Global Learning Semesters
Course Syllabus
Course: BIOL-495 Perspectives of Biotechnology
Department: Health and Life Sciences
Host Institution: University of Nicosia, Nicosia, Cyprus

Course Summary		
Course Code	**Course Title**	**Recommended Credit Hours**
BIOL-495	Perspectives Of Biotechnology	3
Semester Offered	**Contact Hours**	**Prerequisites**
Please contact us	42-45	BIOL-320, BIOL-390
Department	**Level of Course**	**Language of Instruction**
Health and Life Sciences	Upper Division	English

Course Description

The focus of this course will be an overview of the biotechnology industry and drug development from many different perspectives: scientific, clinical, and ethical. The course will review the biotechnology products for genetic research and the drug development-strategies for understanding disease and gene defects, identifying potential drug targets, and development of active molecules against those drug targets. The student is introduced to the process of throughput screening of libraries of chemicals against specific drug targets that has revolutionized the drug discovery process. In addition, the student will learn about the management of the scientific research process for drug development (Clinical Research) (Phases 1-3), and the role of organizations in reviewing the safety and efficacy of genetic and biotechnology products and providing approval for marketing new drugs. (Food and Drug Administration FDA and European Medicines Evaluations Agency EMEA). The course also will focus on the ethical considerations in the conduct of medical research and the question of justice in access to genetic technologies and will explore these issues through discussion of recent research efforts in gene therapy, international clinical trials, cloning, stem cells, xenon transplantation, and the creation of genetic databases. The course format will be 3h/week lectures and assigned reading.

Prerequisites

BIOL-320, BIOL-390

Topic Areas

1. Introduction and History of Biotechnology
2. Core Technologies: DNA and Monoclonal Antibodies
3. Genetic Technologies: e.g., PCR, Genomics, Gene therapy,
4. Proteomics, Antisense,
5. Single nucleotide polymorphism (snips) based pharmacogenomics for individualized pharmacotherapy
6. Cell model based pharmacogenomics and pharmacotherapy
7. Pharmacogenetics in drug discovery and therapeutics
8. Biological Product Development Advances: e.g., Molecular engineering, Drug delivery, Combinatorial chemistry
9. Clinical drug development for Humans
10. Diseases & Indications for Approved Biologicals
11. Approved Biologicals: Hormone, Enzyme, Growth Factor, Mab, Interferons, etc.
12. Current therapeutic strategies in cardiovascular diseases cancer treatment and AIDS
13. Research ethics

14. Bioethics and Biotechnology (access to databases; genetic id).

Readings and Resources

Required Textbooks

1. Understanding Biotechnology by Aluizio Borem, Fabricio R. Santos, David E. Bowen Publisher: Prentice Hall PTR; 1st edition (January 17, 2003) ISBN: 0131010115
2. From Genome to Therapy: Integrating New Technologies with Drug Development - No. 229 by Gregory Bock, Dalia Cohen, Jamie Goode, Novartis Foundation, Symposium on from Genome to Therapy: Integrating New Technologies with, J. Craig Venter " Publisher: John Wiley & Sons (November, 2000) ISBN: 0471627445

Recommended Textbooks

1. Pharmacogenetics by Wendell W., Ph.D., Md. Weber Publisher: Oxford University Press; 1st edition (January 15, 1997) ISBN: 0195068785
2. Genetic Variance Detection: Technologies For Pharmacogenomics (Nuts & Bolts Series) by Karl Hecker Heinz Publisher: DNA Press (February 28, 2005) ISBN: 0974876550
3. Model Organisms in Drug Discovery by Pamela M. Carroll (Editor), Kevin Fitzgerald (Editor) Publisher: John Wiley & Sons (December 5, 2003) ISBN: 0470848936
4. Lexi-Comp's Pharmacogenomics Handbook by Larisa M. Humma, Vicki L. Ellingrod, Jill M. Kolesar Publisher: Lexi-Comp, Inc. (July 1, 2003) ISBN: 1591950600
5. Microbial Genomics and Drug Discovery by Thomas J. Dougherty, Steven J. Projan, STEVE PROJAN Publisher: Marcel Dekker (May 1, 2003) ISBN: 0824740416
6. Essentials of Medical Genomics by Stuart M. Brown Publisher: Wiley-Liss (November 1, 2002) ISBN: 047121003X
7. Pharmacogenomics: Social, Ethical, and Clinical Dimensions by Mark A. Rothstein (Editor) Publisher: Wiley-Liss; International Ed edition (January 10, 2003) ISBN: 0471227692
8. Biotechnology : An Introduction (with InfoTrac) by Susan R. Barnum Publisher: Brooks Cole; 2 edition (March 9, 2004) ISBN: 0534492967
9. Introduction to Biotechnology by William J. Thieman, Michael A. Palladino, William Thieman Publisher: Benjamin Cummings; 1st edition (August 8, 2003) ISBN: 0805348255
10. Pharmaceutical Biotechnology by D. J. A. Crommelin, Daan J. A. Crommelin, Robert D. Sindelar, Daan J.A. Crommelin Publisher: T&F STM ; 2nd edition (December, 2002) ISBN: 0415285011
11. Molecular Biotechnology: Principles and Applications of Recombinant DNA by Bernard R. Glick, Jack J. Pasternak Publisher: American Society Microbiology; 3rd edition (March 1, 2003) ISBN: 1555812244
12. Fundamentals of Clinical Trials by Lawrence M. Friedman, Curt Furberg, David L. Demets Publisher: Springer-Verlag; 3rd edition (November 1, 1998) ISBN: 0387985867
13. Human Trials: Scientists, Investors, and Patients in the Quest for a Cure by Susan Quinn Publisher: Perseus Publishing (May, 2002) ISBN: 0738206776
14. Textbook of Drug Design and Discovery, Third Edition by Povl Krogsgaard-Larsen (Editor), Tommy Liljefors (Editor), Ulf Madsen (Editor), U. Madsen Publisher: T&F STM ; 3rd edition (July, 2002) ISBN: 0415282888
15. RNA Interference Technology : From Basic Science to Drug Development by Andrew Fire (Foreword), Marshall Nirenberg (Foreword), Krishnarao Appasani (Editor) Publisher: Cambridge University Press (January 31, 2005) ISBN: 0521836778
16. Anticancer Drug Development Guide by Beverly A. Teicher, Paul A. Andrews, Beverly Teicher, Paul Andrews Publisher: Humana Press; 2nd edition (February, 2004) ISBN: 1588292282
17. Principles Of Proteomics (Advanced Text Series) by R.M. Twyman Publisher: BIOS Scientific Publishers (October 4, 2004) ISBN: 1859962734
18. Proteomics: Biomedical and Pharmaceutical Applications by HUBERT HONDERMARCK Publisher: Kluwer Academic Publishers (October 30, 2004) ISBN: 1402023227
19. Protein Engineering For Industrial Biotechnology by L. Alberghina, Lilia Alberghi Publisher: T&F STM (January 1, 2000) ISBN: 9057024128
20. Tissue Engineering, Stem Cells, and Gene Therapies (Advances in Experimental Medicine and Biology) by International Symposium on Biomedical Science and Technology 2002 ant, Y. Murat Elcin Publisher: Kluwer Academic/Plenum Publishers (August 1, 2003) ISBN: 0306477882

21. Model Organisms in Drug Discovery by Pamela M. Carroll (Editor), Kevin Fitzgerald (Editor) Publisher: John Wiley & Sons (December 5, 2003) ISBN: 0470848936
22. Genetic Factors in Drug Therapy : Clinical and Molecular Pharmacogenetics by David A. Price Evans Publisher: Cambridge University Press (December 16, 1993) ISBN: 052141296X
23. Pharmacogenomics: The Search for Individualized Therapies by Julio Licinio (Editor), Ma-Li Wong (Editor) Publisher: Wiley-VCH (May 24, 2002) ISBN: 3527303804