



# G. Pulla Reddy College of Pharmacy

ISO 9001 - 2000 Certified College

(Affiliated to Osmania University and Approved by AICTE & PCI)



## M.Pharm - PHARMACOGNOSY Program outcome (MPG)

<b>PO1(MPG)</b>	Understand the advances in Herbal drugs, cultivation aspects and Phytochemistry. Perform the experiments on analytical chemistry, isolations and standardization of drugs from Natural origin.
<b>PO2(MPG)</b>	Understand the basic concepts in indigenous systems of medicine, cosmetic preparations and biotechnological developments. Perform the experiments on preparation and standardization of herbal cosmetics and experiments related to plant tissue culture.
<b>PO3 (MPG)</b>	Gain the knowledge the on research methodology. Literatures survey, ethics in research, biostatistics and able to design the experimental methods
<b>PO4(MPG)</b>	Gain the knowledge in various experimental techniques in Pharmacognosy and able to understand the presentation and interpretation of research data.

## M. PHARM PHARMACOGNOSY COURSE OUTCOME

M. PHARM PHARMACOGNOSY COURSE OUTCOME	
ID	OUTCOME
<b>CO1(MPG)</b>	Understand the basic concepts and advances in analytical techniques and theoretical skills of the analytical instruments
<b>CO2(MPG)</b>	Learn the fundamentals of cultivation, isolation of Phytoconstituents and health benefits of nutraceuticals.
<b>CO3(MPG)</b>	Gain the knowledge of drug discovery, extraction and isolation techniques.



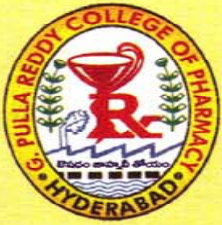
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<b>CO4(MPG)</b>	Understand the commercial aspects of natural drugs, regulatory and quality policies of drugs from natural origin.
<b>CO5(MPG)</b>	Able to perform various experiments on analysis of drugs in formulation, standardization of herbal drugs and evaluation herbal drugs as per monographs.
<b>CO6(MPG)</b>	Learn the compilation, interpretation and presentation skills
<b>CO7(MPG)</b>	Gain the knowledge about biotechnology aspects to improve the quality and yield of natural products
<b>CO8(MPG)</b>	Attains the knowledge of validation, screening for biological properties, and detection of adulterations and deterioration of natural drugs.
<b>CO9(MPG)</b>	Understand the principles, concepts and formulations in Indian systems of medicine. Learn the AYUSH, GMP and GLP aspects related to Herbal drugs.
<b>CO10(MPG)</b>	Learn the principles, preparation and standardization of herbal cosmetics and gain the knowledge about the regulatory aspects of herbal cosmetics manufacturing.
<b>CO11(MPG)</b>	Able to learn the preparation and standardization of various Herbal cosmetics and plant tissue culture techniques
<b>CO12(MPG)</b>	Able to improve the compilation, interpretation and presentation skills.
<b>CO13(MPG)</b>	Gain the idea about research methodologies, biostatistical tools that can be employed in research, various medical care protocols, CPCSEA guidelines for laboratory animals.
<b>CO14(MPG)</b>	Learn the literature reviews, Presentation of research articles, journal protocols for writing research articles and importance of publication.
<b>CO15(MPG)</b>	Able to express their ideas and thoughts of their perspective in choosing a project of their own interest under the supervision of respective guides.
<b>CO16(MPG)</b>	Understand the concept of research and its importance. Students can finalized their area of research and proceeded with the work in consultation with supervisors.
<b>CO17(MPG)</b>	Able to publish the research papers in various national and international journals approved by UGC.
<b>CO18(MPG)</b>	Students conclude their research projects and engaged themselves in drafting thesis under the guidance of supervisors.



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<b>CO19(MPG)</b>	Students can explain their research projects through seminars, along with their thesis, in partial fulfillment for the award of their post-graduation degree
<b>CO20(MPG)</b>	Able to compete in various national and international seminars/conferences with innovative research ideas. Students also took up trainings and workshops to enhance their practical skills.

## M.Pharm Pharmacognosy Programme outcome and Course outcome Mapping

<b>I- SEMESTER</b>				
<b>Code:MPG:101T - Sub: MPAT</b>				
	<b>PO1(MPG)</b>	<b>PO2(MPG)</b>	<b>PO3(MPG)</b>	<b>PO4(MPG)</b>
<b>CO1(MPG)</b>	X			
<b>CO2(MPG)</b>				
<b>CO3(MPG)</b>				
<b>CO4(MPG)</b>				
<b>CO5(MPG)</b>				
<b>CO6(MPG)</b>				
<b>Code:MPG:102T - Sub: APG-I</b>				
	<b>PO1(MPG)</b>	<b>PO2(MPG)</b>	<b>PO3(MPG)</b>	<b>PO4(MPG)</b>
<b>CO1(MPG)</b>				
<b>CO2(MPG)</b>	X			
<b>CO3(MPG)</b>				
<b>CO4(MPG)</b>				
<b>CO5(MPG)</b>				



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CO6(MPG)				
<b>Code:MPG:103T- Sub: PCY</b>				
	PO1(MPG)	PO2(MPG)	PO3(MPG)	PO4(MPG)
CO1(MPG)				
CO2(MPG)				
CO3(MPG)	X			
CO4(MPG)				
CO5(MPG)				
CO6(MPG)				
<b>Code:MPG:104T- Sub: IPT</b>				
	PO1(MPG)	PO2(MPG)	PO3(MPG)	PO4(MPG)
CO1(MPG)				
CO2(MPG)				
CO3(MPG)				
CO4(MPG)	X			
CO5(MPG)				
CO6(MPG)				
<b>Code:MPG:105TP- Sub: PHARMACOGNOSY PRACTICAL- I (PCP-I)</b>				
	PO1(MPG)	PO2(MPG)	PO3(MPG)	PO4(MPG)
CO1(MPG)				
CO2(MPG)				
CO3(MPG)				
CO4(MPG)				



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CO5(MPG)	X			
CO6(MPG)				
<b>SEMINAR/ASSIGNMENT</b>				
	<b>PO1(MPG)</b>	<b>PO2(MPG)</b>	<b>PO3(MPG)</b>	<b>PO4(MPG)</b>
CO1(MPG)				
CO2(MPG)				
CO3(MPG)				
CO4(MPG)				
CO5(MPG)				
CO6(MPG)	X			X

<b>II- SEMESTER</b>				
<b>Code: MPG: 201T - Sub: MPB</b>				
	<b>PO1(MPG)</b>	<b>PO2(MPG)</b>	<b>PO3(MPG)</b>	<b>PO4(MPG)</b>
CO7(MPG)		X		
CO8(MPG)				
CO9(MPG)				
CO10(MPG)				
CO11(MPG)				
CO12(MPG)				
<b>Code:MPG:202T - Sub: APG-II</b>				



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	PO1(MPG)	PO2(MPG)	PO3(MPG)	PO4(MPG)
CO7(MPG)		X		
CO8(MPG)		X		
CO9(MPG)				
CO10(MPG)				
CO11(MPG)				
CO12(MPG)				
<b>Code:MPG:203T- Sub: ISM</b>				
	PO1(MPG)	PO2(MPG)	PO3(MPG)	PO4(MPG)
CO7(MPG)				
CO8(MPG)				
CO9(MPG)		X		
CO10(MPG)				
CO11(MPG)				
CO12(MPG)				
<b>Code:MPG:204T- Sub: HCM</b>				
	PO1(MPG)	PO2(MPG)	PO3(MPG)	PO4(MPG)
CO7(MPG)				
CO8(MPG)				
CO9(MPG)				
CO10(MPG)		X		
CO11(MPG)				
CO12(MPG)				



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Code:MPG:205TP- Sub: PHARMACOGNOSY PRACTICAL II (PCP-II)				
	PO1(MPG)	PO2(MPG)	PO3(MPG)	PO4(MPG)
CO7(MPG)				
CO8(MPG)				
CO9(MPG)				
CO10(MPG)	X			
CO11(MPG)				
CO12(MPG)				
III- SEMESTER				
Code:MPG:301T - Sub: RMB				
	PO1(MPG)	PO2(MPG)	PO3(MPG)	PO4(MPG)
CO13(MPG)	X		X	
CO14(MPG)		X		
CO15(MPG)				
CO16(MPG)				X
Discussion/Presentation (Proposal Presentation)				
	PO1(MPG)	PO2(MPG)	PO3(MPG)	PO4(MPG)
CO13(MPG)				
CO14(MPG)				
CO15(MPG)			X	
CO16(MPG)				
IV- SEMESTER JOURNAL CLUB and RESEARCH WORK				
	PO1(MPG)	PO2(MPG)	PO3(MPG)	PO4(MPG)



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CO17(MPG)				X
CO18(MPG)				X
CO19(MPG)				
CO20(MPG)				

## SPECIFIC LEARNING OUTCOMES (SLO)- M.PHARM-PHARMACOGNOSY- I Semester

M.PHARM-PHARMACOGNOSY (MPG)		
Code:101T - MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES (MPAT)		
ID	Unit / Topic	Outcome statement
SLO1(MPAT)	Spectroscopy	Ability to understand principles and instrumentation of UV-Vis, IR, Flame emission spectroscopy along with Spectrofluorimetry and their applications
SLO2(MPAT)	NMR spectroscopy	Understands Principles, Instrumentation, Solvent requirements, chemical shifts of NMR; briefly about FT-NMR and <sup>13</sup> CNMR
SLO3(MPAT)	Mass spectroscopy	Understands Mass Spectroscopy, Ionization techniques, Fragmentation Rules, Mass Analyzers, Applications
SLO4(MPAT)	Chromatography	Ability to understand Detailed study of various types of Chromatography's (TLC, HPLC, HPTLC, GC, UPLC, etc.,)
SLO5(MPAT)	Electrophoresis and X ray crystallography	Learn the principle, technique and applications of paper, Gel, Capillary, zone electrophoresis. Understands X ray diffraction and techniques.
SLO6(MPAT)	Potentiometry and Thermal Techniques	Learns the principle, instrument and applications of Potentiometry, Differential Thermal Analysis, and Derivative differential thermal analysis.





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<b>CODE:102T- ADVANCED PHARMACOGNOSY – (APG1)</b>		
<b>SLO7 (APG1)</b>	Cultivation	Learns the cultivation techniques and good agricultural practices
<b>SLO8(APG1)</b>	Marine natural products	Understand the advances, problems and evaluation of Marine Natural products
<b>SLO9(APG1)</b>	Nutraceuticals	Understands the trends, formulations standardization and regulatory guidelines in Nutraceuticals.
<b>SLO10(APG1)</b>	Phytopharmaceuticals	Attains the knowledge on isolation chemistry and therapeutic uses of natural products.
<b>SLO11 (APG1)</b>	Pharmacovigilance	Understands the safety monitoring regulations as per AYUSH and WHO guidelines
<b>CODE:103T- PHYTOCHEMISTRY (PCY)</b>		
<b>SLO12(PCY)</b>	Biosynthesis	Attains the knowledge of biosynthesis of natural products and techniques involved in research
<b>SLO13(PCY)</b>	Drug discovery	Learns the types of drug discovery techniques and developments in drug discovery in natural products
<b>SLO14(PCY)</b>	Extraction techniques	Attains the knowledge of extraction techniques principles and applications
<b>SLO15(PCY)</b>	Finger printing analysis	Understands the characterization of extracts using HPTLC and LC/MS
<b>SLO16(PCY)</b>	Spectral Interpretation	Understands the basic principles of spectral studies.
<b>CODE:104T- INDUSTRIAL PHARMACOGNOSTICAL TECHNOLOGY (IPT)</b>		
<b>SLO17(IPT)</b>	Herbal drug Industry	Understands the scale up techniques, lay out, commercial formulation techniques.
<b>SLO18(IPT)</b>	Regulatory requirements	Learns the regulatory requirements – GMP, GLP and laws applicable to herbal drugs.
<b>SLO19(IPT)</b>	Monograph	Understands the scope of pharmacopoeias and learns the monographs.
<b>SLO20(IPT)</b>	Clinical testing	Understand the importance and techniques of stability studies.
<b>SLO21(IPT)</b>	Patents	Attains the knowledge of IPRS and failing patents and protection of natural wealth.
<b>CODE:105TP- PHARMACOGNOSY PRACTICAL'S-I (PCP1)</b>		



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<b>SLO22(PCP1)</b>	Able perform the experiments on various analytical Instruments.
<b>SLO23(PCP1)</b>	Understand the spectral data
<b>SLO24(PCP1)</b>	Evaluate the natural drugs as per ,monographs
<b>SLO25(PCP1)</b>	Able to isolate, identify and standardize the natural drugs
<b>SLO26(PCP1)</b>	Understand the principles and preparation of herbal cosmetics.
<b>SEMINAR/ASSIGNMENT (SAG)</b>	
<b>SLO27 (SAG)</b>	able to understand, compile and present a topic

## SPECIFIC LEARNING OUTCOMES (SLO)- M.PHARM-PHARMACOGNOSY– II Semester

<b>M.PHARM-PHARMACOGNOSY (MPG)</b>		
<b>Code:201T - MEDICINAL PLANT BIOTECHNOLOGY (MPB)</b>		
<b>ID</b>	<b>Unit / Topic</b>	<b>Outcome statement</b>
<b>SLO28(MPB)</b>	Plant Biotechnology	Understand the developments, applications and genetic techniques applied in Medicinal plants
<b>SLO29(MPB)</b>	Tissue culture technique.	Understand the type's tissue culture techniques, aseptic management techniques and applications.
<b>SLO30(MPB)</b>	Immobilization	Able to learn the cloning techniques, applications and methods of improving the secondary metabolites
<b>SLO31(MPB)</b>	Biotransformation	Attains the knowledge of bioreactors, transgenic plants, gene sequence and PCR techniques.
<b>SLO32(MPB)</b>	Fermentation technology	Attains Fermentation process, production of secondary metabolites and applications of Fermentation technology.
<b>CODE:202T- ADVANCED PHARMACOGNOSY-II (APG2)</b>		
<b>SLO33(APG2)</b>	Herbal remedies	Attains the knowledge of validation and pharmacodynamics of herbal drugs.



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<b>SLO34(APG2)</b>	Adulteration	Understand the measures to adulteration and finger printing technique. Analysis of heavy metals and pesticide residues
<b>SLO35(APG2)</b>	Ethanobotany and Ethanopharmacology	Understand the bioprospecting tools for drug discovery and drug evaluation
<b>SLO36(APG2)</b>	Analytical profiles	Attain the knowledge of herbal drugs analysis.
<b>SLO37(APG2)</b>	Biological screening	Able to learn the Pharmacological screening of natural drugs .
<b>CODE:203T- INDIAN SYSTEM OF MEDICINE (ISM)</b>		
<b>SLO38(ISM)</b>	Indigenous systems	Understand the principles and concepts of Ayurveda, Homeopathy, Siddha and Unani systems of medicines
<b>SLO39(ISM)</b>	Indigenous practices	Learn the principles, treatments and techniques of Naturopathy, Yoga and Aromatherapy.
<b>SLO40(ISM)</b>	Formulations	Learn the techniques and methods of formulations as per AYUSH and stability studies.
<b>SLO41(ISM)</b>	GMP and GLP aspects	Learn the GLP and GMP aspects for monitoring the safety of herbal medicine
<b>SLO42(ISM)</b>	AYUSH councils	Understand the objectives and functions of various councils.
<b>CODE:204T- HERBAL COSMETICS (HCM)</b>		
<b>SLO43(HCM)</b>	Regulations in Herbal cosmetics	Regulatory aspects- Licensing procedure, types of licenses and GMP aspects for manufacturing will learned.
<b>SLO44(HCM)</b>	Cosmetics Raw Material	Learn the excipients used in herbal cosmetics and compatibility of chemicals with herbs.
<b>SLO45(HCM)</b>	Types of Herbal Cosmetics	Learn the preparation of different cosmetics.
<b>SLO46(HCM)</b>	Types of Herbal Cosmetics	Learn the preparation of different cosmetics.



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<b>SLO47(HCM)</b>	Analysis	Understand the analytical methods and quality parameters as per the DC act.
<b>CODE:205P- PHARMACOGNOSY PRACTICAL'S-II (PCP2)</b>		
<b>SLO48(PCP2)</b>	Able to understand the culture techniques.	
<b>SLO49(PCP2)</b>	Able to understand the isolation techniques of DNA and RNA	
<b>SLO50(PCP2)</b>	Learn the preparation of herbal cosmetics formulations.	

<b>M.PHARM PHARMACOGNOSY (MPG) - III SEMESTER</b>		
<b>Code:301T - RESEARCH METHODOLOGY AND BIO STATISTICS</b>		
<b>ID</b>	<b>Unit/Topic</b>	<b>Outcome statement</b>
<b>SLO52(RMB)</b>	Unit I	Understanding of General research methodology
<b>SLO53(RMB)</b>	Unit II	Introduction to Biostatistics
<b>SLO54(RMB)</b>	Unit III	Detailed study on protocols of Medical research
<b>SLO55(RMB)</b>	Unit IV	Clear perspective of CPCSEA guidelines for laboratory animal facilities
<b>SLO56(RMB)</b>	Unit V	Importance of declaration of Helsinki rule, additional principles combined with medical care

<b>M.Pharm PHARMACOGNOSY Course outcome and Specific Learning Outcome Map</b>						
<b>M.PHARM-PHARMACOGNOSY</b>						
<b>I-SEMESTER</b>						
	<b>CO1(MPG)</b>	<b>CO2(MPG)</b>	<b>CO3(MPG)</b>	<b>CO4(MPG)</b>	<b>CO5(MPG)</b>	<b>CO6(MPG)</b>
<b>SLO1(MPAT)</b>	<b>X</b>					
<b>SLO2(MPAT)</b>	<b>X</b>					
<b>SLO3(MPAT)</b>	<b>X</b>					



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SLO4(MPAT)	X					
SLO5(MPAT)	X					
SLO6(MPAT)	X					
SLO7(APG1)		X				
SLO8(APG1)		X				
SLO9(APG1)		X				
SLO10(APG1)		X				
SLO11(APG1)		X				
SLO12(PCY)			X			
SLO13(PCY)			X			
SLO14(PCY)			X			
SLO15(PCY)			X			
SLO16(PCY)			X			
SLO17(IPT)				X		
SLO18(IPT)				X		
SLO19(IPT)				X		
SLO20(IPT)				X		
SLO21(IPT)				X		
SLO22(PCP1)					X	
SLO23(PCP1)					X	
SLO24(PCP1)					X	
SLO25(PCP1)					X	
SLO26(PCP1)					X	



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SLO27(SAG)							X
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M.Pharm Pharmacognosy Course outcome and Specific Learning Outcome Map						
M.PHARM-PHARMACOGNOSY						
II-SEMESTER						
	CO7(MPG)	CO8(MPG)	CO9(MPG)	CO10(MPG)	CO11(MPG)	CO12(MPG)
SLO28(MPB)	X					
SLO29(MPB)	X					
SLO30(MPB)	X					
SLO31(MPB)	X					
SLO32(MPB)	X					
SLO33(APG2)		X				
SLO34(APG2)		X				
SLO35(APG2)		X				
SLO36(APG2)		X				
SLO37(APG2)		X				
SLO38(ISM)			X			
SLO39(ISM)			X			
SLO40(ISM)			X			
SLO41(ISM)			X			



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SLO42(ISM)			X			
SLO43(HCM)				X		
SLO44(HCM)				X		
SLO45(HCM)				X		
SLO46(HCM)				X		
SLO47(HCM)				X		
SLO48(PCP2)					X	
SLO49(PCP2)					X	
SLO50(PCP2)					X	
SLO51(SAG)						X

III SEMESTER				
	C013(MPG)	CO14(MPG)	CO15(MPG)	CO16(MPG)
SLO52(RMB)	X			
SLO53(RMB)	X			
SLO54(RMB)	X			
SLO55(RMB)	X			
SLO56(RMB)	X			