



ANNAMACHARYA COLLEGE OF PHARMACY

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



Course Outcomes (CO's) R 17 Pharm. D

SUBJECT NAME & CODE	CODE	COURSE OUTCOMES
Human Anatomy and Physiology 101 T	C101.1	Identify the various tissues and organs of the different systems.
	C101.2	Describe the various homeostatic mechanisms and the imbalances of various systems.
	C101.3	Explain the structure and functions of various organs of the human body.
	C101.4	Discuss the interlinked mechanisms in the maintenance of normal functioning of human body.
	C101.5	Understand the effect of Skeletal muscles in Sports physiology.
Pharmaceutics 102 T	C102.1	Describe the evolution of Pharmacy and Pharmacopoeias.
	C102.2	Discuss the need and identification of different dosage forms.
	C102.3	Design a suitable formulation/dosage form with the use of appropriate ingredients.
	C102.4	Discuss the different techniques involved in formulation of a dosage form.
	C102.5	Analyze the instabilities observed in formulations and suggest suitable remedial measures to overcome the instabilities of dosage form.
	C102.6	Prepare appropriate labels and recommend storage conditions for dosage forms.
Medicinal Biochemistry 103 T	C103.1	Describes the cell organization, catalytic activity of enzymes and importance of isoenzymes in diagnosis of diseases.
	C103.2	Illustrates the metabolic process of biomolecules in health and illness (metabolic disorders).
	C103.3	Explains the genetic organization of mammalian genome; protein synthesis; replication; mutation and repair mech
	C103.4	Describe the biochemical principles of organ function tests of kidney, liver and endocrine gland.



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	C103.5	Demonstrate the qualitative analysis and determination of biomolecules in the body fluids.
Pharmaceutical Organic Chemistry 104 T	C104.1	Understand basic concepts of organic chemistry.
	C104.2	Summarize the naming reactions of carbonyl compounds and special emphasis on mechanisms and orientation of chemical reactions.
	C104.3	Analysis of kinetics, mechanism, stereochemistry of free radical, electrophilic, nucleophilic addition reactions and theory of resonance.
	C104.4	Comparison of reactivity, orientation and factors influencing aliphatic nucleophilic substitution with aromatic nucleophilic substitution.
	C104.5	Discussion on the method of preparation, test for purity, assay and medicinal uses of selected organic compounds.
	C104.6	Remember IUPAC rules for nomenclature of organic compounds and Identification of the structures of a given organic compound and nomenclature.
Pharmaceutical Inorganic Chemistry 105 T	C105.1	Summarize the principles, procedures and applications of various titrations.
	C105.2	Understand concept of impurities its identification and limit tests in pharmaceutical substances.
	C105.3	Construct various methods to prepare inorganic pharmaceutical substances.
	C105.4	Remember storage conditions for inorganic pharmaceuticals.
	C105.5	Estimate the inorganic medicinal substances and interpret their percentage purity.
	C105.6	Understand basics of radio activity and recognize the role of essential trace elements.
Remedial Mathematics 106 T (A)	C106.1 A	Know the theory and their application in Pharmacy.
	C106.2 A	Solve the different types of problems by applying



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		theory.
	C106.3 A	Appreciate the important application of mathematics in Pharmacy.
	C106.4 A	Apply both conventional and creative techniques to the solutions of mathematical problems.
Remedial Biology 106 T (B)	C106.1 B	Understand the basic components, both anatomy and physiology of plants.
	C106.2 B	Identify and understand the Physiology and reproduction in plants.
	C106.3 B	Understand the taxonomy in plants.
	C106.4 B	Identify and understand the various tissue systems and cell organization in animals.
	C106.5 B	Classify and study about different animal classes especially reptiles, aves, pisces and mammals.
Human Anatomy and Physiology 107 P	C107.1	Identify the various tissues of the human body.
	C107.2	Perform the hematological tests.
	C107.3	Record blood pressure and simple muscle curve.
	C107.4	Study of various systems of the human body.
Pharmaceutics 108 P	C108.1	Formulate various solid and liquid dosage forms.
	C108.2	Demonstrate different techniques involved in formulation.
	C108.3	Identify and apply the suitable remedial measures to solve instabilities observed in formulations.
	C108.4	Prepare appropriate labels for dosage forms.
	C108.5	Conducts planned experiments and prepare laboratory report in a standard format.
Medicinal Biochemistry 109 P	C109.1	Employs the qualitative analysis of urine sample for normal and abnormal constituents.
	C109.2	Experiments on blood sample helps the students to know the various parameters that are related to health and disease conditions.
	C109.3	Examining the biological samples for clinical significance of blood sugar, creatinine, cholesterol like samples gives practical knowledge to the students.



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	C109.4	Describes about the enzymatic tests like SGOT, SGPT and enzyme kinetic tests.
Pharmaceutical Organic Chemistry 110 P	C110.1	Acquire the knowledge and understanding of the basic experimental principles of pharmaceutical organic chemistry.
	C110.2	Apply stereo models and explain the structural aspects of organic compounds.
	C110.3	Identify various classes of organic compounds by systematic qualitative analysis, outline the preliminary tests and detection of elements for qualitative analysis.
	C110.4	Make correct use of various equipment's and take safety measures while working in Chemistry Laboratory.
	C110.5	Synthesize simple organic compounds by different organic reactions.
	C110.6	Analyze the appropriate method for purification of organic compounds.
Pharmaceutical Inorganic Chemistry 111 P	C111.1	Analyze the purity of compound quantitatively by performing assays.
	C111.2	Identify the impurities in given inorganic compounds by performing limit tests.
	C111.3	Apply different methods to prepare inorganic pharmaceuticals.
	C111.4	Carryout identification tests as per Indian Pharmacopoeia.
	C111.5	Determine the impurities qualitatively by performing test for purity.
	C111.6	Estimation of pharmaceutical inorganic compounds by gravimetry.
Remedial Biology 112 P	C112.1	Construct and develop microscopic sections of parts of the plant.
	C112.2	Identify and study different animal specimen.
	C112.3	Various systems of frog using computer model.
Pathophysiology 201 T	C201.1	Apply the knowledge of the relevant aspects of pathology of various conditions with reference to its pharmacological applications.
	C201.2	Evaluate the basic Pathophysiological



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		mechanisms in various diseases.
	C201.3	Explain the etiopathogenesis of selective diseases.
	C201.4	Discuss the pathogenesis and morphology of reversible and irreversible cell injury.
	C201.5	Describe various lipoproteins and lipoprotein disorders, with acute and chronic inflammation, cancer, auto immune diseases with biological significance of hypersensitivity disorders.
	C201.6	Execute the baseline knowledge and application in other subject of pharmacy.
Pharmaceutical Microbiology 202 T	C202.1	Explains the anatomy, identification, growth factors and sterilization of microorganisms.
	C202.2	Describes the mode of transmission of disease causing microorganism, symptoms of disease, and treatment aspect.
	C202.3	Illustrates the cultivation and identification methods of the microorganisms in the laboratory.
	C202.4	Demonstrates the identification of diseases by performing the diagnostic test.
	C202.5	Describes the behavior of motility and behavioral characteristics of microorganisms.
Pharmacognosy &Phytopharmaceuticals 203 T	C203.1	Describe the history and scope of pharmacognosy and identify the cell wall constituents and cell inclusions.
	C203.2	Know the cultivation, collection, processing, storage of medicinal plants.
	C203.3	Discuss regarding natural pesticides and their sources and describe the various plant fibers used in surgical dressing and related products.
	C203.4	Learn the pharmacognosy and chemistry of carbohydrates, lipids, proteins and elaborate on their sources.
	C203.5	Learn the Microscopical and powder microscopical study of crude drugs.
	C203.6	Enumerate the role of medicinal plants in the identification of adulteration and contamination of herbal medicines and determine the



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		adulteration in crude drug.
Pharmacology-I 204 T	C204.1	Demonstrate the basics of pharmacodynamics, adverse reaction, drug interaction and drug discovery.
	C204.2	Explain the role of neurohumoral transmission and drugs acting on peripheral nervous system.
	C204.3	Distinguish the function of neurotransmitters and drugs acting on central nervous system.
	C204.4	Identify the role of autocoids and related drugs.
	C204.5	Classify and explain the pharmacology of drugs acting on various systems.
	C204.6	Explain the physiological role of sex hormones and to assess the effect of oral contraceptives.
Community Pharmacy 205 T	C205.1	Discuss the roles and responsibilities of community pharmacist.
	C205.2	Outline the layout and infrastructure requirements for community pharmacy.
	C205.3	Recognize the need of inventory control and discuss the various methods.
	C205.4	Discuss the factors affecting medication adherence.
	C205.5	Perform general patient counseling.
	C205.6	Apply health screening services in community pharmacy.
Pharmacotherapeutics-I 206 T	C206.1	The Pathophysiology of selected disease states and the rationale for drug therapy. And therapeutic approach to management of these diseases.
	C206.2	The controversies in drug therapy; The importance of preparation of individualized therapeutic plans based on diagnosis; Needs to identify the patient-specific parameters relevant in initiating drug therapy and monitoring therapy (including alternatives, time-course of clinical and laboratory indices of therapeutic response and adverse effects).
	C206.3	Describe the Pathophysiology of selected disease states and explain the rationale for drug therapy.



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	C206.4	Summarize the therapeutic approach to management of these diseases including reference to the latest available evidence; discuss the controversies in drug therapy.
	C206.5	Explain the general prescribing guidelines and rational use of drugs.
	C206.6	Recognize the role of pharmacist in essential and rational drug use.
Pharmaceutical Microbiology 207 P	C207.1	Explains the sterilization and disinfection methods for the control of micro-organisms.
	C207.2	Examination of microbes by staining techniques helps to identify the different types of micro-organisms.
	C207.3	Biochemical tests employs in study of cultural characteristic features of microbes.
	C207.4	Diagnostic tests like widal tests give experimental knowledge to the students on diagnosis of diseases.
Pharmacognosy &Phytopharmaceuticals208 P	C208.1	Experiment macroscopicalµscopical characters of few pharmacognostically important crude drugs with neat labeled diagrams. Examine the powder microscopy of few crude drugs with well demonstrated diagrams.
	C208.2	Able to identify compound by performing chemical test.
	C208.3	Determine the chemical parameters of few oils that is of pharmacognostic significance.
	C208.4	Enumerate and list the cell contents and cell inclusions in a plant.
Pharmacotherapeutics-I 209 P	C209.1	Discuss the controversies in drug therapy.
	C209.2	Discuss the preparation of individualised therapeutic plans based on diagnosis.
	C209.3	Identify the patient-specific parameters relevant in initiating drug therapy.
	C209.4	Monitoring of drug therapy (including alternatives, timecourse of clinical and laboratory indices of therapeutic response and adverse effects).



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	C209.5	Discuss the therapeutic approach to management of selected diseases.
	C209.6	Perform patient counselling and Conduct planned experiments and prepare laboratory report in a standard format.
Pharmacology-II 301 T	C301.1	Identify the pharmacological aspects of various drugs.
	C301.2	Review the experiments confidently.
	C301.3	Reproduce the importance of pharmacology subject as a basis of therapeutics.
	C301.4	Duplicate the knowledge therapeutically.
	C301.5	Describe the pharmacokinetic and pharmacodynamic principles in pharmacology.
	C301.6	List the drugs in chemotherapy of various diseases.
Pharmaceutical Analysis 302 T	C302.1	Understand the importance of Regulatory authorities like GLP, ISO, TQM and Validation Guidelines involved in Pharmaceutical Analysis and various methods to ensure the Quality assurance of Drug and formulation.
	C302.2	Discuss the Application of Chromatography technique like TLC, Paper Chromatography and Electrophoresis used in analysis of Pharmaceuticals.
	C302.3	Examine the application of electrometric method utilized in analysis of drugs and Pharmaceuticals.
	C302.4	Illustrate the Principle, Instrumentation and application of various spectroscopic techniques involved in Analysis of Drug and Pharmaceuticals.
	C302.5	Instruct theoretical knowledge on various hyphenated instrumental techniques adopted for analysis of Pharmaceuticals.
	C302.6	Describe the fundamental principles and applications of Flame photometry, X-ray diffraction, atomic emission and atomic absorption spectroscopy.
Pharmacotherapeutics-II	C303.1	To know the pathophysiology of selected disease



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303 T		states and the rationale for drug therapy.
	C303.2	To understand the therapeutic approach for management of different diseases.
	C303.3	To know the importance of preparation of individualized therapeutic plans based on diagnosis & controversies in drug therapy.
	C303.4	To understand & identify the patient-specific parameters relevant in initiating drug therapy, and monitoring therapy.
	C303.5	Explain the etiopathogenesis of selected infectious diseases, musculoskeletal and renal disorders.
	C303.6	Discuss the principles of cancer therapy and dermatological disorders.
Pharmaceutical Jurisprudence 304 T	C304.1	Acquire the basic knowledge about pharmaceutical laws and role of ethics in pharmacy profession in India.
	C304.2	Memorize and explain the provisions of acts pertaining to Drugs and Cosmetics Act and Narcotic Drugs & Psychotropic Substance Act.
	C304.3	Describe the concepts of price fixation of pharmaceutical products.
	C304.4	Implement the rules and regulations of M&TP (Excise Duties) Act and Drugs and Magic remedies Act.
	C304.5	Summarize the Pharmaceutical Acts and Laws and their implications in the development and marketing of pharmaceuticals.
Medicinal Chemistry 305 T	C305.1	Understand the chemistry of drugs with respect to their pharmacological activity.
	C305.2	Analyze how current drugs were developed by using pharmacophore modeling and docking technique.
	C305.3	Know the structural activity relationship of different class of drugs.
	C305.4	Acquire knowledge in the chemotherapy for cancer and microbial diseases and different anti-viral agents.
	C305.5	Relate the knowledge of the chemistry of drugs



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		with respect to their pharmacological activity, mode of action & adverse effect.
	C305.6	Interpret the concept of rational drug design including combinatorial chemistry and computer aided drug design.
Pharmaceutical Formulations 306 T	C306.1	Explain the significance of formulation, preparation and evaluation of various pharmaceutical dosage forms.
	C306.2	Describe formulation additives for various dosage forms.
	C306.3	Explain suitable measures for stability of the dosage forms.
	C306.4	Describe the manufacturing methods of solid, semisolid, parenteral and ophthalmic products.
	C306.5	Evaluate different dosage forms with appropriate quality control test for a given drug.
	C306.6	Assess suitable packaging material for a dosage form of a given drug Pharmaceuticals.
Pharmacology-II 307 P	C307.1	Identify the drugs confidently in experiments.
	C307.2	Interpret the experiments of pharmacology.
	C307.3	Identify the various techniques in pharmacology experiments.
	C307.4	Interpret the results of biological samples in experimental pharmacology.
	C307.5	Demonstrate the pharmacological experiments.
Pharmaceutical Analysis 308 P	C308.1	Perform quantitative & qualitative analysis of drugs using various analytical instruments like UV-visible and IR spectrophotometer.
	C308.2	Interpret spectra of UV-visible, IR, NMR and Mass to identify the given compound.
	C308.3	Compare spectral data with chemical structure.
	C308.4	Evaluate the quantity of a drug in a given mixture or solution.
	C308.5	Practice planned experiments and prepare laboratory report in a standard format.
Pharmacotherapeutics-II 309 P	C309.1	To understand therapeutic goals of the drugs used in different diseases.
	C309.2	To understand dose and frequency of the



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		medications.
	C309.3	· To understand the time-course of clinical and laboratory indices of therapeutic response and adverse effects.
	C309.4	Identify adverse drug reactions, drug interactions and rationalize the prescription.
	C309.5	Prepare individualized therapeutic plans based on diagnosis.
	C309.6	Perform patient counseling.
Medicinal Chemistry 310 P	C310.1	Make correct use of various equipment's and take safety measures while working in Medicinal Chemistry Laboratory.
	C310.2	Synthesize medicinally important compounds.
	C310.3	Apply and understand the reaction mechanisms involved in synthesis of medicinally important compound.
	C310.4	Conduct monograph analysis of the pharmaceutical compounds and determination of the amount of drug present.
	C310.5	Determine partition coefficient and dissociation constant of a given compound.
	C310.6	Gains knowledge on purification of the synthesized medicinal compound by using appropriate techniques.
Pharmaceutical Formulations 311 P	C311.1	Develop formulations of different dosage forms as per the batch formula,
	C311.2	Demonstrate different equipment's and instruments used in preparation of dosage forms
	C311.3	Select suitable packaging container for a dosage form.
	C311.4	Evaluate different dosage forms by performing quality control tests.
	C311.5	Prepare and evaluate cosmetics such as lipstick, cold cream and shampoo.
	C311.6	Design planned experiments and prepare laboratory report in a standard format.
Pharmacotherapeutics-III	C401.1	Explain the etiopathogenesis of selected



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401 T		gastrointestinal, haematological, neurological and psychiatric diseases.
	C401.2	Discuss the principles of evidence-based therapy and pain management.
	C401.3	Identify the patient-specific parameters relevant in initiating and monitoring drug therapy and adverse effects.
	C401.4	Discuss the therapeutic approach in the management of selected diseases and controversies in drug therapy.
	C401.5	Prepare individualized therapeutic plans based on diagnosis.
	C401.6	Recognize the role of pharmacist in essential and rational drug use.
Hospital Pharmacy 402 T	C402.1	Discuss the roles and responsibilities of hospital pharmacist, hospital drug policies and guidelines for hospital pharmacy.
	C402.2	Discuss various drug distribution methods in a hospital pharmacy.
	C402.3	Apply various methods of inventory control.
	C402.4	Formulate parenteral preparations.
	C402.5	Review a newsletter for providing continuous education and awareness.
	C402.6	Explain about handling and packaging of radiopharmaceuticals.
Clinical Pharmacy 403 T	C403.1	Explain the roles and responsibilities of clinical pharmacist.
	C403.2	Analyze and interpret the laboratory test results for clinical diagnosis.
	C403.3	Conduct interview to elicit medication history and perform patient counseling.
	C403.4	Identify, monitor, assess, manage, prevent, document and report suspected adverse drug reactions.
	C403.5	Provide drug and poison information through critical analysis.
	C403.6	Recognize the potential sources of medication errors and act for its prevention.



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Biostatistics & Research Methodology 404 T	C404.1	Choose the appropriate research design and develop appropriate research hypothesis for a research project.
	C404.2	Explain the concept of central tendency of data & describe the different measures of central tendency.
	C404.3	Describe the appropriate statistical methods required for a particular research design.
	C404.4	Understand the basic epidemiological methods and study designs.
	C404.5	Explain the applications of computer in Hospital and Community Pharmacy.
Biopharmaceutics & Pharmacokinetics 405 T	C405.1	Understand the concept of ADME of a drug in the human body and factors influencing them.
	C405.2	Explain the introductory aspects of pharmacokinetics.
	C405.3	Determine the various pharmacokinetic parameters from either plasma concentration or urinary excretion data of the drug for a drug following one and multi compartment models.
	C405.4	Summarize the concept of multiple-dose administration and identify the various causes of the nonlinear pharmacokinetics.
	C405.5	Describe the concept of non-compartmental pharmacokinetics and state the principles underlying Bioavailability and Bioequivalence studies.
Clinical Toxicology 406 T	C406.1	Developing general working knowledge of the principles and management of clinical toxicology.
	C406.2	Generalized understanding of the health implications of toxic exposure involving therapeutic and non therapeutic agents.
	C406.3	Examine previous history, assessment, and therapy considerations associated with the management of a toxic exposure.
	C406.4	Distinguishing the characteristics and treatment guidelines for specific toxic substances.



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	C406.5	Implementing several preventive approaches to reduce unintentional poisoning.
Pharmacotherapeutics-III 407 P	C407.1	Identify drug interactions and rationalize the prescription.
	C407.2	Discuss the therapeutic approach to management of selected diseases.
	C407.3	Prepare individualized therapeutic plans based on diagnosis.
	C407.4	Conduct patient counseling.
	C407.5	Conducts planned experiments and prepare laboratory report in a standard format.
Hospital Pharmacy 408 P	C408.1	Analyze prescriptions for drug interaction.
	C408.2	Develop and prepare parenteral formulations and powders.
	C408.3	Solve inventory analysis.
	C408.4	Solve drug information queries through literature search.
	C408.5	Conduct planned experiments and prepares laboratory report in a standard format.
	C408.6	Produce various preparations used in hospital.
Clinical Pharmacy 409 P	C409.1	Assess prescriptions for drug interaction and answer drug information query.
	C409.2	Perform patient counseling on medication and conduct medication history interview.
	C409.3	Analyze and interpret the data obtained through laboratory tests.
	C409.4	Conducts planned experiments and prepare laboratory report in a standard format.
Biopharmaceutics & Pharmacokinetics 410 P	C410.1	Compare the in-vitro drug release profile of different marketed products and perform the solubility enhancement techniques for improvement of drug release of poorly water soluble drugs.
	C410.2	Estimate the bioavailability (absolute and relative) and bioequivalence from the given clinical data.
	C410.3	Calculate the drug content in blood sample using Area Under Curve approach and interpret



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		various pharmacokinetic parameters from the given clinical data.
	C410.4	Conducts planned experiments and prepare laboratory report in a standard format.
Pharmacotherapeutics I & II 411 T	C411.1	Explain the etiopathogenesis of selected diseases.
	C411.2	Prepare individualized therapeutic plans based on diagnosis.
	C411.3	Recognize the role of pharmacist in essential and rational drug use.
	C411.4	Explain the general prescribing guidelines and rational use of drugs.
	C411.5	Discuss the therapeutic approach in the management of selected diseases and controversies in drug therapy.
Pharmacotherapeutics I & II 412 P	C412.1	Identify drug interactions and rationalize the prescription.
	C412.2	Discuss the therapeutic approach to management of selected diseases.
	C412.3	Prepare individualized therapeutic plans based on diagnosis.
	C412.4	Conduct patient counseling.
Clinical Research 501 T	C501.1	Discuss the Pharmacological and Toxicological considerations in process of development of new drugs.
	C501.2	Discuss the principles and phases in clinical trial of drug.
	C501.3	Explain the guidelines for ethics and safe monitoring in clinical trial of a drug.
	C501.4	Design the documents of clinical trial.
	C501.5	Distinguish the guidelines of national and international regulatory bodies for clinical trial.
	C501.6	Recognize differing roles and obligations of the Investigator, Sponsor and Institutional Review Board.
Pharmacoepidemiology and Pharmacoeconomics 502 T	C502.1	Discuss the scope, need, origin and evaluation of Pharmacoepidemiology.
	C502.2	Explain the importance of Measurement of



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		outcomes in Pharmacoepidemiology.
	C502.3	Recommend suitable method for measuring the outcome of Pharmacoepidemiology for a disease.
	C502.4	Suggest an appropriate Pharmacoepidemiological method for a given drug and address the risks associated with Pharmacoepidemiological study.
	C502.5	Discuss the basic principles, role and relevance of Pharmacoeconomics in the development of a new drug.
	C502.6	Identify and justify an appropriate evaluation method for Pharmacoeconomics study of a disease.
Clinical Pharmacokinetics &Pharmacotherapeutic Drug Monitoring 503 T	C503.1	Discuss the pharmacokinetic principles to individualize drug therapy in patient care situations.
	C503.2	Determine dose, dosing intervals and dosage adjustments of a drug for a given patient.
	C503.3	Apply the principles of pharmacokinetics to analyze and predict drug interactions.
	C503.4	Prepare protocol for TDM of drugs for selected diseases.
	C503.5	Discuss the concept of genetic polymorphism in metabolism, transport and target of a drug.