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

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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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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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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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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.

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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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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.