

Course code/ Course title	Course outcomes
	Upon the completion of the course students will be able to:
C402.1	**CO1.**classify the medicinal agents on the basis of chemical nature of drugs.
C402.2	**CO2.**draw the structure, write the chemical name and synthetic procedure of drugs.
C402.3	**CO3.** relate the knowledge of chemistry of a drug of some specified categories as listed in syllabus with respect to their pharmacological activity, mode of action & adverse effect.
C402.4	
C402.5	**CO4** explain the Structural Activity Relationship (SAR) of various classes of drug. **CO5.** describe the physicochemical and steric properties of various classes of drug.

Course Name: C403: PHARMACEUTICAL ANALYSIS-IV (Spectroscopy) Practical

Course code/ Course title	Course outcomes
	Upon the completion of the course student will be able to:
C403.1	**CO1.** Handle sophisticated analytical instrument and do calibration of U.V. spectrophotometer
C403.2	**CO2.** Describe the methods for determination of wavelength of maximum absorbance & validity of Lambert Beer's law
C403.3	**CO3.**Develop skills for evaluation of various solid dosage form U.V. spectrophotometric methods
C403.4	**CO4.**Demonstrate the working of IR, AAS etc
C403.5	**CO5.** Interprets the IR spectra of given compounds

Course Name: C404: PHARMACEUTICAL MEDICINAL CHEMISTRY III (Theory)

Course code/ Course title	Course outcomes
	Upon the completion of the course students will be able to:
C404.1	**CO1.**classify the medicinal agents on the basis of chemical nature of drugs.
C404.2	**CO2.**draw the structure, write the chemical name and synthetic procedure of drugs.
C404.3	**CO3.** relate the knowledge of chemistry of a drug of some specified categories as listed in syllabus with respect to their pharmacological activity, mode of action & adverse effect.
C404.4	
C404.5	**CO4** explain the Structural Activity Relationship (SAR) of various classes of drug.
C404.6	**CO5.** describe the physicochemical and steric properties of various classes of drug.
C404.7	**CO6.** Describe the importance of drug design and various techniques of drug design like CADD, QSAR & Molecular modeling.
	CO7. Outline the different strategies and application of genetic engineering in pharmacy.

Course Name: C410: PHARMACEUTICAL MEDICINAL CHEMISTRY-III (Practical)

Course code/ Course title	Course outcomes
	Upon the completion of the course student will be able to:
C410.1	**CO1.** Skillfully carry out the evaluation of pharmacopoeial standards of synthesized drugs.
C410.2	**CO2.**describe the various reaction mechanisms, and the synthesis of drugs.
C410.3	
C410.4	**CO3.**demonstrate the use of stereomodels.
	CO4. carry out the spectral analysis of synthesized drugs.

Course Name: C404: PHARMACEUTICAL ANALYSIS-III Theory

Course code/ Course title	Course outcomes
	Upon the completion of the course student shall be able to:
C404.1	**CO1.** Explain validation techniques for the analytical instruments and methods, GLP and their implementation in routine practices.
C404.2	**CO2.** Learn about ICH, ISO guidelines, documentation and record keeping.
C404.3	**CO3.** Describe different quality control measures for raw materials, dosage forms, cosmetics, packaging materials as well as that of radiopharmaceuticals.
C404.4	
C404.5	**CO4.** Explain the principle, working and applications of advanced instrumental techniques.
C404.6	**CO5.** Importance and usefulness of the separation techniques.
C404.7	**CO6.** Emphasize on chromatographic techniques in detail with their applications.
	CO7. Implement the knowledge about estimation biochemicals and drugs in biological samples.

Course Name: C404: PHARMACEUTICAL ANALYSIS-III Practical

Course code/ Course title	Course outcomes
	Upon the completion of the course student shall be able to:
C404.1	**CO1.** Develop skills for evaluation of active pharmaceutical ingredient in different dosage forms by titrimetric, uv spectrophotometric and chromatographic techniques.
C404.2	**CO2.**Evaluate the dosage forms and raw materials used in

C404.3	pharmaceuticals.
C404.3	**CO3.** Estimate the biochemical and drugs in biological samples. **CO4.** Develop analytical skills. .

Course name: Pharmaceutical Analysis – III (Theory)

Course code / course title	Course outcomes
	Upon completion of course student shall be able to:
404.1	CO 1. Able to explain the concept and principle of solvent extraction, liquid-liquid extraction
404.2	CO 2. Knows classification and important term in chromatography
404.3	CO 3. Able to explain the about stationary phase and mobile phase used in chromatography.
404.4	CO 4. Know the techniques of development of paper chromatography and TLC
404.5	CO 5. Able to handle instrument like HPLC, HPTLC and GC

Course Name: C404: PHARMACOLOGY- II Theory

Course code/ Course title	**Course outcomes**
	Upon the completion of the course student will be able to:
C404.1	**CO1.** Describe pharmacology of drugs acting on cardiovascular and renal system.
C404.2	**CO2.** Explain structure, MOA, systemic effects of autocoids leucotrienes and platelet activating factor.
C404.3	**CO3.** Discuss in detail about NSAIDs
C404.4	**CO4.** Describe pharmacology of drugs acting on hemopoetic system.
C404.5	**CO5.** Appreciate correlation of pharmacology with other biomedical sciences.

Course Name: C404: PHARMACOLOGY- II Practical

Course code/ Course title	**Course outcomes**
	Upon the completion of the course student will be able to:
C404.1	**CO1.** Explain drug administration by per oral and parenteral route of drug administration in laboratory animals.
C404.2	**CO2.** Describe various blood withdrawal techniques.
C404.3	**CO3.** Record concentration drug response curve using different animal tissues preparation.
C404.4	**CO4.** Estimate unknown concentration of neurotransmitter by various bioassay procedures.
C404.5	**CO5.** Evaluate antihistaminic activity on laboratory animals.

Course Name: C406: Pharmaceutical management Theory

Course code/ Course title	Course outcomes
	Upon the completion of the course student shall be able to:
C406.1	**CO1.** To introduce the newer technology of pharmaceutical management
C406.2	**CO2.** To study various management skill
C406.3	**CO3.** To understand the marketing concept, organization concept ,and Material management
C406.4	**CO4.** To study different techniques for improvement in skill and their Application in the pharmaceutical industry

Course Name: C414: PHARMACEUTICAL ANALYSIS-IV (Theory)

Course code/ Course title	Course outcomes
	Upon the completion of the course student will be able to:
C414.1	**CO1.**explain the principles of different instrumental methods used in spectroscopic technique.
C414.2	**CO2.**describe the instrumentation and its working used in various spectroscopic technique.
C414.3	**CO3.**enumerate the applications of each spectroscopic technique mentioned in syllabus.
C414.4	**CO4.** differentiate the atomic absorption and flame emission spectroscopy
C415.5	**CO5.** Narrate the various hyphenated techniques.

Course Name: 5T5: PHARMACOGNOSY & PHYTOCHEMISTRY-III (Theory)

Course code/ Course title	Course outcomes
	Upon the completion of the course student shall be able to:
5T5.1	**CO1.** Describe the various methods of extraction isolation & purification of phyto-pharmaceuticals.
5T5.2	**CO2.** To know chemical nature uses and medicinal importance of crude drugs.
5T5.3	**CO3. D**emonstrates general methods of extraction of Volatile oils,
5T5.4	Terpenoids & Resins etc.
	CO4. Apply the knowledge of chromatographic profile/techniques of
5T5.5	crude drugs.
	CO5. Explain n understand biogenetic pathways of Primary & secondary metabolites.

Course Name: 5P5: PHARMACOGNOSY & PHYTOCHEMISTRY-III (Practical)

Course code/ Course title	Course outcomes
	Upon the completion of the course student shall be able to:
5P5.1	**CO1.** Perform isolations techniques of crude drugs.
5P5.2	**CO2.** Explain and perform separation as well as purification of crude drugs .
5P5.3	**CO3.** Estimate content of chemical constituents in crude drugs
5P5.4	**CO4.**. Carryout microscopic and morphological evaluation of crude drugs.
5P5.5	**CO5.** Carryout chemical evaluation of crude drugs.

Course Name: C503: PHARMACOLOGY- III Theory

Course code/ Course title	Course outcomes
	Upon the completion of the course student will be able to:
C503.1	**CO1.** Describe pharmacology of drugs acting on Central nervous system
C503.2	**CO2.** Describe pharmacology of local anaesthetics and explain techniques for local anaesthesia.
C503.3	**CO3.** Discuss pharmacology of drugs acting on respiratory system.
C503.4	**CO4.** Explain MOA of drugs acting on gastrointestinal tract.
C503.5	**CO5.** Define terminologies of clinical research. Describe various phases, forms and ethical issues.

Course Name: C503: PHARMACOLOGY- III Practical

Course code/ Course title	Course outcomes
	Upon the completion of the course student will be able to:
C503.1	**CO1.** Explain general pharmacology of drugs acting on Central nervous system
C503.2	
C503.3	**CO2.** Describe various pharmacological actions using animal models.
C503.4	**CO3.** Evaluate anticonvulsant activity of drug using particular animal model.
C503.5	**CO4.** Evaluation of CNS stimulant and depressant activity of drugs using animal models.
	CO5. Describe the effect of drug on animals by simulated experiments.

Course Name: 5T6: REGULATORY AFFAIRS & IPR(Theory)

Course code/ Course title	Course outcomes
	Upon the completion of the course student shall be able to:
5T6.1	**CO1.** Understand the process of drug discovery and development
	CO2. Know regulatory authorities & agencies governing the
5T6.2	manufacturing & Sales of pharmaceuticals
5T6.3	**CO3.** Understand regulatory approval process & their registration in
5T6.4	Indian & international market
	CO4. Describe various application for approval of new drug (INDA, NDA,
5T6.5	ANDA, DMF).
5T6.6	**CO5.** Explain patent related issues, patent infridgment, freedom to aperate.
	CO6. Understand IPR & IPR related regime (Copy rights, TM, etc)

Course Name: C301: PHARMACOGNOSY & PHYTOCHEMISTRY-IV (Theory)

Course code/ Course title	Course outcomes
	Upon the completion of the course student shall be able to:
6T4.1	**CO1.** Explain and classify the crude drug from Glycosides & Tannins .
6T4.2	**CO2.** To know isolation and purification techniques of glycosides/tannins.
6T4.3	**CO3.** Describe spectral studies of crude drugs along.
6T4.4	**CO4.** Understand the importance of medicinal/therapeutic uses of crude drugs
6T4.5	**CO5.** Understand and explain various advances in phyto-pharmacognosy.

Course Name: 6P4: PHARMACOGNOSY & PHYTOCHEMISTRY-IV (Practical)

Course code/ Course title	Course outcomes
	Upon the completion of the course student shall be able to:
6P4.1	**CO1.** Describe general isolation techniques in lab scale.
6P4.2	**CO2.** Estimate the total content of principle chemical constituents
6P4.3	**CO3.** Understand the principles of UV & FTIR spectra.
6P4.4	**CO4.** Carryout microscopic and morphological evaluation of crude drugs.
6P4.5	**CO5.** Carryout chemical evaluation of crude drugs.

Course Name: 6T6: PHARMACEUTICAL VALIDATION (Theory)

Course code/ Course title	Course outcomes
	Upon the completion of the course student shall be able to:
6T6.1	**CO1.** Determine/understand various pharmaceutical process during manufacturing.
6T6.2	**CO2.** Understand cGMP aspects in Industries.
6T6.3	**CO3.** Appreciate the importance of documentation in industry
6T6.4	**CO4.** Understand the scope of quality certification applicable to Pharmaceutical Industry**..**
6T6.5	**CO5.** Understand the responsibility of QA & QC department

Course Name: C6T3: PHARMACOLGY-IV Theory

Course code/ Course title	Course outcomes
	Upon the completion of the course student will be able to:
C6T3.1	**CO1.** Describe the various pharmacological aspects of drugs acting on endocrine system.
C6T3.2	**CO2.** Describe the various pharmacological aspects on chemotherapy of microbial infections.
C6T3.3	**CO3.** Describe the various pharmacological aspects of drugs acting on Immune system.
C6T3.4	**CO4.** Explain the designs used in clinical trials, and their advantages and disadvantages.
C6T3.5	**CO5.** Describe the role and responsibility of all the stakeholders connected with clinical trial.
C6T3.6	**CO6.** Describe the guidelines of clinical research and management of clinical trials.

Course Name: C6P3: PHARMACOLGY-IV Practical

Course code/ Course title	Course outcomes
	Upon the completion of the course student shall be able to:
C6P3.1	**CO1.** Determine the PA2 value of some antagonist by biological method.
C6P3.2	**CO2.** Perform biological evaluation of behavior modulating drugs by various methods.
C6P3.3	**CO3.** Determine the LD50 of some drugs or chemicals in rats and mice.
C6P3.4	**CO4.** Record CVS related parameters such as BP, ECG, and EEG by non-invasive methods.

Course Name: C7T4: CLINICAL PHARMACOTHERAPEUTICS-II Theory

Course code/ Course title	Course outcomes
	Upon the completion of the course student will be able to:
C7T4.1	**CO1.** Describe the general prescribing guidelines for paediatrics, geriatrics and pregnancy and lactation.
C7T4.2	**CO2.** Explain etiology and pathogenesis of various endocrine, infectious, ophthalmologic and dermatologic diseases.
C7T4.3	**CO3.** Explain etiopathogenesis and pharmacotherapy of diseases and disorders associated with following infectious diseases
C7T4.4	**CO4.** Explain etiology and pathogenesis of various oncologic diseases.
C7T4.5	**CO5.** Explain the pharmacologic and non-pharmacologic therapy of various diseases.

Course Name: C7P4: CLINICAL PHARMACOTHERAPEUTICS-II Practical

Course code/ Course title	Course outcomes
	Upon the completion of the course student shall be able to:
C7P4.1	**CO1.** Determine the potency of the agonist on isolated tissues of rats.
C7P4.2	**CO2.** Perform biological evaluation of behavior modulating drugs by various methods.
C7P4.3	**CO3.** Demonstration of the principles of clinical trials and of detection and estimation of drugs in biological fluids
C7P4.4	**CO4.** Study of the prescription and related patient oriented problems on various diseases along with error in prescription.
C7P4.5	**CO5.** Study of pharmaceutical preparations and formulations and adverse drug reactions.

Course Name: C204: PHARMACOVIGILANCE Theory

Course code/ Course title	Course outcomes
	Upon the completion of the course student will be able to:
C805.1	**CO1.**Brief importance of safety drug monitoring with history and development of pharmacovigilance.
C805.2	**CO2.** Describe national and international scenario of pharmacovigilance.
C805.3	**CO3.** Explain different methods for detection of new adverse drug reactions.
C805.4	**CO4.** Describe adverse drug reaction reporting systems and communication in pharmacovigilance.
C805.5	**CO5.** Describe drug safety evaluation paediatrics, geriatrics, pregnancy and lactation
C805.6	**CO6.** Enumerate ICH guidelines ICSR, PUSR.
C805.7	**CO7.** Explain requirement of Pharmacovigilance programme of India for reporting ADR in India.
C805.8	**CO8.** What is a CIOMS requirement for ADR reporting.