

GANPAT UNIVERSITY									
FACULTY OF SCIENCE									
PROGRAMME		M.Sc.			Branch/Spec.			Chemistry	
SEMESTER		III			Version			2.0.0.1	
Effective From Academic Year				2021-22		Effective for the batch Admitted in			July-2020
Subject Code		MCHE3MDC		Subject Name		Medicinal Chemistry			
Teaching Scheme					Examination Scheme (Marks)				
Per Week	Lecture		Practical		Total	CE	SEE	Total	
	L	Tu	P	Tw					
Credit	04	-	0	0	04	Theory	40	60	100
Hours	04	-	0	0	04	Practical	-	-	-
Pre-requisites									
Before studying Medicinal Chemistry, all students have basic knowledge of pharmaceutical chemistry, organic chemistry, drugs, SAR, reaction mechanism and knowledge related to UG level chemistry.									
Learning Outcome									
After the successful completion of the course, students will be able to understand									
<ul style="list-style-type: none"> • Drug design and development. • Pharmacodynamics and pharmacokinetics of drugs. • SAR, QSAR, drug delivery system and drug development process. • Medicinal Chemistry and synthesis of drugs. • Antibiotics, Antimalarial, Anticonvulsant, Anti tuberculosis, Sedative and hypnotics drugs etc. 									
Theory Syllabus									
Unit	Content								Hours
01	Introduction: Medicinal Chemistry, Drug design and development, QSAR, pharmacopeia, pharmaceutical analysis, receptor site theory and metabolism. Antibiotics: Introduction, Classification, β -lactam antibiotics, classification of β -lactam antibiotics. Synthesis, SAR and Mode of actions of Penicillin, Cephalosporin, Chloramphenicol, Streptomycin. Synthesis, properties and uses of Methicillin, Oxacillin, Cloxacillin, Ampicillin, Cefazolin, Azithromycin, Dirithiomylin, Cefadroxil, Pivampicillin.								15
02	Antineoplastic agents. Introduction and classification, synthesis, uses and MOA of Mechlorethamine, Melphalan, cyclophosphamide, 6-MP, Methotraxate, Azathiopurine, Cytarabin & Taxol Analgesics & Antipyretics Introduction, Classification, and Synthesis: Paracetamol, Aspirin, Diclofenac, Ibuprofen, Indomethacin, Allopurinol, Mefenamic acid, Nimesulide, Naproxen. Opioid analgesics: Pethidine, Methadone								15
03	Antimalarial and Antituberculosis Antimalarial; Introduction, Classification, types of malaria, Malaria life cycle in human and mosquito, Quinine analogous. Synthesis and mode of actions of Chloroquine, Primaquine, Meflaquine and Dapsone. Antituberculosis: Introduction, Classification, categories of tuberculosis. Synthesis and uses of Isoniazid, Ethionamide and ethambutol.								15
04	Antihypertensive and Antidiabetics Introduction and classification MOA, SAR and recent advance synthesis of Nifedipine, Amlodipine, Atenolol, Metoprolol, Captopril, Hydralazine, Glipizide, Metformin, Rosiglitazone, Tolbutamide, Glimipride								15

Reference Books

1. Principles of Medicinal Chemistry, Vol. I & II (5/e), by S. S. Kadam, K. R. Mahadik, K. G. Bothra Nirali Prakashan
2. Burger's medicinal chemistry and drug design (5/e) 1997, vol 1 to 5 edited by Manfred E. Woltt John wiley and sons Mc. New york
3. Principles of medicinal chemistry by William A. Foye
4. Medicinal Chemistry by ashutosh kar (Ed. 6th) New Age International
5. The organic chemistry of drug synthesis vol I, II and III (1980) ed by D. lednicer and L.A. mitscher Johyn wiley and sons, New york
6. Wilson and Gisvold text book of organic medicinal and pharmaceutical chemistry Toppan co.Ltd,
7. The pharmaceutical basis of theraperutics by Geoman and Gilman Mcmillan co.
8. Medicinal Chemistry, A. Burger Vols. I to V Ed. M. E. Wolff, John Wiley(1994).
9. Goodman & Gilman. Pharmacological Basis of Therapeutics, McGraw-Hill (2005).
10. S. S. Pandeya & J. R. Dimmock. Introduction to Drug Design, New Age International. (2000).
11. D. Lednicer. Strategies for Organic Drug Synthesis and Design, John Wiley (1998).
12. Graham & Patrick. Introduction to Medicinal Chemistry (3rd edn.), OUP (2005).
13. Medicinal Chemistry — A molecular and Biochemical Approach, Thomas Nogrady and Donald F. Weaver
14. Principles of Medicinal Chemistry, W. O. Foye
15. Wilson and Gisvolds Text book of Medicinal Chemistry
16. The Organic Chemistry of the Drug Design and Drug Action, Richard B. Silverman S
17. Analogue based Drug Discovery, János Fischer and C. Robin Ganellin.

GANPAT UNIVERSITY									
FACULTY OF SCIENCE									
PROGRAMME		M.Sc.			Branch/Spec.		Chemistry		
SEMESTER		III			Version		2.0.0.1		
Effective From Academic Year			2021-22		Effective for the batch Admitted in			July-2020	
Subject Code		MCHE3CNP		Subject Name		Chemistry of Natural Products			
Teaching Scheme					Examination Scheme (Marks)				
Per Week	Lecture		Practical		Total		CE	SEE	Total
	L	Tu	P	Tw					
Credit	04	-	0	0	04	Theory	40	60	100
Hours	04	-	0	0	04	Practical	-	-	-
Pre-requisites									
Before studying Natural products and Biomolecules, all students have basic knowledge of Biomolecules, drugs, vitamins, alkaloids, steroids and knowledge related to UG level chemistry.									
Learning Outcome									
After the successful completion of the course, students will be able to understand									
<ul style="list-style-type: none"> ● Basics of Natural product chemistry, Steroids, Terpenoids application and functions. ● Vitamins, Pigments, chlorophyll and alkaloids. ● The distribution of selected secondary metabolites, their biosynthesis and bioactivity. ● Production of natural products including metabolites as well as knowledge on and experience with isolation, identification, using chromatographic and spectroscopic techniques as 									
Theory Syllabus									
Unit	Content								Hours
01	<u>Natural pigment</u> Introduction, Natural coloring matter, general classification, method of synthesis, structure determination of anthocyanins (cyanine) flavones (chryosin) and flavanol (Querecetin) Porphyrin-structure, spectral properties and synthesis, general and structure determination of Haemoglobin, chlorophyll and Bilirubin.								15
02	<u>Alkaloids and Vitamins</u> Alkaloids: Introduction, structure determination of alkaloids and chemistry of quinine, morphine, narcotine. Vitamins: Introduction, synthesis and structure determination of Vitamin-A, Vitamin B complex, Vitamin H and α -tocopherol (Vitamin E), Vitamin C.								15
03	<u>Steroids and Hormones</u> General introduction and structure determination of steroids, structure of cholesterol and ergosterol (No synthesis). Stereochemistry of steroids, chemistry of bile acids. Chemistry of androgens, oestrogens and gestrogens, their synthesis and biochemical role. Adrenocortical hormones, partial synthesis of cortisone.								15
04	<u>Terpenoids and Carotenoids</u> Classification, nomenclature, general methods of structure determination, chemistry and synthesis of abietic acid and gibberellic acid (gibberllin-A), farnesol, zingeberine and squalene. Biosynthetic studies on triterpenoids and tetraterpenoides. α -carotene, β -carotene								15
Reference Books									
<ol style="list-style-type: none"> 1. Chemistry of Natural products vol I & II by O.P.Agrawal 2. Natural Products : Chemistry and Biological Significance, J. Mann, R.S. Davidson, J.B. Hobbs, D.V. Banthropeadn J.B. Harbome, Longman, Esses. 3. Organic Chemistry: Vol. 2 1L. Finar, ELBS 									

4. Stereoselective Synthesis : A Practical Approach, M. Norrgradi, VCH.
5. Rodd's Chemistry of Carbon Compounds, Ed. S. Coffey, Elsevier.
6. Chemistry, Biological and Pharmacological Properties of Medicinal Plants from the Americas, Ed. Kurt Hostettmann, M.P. Gupta and A. Marston. Harwood Academic Publishers.
7. Introduction to Flavonoids, B.A. Bohm. Harwood Academic Publishers. Organic chemistry vol I & II (sixth edition) I.L. Finar
8. Chemistry of vitamins-S.F. Dyke
9. Chemistry of natural products by Bantely, Vol 1-10
10. L.J. Wade Jr. Organic chemistry, Prentice Hall, Englewood Cliffs, 1987

GANPAT UNIVERSITY									
FACULTY OF SCIENCE									
PROGRAMME		M.Sc.			Branch/Spec.		Chemistry		
SEMESTER		III			Version		2.0.0.1		
Effective From Academic Year			2021-22		Effective for the batch Admitted in			July-2020	
Subject Code		MCHE3ADC		Subject Name		Advanced Organic Chemistry			
Teaching Scheme					Examination Scheme (Marks)				
Per Week	Lecture		Practical		Total		CE	SEE	Total
	L	Tu	P	Tw					
Credit	04	-	0	0	04	Theory	40	60	100
Hours	04	-	0	0	04	Practical	-	-	-
Pre-requisites									
Before studying organic chemistry, all students have basic knowledge of organic chemistry, dyes, instrumentation and importance of industries safety and laboratory requirements knowledge related to UG level chemistry.									
Learning Outcome									
After the successful completion of the course, students will be able to understand									
<ul style="list-style-type: none"> ● Synthesis and classification of polymers. ● Instrumentation and Structural elucidation of organic molecules by spectroscopy ● Applications of Green Chemistry and catalysts. ● Concept of industrial safety and laboratory requirements. 									
Theory Syllabus									
Unit	Content								Hours
01	<p>Polymers Introduction, Classification, properties and uses. Copolymerisation, Effects of polymer structure on property, Thermoplastics, Thermosetting resins, examples of common Plastics. Rubber: Introduction, importance of rubber, types of rubber, rubber plants, chemical properties of rubber, examples of common rubber. Fibres: Introduction, importance, synthetic fibres, properties and applications. Nylon-66, Nylon-6, Teflon, Orlon, Saran, Vinyon, Dynel and Dacron.</p>								15
02	<p>Structural elucidation by spectroscopy Correlation spectroscopy, theory, 1H-1H- COSY, DQF 1H-1H-COSY, 1H-13C-HETCOR, HMQC, HMBC, INADEQUATE, TOCSY. Structural elucidation of molecules based on joint application of UV, FTIR, PMR, CMR and mass spectroscopy.</p>								15
03	<p>Green Chemistry and Catalysis Introduction, basic principles of green chemistry. Designing a green synthesis: Green starting materials, green reagents, green solvents and reaction conditions, green catalysts. Green synthesis with suitable examples. Green reagents: dimethylcarbonate, polymer supported reagents. Green catalysts: Acid catalysts, oxidation catalysts, basic catalysts, phase transfer catalysts and biocatalysts. Green solvents: water, ionic liquids, deep eutectic solvents, supercritical carbon dioxide. Microwave assisted synthesis: reactions in water, reactions in organic solvents, solvent free reactions. Ultrasound assisted reactions, Enzyme catalyst.</p>								15

04	<p>Industrial Hygiene and Safety</p> <p>Concept of Industrial safety, Accident causes & prevention, Safety committee and policies, Accident Investigation and Analysis.</p> <p>Types of chemical hazards and control, Control techniques, Process flow chart and its importance for safety inspection, Interpretation, Causes and prevention measures for examples like Bhopal gas tragedy, Chernobyl tragedy, Minamata tragedy, Fukushima nuclear reactor tragedy etc. use and training of MSDS, UN, HAZCHEM classification of chemicals, chemistry of fire.</p>	15
Reference Books		
<ol style="list-style-type: none"> 1. Accident prevention manual for industrial operations, national safety council, Chicago, 10th edition. 2. Safety and accident prevention in chemical operation, 2nd edition, Howard H., 3. Handbook of occupational safety and health, Lawrence S. 4. MSDS, your guide to chemical safety 5. Engg design for control of workplace hazards 6. Organic synthesis: the disconnection approach by Stuart Warren (Wiley student edition) 7. Organic spectroscopy by William Kemp ELBS 8. Organic spectroscopy by P.S. Kalsi 9. Spectroscopic methods in organic chemistry, D.H. Williams and Tan Fleming 10. Green Chemistry: Theory & Practice P. T. Anastas and J. C. Warner 11. Green Chemistry: Frontiers in Benign Chemical Synthesis P. T. Anastas and T. C. Williamson 12. Organic Synthesis: Special Techniques V. K. Ahluwalia and Renu Aggarwal Green Chemistry. J. N. Gurtu, and A. Gurtu. 13. Green Chemistry. R. Sanghi, and M. M. Srivastava 14. Spectrometric Identification of Organic Compounds R M Silverstein, F.X. Webster 		

GANPAT UNIVERSITY									
FACULTY OF SCIENCE									
PROGRAMME	M.Sc.				Branch/Spec.	Chemistry			
SEMESTER	III				Version	2.0.0.1			
Effective From Academic Year			2021-22		Effective for the batch Admitted in		July-2020		
Subject Code	MCHE3PRO		Subject Name		Project Work-I				
Teaching Scheme					Examination Scheme (Marks)				
Per Week	Lecture		Practical		Total		CE	SEE	Total
	L	Tu	P	Tw					
Credit	08			0	08	Theory	-	-	-
Hours	08				08	Practical	-	200	200

GANPAT UNIVERSITY									
FACULTY OF SCIENCE									
PROGRAMME		M.Sc.			Branch/Spec.		Chemistry		
SEMESTER		III			Version		2.0.0.1		
Effective From Academic Year			2021-22		Effective for the batch Admitted in			July-2020	
Subject Code		MCHE3PRA		Subject Name		Practical Module-III			
Teaching Scheme					Examination Scheme (Marks)				
Per Week	Lecture		Practical		Total		CE	SEE	Total
	L	Tu	P	Tw					
Credit	-	-	06	-	06	Theory	-	-	-
Hours	-	-	12	0	12	Practical	-	200	100
Pre-requisites									
Before performing these practical, students should have basic knowledge of laboratory chemicals, inorganic & organic compounds and their properties, name reactions and rearrangements, working knowledge of computer and synthetic organic chemistry.									
Learning Outcome									
Practical knowledge of multi steps synthesis of organic molecules. <ul style="list-style-type: none"> • Organic synthesis based on medicinal chemistry. • Knowledge of various natural products for extraction and isolation. • Synthesis of organic compounds using green synthetic methods. 									
Theory Syllabus									
Unit	Content								
01	Medicinal Chemistry: Synthesis of drugs and pharmaceutical analysis Aspirin, Paracetamol, Hydantoin, Sulphanilamide, Phenacetine, Benzocain, Salol, Hydroxyl-Coumarin, Dihydropyrimidines, Methyl Salicylate, Benzimidazole, Sulphanilic acid. Estimation of drugs (any three).								
02	Natural products Identification and isolation any three								
03	Synthesis using green chemistry and microwave techniques								
Reference Books									
<ol style="list-style-type: none"> 1. Vogel, A Text Book of Practical Organic Chemistry. 2. Ault, Techniques and Experiments for Organic Chemistry. 3. N. K. Vishnoi, Advanced Practical Organic Chemistry. 4. B. Dey and M.V. Sitaraman, Laboratory Manual of Organic Chemistry 5. Raj K. Bansal, Laboratory Manual in Organic Chemistry. 6. The organic chemistry of drug synthesis vol I, II and III (1980) ed by D. lednicer and L.A. mitscher (Johyn wiley and sons, New york) 7. Quantitative analysis by Arther I.Vogel 8. Quantitative analysis by V.K.Ahluwalia 9. Quantitative analysis by Mann and sanders 10. Principles of Medicinal Chemistry, Vol. I & II (5/e), by S. S. Kadam, K. R. Mahadik, K. G. Bothra (Nirali Prakashan). 11. Practical Pharmaceutical Chemistry by A. H. Bakett, Volume I & II. 12. comprehensive Practical Organic Chemistry Qualitative Analysis by Ahluwalia & Aggarwal. 									

GANPAT UNIVERSITY									
FACULTY OF SCIENCE									
Programme		Master of Science				Branch/Spec.		Chemistry	
Semester		III				Version		2.0.0.0	
Effective From Academic Year			2021-22			Effective for the batch Admitted in			July-2020
Subject code		MOPE3SSD		Subject Name		Soft Skills and Development			
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	02	00	00	00	02	Theory	40	60	100
Hours	02	00	00	00	02	Practical	00	00	00
Pre-requisites:									
Considerable (Intermediate level) ability to use skills like Listening, Reading, Speaking and Writing									
Learning Outcome:									
This course aims at developing soft skills as well as written and oral Professional Communication skills to enhance the ability to act with confidence, develop the overall personality of the student and its application in the professional world.									
Theory syllabus									
Unit	Content								Hrs
1	Technical Writing skills Drafting of Job Application, Resume preparation, Different types of resume, Guidelines for Writing an Impressive Resume, and recommendation letter, Scientific / Technical writing skills; Proposal writing, Report writing, Bibliography writing, Research paper writing: format and rules								07
2	Interpersonal Skills Interviewing: How to face an Interview Board, Proper Body Posture, Group Discussion, Debating Importance of Gestures and Steps to Succeed in Interviews, Self-introduction – highlighting positive and negative traits and Face to Face Communication Leadership: Team building, Strategic Planning, Mentoring, Decision making Delivery of Public Speech, self-confidence and professionalism.								08
3	Communication Skills: Verbal and Nonverbal communication, Public Speaking, Listening, Presentation skill: Planning for effective presentation, Discuss 6 great helpers of effective presentation, How to Make Presentation, Presentation Tools, Boredom Factors in Presentation and How to Overcome them.								08
4	Professional Skills Etiquettes and Manners, Ethics, Telephonic Etiquettes, Expressing thanks and appreciation, greetings, conversation, Time management, SWOT Analysis.								07
Reference Books									

1. Technical Communication - Raman, Meenakshi & Sharma Sangeeta, 2006, OUP, New Delhi
2. Robinson, David; Business Etiquette, Kogan Page.
3. Kaul, Asha; Business Communication, 1998, Prentice-Hall of India Ltd, New Delhi
4. Improve Your Communication Skills - Barker, Alan, 2007, Kagan Page (I) Pvt. Ltd.
5. The Handbook of interviewing - Taylor, Poul J & O'Driscoll Michael P.,2001, Infinity Books.
6. Business Communication - Lesikar, Raymond V & Pettit John D, 1999, AIIBS Publishers, New Delhi.