

GANPAT UNIVERSITY											
FACULTY OF ENGINEERING & TECHNOLOGY											
Programme		Master of Technology			Branch/Spec.		Biomedical Engineering				
Semester		I			Version		1.0.0.0				
Effective from Academic Year			2018-19		Effective for the batch Admitted in			August 2018			
Subject code		3BM101		Subject Name		Quantitative Physiology for Engineer					
Teaching scheme					Examination scheme (Marks)						
(Per week)		Lecture(DT)		Practical(Lab.)		Total		Total			
		L	TU	P	TW			CE	SEE		
Credit		3	-	-	-	3		Theory	40	60	100
Hours		3	-	-	-	3		Practical	-	-	-
Pre-requisites: Basic knowledge of Human Anatomy and Physiology.											
Learning Outcome: The educational objectives of the course are to educate students to attain the following: <ul style="list-style-type: none"> To understand different physiological processes taking place inside human body. Correlation of medicine and engineering for development of various instruments. To understand various biophysical concept and their control. 											
Theory syllabus											
Unit	Content									Hrs	
	Introduction to the overview and importance of the course.										
1	CELLULAR PHYSIOLOGY: Introduction to Physiology, Introduction to Modeling and Review of Electric Circuits. Review of Cellular Physiology, Cellular Metabolism and Kinetics, Membrane Dynamics. Ion Transport types of transport and Cellular Homeostasis, The Resting Potential. Regulation of Cell Function and Cell Cycle.									08	
2	NEUROMUSCULAR PHYSIOLOGY: Review of Nervous System, The Action Potential, Propagation of Action Potentials measurement by Patch Clamp, Skeletal Muscle, Neuromuscular Junction and Synaptic Transmission, Smooth Muscle, study of Demyelinating Diseases									10	
3	RENAL SYSTEM PHYSIOLOGY: Overview of renal physiology. Clearance equation and biophysics of filtration, reabsorption and secretion. Counter-current multiplication and exchange, acid base balance, Regulation of body temperature.									07	
4	CARDIOVASCULAR PHYSIOLOGY: Review of Cardiovascular Physiology, The ECG, causes and classification of Arrhythmias, Characteristics of Defibrillation phenomena, Blood Pressure-regulation & controlling factors, Pressure Volume Relationships, Models of Circulation, Cardiac Output and methods of estimation, Cardiac Regulation, Physiological aspects of Myocardial infarction.									12	
5	RESPIRATORY PHYSIOLOGY: Review of Respiratory Physiology, Mechanics of breathing, Transport and control of gases in blood, Ventilation, alveolar, shunt and dead space equations, Lungs volume and capacities, Regulation of respiration, Pulmonary function tests.									08	
Practical content: Term Work and Practical shall be based on the above syllabus.											
Text Books:											
1	Text Book of Physiology by Guyton.										
2	Text Book of Physiology by West & Todd										
3	Richard S Snell, Clinical Anatomy by Regions: Lippincott Williams & Wilkins, 8th edition, 2007.										
4	Best and Taylor, Physiological basis of Medical practice, The Living Body, B.I. Publication, 1980.										
Reference Books											
1	Richard Drake, A. Wayne Vogl, Adam W. M. Mitchell, and Richard Tibbitts, Gray's Atlas of Anatomy: Churchill Livingstone, 1st edition, 2007.										
2	Kenneth Saladin, Anatomy & Physiology: The Unity of Form and Function, McGraw-Hill College, 2006										
3	David Shier, Jackie Butler, Ricki Lewis Hole's Human Anatomy & Physiology McGraw-Hill College, 2006.										
4	Mount castle Textbook of medical physiology Better World Books, IN, USA										
5	Walter F. Boron, Textbook of medical physiology, W.B. Saunders Company										

