

**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

**Course description:**

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.	<b>a. Photosynthesis:</b> from light to chemical energy <b>b. Water and solute transport</b> <b>c. Water flux in plants</b>	10
2.	<b>a. Food and energy intake in animals</b> <b>b. Cellular respiration:</b> production of cellular chemical energy (ATP)	4 Y. K. Ip
3.	<b>a. Diffusion, facilitated diffusion and active transport:</b> from chemical energy to chemical potential energy <b>b. Ionic gradients and membrane potential:</b> from chemical potential energy to electrical energy <b>c. Neural signals</b>	6
4.	<b>a. Cilia, flagella and amoeboid movement:</b> from chemical energy to mechanical energy <b>b. Muscle contraction</b>	6 Y. K. Ip
Total Lectures:26h CA : 2h Tutorials: 4h Practicals: 6x3= 18h		
<b>Total hours:</b>		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, 4<sup>th</sup> Edition (W H Freeman and Company, New York, 1997)

W. G. Hopkins and N. P.A. Hüner. Introduction to plant physiology. 4<sup>th</sup> Edition. (Hoboken, N.J.: Wiley, 2009)

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