Dr. B.C. Roy College of Pharmacy and Allied Health Sciences

Ph. : (0343) 253 2678/79
Mob. : +91 7477788556
Telefax : (0343) 253 2679
e-mail : bcrcp_dgp@yahoo.co.in
contact@bcrcp.org
www.bcrcp.ac.in

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Dr. Meghnad Saha Sarani, Bidhannagar, Durgapur - 713206, West Bengal

PROGRAM OUTCOMES (PO)

PO	KEY CONCEPT	EXPLANATION
PO1	**Pharmacy Knowledge**	Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy
PO2	**Modern tool usage**	Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations
PO3	**Leadership skills**	Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.
PO4	**Professional Identity**	Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).
PO5	**Pharmaceutical Ethics**	Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.
PO6	**Communication**	Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions
PO7	**The Pharmacist and society**	Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.
PO8	**Environment and sustainability**	Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO9	**Life-long learning**	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

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COURSE OUTCOME: D.PHARM.

NAME OF THE COURSE WITH CODE	COURSE OUTCOME
ER91-23P Biochemistry & Clinical Pathology Practical	**ER91-23P. CO1:** Inspect and analyze various macromolecules in the unknown sample
	ER91-23P. CO2: Apply the knowledge of clinical pathology practices that help to select an effective treatment.
	ER91-23P. CO3: Interpret appropriate microscopical examination for the proper diagnosis of disease.
	ER91-23P. CO4: Develop skill of injecting drugs and withdrawal of blood sample
ER91-22T Health Education & Community Pharmacy	**ER91-22T. CO1:** Understand the Concept of Health, Nutrition and its requirements, Environment and its effect on health, Demography and family Planning.
	ER91-22T. CO2: Apply the knowledge in providing various emergency treatments.
	ER91-22T.CO3: Distinguish different types of Microorganisms causing infection.
	ER91-22T. CO4: Participate in prevention and control programme of Communicable and Non-communicable diseases.
	ER91-22T. CO5: Develop knowledge about disease transmission, immunity, immunological product and skill of disinfection procedure.
ER91-23T Biochemistry & Clinical Pathology	**ER91-23T. CO1:** Students will be to apply the basic knowledge of biological macromolecules in understanding of various pathological states.
	ER91-23T. CO2: Students will be able to analyze the significance of biological macromolecules in the interpretation of laboratory results and pathophysiology of different diseases.
	ER91-23T. CO3: Students will be able to apply the knowledge of clinical biochemistry to meet the needs of community and hospital pharmacy.
ER91-14T Human Anatomy & Physiology	**ER91-14T. CO1:** Understand the structure and functions of the various organs of the human body.
	ER91-14T. CO2: Understand the various homeostatic mechanisms and their imbalance.
	ER91-14T. CO3: To appraise and correlate the homeostatic mechanisms of various physiological systems..
ER91-13T Pharmacognosy	**ER91-13T. CO1:** To explain the origin of drugs from natural sources with illustration of the role of natural products as the source of many drugs and pharmaceutical ingredients.
	ER91-13T. CO2: To explain collection and preparation of crude drugs for the market with different examples.

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NAME OF THE COURSE WITH CODE	COURSE OUTCOME
ER91-13T Pharmacognosy	**ER91-13T. CO3:** To attain Knowledge of the important natural products, their origin, properties and biological activity with anatomical study of the crude drugs.
ER91-12T Pharmaceutical Chemistry I	**ER91-12T.CO1:** To select inorganic drugs and pharmaceuticals accordingly their medicinal and pharmaceutical uses.
	ER91-12T.CO2: To assess the purity by evaluating range the impurities in inorganic drugs and pharmaceuticals.
	ER91-12T.CO3: To indentify inorganic pharmaceuticals from the knowledge of various tests.
ER91-11T Pharmaceutics	**ER91-11T. CO1:** Student can able to implement their concept and prepare different solid dosage forms.
	ER91-11T. CO2: Students can able to implement their knowledge for proper utilization of various unit operations used in pharmaceutical industry.
	ER91-11T. CO3: Students can able to utilize their idea for the Pharmaceutical packaging technology for different dosage forms.
	ER91-11T. CO4: Student can utilize their knowledge in various sterilization processes and aseptic technique.
ER91-13P Pharmacognosy Practical	**ER91-13P. CO1:** To learn the usage of different instrument for identification of crude drugs.
	ER91-13P. CO2: To identify the drugs from from natural origins.
	ER91-13P. CO3: To apply different techniques in analyzing drugs from natural origins.
ER91-11P Pharmaceutics Practical	**ER91-11P. CO1:** Students can to able to prepare and evaluate different pharmaceutical dosage forms.
	ER91-11P. CO2: Students can able to prepare and dispense parenteral products.
	ER91-11P. CO3: Student can able to formulate various cosmetics products.
ER91-14P Human Anatomy & Physiology Practical	**ER91-14P. CO1: Evaluate** the structure and functions of the various organs of the human body**.**
	ER91-14P. CO2: Evaluate & differentiate the various homeostatic mechanisms and their imbalance
	ER91-14P. CO3: Evaluate, analyse and differentiate Perform the haematological tests and also record the blood pressure, heart rate, pulse rate and respiratory volumes
ER91-12P Pharmaceutical Chemistry Practical I	**ER91-12P. CO1:** To identify inorganic drugs and pharmaceuticals by using various chemicals method.
	ER91-12P. CO2: To assess the purity by evaluating range the impurities in inorganic drugs and pharmaceuticals.
	ER91-12P. CO3: To build an idea about quantitative analysis through performing assay of inorganic pharmaceuticals by carrying out various volumetric titrations.

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PROGRAM OUTCOMES : UG PHARMACY

PO	KEY CONCEPT	EXPLANATION
PO1	Pharmacy Knowledge	Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices
PO2	Planning Abilities	Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines
PO3	Problem analysis	Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions
PO4	Modern tool usage	Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations
PO5	Leadership skills	Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfilment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.
PO6	Professional Identity	Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).
PO7	Pharmaceutical Ethics	Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.
PO8	Communication	Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions
PO9	The Pharmacist and society	Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.
PO10	Environment and sustainability	Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO11	Life-long learning	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

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COURSE OUTCOME : B. PHARM (OLD SYLLABUS)

NAME OF THE SUBJECT WITH CODE	OUTCOME
HU 101 PROFESSIONAL COMMUNICATION IN ENGLISH	**CO.HU 101.1:** Students will be able to **enhance** their behavioural needs for a Pharmacist to **develop** better communication skills.
	CO.HU 101.2: Able to **appraise** effective Communication (both Verbal and Nonverbal) that would give an impetus to act as a team player in a team or in group discussions
	CO.HU 101.3: Develop essential interview skills and required soft skills.
PT 101 PHARMACEUTICAL ANALYSIS	**CO.PT 101O.1:** Students will be able to **determine** impurities and sources of errors as well as they will be able to **prepare** different concentration of solution.
	CO.PT 101O.2: Students will be able to **utilize** the Principle behind different Pharmaceutical Analytical methods/techniques like gravimetric methods
	CO.PT 101O.3: Students will be able to **apply** different Pharmaceutical Analytical techniques like precipitation titrations for **analyzing** various pharmaceutical products.
	CO.PT 101O.4: Students will be able to **justify** and/or **distinguish** different Pharmaceutical Analytical methods/techniques such as redox and acid-base titrations
	CO.PT 101O.5: Students will be able to **evaluate** and **interpret** various results obtained using both titrimetric and instrumental methods of analysis
M 103 REMEDIAL MATHEMATICS	**CO.M 103O.1: Summarize** the concepts and methods of elementary matrices with **applications** in pharmacy (pharmaceutical basic calculations)
	CO.M 103O.2: Discuss the eigen values and eigen vectors with **applications** (energy levels and molecular orbital's of chemical systems)
	CO.M 103O.3: Elaborate basic integration rules with same applications (growth and decay problems)
PTB 101 REMEDIAL BIOLOGY	**CO.PTB 101O.1: Classification** of plants, Plant cell, mitosis, meiosis natural sexual and phyllogenetic system, Binomial nomenclature, taxa, taxon

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NAME OF THE SUBJECT WITH CODE	OUTCOME
	CO.PTB 101O.2: Describe the process of Mitosis, Meiosis. Morphology and histology of root, stem. Bark, leaf, flower, fruit ,seed
	CO.PTB 101O.3: Understand Animal kingdom, structure, life history & pathogenecity of Parasites including amoeba, entamoeba, Trypanosoma, Plasmodium, Taenia, Ascaris, Schistosom, Oxyuris, Ancylostoma
	CO.PTB 101O.4: Description of study of general structure & life history of mosquito, housefly, mites (sarcoptes scabies) & silkworm
PT 103 PHARMACEUTICAL CHEMISTRY (INORGANIC CHEMISTRY)	**CO.PT 103O.1: Determin**e the impurities in pharmaceutical inorganic substances.
	CO.PT 103O.2: Preparebuffered solution and **calculate** pH.
	CO.PT 103O.3: Identify and **determine** the pharmaceutical inorganic components of a substance
PT 106 PHARMACEUTICS (DISPENSING PHARMACY)	**CO.PT 106O.1: Prepare** and **dispense** conventional solid and semi-solid dosage forms through proper understanding of the concept of incompatibilities.
	CO.PT 106O.2: Prepare and **dispense** different kinds of liquids dosage forms using vehicles, chemical stabilizers, adjuncts such as colouring, flavouring and sweetening agents, co-solvents and antimicrobial agents.
	CO.PT 106O.3: Interpret the prescriptions and dispense to the patient. **Calculate** the dose of drug according to physical and biological conditions, such as age, body weight, sex, metabolic activity, disease, drug-allergy history of the patients.
	CO.PT 106O.4: Identify the requirements for setting up a retail and wholesale pharmacy store
PT 191 PHARMACEUTICAL ANALYSIS LAB	**CO.PT 191O.1:** Students will be able to **apply** different methods used to prepare and **standardize** the Pharmaceutical active ingredients and their formulations using acid-base, redox, precipitation and gravimetric procedures.
	CO.PT 191O.2: Students will be able to **utilize** the idea for **performing** assay of the Pharmaceutical active ingredients and their formulations using acid-base, redox, precipitation and gravimetric procedures
	CO.PT 191O.3: Students will be able to apply/perform techniques using Gravimetric Analysis for estimation of constituents present in a Pharmaceutical compound
PT 193 PHARMACEUTICAL CHEMISTRY LAB	**CO.PT 193O.1: Identify** some inorganic compound and **detect** the impurities in inorganic compound.
	CO.PT 193O.2: To **do** the experiment cautiously with inorganic chemical and able to **report** the data scientifically.

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NAME OF THE SUBJECT WITH CODE	OUTCOME
PT 196 PHARMACEUTICS (DISPENSING PHARMACY) LAB	**CO.PT 196O.1:** To **prepare** and **dispense** liquid dosage forms such as mixtures, solutions, syrups, lotion, emulsion and suspension.
	CO.PT 196O.2: To **prepare** and **dispense** powders dosage forms such as compound, effervescent and divided powders.
	CO.PT 196O.3: To **prepare** and **dispense** semi-solid dosage forms such as ointments and pastes.
PTB 191 REMEDIAL BIOLOGY LAB	**CO.PTB 191O.1:** –Using Microscope for **identifying** different slides of lower plants, animals
	CO.PTB 191O.2: Preparing slide of different parts of dicot and monocot plant
PT 203 PHARMACEUTICAL CHEMISTRY (PHYSICAL CHEMISTRY)	**CO.PT 203O.1: Compare** the different physicochemical properties of molecules to **design** various dosage forms.
	CO.PT 203O.2: Analyze the kinetic equation to **evaluate** any chemical process and **develop** the formulation.
	CO.PT 203O.2: Apply phase rule to characterize and **develop** stable dosage form
	CO.PT 203O.4: Predict the correlation between Energy and Works in different thermodynamic process.
M 203 ADVANCED MATHEMATICS & ENGINEERING MECHANICS	**CO.M 203O.1: Describe** briefly the basic concept of data by statistical of tests of significance, the student t-test, analysis of variance ,the chi-square test, linear regression and factorial design
	CO.M 203O.2: Discuss in depth about the Laplace transforms, which is powerful method for solving differential equations.
	CO.M 203O.3: Summarize the structure of composition and resolution of forces, equilibrium of concurrent forces, Polygon of forces, Friction, Sliding friction (simple problems) Centre of gravity arc, area, volume (use of calculus) simple problems, Motion under gravity, work, power, energy, conservation of Energy
PT 204 PHARMACEUTICAL CHEMISTRY (ORGANIC CHEMISTRY)	**CO. PT 204O.1: Identify**, **classify**, **name** and structure the organic compound.
	CO.PT 204.2: Illustrate and name the reaction of organic compounds
	CO.PT 204O.3: Correlates the isomers and **identify** the organic compound.
	CO.PT 204O.4: Account for reactivity/stability of compounds, 4. **identify/confirm** the identification of organic compound
HU202 ENVIRONMENT & ECOLOGY	**CO.HU 202O.1:** To **understand** the need of conservation natural resources.

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	CO.HU 202O.2: To **explain** the structure and function of an ecosystem.
	CO.HU 202O.3: To **interpret** pollution data and design remedial action.
PT 202 PHARMACOGNOSY	**CO.PT 202O.1:** To **explain** indigenous system of medicine
	CO.PT 202O.2: To **classify** crude drugs on the basis of phytochemistry, occurrence, distribution, organoleptic characters, chemical constituents and therapeutic efficacy.
	CO.PT 202O.3: To **judge** the presence of different types of adulterants and to **evaluate** crude drugs.
	CO.PT 202O.4: To **apply** the knowledge of therapeutics of different categories of crude drugs
PT 205 PHYSIOLOGY	**CO.PT 205O.1: Identify** to draw contrast between physiological properties, characteristics & functions of blood, heart, respiratory, endocrine gland, excretory & digestive system of a human body.
	CO.PT 205O.2: Evaluate processes like, haemostastic, Hemolysis, respiration, Excreation, digestion etc. to **develop**ed their Scientific skills.
	CO.PT 205O.3: Interpret the factors and control of the various anomalies of regulation of heart's action, respiration, Renal circulation etc. to **Predict** their pathological state.
	CO.PT 205O.4: Draw the relationship of various systems in coordination with importance Of various organs and tissues.
PT 292 PHARMACOGNOSY LAB	**CO.PT 292O.1:** To **develop** and **utilize** the knowledge of morphological characters of crude drugs eg. carbohydrate, lipid, glycosides, volatile oil, alkaloid etc.
	CO.PT 292O.2: To **utilize** the knowledge of physical, chemical & microscopical properties of crude drugs to **develop** pharmaceutical herbal preparations.
	CO.PT 292O.3: To **apply** the knowledge of fibers and surgical dressings to prepare pharmaceutical preparations.
PT 293 PHARMACEUTICAL CHEMISTRY (PHYSICAL CHEMISTRY) LAB	**CO.PT 293O.1:** Able to **identify** various standard values physicochemical properties of drug molecules.
	CO.PT 293O.2: Students can **derive** equation and **identify** the half-life and shelf life for stability of formulation.
	CO.PT 293O.3: Distinguish the usefulness of mathematics in physical chemistry and their application.

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NAME OF THE SUBJECT WITH CODE	OUTCOME
	CO.PT 293O.4: Predict the correlation between Energy and Works in different thermodynamic process.
PT 294 PHARMACEUTICAL CHEMISTRY (ORGANIC CHEMISTRY) LAB	**CO.PT 294O.1: Obtain** various organic compounds like aspirin, p-bromoacetanilide, reduction of nitrobenzene etc. in an optimum yield.
	CO.PT 294O.2: Identification of several derivatives of organic compounds
	CO.PT 294O.3: Ability to **design** various organic compounds in the laboratory using stereo models.
PT 295 PHYSIOLOGY LAB	**CO.PT 295O.1: Skill** of **performing** various experiments for **evaluation** of various biochemical and physical parameters using appropriate chemicals and apparatus
	CO.PT 295O.2: Perform and **interpret** various haematological parameters, body temperature, pulse rate, blood pressure and ECG report
	CO.PT 295O.3: have better **understanding** of the subject area by microscopic study of various tissues and macroscopic study of skeleton, organ and system of human body
PT 304 PHARMACEUTICAL CHEMISTRY (ORGANIC CHEMISTRY)	**CO.PT 304O.1: Design** and **develop** chemical reactions to synthesize newer organic compounds. **CO.PT 304O.2: Explain** organic reactions involving different parameters affecting the reaction. **CO.PT 304O. 3: Know** about the electrophilic and nucleophilic aromatic substitution.
PT 301 PHARMACEUTICAL ANALYSIS	**CO.PT 301O.1:** Students will be able to **apply** different analytical procedures which are used to **determine** the different components.
	CO.PT 301O.2: Students will **utilize** the detail idea about the electrochemical methods of analysis like potentiometer/ conductometry/amperometry etc.
	CO.PT 301O.3: Students will be able to **estimate** the analytes by applying theory of complexometric titration, Diazotization Titration, Kjeldahl method or Kjeldahl digestion, Karl Fischer titration and Oxygen flask combustion method which is used for elemental analysis.
PT 306 PHARMACEUTICS (PHYSICAL PHARMACY)	**CO.PT 306O.1:** In the end, students will be able to **explain** about the properties of powders and liquids in designing a formulation, **understand** about complex formation of compounds and binding of drugs to proteins, **understand** the various mechanisms of degradation of formulations and assessment of their stability.

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NAME OF THE SUBJECT WITH CODE	OUTCOME
PT 306 PHARMACEUTICS (PHYSICAL PHARMACY)	**CO.PT 306O.2:** Students will **develop** sound knowledge regarding the practical applications of the various principles related to development of pharmaceuticals.
	CO.PT 306O.3: The course will enable students to be able to be **skill**ed in their mathematical treatment regarding formulations.
	CO.PT 306O.4: Students will **develop** knowledge to **evaluate** the effectiveness of a formulation on the basis of the fundamental properties of solid and liquid systems and their various parameters.
PT 307 PHARMACEUTICAL ENGINEERING	**CO.PT 307O.1"** To **correlate** different measurement in unit & dimension and **evaluate** different unit operation based on their numerical data.
	CO.PT 307O.2: To **demonstrate** working principles, to **construct** & **operate** different equipment's of filtration, centrifugation, material handling (pumps, blowers, valves), used in pharmaceutical industries.
	CO.PT 307O.3: To **assess** pollutant level in industry & **recommended** a plant lay out for optimum use of resources.
CS 303 BASIC ELECTRONICS & COMPUTER APPLICATION	**CO.CS 303O.1:** Student can **apply** their knowledge of softwares for various fields of pharmaceutical sciences like preparation of seminar slides, assignments, projects
	CO.CS 303O.2: Student can use their statistical concepts to **interpret** different analytical data in the field of pharmaceutical sciences.
	CO.CS 303O.3: Student can **design** different computer programs to solve their day to day problems related to their laboratory experiments.
PT 305 ANATOMY, PHYSIOLOGY & HEALTH EDUCATION (APHE)	**CO.PT 305O.1: Orientation** to the study of tissues, joints, muscles, haemopoetic system, blood vascular system, lymphatic system, digestive system, respiratory system, nervous system, communicable disease and first aid measures.
	CO.PT 305O.2: Identify and **use** proper terminology for **describing** anatomical position of body
	CO.PT 305O.3: Develop and **understand** relating to family planning, infectious disease and emergency first aid measures
PT 391 PHARMACEUTICAL ANALYSIS LAB	**CO.PT 391O1**: Students will be able to **perform** non aqueous titration, complexometric titration and diazotization method to **estimate** different compounds.

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NAME OF THE SUBJECT WITH CODE	OUTCOME
	CO.PT 391O.2: Students will **utilise** the *Elctroanalytical methods like* potentiometry/conductometry/amperometry to **analyse** different types of ions
	CO.PT 391.3: Students will be able to **separate**, **detec**t and **estimate** the different types of compounds by applying theory of chromatography
PT 394 PHARMACEUTICAL CHEMISTRRY (ORGANIC CHEMISTRY) LAB	**CO.PT 3940.1**: **Design** and **development** of synthesis involving various heterocyclic ring systems.
	CO.PT 3940.2: **Knowledge**of reactions and **synthesis** involving eletrophilic aromatic substitutions
	CO.PT 3940.3: **Idea** about the workshop on molecular modelling of different organic isomers.
PT 396 PHARMACEUTICS (PHYSICAL PHARMACY) LAB	**CO.PT 396O.1:** Students can **identify** various properties of powders and **implement** it to develop suitable dosage forms.
	CO.PT 396O.2: Students can **utilize** their knowledge to **prepare** and **evaluate** suspension and emulsion
	CO.PT 396O.3: Students can **gain** various information on rheological properties and **apply** their ideas for the **development** of various types of systems.
PT 397 ENGINEERING DRAWING LAB	**CO.PT 397O.1**: **Gather** knowledge about sketching Conventions of drawing, lettering, scales with Orthographic Projection first and third angle concepts Isometric drawing and Dimensioning.
	CO.PT 397O.2: **Select**, **Construct** and **Interpret** appropriate ellipse, cycloid and spiral. **Draw** Orthographic projections of points, lines and planes
	CO.PT 397O.3: Draw orthographic projection of solids like cylinders, cones, prisms and pyramids including sections. Layout development of solids for practical situations. **Draw** isometric projections of simple objects
CS 393 BASIC ELECTRONICS & COMPUTER APPLICATION LAB	**CO.CS 393O.1**: Student can **apply** the concepts of computer knowledge for creating reports, presentation and for various comparative analyses.
	CO.CS 393.2: Student can **interpret** different pharmaceutical data's by using the concept of different statistical tools
	CO.CS 393.3: By the concept of programming students can **construct** programs to **solve** and **evaluate** different practical problems
PT 406 PHARMACEUTICS (PHARMACEUTICAL	**CO. PT 406O.1: Explain** the factors which **influence** the design of pharmaceutical solid, semisolid and liquid dosage forms with different packaging technology.

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NAME OF THE SUBJECT WITH CODE	OUTCOME
TECHNOLOGY-I)	**CO. PT 406O.2**: **Apply** knowledge regarding Aerosol manufacturing and packaging methods with pharmaceutical application and testing
	CO. PT 406O.3: **Apply** Knowledge regarding ophthalmic preparation, evaluation and packaging.
	CO. PT 406.4: **Apply** concept of extraction concern with techniques applicable in pharmaceutical industries.
	CO. PT 406O.5: Use the concept of collection, processing and storage of biological products like blood and plasma substitutes.
PT 402 PHARMACOGNOSY	**CO.PT 402O.1**: To **explain** &**evaluate** various crude drugs belonging to important categories like resin, fibers, tannins, volatile oil, pharmaceutical aids & natural colouring gents.
	CO.PT 402O.2: To **evaluate** different categories of glycosides &to **characterize** of traditional drugs like **Brahmi, Arjuna, Ashoka, Kantakari, Methi etc.**
	CO.PT 402O.3: To **develop**, **formulate** & **evaluate** different Ayurvedic preparations like Aristha, Asvas, Gutikas, Tailas, Churnas, Lehyas, Bhasmas etc
PT 404 PHARMACEUTICAL CHEMISTRY (BIO-CHEMISTRY)	**CO.PT 404O.1:** Students will be able to get a detail **concept** of different biochemical reactions.
	CO.PT 404.2: Students will be able to **acquire** knowledge about the metabolism of lipid, carbohydrates and their clinical significance
	CO.PT 404O.3: They will be able to **outline** different transport processes across cell membrane and production of ATP
PT 405 PHYSIOLOGY	**CO.PT 405O.1**: **Orientation** to the study of CNS, ANS PNS and mechanism involved in regulation of body temperature, reproductive system.
	CO.PT 405O.2: **Correlating** the effects and disorders of the nervous system with the physiology of the human system.
	CO.PT 405O.3: Students will be able to **develop** comprehensive knowledge about the physiological functioning of the reproductive system
PT 407 PHARMACEUTICAL ENGINEERING	**PT 407O.1**: Students will be able to **utilize** and **implement** their knowledge for selection of different heat transfer modes, equipments and applications used for manufacturing of dosage forms.

Ph. : (0343) 253 2678/79
Mob. : +91 7477788556
Telefax : (0343) 253 2679
e-mail : bcrcp_dgp@yahoo.co.in
contact@bcrcp.org
www.bcrcp.ac.in
Approved by PCI & AICTE and Affiliated to MAKAUT, W.B., WBSCT&VE&SD
Dr. Meghnad Saha Sarani, Bidhannagar, Durgapur - 713206, West Bengal

NAME OF THE SUBJECT WITH CODE	OUTCOME
	PT 407O.2: Students will be able to **plan** for proper utilization of different equipments used in evaporation, size reduction and size separation as well as **selection** of construction materials in unit operations
	PT 407O.3: Students will be able to **choose** different mixers and crystallizers depending on the need of pharmaceutical industry in day to day process
PT 492 PHARMACOGNOSY LAB	**CO.PT 492O.1**: To **apply** the knowledge of microscopical properties of crude drugs in **evaluation&identification** of crude drugs.
	CO.PT 492O.2: To **create** and **develop** pharmaceutical preparations by **utilizing** the knowledge of important chemical constituents present in crude drugs.
	CO.PT 492O.3: To **utilize** the knowledge of crude drugs belonging to the category of alkaloids, glycosides, steroids, flavonoids, tannins and resins in identification, standardization of crude drugs & to **use** them in herbal preparation.
PT 494 PHARMACEUTICAL CHEMISTRY(BIOCHEMISTRY) LAB	**CO.PT 494O.1**: Students will be able to **identify** and **estimate** basic biochemical parameters such as carbohydrate, protein and lipid from any biological sample.
	CO.PT 494O.2: Students will be able to **analyse** (both qualitative and quantitative) the clinical parameters such as blood glucose, protein, cholesterol, non-protein N_2 etc. and thus can **interpret** the pathophysiological condition present in the respective subject
	CO.PT 494O.3: Particularly **outline** any relevant sugar/protein/lipid present in the biological sample which may help to **analyse** any relevant disease of the subject
	CO.PT 494O.4: Will help to **estimate** any drug action on a particular enzyme and **correlate** the change of enzyme activity with surrounding pathophysiological condition.
PT 496 PHARMACEUTICS (PHARMACEUTICAL TECHNOLOGY LAB-1)	**CO.PT 496O.1**: Students will be able to **apply** different methods used to **prepare** and **evaluate** different Pharmaceutical formulation.
	CO.PT 496O.2: Students will be able to **utilize** the idea for the Pharmaceutical packaging technology for different dosage forms
	CO.PT 496O.3: Students will be able to **apply** techniques for the preparation pharmacopoeial extracts and galenical products

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PT 497 (PHARMACEUTICAL ENGINEERING LAB)	**CO.PT 497O.1:** Students will be able to **handle** different equipments which are used in pharmaceutical industry.
	CO.PT 497O.2: Students can **determine** particle size, mixing index and crystallization of the supplied samples.
	CO.PT 497O.3: Students can **utilize** their knowledge to **analyze** the different factors of filtration
PT 506 PHARMACEUTICS (PHARMACEUTICAL TECHNOLOGY-II)	**CO. PT 506.1:** To **formulate** different solid dosage form like Tablet and capsule with their acceptable quality control parameters to meet industrial requirements.
	CO. PT 506.2: **Apply** different coating technology for solid dosage form applicable in pharmaceutical industries.
	CO. PT 506.3: To **formulate** different cosmetic formulation concern with techniques applicable in pharmaceutical industries with their acceptable quality control parameters
PT 508 PHARMACOLOGY	**CO.PT 508.1**: **Recognize** the fundamental principles of drug actions at their target sites (eg. receptors, enzymes etc). **Interpret** and **apply** the various drug pharmacodynamics and pharmacokinetic interactions in therapeutics
	CO.PT 508.2: **Evaluate** and **differentiate** the properties of the peripheral nervous system from central nervous system at anatomical, physiological and level pharmacological. **Identify** the diseases related to it
	CO.PT 508.3: **Assess** the functional roles of different neurotransmitters of central nervous system transmitters and be able to **justify** the use of clinically important drugs acting at this pharmacological system in numerous CNS and ANS disorders viz: Parkinsonism, anxiety, depression, insomnia, epilepsy, psychosis. Also **understand** the basis of screening procedure of the drug used for the treatmen
	CO.PT 508.4: **Interpreting** and **distinguishing** the dose and drug related toxicities and able to **compose** its treatment
PT 509 PHARMACEUTICAL MICROBIOLOGY	**CO.PT 509.1**: To **prepare** work flow-sheets for cultivation, identification and isolation of microbes and to **calculate** and/or **predict** growth rate of microbes.
	CO.PT 509.2: To **design** effective sterilization protocols for different pharmaceuticals

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NAME OF THE SUBJECT WITH CODE	OUTCOME
	CO.PT 509.3: To **evaluate** antibiotics, disinfectants, vitamins, water quality and to **judge** presence of bacterial endotoxins in samples.
	CO.PT 509.4: To **explain** and **relate** various components of Immune system.
PT 503 PHARMACEUTICAL CHEMISTRY (MEDICINAL CHEMISTRY)	**CO.PT 503.1:** Students will be able to **understand** and **apply** principles involved in drug action and **correlate** the Pharmacodynamic and pharmacokinetics aspects of biologically active molecules. They will also learn to **interpret** and **plan** synthetic procedures for the preparation of simple prototypical drug molecules and analyze the purity.
	CO.PT 503.2: **Know** the types of biological targets (proteins, nucleic acids, carbohydrates and lipids) and they **develop** demands for drugs interacting with them
	CO.PT 503.3: **Suggest** and **plan** structures of inhibitors, agonists and antagonists based on knowledge about natural substrates or ligands. **Interpret** SAR in evaluating leads
	CO.PT 503.4: They will **learn** designing QSAR analysis for creating new drugs, optimization of drug's activity and improving its bioavailability. They will also **learn** to use *in silico* docking in the process of drug discovery and to **measure** any drug's bioactivity for analysis purpose.
PT 507 PHARMACEUTICAL ENGINEERING	**CO.PT 507.1**: To **evaluate** different conditions numerically based on gas-liquid and inter-phase mass-transfer systems.
	CO.PT 507.2: To **perform** various processes (extraction, drying and distillation) involved in pharmaceutical manufacturing unit
	CO.PT 507.3: To **understand** principle, working and construction of equipments and **implement** them for unit operation
	CO.PT 507.4: To **utilize** various instrumentation processes to measure several parameters such as temperature, pressure, flow rate, humidity, vacuum and level used for automated process control systems
PT 504 PHARMACEUTICAL CHEMISTRY (BIO-CHEMISTRY)	**CO.PT 504.1**: **Evaluate** various biochemical pathways to diagnose the disease and identify the cause of the disease.
	CO.PT 504.2: **Analyse** the cause and etiology of any disease by **identifying** relevant macromolecules and micromolecules in biochemical pathways
	CO.PT 504.3: **Assess**, **diagnose** and **target** the disease through understanding DNA, RNA and proteins

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NAME OF THE SUBJECT WITH CODE	OUTCOME
	CO.PT 504.4: **Create** newer therapies in target specific fashion, more **efficient** manner and in lesser side effects using genetic engineering
PT 593 PHARMACEUTICAL CHEMISTRY (MEDICINAL CHEMISTRY) LAB	**CO.PT 593.1:** Student will be able to **understand** various parameters governing chemical synthesis including temperature, solvent and catalysis.
	CO.PT 593.2: Student will be able to **design** synthesis of newer drugs involving electrophiles and such reagents.
	CO.PT 593.3: Student will be able to **analyze** purity of synthesized compounds, also evaluate the nature of impurities present in it.
	CO.PT 593.4: Student will be able to **design** method of purification of newer chemical compounds
	CO.PT 593.5: Student will be able to **design** assay methods as an essential step of quality control of active pharmaceutical ingredients (API).
PT 596 PHARMACEUTICS (PHARMACEUTICAL TECHNOLOGY II) LAB	**CO.PT 596.1**: **Knowledge** of solid dosage forms like tablets and capsules, their formulation and quality control serves as an important role for dosage form design.
	CO.PT 596.2: Apply **knowledge** to formulate solid, liquid and semisolid dosage forms and **evaluate** them for their quality development of pharmaceutical dosage forms.
PT 597 PHARMACEUTICAL ENGINEERING LAB	**CO.PT 597.1**: Students will be able to **implement** different unit operations and process controls that are employed in pharmaceutical industry. .
	CO.PT 597.2: For manufacturing of drugs students can **evaluate** those drugs in different perspective with correct use of various equipments in pharmaceutical industry
PT 599 PHARMACEUTICAL MICROBIOLOGY LAB	**CO.PT 599.1**:.**Identify** the type of microorganism and determine the potency of antibiotics
	CO.PT 599.2: **Develop** the skill of working in a aseptic area
	CO.PT 599.3: **Perform** the sterilization process in Laboratory set up
	CO.PT 599.4:.**Skill** in sterility testing of pharmaceutical products
	CO.PT 599.5: **Differentiate** antiseptic and disinfectant
PT 603 PHARMACEUTICAL CHEMISTRY (MEDICINAL CHEMISTRY)	**CO.PT 603.1**: **Identify** the structural requirement for exerting biological activities.
	CO.PT 603.2: **Design** chemical process, selection of reagents, catalysts and reaction conditions for synthesizing selected medicinal compounds.

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NAME OF THE SUBJECT WITH CODE	OUTCOME
	CO.PT 603.3: **Construct** newer drugs through structure activity relationship for drug design.
	CO.PT 603.4: Identification of selected medicinal compounds through chemical reactions.
PT 606 PHARMACEUTICS (PHARMACEUTICAL TECHNOLOGY)	**CO.PT 606.1**: **Prepare** and **dispense**parenteral products through proper understanding of the concept of formulation details, Pre-filling treatment, aseptic techniques, sterility testing.
	CO.PT 606.2: Preparation and sterilisation of several surgical products including wound dressing, absorbents, surgical cotton, and surgical gauze
	CO.PT 606.3: **Execute** generalize factors influencing choice of containers, legal and other official requirements for containers, packaging testing
	CO.PT 606.4: **Interpret** novel drug delivery system with brief description of micro-capsule and micro-pellet parenteral and implantable therapeutic systems, transdermal therapeutic systems, micro-particulate drug carrier system and micro-encapsulation.
PT 611 PHARMACEUTICS (BIO-PHARMACEUTICS & PHARMACOKINETICS)	**CO.PT 611.1**: In the end, students will be able to **understand** the need and **application** of biopharmaceutical study to pharmaceutical dosage forms and drug delivery; **conceive** the preliminary idea that a dosage form development technology vividly influences the course of the drug *in vivo*. This knowledge would help a student to **estimate** the possible therapeutic outcomes of a formulation following its systemic administration. A student should be able to **estimate** the rate and extent of absorption of a drug candidate from its site of administration, and should confidently **extrapolate** the data to **deduce** both therapeutic and toxic effects of the drug.
	CO.PT 611.2: Students will also **learn** about the various methods to assess bioavailability by various pharmacokinetic and pharmacodynamic studies and their application for IVIVC studies.
	CO.PT 611.3: A student would **learn** to **demonstrate** the kinetics of a drug in physiological conditions through proper mathematical representation. Students will also know about the significance of dose-dependent kinetics and its causes and the various mathematical ways to express non-linear kinetics. A student would be able to **suggest** an apt dosage regimen for a patient, like drug interactions, renal or hepatic functions, and dosage adjustment & calculation in patients with and without renal and hepatic failure.

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	CO.PT 611.4: Problem solving techniques to numerical questions from various chapters will enable the students for practical evaluation of the various properties.
PT 608 PHARMACOLOGY	**CO.PT 608.1**: Students will be able to **describe** the pharmacological concepts regarding Digitalis and cardiac glycosides, Antihypertensive drugs, Anti-anginal drugs, Anti-arrhythmic drugs, Anti-hyperlipedemic drugs, Coagulant and Anticoagulant drugs, Diuretics, Anti-diuretics and Anti-asthmatic drugs. Students will **learn** about the principles and protocols involved in bioassay of physiological molecules like acetylcholine, hydroxytryptamine, adrenaline, digitalis, noradrenaline and oxytocin.
	CO.PT 608.2: Students will be able to **identify** specific drugs of different classes along with the mechanism of action, pharmacological actions, clinical effects, indications, and adverse effects.
	CO.PT 608.3: Students will be able to **differentiate** the different types of ailments and would be able to identify the correct therapeutic options for the same. Students will learn to **evaluate** the possible adverse effects of the drugs used in treatment of those ailments.
PT 609 PHARMACEUTICAL BIO-TECHNOLOGY & INDUSTRIAL MICRO-BIOLOGY	**CO.PT 609.1:** To **explain** and **relate** various components of Immune system and to **evaluate** specific antigen or antibody.
	CO.PT 609.2: To **apply** various recombination strategies in drug development
	CO.PT 609.3: To **design** fermenters and to **operate** fermentative processes of pharmaceuticals
	CO.PT 609.4: To **compare** and **select** relevant immobilization and biotransformation processes for pharmaceutical production
PT 610 B ELECTIVE-I: ADVANCED PHARMACEUTICAL BIOTECHNOLOGY	**CO610B.1:** to **Explain** the concept and application of biotechnology, especially micro & nanotechnology for medicine.
	C610B.2: To **visualize** the concept of Recombinant DNA technology and **summarize** the current applications of advanced techniques in the diverse areas such as pharmaceuticals.
	CO610B.3: To **demonstrate** and to provide examples of the production of pharmaceutical products by Genetic engineering.
	CO610B.4: To **illustrate** the principle, usage and to compare the various modern techniques used in biotechnology including PCR.

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NAME OF THE SUBJECT WITH CODE	OUTCOME
	CO610B.5: To **relate** various bioinformatics databases like Nucleic acid, Protein etc with their structure and function.
PT 610A ELECTIVE-I: COMPUTER APPLICATION IN PHARMACEUTICAL TECHNOLOGY & IN CLINICAL PHARMACY	**CO.PT 610A.1**: Students can **apply** the concept of DBMS for clinical pharmacy, hospital pharmacy etc.
	CO.PT 610A.2: Students can **create** a database by **applying** the concept of Statistics in an experiment.
	CO.PT 610A.3: Students can **design** and **analyze** newer drugs using QSAR concept.
PT 693 PHARMACEUTICAL CHEMISTRY (MEDICINAL CHEMISTRY) LAB	**CO.PT 693.1: Illustrate** the practical concepts involving the steriochemical aspect depending on **stereomodel**
	CO.PT 693.2: **Illustrate** the fundamental practical concepts in synthesis of drug intermediates and medicinal compounds involving multi step reaction of Benzil, Benzillicacid, Diphenyl hydantoin, Benzocaine.
	CO.PT 693.3: Determine the physicochemical properties and identification of synthesized drugs and medicinal compounds.
	CO.PT 693.4: Calculate and **judge** the yield of the synthesised drug and medicinal compounds.
	CO.PT 693.5: Test the knowledge in the field of medicinal chemistry in particular to **pharmacopoeial** sciences for the analysis of the formulation involving Propranolol HCL, warfarin sodium, verapamil hydrochloride, chlordiazepoxide, spironolactone, diazepam (any four).
PT 696 PHARMACEUTICS (PHARMACEUTICAL TECHNOLOGY) LAB	**CO.PT 696.1:** Students will be able to **apply** different methods used to prepare and evaluate sustained release oral dosage form.
	CO.PT 696.2: Students will be able to **utilize** the idea for the Pharmaceutical packaging technology for different dosage forms.
	CO.PT 696.3: Students will be able to **apply** techniques for the preparation different dressing materials as per pharmacopoeial specifications
PT 697 PHARMACUTICS (BIO-PHARMACEUTICS & PHARMACOKINETICS) LAB	**CO.PT 697.1**: Students will be able to **understand** the significance of release studies of various dosage forms under various experimental conditions.
	CO.PT 697.2: In the end, students will be able to **determine** the various pharmacokinetic parameters related to different type of dosage forms.
PT 698 PHARMACOLOGY LAB	**CO.PT 698.1**: Students will able to **evaluate** bioactivity of drugs using isolated tissue preparations.
	CO.PT 698.2: Students will be able to **carry** out the bioassay of the bioactive substances like acetylcholine, serotonin, histamine, noradrenaline and oxytocin.

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	CO.PT 698.3: Students will learn to **carry** out experiments using different instrumental techniques and to **interpret** the results of the experiments.
PT 691A ELECTIVE-I: COMPUTER APPLICATION IN PHARMACEUTICAL TECHNOLOGY & IN CLINICAL PHARMACY LAB	**CO.PT 691A.1:** Student can **apply** the concept of Database Management System (MS ACCESS and ORACLE) to design, construct and analyze different pharmaceutical and clinical data's.
	CO.PT 691A.2: Student will be able to **Plan, compare and explain** different Pharmaceutical data's
PT 691B ELECTIVE-I: ADVANCED PHARMACEUTICAL BIOTECHNOLOGY LAB	**CO.PT 691B.1**: Students will be able to **estimate** basic molecular entities such as DNA, RNA and proteins in a given cell.
	CO.PT 691B.2: Students will be able to **analyse** specific proteins for e.g. recombinant proteins, proteins expressed in specific pathophysiological conditions- will be able to diagnose any disease.
	CO.PT 691B.3: Liver functionality of any individual, hepatotoxicity or hepato-protective capacity of any drug, chronic toxicity of a drug could be **interpreted** by SGPT, SGOT assay.
	CO.PT 691B.4: Pathophysiological conditions of a given cell can be **evaluated** by estimating marker enzyme/s activity under that condition
	CO.PT 691B.5: Hormone and protein associated disease, cells pathophysiology, drug's role on hormonal or protein synthesis pathway could be **analysed** by estimation of hormone and protein concentrations
PT 682 SEMINAR	**CO.PT682.1:** To **identify** the aims and objectives of the study on the seminar topic
	CO.PT682.2: To **summarise** their findings
	CO.PT682.3: To **create** the effective presentation
	CO.PT682.4: To **present** their seminar with proper communication skills
PT 706 PHARMACEUTICS (PHARMACEUTICAL TECHNOLOGY)	**CO.PT 706.1**: Student can **implement** the knowledge of preformulation study to develop various dosage form designing and get optimize stability.
	CO.PT 706.2: Students can able to **develop** their knowledge on GMP, Quality audit and Quality assurance to establish quality management system in pharmaceutical industry.
	CO.PT 706.3: Students can able to **prepare** and **evaluate** the different oral controlled released formulation

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	CO.PT 706.4: Students can **utilize** their knowledge in different methods of validation and also extend their knowledge about stabilization and their stability testing protocol.
PT 703 PHARMACEUTICAL CHEMISTRY (MEDICINAL CHEMISTRY)	**CO.PT 703.1: Identify** the correlation between cause of a disease and importance of chemical structure of drug.
	CO.PT 703.2: To **describe** the metabolic biochemical pathway and explain the Chemical structure in therapeutic values of drug.
	CO.PT 703.3: To **relate** the structure activity relationship of different class of drugs for newer drug design.
	CO.PT 703.4: Design and **develop** the syntheses of some important drugs.
PT 702 PHARMACOGNOSY	**CO.PT 702.1:** To **illustrate** & **analyze**biogenesis and pharmacological activity of medicinally important alkaloids, terpenes, glycosides, carotenoids & biogenetics of secondary metabolites.
	CO.PT 702.2: To **develop** & **design** plant tissue culture. CO.PT 702.3: To **analyze**, **categorize** & **relate**important medicinal agents from marine & plant sources.
	COB.PT 702.4: To **explain** the collection, identification, preservation & utilization of important medicinal herbs & Herbal Cosmetics.
	CO.PT 702.5: To **outline, utilize & correlate**different screening methods of flavonoids and polyphenols for isolation in plant extracts.
PT 708 PHARMACOLOGY	**CO.PT 708.1**: Students will be able to **describe** the pharmacological concepts regarding antibiotics, antiviral drugs, anti-tubercular drugs, anti-leprosy drugs, anti-protozoal dugs, anti-fungal drugs, anti-cancer drugs, immunosuppressive drugs and drugs acting on the endocrine and gastrointestinal system.
	CO.PT 708.2: This will enable the students to **identify** specific drugs of different classes along with the mechanism of action, pharmacological actions, clinical effects, indications, and adverse effects.
	CO.PT 708.3: Students will be able to **differentiate** the different types of ailments and would be able to identify the correct therapeutic options for the same. Students will learn to **evaluate** the possible adverse effects of the drugs used in treatment of those ailments.
PT 709 A ELECTIVE-II: PACKAGING TECHNOLOGY	**CO.PT 709A.1:** Students will be able to **select** specific containers and closures (materials) for the given formulation/ dosage forms.

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	CO.PT 709A.2: Students will be able to **judge** specific tamper proof packaging to provide maximum security during the storage and transition.
	CO.PT 709A.3: Students can **select** the packing materials so that a better shelf-life can be achieved with the immense of stability which directly helps for the storage of the pharmaceutical Products.
	CO. PT 709A.4: Students will be able to **evaluate** the quality and standards of different types of packaging materials.
PT 709 B ELECTIVE-II: ADVANCED PHARMACOGNOSY	**CO.PT 709B.1**: To **enumerate** Ayurvedic system of medicine with indigenous systems of medicine & apply important techniques associated with quality control of herbal drugs.
	CO.PT 709B.2: To **apply, analyze & compare** important techniques like TLC/HPTLC, with different types of drug evaluation process in drug isolation and identification.
	CO.PT 709B.3: To **explain, relate & develop** extraction and isolation method, with quality assurance and stability testing of herbal drugs.
PT 709 C ELECTIVE-II: PHARMACEUTICAL MARKETING MANAGEMENT	**CO.PT709C.1**: **Demand** states, marketing task along with scope of different markets. Core Marketing concept along with needs wants etc.4P components of Marketing Mix. Strategic formulation, product planning along with SWOT analysis
	CO.PT709C.2: Various aspects of Market Research and Marketing Research along with **Forecasting** and Demand measurement. Consumer behaviour analysis, motivating Physicians towards brand. Knowledge of product positioning etc.
	CO.PT709C.3: Various aspects of Marketing strategies at different stages of product life cycle. **Market searching procedure, market testing** along with **product development**. Knowledge about different aspects of product strategies along with packaging labelling etc.

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	CO.PT709C.4: **Management of channel dynamics** of marketing including selection, evaluation, conflicts, cooperation etc. Details of wholesale & and retail management. **Utilising** advertisement for sales promotion by proper handling of the advertisement tool. Public Relations management is also learnt. Different aspects of recruitment, training of Sales **Representative, Supervising, controlling, motivating & evaluating** them.
PT 793 PHARMACEUTICAL CHEMISTRY (MEDICINAL CHEMISTRY) LAB	**CO.PT 793.1**: Students can **interpret** the drug receptor interaction with respect to pharmacological activity.
	CO.PT 793.2: They can also **estimate** and **analyses** the different metabolic product of drug molecules which may help in drug delivery system.
	CO.PT 793.3: They can improve the drug receptor interaction to get better pharmacological activity and also minimize the side effects.
	CO.PT 793.4: They can able to synthesis different derivatives of drug molecules with respect to better pharmacological activity with minimize.
PT 796 PHARMACEUTICS (PHARMACEUTICAL TECHNOLOGY) LAB	**CO.PT 796.1:** Students will able to **determine** the various micromeritics properties of powders during formulation of a dosage form.
	CO.PT 796.2: Students will able to **develop** the analytical method of the supplied sample.
	CO.PT 796.3: Students can **utilize** their knowledge to prepare and evaluate tablets.
	CO.PT 796.4: Students will able to perform the dissolution study of dosage form, calculate the drug release from the dosage form and compare it with the marketed formulation.
PT 782 SEMINAR ON ASSIGNED TOPIC	**CO.PT782.1:** To **identify** the aims and objectives of the study on the seminar topic.
	CO.PT782.2: To **summarise** their findings.
	CO.PT782.3: To create the power point presentation.
	CO.PT782.4: To present their seminar with proper communication skills.
PT 783 SEMINAR	**CO.PT783.1:** To **identify** the aims and objectives of the study.
	CO.PT783.2: To **prepare** the plan of work and to demonstrate the execution of the plan.
	CO.PT783.3: To **analyze** and to summarise their findings.
	CO.PT783.4: To prepare the thesis report in their own words.

Ph. : (0343) 253 2678/79
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contact@bcrcp.org
www.bcrcp.ac.in
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Dr. Meghnad Saha Sarani, Bidhannagar, Durgapur - 713206, West Bengal

NAME OF THE SUBJECT WITH CODE	OUTCOME
PT 812 PHARMACEUTICAL INDUSTRIAL MANAGEMENT	**CO.PT 812.1**: The students can be able to **define** the concept of management, Accountancy, Economics ,GLP,ISO 9000 and TQM.
	CO.PT 812.2: Students can **explain** Planning, organizing, Staffing, Directing and Controlling.
	CO.PT 812.3: Students can **compare** their level of understanding to interpret various situations in industry.
PT 813 PHARMACEUTICAL JURISPRUDENCE & ETHICS	**CO.PT 813.1:** To **understand** different statutory body related to drug administration and their recommendations prevailing across the country.
	CO.PT 813.2: To **perform** in various operational activities as Pharmacist maintaining Professional Ethics.
	CO.PT 813.3: To **understand** the dangerous effects of Narcotic and Psychotropic substances and create awareness in the society.
	CO.PT 813.4: To **apply** MTP Act/Rules1971, Prevention of Cruelty to Animals Act/Rules 1960, Drugs and Magic Remedies Act/Rules , DPCO 1995 & Medicinal and Toilet preparation Act 1955 in their future as needed.
	CO.PT 813.5: To **apply** Factories Act/Rules1948 and the Patents Act/Rules1970 in future as needed.
PT 818 HOSPITAL PHARMACY & CLINICAL PHARMACY	**CO. PT 818.1**: **Prepare** hospital formulary with information about each medication and design new approach to labeling, personnel requirements of dispensing of drugs to in-patients and out-patients.
	CO. PT 818.2: **Deduce** management of important Cardiovascular and CNS disorders of organ systems.
	CO. PT 818.3: Indicate rational use of drug in comparison to various drug interactions and recognize various stages of clinical trials.
	CO. PT 818.4: Develop GMP related protocols for manufacture of sterile and non sterile products.
PT 801 PHARMACEUTICAL ANALYSIS	**CO.PT 801.1**: The students will be able to **define** the basic principle of UV-Visible spectroscopy and also able to estimate the λ_{max}.
	CO.PT 801.2: Students will be able to **detect/analyze** different elements with the help of Flame photometry and AAS.
	CO.PT 801.3: Students will be able to **compare** their level of **understanding** to **interpret** different compounds with the help of IR, Mass and NMR spectroscopy.

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NAME OF THE SUBJECT WITH CODE	OUTCOME
PT 891 PHARMACEUTICAL ANALYSIS LAB	**CO.PT 891.1**: Students will able to **interpret** IR spectroscopy, arrange components in IR spectroscopy device. Students will able to interpret the NMR and Mass spectra.
	CO.PT 891.2: Students will be able to carry out different separation and purification techniques and their application in different pharmaceutical ingredients by different chromatographic and Radio-immune assay technique.
	CO.PT 891.3: Students will be able to **utilize** the idea to assay of the Pharmaceutical active ingredients.
PT 884 VIVA-VOCE	**CO.PT884.1:** To **summarize** their learning from the entire programme.
	CO.PT884.2: To **identify** the relative strengths and weaknesses.
	CO.PT884.3: To **assess** their future area of excellence.

COURSE OUTCOME B. PHARM NEW SYLLABUS

NAME OF THE SUBJECT WITH CODE	OUTCOME
HU 181 COMMUNICATION SKILL	**CO.HU 181N.1:** Able to **associate** the importance of communication and the communication process. Know various perspectives in Communication and its effects.
	CO.HU 181N.2: Able to **communicate** properly for a flawless service to the industry as well as academics.
	CO.HU 181N.3: Able to **imbibe** essential interpersonal skills with proper professional attitude.
PTB 184 REMIDIAL BIOLOGY	**CO.PT 184N.1: Grasp** the significance of the characters of living organism, diversity of living world, Binomial nomenclature, five kingdoms of life and basis of classification. Salient features of Monera, Protista, Fungi, Anamals, Plants & virus. **CO.PT 184N.2**: **Appreciate** the various parts of plant-Root,stem, flower, leaf, fruit, seed.
	CO.PT 184N.3: Appreciate the significance of blood groups, coagulation of blood, composition and functions of lymph, human circulatory system, human heart, cardiac cycle, cardiac output &ECG.
	CO.PT 184N.4 To **interpret** Digestion & Absorption, Breathing & respiration, Excretory products and their elimination, Neural control and coordination, Endocrine glands and their secretions, Human reproduction.
	CO.PT 184N.5: To **understand** Plants and mineral nutrition, photosynthesis, plant respiration, plant growth and development.

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NAME OF THE SUBJECT WITH CODE	OUTCOME
	CO.PT 184N.6: Differentiate the structure and functions of cell and cell organelles, Cell division & tissues.
M 183 REMIDIAL MATHEMATICS	**CO.M 183N.1: Develop and understand** differentiation(successive derivative) , integration CO.M 183N.2 Basic concept of Laplace transform and its **application** in solving linear differential equations. Application in solving chemical kinetics and Pharmacokinetics equations
	CO.M 183N.3: An introductory treatment of first order differential equations. To cover solution of differential equations especially when treating exponential growth and decay applications.
PT 101 PHARMACEUTICAL ANALYSIS I	**CO.PT 101N.1**: Students will be able to **apply** different methods used in Pharmaceutical Analysis. CO.PT 101N.2 Students will be able to **utilize** the Principle behind different Pharmaceutical Analytical methods/techniques like complexometric and non aqueous titrations.
	CO.PT 101N.3: Students will be able to **apply** different Pharmaceutical Analytical techniques like electrochemical methods for analyzing various pharmaceutical products.
	CO.PT 101N.4: Students will be able to **justify** and/or **distinguish** different Pharmaceutical Analytical methods/techniques such as redox and acid-base titrations.
	CO.PT 101N.5: Students will be able to **evaluate** and **interpret** various results obtained using both titrimetric and instrumental methods of analysis.
PT 103 PHARMACEUTICAL INORGANIC CHEMISTRY	**CO.PT 103N.1**: Student will be able to **determine** the impurities in pharmaceutical inorganic substances.
	CO.PT 103N.2: Student will be able to prepare buffer solution and measure its tonicity.
	CO.PT 103N.3: Student will be able to **identify** and **determine** the medicinal and pharmaceutical uses of various inorganic compounds.
PT 105 HUMAN ANATOMY & PHYSIOLOGY I	**CO.PT 105N.1: Describe** the cellular & tissue level of organization of integumentary system, Skeletal system, Blood & Lymphatic system, Peripheral Nervous system, Cardiovascular system of the human body
	CO.PT 105N.2: **Develop** an understanding of physiological function of integumentary system, Skeletal system, Blood & Lymphatic system, Peripheral Nervous system, Cardiovascular system.
	CO.PT 105N.3: Explain homeostatic mechanism, their imbalances and consequences.

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NAME OF THE SUBJECT WITH CODE	OUTCOME
PT 106 PHARMACEUTICS I	**CO.PT 106N.1: Interpret** the prescriptions and dispense to the patient. Calculate the dose of drug according to physical and biological conditions, such as age, body weight, sex, metabolic activity, disease, drug-allergy history of the patients.
	CO.PT 106N.2: Prepare and dispense conventional solid and semi-solid dosage forms through proper understanding of the concept of incompatibilities.
	CO.PT 106N.3: Prepare and **evaluate** liquid dosage forms using excipients such as surfactants, chemical stabilizers, co-solvents and antimicrobial agents and evaluate them in terms of physicochemical properties viz., droplet size, viscosity, electrophoretic mobility and stability.
HU 182 COMMUNICATION SKILLS LAB	**CO.HU 182N.1:** Able to **associate** the importance of communication and the communication process. Know various perspectives in Communication and its effects.
	CO.HU 182N.2: Able to communicate properly for a flawless service to the industry as well as academics.
	CO.HU 182N.3: Able to **imbibe** essential interpersonal skills with proper professional attitude.
PT 191 PHARMACEUTICAL ANALYSIS I LAB	**CO.PT 191N.1:** Students will be able to **apply** different methods used to prepare and standardization of Pharmaceutical compounds.
	CO.PT 191N.2: Students will be able to **utilize** the idea to assay of the Pharmaceutical active ingredients along with Standardization of Titrant.
	CO.PT 191N.3: Students will be able to **apply** different Pharmaceutical Analytical techniques like electrochemical methods for analyzing various pharmaceutical products.
PT 193 PHARMACEUTICAL INORGANIC CHEMISTRY LAB	**CO.PT 193N.1**: **Identify** some inorganic compound and examine the purity & detect the impurities in inorganic compound.
	CO.PT 193N.2: Prepare or synthesize some inorganic compound in laboratory.
	CO.PT 193N.3: To do the experiment with inorganic chemical and able to report the data scientifically.
PT 195 HUMAN ANATOMY & PHYSIOLOGY LAB	**CO.PT 195N.1:** Able to work with compound microscope
	CO.PT 195N.2: Evaluate and **differentiate** the properties of different tissues and bones.
	CO.PT 195N.3: **Evaluate, analyze and differentiate** the components of blood and the essential elements in blood clotting and bleeding time.

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	CO.PT 195N.4: Evaluate, analyze and differentiate blood pressure, pulse pressure, heart rate and its importance in the physiology.
PT 196 PHARMACEUTICS I LAB	**CO.PT 196N.1**: To prepare and dispense liquid dosage forms such as solutions, syrups, elixirs, emulsion and suspension.
	CO.PT 196N.2: To prepare and dispense solid dosage forms such as powders, granules and suppositories.
	CO.PT 196N.3: To prepare and dispense semi-solid dosage forms such as ointment and gels.
PTB 185 REMIDIAL BIOLOGY LAB	**CO.PT 185N.1**:.Handle microscope and can perform microscopic study.
	CO.PT 185N.2: Identify the types of bones.
	CO.PT 185N.3: **Interpret** the importance of once blood pressure, blood group and tidal volume.
HU 282 ENVIRONMENTAL SCIENCES	**CO.HU 282N.1**: To **understand** the need of conservation natural resources.
	CO.HU 282N.2: To **explain** the structure and function of an ecosystem.
	CO.HU 282N.3: To **interpret** pollution data and design remedial action.
PT 213 PHARMACEUTICAL ORGANIC CHEMISTRY I	**CO.PT 213N.1: Design** and **develop** chemical reactions to synthesize newer organic compounds.
	CO.PT 213N.2: **Explain** organic reactions involving different parameters affecting the reaction.
	CO.PT 213N.3: Know the classification, nomenclature and isomerism of organic compounds.
PT 214 BIOCHEMISTRY	**CO.PT 214N.1:** To **explain**and **understand** the chemistry and biological importance of biomolecules such as carbohydrate, amino acids and proteins, lipids, nucleic acids.
	CO.PT 214N.2: To **compare and identify** the importance of metabolism, bioenergetics in normal or various pathological conditions.
	CO.PT 214N.3: To **describe**the genetic organization of mammalian genome and appreciate the functions of DNA in the synthesis of RNAs and proteins.
	CO.PT 214N.4: To **illustrate** the catalytic role of enzymes, importance of enzyme inhibitors and coenzyme with examples, therapeutic and diagnostic applications of enzymes and isoenzyme.
PT 215 HUMAN ANATOMY & PHYSIOLOGY II	**CO.PT 215N.1**:.**Understand** the gross morphology, and functions of nervous, reproductive, endocrine and respiratory system.

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	CO.PT 215N.2: Describe the physiological process of nerve conduction, reproduction, hormone regulation, urine formation and excretion, acid secretion and respiration.
	CO.PT 215N.3:.**Illustrate** the formation of ATP and understand the significance of BMR
	CO.PT 215N.4: **Describe** the structure of chromosome, DNA and explain the process of protein synthesis.
	CO.PT 215N.5: Develop as a leadership quality in fighting medical emergencies by resuscitation methods.
PT 216 PATHOPHYSIOLOGY	**CO.PT 216N.1**: **Recognize** the fundamental aspects of pathogenesis.
	CO.PT 216N.2: Analyze and **compare** the different signs and symptoms for different diseases.
	COB.PT 216N.3: **Assess** the complications and identify the different stages of various diseases.
	COB.PT 216N.4: **Analyze** the basic pathophysiological mechanisms and relate it to the pharmacological applications.
PTC 203 COMPUTER APPLICATION IN PHARMACY	**CO.PTC 203N.1**: Students will be able to **design, Implement and analyze** database system related to pharmaceutical and clinical studies with the concept of DBMS.
	CO.PTC 203N.2: With the concept of HTML and other webpage development tools, students can **design** and **develop** simple web pages about any topics.
	CO.PTC 203N.3: Students can **apply** the concept of computer / computer concept (drug design, electronic prescribing etc) in different fields of pharmaceutical studies.
PT 296 PHARMACEUTICAL ORGANIC CHEMISTRY I LAB	**CO.PT 296N.1**: **Analysis** of unknown organic compounds by designing Preliminary test, Solubility test, Functional group test like Phenols, Amides/ Urea, Carbohydrates, Amines, Carboxylic acids, Aldehydes and Ketones, Alcohols, Esters, Aromatic and Halogenated Hydrocarbons, Nitro compounds and Anilines, Detection of elements and Melting point/Boiling point
	CO.PT 296N.2: **Designing** a reaction pathway for the preparation of the derivatives and confirmation of organic compounds.
	CO.PT 296N.3: **Visualizing** the three dimensional structure of various compounds using the art of constructing molecular models.

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PT 297 BIOCHEMISTRY LAB	**CO.PT 297N.1:** To **appraise** the qualitative and quantitative analysis of biological macromolecules *i.e.* Carbohydrate, amino acids and proteins, etc. in a given biological sample.
	CO.PT 297N.2: To **estimate** quantitatively biomolecules such as carbohydrate, proteins, lipids in body fluids like urine, blood in normal or various pathological conditions.
	CO.PT 297N.3: To **evaluate and interpret** the catalytic activity of enzymes, enzyme kinetics through performing various tests.
PT 298 HUMAN ANATOMY & PHYSIOLOGY II LAB	**CO.PT 298N.1**: **Verification** of Physiological processes which are discussed in theory classes through experiments on living beings
	CO.PT 298N.2: **Practical orientation** to the study of CNS, ANS PNS and mechanism involved in regulation of body temperature, reproductive system.
	CO.PT 298N.3: Correlating the effects and disorders of the nervous system with the physiology of the human system.
PTC 293 COMPUTER APPLICATION IN PHARMACY LAB	**CO.PTC 293N.1**: Students can **design** and develop web pages to display, store, and retrieve information about any topics.
	CO.PTC 293N.2: Students will be able to **plan, design and implement** databases.
	CO.PTC 293N.3: Students can **apply the concept** of internet and online tools for searching drug information or any other information.
PT 314 PHARMACEUTICAL ORGANIC CHEMISTRY II	**CO.PT 314N.1**: **Design and develop** chemical reactions to synthesize newer organic compounds.
	CO.PT 314N.2: **Explain** organic reactions involving different parameters affecting the action.
	CO.PT 314N.3: **Identication** and characterization of various Fats and oils.
PT 316 PHYSICAL PHARMACEUTICS I	**CO.PT 316N.1:** Upon the completion of the course student shall be able to **understand** various physicochemical properties of drug molecules important to designing dosage forms
	CO.PT 316.2: Students will be able to **analyze** the use of physicochemical properties in the formulation development and **evaluation** of dosage forms and will develop sound knowledge regarding the practical applications of the various principles related to development of pharmaceuticals.

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	CO.PT 316N.3: The course will enable students to be able to be **skilled** in their mathematical treatment regarding formulations.
	CO.PT 316N.4: Students will develop knowledge to **evaluate** the effectiveness of a formulation on the basis of the fundamental properties of solid and liquid systems and their various parameters.
PT 317 PHARMACEUTICAL ENGINEERING	**CO.PT 317N.1**: To **prepare** work flow sheet involved in manufacturing of different dosage form in Industry.
	CO.PT 317N.2: To **predict** different type of error associated with unit operation and their corrective method.
	CO.PT 317N.3: To **develop** various preventive methods used for corrosion control in pharmaceutical industry.
PT 319 PHARMACEUTICAL MICROBIOLOGY	**CO.PT 319N:** 1.Make use of the knowledge to prepare bacterial culture and proper handling of microscope to perform the various methods used in laboratory/industry.
	CO.PT 319N.2: Explain sterilization, disinfection, antiseptics, aseptic area & preservatives.
	CO.PT 319N.3: **Discuss** the cell culture technology and its applications in pharmaceutical industries.
PT 394 PHARMACEUTICAL ORGANIC CHEMISTRY II LAB	**CO.PT 394N.1**: **Knowledge** about different laboratory techniques, like Recrystallization, Steam distillation, etc.
	CO.PT 394N.2: **Design and development** of synthesis involving various organic compounds.
	CO.PT 394N.3: **Practical idea** to determine Acid value, Saponification value & Iodine value.
PT 396 PHYSICAL PHARMACEUTICS I LAB	**CO.PT 396N.1**: In the end, students will be able to **determine** the physicochemical parameters of drugs using various methods.
	CO.PT 396N.2: Students will be able to **understand** the methodology for carrying out the various experiments.
PT 397 PHARMACEUTICAL ENGINEERING LAB	**CO.PT 397N.1**: To **illustrate & apply** the knowledge of Pharmaceutical Machinery and estimation of radiation constant, Steam distillation, heat transfer coefficient, drying curves, moisture content, humidity of air.
	CO.PT 397N.2: To **analyse and apply** the knowledge of size analysis by sieving, size reduction and other major equipments to plan develop pharmaceutical preparations.
	CO.PT 397N.3 To **evaluate and apply** the knowledge of Factors affecting Rate of Filtration and Evaporation, effect of time on the Rate of Crystallization, uniformity Index.

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PT 399 PHARMACEUTICAL MICROBIOLOGY LAB	**CO.PT 399N.1**:.**Identify** the type of microorganism and determine the potency of antibiotic
	CO.PT 399N.2:.**Develop** the skill of working in a aseptic area.
	CO.PT 399N.3: Perform the sterilization process in Laboratory set up.
	CO.PT 399N.4: **Skill** in sterility testing of pharmaceutical products.
	CO.PT 399N.5: **Differentiate** antiseptic and disinfectant.
PT 412 PHARMACOGNOSY & PHYTOCHEMISTRY I	**CO.PT 412N.1:** To **apply** the knowledge of Pharmacognosy in explaining indigenous system of medicine & to classify crude drugs on the basis of alphabetical, morphological, taxonomical, chemical, pharmacological, chemo and sero-taxonomical classification of drugs
	CO.PT 412N.2: To **judge** the presence of different types of adulterants & different characteristics to evaluate crude drugs & apply the knowledge of different plant hormones, polyploidy, mutation and hybridization technique to create disease free, genetically modified and transgenic plants
	CO.PT 412N.3: To **develop** & **design** plant tissue culture.
	CO.PT 412N.4: To **apply** the knowledge of therapeutics of different crude drugs belonging to different categories of primary and secondary metabolites.
	CO.PT 412N.5: To **analyze, categorize & relate**important medicinal agents from marine sources.
PT 413 INDUSTRIAL PHARMACY I	**CO.PT 413N.1**: **Evaluate** the physical and chemical parameters of a drug, and understand the role of those parameters during formulation of a dosage form.
	CO.PT 413N.2: **Prepare** different dosage forms such as tablets, capsules, liquids, and cosmetics through scalable techniques and **evaluate** them according to the quality tests mentioned in different national compendiums.
	CO.PT 413N.3: **Reviewing** the materials used for packaging of pharmaceuticals and identifying the chances of any adverse effect on packed products.
PT 414 PHARMACEUTICAL ORGANIC CHEMISTRY III	**CO.PT 184N.2**: **Design** and **development** of newer bioactive organic compounds.
	CO.PT 414N.2: Explain organic reactions involving different parameters affecting the reaction.

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NAME OF THE SUBJECT WITH CODE	OUTCOME
	CO.PT 414N.3: **Knowledge** of stereoisomers of organic compounds.
PT 416 PHYSICAL PHARMACEUTICS II LAB	**CO.PT 416N.1**: **Able** to identify various standard values physicochemical properties of drug molecules.
	CO.PT 416N.2: Students can **derive** equation and identify the half-life and shelf life for stability of formulation.
	CO.PT 416N.3: Able to **optimize** the mathematical equation in physical chemistry to improve the stability of formulation.
	CO.PT 416N.4: They can **formulate** the new drug release pattern from formulation.
PT 418 PHARMACOLOGY I	**CO.PT 418N.1**: Students will be able to **describe** the pharmacological concepts regarding peripheral nervous system and central nervous system.
	CO.PT 418N.2: Students will be able to **identify** specific drugs of different classes related to the nervous system along with the mechanism of action, pharmacological actions, clinical effects, indications, and adverse effects.
	CO.PT 418N.3 Students will be able to **differentiate** the different types of ailments involving the nervous system and would be able to identify the correct therapeutic options for the same. Students will learn to evaluate the possible adverse effects of the drugs used in treatment of those ailments.
PT 492 PHARMACOGNOSY & PHYTOCHEMISTRY I LAB	**CO.PT 492N.1**: To **utilize** the knowledge of crude drugs belonging to the category of pharmaceutical aids & to apply them as excipients in different pharmaceutical formulations.
	CO.PT 492N.2: To **utilize** the knowledge of microscopical properties of crude drugs in standardization & identification of crude drugs.
	CO.PT 492N.3: To **apply** the knowledge of physical characteristics of crude drugs in evaluation & standardization of herbal drugs.
PT 493 INDUSTRIAL PHARMACY I LAB	**CO.PT 493N.1**: To **prepare and evaluate** tablets containing different drug compounds and compare with respect to marketed products.
	CO.PT 493N.2: To **prepare** and store sterile solution in suitable containers.
	CO.PT 493N.3: To **assess** the different physical and chemical parameters related to preformulation studies of different drugs.

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PT 496 PHYSICAL PHARMACEUTICS II LAB	**CO.PT 496N.1**: Able to **identify** various standard values physicochemical properties of drug molecules.
	CO.PT 496N.2: Students can **derive** equation and identify the half-life and shelf life for stability of formulation.
	CO.PT 496N.3: They can **analyze** the different equation to standardize and stabilize the drug dosage form.
	CO.PT 496N.4: They can formulate new drug delivery system.
PT 498 PHARMACOLOGY I LAB	**CO.PT 498N.1**: Students would be able to administer drugs using different routes of administration of drugs in animal models. Students would be **aware** of common laboratory techniques like blood withdrawal, plasma and serum separation etc.
	CO.PT 498N.2: Students will able to **evaluate** bioactivity of drugs
	CO.PT 498N.3: Students will **learn** to carry out experiments using different instrumental techniques and to interpret the results of the experiments.
PT 512 PHARMACOGNOSY & PHYTOCHEMISTRY II THEORY	**CO.PT 512.1**: To **discuss, describe**, **explain** and **identify** different secondary metabolic pathways for alkaloids, glycosides, steroids and flavonoids.
	CO.PT 512.2: To **recognize** and **relate** the phytochemical, pharmacological and commercial aspects of secondary metabolites.
	CO.PT 512.3: To **develop** and **design** extraction, isolation and purification techniques for crude drugs.
	CO.PT 512.4: To **apply** and **interpret** different techniques for identification and analysis of phytoconstituents.
PT 513A MEDICINAL CHEMISTRY I	**CO. PT 513A.1**: Identify the structural requirement for exerting biological activities.
	CO. PT 513A.2: Analyze drug's chemistry for stability, metabolism, activity and toxicity.
	CO. PT 513A.3: Construct future drugs through structure activity relationship for drug design.
	CO. PT 513A.4: Design chemical process, selection of reagents, catalysts and reaction conditions for synthesizing selected medicinal compounds.
PT 513B MEDICINAL CHEMISTRY II	**CO.PT 513B.1**: Students will be able to **understand** Histamine receptor in relation to biological action and **correlate** SAR synthesis MOA of H-1 antagonist, H-2 antagonists and antineoplastic agents, biological action.

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NAME OF THE SUBJECT WITH CODE	OUTCOME
	CO.PT 513B.2: Know synthesis of medicinal drugs acting on Angina, Diuretics: SAR of anti-hypertensive agents, Calcium channel blockers develop demands for drug interacting with them
	CO.PT 513B.3: Suggest and plan structures of Anti-arrhythmic drugs, Antihyperlipidemic agents, Coagulants & Anticoagulants, Congestive heart failure agents: Interpret SAR of the following agents.
	CO.PT 513B.4: They will learn structure activity relationship and biosynthesis of drugs acting on Endocrine system. Antidiabetic agents and Local anaesthetics and determine the SAR of the above mentioned compounds.
PT 516 PHARMACEUTICAL JURISPRUDENCE	**CO.PT 516N.1**: Student shall be able to **judge** different situations and be able to act according to important pharmaceutical legislations, pharmaceutical Act and Rules prevails in India as whenever it seems to be required
	CO.PT 516N.2: Student shall be able to **assess** the standards of educational regulations, compositions and functions of various regulatory authorities, committees and agencies, offences and guidelines imposed according to various pharmaceutical Acts and Rules.
	CO.PT 516N.3: Student shall be able to **implement** the code of ethics in their professional activities in pharmacy.
PT 518 PHARMACOLOGY II	**CO.PT518.1**: **Interpret** the **relation** between various biomolecules resembles with physiological and pathophysiological activity essential to**formulates** safer choice of drug used in circulatory & cardiovascular, endocrinological and inflammatory disorders.
	CO.PT 518.2: Justify and **evaluate** the relation between mechanism of action and adverse drug reaction and contraindication of different drugs used in therapeutics of disease and disorder.
	CO.PT 518.3: Interpret the **importance** of various bimolecular and hormonal activities to assess their relative potency using animal tissue and intact animal.
PT 592 PHARMACOGNOSY & PHYTOCHEMISTRY II PRACTICAL	**CO.PT 592.1:** To execute morphological, microscopic and chemical characterization of various crude drugs.
	CO.PT 592.2: To design and execute extraction and isolation of phytochemicals from crude drugs.
	CO.PT 592.3: To design and formulate chromatographic procedures for separation, isolation and identification of phytoconstituents.
PT 593 MEDICINAL CHEMISTRY I	**CO.PT 593.1**: Design synthesis of heterocyclic rings by selecting reagents, catalysts and reaction conditions.

Ph. : (0343) 253 2678/79
Mob. : +91 7477788556
Telefax : (0343) 253 2679
e-mail : bcrcp_dgp@yahoo.co.in
contact@bcrcp.org
www.bcrcp.ac.in
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NAME OF THE SUBJECT WITH CODE	OUTCOME
PRACTICAL	**CO.PT 593.2**: Design synthesis of specific drugs by selecting reagents, catalysts and reaction conditions.
	CO.PT 593.3: Develop assay methods of various drugs depending on their ring chemistry.
	CO.PT 593.4: Analyze partition coefficients of various drugs, compare their hydrophilic-lipopophilic chemistries from their partition coefficients.
PT 598 PHARMACOLOGY II PRACTICAL	**CO.PT598.1**: Determine and evaluate different animal and tissue experiment and their mathematical association to assess the outcome and to draw the conclusion.
	CO.PT598.2: Interpret the correlation between different tissue isolation, their association with various types of bioassay of different essential biomolecules.
	CO.PT598.3: Interpret and predict the importance of bimolecular activities with various physiological and pathophysiological conditions related to different clinical & medical issues.
PT 612 HERBAL DRUG TECHNOLOGY THEORY	**CO.PT 612N.1**: To **apply** the knowledge of herbal medicine, good agricultural practices in cultivation of medicinal plants including organic farming, pest management & biopesticides.
	CO.PT 612N.2: To **apply** the **knowledge** of indigenous systems of medicine & **to utilize** standardised Ayurvedic formulation as herbal medicine or, herbal formulation & different foods as nutraceuticals and **to evaluate** their effects in different diseases.
	CO.PT 612N.3: To **apply the knowledge** of different herbal drugs and their possible side effects and interaction & **to develop** & **design** different herbal formulations by utilizing the knowledge of herbal cosmetics & herbal excipients.
	CO.PT 612N.4: To **evaluate** crude drugs in preparation of standard herbal formulation.
	CO.PT 612N.5: To **apply** the knowledge of good manufacturing practices (Schedule T) to **formulate** different herbal formulations in herbal drug industry.
PT 613 MEDICINAL CHEMISTRY III THEORY	**CO. PT 613.1**: Students will be able to understand and can correlate synthesis, SAR, MOA of β- Lactam Aminoglycosides, Tetracyclines
	CO. PT 613.2: Students should know the synthesis of Macrolide, Antimalarials and Miscellaneous agents, SAR and MOA of agents and be able to develop knowledge for drugs interacting with them.

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NAME OF THE SUBJECT WITH CODE	OUTCOME
	COB. PT 613.3: Students will be able to suggest and plan structures and synthesis of Anti-tubercular Agents, Urinary tract anti-infective and Antiviral agents. Interpret SAR of the following agents
	COB. PT 613.4: Students will learn structure activity relationship, synthesis and MOA of Antifungal agents, Sulphonamides and Sulfones and be able to determine the SAR of the above-mentioned compounds.
	CO. PT 613.5: Students will be able to evaluate and interpret various results of Pharmacophore modelling and docking along with application to the combinatorial chemistry.
PT 616 BIOPHARMACEUTICS & PHARMACOKINETICS THEORY	**CO. PT 6161**: To build an understanding about the concepts of biopharmaceutics and pharmacokinetics.
	CO. PT 616.2: To develop the ability to estimate pharmacokinetic parameters by using various mathematical models.
	CO. PT 616.3: To be able to explain the requirement of bioavailability and bioequivalence studies.
	CO. PT 616.4: To be able to develop concepts of pharmacokinetic principles in clinical settings.
PT 618 PHARMACOLOGY III THEORY	**CO.PT618.1**:.**Interpret** the **relation** between various biomolecules resembles with physiological and pathophysiological activity essential to **choose** safe drug/drug regimen used to treat infectious diseases, cancer and transplantation.
	CO.PT618.2: Evaluate different types of side effects, adverse drug reaction; and iatrogenic and other types of toxicities.
	CO.PT618.3: **Interpret** the **importance** of mechanism of action drugs acting on infectious diseases, cancer and transplantation; and **investigation** of drug effects as a function of biologic timing and rhythm characteristics.
PT 619 PHARMACEUTICAL BIOTECHNOLOGY THEORY	CO.PT 619.1: **Apply** solitary and immobilized enzymes in industries for various productions especially pharmaceuticals.
	CO.PT 619.2: Construct genetically engineered organisms and transgenic floras for desired applications involving industrial productions.
	CO.PT 619.3: Analyze pathophysiology of organism and apply various biological remedies such as monoclonal antibodies for specific applications
	CO.PT 619.4: Create various protocols for fermentations with specific microorganisms.
PT 611 QUALITY ASSURANCE THEORY	**CO.PT 611.1:** The students will be able to **define** the basic concept of Quality control, Quality assurance and GMP, TQM, ICH Guidelines.

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NAME OF THE SUBJECT WITH CODE	OUTCOME
	CO.PT 611.2: Students will be able to **become aware of** different elements of QbD program, tools,NABL accreditation,ISO 9000 & ISO14000.
	CO.PT 611.3: Students will be able to **utilize** their level of **understanding** regarding Quality Control, Good Laboratory Practices, Document maintenance in pharmaceutical industry & Calibration and Validation.
PT 692 HERBAL DRUG TECHNOLOGY PRACTICAL	**CO.PT 692.1**: To identify different chemical constituents present in drugs.
	CO.PT 692.2: To analyze chemical components such as alcohol or alkaloid indifferent herbal drugs and traditional dosage forms.
	CO.PT 692.3: To analyze monographs of plants used in preparation of herbal formulations.
	CO.PT 692.4 To design and execute formulation and evaluation of dosage forms with herbal extracts.
PT 693 MEDICINAL CHEMISTRY III PRACTICAL	**CO.PT 693.1**: Design and development of synthesis involving various drugs.
	CO.PT 693.2: Knowledge of assay methods involving various drug molecules
	CO.PT 693.3: Preparation of medicinally important drug molecules using modern techniques
	CO.PT 693.4: Create and design newer structure of medicinal compounds and reactions in software for further analysis.
	CO.PT 693.5: Determination of physicochemical properties such as logP, MR, molecular weight of drugs using drug design software.
PT 698 PHARMACOLOGY III PRACTICAL	**CO.PT 698.1**: To perform various calculations required for pharmacological experiments and determination of statistical significance of the study.
	CO.PT 698.2: To perform and evaluate various animal models to determine effects of various drugs.
	CO.PT 698.3: To interpret OCED guidelines.
	CO.PT 698.4: To establish the significance of various biochemical parameters and be more competent to draw inference of the effects of various drugs from various experimental models.
PT 711 INSTRUMENTAL METHODS OF ANALYSIS THEORY	**CO. PT 711.1**: The students can be able to define the basic principle of UV-Visible spectroscopy and also able to estimate the λmax.
	CO. PT 711.2: Students can organize the outline to analyze different elements with the help of Flame photometry, AAS Fluorimetry and Nepheloturbidometry.

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NAME OF THE SUBJECT WITH CODE	OUTCOME
	CO. PT 711.3: Students can compare their label understanding to interpret different compounds with the help of IR, other instrumental and chromatographic techniques.
PT 716A INDUSTRIAL PHARMACY II THEORY	**CO. PT 716A.1:** To build a large-scale production plant along with increased production rate.
	CO.PT716A.2: Apply technology transfer knowledge innovative process may be developed.
	CO. PT 716A.3: To plan and develop an affordable health care system by utilizing law and regulation of the industry.
	CO.PT 716A.4: To formulate product ensuring that drugs, both brand-name and generic, work correctly and that their health benefits outweigh their known risks.
PT 716B NOVEL DRUG DELIVERY SYSTEM THEORY	**CO.PT 716B.1:** Student can implement their concept and knowledge to design various novel drug delivery systems.
	CO.PT 716B.2: Students can utilize their knowledge for selection of drugs and polymers for the development of novel drug delivery systems.
	CO.PT 716B.3: Students can able to prepare and evaluate different novel drug delivery systems.
PT 718 PHARMACY PRACTICE THEORY	**CO.PT 718.1:**Students will develop knowledge and ability to use principles of hospital and community pharmacy to cater to the needs of heath care system.
	CO.PT 718.2: Plan and manage the drug distribution, drug store and inventory control.
	CO.PT 718.3: Develop economical, social, administrative, managerial skills for creating community and hospital pharmacy.
	CO.PT 718.4: Analyze, interpret results of laboratory test, various adverse drug reactions and apply the information for use of appropriate medicines, provide and propose unbiased information to doctors and counsel patients.
	CO.PT 718.5: Design education and training programes and execute the role of pharmacist and develop the professional ethics.
PT 791 INSTRUMENTAL METHODS OF ANALYSIS PRACTICAL	**CO. PT 791.1:** Students will able to interpret spectroscopic data, arrange components in UV spectroscopy device.
	CO. PT 791.2: Students will be able to carry out different separation and purification techniques and their application in different pharmaceutical ingredients by different chromatographic technique.

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NAME OF THE SUBJECT WITH CODE	OUTCOME
	CO. PT 791.3: Students will be able to utilize the idea to assay of the Pharmaceutical active ingredients.
PT 781 PRACTICE SCHOOL	**CO.PT781.1**: To comprehend the significance of realistic learning through practice in different areas such as dispensing and community pharmacy, pharmacovigilance, drug testing and manufacturing, quality assurance, packaging etc.
	CO.PT781.2: Todevelop the planning and technical proficiency through practical learning in the domain of interest.
	CO.PT781.3: To evaluate the problems faced during realistic practice and imply theoretical knowledge to rectify those problems.
	CO.PT781.4: To utilize their knowledge achieved in isolation, identification, standardization, formulation, manufacturing and evaluation of pharmaceuticals and cosmetics.
PT 810A PHARMACEUTICAL MARKETING MANAGEMENT	**CO.PT 810A.1:** The students can be able to define the concept of management, Analyzing consumer buying behaviour; industrial buying behaviour.
	CO.PT 810A.2: Students can take decisions for Product Branding, packaging and labelling.
	CO.PT 810A.3: Students can compare their level of understanding to interpret various situations in industry.
PT 810B COMPUTER AIDED DRUG DESIGN	**CO.PT 810B.1:** know the steps and methodologies of lead design and discovery.
	CO.PT 810B.2: Understand the implementation methodologies of lead design into drug discovery.
	CO.PT 810B.3: Apply the concept of QSAR and docking in new molcule design and development.
	CO.PT 810B.4: Construct and apply various startegies involving ligand design, QSAR and docking in designing new drug like molecules.
	CO.PT 810B.5: Create new molecules by various modelling approaches and using various molecular modelling software.
PT 810C ADVANCED INSTRUMENTATION TECHNIQUES	**CO.PT810C.1:** To explain significance and concept of advanced instrumentation i.e., MASS and NMR spectroscopy, XRD, LC-MS/MS, GC-MS/MS and also able to implement the knowledge of choosing the right instruments for the analysis of drug.
	CO.PT810C.2: To realize the difference between various thermal methods and its applications in drug analysis.

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NAME OF THE SUBJECT WITH CODE	OUTCOME
	CO.PT810C.3: To comprehend the general principles and instrumentation of radioimmunoassay and its applications of advance instrument for analysis.
	CO.PT810C.4: To build idea about general principles and procedures involved in extraction techniques.
	CO.PT810C.5: To know the requirement of calibration and validation for analytical instruments and also develop the idea about the importance of ICHQ2A and USFDA review guideline.
PT 817 BIOSTATISTICS AND RESEARCH METHODOLOGY	**CO.PT817.1:** To build idea about the importance of biostatistics and its application in solving problems associated with the research.
	CO.PT817.2: To strategize and execute a research hypothesis independently.
	CO.PT817.3: To demonstrate expertise in operating M.S. Excel, SPSS, R and MINITAB®, DoE (Design of Experiment) and its applications in designing and analysis of experiments.
PT 818 SOCIAL AND PREVENTIVE PHARMACY	**CO. PT 818.1**: Students will be able to Evaluate alternative ways of solving problems related to health
	CO. PT 818.2: Students will Develop a critical way of thinking based on current healthcare development.
	CO. PT 818.3: Students will be capable of Identifying National health programs its objectives functioning and outcomes.
	CO. PT 818.4: Students can recognize the community services in rural, urban and school health.
	CO. PT 818.5: Students will be able to explain the general measures and strategies to be followed in social and preventive pharmacy.
PT 883 PROJECT WORK	**CO. PT 883.1:** Students will be able to identify their area of interest and learn literature survey.
	CO. PT 883.2: Students will be able to plan and execute the experimental procedures to carry out the topic.
	CO. PT 883.3: Students will be able to communicate and defend their findings in the form of thesis and seminar.

Dr. B.C. Roy College of Pharmacy and Allied Health Sciences

Ph. : (0343) 253 2678/79
Mob. : +91 7477788556
Telefax : (0343) 253 2679
e-mail : bcrcp_dgp@yahoo.co.in
contact@bcrcp.org
www.bcrcp.ac.in

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PROGRAM OUTCOMES (PO)

PO	KEY CONCEPT	EXPLANATION
PO1	**Research Ability**	An ability to independently carry out research and development work utilising modern tools and employing planning and problem analysis skills to solve practical problems
PO2	**Technical Communication**	An ability to write and present substantial technical documents / reports and communicate effectively
PO3	**Expertise Demonstration**	An ability to demonstrate a degree of mastery over the area of specialization in terms of pharmaceutical knowledge, learning aptitude, managerial and administrative skills, computational and informatics skills in academia, manufacturing, clinical and allied sectors
PO4	**Professional Leadership**	An ability to lead in terms of team building, planning, motivating and ethically executing professional responsibilities and establish professional identity in the society
PO5	**Environment & Sustainability**	An ability to comprehend the impact of the pharmaceutical solutions in societal and environmental contexts, and explore the knowledge of and need for sustainable development and apply the knowledge to solve such problems.

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PROGRAM SPECIFIC OUTCOMES (PSO): PHARMACEUTICS

PSO	KEY CONCEPT	EXPLANATION
PSO1	**F&D**	Apply the principles of drug delivery system in designing of safe and efficacious pharmaceutical dosage forms including novel drug delivery systems and cosmetics.
PSO2	**Unit Operations**	Able to plan, manage and carry out unit operations for environmentally sustainable manufacturing of pharmaceuticals and cosmetics.
PSO3	**Regulatory Compliance**	Able to develop and evaluate new drug formulations and cosmetics meeting the regulatory specification.
PSO4	**Modern tools**	Able to use modern scientific instrumental and computational tools in formulation development and pharmacokinetic investigation.
PSO5	**Research Methodology**	Understand, plan and apply the concepts of research methodology in pharmaceutical product development and able to interact with scientific audience through writing in form of reports/thesis or presentations

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COURSE OUTCOME M. PHARM. PHARMACEUTICS (Old syllabus)

NAME OF THE COURSE WITH CODE	COURSE OUTCOME
MPT 106 DOSAGE FORM DESIGN PARAMETERS & PHARMACEUTICAL PRODUCT DEVELOPMENT	**MPT 106.CO1:** Student can able to **implement** the concepts of pilot plant for the manufacturing of pharmaceutical dosage forms.
	MPT 106.CO2: Student can **execute** their knowledge of preformulation studies to fabricate and develop different pharmaceutical dosage forms.
	MPT 106.CO3: Students can able to **perform** various physicochemical studies and can understand their significance on drug absorption as well as on bioavailability.
MBS 101 BIO-STATISTICS	**MBS 101.CO1: Identify** data relating to different variables and select samples.
	MBS 101. CO2: Discuss the basic concept and importance of statistical analysis.
	MBS 101.CO3: Arrange the results using biostatistical knowledge and make statistical decisions in pharmaceutical research.
MPT 101 MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES	**MPT101. CO1: Design** various spectroscopic characterization techniques as well as **interpret** various spectra for characterization of compounds.
	MPT101. CO2: Apply knowledges of separation science to separate and identify various pharmaceutical and biological ingredients from their mixture.
	MPT101. CO3: Utilize various thermal and thermogravimetric techniques for characterization of pharmaceutical compounds and their combinations.
	MPT101. CO4: Develop various bioassays and herbal methods for separation and characterization of biological and/or phytopharmaceutical entities.
MPT 116 BIO-PHARMACEUTICS& PHARMACOKINETICS	**MPT 116. CO1:** Students will be able to **understand** the need and applications of biopharmaceutical study to pharmaceuticals and factors governing product development.
	MPT 116. CO2: Students will **learn** various methods of assessing bioavailability by various pharmacokinetic and pharmacodynamic studies and their application for IVIVC studies.
	MPT 116. CO3: The knowledge of pharmacokinetics of a drug through proper mathematical representation will **enable** students to design dosage regimen.

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NAME OF THE COURSE WITH CODE	COURSE OUTCOME
	MPT 116. CO4: Special considerations with respect to dosage interval and physiological conditions will enlighten students to the concepts of pharmacodynamics models.
MPT 181 SEMINAR	**MPT 181. CO1:** Students can able to show competence in identifying relevant information, defining and explaining topics under discussion. **MPT 181. CO2:** Students can able to **improve** their communication and presentation skill. **MPT 181. CO3:** Students can**engage** with works that are widely held to be significant in the field of pharmaceutical research.
MPT 191 PHARMACEUTICAL ANALYSIS LAB	**MPT191. CO1:** The students would be able to **understand** different spectroscopic analysis, their theory and application range based on their functions.
	MPT191. CO2: The students would be able to **apply** their knowledge in method development and results interpretation of various spectroscopic analysis.
	MPT191. CO3: The students will be able to **design** various microbiological assays involving Vitamins and Antibiotics.
	MPT191. CO4: The students will be able to **construct** various pharmacological assays depending upon the drug of choice.
MPT 206(1) DRUG DELIVERY SYSTEM	**MPT 206(1). CO1:** To **explain** various approaches for development of novel drug delivery system and **defining** need for drug targeting in case in terms of site and target specificity.
	MPT 206(1). CO2: To **determine** selection of suitable polymers along with drugs for formulation design and to develop various delivery systems for a specific drug target for NTDS
	MPT 206(1). CO3: To **determine evaluation** for the developed targeted drug delivery system and to **analyse** the formulation approaches with the accurate pharmaceutical processes for site specific drug delivery.
MPT 209 PHARMACEUTICAL BIOTECHNOLOGY	**MPT209 .CO1**: Gain Technical skills involved in extraction, manipulation of biomolecules and identification of gene and its expressions**.**
	MPT209. CO2: **Develop** and **apply** the modern technology of genetic engineering in industries and Fermentation processes for the human welfare**.**
	MPT209. CO3: **Understand** and **evaluate** the different pharmaceutical parameters of the current and future biotechnology related pharmaceutical products in the market
MPT-212	**MPT212. CO1:** Students will be able to **understand** the need and application validation in pharmaceutical industry.

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NAME OF THE COURSE WITH CODE	COURSE OUTCOME
PROCESS VALIDATION & CGMP	**MPT212. CO2:** Students will be able to **understand** the concepts of quality practices for certification standards in pharmaceutical industry.
	MPT212. CO3: Students will **develop** the knowledge about the various regulatory agencies and their role.
	MPT212. CO4: Students will **learn** to apply different laws and guidelines for drug registration and approval process.
MPT 206(2) PHYSICAL PHARMACEUTICS	**MPT 206(2). CO1:** Students can **develop** the different solid dosage form by utilizing different parameters.
	MPT 206(2). CO2: Students can able to **perform** dissolution of different dosage form.
	MPT 206(2). CO3: The students can be able to **solve** different problems related to solubility, permeability etc with the knowledge of surfactant system.
	MPT 206(2). CO4: Students can **construct** hydrogel system with required dissolution profile.
MPT 281 SEMINAR	**MPT 281. CO1:** Students shall be able to **communicate** with the scientific community in a confident manner.
	MPT 281. CO2: Student shall be able to **recognize** the societal issues related to healthcare, **analyse** and **solve** them
	MPT 281. CO3: Students shall be proficient in interpreting scientific data to **defend** the relevant topic.
	MPT 281. CO4: Students shall be able to **utilize** modern computational tools for presentation.
MPT 296 BIO-PHARMACEUTICS LAB	**MPT 296. CO1:** To **design** single dose bioavailability study and relevant statistics.
	MPT 296. CO2: To **perform** testing of dosage forms on animal and collection of plasma.
	MPT 296. CO3: To **interpret** data obtained from animal experiments and estimate dosing frequency.
MPT314 RESEARCH METHODOLOGY AND CLINICAL TRIALS	**MPT 314. CO1:** Students will be able to **implement** the regulatory requirements and follow ethics while conducting clinical trials.
	MPT 314. CO2: Students will be able to **design** and **manage** clinical trial coordination process.
	MPT 314. CO3: Students shall **appreciate** statistical techniques in solving the problems.
	MPT 314. CO4: Students shall be able to **report** and **communicate** the adverse drug reactions.
MPT391 SYNOPSIS	**MPT 391. CO1:** Students will be able to **categorize** relevant information for **defining** and **explaining** the topic for presentation.

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NAME OF THE COURSE WITH CODE	COURSE OUTCOME
	MPT 391. CO2: In terms of **summarizing** and organizing the whole methodology, students will be able structure their oral work and **composing** information.
	MPT 391. CO3: Students will be able to **build** appropriate vocabularies with voice modulation, voice projection and pacing.
MPT392 PRESENTATION	**MPT 392. CO1:** Students can **develop** a structured presentation methodology to prepare presentation material and effective visual aids.
	MPT 392. CO2: Students can able to percolate his knowledge to the audiences.
	MPT 392. CO3: The students can be able to**Determine** and **develop** personal style.
MPT 496 THESIS	**MPT 496. CO1:** The students would be able to **learn** different types of scholarly sources and **analyse** them.
	MPT496. CO2: The students would be able to **analyse** the gaps and **evaluate** them.
	MPT 496. CO3: The students would be able to **build** problem solving skills and **execute** them to research in the related fields.
	MPT 496. CO4: The students would be able to **design** plan of work, **execute** them and **interpret** the data to evaluate the work.
	MPT 496. CO5: The students would be able to **write** their research reports constituting Introduction, Experimental Methods, Results & Discussion, Conclusion and References.

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COURSE OUTCOME: M. PHARM. PHARMACEUTICS (New syllabus)

NAME OF THE COURSE WITH CODE	COURSE OUTCOME
MPT 1061 MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES	**MPT 1061. CO1: Determine** the role of various drug excipients interaction.
	MPT 1061. CO2: Apply the knowledge to undertake various analytical instrumental studies such as spectroscopic, separation science, thermal, biotechnological and crystallography-based studies
	MPT 1061. CO3: Evaluate various results and interpretations of such instrumental techniques, solve any existing problems.
	MPT 1061. CO4: Develop newer analytical methods by instrumental techniques.
MPT 1062 DRUG DELIVERY SYSTEMS	**MPT 1062. CO1:** Students can able to **build** their concept and knowledge of novel drug delivery systems.
	MPT 1062. CO2: Students can **implement** their knowledge for selection of drugs and polymers for the development of novel drug delivery systems.
	MPT 1062. CO3: Students can be able to **develop** and **evaluate** various novel drug delivery systems.
MPT 1063 MODERN PHARMACEUTICS	**MPT 1063. CO1: Apply** the preformulation parameters through an optimized approach for designing a viable pharmaceutical product.
	MPT 1063. CO2: Review the policies of good manufacturing practice and implement the concept of total quality management.
	MPT 1063. CO3: Apply statistical tools for determining the stability of pharmaceutical tablets.
MPT1064 REGULATORY AFFAIR	**MPT 1064. CO1: Apply** the significance of regulatory guidelines in documentation and fulfilling of regulatory criteria for drug product approval and registration.
	MPT 1064. CO2: Understand the regulatory framework of different countries and concept of harmonization of regulatory guidelines.
	MPT 1064. CO3: Evaluate strategies for non-clinical drug development in the regulatory framework.
	MPT 1064. CO4: Student can able to **conduct** clinical trials after getting the proper approval from the regulatory method.

Ph. : (0343) 253 2678/79
Mob. : +91 7477788556
Telefax : (0343) 253 2679
e-mail : bcrcp_dgp@yahoo.co.in
contact@bcrcp.org
www.bcrcp.ac.in
Approved by PCI & AICTE and Affiliated to MAKAUT, W.B., WBSCT&VE&SD
Dr. Meghnad Saha Sarani, Bidhannagar, Durgapur - 713206, West Bengal

NAME OF THE COURSE WITH CODE	COURSE OUTCOME
MPT 1965 PHARMACEUTICS PRACTICAL I	**MPT 1965. CO1:** Students will able to **develop** the analytical method of the supplied sample by various analytical instrumentation methods.
	MPT 1965. CO2: Students will able to **perform** preformulation studies and implement their knowledge to develop various novel drug delivery systems.
	MPT 1965. CO3: Students can **utilize** their knowledge to formulate and evaluate various novel drug delivery systems.
MPT 1986 SEMINAR	**MPT 1986. CO1:** Students can able to **show** competence in identifying relevant information, defining and explaining topics under discussion.
	MPT 1986. CO2: Students can able to **improve** their communication and presentation skill.
	MPT 1986. CO3: Students can**engage** with works that are widely held to be significant in the field of pharmaceutical research.
MPT 2061 MOLECULAR PHARMACEUTICS (NANO TECHNOLOGY & TARGETED DDS)	**MPT 2061. CO1:** Students can able to **implement** their knowledge on various approaches of novel drug delivery system.
	MPT 2061. CO2: Students can able to **gathe**r a clear concept on drug and formulation components required for designing novel drug delivery systems.
	MPT 2061. CO3: Students can **utilize** their knowledge to fabricate targeted drug delivery systems.
MPT 2062 ADVANCED BIO PHARMACEUTICS & PHARMACOKINETICS	**MPT 2062. CO1: Understand** the mechanism of drug absorption and the various factors affecting the movement of the drug in the body.
	MPT 2062. CO2: Students can able to **analyse** concept and significance of dissolution testing and their mathematical validation for optimization of drug bioavailability.
	MPT 2062. CO3: Students can able design and derive pharmacokinetic models for quantitative study of drug ADME (drug absorption, distribution, metabolism and elimination).
	MPT 2062. CO4: Students can able evaluate the role of bioavailability and bioequivalence studies using biopharmaceutic and pharmacokinetic parameters.
MPT 2063 COMPUTER AIDED DRUG DELIVERY SYSTEM	**MPT 2063. CO1:** Optimize the biopharmaceutical characteristics of a drug or pharmaceutical product through virtual simulations.
	MPT 2063. CO2: Review the various protocols for management of clinical data and adherence to regulatory guidelines.
	MPT 2063. CO3: Nurture the idea of artificial intelligence and its applications in the automation in pharmaceutical industry.

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www.bcrcp.ac.in
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NAME OF THE COURSE WITH CODE	COURSE OUTCOME
MPT2064 COSMETIC AND COSMECEUTICALS	**MPT 2064. CO1:** Utilize the knowledge of regulatory requirement for the manufacturing of cosmetics.
	MPT 2064. CO2: Prepare different cosmetics and cosmeceuticals.
	MPT 2064. CO3: Evaluate the different formulation as per different official book.
MPT 2965 PHARMACEUTICS PRACTICAL II	**MPT 2965. CO1:** To prepare and characterize various polymer-based formulations for drug encapsulation.
	MPT 2965. CO2: To interpret the effect of formulation processing parameters on pharmacokinetic profile of the drugs.
	MPT 2965. CO3: To develop and evaluate different kinds of cosmeceutical products.
MPT 2986 SEMINAR	**MPT 2986. CO1:** Students can able to show competence in identifying relevant information, defining and explaining topics under discussion.
	MPT 2986. CO2: Students can able to improve their communication and presentation skill.
	MPT 2986. CO3: Students can engage with works that are widely held to be significant in the field of pharmaceutical research.
MPT 381 JOURNAL CLUB	**MPT 381. CO1:** To search articles from various scientific databases.
	MPT 381. CO2: To prepare a technical presentation for a small audience.
	MPT 381. CO3: To deliver a presentation and address related queries.
MPT 384 RESEARCH METHODOLOGY & BIOSTATISTICS	**MPT 384.CO1: Discuss** and **explain** different methods and technologies used to carry out research work**.**
	MPT 384.CO2: Assess the basic principles and working of analytical instrument in carrying out research work.
	MPT 384.CO3: Implement the regulatory requirements and follow ethics while conducting clinical trials.
	MPT 384. CO4:Demonstrate expertise in carrying out statistical analysis of the research findings.
MPT 391 DISCUSSION/ PRESENTATION (PROPOSAL)	**MPT 391. CO1:** Students will be able to **categorize** relevant information for **defining** and **explaining** the topic for presentation.

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NAME OF THE COURSE WITH CODE	COURSE OUTCOME
	MPT 391. CO2: In terms of **summarizing** and organizing the whole methodology, students will be able structure their oral work and **composing** information.
	MPT 391. CO3: Students will be able to **build** appropriate vocabularies with voice modulation, voice projection and pacing.
MPT392 RESEARCH WORK	**MPT 392. CO1:** Students can develop a structured presentation methodology to prepare presentation material and effective visual aids
	MPT 392. CO2: Students can able to percolate his knowledge to the audiences.
	MPT 392. CO3: The students can be able to Determine and develop personal style.
MPT 481 JOURNAL CLUB	**MPT 481. CO1:** To search articles from various scientific databases.
	MPT 481. CO2: To prepare a technical presentation for a small audience.
	MPT 481. CO3: To deliver a presentation and address related queries.
MPT 491 FINAL PRESENTATION	**MPT 491. CO1:** Students will be able to **categorize** relevant information for **defining** and **explaining** the topic for presentation.
	MPT 491. CO2: In terms of **summarizing** and organizing the whole methodology, students will be able structure their oral work and **composing** information.
	MPT 491. CO3: Students will be able to **build** appropriate vocabularies with voice modulation, voice projection and pacing.
MPT 492 RESEARCH WORK	**MPT 492. CO1:** The students would be able to **build** problem solving skills and **execute** them to research in the related fields
	MPT 492. CO2: The students would be able to **design** plan of work, **execute** them and **interpret** the data to evaluate the work
	MPT 492. CO3: The students would be able to **write** their research reports constituting Introduction, Experimental Methods, Results & Discussion, Conclusion and References

Dr. B.C. Roy College of Pharmacy and Allied Health Sciences

Ph. : (0343) 253 2678/79
Mob. : +91 7477788556
Telefax : (0343) 253 2679
e-mail : bcrcp_dgp@yahoo.co.in
contact@bcrcp.org
www.bcrcp.ac.in

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Dr. Meghnad Saha Sarani, Bidhannagar, Durgapur - 713206, West Bengal

PROGRAM OUTCOMES (PO)

PO	KEY CONCEPT	EXPLANATION
PO1	**Research Ability**	An ability to independently carry out research and development work utilising modern tools and employing planning and problem analysis skills to solve practical problems
PO2	**Technical Communication**	An ability to write and present substantial technical documents / reports and communicate effectively
PO3	**Expertise Demonstration**	An ability to demonstrate a degree of mastery over the area of specialization in terms of pharmaceutical knowledge, learning aptitude, managerial and administrative skills, computational and informatics skills in academia, manufacturing, clinical and allied sectors
PO4	**Professional Leadership**	An ability to lead in terms of team building, planning, motivating and ethically executing professional responsibilities and establish professional identity in the society
PO5	**Environment & Sustainability**	An ability to comprehend the impact of the pharmaceutical solutions in societal and environmental contexts, and explore the knowledge of and need for sustainable development and apply the knowledge to solve such problems.

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contact@bcrcp.org
www.bcrcp.ac.in

PROGRAM SPECIFIC OUTCOMES (PSO) : PHARMACOLOGY

PSO	KEY CONCEPT	EXPLANATION
PSO1	**Discovery Pharmacology**	Building core concept on mechanism, toxicities and evaluation of drugs through pharmacological and toxicological models via comprehensive understanding of cellular and molecular pharmacology based pharmacotherapy for drug discovery and development.
PSO2	**Design and Analysis**	Understand the principles of pharmaceutical analysis and apply the modern instruments, computational and informatics tools, and techniques for target and lead optimization in designing and quantification of drugs.
PSO3	**Pharmacovigilance**	Apply and appraise regulatory and ethical concepts in preclinical and clinical research for pharmaceutical and healthcare domain in relation to society.
PSO4	**Research Methodology**	Understand, apply and appraise concepts of research methodology & biostatistics, as well as apply computational and informatics tools in clinical and pharmacovigilance research.
PSO5	**Scientific Communication**	Ability to create an inquisitive mind thorough appraisal of various journals and develop technical communication skills to able to interact with broad scientific audience through scientific writing in form of reports/thesis or presentations.

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www.bcrcp.ac.in
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COURSE OUTCOME: M.PHARM. PHARMACOLOGY (Old syllabus)

NAME OF THE COURSE WITH CODE	COURSE OUTCOME
MPT 108 (1) General Pharmacology	**MPT 108 (1). CO1:** Understand the pharmacodynamics and pharmacokinetics of a drug and its correlation in pharmacotherapy.
	MPT 108 (1). CO2: Propose different categories drugs in the treatment of a disease and execute its management.
	MPT 108 (1). CO3: Explain side effects, adverse effects, contradictions and the clinical uses in the treatment.
MBS 101 Biostatistics	**MBS 101.CO1:** Identify data relating to different variables and select samples.
	MBS 101. CO2: Discuss the basic concept and importance of statistical analysis.
	MBS 101.CO3: Arrange the results using biostatistical knowledge and make statistical decisions in pharmaceutical research.
MPT 101 Modern Pharmaceutical Analytical Techniques	**MPT101. CO1: Design** various spectroscopic characterization techniques as well as **interpret** various spectra for characterization of compounds.
	MPT101. CO2:Apply knowledge of separation science to separate and identify various pharmaceutical and biological ingredients from their mixture
	MPT101. CO3: Utilize various thermal and thermogravimetric techniques for characterization of pharmaceutical compounds and their combinations.
	MPT101. CO4: Develop various bioassays and herbal methods for separation and characterization of biological and/or phytopharmaceutical entities.
MPT 108 (2) Advanced Pharmacology	**MPT 108 (2). CO1:** Students will be expertise themselves in analyzing and interpretation of various biochemical involvement and cellular changes at molecular level of hormone action, inflammation, immune responses & antimicrobial resistance.
	MPT 108 (2). CO2: Students will develop the skill in assessment of effectiveness of drugs action, side effects & various contraindications in various disease cases.
	MPT 108 (2). CO3: Students will be able to Evaluate the effects of drugs vary with biological timing in various diseases like cardiovascular disease, diabetes, asthma and peptic ulcer.
	MPT 108 (2). CO4: Students will be able to interpret role of free radicals in aetiology of chronic health problem, and demonstrate antioxidant action.

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NAME OF THE COURSE WITH CODE	COURSE OUTCOME
MPT 181 Seminar	**MPT 181. CO1:** Students can able to show competence in identifying relevant information, defining and explaining topics under discussion.
	MPT 181. CO2: Students can able to improve their communication and presentation skill.
	MPT 181. CO3: Students can engage with works that are widely held to be significant in the field of pharmaceutical research.
MPT 198 Pharmacology Lab	**MPT 198.CO1:** Analyze various formulation or its components using the analytical techniques.
	MPT 198.CO2: Develop skills in working techniques used in cellular and molecular biology.
	MPT 198.CO3: Develop skill in animal handling, administration of drugs through various routes and withdrawal of blood.
	MPT 198.CO4: Developing skills in In vivo assay of various pharmacological activities.
MPT191 Pharmaceutical Analysis Lab	**MPT191. CO1:** The students would be able to **understand** different spectroscopic analysis, their theory and application range based on their functions.
	MPT191. CO2: The students would be able to **apply** their knowledge in method development and results interpretation of various spectroscopic analysis.
	MPT191. CO3: The students will be able to **design** various microbiological assays involving Vitamins and Antibiotics.
	MPT191. CO4: The students will be able to **construct** various pharmacological assays depending upon the drug of choice.
MPT 208 (1) Clinical Pharmacology	**MPT 208 (1). CO1:** Explain the regulatory requirements for conducting clinical trials.
	MPT 208 (1). CO2: Demonstrate the types of clinical trial designs.
	MPT 208 (1). CO3: Execute safety monitoring, reporting and close out activities.
	MPT 208 (1). CO4: Execute reporting of adverse drug reaction.
MPT 209 Pharmaceutical Bio-technology	**MPT 209. CO1:** Understand the various stages of drug discovery and understand the various targets for drug discovery and its validation along with techniques for lead identification and optimization**.**
	MPT 209. CO2: Understand the role of genomics, proteomics and bioinformatics in drug discovery
	MPT 209. CO3: Apply computer aided drug designing in the process of drug discovery.
MPT 212	**MPT212. CO1:** Students will be able to understand the need and application validation in pharmaceutical industry.

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Mob. : +91 7477788556
Telefax : (0343) 253 2679
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www.bcrcp.ac.in
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NAME OF THE COURSE WITH CODE	COURSE OUTCOME
Process validation & CGMP	**MPT212. CO2:** Students will be able to understand the concepts of quality practices for certification standards in pharmaceutical industry.
	MPT212. CO3: Students will develop the knowledge about the various regulatory agencies and their role.
	MPT212. CO4: Students will learn to apply different laws and guidelines for drug registration and approval process.
MPT 208 (2) Molecular Pharmacology	**MPT 208 (2). CO1:** Explain the receptor signal transduction process and their molecular pathway.
	MPT 208 (2). CO2: Develop skills in r DNA in context to gene therapy.
	MPT 208 (2). CO3: Explain genetic variation and its role in pharmacology.
	MPT 208 (2). CO4: Develop skills in preparing and handling cell culture media.
MPT 281 Seminar	**MPT 281. CO1:** Students shall be able to **communicate** with the scientific community in a confident manner.
	MPT 281. CO2: Student shall be able to **recognize** the societal issues related to healthcare, **analyse** and **solve** them
	MPT 281. CO3: Students shall be proficient in interpreting scientific data to **defend** the relevant topic.
	MPT 281. CO4: Students shall be able to **utilize** modern computational tools for presentation.
MPT314 (Research Methodology and Clinical Trials)	**MPT 314. CO1:** Students will be able to implement the regulatory requirements and follow ethics while conducting clinical trials.
	MPT 314. CO2: Students will be able to design and manage clinical trial coordination process.
	MPT 314. CO3: Students shall appreciate statistical techniques in solving the problems
	MPT 314. CO4: Students shall be able to report and communicate the adverse drug reactions.
MPT391 (Synopsis)	**MPT 391. CO1:** Students will be able to **categorize** relevant information for **defining** and **explaining** the topic for presentation.
	MPT 391. CO2: In terms of **summarizing** and organizing the whole methodology, students will be able structure their oral work and **composing** information.
	MPT 391. CO3: Students will be able to **build** appropriate vocabularies with voice modulation, voice projection and pacing.
MPT392 (Presentation)	**MPT 392. CO1:** Students can develop a structured presentation methodology to prepare presentation material and effective visual aids.

Ph. : (0343) 253 2678/79
Mob. : +91 7477788556
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e-mail : bcrcp_dgp@yahoo.co.in
contact@bcrcp.org
www.bcrcp.ac.in
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NAME OF THE COURSE WITH CODE	COURSE OUTCOME
	MPT 392. CO2: Students can able to percolate his knowledge to the audiences.
	MPT 392. CO3: The students can be able to Determine and develop personal style.
MPT 493 (1) Thesis	**MPT 493 (1). CO1:** The students would be able to **learn** different types of scholarly sources and **analyse** them
	MPT493 (1). CO2: The students would be able to **analyse** the gaps and **evaluate** them.
	MPT 493 (1). CO3: The students would be able to **build** problem solving skills and **execute** them to research in the related fields.
	MPT 493 (1). CO4: The students would be able to **design** plan of work, **execute** them and **interpret** the data to evaluate the work.
	MPT 493 (1). CO5: The students would be able to **write** their research reports constituting Introduction, Experimental Methods, Results & Discussion, Conclusion and References
MPT 493 (2) Defence of Thesis	**MPT 493 (2). CO1:** Students can develop a structured presentation methodology to prepare presentation material and effective visual aids.
	MPT 493 (2). CO2: Students can able to percolate his knowledge to the audiences.
	MPT 493 (2). CO3: The students can be able to determine and develop personal style.

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Dr. Meghnad Saha Sarani, Bidhannagar, Durgapur - 713206, West Bengal

COURSE OUTCOME: M.PHARM. PHARMACOLOGY (New syllabus)

NAME OF THE COURSE WITH CODE	COURSE OUTCOME
MPT 1081 (Modern Pharmaceutical Analytical Techniques)	**MPT 1081. CO1: Determine** the role of various drug excipients interaction.
	MPT 1081. CO2: Apply the knowledge to undertake various analytical instrumental studies such as spectroscopic, separation science, thermal, biotechnological and crystallography-based studies.
	MPT 1081. CO3: Evaluate various results and interpretations of such instrumental techniques, solve any existing problems.
	MPT 1081. CO4: Develop newer analytical methods by instrumental techniques.
MPT 1082 (Advanced Pharmacology-I)	**MPT 1082. CO1:** Understand the pharmacodynamics and pharmacokinetics of a drug and its correlation in pharmacotherapy.
	MPT 1082. CO2: Propose different categories drugs in the treatment of a disease and execute its management.
	MPT 1082. CO3: Explain side effects, adverse effects, contradictions and the clinical uses in the treatment.
MPT 1083 (Pharmacological screening and toxicological methods I)	**MPT 1083.CO1:** Appreciate ethical use of animals in research.
	MPT 1083.CO2: Design, construct and validate animal models in context to a particular disease and used it for screening of drugs.
	MPT 1083.CO3: Evaluate the various methods in vivo and invitro screening methods used in pharmacological evaluations.
MPT 1084 Cellular and Molecular Pharmacology	**MPT 1084.CO1:** Explain the receptor signal transduction process and their molecular pathway.
	MPT 1084.CO2: Develop skills in r DNA in context to gene therapy.
	MPT 1084.CO3: Explain genetic variation and its role in pharmacology.
	MPT 1084.CO4: Develop skills in preparing and handling cell culture media.
	MPT 1985.CO1: Analyze various formulation or its components using the analytical techniques.

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NAME OF THE COURSE WITH CODE	COURSE OUTCOME
MPT 1985 Pharmacology Practical I	**MPT 1985.CO2:** Develop skills in working techniques used in cellular and molecular biology.
	MPT 1985.CO3: Develop skill in animal handling, administration of drugs through various routes and withdrawal of blood.
	MPT 1985.CO4: Developing skills in In vivo assay of various pharmacological activity
MPT 1986 Seminar/ Assignment	**MPT 1986. CO1:** Students can able to show competence in identifying relevant information, defining and explaining topics under discussion.
	MPT 1986. CO2: Students can able to improve their communication and presentation skill.
	MPT 1986. CO3: Students can engage with works that are widely held to be significant in the field of pharmaceutical research.
MPT 2081 (Advance Pharmacology II)	**MPT 2081. CO1:** Students will be expertise themselves in analyzing and interpretation of various biochemical involvement and cellular changes at molecular level of hormone action, inflammation, immune responses & antimicrobial resistance.
	MPT 2081. CO2: Students will develop the skill in assessment of effectiveness of drugs action, side effects & various contraindications in various disease cases.
	MPT 2081. CO3: Students will be able to Evaluate the effects of drugs vary with biological timing in various diseases like cardiovascular disease, diabetes, asthma and peptic ulcer.
	MPT 2081. CO4: Students will be able to interpret role of free radicals in aetiology of chronic health problem, and demonstrate antioxidant action.
MPT 2082 (Pharmacological and Toxicological Screening Methods – II)	**MPT 2082. CO1:** Evaluate and estimate different types of toxicity studies in regulatory toxicology and its importance in drug development.
	MPT 2082. CO2: Interpret and justify ethical and safety aspects of regulatory requirements for toxicity studies in association with investigational new drug application.
	MPT 2082. CO3: Interpret the importance of toxicokinetic and alternative methods to animal toxicity testing in association with drug discovery and assessment.
MPT 2083 (Principles of Drug Discovery)	**MPT 2083. CO1:** Understand the various stages of drug discovery and understand the various targets for drug discovery and its validation along with techniques for lead identification and optimization**.**
	MPT 2083. CO2: Understand the role of genomics, proteomics and bioinformatics in drug discovery.

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NAME OF THE COURSE WITH CODE	COURSE OUTCOME
	MPT 2083. CO3: Apply computer aided drug designing in the process of drug discovery.
MPT 2084 (Clinical Research and Pharmacovigilance	**MPT 2084. CO1:** Explain the regulatory requirements for conducting clinical trials.
	MPT 2084. CO2: Demonstrate the types of clinical trial designs.
	MPT 2084. CO3: Execute safety monitoring, reporting and close out activities.
	MPT 2084. CO4: Execute reporting of adverse drug reaction.
MPT 2985 (Pharmacology Practical II)	**MPT 2985. CO1:** Understand the principles of bioassay and its importance.
	MPT 2985. CO2: Execute toxicity study in accordance with the guidelines like OECD, ICH and determine the lethal doses of drugs.
	MPT 2985. CO3: Analyse the various clinical trials and monitoring safety and reporting of ADRs
	MPT 2985. CO4: Using Bioinformatics for drug designing
MPT 2986 (Seminar)	**MPT 2986. CO1:** Students can able to show competence in identifying relevant information, defining and explaining topics under discussion.
	MPT 2986. CO2: Students can able to improve their communication and presentation skill.
	MPT 2986. CO3: Students can engage with works that are widely held to be significant in the field of pharmaceutical research.
MPT 381 (Journal Club)	**MPT 381. CO1:** To search articles from various scientific databases.
	MPT 381. CO2: To prepare a technical presentation for a small audience.
	MPT 381. CO3: To deliver a presentation and address related queries.
MPT 384 (Research methodology & Biostatistics)	**MPT 384.CO1:** Discuss and explain different methods and technologies used to carry out research work**.**
	MPT 384.CO2: Assess the basic principles and working of analytical instrument in carrying out research work.
	MPT 384.CO3: Implement the regulatory requirements and follow ethics while conducting clinical trials.
	MPT 384. CO4: Demonstrate expertise in carrying out statistical analysis of the research findings
MPT 391 (Discussion/ Presentation) (Proposal)	**MPT 391. CO1:** Students will be able to **categorize** relevant information for **defining** and **explaining** the topic for presentation.

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NAME OF THE COURSE WITH CODE	COURSE OUTCOME
	MPT 391. CO2: In terms of **summarizing** and organizing the whole methodology, students will be able structure their oral work and **composing** information.
	MPT 391. CO3: Students will be able to **build** appropriate vocabularies with voice modulation, voice projection and pacing.
MPT392 (Research Work)	**MPT 392. CO1:** Students can develop a structured presentation methodology to prepare presentation material and effective visual aids.
	MPT 392. CO2: Students can able to percolate his knowledge to the audiences.
	MPT 392. CO3: The students can be able to Determine and develop personal style.
MPT 481 (Journal club)	**MPT 481. CO1:** To search articles from various scientific databases.
	MPT 481. CO2: To prepare a technical presentation for a small audience.
	MPT 481. CO3: To deliver a presentation and address related queries.
MPT 491 (Final presentation)	**MPT 491. CO1:** Students will be able to **categorize** relevant information for **defining** and **explaining** the topic for presentation.
	MPT 491. CO2: In terms of **summarizing** and organizing the whole methodology, students will be able structure their oral work and **composing** information.
	MPT 491. CO3: Students will be able to **build** appropriate vocabularies with voice modulation, voice projection and pacing.
MPT 492 (Research work)	**MPT 492. CO1:** The students would be able to **build** problem solving skills and **execute** them to research in the related fields.
	MPT 492. CO2: The students would be able to **design** plan of work, **execute** them and **interpret** the data to evaluate the work
	MPT 492. CO3: The students would be able to **write** their research reports constituting Introduction, Experimental Methods, Results & Discussion, Conclusion and References.