Department of Biochemistry & Microbiology
School of Health & Life Sciences
North South University

Generalized course outline for BIO103 course for Spring 2018 Semester

Chapter	Contents	Lec No.
1. Introduction to Biology	Biology, Scope, Themes; Life: definition, examples history, characteristics; classification; Hierarchical organization of life	2
2. Chemistry of life	Atoms & elements; Molecules & bonds; Electronegativity; Polar & non-polar bonds; Water: Properties, Characteristics, Distribution inside human body; Solutions, Acids, Bases, pH, Biological Buffers; Diffusion, Osmosis, Active Transport	2
3. Biological Macromolecules	Carbohydrate, Lipid, Protein and Nucleic acids	2
Assessment: At least 1 Quiz exam and midterm-I		
4. Central Dogma of Molecular Biology	Gene, Genome: Definition; Nuclear and Mitochondrial genome; Flow of Genetic Information: Sketch the pathway of protein synthesis by mentioning process involved; Transcription, Translation: Definition; where those occurs (in which organelle).	1
5. Cell structure and function	**Cell:** Definition, Theory; Types of cells; Prokaryote, Eukaryote with examples; Common cell features of both Prokaryote and Eukaryotes: Cell Membrane, Genetic Material, Cytoplasm; Characteristic structural features of Prokaryotes; Characteristic structural features of Eukaryotes; Name of one Bacteria *Escherichia coli*. Structural organization of bacteria showing major organelles; Structural organization of animal cell showing major organelles; Structural organization of plant cell showing major organelles; Differences between prokaryotes and eukaryotes; Name of organelles found in Eukaryotes; **Structure and Functions** of Cell membrane, Nucleus, Mitochondria, Chloroplasts, Ribosomes, Endoplasmic Reticulum, Golgi apparatus, Lysosomes, Peroxisomes. Difference between Plant and Animal cell structure.	2
6. Cellular reproduction	**Cell cycle:** Definition, Name of Different phases of cell cycle, What happens in each phase; **Cell reproduction:** Definition, Types of cellular production; Asexual reproduction: Definition, Names of asexual production in animal, plant and bacteria with examples; **Cell Division:** Definition, Types of cell division; Mitosis: Characteristic features of mitosis, Overview of mitosis, Instances of Mitosis; Meiosis: Characteristic features of Meiosis, Overview of Meiosis, Instances of Meiosis; Number of Chromosomes in Human, Autosomes, Sex Chromosome; Somatic cell or Body cells, Sex cells or Gamets; Name of Organs that produces Gamets in Human and Plants; Zygote; Definition; Difference between mitosis and meiosis.	2
7. Energy of life	**Metabolism:** Definition, Types of metabolism with examples, specific functions of metabolism; Aerobic and Anaerobic respiration with examples; Circumstances of anaerobic respiration with examples; **Enzymes:** Definition, Characteristics of enzymes; **Cellular respiration**: types of cellular respiration; Equation of aerobic respiration, Where it occurs; Equation of anaerobic respiration by bacteria, What is it called; Equation of anaerobic respiration by Yeast; Instances anaerobic respiration occurs in animals including human, Equation for that; **Photosynthesis:** Respiration by Plant, Definition, Complete Equation, Role of Chloroplast.	2
Assessment: At least 2 Quiz exams and midterm-II		
8. Human Physiology	**Homeostasis:** Definition; Name organs involved in homeostasis; Basic mechanism by which homeostasis is maintained-Feedback mechanism; Role of thermoregulatory centre (TRC); Name of regions of hypothalamus of brain responsible for the maintenance of different homeostatic, autonomic functions; Core body temperature: how it can vary normal ways; how temperature variation is retained to normal: regulation steps; What happens when we get too hot; What happens when we get too cold; Responding organ: Skin; Name three primary layers of skin; Functions of skin; Condition when variation of normal core body temperature cannot be corrected: Fever and hyperthermia.	5

	Circulatory system: Definition; Components; How it works; ***Blood:*** Definition; Function; Composition; Functions of blood cells and fluid part; Blood cells count how related with functional disorders or diagnosis; knowing Blood group ***Blood Vessels:*** Definition; Types; Difference between Artery and Veins. ***Heart:*** Components; Function; Illustration on how heart pumps blood and discuss; Illustration and discussion on heart disease and stroke can be developed; Preventive measures to avoid heart disease in terms of life and food styles. **Respiratory system:** Definition; Two Phases of respiration; Components; Illustration and discussion on how red blood cell carries oxygen from lung to tissue and tissue to lung. **Excretory system:** Definition; components with figure; functional unit of kidney; Osmoregulation; Functions of kidney. **Digestive system:** Digestion definition; components of Human Digestive System; different parts of human alimentary canal; Saliva, and its components; Role of Oral Cavity, Esophagus in digestion; Peristalsis; functions of Stomach; Chyme; functions of small Intestine ; Name and definition of accessory organs; Bile and role of bile in digestion; role of liver and pancreas.	
9. Health and disease	**Food & Nutrition:** Food: Definition, Function, Classification with examples; Name of basic nutrients requirement of human body; Unit of energy, Calorie value of Carbohydrates, Fats and Proteins; Balanced diet: Definition, Components; Name factors to be considered to formulate a balanced diet; Illustration of balanced diet chart for adult, total calorie requirements for adult Male and Female; BMI: Definition, Equation, BMI range for underweight, normal, overweight and obese: Significance of BMI; Vitamins: Definition, Classification, One deficiency disorder of each vitamins and food sources; Minerals: Important minerals of life: Sources, deficiency disorder name. **Diabetes and Lipid Profile:** Diabetes Mellitus: Definition; Hyperglycemia, Possible causes of hyperglycemia; Type of Diabetes: Characteristics features, Mechanisms involved for the development of type I and type II diabetes; Differences of type I and type II Diabetes; Gestational diabetes: Definition, how it develops, possible fates of a baby born to mother having diabetes during pregnancy; Sign and symptoms of Diabetes; Diabetes diagnosis, Normal blood glucose level, glucose level considered as diabetic; Lipid profile: Definition, Tests included in lipid Profile, Implication of doing Lipid Profile test. **Cancer:** Cellular Basis of Cancer, Definition, How cancer occurs; Breast cancer: Name of different types of Breast Cancer, Predisposing risk factors of breast cancer, Name of methods for the screening and diagnosis of breast cancer; Name of the ways for the treatment of breast cancer; Difference between Tumerectomy and Mastectomy; Sign and symptoms of breast cancer.	3
Assessment: At least 1 Quiz exam and Final		

Textbook:

1. Kathleen Anne Ireland. **Visualizing Human Biology** 3rd Edition. John Wiley & Sons, Inc. 2011.

Performance Evaluation

Exam	Mark Distribution
Midterm I	20
Midterm II	20
Quiz (2 x 10)	20
Final Exam	30
Assignment	5
Attendance	5
Total	100

** For midterm if there is any regular class or strike on Quiz or Midterm day, the exam will automatically move to the Next working dayy of that week*
*** There will be some extra classes on Friday, Mostly the Midterm Exam will move on Friday.*

Grading:

Letter Grade	Grade Point	Numerical Grade	Letter Grade	Grade Point	Numerical Grade
A	4.0	93-100%	C	2.0	**73-76%**
A-	3.7	90-92%	C-	1.7	**70-72%**
B+	3.3	87-89%	D+	1.3	**67-69%**
B	3.0	83-86%	D	1.0	**60-66%**
B-	2.7	80-82%	F	0.0	**Below 60%**
C+	2.3	77-79%			

** Neatness in Midterms and Finals exam will provide 5% bonus point. This will not provide to the student who will not give Midterm in due time or in case of midterm retake. Moreover, they will be penalized with 5% mark for the late exam.*

Policies and Expectations

Class attendance: 100% attendance is expected and absences will detract from one's grade

Class participation: Intelligent, vocal participation in class will be a primary determinant of class participation grade, although other types of contributions will also be recognized.

Scheduling and Deadlines: Please plan carefully. Exam schedules and deadlines for submitting assigned work are firm, and extensions will not be granted for conflicts with the workload for other courses. Accommodations due to illness or other personal situation must be requested and negotiated under special circumstances.

Academic Honesty: Do not lie, cheat, or plagiarize. Do your own work on exams; properly cite your sources of information. Acknowledge others work.

Please Note: The schedule and procedures for this course are subject to change in the event of extenuating circumstances. Changes in this syllabus will be announced in lecture. In addition, revised syllabuses will be distributed for any large-scale changes.