Global Learning Semesters
Course Syllabus
Course: BIOL-102 General Biology II: Basics of Molecular Biology
Department: Health and Life Sciences
Host Institution: Intercollege, Nicosia, Cyprus

Course Summary		
Course Code	**Course Title**	**Recommended Credit Hours**
BIOL-102	General Biology II: Basics of Molecular Biology	4
Semester Offered	**Contact Hours**	**Prerequisites**
Please contact us	42-45	BIOL-101
Department	**Level of Course**	**Language of Instruction**
Health and Life Sciences	Lower Division	English

Course Description

BIOL-102 is a continuation of the BIOL-101 course which covers the fundamental principles of cell biology in living systems. In this course the student will proceed to study the basis of Mendelian Genetics and the Chromosomal basis of Inheritance. The course aims to give students a basic knowledge and background on the structure and function of genes and chromosomes and on genetic inheritance and the theory of evolution: Darwinian Theory of Evolution, Evolution of Populations, the Origin of Species and the Evolutionary History of Biological Diversity. The course format includes 3h lectures/week and 2h hands on laboratory experience

Prerequisites

BIOL-101

Topic Areas

1. Cell Division: Mitosis and Meiosis
2. Human Genetics: Karyotypes and Pedigrees
3. Mendelian Inheritance,
4. Chromosomes structure function
5. The Molecular Basis of Inheritance: Watson and Crick Model of DNA.
6. DNA Replication
7. Connection between Genes and Proteins: The Genetic Code,
8. RNA Transcription, Translation
9. Post Transcriptional Modifications and protein function
10. DNA/RNA Biotechnology
11. The genetic Basis of Development
12. The Darwinian Theory of Evolution, Natural Selection and Adaptation
13. The Evolution of Populations from a molecular perspective ,
14. The Concept of Biological Species: molecular similarities and differences

Lab Experiments

The goal of this course is also to give students a real understanding of techniques in Biology with firsthand contact with the materials and methods used in this representative group of laboratory exercises. This course also includes laboratory exercises on Evolution of Populations and Taxonomy and Systematics. Students are required to write

and present “laboratory reports” on at least three representative laboratory exercises.

1. Microbial Nutrition: Establishment of microbial culture
2. Microbial growth: Determination of the cell concentration in microbial cultures
3. Control of microorganisms: Evaluation of antimicrobial agents effectiveness
4. Effect of UV on Bacterial Viability
5. Genetics of Bacteria: Transformation of E. coli
6. Bacterial genome: Isolation of plasmid DNA. Isolation of DNA from Human blood samples
7. DNA technology Methods: DNA gel electrophoresis, and mapping of recombinant plasmids
8. Protein gel electrophoresis: Determination of the molecular weight of Proteins
9. Quantitative determination of proteins with Bradford’s method
10. Hemagglutination: Human Blood Typing. Population Genetics: The Hardy Weinberg equilibrium
11. Systematics and Taxonomy
12. 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
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