

SEMESTER I & II
LSM2231 GENERAL PHYSIOLOGY

Prerequisite: GCE 'A' level Biology or H2 Biology or equivalent or LSM1301

Workload: 26 lecture hours + 2 CA hours + 4 tutorial hours + 18 laboratory hours

This module deals with "General Physiology" and its theme is "Biological Transducers and Energy Transformation". This module will start with bioenergetics which stresses on the application of thermodynamics to physiological processes in both animals and plants. Six types of energy will be dealt with, concerning (1) the transformation of light energy to chemical energy by plants, (2) the transformation of chemical energy to chemical potential energy of ions and water across bio-membranes, (3) the transformation of chemical potential energy to electrical energy by plasmalemma with special emphasis on neurons, (4) the transformation of chemical energy to mechanical energy during animal locomotion, and (5) and the production and release of heat during energy transformation. In this module, the important concept of homeostasis, with special emphasis on the balance of heat gain and heat loss to maintain a constant body temperature will be covered.

S/N	Topics	Lecture hours
1.	a. Photosynthesis: from light to chemical energy b. Water and solute transport c. Water flux in plants	10
2.	a. Food and energy intake in animals b. Cellular respiration: production of cellular chemical energy (ATP)	4 Y. K. Ip
3.	a. Diffusion, facilitated diffusion and active transport: from chemical energy to chemical potential energy b. Ionic gradients and membrane potential: from chemical potential energy to electrical energy c. Neural signals	6
4.	a. Cilia, flagella and amoeboid movement: from chemical energy to mechanical energy b. Muscle contraction	6 Y. K. Ip
Total Lectures:26h		
CA : 2h		
Tutorials: 4h		
Practicals: 6x3= 18h		
Total hours:		50h

REFERENCE BOOKS:

R Garrett and C M Grisham, Molecular Aspects of Cell Biology (Saunders College Publishing, New York, 1995)
 D Randall, W Burggren and K French, Animal Physiology, 4th Edition (W H Freeman and Company, New York, 1997)
 W. G. Hopkins and N. P.A. Hüner. Introduction to plant physiology. 4th Edition. (Hoboken, N.J.: Wiley, 2009)

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