UTD	Professor	Mehmet Candas
	Course	BIOTECHNOLOGY TOPICS IN BIOLOGICAL SCIENCES BIOLOGY PREPARATION MS IN BIOTECHNOLOGY II BIOL-5V00-06M
	Term	Summer 2007
	Meetings	Monday and Wednesday, 4:00 p.m. - 5:30 p.m. Class Room: FO3.616

Professor	Mehmet Candas
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Office Location	FO 2.903
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Office Hours	Monday 2:00 p.m. - 4:00 p.m. Wednesday 2:00 p.m. - 4:00 p.m.
Other Information	Best way to reach Dr. Candas is via email communication. If you need to have a meeting, please send a message to schedule a meeting time.

General Course Information

Pre-requisites, Co-requisites, & other restrictions	This is the second part of the biotechnology primer program, Biology Preparation - MS in Biotechnology. The course is open to business, science and engineering students who are seeking to further their understanding of the concepts and mechanisms related to applications of molecular and cellular biology, biophysics, biochemistry, microbiology, genomics, proteomics, bioinformatics and systems biology to biotechnology research and product development. The course emphasizes that biotechnology represents a collection of approaches that use living cells and biological molecules to solve problems. The era of molecular biotechnology is defined by translational research in which life sciences discoveries are increasingly converted into technology applications and useful products. The central premise of the course is that biotechnological research is driven by the knowledge of cellular and biomolecular processes and expanding the boundaries of scientific applications to benefit mankind by providing better healthcare, enhanced agriculture, and a cleaner and safer environment.

Course Description

Themes selected for the course are based on fundamental aspects related to structure and function of biological molecules and the role of these molecules in biological processes. The course will explore the different fields of molecular biotechnology such as DNA cloning, genome research, functional genomics, proteomics, molecular imaging, diagnostics, bioprocessing and biomanufacturing. It will highlight current techniques utilized in research and development activities involving drug targets, biopharmaceuticals, gene- and cell-based therapies as well as agricultural and industrial applications.

The course is a combined undergraduate and graduate program and intends to be a biotechnology primer. It is open to business, science and engineering students who are seeking to further their understanding of the concepts and mechanisms related to applications of molecular and cellular biology, biophysics, biochemistry, microbiology, genomics, proteomics, bioinformatics and systems biology to biotechnology research and product development.

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	The course aims to familiarize students with concepts pertaining to techniques for understanding various contemporary areas of life sciences research and their applications that capitalize on the attributes of cells, biological molecules and processes utilized in the biotechnology industry.
Learning Outcomes	**The key objective is to generate a stimulating environment for understanding implications of interdisciplinary biology research and discussing the industrial environment of molecular biotechnology, including the business environment and opportunities and challenges related to future applications and developments. As such, the course will provide a view to developing practical applications and transferring basic research to tangible products or service offerings in biotechnology industry.**
Suggested Texts, Readings, & Materials	**An Introduction to Molecular Biotechnology: Molecular Fundamentals, Methods and Applications in Modern Biotechnology,** **Michael Wink (Editor)**

Assignments & Academic Calendar

Dates	Topics for BIOL-5V00-06A
May 14	Structure and function of biological molecules
May 16	Cell, cellular processes and evolution
May 21	Central dogma of molecular biology; transcription and translation
May 23	Isolation, purification and analysis of DNA; nucleic acid electrophoresis, hybridization, Southern and Northern blotting
May 28	Isolation and purification of proteins; centrifugation, precipitation and chromatography
May 30	Protein analysis; SDS PAGE, Western blotting
June 4	Recombinant DNA techniques; restriction enzymes, plasmids
June 6	Recombinant proteins; cloning and expression of genes
June11	PCR applications, primer design, RT PCR, real-time PCR, qPCR
June 13	Molecular beacons and nucleic acid hybridization-based diagnostics
June 18	DNA Sequencing, genome sequencing and annotation
June 20	Exam

Dates	Topics for BIOL-5V00-06M
June 25	Biotechnology; translational research and product development
June 27	Diseases research, drug targets and drug discovery
July 2	Molecular medicine, biomarkers and clinical research
July 4	cDNA and genomic DNA libraries, screening gene librarires
July 9	Genomics and functional genomics, gene expression profiling
July 11	Microarrays; making and using DNA arrays
July 16	Proteomics
June 18	2D gel electrophoresis, mass spectroscopy
July 23	RNA interference
July 25	Bioinformatics, systems biology
July 30	Agricultural and environmental biotechnology, transgenic plants, biofuels, biocatalysis in chemical industry
August 1	Exam

Course Policies

Grading (credit) Criteria	**There will be one exam. The exam is multiple choice and/or short answer questions.**
Make-up Exams	**Make-up exam will be provided in the event of illness (doctor's note required), official university business (e.g., athletic team), or professional school (e.g., medical school) interviews. Since religious holidays are known in advance, we must be informed of them at the beginning of the semester. Scheduled trips well in advance are acceptable, but it is best to inform us as soon as possible (not one or two days before an exam). Make-up exam may be different from regular exams, and may include a verbal component to test for understanding, and the drawing of models and structures.**
Class Attendance	**Strongly recommended. The classes will be conducted in an interactive manner to discuss information presented in specific chapters of the suggested text along with original research papers, review articles, industry reports and white papers. Class notes and/or assigned papers rarely can convey the emphasis placed on certain principles and technology applications during lectures. Biotechnology encompasses a broad range of interdisciplinary subjects in many areas of engineering and life sciences as well as business development and management practices. Learning of biotechnology is enhanced by reinforcement of topics presented in the lectures.**
Student Conduct and Discipline	**The University of Texas System and The University of Texas at Dallas have rules and regulations for the orderly and efficient conduct of their business. It is the responsibility of each student and each student organization to be knowledgeable about the rules and regulations which govern student conduct and activities. General information on student conduct and discipline is contained in the UTD publication, *A to Z Guide*, which is provided to all registered students each academic year.** **The University of Texas at Dallas administers student discipline within the procedures of recognized and established due process. Procedures are defined and described in the *Rules and Regulations, Board of Regents, The University of Texas System, Part 1, Chapter VI, Section 3*, and in Title V, Rules on Student Services and Activities of the university's *Handbook of Operating Procedures*. Copies of these rules and regulations are available to students in the Office of the Dean of Students, where staff members are available to assist**

	students in interpreting the rules and regulations (SU 1.602, 972/883-6391). **A student at the university neither loses the rights nor escapes the responsibilities of citizenship. He or she is expected to obey federal, state, and local laws as well as the Regents' Rules, university regulations, and administrative rules. Students are subject to discipline for violating the standards of conduct whether such conduct takes place on or off campus, or whether civil or criminal penalties are also imposed for such conduct.**
Academic Integrity	**The faculty expects from its students a high level of responsibility and academic honesty. Because the value of an academic degree depends upon the absolute integrity of the work done by the student for that degree, it is imperative that a student demonstrate a high standard of individual honor in his or her scholastic work.** **Scholastic dishonesty includes, but is not limited to, statements, acts or omissions related to applications for enrollment or the award of a degree, and/or the submission as one's own work or material that is not one's own. As a general rule, scholastic dishonesty involves one of the following acts: cheating, plagiarism, collusion and/or falsifying academic records. Students suspected of academic dishonesty are subject to disciplinary proceedings.** **Plagiarism, especially from the web, from portions of papers for other classes, and from any other source is unacceptable and will be dealt with under the university's policy on plagiarism (see general catalog for details). This course will use the resources of turnitin.com, which searches the web for possible plagiarism and is over 90% effective.**
Email Use	**The University of Texas at Dallas recognizes the value and efficiency of communication between faculty/staff and students through electronic mail. At the same time, email raises some issues concerning security and the identity of each individual in an email exchange. The university encourages all official student email correspondence be sent only to a student's U.T. Dallas email address and that faculty and staff consider email from students official only if it originates from a UTD student account. This allows the university to maintain a high degree of confidence in the identity of all individual corresponding and the security of the transmitted information. UTD furnishes each student with a free email account that is to be used in all communication with university personnel. The Department of Information Resources at U.T. Dallas provides a method for students**

	to have their U.T. Dallas mail forwarded to other accounts.
Withdrawal from Class	**The administration of this institution has set deadlines for withdrawal of any college-level courses. These dates and times are published in that semester's course catalog. Administration procedures must be followed. It is the student's responsibility to handle withdrawal requirements from any class. In other words, I cannot drop or withdraw any student. You must do the proper paperwork to ensure that you will not receive a final grade of "F" in a course if you choose not to attend the class once you are enrolled.**
Student Grievance Procedures	**Procedures for student grievances are found in Title V, Rules on Student Services and Activities, of the university's *Handbook of Operating Procedures*.** **In attempting to resolve any student grievance regarding grades, evaluations, or other fulfillments of academic responsibility, it is the obligation of the student first to make a serious effort to resolve the matter with the instructor, supervisor, administrator, or committee with whom the grievance originates (hereafter called "the respondent"). Individual faculty members retain primary responsibility for assigning grades and evaluations. If the matter cannot be resolved at that level, the grievance must be submitted in writing to the respondent with a copy of the respondent's School Dean. If the matter is not resolved by the written response provided by the respondent, the student may submit a written appeal to the School Dean. If the grievance is not resolved by the School Dean's decision, the student may make a written appeal to the Dean of Graduate or Undergraduate Education, and the deal will appoint and convene an Academic Appeals Panel. The decision of the Academic Appeals Panel is final. The results of the academic appeals process will be distributed to all involved parties.** **Copies of these rules and regulations are available to students in the Office of the Dean of Students, where staff members are available to assist students in interpreting the rules and regulations.**
Incomplete Grades	**As per university policy, incomplete grades will be granted only for work unavoidably missed at the semester's end and only if 70% of the course work has been completed. An incomplete grade must be resolved within eight (8) weeks from the first day of the subsequent long semester. If the required work to complete the course and to**

	remove the incomplete grade is not submitted by the specified deadline, the incomplete grade is changed automatically to a grade of F.
Disability Services	**The goal of Disability Services is to provide students with disabilities educational opportunities equal to those of their non-disabled peers. Disability Services is located in room 1.610 in the Student Union. Office hours are Monday and Thursday, 8:30 a.m. to 6:30 p.m.; Tuesday and Wednesday, 8:30 a.m. to 7:30 p.m.; and Friday, 8:30 a.m. to 5:30 p.m.** **The contact information for the Office of Disability Services is:** **The University of Texas at Dallas, SU 22** **PO Box 830688** **Richardson, Texas 75083-0688** **(972) 883-2098 (voice or TTY)** **Essentially, the law requires that colleges and universities make those reasonable adjustments necessary to eliminate discrimination on the basis of disability. For example, it may be necessary to remove classroom prohibitions against tape recorders or animals (in the case of dog guides) for students who are blind. Occasionally an assignment requirement may be substituted (for example, a research paper versus an oral presentation for a student who is hearing impaired). Classes enrolled students with mobility impairments may have to be rescheduled in accessible facilities. The college or university may need to provide special services such as registration, note-taking, or mobility assistance.** **It is the student's responsibility to notify his or her professors of the need for such an accommodation. Disability Services provides students with letters to present to faculty members to verify that the student has a disability and needs accommodations. Individuals requiring special accommodation should contact the professor after class or during office hours.**
Religious Holy Days	**The University of Texas at Dallas will excuse a student from class or other required activities for the travel to and observance of a religious holy day for a religion whose places of worship are exempt from property tax under Section 11.20, Tax Code, Texas Code Annotated.**

	The student is encouraged to notify the instructor or activity sponsor as soon as possible regarding the absence, preferably in advance of the assignment. The student, so excused, will be allowed to take the exam or complete the assignment within a reasonable time after the absence: a period equal to the length of the absence, up to a maximum of one week. A student who notifies the instructor and completes any missed exam or assignment may not be penalized for the absence. A student who fails to complete the exam or assignment within the prescribed period may receive a failing grade for that exam or assignment. **If a student or an instructor disagrees about the nature of the absence [i.e., for the purpose of observing a religious holy day] or if there is similar disagreement about whether the student has been given a reasonable time to complete any missed assignments or examinations, either the student or the instructor may request a ruling from the chief executive officer of the institution, or his or her designee. The chief executive officer or designee must take into account the legislative intent of TEC 51.911(b), and the student and instructor will abide by the decision of the chief executive officer or designee.**
Off-Campus Instruction and Course Activities	**Off-campus, out-of-state, and foreign instruction and activities are subject to state law and University policies and procedures regarding travel and risk-related activities. Information regarding these rules and regulations may be found at http://www.utdallas.edu/BusinessAffairs/Travel_Risk_Activities.htm. Additional information is available from the office of the school dean.**

These descriptions and timelines are subject to change at the discretion of the Professor.