

**Foundation Module - Year 1 Semester I**  
**2013/14 Batch**

Topic	Objectives	Time	Dept.	T/ L Activity
	<b>At the end of the overview, the student should be able to:</b>			
<b>2013-1/SBM-1/1</b>				
<b>Health</b>				
<b>Introduction to health and determinants of health (Assignments)</b>		1 h	Community Medicine	Introductory Lecture and Student Assignment
	1. define the term health and identify the role and the responsibility of a doctor in sustaining health.	2 h	Community Medicine	2x1h SGD Student Assignments
	2. describe the evolutionary process of health care to understand the current concept of health.			
	3. effects of biological and environmental factors on health.			
	4. describe the organizational structure of preventive and curative health care services provided by the government and other health care services in Sri Lanka.			
5. explain the effects of lifestyle and psychological factors on health.				
6. describe the effects of socioeconomic and demographic factors on health.				
7. identify the responsible persons or institutions in Sri Lanka to ensure the health of people.				
8. identify the methods and techniques used to evaluate the health of a community, describe how the countries are classified using the health indices.				
	Presentation of student assignments	3 h	Community Medicine	Seminar / presentation of Student assignments



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<b>2013-1/SBM-1/2</b>				
<b>Overview</b>	understand,			
<b>a. Introduction to Anatomy</b>	1. the importance of studying human anatomy 2. that the study of the structure of the body is facilitated by dividing it in to subsections 3. anatomical nomenclature	1 h	Anatomy	Lecture (1 h)
<b>b. The multicellular organism</b>	1. understand the levels of organization of the multicellular organism from cells, tissues, organs and systems and their integration in to human being 2. understand the terms "totipotent" and "pluripotent " 3. understand that the functional unit of the multicellular organism is the tissue 4. state the basic systems of the body and their functions	1 h	Anatomy	Lecture (1 h)
<b>c. Microscopy</b>	1. identify the parts of the light microscope 2. handle the light microscope and state its uses 3. calculate the magnification 4. name the other microscopes and their uses (phase contrast, fluorescent, canning, transmission electron microscopes)	1 h	Anatomy	Lecture (1 h)
<b>2013-1/SBM-1/3</b>				
<b>The cell</b>				
<b>Structure and microscopic appearance</b>	describe, 1. the basic structure of the prokaryotic and eukaryotic cell 2. be able to describe the electron microscopic appearance of a normal eukaryotic cell 3. be able to understand that there are different types and size of cells (squamous, cuboidal, columnar)	3 h	Anatomy	Lecture (1 h) PD (2 h)
<b>2013-1/SBM-1/4</b>				
<b>Cell Basics</b>				
	1. describe the fundamental unit of life (cell)			
	2. describe the basic functions of the cell organelles and the membrane	1 h	Biochemistry	Lecture (1 h)
	3. cell- structural adaptations to function	1 h	Anatomy	Lecture (1 h)

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<b>2013-1/SBM-1/5</b>				
<b>a. Membrane</b>	describe the basic structure & functions of the cell membrane	1h	Biochemistry	Lecture (1 h)
<b>b. Biomolecules</b>	briefly describe the biomolecules (carbohydrates, amino acids, proteins, lipids, ) of the cell and their importance in cellular function	10 h	Biochemistry	Lecture (4 h) +PD (6 h)
<b>2013-1/SBM-1/6</b>				
<b>Enzymes</b>	<p>1. describe what an enzyme is and the functions of enzymes in the body</p> <p>2. explain that enzymes are globular proteins which catalyse biological reactions.</p> <p>3. explain the mode of action of enzymes in terms of an active site, enzyme/substrate complex, lowering of activation energy and enzyme specificity.</p> <p>4. describe and explain the effects of pH, temperature, enzyme concentration and substrate concentration on enzyme action.</p> <p>5. follow the time course of an enzyme-catalysed reaction, by measuring rates of formation of products (for example using catalase) or rate of disappearance of substrate (for example using amylase).</p> <p>6. investigate the effects of temperature, pH, enzyme concentration and substrate concentration on the rate of enzyme-catalysed reactions, and explain these effects.</p> <p>7. explain the effects of competitive and non-competitive inhibitors on the rate of enzyme activity.</p> <p>8. describe the role of allosteric enzymes and isozymes.</p> <p>9. use the knowledge gained in this section in new situations or to solve related problems.</p>	8 h	Biochemistry	Lecture (2 h), PD (6 h)



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<b>2013-1/SBM-1/7</b>				
<b>a. Regulation of enzyme activity</b>	1. Illustrate the different ways in which activity of existing enzymes could be regulated, citing examples.	1 h	Biochemistry	Lecture (1 h)
	2. recognize that most regulatory enzymes are allosteric.			
	3. explain how allosteric modulators regulate enzyme activity.			
	4. recall the regulatory functions of the following; hexokinase, glucose 6-phosphatase, phosphofructokinase, fructose diphosphatase, pyruvate dehydrogenase, pyruvate carboxylase, citrate synthase and isocitrate dehydrogenase, acetyl CoA carboxylase, HMG CoA reductase, aspartate carbamoyl transferase and phosphoribosyl pyrophosphate amino transferase.			
	5. explain how the activity of an enzyme could be regulated by covalent changes in its molecule.			
	SBM-1/6 & SBM-1/7	2 h	Biochemistry	SGD (2 h)
<b>b. Energy for the cell</b>	1. state the need for energy for cellular activity 2. identify the mode of energy production	1 h	Biochemistry	Lecture (1 h)
<b>2013-1/SBM-1/8</b>				
<b>Energy for the cell</b>				
<b>a. Glycolysis</b>	1. recognise that glycolysis is an universal pathway			Lecture (1 h)
	2. outline the glycolytic pathway and its rate limiting steps			
	3. identify the reaction where substrate level phosphorylation occurs			
	4. differentiate between aerobic and anaerobic glycolysis			
<b>b. HMP Shunt</b>	1. explain the role of the HMP shunt in different cells			Lecture (1 h)
	2. outline the pathway and its rate limiting step			
	3. list the tissues that have an active HMP Shunt and explain the need for it to be active.			
	4. explain why it is considered as a shunt?			
<b>c. TCA Cycle</b>	1. list in sequence the enzymes and co enzymes of the TCA cycle.	10 h	Biochemistry	Lecture (1 h)
	2. recognise that it is a key pathway for integration of various metabolic pathways			
	3. explain the amphibolic role of the pathway (plays a role in both oxidative and synthetic pathways)			
	4. explain how the pathway is regulated			
	5. describe the entry of fatty acids, pyruvate and amino acids into the TCA cycle.			

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<b>d. Electron transport chain</b>	<ol style="list-style-type: none"> <li>1. state the function of the electron transport chain.</li> <li>2. describe the components of the chain</li> <li>3. describe how ATP is generated during electron transport.</li> <li>4. state the final electron acceptor and the end product formed at the end of aerobic respiration.</li> </ol>		100 y	Lecture (1 h)	
<b>e. Oxidation of fatty acids, ketone bodies &amp; amino acids</b>	<ol style="list-style-type: none"> <li>1. outline the main events taking place during oxidation of fatty acids</li> <li>2. recognise that fat produce more energy upon oxidation compared to that of carbohydrates and proteins</li> <li>3. describe how the oxidation of fatty acids is regulated</li> <li>4. recognise that ketone bodies serve as a fuel for extrahepatic tissues</li> <li>5. recognise that transamination and oxidative deamination are methods for the removal of amino groups before oxidizing the carbon skeleton.</li> <li>6. differentiate glucogenic from ketogenic amino acids</li> <li>7. recognise that Ala, Asp, and Glu are the major amino acids in blood during fasting and they carry NH<sub>2</sub> groups to the liver for disposal as urea.</li> <li>8. state the situations where catabolism of amino acids are increased</li> </ol>			Lecture (1 h)	
<b>2013-1/SBM-1/9</b>					
<b>Synthetic Functions</b>					
<b>a. Carbohydrate</b>	<ol style="list-style-type: none"> <li>1. state what gluconeogenesis is, and explain how it differs from glycolysis.</li> <li>2. state the rate limiting steps of gluconeogenesis and explain how they are regulated.</li> <li>3. describe the process of glycogenesis and explain how it is regulated</li> <li>4. outline the processes involved in the synthesis of fructose, galactose and lactose.</li> </ol>			Lecture (1 h)	
<b>b. Lipids</b>	<ol style="list-style-type: none"> <li>1. outline the process of fatty acid synthesis.</li> <li>2. state the characteristic features of the 'fatty acyl synthase' enzyme.</li> <li>3. state how fatty acid synthesis is regulated.</li> <li>4. outline the process of cholesterol synthesis</li> <li>5. state how mevolanate is synthesised.</li> <li>6. state how cholesterol synthesis is regulated.</li> <li>7. explain how ketone bodies are synthesised.</li> <li>8. state the importance of ketone bodies in energy production.</li> </ol>	11 h	Biochemistry	Lecture (1 h) Lecture (1 h) Lecture (1 h)	 Chairperson Curriculum Coordinating Committee Faculty of Medicine University of Peradeniya

<b>c. Nucleic acids</b>	1. state the precursors of purine and pyrimidine nuclei.			Lecture (1 h)
	2. describe the role of PRPP in nucleic acids synthesis			
	3. explain how the purine and pyrimidine syntheses are regulated.			
<b>d. Cell division</b>	1. describe mitosis and meiosis (giving examples) stating their importance	2 h	Anatomy	Lecture (2 h)
	2. be able to state the phases of the cell cycle			
	3. state the events that take place in the cell cycle	1 h	Biochemistry	Lecture (1 h)
<b>2013-1/SBM-1/10</b>				
<b>Tissues of the body</b>				
<b>a. Introduction to basic tissue</b>	1. state the basic tissue types of the body, their distribution and arrangement	7 h	Anatomy	Lecture (1X3 h) PD (4 hr)
<b>b. Epithelia and glandular tissue</b>	1. identify the different types of epithelial tissue, glandular tissue and connective tissue giving examples			
<b>c. Connective tissue</b>	2. describe the light microscopic appearance 3. describe how the structure of epithelial, glandular and connective tissues adapted to perform the functions			
<b>2013-1/SBM-1/11</b>				
<b>Homeostasis</b>				
<b>a. Introduction to cellular homeostasis</b>	1. state the role of hormones in metabolic regulation	1 h	Biochemistry	Lecture (1 h)
<b>b. Introduction to Body Homeostasis</b>	1. explain the term internal environment	1 h	Physiology	Lecture (1 h)
	2. explain the mechanisms by which the various systems of the body maintain homeostasis			
	3. explain what is meant by "feedback mechanisms"			
	4. explain giving an example, how homeostasis is disturbed			

*J. A. Edmundo*

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<b>c. Body composition, membrane transport mechanisms, fluid and electrolyte balance and pH</b>				
<b>i. Body composition</b>	<p>1. list the body fluid compartments and state the percentages of water and concentration of electrolytes in each compartment</p> <p>2. state the composition of the body in terms of body water, lean body mass and body fat and the variations in body composition (Introduce body mass index-BMI).</p> <p>3. state the basis percentage of fat in the body and its variations with sex and age</p> <p>4. state the basis of estimation of body fat from skin fold thickness</p> <p>6. measure skin fold thickness in common sites and determine the body fat percentage</p> <p>7. determine BMI from anthropometric measurements and state the basis of its use as an index of obesity</p>	3 h	Physiology	Lecture (1 h) + PD (2 h)
<b>ii. Membrane transport</b>	explain cell membrane structure and permeability characteristics with reference to simple diffusion, facilitated diffusion, active transport, phagocytosis and pinocytosis, osmosis	4 h	Physiology	Lecture (2 h) PD (2 h)
<b>iii. Ion channels</b>	describe the functions of ion channels and transport proteins and explain how contribute to selective permeability of the plasma membrane	2 h	Physiology	Lecture (2 h)
<b>iv. Fluid balance</b>	<p>1. list the routes of fluid intake and output and recognise that in health, intake equals output</p> <p>2. explain the normal variations and clinical situations where the fluid intake is not equal to output</p>	5 h	Biochemistry	CCR (4 h discussion + 1 h lecture)
<b>v. Acid base balance</b>	understand the basic principles of acid-base balance and maintenance of blood pH	4 h	Biochemistry	Lecture (1 h) PD (3 h)
<b>vi. Disposal of cell waste</b>	explain the mechanisms of disposal of cell waste (water-soluble and water-insoluble)			

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<b>vii. Disposal of nitrogenous waste</b>					
<b>Urea cycle &amp; regulation, Uric acid, Creatinine</b>	1. explain the modifications needed to be made prior to excretion of a substance	6 h	Biochemistry	Lecture (2 h)	
	2. list the biomolecules whose catabolism leads to the formation of nitrogenous waste.				
	3. state the role of transamination and oxidative deamination in the removal of amino nitrogen.				
	4. describe the importance of urea cycle in excretion of N waste.			PD (3 h)	
	5. describe the urea synthesis pathway and its regulation				
	6. explain how nucleic acids are catabolised				
	7. state how the catabolism is regulated				
	8. state the precursors and function of creatine phosphate				Lecture (1 h)
	9. state why creatinine excretion is obligatory				
	10. state how sulphur is excreted				
<b>2013-1/SBM-1/12</b>					
<b>Introduction to Nervous tissue &amp; Nervous system</b>	1. describe the general arrangement of nervous system and nervous tissue 2. describe the arrangement of a spinal nerve, dermatomes and myotomes Body wall nerve supply Neurovascular plane Nerve supply of the limb	1 h	Anatomy	Lecture (1 h)	
<b>2013-1/SBM-1/13</b>					
<b>Autonomic Nervous System</b>	1. compare and contrast the sympathetic and parasympathetic NS in terms of; outflow from the CNS/ pre-ganglionic and postganglionic fibres/ neurotransmitters/ receptors	1 h	Physiology	Lecture (1 h)	
<b>2013-1/SBM-1/14</b>					
<b>Early embryogenesis</b>	describe	5 h	Anatomy	Lectures (5 h)	
	1. the male and female germ cells and their origin				
	2. the cyclical changes in the endometrium after puberty				
	3. fertilization and factors affecting fertilization				
	4. implantation and factors affecting implantation				
	5. the process from fertilized ovum to germ layer formation				
	6. state the basic tissues derived from the germ layers				
	7. formation of the neural tube, neural crest cells and their derivatives				
	8. the development of pharyngeal arches				
9. introduction to congenital abnormalities and twinning					

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2013-1/SBM-1/15					
Human Genetics					
<b>a. Introduction</b>	Overview of the following	1 h	Anatomy	Lectures (1 h)	
	1. understand the importance of protein molecules in cellular functions and maintaining the structure ,				
	2. state how genetic material store information of the amino acid sequence of a polypeptide				
	3. state how the information is transferred to the next generation				
	4. describe arrangement of genetic material in prokaryotic and eukaryotic cells				
	5. be able to state the importance of studying genetics and a brief history				
	6. be able to describe polymorphism, polymorphic gene and house keeping genes etc.				
<b>b. Chromosomes</b>	1. describe the basic structure and classification of	2 h	Anatomy	Lecture (2 h)	
	2. understand what is meant by Ploidy , diploid, haploid , aneuploidy, trisomy, monosomy ...				
	Describe alleles, heterozygous, homozygous, dominant, recessive etc.				
	3. describe the normal karyotype and karyotyping procedure				
	4. describe chromosomal abnormalities and their consequences (structural & numerical)				
<b>c. Nucleic acids and genes</b>	1. describe the structure & function of nucleic acids	1 h	Biochemistry	Lecture (1 h)	
	2. define 'gene'				
	3. state the role of genes in the body				
	4. state what is gene expression				
<b>d. Inheritance</b>	1 explain what is meant by a Pedigree	3 h	Anatomy	Lecture(1 h) , PD (2 h)	
	2. identify the symbols used in a Pedigree				
	3. construct a Pedigree				
	4. analyse and interpret a Pedigree				
		5. describe the term Mendelian Inheritance using examples		2 h	Lecture (2 h)
		6. describe the term polygenic inheritance using examples		1 h	Lecture (1 h)
<b>2013-1/SBM-1/16</b>					
<b>Human evolution</b>	describe the evolution of man	1 h	Anatomy	Lecture (1 h)	

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<b>2013-1/SBM-1/17</b>				
<b>Free radicals and Antioxidants</b>	1. define a free radical.	3 h	Biochem istry	Lecture (1 h) SGD (2 h)
	2. explain how free radicals are formed in the body.			
	3. state the effect of free radicals on biomolecules			
	4. describe how free radicals lead to ill health			
	5. explain what an antioxidant is			
	6. list the substances that act as antioxidants			
	7. describe giving examples, how antioxidants counteract the effects of free radicals			
<b>2013-1/SBM-1/18</b>				
<b>Basic Statistics, units &amp; measurements</b>	1. Introduction to statistics	1 h	Physiolo gy	Lecture (1 h)
	2. identify basic units of length, mass, volume, temperature in the metric system			
<b>2013-1/SBM-1/19</b>				
<b>Introduction to Imaging</b>	to know the basic different imaging modalities and the basic principles of them	1 h	Radiolog y	Lecture (1 h)

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