THE MAHATMA GANDHI UNIVERSITY

UNDERGRADUATE PROGRAMMES (HONOURS)

SYLLABUS

MGU-UGP (Honours)

(2024 Admission Onwards)

Faculty: Science

Expert Committee: Clinical Nutrition and Dietetics

Subject: Human Physiology

Mahatma Gandhi University
Priyadarshini Hills
Kottayam – 686560, Kerala, India

Syllabus Index

Name of the Minor: **Human Physiology**

Semester 1

Course Code	Title of the Course	Type of the Course DSC, MDC, SEC etc.	Credit	Hours/ week	Hour Distribution /week			
					L	T	P	O
MG1DSCHPY100	Basics of Physiology	DSC B	4	5	3	0	2	0

Semester: 2

Course Code	Title of the Course	Type of the Course DSC, MDC, SEC etc.	Credit	Hours/ week	Hour Distribution /week			
					L	T	P	O
MG2DSCHPY100	Physiology of Human Control System	DSC B	4	5	3	0	2	0

Semester: 3

Course Code	Title of the Course	Type of the Course DSC, MDC, SEC etc.	Credit	Hours/ week	Hour Distribution /week			
					L	T	P	O
MG3DSCHPY200	Essentials of Physiology	DSC B	4	5	3	0	2	0

Semester: 4

Course Code	Title of the Course	Type of the Course DSC, MDC, SEC etc.	Credit	Hours/ week	Hour Distribution /week			
					L	T	P	O
MG4DSCHPY200	Essentials of Physiology	DSC C	4	5	3	0	2	0

	Mahatma Gandhi University **Kottayam**

Programme						
Course Name	BASICS OF PHYSIOLOGY					
Type of Course	DSC B					
Course Code	MG1DSCHPY100					
Course Level	100-199					
Course Summary	The Basics of Physiology course is designed to provide students with a fundamental understanding of how the human body functions at the cellular, tissue, organ, and organ system levels, Cytology, Histology and Haematology.					
Semester	1	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3	0	1	0	75
Pre-requisites, if any	Basic knowledge in science					

COURSE OUTCOMES (CO)

CO NO.	Expected Course Outcome	Learning Domains *	PO NO.
CO1	Discuss the organizational levels of human body, cytology and histology	U	1
CO2	Differentiate between different body fluids and blood parameters	U	1
CO3	Explain the anatomy of the musculo-skeletal system.	U	1
CO4	Identify the principle tissue structures and haematological aspects of human body	A	2, 3
Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)			

COURSE CONTENT

Module	Unit	Course Description	Hours	CO NO.
1		**Organization Levels of Human Body**	**15**	**CO1**
	1.1	**Levels of organization**– cellular level, tissue level, organ and organ system level. Homeostasis- role of various systems of the body in homeostasis, components of homeostatic system, mechanism of action of homeostatic system.	4	
	1.2	**Cell**– structure and functions, basic mechanism of transport.	3	
	1.3	**Types of Cell junction**– occluding junction, communicating junction, anchoring junction. **Types of Cell signalling**– paracrine signalling, autocrine signalling, endocrine signalling, signalling through cell to cell contact.	4	
	1.4	**Types of Tissues-** classification, structure, location and functions.	4	
2		**Body Fluids**	**15**	**CO2**
	2.1	**Body fluids-**composition, significance and compartments of body fluids, tissue fluids and oedema.	3	
	2.2	**Blood-** properties, functions and composition of blood, physiological and pathological variations in blood cells, blood clotting PCV, blood indices, blood groups, blood transfusion.	6	
	2.3	**Anatomy of the lymphatic system**- lymphatic capillaries and vessels, primary and secondary lymphoid organs, functions of lymphatic system.	4	
	2.4	**Lymph**- composition, functions and formation.	2	
3		**Musculo- Skeletal System**	**15**	
	3.1	**Physiology of bone**- composition, functions, classification and structure, types of cells in bone and bone tissues.	4	
	3.2	**Skeletal system**- axial and appendicular skeletal system. **Structural classification of joints**- Fibrous , cartilaginous and synovial joints.	4	

	3.3	**Muscles-** Basic properties of muscles, classification of muscles - depending upon striations, depending upon control, depending upon situation**.**	3	**CO 3**
	3.4	**Types of muscles-** structure, properties and functions	4	

PRACTICAL

Module	Unit	Course Description	Hours	CO NO.
		Histology and haematology	**30**	
	4.1	Microscope and its uses	4	
	4.2	Microscopic examination of prepared slides- examine and draw the tissues: Squamous, ciliated and columnar epithelia. Bone and cartilage Smooth, cardiac and striated muscle Nervous tissues	10	
	4.3	Testing of blood groups	4	
	4.4	Determination of bleeding time	2	
4	4.5	Determination of clotting time	2	**CO4**
	4.6	Determination of Blood pressure	2	
	4.7	Determination of pulse rate at rest and after exercise	4	
	4.8	Measurement of body temperature	2	
5		**Teachers specific content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** ● Lecture ● E-learning **Interactive Instructions:** ● Group Assignment ● Library Work and Group Discussion ● Practical
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-25 Marks** ● Internal Test ● Assignment/ Oral presentation ● Quiz ● In- class discussion and involvement **Practical-15 Marks** ● Internal Test ● Record ● Lab involvement
	B. End Semester Examination **Theory -50 Marks** ● Section A - MCQ - 6/6 (6x1=6 marks) ● Section B - Short Answer - 2/4 (2x2=4 marks) ● Section C - Short Essay - 4/6 (4x5=20 marks) ● Section D – Essay – 2/4 (2x10=20 marks) **Practical -35 Marks** ● Lab test – 20 marks ● Record – 5 marks ● Viva – 10 marks

REFERENCES

1. Chandra Sekar C.N, (2007), Manipal Manual of Physiology, 1st Edition, CBS publishers and Distributors, New Delhi.

2. Gyton and Hall (2000), Textbook of Medical Physiology, 10th edition, Harcourt Asia LTD Singapore.
3. Hole, J.W (1989), Essentials of Human Anatomy and Physiology, 3rd edition, WCB publishers, Dubuque, Iowa.
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5. Sembulingam, K. and Sembulingam, P. (2012), Essential of Medical Physiology. 6th Edition, New Jaypee Brothers Medical Publishers, Delhi, India.
6. Wilson, K.J. and Waugh, A. (2022), Ross and Wilson Anatomy and Physiology in Health and Illness, 14th Edition, Elsievier Publishers.

SUGGESTED READINGS

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2. Indu Khurana and Arushi (2009), Textbook of Anatomy and Physiology for Health Professionals, CBS Publishers and Distributors, New Delhi.
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	Mahatma Gandhi University **Kottayam**

Programme					
Course Name	PHYSIOLOGY OF HUMAN CONTROL SYSTEM				
Type of Course	DSC B				
Course Code	MG2DSCHPY100				
Course Level	100-199				
Course Summary	The course is designed to provide students an overview of various sensory organs and their functions, endocrine glands and their secretions, control and coordination of human body by nervous system.				
Semester	2	Credits		4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others
		3	0	1	0
Pre-requisites, if any	Basic knowledge in science				

COURSE OUTCOMES (CO)

CO NO.	Expected Course Outcome	Learning Domains *	PO NO.
CO1	Identify the structure and function of various sense organs and common disorders related to sense organs	U	1
CO2	Discuss the structure and function of the human nervous system, role of neurons, neurotransmitters and electrical impulses in the nervous system.	U	1
CO3	Describe the major endocrine glands and their functions in regulating body functions.	U	1
CO4	Apply knowledge on various haematological aspects	A	2
CO5	Identify microscopic slides of various skin, nerve cell	A	2
Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)			

COURSE CONTENT

Module	Unit	Course Description	Hours	CO NO.
1		**Special Senses**	**15**	**CO1**
	1.1	Sensation of vision - structure of eye, visual process, disorders of vision.	3	
	1.2	Sensation of olfaction - structure of nose, mechanism of olfaction, abnormalities of olfactory senses.	3	
	1.3	Sensation of hearing - structure of ear, mechanism of hearing, auditory defects.	3	
	1.4	Sensation of taste - structure of tongue, taste buds, pathway for taste, taste sensation, abnormalities of taste sensation.	3	
	1.5	Skin - structure, functions of skin, temperature regulation, disorders of skin.	3	
2		**Nervous System**	**15**	**CO2**
	2.1	Divisions of nervous system - CNS, PNS, functions of nervous system.	8	
	2.2	Structure of neuron, classification of nerve fibres, synapse, neurotransmitters.	4	
	2.3	Transmission of impulses, reflex activity.	3	
3		**Endocrine System**	**15**	**CO3**
	3.1	Endocrine glands - secretions and functions of hypothalamus, pituitary and pineal gland.	6	
	3.2	Secretions and functions of thyroid and parathyroid gland.	3	
	3.3	Secretions and functions of adrenal gland and pancreas.	3	
	3.4	Secretions and functions of ovary and testes	3	

PRACTICAL

Module	Unit	Course Description	Hours	CO NO.
4		**Haematology and Microscopic Examination of Slides**	**30**	**CO4, CO5**
	4.1	Preparation of blood smear	6	
		Estimation of Haemoglobin	4	
	4.2	Haematocrit (PCV)	4	
	4.3	Mean Corpuscular Volume (MCV), Mean Corpuscular Haemoglobin (MCH), Mean Corpuscular Haemoglobin Concentration (MCHC), Colour Index (CI)	4	
	4.4	Microscopic examination of prepared slides- examines and draw- Skin	2	
	4.5	Identify and draw using models - parts of eye, ear, brain	6	
	4.6	Examine the different types of tastes	4	
5		**Teacher specific content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** ● Lecture ● E-learning **Interactive Instructions:** ● Group Assignment ● Library Work and Group Discussion ● Practical
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-25 Marks** ● Internal Test ● Assignment/ Oral presentation ● Quiz ● In- class discussion and involvement **Practical-15 Marks** ● Internal Test ● Record ● Lab involvement
	B. End Semester Examination **Theory -50 Marks** ● Section A - MCQ - 6/6 (6x1=6 marks) ● Section B - Short Answer - 2/4 (2x2=4 marks) ● Section C - Short Essay - 4/6 (4x5=20 marks) ● Section D – Essay – 2/4 (2x10=20 marks) **Practical -35 Marks** ● Lab test - 20 marks ● Record – 5 marks ● Viva – 10 marks

REFERENCES

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	Mahatma Gandhi University **Kottayam**

Programme						
Course Name	ESSENTIALS OF PHYSIOLOGY					
Type of Course	DSC B					
Course Code	MG3DSCHPY200					
Course Level	200-299					
Course Summary	The essentials of human anatomy and physiology course provides a comprehensive explanation of the structure and function of the human body					
Semester	4	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3	0	1	0	75
Pre-requisites, if any	Basic knowledge in science					

COURSE OUTCOMES (CO)

CO NO	Expected Course Outcome	Learning Domains *	PO NO
CO1	Identify the anatomy of the respiratory system, the mechanism of breathing, exchange and transport of gases.	U	1
CO2	Explain the anatomy and physiology of the cardiovascular system.	U	1
CO3	Discuss the anatomy and function of the digestive and excretory system, processes of digestion, absorption, and elimination. mechanism of urine formation.	U	1
CO4	Discuss the basic principles of immunology and evaluate the impact of vaccination on public health and disease prevention.	An	1
CO5	Examine the haematological aspects of the human body.	A	2
CO6	Distinguish between the normal and abnormal constituents of urine.	An	2
Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)			

COURSE CONTENT

Module	Unit	Course Description	Hours	CO NO.
1		**Respiratory and Cardiovascular System**	**20**	**CO1, CO2**
	1.1	**Anatomy of respiratory system**- upper respiratory tract and lower respiratory tract, primary respiratory functions and non-respiratory functions of respiratory system.	2	
	1.2	**Mechanism and regulation of respiration-** inspiration and expiration, respiratory pressures, respiratory volumes and lung capacities, artificial respiration, regulation of respiration- nervous regulation and chemical regulation (brief)	4	
	1.3	**Exchange and transport of gases-** external respiration and internal respiration, transport of oxygen and carbon dioxide	4	
	1.4	**Cardiovascular system-** anatomy of heart, blood vessels: arteries, capillaries and veins	4	
	1.5	**Divisions of circulation-** systemic and pulmonary circulation, conductive system of heart	2	
	1.6	**Cardiac rhythm-**Cardiac cycle, normal ECG, heart sounds, blood pressure	4	
2		**Digestive and Excretory System**	**15**	**CO3**
	2.1	**Anatomy of digestive system-** primary and accessory digestive organs, walls of GI tract, movement of GI tract	3	
	2.2	**Digestion and absorption-**GI hormones, digestion and absorption	4	
	2.3	**Anatomy and functions of excretory system**-structure and functions of kidney and nephron	3	
	2.4	**Mechanism of urine formation**- Mechanism of urine formation, GFR, factors affecting GFR and urine formation, composition of normal urine, abnormal constituents of urine, micturition, counter current mechanism.	5	
		Immune System	**10**	**CO 4**
	3.1	**Immunity**- definition and types of immunity- innate immunity and acquired immunity.	3	
	3.2	**Specific immune responses**- antibody mediated immunity (humoral) and cell mediated immunity. Cells of immune system- B and T lymphocytes, antigen presenting cells, mast cells.	4	

3	3.3	**Antigen** - Structure and functional classification. **Antibodies** - structure, functions and classes of antibodies. **Hypersensitivity** - Classification of hypersensitivity (Allergy). **Immunization**- passive and active immunization.	3	

PRACTICAL

Module	Unit	Course Description	Hours	CO NO.
4		**Analysis of urine and blood sample**	**30**	**CO5** **CO6**
	4.1	Enumeration of RBC	4	
	4.2	Enumeration of WBC	4	
	4.3	Determination of ESR	2	
	4.4	Analysis of saliva- amylase, mucin, calcium, inorganic phosphate	4	
	4.5	Physical characteristics in pathological conditions- volume, appearance, colour, odour.	2	
	4.6	Test for abnormal constituents in urine- blood, protein, reducing sugar, bile salts, and bile pigments.	8	
	4.7	Model identification and diagrammatic representation Section of human heart Section of human kidney Histology of artery and vein	6	
5		**Teacher specific content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** ● Lecture ● E-learning **Interactive Instructions:** ● Group Assignment ● Library Work and Group Discussion ● Practical
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-25 Marks** ● Internal Test ● Assignment/ Oral presentation ● Quiz ● In- class discussion and involvement **Practical-15 Marks** ● Internal Test ● Record ● Lab involvement
	B. End Semester Examination **Theory -50 Marks** ● Section A - MCQ - 6/6 (6x1=6 marks) ● Section B - Short Answer - 2/4 (2x2=4 marks) ● Section C - Short Essay - 4/6 (4x5=20 marks) ● Section D – Essay – 2/4 (2x10=20 marks) **Practical -35 Marks** ● Lab test – 20 marks ● Record – 5 marks ● Viva – 10 marks

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Programme						
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Type of Course	DSC C					
Course Code	MG4DSCHPY200					
Course Level	200-299					
Course Summary	The essentials of human anatomy and physiology course provides a comprehensive explanation of the structure and function of the human body					
Semester	4	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3	0	1	0	75
Pre-requisites, if any	Basic knowledge in science					

COURSE OUTCOMES (CO)

CO NO	Expected Course Outcome	Learning Domains *	PO NO
CO1	Identify the anatomy of the respiratory system, the mechanism of breathing, exchange and transport of gases.	U	1
CO2	Explain the anatomy and physiology of the cardiovascular system.	U	1
CO3	Discuss the anatomy and function of the digestive and excretory system , processes of digestion, absorption, and elimination. mechanism of urine formation.	U	1
CO4	Discuss the basic principles of immunology and evaluate the impact of vaccination on public health and disease prevention.	An	1
CO5	Examine the haematological aspects of the human body.	A	2
CO6	Distinguish between the normal and abnormal constituents of urine.	An	2
Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)			

COURSE CONTENT

Module	Unit	Course Description	Hours	CO NO.
1		**Respiratory and Cardiovascular System**	**20**	**CO1, CO2**
	1.1	**Anatomy of respiratory system**- upper respiratory tract and lower respiratory tract, primary respiratory functions and non-respiratory functions of respiratory system.	2	
	1.2	**Mechanism and regulation of respiration-** inspiration and expiration, respiratory pressures, respiratory volumes and lung capacities, artificial respiration, regulation of respiration- nervous regulation and chemical regulation (brief)	4	
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2		**Digestive and Excretory System**	**15**	**CO3**
	2.1	**Anatomy of digestive system-** primary and accessory digestive organs, walls of GI tract, movement of GI tract	3	
	2.2	**Digestion and absorption-**GI hormones, digestion and absorption	4	
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	2.4	**Mechanism of urine formation**- Mechanism of urine formation, GFR, factors affecting GFR and urine formation, composition of normal urine, abnormal constituents of urine, micturition, counter current mechanism.	5	
		Immune System	**10**	**CO 4**
	3.1	**Immunity-** definition and types of immunity- innate immunity and acquired immunity.	3	
	3.2	**Specific immune responses**- antibody mediated immunity (humoral) and cell mediated immunity. Cells of immune system- B and T lymphocytes, antigen presenting cells, mast cells.	4	

3	3.3	**Antigen** - Structure and functional classification. **Antibodies** - structure, functions and classes of antibodies. Classification of hypersensitivity (Allergy). **Immunization**- passive and active immunization.	3	

PRACTICAL

Module	Unit	Course Description	Hours	CO NO.
4		**Analysis of urine and blood sample**	**30**	**CO5** **CO 6**
	4.1	Enumeration of RBC	4	
	4.2	Enumeration of WBC	4	
	4.3	Determination of ESR	2	
	4.4	Analysis of saliva- amylase, mucin, calcium, inorganic phosphate	4	
	4.5	Physical characteristics in pathological conditions- volume, appearance, colour, odour.	2	
	4.6	Test for abnormal constituents in urine- blood, protein, reducing sugar, bile salts, and bile pigments.	8	
	4.7	Model identification and diagrammatic representation Section of human heart Section of human kidney Histology of artery and vein	6	
5		**Teacher specific content**		

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