School of Allied Health Sciences

MSc (Clinical Research)

Program Code: SAH0101

Batch 2021-23

Vision of the University

To serve the society by being a global University of higher learning in pursuit of academic excellence, innovation and nurturing entrepreneurship.

Mission of the University

1. Transformative educational experience
2. Enrichment by educational initiatives that encourage global outlook
3. Develop research, support disruptive innovations and accelerate entrepreneurship
4. Seeking beyond boundaries

Core Values

- Integrity
- Leadership
- Diversity
- Community

Vision of the School

To produce skilled man power in different areas of biomedical science for better healthcare delivery.

Mission of the School

- To strengthen the main line medical and health services.
- To become effective assisting and support system to medical and health personnel.

Core Values

- Skilled professional
- Multidimensional
- Compassion
- Management

3 Programme Educational Objectives (PEO)

PEO1: To understand and analyze the impact of clinical research in a global, economic, environmental and societal context.
PEO2: To understand the regulatory perspectives and processes, standards and practices of ICH-GCP in conduct of ethical clinical trials.
PEO3: Forecast the resources necessary for developing and managingclinical research grants and trials as required and regulated by global regulatoryagencies.
PEO4: Demonstrate advanced critical thinking skills necessary to enhance employment opportunitiesor advancement within the clinical research industry.
PEO5: Effectively communicate and collaborate with health care providers and regulatory agencies to develop culturally diverse domestic and global strategies for biopharmaceutical product approvals.

1.3.2 Map PEOs with Mission Statements:

PEO Statements	School Mission 1	School Mission 2
PEO1:	**3**	**3**
PEO2:	**3**	**3**
PEO3:	**3**	**3**
PEO4:	**3**	**3**
PEO5:	**3**	**3**

1.3.3 Program Outcomes (PO's)

On successful completion of the program, post graduate attributes will be:

PO1: Clinical research and basic medical knowledge: Apply knowledge of basic medical sciences and clinical research to be a successful member of the research team or a individual.

PO2: Design/development of trials:design and implement a clinical (patient-oriented) research study including selection of study methods, measures of the intervention and outcomes, data collection, management and analysis.

PO3: Modern tool usage: Create, select and apply appropriate techniques, resources and modern tools in clinical data management with an understanding of the limitations.

PO4: Ethics: Understand professional and ethical responsibilities in clinical research practice by following standards, norms and practices of ethical and regulatory bodies.

PO5: Communication: Understand the regulatory perspectives, norms and processes and communicate effectively with them for seeking permissions/approvals; being able to comprehend, write and present effectively trial reports and documentation

PO6: Individual and teamwork: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO7: Lifelong learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in broadest context of technological change.

1.3.4 Mapping of Program Outcome Vs Program Educational Objectives

	PEO1	PEO2	PEO3	PEO4	PEO5
PO1	2	3	3	2	2
PO2	3	2	3	3	2
PO3	1	1	2	3	3
PO4	1	3	1	1	3
PO5	2	3	3	2	3
PO6	1	2	3	2	3
PO7	3	2	1	2	3

1. Slight (Low) **2. Moderate (Medium)** **3. Substantial (High)**

1.3.5 Program Outcome Vs Courses Mapping Table[1]:

Program Outcome Courses	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7
Sem-1		3	2	1	1	1	2	2
MCR 103	Human Anatomy and Physiology	3	2	1	1	1	2	2
MCR 104	Microbiology and Pathology	3	2	1	1	1	2	2
MCR 105	General and Clinical Biochemistry	3	2	1	1	1	2	2
MCR 106	General Pharmacology	3	2	1	1	1	2	2
MCR 107	Introduction to Clinical Research	3	3	3	2	2	2	3
MCR 108	Human Anatomy and Physiology (Lab)	3	2	1	1	1	2	2
MCR 109	Microbiology and Pathology (Lab)	3	2	1	1	1	2	2
MCR 110	General and Clinical Biochemistry (Lab)	3	2	1	1	1	2	2
MCR 111	General Pharmacology (Lab)	3	2	1	1	1	2	2
Sem-2								
MCR 112	Systemic Pharmacology	3	2	1	1	2	2	2
MCR 113	Clinical trial process and good clinical practices	3	2	2	3	2	2	2
MCR 114	Introduction to Management	2	2	3	2	3	3	3
MCR 115	Medical terminologies and conditions	3	2	2	1	2	2	3
MCR 116	Epidemiology and biostatistics	3	3	3	2	3	2	3
MCR 117	Systemic Pharmacology (Lab)							
Sem-3								
MCR203	Clinical Trials Management	3	3	3	3	3	3	3
MCR 204	Regulations in Clinical research	3	3	3	3	3	3	3
MCR205	Documentation and Data Management in Clinical research	3	3	3	3	3	3	3
MCR 206	Pharmacovigilance and Pharmacoeconomics	3	3	2	2	3	2	2
MCR 207	Psychology and patient counselling	2	1	2	2	3	3	3
Sem-4								
MCR 211	Research Methodology	3	3	3	3	3	3	3
MCR 212	Recent Advances in Clinical Research	3	3	3	1	2	2	3

[1]Cel value will contain the correlation value of respective course with PO.

Program Structure Template
School of Allied Health Sciences
M.Sc. Clinical Research
Batch: 2021-2023
Session: 2021-2022
TERM: I semester I

S. No.	Paper ID	Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite	Type of Course[2]: 1. CC 2. AECC 3. SEC 4. DSE
				L	T	P			
THEORY SUBJECTS									
1		MCR 103	HUMAN ANATOMY AND PHYSIOLOGY	3	1	--	4	Core	CC
1.		MCR 104	MICROBIOLOGY AND PATHOLOGY	3	1	--	4	Core	CC
2.		MCR 105	GENERAL AND CLINICAL BIOCHEMISTRY	3	1	--	4	Core	CC
3.		MCR 106	GENERAL PHARMACOLOGY	3	1	--	4	Core	CC
4.		MCR 107	INTRODUCTION TO CLINICAL RESEARCH	3	1	--	4	Core	CC
Practical/Viva-Voce/Jury									
5.		MCR 108	HUMAN ANATOMY AND PHYSIOLOGY(LAB)	--	--	4	2	Core	CC
6.		MCR 109	MICROBIOLOGY AND PATHOLOGY(LAB)			4	2	Core	CC
7.		MCR 110	GENERAL AND CLINICAL BIOCHEMISTRY(LAB)			2	1	Core	CC
8.		MCR 111	GENERAL PHARMACOLOGY(LAB)			2	1	Core	CC
TOTAL CREDITS							**26**		

[2] CC: Core Course, AECC: Ability Enhancement Compulsory Courses, SEC: Skill Enhancement Courses, DSE: Discipline Specific Courses

Program Structure Template
School of Allied Health Sciences
M.Sc. Clinical Research
Batch: 2021-2023
Session: 2021-2022
TERM: II, Semester II

S. No.	Paper ID	Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite	Type of Course[3]: 5. CC 6. AECC 7. SEC 8. DSE
				L	T	P			
THEORY SUBJECTS									
1		MCR 112	SYSTEMIC PHARMACOLOGY	3	1	--	4	Core	CC
2		MCR 113	CLINICAL TRIAL PROCESS AND GOOD CLINICAL PRACTICES	3	1	--	4	Core	CC
3		MCR 114	INTRODUCTION TO MANAGEMENT	3	1	--	4	Core	CC
4		MCR 115	MEDICAL TERMINOLOGIES AND CONDITIONS	3	1	--	4	Core	CC
5		MCR 116	EPIDEMIOLOGY AND BIOSTATISTICS	3	1	--	4	Core	CC
6		OPE	Open Elective	2			2		
Practical/Viva-Voce/Jury									
6		MCR 117	SYSTEMIC PHARMACOLOGY (LAB)	--	--	2	1	Core	CC
7			COMMUNITY POSTING AND APPLICATION OF BIOSTATISTICS (NON-EXAM)			4	2	Co Requisite	AECC
8			CLINICAL TRIAL PROCESS AND GOOD CLINICAL PRACTICES (NON-EXAM)			4	2	Co Requisite	AECC
TOTAL CREDITS							**27**	Elective	SEC, AECC

[3] CC: Core Course, AECC: Ability Enhancement Compulsory Courses, SEC: Skill Enhancement Courses, DSE: Discipline Specific Courses

Program Structure Template
School of Allied Health Sciences
M.Sc. Clinical Research
Batch: 2021-2023
Session: 2022-2023
TERM: III, Semester III

S. No.	Paper ID	Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite	Type of Course[4]: 9. CC 10. AECC 11. SEC 12. DSE
				L	T	P			
THEORY SUBJECTS									
1		MCR 203	CLINICAL TRIAL MANAGEMENT	2	2	--	4	Core	CC
2		MCR 204	REGULATIONS IN CLINICAL RESEARCH	2	2	--	4	Core	CC
3		MCR 205	DOCUMENTATION AND DATA MANAGEMENT IN CLINICAL RESEARCH	2	2	--	4	Core	CC
4		MCR 206	PHARMACOVIGILANCE AND PHARMACOECONOMICS	2	2	--	4	Core	CC
5		MCR 207	PSYCHOLOGY AND PATIENT COUNSELLING	3	1	--	4	Core	CC
Practical/Viva-Voce/Jury									
6		MCR 208	ENGLISH AND COMMUNICATION SKILLS (NON-EXAM)	2	--	2	3	Co Requisite	SEC
7		MCR 209	DOCUMENTATION IN CLINICAL RESEARCH (NON-EXAM)			4	2	Co Requisite	AECC
8		MCR 210	PSYCHOLOGY AND PATIENT COUNSELLING (NON-EXAM)			2	1	Co Requisite	AECC
TOTAL CREDITS							**26**		

[4] CC: Core Course, AECC: Ability Enhancement Compulsory Courses, SEC: Skill Enhancement Courses, DSE: Discipline Specific Courses

Program Structure Template
School of Allied Health Sciences
M.Sc. Clinical Research
Batch: 2021-2023
Session: 2022-2023
TERM: IV, Semester IV

S. No.	Paper ID	Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite	Type of Course[5]: 13. CC 14. AECC 15. SEC 16. DSE
				L	T	P			
THEORY SUBJECTS									
1		MCR 211	RESEARCH METHODOLOGY	1	1	--	2	Core	CC
2		MCR 212	RECENT ADVANCES IN CLINICAL RESEARCH	1	1	--	2	Core	CC
3		OPE	Open Elective	2			2	Elective	AECC, SEC
Practical/Viva-Voce/Jury									
4		MCR 213	PERSONALITY DEVELOPMENT AND LEADERSHIP (NON-EXAM)	1	1	--	2	Co Requisite	SEC
5		MCR 214	TRAINING			24	12	Core	CC
6		MCR 215	DISSERTATION			20	10	Core	CC
TOTAL CREDITS							**30**		

SHARDA UNIVERSITY

[5] CC: Core Course, AECC: Ability Enhancement Compulsory Courses, SEC: Skill Enhancement Courses, DSE: Discipline Specific Courses

SCHOOL OF ALLIED HEALTH SCIENCES

UNIVERSITY EXAMINATION EVALUATION SCHEME

Program: MSc. Clinical Research Year.: I semester I Session: 2021-2022

S.No.	Paper ID	Subject Code	Subject Name	Evaluation Scheme (Distribution of Marks)					Total Marks
				Theory			Practical		
				Internal Assessment (CA)	MTE	University Examination (ETE)	Internal Assessment CA	University Examination	
1.		MCR103	Human anatomy and physiology	30	20	50	-	-	100
2		MCR104	Microbiology and pathology	30	20	50	-	-	100
3		MCR 105	General and clinical biochemistry	30	20	50	-	-	100
4		MCR 106	General pharmacology	30	20	50	-	-	100
5		MCR 107	Introduction to Clinical Research	30	20	50	-	-	100
6		MCR 108	Human anatomy and physiology (Lab)	-	-	-	60	40	100
7		MCR 109	Micobiology and pathology (Lab)	-	-	-	60	40	100
8		MCR 110	General and clinical Biochemistry (Lab)	-	-	-	60	40	100
9		MCR 111	General Pharmacology (Lab)				60	40	100
					GRAND TOTAL				

SHARDA UNIVERSITY

SCHOOL OF ALLIED HEALTH SCIENCES

UNIVERSITY EXAMINATION EVALUATION SCHEME

Program: MSc. Clinical Research Year.: I semester II Session: 2021-2022

S.No.	Paper ID	Subject Code	Subject Name	Evaluation Scheme (Distribution of Marks)					Total Marks
				Theory			Practical		
				Internal Assessment (CA)	MTE	University Examination (ETE)	Internal Assessment CA	University Examination	
1.		MCR112	Systemic Pharmacology	30	20	50	-	-	100
2		MCR113	Clinical trial process and GCP	30	20	50	-	-	100
3		MCR 114	Introduction to management	30	20	50	-	-	100
4		MCR 115	Medical terminology	30	20	50	-	-	100
5		MCR 116	Epidemiology, biostatistics	30	20	50	-	-	100
6		MCR 117	Systemic Pharmacology (Lab)	-	-	-	60	40	100
7			Open elective	-	-	-	-	-	-
8									
9									
					GRAND TOTAL				

Sharda University

SCHOOL OF ALLIED HEALTH SCIENCES

UNIVERSITY EXAMINATION EVALUATION SCHEME

Program: MSc. Clinical Research Year.: I semester III Session: 2022-2023

S.No.	Paper ID	Subject Code	Subject Name	Evaluation Scheme (Distribution of Marks)					
				Theory			Practical		T
				Internal Assessment (CA)	MTE	University Examination (ETE)	Internal Assessment CA	University Examination	
1.		MCR203	Clinical Trial Management	30	20	50	-	-	
2		MCR204	Regulations in clinical Research	30	20	50	-	-	
3		MCR 205	Clinical Data Management	30	20	50	-	-	
4		MCR 206	Pharamcovigilance , Pharmacoeconomicds	30	20	50	-	-	
5		MCR 207	Psychology and patient counseling	30	20	50	-	-	
6		MCR 208	English communication	-	-	-	60	40	
7		MCR 209	Clinical data Management Practice	-	-	-	60 -	40 -	
8		MCR 210	Psychology ,patient counseling				60	40	
9									
					GRAND TOTAL				

SCHOOL OF ALLIED HEALTH SCIENCES

UNIVERSITY EXAMINATION
Evaluation

Program: MSc. Clinical Research Year.: I semester IV Session: 2022-2023

S.No.	Paper ID	Subject Code	Subject Name	Evaluation Scheme (Distribution of Marks)					T
				Theory			Practical		
				Internal Assessment (CA)	MTE	University Examination (ETE)	Internal Assessment CA	University Examination	
1.		MCR211	Research Methodology	30	20	50	-	-	
2		MCR212	Recent advances in Clinical Trial	30	20	50	-	-	
3		MCR 213	Internship				-50	-150	
4		MCR 214	Dissertation				-50	-150	
5		OPE	Open Elective	-	-	-	-	-	
6									
7									
					GRAND TOTAL				

Course Templates

Syllabus for Theory and Practical Subjects

School: SAHS		**Batch : 2021-23**	
Program: M.SC		**Current Academic Year: 2021-2022**	
Branch:		**Semester: I**	
1	Course Code	MCR 103	
2	Course Title	Human Anatomy and Physiology	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Type	Compulsory	
5	Course Objective	1.To understand the normal structure and functioning of various organ systems of the body and their interactions 2.to be able to comprehend the pathophysiology of commonly occurring diseases	
6	Course Outcomes	By the end of the course, student will be able to: CO1: Understand the current state of knowledge about the functional organization of the human body. CO2: Describe insight of normal functioning of all the organ systems of the body and their interactions. CO3: State the pathophysiology of commonly occurring diseases. CO4: Identify physiology with various disorders and their pathogenesis. CO5: To understand the defence mechanism of human body	
7	Course Description	The course is designed to give the students ain-depth knowledge of fundamental functions of different systems of human body. The major topics to be covered include the following: the cell, muscle& nervous tissue; blood; lymphoid tissues; respiratory system; blood vessels; circulation; heart; gastro intestinal tract; endocrine & Reproductive system, excretory system, central nervous system and special senses	
8	Outline syllabus		CO Mapping
	Unit 1	**GENERAL AND NERVE MUSCLE PHYSIOLOGY**	
	A	Components of cell, functions of cell organelles, transport across cell membrane, homeostasis& membrane potential.	CO1, CO2
	B	Structure , functions of nerve tissues.	CO1, CO2
	C	neuromuscular junction, Difference between skeletal muscle, smooth muscle & cardiac muscle.	CO1, CO2

	Unit 2	**BLOOD AND CVS**			
	A	composition; functions of blood, plasma proteins & haemoglobin, Erythrocytes, leucocytes & platelets, blood coagulation, blood groups & immunity			CO1, CO2, CO5
	B	physiological anatomy of the heart & blood vessels, cardiac cycle.			CO1, CO3
	C	Heart sounds & ECG graph , Heart Rate, Cardiac Output, Blood Pressure & Pulse.			CO1, CO2, CO5
	Unit 3	**THE RESPIRATORY SYSTEM**			
	A	physiological anatomy & functions of respiratory system.			CO1, CO3
	B	Transport of Gases.			CO1, CO3
	C	Regulation of respiration & Hypoxia.			CO1, CO3
	Unit 4	**DIGESTIVE SYSTEM AND EXCRETORY SYSTEM**			
	A	physiological anatomy and functions of GIT,Composition and functions of different dijestive juices , Digestion and Absorption in GIT.			CO1, CO2
	B	Physiological anatomy of kidney, structure and functions of excretory system, structure of nephron.			CO1, CO3
	C	Physiology of micturition and Regulation of Body Temperature in Humans.			CO1, CO3, CO4
	Unit 5	**ENDOCRINE AND REPRODUCTIVE SYSTEM**			
	A	General principles of endocrinology, Different endocrine glands and their functions			CO1, CO3, CO4
	B	Puberty, Spermatogenesis & semen.			CO1, CO3, CO4
	C	menstruation, ovulation and contraception.			CO1, CO3, CO4
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	Text book of physiology- A.K. Jain Essentials of medical physiology- K.Sembulingam			
	Other References				

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
MCR 103.1	3	2	2	1	1	2	3
MCR 103.2	3	2	2	1	1	2	3
MCR 103.3	3	3	1	1	2	2	3

MCR 103.4	3	3	1	1	2	2	3
MCR 103.5	3	3	1	1	2	2	3

School: SAHS		**Batch : 2021-23**	
Program: M.SC		**Current Academic Year: 2021-2022**	
Branch:		**Semester: I**	
1	Course Code	MCR 104	
2	Course Title	Microbiology and Pathology	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Type	Compulsory	
5	Course Objective	1.To equip with the basic knowledge and concepts about microbiology that would develop a better understanding and management of the microbes causing infections and various other ailments. 2. To equip with the basic knowledge and concepts about microbiology that would develop a better understanding of the pathology of various diseased conditions.	
6	Course Outcomes	By the end of the course, student will be able to: CO1:define, list and recognise the extremely small forms of life. CO2: perform, demonstrate, implement and apply the concept of microbiology in better understanding of the human infections CO3: define, list and recognise the essential nature of disease. CO4: perform, demonstrate, implement and apply the concept of pathological changes in human body in various diseased conditions CO5: perform, demonstrate, implement and apply the concept of various changes in human body in various diseased conditions	
7	Course Description	The course is designed to give the students basic knowledge and concepts of microbes, pathogens, their relation and impact on various body functions and management by developing the basic understanding of the pathophysiology of various ailments.	
8	Outline syllabus		CO Mapping
	Unit 1	**Introduction**	
	A	Introduction, classification of microorganisms	CO1
	B	basic concepts- normal flora, probiotics, colonization	CO1
	C	Infection and sterilization	CO1
	Unit 2	**Bacteriology and Virology**	
	A	Introduction, classification, general features	CO1, CO2

	B	pathogenicity, diagnosis			CO1, CO2, CO3
	C	treatment and prevention of common infections			CO1, CO2, CO3
	Unit 3	**Mycology and parasitology**			
	A	Introduction, classification, general features			CO1, CO2
	B	pathogenicity, diagnosis			CO1, CO2, CO3
	C	treatment and prevention of common infections			CO1, CO2, CO3
	Unit 4	**Inflammation and Healing**			
	A	Cell and Tissue response to injury,hypertrophy, hyperplasia, necrosis, apoptosis			CO3, CO4
	B	Inflammation and Healing			CO3, CO4
	C	Immunity			CO3, CO4
	Unit 5	**Clinical pathology**			
	A	Hypersensitivity reactions			CO3, CO4
	B	Introduction to histopathology and Clinical pathology			CO3, CO4
	C	Examination of body fluids and secretions			CO3, CO4
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	BURTON G.R.W: Microbiology for the Health Sciences CORTON KUMAR AND ROBINS: Pathological Basis of the Disease			
	Other References				

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
MCR 104.1	3	2	2	1	1	2	3
MCR 104.2	3	2	2	1	1	2	3
MCR 104.3	3	3	1	1	2	2	3
MCR 104.4	3	3	1	1	2	2	3
MCR 104.5	3	3	1	1	2	2	3

School: SAHS		**Batch : 2021-23**	
Program: M.SC		**Current Academic Year: 2021-2022**	
Branch: Clinical research		**Semester: 1**	
1	Course Code	**MCR 105**	

2	Course Title	**GENERAL** AND CLINICAL BIOCHEMISTRY	
3	Credits	**4**	
4	Contact Hours (L-T-P)	**3-1-0**	
	Course Status	Compulsory	
5	Course Objective	1. To train the students in the management of medical laboratory along with handling a variety of laboratory chemicals and instruments including electronic and advanced equipment used in modern medical laboratories. 2. To make the students able to do routine laboratory testing under stipulated conditions. 3. To prepare specimens and operate machines that automatically analyse samples. 4. To provide the conceptual basis for understanding biochemical and particularly address the fundamental mechanisms of the biomolecules to facilitate the life. 5. To develop diagnostic skills in clinical biochemistry and to provide an advanced understanding of the core principles and topics of Biochemistry and their experimental basis.	
6	Course Outcomes	CO1: To understand the importance of acid, base, Buffers and nurition CO2: To understand the importance of chemistry of carbohydrates and proteins CO3: To understand the importance of chemistry of lipids and fatty acid CO4: To understand the clinical importance of enzymes and energy metabolism CO5: To understand the importance of organ function test and DNA based diagnostics	
7	Course Description	• Acid, Base and Indicators • Nutrition • Carbohydrate and Protein Chemistry • Lipid Chemistry and Fatty acids • Enzyme and Energy metabolism • Clinical Chemistry	
8	Outline syllabus **Theory**		
	Unit 1	**Acid, Base, Indicators and Nutrition**	
		A. Acid- base indicators: Definition, concept, mechanism of action.	CO1

		B. Importance of nutrition: Calorific values, Respiratory quotient, Energy requirement of a person - Basal metabolic rate, Balanced diet, Recommended dietary allowances C. Role of carbohydrates, lipids and proteins in diet.	CO1 CO1
	Unit 2	**Carbohydrate and Protein Chemistry**	
		A. Definition, general classification with examples of Carbohydrate and Lipid. B. Glycosidic bond, Structures, composition, sources, properties and functions of Monosaccharides, Disaccharides, Oligosaccharides and Polysaccharides. C. Peptide bond, Biologically important peptides, isoelectric pH, properties of amino acid and structural organisation of protein.	CO2 CO2 CO2
	Unit 3	**Lipid Chemistryand Fatty acids**	
		A. Definition, classification, properties and functions of lipids. B. Triacylglycerol and Phospholipids. C. Cholesterol and Essential fatty acids and their importance, Lipoproteins	CO3 CO3 CO3
	Unit 4	**Enzymes and Energy metabolism**	
		A. Enzyme kinetics B. Electron transport chain C. Oxidative phosphorylation and Uncouplers.	CO4 CO4 CO4
	Unit 5	**Clinical Biochemistry**	
		D. Kidney function tests E. Liver function tests F. Cardiac markers, ELISA, PCR, DNA based diagnostics	CO5 CO5 CO5

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
MCR 105.1	3	2	2	1	1	2	3
MCR 105.2	3	2	2	1	1	2	3
MCR 105.3	3	3	1	1	2	2	3
MCR 105.4	3	3	1	1	2	2	3

MCR 105.5	3	3	1	1	2	2	3

School: SAHS		**Batch : 2021-2023**	
Program: M.Sc		**Current Academic Year: 2021-2022**	
Branch:ClinicalReaserch		**Semester: I**	
1	Course Code	MCR 106	
2	Course Title	Basic Pharmacology	
3	Credits	4	
4	Contact Hours (L)	3-1-0	
	Course Type	Compulsory	
5	Course Objective	To equip with the basics knowledge about drugs,their types, mode of action, effect etc which would lay the foundation for their courses in the next semester.	
6	Course Outcomes	**CO1: Knowledge:** defining, listing and recognising the drugs. **CO:2Comprehension:** understanding, characterising, explaining, identifying and locating the various drugs that are useful in treatment and management of diseases. **CO3: Application:** performing, demonstrating, implementing and applying the concept of basic pharmacology which help in appropriate diagnosis and treatment of systematic diseases. **CO4: Analysis:** analysing, categorising, comparing and differentiating type of drugs.	
7	Course Description	This course is designed to develop an understanding of the theoretical concepts surrounding pharmacology, such as the pharmacokinetics and pharmacodynamics of drugs, and the concepts surrounding pharmacotherapy.	
8	Outline syllabus		CO Mapping
	Unit 1	**General Pharmacology**	
	A	Drugs- nature, Sources.	CO1, CO2
	B	Doses Forms	CO3, CO4
	C	Routes of drug Administration.	CO1, CO2
	Unit 2	**Action of Specific Agents**	
	A	Mechanisms or drug action	CO2, CO4
	B	Dose–response relationship	CO1, CO3
	C	Pharmacokinetics of drug absorption, distribution, biotransformation, excretion and toxicity, Factors influencing drug metabolism of drug action	CO1, CO3
	Unit 3	**Pharmacology**	
	A	Drug action and effectiveness	CO2, CO4
	B	Drug safety; Factors influencing the objectively	CO1, CO3

		demonstrated response.			
	C	Pharmacodynamic			CO1, CO2
	Unit 4	**Drug Discovery Process**			
	A	Bioavailability and Bioequivalence			CO2
	B	Drug Development			CO4
	C	**Discovery of New Drugs**			CO1, CO3
	Unit 5	**Pre-clinical Evolution and toxicity studies**			
	A	Introduction to clinical trial			CO1, CO3
	B	Phase 1			CO2
	C	Phase 2 clinical Trials			CO4
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Textbook/s*	K D TRIPATHI: Essentials of Medical Pharmacology. 5th edition, Jaypee, New Delhi, 2004 Ashok Garg: Manual of Ocular Therapeutics, Jaypee, NewDelhi, 1996 Essentials of Medical Pharmacology by Tripathi			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
MCR 106.1	3	2	2	1	1	2	3
MCR 106.2	3	2	2	1	1	2	3
MCR 106.3	3	3	1	1	2	2	3
MCR 106.4	3	3	1	1	2	2	3
MCR 106.5	3	3	1	1	2	2	3

School: SAHS		**Batch : 2021-2023**
Program: M.Sc		**Current Academic Year: 2021-2022**
Branch:		**Semester: I**
1	Course Code	MCR 107
2	Course Title	Introduction to clinical research
3	Credits	4
4	Contact Hours (L-T-P)	3-1-0
	Course Type	Compulsory
5	Course Objective	1.To have an overview of the various processes involved in the clinical development of a new drug

		2.To understand some frequently used terms in clinical research 3. To understand and appreciate the roles and responsibilities of various stakeholders in clinical research 4. To understand the key concepts in evolution and responsible conduct of clinical research	
6	Course Outcomes	On successful completion of this course, student will be able to: CO1:Develop an understanding of basic structure, prospects and evolution of the clinical research industry CO2:Demonstrate knowledge about basic terminologies, standard definitions, terms and vocabulary used in clinical research field. CO3:Develop an understanding of basic infrastructure, working, effectiveness, requirements and importance of CROs and SMOs. CO4:Demonstrate concepts and knowledge about clinical evolution of drug through various phases and role of various stakeholders. CO5:Understand, identify fraud and misconduct in clinical research and adopt ethical practices.	
7	Course Description	The course provides an introductory overview about clinical research, its evolution, history, phases, key role players and focuses on the main areas of why and how ethical and responsible clinical research is carried out.	
8	Outline syllabus		CO Mapping
	Unit 1	**Introduction, history, definitions and terminologies in Clinical research**	
	A	Introduction	CO1
	B	History	CO1
	C	Definitions and terminologies	CO2
	Unit 2	**CROs and SMOs**	
	A	Introduction and working	CO3
	B	Types	CO3
	C	Responsibilities and limitations	CO3
	Unit 3	**Phases of Clinical trials**	
	A	Phase 0 and 1	CO4
	B	Phase 2	CO4
	C	Phase 3 and 4	CO4
	Unit 4	**Stakeholders in Clinical research**	
	A	Sponsor and Investigator	CO3, CO4
	B	Ethics review bodies	CO4
	C	CRC and CRA	CO4
	Unit 5	**Fraud and Misconduct**	

	A	Introduction and definitions, identification			CO5
	B	Importance of ethical and responsible trials			CO5
	C	Legal implications and management			CO5
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	Basic Principles of Clinical Research			
	Other References				

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
MCR 107.1	3	2	3	2	3	2	2
MCR 107.2	3	2	3	2	2	2	2
MCR 107.3	3	2	3	2	3	3	2
MCR 107.4	3	2	2	2	3	3	2
MCR 107.5	3	2	2	3	2	2	3

Syllabus for Practical Subjects

School: SAHS		**Batch : 2021-2023**
Program: M.Sc		**Current Academic Year: 2021-2022**
Branch: Clinical research		**Semester: I**
1	Course Code	MCR 108
2	Course Title	Human Anatomy and Physiology
3	Credits	2
4	Contact Hours (L-T-P)	0-0-4
	Course Status	Compulsory
5	Course Objective	To understand the normal structure and functioning of various organ systems of the body and their interactions and to be able to comprehend the pathophysiology of commonly occurring diseases
6	Course Outcomes	On successful completion of this course, student will be able to: CO1:Demonstrate knowledge about the microscope and its use, and estimation of haemoglobin. CO2:Perform TLC and RBC count.

		CO3:Perform DLC count. CO4:Perform BT,CT and BG tests. CO5: Use device and record BP			
7	Course Description	The course in Physiology and Anatomy cover the first year is designed to give the students a depth knowledge of fundamental functions of different systems of human body. The major topics to be covered include the following: the cell, muscle& nervous tissue; blood; lymphoid tissues; respiratory system; blood vessels; circulation; heart; gastro intestinal tract; endocrine & Reproductive system, excretory system, central nervous system and special senses.			
8	Outline syllabus				CO Mapping
	Unit 1	**Microscope and Haemoglobin Estimation**			
	A	Demonstration and Focussing of Microscope			CO1
	B	Briefing and Demonstration of Hb Estimation			CO1
	C	Practical of Hb Estimation			CO1
	Unit 2	**TLC and RBC Count**			
	A	Briefing			CO1, CO2
	B	Demonstration			CO1, CO2
	C	Practical			CO1, CO2
	Unit 3	**DLC**			
	A	Briefing			CO1, CO3
	B	Demonstration			CO1, CO3
	C	Practical			CO1, CO3
	Unit 4	**BT, CT and BG**			
	A	Briefing			CO4
	B	Demonstration			CO4
	C	Practical			CO4
	Unit 5	**Blood Pressure recording**			
	A	Briefing			CO5
	B	Demonstration			CO5
	C	Practical			CO5
	Mode of examination	Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
MCR 108.1	3	2	2	1	1	2	3
MCR 108.2	3	2	2	1	1	2	3
MCR 108.3	3	3	1	1	2	2	3

MCR 108.4	3	3	1	1	2	2	3
MCR 108.5	3	3	1	1	2	2	3

School: SAHS		**Batch : 2021-2023**	
Program: M.Sc		**Current Academic Year: 2021-2022**	
Branch: Clinical research		**Semester: I**	
1	Course Code	MCR 110	
2	Course Title	General and Clinical Biochemistry	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Objective	1. To train the students in the management of medical laboratory along with handling a variety of laboratory chemicals and instruments including electronic and advanced equipment used in modern medical laboratories. 2. To make the students able to do routine laboratory testing under stipulated conditions. 3. To prepare specimens and operate machines that automatically analyse samples. 4. To provide the conceptual basis for understanding biochemical and particularly address the fundamental mechanisms of the biomolecules to facilitate the life. 5. To develop diagnostic skills in clinical biochemistry and to provide an advanced understanding of the core principles and topics of Biochemistry and their experimental basis.	
6	Course Outcomes	CO1: To understand the importance and use of different types of glasswares CO2: To understand the importanceof safety measures and use of different types of equipments CO3: To understand the importance of acid, base and pH CO4: To understand the importance of qualitative analysis of carbohydrate, lipid and protein CO5: To understand the importance of colorimetry	
7	Course Description	• Introduction of Glasswares • Introduction of Laboratory Equipments • Safety of measurements in Laboratory, • Preparation of Solutions • Determination of strength of acids and bases	
8	Outline syllabus		CO Mapping
	Unit 1	**Introduction of Glasswares**	
		a. Introduction to Laboratory apparatus b. Introduction to Laboratory glasswares c. Maintenance of Laboratory apparatus	CO1 CO1 CO1

		andglasswares			
	Unit 2	**Introduction of Laboratory Equipments and safety measures**			
		a. Safety measurements in Biochemistry lab b. General laboratory protocols c. Awareness in a lab			CO2 CO2 CO2
	Unit 3	**Acid, Base and pH and Preparation of Solutions**			
		a. Preparation of acids of different concentration b. Preparation of bases of different concentration c. Demonstration of pH meter			CO3 CO3 CO3
	Unit 4	**Qualitative analysis**			
		a. Qualitative analysis of Carbohydrates b. Qualitative analysis of Proteins c. Hydrolysis of Sucrose			CO4 CO4 CO4
	Unit 5	**Determination of strength of acids and bases, Calorimetry**			
		a. Determination of the strength of NaOH solution b. Demonstration of Colorimeter c. Lambert Beer law			CO5 CO5 CO5
	Mode of examination	Jury/Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	
	Text book/s*	A text book of Medical Biochemistry by Chatterjee &Shinde Text book of biochemistry for Medical students byVasudevan and Sreekumari Harpers Illustrated Biochemistry by Robert K.M.			
	Other References				

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
MCR 110.1	3	2	2	1	1	2	3
MCR 110.2	3	2	2	1	1	2	3
MCR 110.3	3	3	1	1	2	2	3
MCR 110.4	3	3	1	1	2	2	3
MCR 110.5	3	3	1	1	2	2	3

School: SAHS		**Batch : 2021-2023**	
Program: M.SC		**Current Academic Year: 2021-2022**	
Branch:		**Semester: I**	
1	Course Code	MCR 109	
2	Course Title	Microbiology and Pathology	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Type	Compulsory	
5	Course Objective	1.To equip with the basic knowledge and concepts about microbiology that would develop a better understanding and management of the microbes causing infections and various other ailments. 2. To equip with the basic knowledge and concepts about microbiology that would develop a better understanding of the pathology of various diseased conditions.	
6	Course Outcomes	By the end of the course, student will be able to: CO1:define, list and recognise the extremely small forms of life using microscope. CO2: Identify microorganisms on already prepared slides and prepare new slides. CO3: Identify and prepare culture media through various methods. CO4:Perform physical, chemical and microscopic examination of various samples CO5: Perform section cutting and staining and efficiently do specimen handling	
7	Course Description	The course is designed to give the students basic knowledge and concepts of microbes, pathogens, their relation and impact on various body functions and management by developing the basic understanding of the pathophysiology of various ailments.	
8	Outline syllabus		CO Mapping
	Unit 1	**Basics and Equipments**	
	A	Compound Microscope	CO1
	B	Sterilization of equipments	CO1
	C	Examination of body fluids and secretions	CO1
	Unit 2	**Slides**	
	A	Permanent slides I	CO1, CO2
	B	Permanent slides II	CO1, CO2
	C	Gram positive and negative staining	CO1, CO2
	Unit 3	**culture media**	
	A	culture media	CO3
	B	culture methods	CO3
	C	culture conformation	CO3
	Unit 4	**examination**	

	A	Physical and Chemical examination of urine			CO4
	B	Microscopic examination of urine			CO1, CO4
	C	Examination of body fluids and secretions			CO1, CO4
	Unit 5	**Sections and staining**			
	A	Types of section cutting			CO1, CO5
	B	Specimen handling			CO5
	C	Staining of tissues-H & E staining			CO1, CO5
	Mode of examination	Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	BURTON G.R.W: Microbiology for the Health Sciences CORTON KUMAR AND ROBINS: Pathological Basis of the Disease			
	Other References				

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
MCR 109.1	3	2	2	1	1	2	3
MCR 109.2	3	2	2	1	1	2	3
MCR 109.3	3	3	1	1	2	2	3
MCR 109.4	3	3	1	1	2	2	3
MCR 109.5	3	3	1	1	2	2	3

School: SAHS		**Batch : 2021-2023**
Program: M.sc		**Current Academic Year: 2021-2022**
Branch: Clinical Research		**Semester: I**
1	Course Code	MCR 111
2	Course Title	Basic Pharmacology LAB
3	Credits	1
4	Contact Hours (P)	2
	Course Type	Compulsory
5	Course Objective	To equip with the basics knowledge about drugs,their types, mode of action, effect etc which would lay the foundation for their courses in the next semester.
6	Course Outcomes	CO1: Knowledge: defining, listing and recognising the drugs. CO:2 Comprehension: understanding, characterising, explaining, identifying and locating the various drugs that are useful in treatment

		and management of diseases. CO3: Application: performing, demonstrating, implementing and applying the concept of basic pharmacology which help in appropriate diagnosis and treatment of systematic diseases. CO4: Analysis: analysing, categorising, comparing and differentiating type of drugs.			
7	Course Description	This course is designed to develop an understanding of the theoretical concepts surrounding pharmacology, such as the pharmacokinetics and pharmacodynamics of drugs, and the concepts surroundingpharmacotherapy			
8	Outline syllabus				CO Mapping
	Unit 1	**Practical based on General Pharmacology**			
	A	Mechanisms or drug action			CO1, CO2
	B	Dose–response relationship			CO3, CO4
	C	Pharmacokinetics of drug absorption, distribution, biotransformation, excretion and toxicity, Factors influencing drug metabolism of drug action			CO1, CO2
	Unit 2	**Study of different doses forms.**			
	A	Introduction to Drug Doses			CO2, CO4
	B	Introduction to Routes			CO1, CO3
	C	Calculation of Drug Dose			CO1, CO3
	Unit 3	**Drug Labelling and Package insert**			
	A	Demonstrate to Labelling the bottle			CO2, CO4
	B	Demonstrate Insert drug in the bottle			CO1, CO3
	C	Demonstrate Package of the bottle			CO1, CO2
	Unit 4	**Experimental and Clinical Pharmacology Practical**			
	A	Animal Care, and Sex Determination			CO2
	B	Animal Handling			CO4
	C	**Dose Calculation for Experimental animal**			CO1, CO3
	Unit 5	**Practical based on Preperation of drugs**			
	A	Anti-glaucoma; Sulphonamides			CO1, CO3
	B	Antibiotics; Corticosteroids			CO2
	C	Anaesthetics; Proteolytic enzymes			CO4
	Mode of examination	Practical			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	K D TRIPATHI: Essentials of Medical Pharmacology. 5th edition, Jaypee, New Delhi, 2004 Ashok Garg: Manual of Ocular Therapeutics, Jaypee, NewDelhi, 1996 Essentials of Medical Pharmacology by Tripathi Pharmacology &Pharmacotherapeutics by R. S. Satoskar			

		Essentials of Pharmacotherapeutics by F. S. K. Barar	

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
MCR 111.1	3	2	2	1	1	2	3
MCR 111.2	3	2	2	1	1	2	3
MCR 111.3	3	3	1	1	2	2	3
MCR 111.4	3	3	1	1	2	2	3
MCR 111.5	3	3	1	1	2	2	3

SEMESTER II

School: SAHS		**Batch : 2021-2023**
Program: M.Sc		**Current Academic Year: 2021-2022**
Branch:ClinicalReaserch		**Semester: II**
1	Course Code	MCR 112
2	Course Title	Systemic Pharmacology
3	Credits	4
4	Contact Hours (L)	2-2-0
	Course Type	Compulsory
5	Course Objective	At the end of the course the students will be equipped with the basics knowledge about, Medicine which would lay the foundation for their courses in the next semester.
6	Course Outcomes	**CO1: Knowledge:** defining, listing and recognising the drugs. **CO:2Comprehension:** understanding, characterising, explaining, identifying and locating the various drugs that are useful in treatment and management of diseases. **CO3: Application:** performing, demonstrating, implementing and applying the concept of basic pharmacology which help in appropriate diagnosis and treatment of systematic diseases. **CO4: Analysis:** analysing, categorising, comparing and differentiating type of drugs.
7	Course Description	At the end of the course the students will be equipped with the basics knowledge about certain concepts, which would lay the foundation for their courses in the next semester.
8	Outline syllabus	CO Mapping

	Unit 1	**Drugs affecting blood and cardiovascular system**			
	A	Drugs used in Hypertension			CO1, CO2
	B	Drugs affecting Coagulation			CO3,CO4
	C	Drugs used in Heart Failure			CO1,CO2
	Unit 2	**Drugs Affecting nervous system**			
	A	Introduction to Autonomic Nervous sysyem			CO2,CO4
	B	Cholinergics system and Agent or Adrenergic System and Agents			CO1, CO3
	C	Anti Depressant Drugs			CO1,CO3
	Unit 3	**Drugs affecting Respiratory system and GIT**			
	A	Drugs used in Asthma and COPD			CO2,CO4
	B	Drugs for Peptic Ulcer			CO1,CO3
	C	Drugs for Diarrhoea and Constipations			CO1,CO2
	Unit 4	**Hormones and hormone Antagonist**			
	A	Anti diabetic Agents			CO2
	B	Thyroid and Anti Thyroid Drugs			CO4
	C	**Corticosteroids**			CO1,CO3
	Unit 5	**Antimicrobial and Anti- inflammatory Drugs**			
	A	Introductions to Anti-microbial drugs			CO1,CO3
	B	Anti-Fungal Drugs			CO2
	C	NSAID			CO4
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	K D TRIPATHI: Essentials of Medical Pharmacology. 5th edition, Jaypee, New Delhi, 2004 Ashok Garg: Manual of Ocular Therapeutics, Jaypee, NewDelhi, 1996 Essentials of Medical Pharmacology by Tripathi Pharmacology &Pharmacotherapeutics by R. S. Satoskar Essentials of Pharmacotherapeutics by F. S. K. Barar			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
MCR 112.1	3	2	2	1	1	2	3
MCR 112.2	3	2	2	1	1	2	3
MCR 112.3	3	3	1	1	2	2	3
MCR 112.4	3	3	1	1	2	2	3

MCR 112.5	3	3	1	1	2	2	3

School: SAHS		**Batch : 2021-2023**	
Program: M.sc		**Current Academic Year: 2021-2022**	
Branch: Clinical Research		**Semester: I**	
1	Course Code	MCR 117	
2	Course Title	Systemic Pharmacology LAB	
3	Credits	1	
4	Contact Hours (P)	2	
	Course Type	Compulsory	
5	Course Objective	To equip with the basics knowledge about drugs,their types, mode of action, effect etc which would lay the foundation for their courses in the next semester.	
6	Course Outcomes	CO1: Knowledge: defining, listing and recognising the drugs. CO:2 Comprehension: understanding, characterising, explaining, identifying and locating the various drugs that are useful in treatment and management of diseases. CO3: Application: performing, demonstrating, implementing and applying the concept of basic pharmacology which help in appropriate diagnosis and treatment of systematic diseases. CO4: Analysis: analysing, categorising, comparing and differentiating type of drugs.	
7	Course Description	This course is designed to develop an understanding of the theoretical concepts surrounding pharmacology, such as the pharmacokinetics and pharmacodynamics of drugs, and the concepts surroundingpharmacotherapy	
8	Outline syllabus		CO Mapping
	Unit 1	**Practical based on General Pharmacology**	
	A	Mechanisms or drug action	CO1, CO2
	B	Dose–response relationship	CO3, CO4
	C	Pharmacokinetics of drug absorption, distribution, biotransformation, excretion and toxicity, Factors influencing drug metabolism of drug action	CO1, CO2
	Unit 2	**Study of different doses forms.**	
	A	Introduction to Drug Doses	CO2, CO4
	B	Introduction to Routes	CO1, CO3
	C	Calculation of Drug Dose	CO1, CO3
	Unit 3	**Drug Labelling and Package insert**	
	A	Demonstrate to Labelling the bottle	CO2, CO4
	B	Demonstrate Insert drug in the bottle	CO1, CO3
	C	Demonstrate Package of the botlle	CO1, CO2

	Unit 4	**Experimental and Clinical Pharmacology Practical**			
	A	Animal Care, and Sex Determination			CO2
	B	Animal Handling			CO4
	C	**Dose Calculation for Experimental animal**			CO1, CO3
	Unit 5	**Practical based on Preperation of drugs**			
	A	Anti-glaucoma; Sulphonamides			CO1, CO3
	B	Antibiotics; Corticosteroids			CO2
	C	Anesthetics; Proteolytic enzymes			CO4
	Mode of examination	Practical			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	K D TRIPATHI: Essentials of Medical Pharmacology. 5th edition, Jaypee, New Delhi, 2004 Ashok Garg: Manual of Ocular Therapeutics, Jaypee, NewDelhi, 1996 Essentials of Medical Pharmacology by Tripathi Pharmacology &Pharmacotherapeutics by R. S. Satoskar Essentials of Pharmacotherapeutics by F. S. K. Barar			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
MCR 117.1	3	2	2	1	1	2	3
MCR 117.2	3	2	2	1	1	2	3
MCR 117.3	3	3	1	1	2	2	3
MCR 117.4	3	3	1	1	2	2	3
MCR 117.5	3	3	1	1	2	2	3

School: SAHS		**Batch : 2021-2023**
Program: M.Sc		**Current Academic Year: 2021-2022**
Branch:		**Semester: II**
1	Course Code	MCR 113
2	Course Title	Clinical trial process and good clinical practices
3	Credits	4
4	Contact Hours (L-T-P)	2-2-0
	Course Type	Compulsory

5	Course Objective	1.To provide a comprehensive introduction to the clinical research process, conduct &management of clinical trials. 2.To make student more familiar with roles/jobs as part of the study team. 3.To provide extensive Knowledge & application in different aspects of Clinical research process. 4.To understand the historical development, the principles and content of internationalguidelines for clinical research (Declaration of Helsinki, ICH-GCP) and their influence	
6	Course Outcomes	On successful completion of this course, student will be able to: CO1:Adopt latest technological advancement in clinical practices with professional and ethical uprightness and socio-economic concerns. CO2:Follow and implement GCP and regulatory guidelines during clinical research process. CO3:Construct timelines/guidelines and standard operating procedures for day to day clinical trial activities. CO4:To describe the different phases and working process of clinical drug development CO5:To define the investigator's role and responsibilities in a clinical study, particularly regarding informed consent and safety reporting	
7	Course Description	This course gives insight of the clinical trial process,its conduct and management as per GCP guidelines. Good clinical practice provides a framework of principles which aim to ensure the safety of research participants and the integrity and validity of data. This course aims to provide with the basic principles of GCP and how these principles can be applied practically in the research setting.	
8	Outline syllabus		CO Mapping
	Unit 1	**Regulatory filing applications**	
	A	IND	CO4
	B	NDA	CO4
	C	ANDA, BA/BE	CO4
	Unit 2	**Trial process**	
	A	Site selection and initiation	CO3, CO5
	B	Patient recruitment and retention, informed consent	CO1, CO3
	C	Study close out	CO3
	Unit 3	**Site monitoring**	
	A	Introduction and importance- audit, inspection and monitoring, analysis of reports, improvements and corrections etc.	CO1, CO5

	B	Audit and inspection-process, responsibilities,concerned bodies and people, reports, submissions etc			CO1, CO5
	C	Monitoring- process, responsibilities, concerned bodies and people, reports, submissions, analysisetc			CO1, CO5
	Unit 4	**Historical evolution of GCP**			
	A	Nuremberg code			CO2
	B	Declaration of Helsinki			CO2
	C	Belmont report, ICH			CO2
	Unit 5	**Ethics in clinical research**			
	A	Principles of ethics, ICH-GCP			CO1, CO2
	B	GCP guidelines			CO2
	C	Challenges in implementation of GCP guidelines			CO2
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*				
	Other References				

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
MCR 113.1	2	2	2	2	3	2	3
MCR 113.2	3	2	2	3	2	3	3
MCR 113.3	3	3	3	2	3	3	2
MCR 113.4	3	2	2	2	3	3	3
MCR 113.5	2	2	2	3	2	2	2

School: SAHS		**Batch : 2021-2023**
Program: M.Sc		**Current Academic Year: 2021-2022**
Branch:		**Semester: II**
1	Course Code	MCR 114
2	Course Title	Introduction to management
3	Credits	4
4	Contact Hours (L-T-P)	2-2-0
	Course Type	Compulsory
5	Course Objective	1. To enable students to define and describe the evolution of management and variousbehavioural science contributions; nature and scope of management.

		2.Discuss and communicate the difference betweenmanagement and administration 3. To understandvarious levels and functions of management 4. To describe the various skills, abilities and tools thatare necessary for successful managers.	
6	Course Outcomes	On successful completion of this course, student will be able to: CO1:Develop an understanding and evaluate the influence of historical forces on the current practice of management. CO2:Explain how organizations adapt to an uncertain environment and identify techniques managers use to influence and control the internal environment. CO3:Practice the process of management's four functions: planning, organizing, leading, staffing and controlling. CO4:Identify and properly use vocabularies within the field of management to articulate one's own position on a specific management issue and communicate effectively with varied audiences. CO5:Evaluate leadership styles to anticipate the consequences of each leadership style.	
7	Course Description	This course provides the basic concept about management and its functions of planning, organizing,staffing, directing, and controlling resources to accomplish organizational goals. The role of the manager at each level of theorganization along with the abilities, skills and tools required to be a effective manager/leader are also emphasized. An insight of organizational behaviour is also covered.	
8	Outline syllabus		CO Mapping
	Unit 1	**Basics of management**	
	A	Definition, concept and principles	CO1
	B	Historical perspectives and various theories	CO1, CO2
	C	Various models of management	CO1, CO2
	Unit 2	**Functions of Management**	
	A	Planning and organizing	CO2, CO3
	B	Leading and staffing	CO2, CO3
	C	Controlling and evaluating	CO2, CO3
	Unit 3	**Management vs administration**	
	A	Administration	CO2
	B	Comparison with management	CO2
	C	Similarity with management	CO2, CO4
	Unit 4	**Leadership**	

	A	Definition, concept, managers vs leaders			CO5
	B	Leadership qualities			CO5
	C	Leadership styles			CO5
	Unit 5	**Organizational behaviour**			
	A	Definition, concept, importance			CO4
	B	Personality development, leadership, motivation			CO4
	C	Groups, cooperation and conflicts			CO4
	Mode of examination	Theory/Jury/Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	Dr P. N. Reddy, Prof H R Appannaiah, P C Tripathi,Essentials ofManagement., P. C. Tripathi and P. N. Reddy, Principles of Management			
	Other References	L. M. Prasad, Principles and Practice of Management			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
MCR 114.1	2	2	2	2	2	2	2
MCR 114.2	2	3	2	2	2	3	3
MCR 114.3	2	3	3	3	3	3	2
MCR 114.4	2	3	3	2	3	3	3
MCR 114.5	2	2	2	2	3	3	3

School: SAHS		**Batch : 2021-2023**
Program: M.Sc		**Current Academic Year: 2021-2022**
Branch:		**Semester: II**
1	Course Code	MCR 115
2	Course Title	Medical terminologies and conditions
3	Credits	4
4	Contact Hours (L-T-P)	2-2-0
	Course Type	Compulsory
5	Course Objective	1. To identify and define the roles of the basic word parts including prefixes, suffixes, root words and combining forms. 2. To interpret abbreviations for common signs, symptoms, medical conditions and diagnostic testing and therapeutic procedures. 3. To interpret major symptoms and signs in clinical

		evaluation. 4. To have a understanding of a basic differential diagnosis for problems affecting each organ system.			
6	Course Outcomes	CO1: Define prefixes, roots and suffixes associated with each body system and make use of correct medical terms CO2: Define several pathological conditions affecting each body systems. CO3: Apply symptomatic and diagnostic terms in medical communication, documentation and dealings. CO4: Recall the meanings of abbreviations associated with different body systems CO5: Discuss surgical, clinical and laboratory procedures related to health care.			
7	Course Description	Covers prefixes, suffixes, root words, abbreviations, conditions, symptoms and procedure terms. Course taught by body systems. This course also discusses some of the most common medical conditions and gives an insight into how a human body works and how professionals diagnose ailments.			
8	Outline syllabus				CO Mapping
	Unit 1	**Introduction**			
	A	Components of medical terms			CO1
	B	Prefixes and suffixes			CO1
	C	Terms related to body as a whole			CO1
	Unit 2	**Integumentary, musculo-skeletal system**			
	A	general pathologic conditions			CO2
	B	symptomatic terms, diagnostic terms			CO1, CO3
	C	general abbreviations oncology terms			CO4
	Unit 3	**Cardio-vascular and respiratory system**			
	A	general pathologic conditions			CO2
	B	symptomatic terms, diagnostic terms			CO1, CO3
	C	general abbreviations oncology terms			CO4
	Unit 4	**Urinary, Nervous and sensory system**			
	A	general pathologic conditions			CO2
	B	symptomatic terms, diagnostic terms			CO1, CO3
	C	general abbreviations oncology terms			CO4
	Unit 5	**Endocrine and reproductive system**			
	A	general pathologic conditions			CO2
	B	symptomatic terms, diagnostic terms			CO1, CO3
	C	general abbreviations oncology terms			CO4
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*				

	Other References		

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
MCR 115.1	2	2	2	2	2	2	2
MCR 115.2	2	3	2	2	2	3	3
MCR 115.3	2	3	3	3	3	3	2
MCR 115.4	2	3	3	2	3	3	3
MCR 115.5	2	2	2	2	3	3	3

School: SAHS		**Batch : 2021-2023**
Program: M.Sc		**Current Academic Year: 2021-2022**
Branch:		**Semester:II**
1	Course Code	MCR 116
2	Course Title	Epidemiology and biostatistics
3	Credits	4
4	Contact Hours (L-T-P)	2-2-0
	Course Type	Compulsory
5	Course Objective	1.To introduce the basic principles and methods of epidemiology and demonstrate their broad applicability. 2.To provide fundamental skills needed to interpret and critically evaluate literature relevant to public health professionals. 3.To provide a structured method for organizing and analysing raw data and to interpret and communicate the results. 4. To describe preferred methodological alternatives to commonly used statistical methods when assumptions are not met.
6	Course Outcomes	CO1: Describe the contribution of epidemiology and biostatistics to the scientific study of health and disease. CO2: Define and distinguish the concepts of health, disease, determinants and indicators of health CO3: Apply knowledge, concepts and understanding of levels of prevention, patterns of epidemic, epidemic forecasting etc. for successful

		management of epidemic CO4: Select from, use, and interpret results of, the principal methods of statistical inference and design. CO5: Communicate the results of statistical analyses accurately and effectively.			
7	Course Description	The course is designed to help the students develop essential knowledge and skills in quantitative public health research by integrating the core disciplines of epidemiology and biostatistics in one course. This course will enable the students to apply an epidemiological approach to the study of disease and illness. This study will help in interpreting and assessing the evidence quality of a range of study designs and to apply appropriate statistical techniques in the analysis.			
8	Outline syllabus				CO Mapping
	Unit 1	**Health and disease**			
	A	Concept and definition			CO1, CO2
	B	Natural history of disease			CO1, CO2
	C	Determinants and indicators of health			CO1, CO2
	Unit 2	**Levels of prevention**			
	A	Primary			CO3
	B	Secondary			CO3
	C	Tertiary			CO3
	Unit 3	**Epidemiology**			
	A	Concept, principle and definition			CO1, CO3
	B	Types of Epidemiological studies I			CO1, CO3
	C	Types of Epidemiological studies-II			CO1, CO3
	Unit 4	**Epidemic management**			
	A	patterns of epidemic			CO1, CO3
	B	epidemic forecasting			CO1, CO3
	C	Epidemic management			CO1, CO3
	Unit 5	**Biostatistics**			
	A	sampling, measures of central tendency, correlation, regression			CO1, CO5
	B	standard error of sampling distribution, significance testing			CO1, CO5
	C	probability, standard deviation, application of excel and SPSS software in research			CO1, CO5
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*				
	Other References				

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
MCR 116.1	2	2	2	2	2	2	2
MCR 116.2	2	3	2	2	2	3	3
MCR 116.3	2	3	3	3	3	3	2
MCR 116.4	2	3	3	2	3	3	3
MCR 116.5	2	2	2	2	3	3	3

School: SAHS		**Batch : 2021-2023**
Program: M.Sc		**Current Academic Year: 2022-2023**
Branch:		**Semester: III**
1	Course Code	MCR 118
2	Course Title	Clinical Trial management
3	Credits	4
4	Contact Hours (L-T-P)	2-2-0
	Course Type	Compulsory
5	Course Objective	1. To provide Understanding of how to effectively manage clinical trials through applying a range skills and knowledge 2. To develop effective strategies and problem solving for managing clinical trials
6	Course Outcomes	On successful completion of this course, student will be able to: CO1:Identify the key issues involved in the conduct of a clinical study including investigator and site selection, site management and conflict resolution. CO2:Outline a study level feasibility plan and describe the structure of a study budget CO3:To provide a comprehensive introduction to the clinical research process, conduct & management of clinical trials. CO4:Reporting and managing serious adverse events on site, development of recruitment strategies and clinical study budget. CO5:Staff requirements and construct timelines to target the appropriate study population and to store, shift and dispense a study drug or device as well as how to review some documents, case report forms protocols and study budget
7	Course Description	This course will equip the students with the imperative skills of clinical trial management. This course gives a methodical understanding of the core areas of clinical trial management thus enhancing skills and

		knowledge to the level expected of a Clinical Trial Project Manager			
8	Outline syllabus				CO Mapping
	Unit 1	**Introduction, Training and meeting**			
	A	Introductionto CT Management and Importance			CO1
	B	Roles and Responsibilities in CTM			CO1
	C	Organizing Meetings – Investigator and vendors, CRC			CO1
	Unit 2	**SOPs**			
	A	Introduction, concept, definition			CO3
	B	SOP writing, review and editing			CO3
	C	Implementation, challenges in implementation			CO3
	Unit 3	**Monitoring and record retention**			
	A	Audit, inspection and monitoring- types and process, responsibilities of stakeholders			CO1, CO3
	B	Regulatory binder and record retention			CO3, CO4
	C	Master files			CO3, CO4
	Unit 4	**IP management**			
	A	Storage and handling			CO5
	B	IP accountability			CO5
	C	Confidentiality and other challenges			CO5
	Unit 5	**Outsourcing**			
	A	Overview, process and types			CO2, CO4
	B	Finance and budgeting			CO4
	C	Basis for selection for outsourcing to CROs/SMOs, Agreements			CO2, CO4
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*				
	Other References				

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
MCR 118.1	2	3	3	1	2	3	2
MCR 118.2	2	3	3	1	2	3	3
MCR 118.3	2	3	3	2	2	3	2
MCR 118.4	2	3	3	2	3	3	3
MCR 118.5	2	3	3	2	2	3	3

School: SAHS		**Batch : 2021-2023**	
Program: M.Sc.		**Current Academic Year: 2022-2023**	
Branch: Clinical research		**Semester:III**	
1	Course Code	MCR 119	
2	Course Title	Regulations in Clinical research	
3	Credits	4	
4	Contact Hours (L-T-P)	2-2-0	
	Course Type	Compulsory	
5	Course Objective	1. To gain the essential knowledge and skills required to help companies to work in regulatory environment. 2. Acquire the foundation to work within or in variety of areas including medical products development, pharmaceutical formulations, sales, strategic marketing and clinical investigations. 3. To know about regulatory process in drug development, formulations, API. 4. To sharpen the understanding of the laws that governs the development, manufacturing and commercialization along with the distribution of drugs, biologics and medical devices.	
6	Course Outcomes	On successful completion of this course, student will be able to: CO1: Categorize the general principles of drug regulations and device regulation during the different phases of their life cycle. CO2: Understand and follow the Regulatory guidance's and guidelines for filing and approval process CO3: Compare the role of national and international bodies such as USA, Europe and the rest of the world. CO4: Preparation of Dossiers and their submission to regulatory agencies in different countries CO5: Understand the concept of intellectual property rights, procedural knowledge to Legal system and solving the problem relating to intellectual property rights.	
7	Course Description	The courses will provide integrated knowledge and broad perspectives needed to effectively manage the regulatory process from Innovation →Discovery → Approval→ Commercialization which implies regulatory affairs are essential to bring the product to the market globally.	
8	Outline syllabus		CO Mapping
	Unit 1	**EMA and US FDA**	
	A	Importance and functioning, Roles and responsibilities	CO1, CO3
	B	Powers, authorities, submissions	CO4, CO2
	C	Grants, compensations, promotion of research	CO3

	Unit 2	**Schedule Y and HIPAA**			
	A	Introduction, Importance, History			CO1
	B	Guidelines			CO1, CO3
	C	Details and implications			CO1
	Unit 3	**ICMR and CDSCO**			
	A	Importance and functioning, Roles and responsibilities			CO3
	B	Submissions			CO4,CO2
	C	Grants, compensations, promotion of research			CO3
	Unit 4	**Intellectual Property Rights**			
	A	Patent			CO1, CO5
	B	Copyright			CO1, CO5
	C	Trademark			CO1, CO5
	Unit 5	**Insurance and Indemnity**			
	A	Introduction, concept, advantages, disadvantages			CO1, CO5
	B	Legal implications			CO5
	C	Compensation			CO1, CO5
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*				
	Other References				

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
MCR 119.1	3	2	3	2	2	2	3
MCR 119.2	3	3	3	3	2	2	3
MCR 119.3	2	3	2	2	2	2	3
MCR 119.4	3	3	2	2	3	3	3
MCR 119.5	3	2	2	3	2	2	3

School: SAHS		**Batch : 2021-2023**
Program: M.Sc		**Current Academic Year: 2022-2023**
Branch: Clinical research		**Semester: III**
1	Course Code	MCR 120
2	Course Title	Documentation and data management in clinical research
3	Credits	4
4	Contact	2-2-0

	Hours (L-T-P)		
	Course Type	Compulsory	
5	Course Objective	1.To understand what data management is and the purpose of a data management plan 2.To realize factors to be considered in the design and type of a case report form 3.Considerations for data analysis 4.What is important when deciding on a data management system	
6	Course Outcomes	On successful completion of this course, student will be able to: CO1: Summarize the key documents related to the ethical conduct of clinical trials CO2: Outline the Investigators Brochure sections and describe its use, approval, and distribution. CO3: Describe the procedures for clinical trial data collection and data management to ensure optimal quality data and outline the various quality management issues in clinical trials. CO4: Outline the various data management issues in clinical trials CO5: Discuss the evaluation and interpretation of clinical trials results	
7	Course Description	Clinical Data Management is an integral part of the clinical trial process to transform raw data into consistent, accurate, reliable, meaningful trial output in full compliance with regulatory guidelines. This course provides a comprehensive training on scientific, practical, ethical and technical concepts of clinical data management.	
8	Outline syllabus		CO Mapping
	Unit 1	**Investigator Brochure and Clinical study protocol**	
	A	IB- Importance, contents- preclinical and clinical, other details	CO1, CO2
	B	Protocol- importance, objectives	CO1
	C	Protocol- Design, contents, adherence, challenges	CO1
	Unit 2	**Clinical study report and publication**	
	A	Importance and guidelines	CO1, CO4
	B	Format and components	CO1
	C	Applicable regulatory requirements	CO5
	Unit 3	**Essential documents and source documents**	
	A	Documents before the trial	CO1, CO3
	B	Documents during the trial	CO1, CO3
	C	Documents after the trial	CO1, CO3
	Unit 4	**Clinical data management**	
	A	Introduction to CDM, CRF Design	CO3
	B	Clinical data entry and electronic data capture	CO3
	C	Data validation and database lock	CO3
	Unit 5	**Data Coding and Decoding**	
	A	Introduction	CO4, CO5
	B	Learning	CO5
	C	Practice	CO5

	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*				
	Other References				

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
MCR 120.1	3	3	3	2	3	2	3
MCR 120.2	2	3	3	2	3	3	3
MCR 120.3	3	3	3	2	2	3	2
MCR 120.4	2	2	3	2	3	3	2
MCR 120.5	2	2	3	2	2	3	3

School: SAHS		**Batch : 2021-2023**
Program: M.Sc.		**Current Academic Year: 2022-2023**
Branch: Clinical research		**Semester: III**
1	Course Code	MCR 121
2	Course Title	Pharmacovigilance and pharmacoeconomics
3	Credits	4
4	Contact Hours (L-T-P)	2-2-0
	Course Type	Compulsory
5	Course Objective	1. to understand the key concepts in the responsible conduct of research a 2. tounderstand how to conduct research that conforms to the highest standards for the protection of human research subjects. 3. To sensitize and equip with knowledge on Pharmacovigilance practices worldwide and on the Indian scenario in detail 4. List four primary perspectives that a pharmacoeconomic analysis can be conducted from and describe how they differ. 5. Discern between different medical cost categories that can be identified, measured, and compared in a

		pharmacoeconomicanalysis.	
6	Course Outcomes	On successful completion of this course, student will be able to: CO1: Revise the principles and practical relevance of ethical issues in clinical research and the legal and ethical provision for the protection of clinical trial subjects. CO2: Value the role of pharmacoepidemiology, Pharmacoeconomics in the lifecycle management of a medicine. CO3: Appraise adverse events/adverse drug reactions in terms of severity and then describe the safety reporting requirements pre and post-approval. CO4: Evaluate the ongoing management of drug safety issues (including risk management plans, periodic safety update reports) and the ongoing benefit/risk assessment throughout the lifecycle of a medicine. CO5: Discuss the collection, evaluation, and reporting of adverse event data in clinical trials	
7	Course Description	This course provides insight in to pharmacoeconomics and its effect at healthcare industry. Also, gives comprehensive knowledge, understanding, emphasises importance of pharmacovigilance in the field of research.	
8	Outline syllabus		CO Mapping
	Unit 1	**Introduction PV**	
	A	Basic understanding, concept and definition-PV, ADR, AE, SE, SUSAR	CO1, CO2
	B	Legal basis in selected countries	CO1, CO5
	C	Pharmacovigilance program of India	CO1
	Unit 2	**Mechanism of ADR**	
	A	Renal, Hepatic	CO3
	B	Cardiac, Haematological	CO1, CO3
	C	Ocular, Dermatological, Gastro-intestinal	CO3, CO5
	Unit 3	**Drug safety and risk management in special conditions**	
	A	Pregnancy	CO4
	B	PaediatricPopulations	CO4
	C	Geriatric Populations	CO4
	Unit 4	**Ethical oversight**	
	A	Introduction, importance and understanding ethical principles	CO1
	B	Consent and confidentiality	CO1
	C	CIOMS- Working groups and their Contribution to Pharmacovigilance	CO1
	Unit 5	**Pharmacoeconomics**	
	A	Health Economics : Overview ,Healthcare Demands and Markets, Medical Economics, Behavioral Economics, Health consumerism, Health Insurance, Health Policy /analysis	CO2
	B	Health Planning & Management -Health Policies, healthcare models, healthcare systems, Strategic Planning & its Parameters, Direction and clinical management of	CO2

		health services – Foundations of Clinical Management, Information /system, HRM in Healthcare			
	C	Financial Management – Measurement & analysis of costs and results in healthcare, Economic assessment of health activities, Minimizing costs, Cost-benefit analysis, Cost-effectiveness analysis, Cost-Utility analysis			CO2
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*				
	Other References				

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
MCR 121.1	2	2	2	3	2	2	3
MCR 121.2	2	2	2	2	2	3	3
MCR 121.3	2	1	2	3	2	3	2
MCR 121.4	2	1	2	3	2	3	2
MCR 121.5	2	1	3	2	2	3	3

School: SAHS		**Batch : 2021-2023**
Program: M. Sc		**Current Academic Year: 2022-2023**
Branch: Clinical research		**Semester: III**
1	Course Code	MCR 122
2	Course Title	Psychology and patient counselling
3	Credits	4
4	Contact Hours (L-T-P)	2-2-0
	Course Type	Compulsory
5	Course Objective	1.To help students understand the processes of emotion and relating them to diverse contexts. 2.To prepare students learn organizing their personal lives better by gaining insights into their own emotional strengths. 3. To develop skills how to deal better with peers and patients.
6	Course Outcomes	On successful completion of this course, student will be able to: CO1: Describe key concepts, principles, and overarching themes in psychology. CO2: Demonstrates understanding of counselling and psychological

		practice as an applied behavioural science CO3: Formulates and conceptualizes cases; plans and implements interventions utilizing at least one consistent theoretical orientation CO4: analyse a range of factors within and outside individuals which influence mind and behaviour CO5: Forms and maintains productive and respectful relationships with clients, peers/colleagues, supervisors, and professionals from within and across disciplines			
7	Course Description	This course provides a comprehensive overview of cognitive psychology, the scientific study of mental processes: how people acquire, store, transform, use, and communicate information. Topics may include perception, attention, language, memory, reasoning, problem solving, decision-making, and creativity.			
8	Outline syllabus				CO Mapping
	Unit 1	**Psychology**			
	A	Introduction, scope, evolution and definition of psychology			CO1, CO2
	B	Branches of psychology			CO1
	C	Concept of normality and abnormality			CO1
	Unit 2	**Psychological disorders**			
	A	Identifying psychological disorders			CO1, CO4
	B	Anxiety disorders- panic, phobia; their signs, symptoms and management.			CO1, CO4
	C	Anxiety disorders-OCD, PTSD; their signs, symptoms and management.			CO1, CO4, CO3
	Unit 3	**Stress and learning**			
	A	Hans Selye Model of stress, Lazarus and Folkman model of stress, Sources of stress			CO1, CO4
	B	Stress, disease and health. Changing health- impairing behaviour.			CO1, CO4
	C	Learning- Meaning, definition, Theories of learning , Pavlov's classical conditioning, Skinner's operant conditioning			CO1, CO4
	Unit 4	**Therapeutic techniques**			
	A	Various techniques and their applications, Assessment and management, alcohol dependence			CO1, CO3
	B	Psychotherapy- meaning and definition. (Brief introduction to psychoanalytical, behavioral and cbt techniques)			CO1, CO3
	C	Relaxation-types. (Brief introduction to psychoanalytical, behavioral and cbt techniques)			CO1, CO3
	Unit 5	**Communication**			
	A	Patient communication			CO1, CO5
	B	History taking			CO1, CO5
	C	Patient counselling			CO1, CO2
	Mode of examination	Theory/Jury/Practical/Viva			
	Weightage	CA	MTE	ETE	

	Distribution	30%	20%	50%	
	Text book/s*				
	Other References				

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
MCR 122.1	2	1	1	2	2	1	2
MCR 122.2	2	1	1	2	2	1	2
MCR 122.3	1	1	1	1	3	1	2
MCR 122.4	1	1	1	2	3	2	3
MCR 122.5	2	1	1	2	3	2	3

School: SAHS		**Batch : 2021-2023**
Program: M.Sc		**Current Academic Year: 2022-2023**
Branch:Clinical research		**Semester: IV**
1	Course Code	MCR 123
2	Course Title	Research methodology
3	Credits	2
4	Contact Hours (L-T-P)	1-1-0
	Course Type	Compulsory
5	Course Objective	1.To equip with knowledge and skills necessary in conducting research work and formulating research synopsis andreport. 2.To impart knowledge for enabling students to develop data analytics skills and meaningful interpretation to the data sets so as to solve any research problem. 3.To Use theory and previous research to create research questions and hypotheses and to identifyand analyze the appropriate method and variables needed for research questions
6	Course Outcomes	On successful completion of this course, student will be able to: CO1: Develop understanding on various kinds of research, objectives of doing research, research process, research designs and sampling. CO2: demonstrate basic knowledge on qualitative and quantitative research techniques CO3: Demonstrate adequate knowledge on measurement & scaling techniques as well as the quantitative data analysis CO4: Show basic awareness of data analysis-and hypothesis testing

		procedures CO5: Understand values, responsibilities and ethical issues in research, including those issues that arise in using quantitative and qualitative research	
7	Course Description	This course is designed to provide students with the practical tools of doing research and the theoretical background for critiquing and designing research on various topics. This course will also engage students in the discussion of ethics, studying how personal values, ethical models and reflective processes shape our ethical decision making in a leadership context.	
8	Outline syllabus		CO Mapping
	Unit 1	**Purpose of research**	
	A	Foundations of Research Methodology, Introduction to research, what is Research?	CO1
	B	Objectives and motivations for research	CO1
	C	Types of Research, Introduction to Qualitative Research, Quantitative Research Conceptualization,Problem Formulation	CO1
	Unit 2	**Principles of Research in quantitative and qualitative approaches: Research design**	
	A	Research Process & Research Design, Introduction to Research Process, Steps in Research Process	CO1, CO2
	B	Introduction to Research Design, nature of good design	CO1, CO2
	C	Types of Research Design: Exploratory, Descriptive and Causal research	CO1, CO2
	Unit 3	**Methods of data collection and types of data**	
	A	Data Collection Method, Introduction to Primary & Secondary data, Methods of collecting primary and secondary data	CO4
	B	Advantages & disadvantages of data collection. Measurement & Scaling Technique	CO4
	C	Scales of Measurement, Questionnaire Designing.	CO3
	Unit 4	**The Research Cycle**	
	A	Analysis & Report Writing, Data Preparation, Data aggregation, Data accuracy, Data structure, Data transformation	CO3
	B	Descriptive Statistics, Univariate analysis,Correlation/Regression, InferentialStatistics, Hypothesis Testing Process, Large sample test, Small sample, Parametric and NonParametric Test	CO3
	C	Report Writing, Types of Research output, Key Elements of Report Writing	CO3, CO4
	Unit 5	**Values, Social Responsibility and Ethics in Research**	
	A	Morals, Values and Ethics, Integrity, Work Ethic, Service Learning, Civic Virtue, Respect	CO5

		for Others, Living Peacefully, caring, Sharing, Honesty, Valuing Time, Cooperation, Commitment, Empathy, Self–Confidence, Character, Spirituality			
	B	Models ofProfessional Roles, theories about right action, Self-interest, uses ofethical theories,Multinational corporations, Environmental ethics, computer ethics			CO5
	C	Safety and risk, risk benefit analysis and reducing risk – the three-mile island and Chernobyl case studies, Collegiality and loyalty, respect for authority, collective bargaining – confidentiality, conflicts of interest, occupational crimeprofessionalrights, employee rights, Intellectual Property Rights (IPR), discrimination.			CO5
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	Malhotra N.K. (2011) Marketing Research, Pearson Education, Inc. Zikmund W.G. (2007) Business research Methods, Thomspns, Akash Press New Delhi.			
	Other References	Beri G.C. (2010) Marketing Research 3rd Edition, TMH Publishers Ltd, New Delhi			

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
MCR 123.1	3	3	3	2	2	2	3
MCR 123.2	3	3	3	2	2	1	3
MCR 123.3	3	3	3	2	2	1	3
MCR 123.4	3	3	3	2	2	1	2
MCR 123.5	3	3	3	3	2	2	3

School: SAHS		**Batch : 2021-2023**
Program: M.SC		**Current Academic Year: 2022-2023**
Branch: Clinical research		**Semester: IV**
1	Course Code	MCR 124
2	Course Title	Recent advances in clinical research
3	Credits	2
4	Contact	1-1-0

	Hours (L-T-P)		
	Course Type	Compulsory	
5	Course Objective	1. To achieve a basic understanding of recombinant DNA technology, human genome structure, Genetic Tests, Prenatal Diagnosis of Genetic Diseases etc. 2. To equip with knowledge of Oncogenes and Malignancy, Detection of Oncogenic activation, Functions of oncogenes 3.To achieve basic understanding of Stem Cell Research and New Targets for Drug Designs	
6	Course Outcomes	On successful completion of this course, student will be able to: CO1: Employ the scientific method to generate new knowledge, and to solve problems, regarding human heredity. CO2: understand advanced techniques in genome analysis, recombinant DNA technology. CO3: To develop the understanding for Management of inherited human diseases CO4: Demonstrate knowledge of oncogenes and malignancy, their detection and management CO5: synthesize and incorporate the fundamentals of gene and nanotechnology in order to understand how such technology impacts humans.	
7	Course Description	This course gives in sight into human genetics, oncogenes, stem cell research and Biopharmaceuticals, Re-generative Medicine, Nano technology and Nano medicineetc which will lay foundation and motivate students to pick up and conduct recent challenging research proposals.	
8	Outline syllabus		CO Mapping
	Unit 1	**Human Genetics**	
	A	Recombinant DNA Technology	CO1, CO2
	B	Genetic Tests, Prenatal Diagnosis of Genetic Diseases	CO1, CO2
	C	Human Genome Project, Gene Therapy	CO1, CO2
	Unit 2	**Cancer Research**	
	A	Oncogenes and Malignancy	CO4
	B	Detection of Oncogenic activation	CO4
	C	Functions of oncogenes	CO4
	Unit 3	**Stem Cell Research**	
	A	Cell, growth & regulation	CO1
	B	Proliferative Disorders-I	CO3
	C	Proliferative Disorders-II	CO3
	Unit 4	**New Targets for Drug Designs**	
	A	Biopharmaceuticals	CO2
	B	Re-generative Medicine	CO2
	C	Others	CO2
	Unit 5	**Nano technology and Nano medicine**	

	A	Nano technology			CO5
	B	Nano medicine			CO5
	C	Others			CO5
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	Gene cloning and DNA analysis, T.A. Brown Biotechnology, B.D.Singh			
	Other References				

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
MCR 124.1	2	2	2	1	1	1	2
MCR 124.2	2	2	3	1	1	1	3
MCR 124.3	2	2	2	1	1	1	2
MCR 124.4	2	3	3	2	1	1	3
MCR 124.5	2	3	3	1	1	1	3