

## Global Learning Semesters

### Course Syllabus

Course: BIOL-101 General Biology 1

Department: Health and Life Sciences

Host Institution: University of Nicosia, Nicosia, Cyprus



Course Summary		
Course Code	Course Title	Recommended Credit Hours
BIOL-101	General Biology 1	4
Semester Offered	Contact Hours	Prerequisites
Please contact us	42-45	None
Department	Level of Course	Language of Instruction
Health and Life Sciences	Lower Division	English

### Course Description

The purpose of the course is to give students an understanding of the basic principles of biology and to raise fundamental questions that will strengthen their interest in the science of life. Students get basic knowledge in the biological chemistry of the cell- structure (Cell membrane and Organelles) and the function of biological macromolecules; on Bioenergetics-Thermodynamics and on Photosynthesis and Respiration. This part of the course is completed with an introduction to cell growth and reproduction (Mitosis, Meiosis) in Prokaryotic and Eukaryotic and to cellular diversity. The course format includes 3h lectures/week and 2h hands on laboratory experience.

### Prerequisites

None

### Topic Areas

1. Introduction, Levels of Organization, The Cell (prokaryotic and eukaryotic) and cell organelles;
2. Elements, Compounds, Atoms, Structure, Energy Levels, Chemical Bonds, Chemical Reactions
3. Properties of Water, pH, pKa, Acid/bases
4. Structure function of macromolecules in the living cell
5. Membranes and membrane proteins; cell communication
6. Laws of Thermodynamics, Structure of ATP, Enzymes, Enzyme Activity, Feedback Inhibition
7. Glycolysis and Gluconeogenesis. The TCA Cycle.
8. Fat Synthesis and Degradation.
9. Electron Transport and Oxidative Phosphorylation (Photosynthesis and respiration)
10. The Pentose Phosphate Pathway. Amino Acid Metabolism; purine and pyrimidine metabolism and the urea cycle
11. Cell Reproduction: The Cell Cycle, Mitosis, Regulation of cell cycle, Cancer
12. Sexual Reproduction: Meiosis.
13. Prokaryotes and Metabolic Diversity, Reproduction of Prokaryotes
14. The Origins of Eukaryotic Diversity, Protista

### Lab Experiments

The goal of this course is also to give students a real understanding of Biology/ Biochemistry techniques with firsthand contact with the materials and methods used in this representative group of laboratory exercises. Students

are required to write and present “laboratory reports” on at least two representative laboratory exercises.

1. The process of Scientific Inquiry: The elements of an experiment
2. Use of the Microscope
3. Diversity of Life: The Six Kingdoms
4. Biomolecules: Quantitative determination of Saccharides, Lipids and Proteins
5. Enzymes: Effect of pH on the enzyme activity
6. Enzymes: Effect of temperature on the enzyme activity
7. Membrane structure and Function: Osmosis
8. Photosynthesis: Isolation of leaf pigments
9. Photosynthesis: Absorption spectra of leaf pigments
10. Respiration: Alcohol fermentation
11. Fossil Classification and Phylogeny
12. Biological Diversity
13. Students’ Report Presentation

## Readings and Resources

### Required Textbook

1. “Biology”, Sixth Edition (with Student CD-ROM), by Neil A. Campbell and Jane B. Reece Publisher: Benjamin/Cummings; ISBN: 0-8053-6624-5
2. A “General Biology” Laboratory manual has been prepared and is available to the students from the College’s Copy Center.

### Recommended Textbooks

1. “Biology: Concepts and Connections” by Neil A. Campbell , Naomi E. Ervin Publisher: Benjamin/Cummings; 4th edition (July 22, 2002) ISBN: 080536627X [www.campbellbiology.com](http://www.campbellbiology.com)
2. “Practical skills in Biology” Third edition 2003 by Allan Jones, Rob Reed and Jonathan Weyers, Publisher: Benjamin/Cummings; ISBN: 0-130-45141
3. Investigating Biology” First edition 2002 by Judith G. Morgan and M. Eloise B. Carter, Publisher: Benjamin/Cummings; ISBN: 0-8053-7366-7
4. “Student Study Guide” by Martha R Taylor Publisher: Benjamin/Cummings; ISBN: 0-8053-6634-2
5. Medical Biochemistry by John Phd Baynes (Editor), Marek H. Dominiczak Mosby-Year Book; ISBN: 0723430128; Bk&Cd-Rom edition (September 15, 1999)
6. Guide to Lehninger Principles of Biochemistry by Marcy Osgood, Karen Ocorr Publisher: Worth Publishing; 3rd edition (December 2000) ISBN: 1572591676
7. BIOCHEMISTRY: The Molecular Basis of Life, Third Edition by Trudy McKee, James R. McKee, Publishers: McGraw-Hill, 2002 ISBN: 0-07-231592-X
8. BASIC CONCEPTS IN BIOCHEMISTRY: A Student’s Survival Guide, Second Edition by Hiram F. Gilbert, Publishers: McGraw-Hill, 2000 ISBN: 0-07-135657-6
9. Harper’s Biochemistry by Robert K., Md Murray, Daryl K. Granner, Peter A. Mayes, Victor W. Rodwell, Appleton & Lange, Robert K. Murray Publisher: McGraw-Hill/Appleton & Lange; 25th edition (August 28, 1999) ISBN: 0838536840
10. The Stuff of Life : Profiles of the Molecules That Make Us Tic by Eric P. Widmaier Publisher: Owl Books; 2nd Rep edition (September 1, 2003) ISBN: 0805074376
11. Principles of Biochemistry With a Human Focus by Reginald H. Garrett, Charles M. Grisham, Garrett Publisher: Brooks Cole; 1st edition (May 14, 2001) ISBN: 0030973694

12. Biochemical Individuality by Roger Williams Publisher: McGraw-Hill; 1 edition (September 11, 1998) ISBN: 0879838930
13. Metabolic Regulation: A Human Perspective by Keith N. Frayn Publisher: Blackwell Publishers; 2nd edition (October 1, 2003) ISBN: 063206384X
14. Proteins : Structures and Molecular Properties by Thomas E. Creighton Publisher: W. H. Freeman; 2nd edition (August 15, 1992) ISBN: 071677030X
15. "Understanding the Human Genome Project" by Michael A. Palladino, Publisher: Benjamin/Cummings; ISBN: 0-8053-6774-8
16. "Stem Cells and Cloning": by David A. Prentice, Publisher Benjamin/Cummings; ISBN: 0-8053-4864-6
17. Human Molecular Genetics" by T. Strachan & A.P. Read, 2nd edn. (1999), John Willy & Sons Inc. New York
18. DNA: The Secret of Life by James D. Watson, Andrew Berry (Contributor) Publisher: Knopf; (April 1, 2003) ISBN: 0375415467
19. The Double Helix : A Personal Account of the Discovery of the Structure of DNA by J. Watson (Author) Publisher: Touchstone Books; (June 2001) ISBN: 074321630X
20. Animal Transgenesis and Cloning by Louis-Marie Houdebine Publisher: John Wiley & Sons (April 11, 2003) ISBN: 0470848286
21. Molecular Cell Biology, Fifth Edition by Matthew P Scott, Paul Matsudaira, Harvey Lodish, James Darnell, Lawrence Zipursky, Chris A Kaiser, Arnold Berk, Monty Krieger Publisher: W. H. Freeman; 5th edition (August 1, 2003) ISBN: 0716743663
22. Molecular Biotechnology: Therapeutic Applications and Strategies by Sunil Maulik, Salil D. Patel Publisher: Wiley-Liss; 1st edition (January 15, 1997) ISBN: 0471116815