

MOLECULAR CELL BIOLOGY: FALL SEMESTER, 2009

BIOL 213 SYLLABUS

www.tamu.edu/summerslab/

I. Basic Information about the Course and Instructor:

<i>Course name:</i>	Molecular Cell Biology (Honors)
<i>Course number:</i>	BIOL 213
<i>Section number:</i>	200
<i>Number of credits:</i>	3 cr.
<i>Days and times of class meetings:</i>	Mon./Wed./Fri., 9:10-10:00 AM
<i>Room number and location of meetings:</i>	Room 123 HPCT
<i>Instructor name:</i>	Dr. Max D. Summers, Distinguished Professor
<i>Office location:</i>	Room 324, Minnie Belle Heep Bldg.
<i>Office hours:</i>	Tuesday 4:00-5:00 p.m. for walk-in; or for an appointment contact: 847-9036 or Email m-summers@tamu.edu
<i>Office telephone number:</i>	(979) 847-9036
<i>Dept./College office telephone number:</i>	Dept. Entomology, (979) 845-2516
<i>Fax number:</i>	(979) 845- 6305
<i>E-mail address:</i>	m-summers@tamu.edu

II. Course Description:

Provide a strong background in the cellular and molecular aspects of biology with particular emphasis on eukaryotes (*From: Texas A&M University Undergraduate Catalog, 2008-2009: <http://www.tamu.edu/admissions/catalogs>*). Student may not take concurrently with, or after the completion of BIOL 413. Prerequisites: BIOL 112; CHEM 227 or concurrent enrollment.

III. Course Rationale:

Purpose of the course:

To: a) provide an opportunity for the student to distinguish the molecular basis of cellular processes and interrelationships in living systems with an emphasis on eukaryotic systems; b) teach the student the introductory “language” and “dictionary” of molecular cell biology; c) provide fundamental insights for the student to initiate and further develop the process of inquiry-based learning and discovery in science; d) establish the basic skills to allow the student to explore and assess their interests in the fields of molecular and cellular sciences for career opportunities; e) provide the student with fundamental knowledge to facilitate the systematic process of problem solving in molecular and cell biology.

The major in Molecular Cell Biology provides an appropriate foundation for a career in molecular biology and genetics,

biotechnology, genetic engineering, M.D./Ph. D. programs or basic biological study and research.

Honors MCB 213 can be a special section of the regularly offered MCB 213. It is designed to explore some of the course subject matter in unusual depth for sophomore students. Dependent upon the student's background and interests the subject matter is presented to encourage a variety of inquiry-based activities such as developing initiative, creativity, independent thinking, information synthesis and problem solving skills. Interchange of ideas between and among students is encouraged.

How and where course fits into the students' degree program: See outline of the Molecular and Cell Biology Degree Plan (Bachelor of Science) <http://www.tamu.edu/admissions/catalogs/>

Benefit to students taking the course: The students will learn the basic details of molecular and cellular processes not only for a practical understanding, but to explore the students' interests and potential for continued or advanced studies. Course content will give the student an introductory and general background of molecular systems in cells and their significance in biology, medicine and agriculture.

IV. Prerequisites/Corequisites:

Prerequisites:

BIOL 112, Introductory Biology; CHEM 227, Organic Chemistry I, or concurrent enrollment.

Specific knowledge and skills for course success:

The student should have a fundamental knowledge of general biology and of the structure and chemistry of organic molecules which are the fundamental structural units of macromolecules. This is available in BIOL 113, 114 (Introductory Biology), BIOL 123, 124 (Introductory Lab) and Chem 227 (Organic Chemistry I). The student will be expected to learn, know and describe the basic chemical and molecular structures of selected major structural macromolecular components of cells (nucleic acids, proteins, lipids and carbohydrates); and to distinguish how these molecules and macromolecules interact and function in cellular system(s). The student will be expected to have or develop the appropriate skills to communicate (write, discuss, analyze, evaluate and debate) using the language of introductory molecular cell biology.

V. Course Goals/Objectives:

What students should learn from the course:

The student should learn the elements of: a) the molecular basis of cellular function; b) why there is molecular specificity of structure and function for certain cellular/tissue systems; c) why the living process requires a significant amount of energy in a biologically usable form; d) how biologically usable forms of energy are used and recycled; e) the molecular consequences of errors in metabolism, gene structure or function; f) how molecules and macromolecules interact in cells and eukaryotic systems to carry out specific functions and form cellular structures; g) the

basic techniques to study macromolecule structure, function and interactions in cells and organelles; h) how gene expression and cellular functions are regulated in cells.

The student is expected to develop the skills to communicate details of molecular biology both verbally and graphically in answers to discussion questions on exams, on specific problem(s) as assigned, and during discussions in class and review sessions.

Instructor and student objectives;

Instructor: The instructor will strive to: a) identify and communicate details, facts and an overview of molecular and cellular systems. b) present the “language” and definitions of molecular cell biology and inform the students of how to access additional information; c) inform students of some of the experimental approaches used to study and explore molecular and cellular biology; c) expose the student to the fundamentals of scientific discovery and approaches to problem solving and information synthesis. The professor articulates and sets the standards for evaluation of student performance.

Students: The student should be prepared to devote the time required to comprehend and communicate the basic language and dictionary of molecular cell biology. The student will be expected to communicate these concepts both verbally and in writing using the scientific language of the field. The student should be prepared to distinguish and compare molecular structures, cellular and molecular processes and through knowledge of these molecular structures and functions, compare and describe how these structures interact and function in living systems. Ultimately successful students should be equipped with the basic skills that will allow them to develop and initiate the process of critical thinking, synthesis and problem solving in the molecular cell sciences. Through this process the student should learn to be more insightful and innovative in the application of new knowledge.

The student should be prepared to commit to the personal discipline and amount of time needed to study, comprehend and communicate the science of molecular cell biology. As such, in order to detail and describe molecules, molecular process and molecular interactions, the student may be required to develop new study habits appropriate to the subject matter of the course. To be prepared to succeed and excel in this course the student should understand that excelling in the knowledge of molecular cell biology requires extra study and practice time similar to that required to be proficient or excel in sports or music.

VI. Resources:

Required textbook:

Karp, Gerald. 2008. *Cell and Molecular Biology: Concepts and Experiments*. John Wiley and Sons, Inc. 5th Ed.

Optional texts: www.wiley.com/college/karp (online access to course textbook)
 Alberts, B., Johnson, A., Lewis, J., Raff, M., Roberts, K. and Walter, P. 2008. *Molecular Biology of The Cell*, 5th Ed. Garland Science.

Recommended readings or Internet Assignments: As assigned.

Other materials: Handouts as appropriate to lectures are posted on Professor Summers' web page, click on "Teaching."

Location where text may be obtained: MSC Aggie Bookstore

VII. Conduct of Course:

Instructional techniques used in the course: Lectures with overheads, handouts, etc, using the overhead projector; special problem sets; when possible student led discussion on special topics.

The handouts used in this course are copyrighted. By “handouts” the professor means all materials generated for this class, which include but are not limited to syllabi, quizzes, exams, lab problems, in-class materials, review sheets, and additional problem sets. Because these materials are copyrighted, one does not have the right to copy the handouts, unless the professor expressly grants permission.

Leaving the room during lectures and exams: The student is required to ask permission of the professor if the student needs to leave the classroom during lecture. If this need is frequent and there is a medical problem, a doctor’s statement is required clearly stating the medical problem to the Professor. This will be required before any exam is taken or early in the conduct of the course so the Professor can make arrangements for supervision of the student while out of the classroom during an exam. For example, the excuse that “I drink a lot of coffee or etc.”, will not be acceptable as justification for the student’s expectation of frequent departures during a lecture or leaving the room during any exam.

VIII. Evaluation Procedure:

What students must know to earn the grade expected: The student will be responsible for all of the assigned reading material even if the assigned material is not addressed during a lecture. The student will also be responsible for any facts or information introduced during a lecture or handouts by the professor as new material or material relevant to the course and which is not in the course reading assignment. The student will be expected to know molecular structures and the details of macromolecules that the professor indicates as essential, and to explain and describe these structures or their interactions with other molecules as needed and in the correct language of molecular cell biology. Retained knowledge of certain facts is fundamental to computer-assisted learning or other learning approaches and, most importantly, for correlating concepts in their practical use or for problem solving. The student will be expected

to use the “language” and “dictionary” of molecular cell biology both verbal and written formats as defined by the textbook and in class lectures during their discussions in class, on exams and in problems sets.

Nature/procedures regarding Rules of Conduct For and During Exams:

Exams shall be essay or short answer format. The dates for exams are given in the course outline. The exam questions will involve: 1) specific answers requiring memorization; 2) correlation of facts and/or concepts; 3) analysis and problem solving using facts, molecular structures or data presented in an experimental design or application; 4) the ability to synthesize, design or organize basic experimental approaches to a specific problem; 5) questions as appropriate to the subject matter of the course.

Rules of Conduct For and During Exams:

There will be no excused departures from the classroom during an exam. If one must leave the room during an exam, that student's exam must be terminated and turned in to the Professor. If there is an exception, determination is at the discretion of the Professor and for only very unusual circumstances.

Rules of Conduct for Exams and Problem Sets:

“On my honor as an Aggie, I have neither given nor received unauthorized aid on this academic work.”

This means that each student's effort on an exam or problem set will be individual, not a team effort with other members of the class, or based upon consultation with anyone outside of the professor in charge of the course, with exception of someone whom the professor designates to give advice or assistance.

Grading policy:

Grading for 213-200 will be assigned on the basis of four (4) exams (100 pts each) and two (2) special problems sets (50 points each) to be completed during the semester that total 100 points (equivalent to one exam). The grade for the course will be $500/5=X$. The expected grade distribution should be: 88-100 = A; 78-87 = B; 68-77 = C; 58-67 = D. The final grade distribution can depend on the grade point "curve" which may depart from that given above, and will be determined by the Professor during the progress of the course. Each successive exam can cover all subject material considered in the course to the date of that exam.

The professor will present, and explain, the class grade point distribution on each exam and the cumulative grade point distribution with each subsequent exam so each student will know their relative position in the grading scale as the course progresses.

Questions on exams taken: The time required for the student requesting clarification on answers to exam questions and problem sets is limited to one week after the date of return to the student. The student will be expected to arrange an appointment convenient to the student and Professor, but still within one week following return of the exam or problem set.

MAKE-UP EXAMS ARE NOT GIVEN IN THIS COURSE: If one exam is missed, the next exam will count 2X. If a student maintains an "A" average (including problem sets) and has attended all lectures and special sessions (problem set discussions and review sessions), exam IV will not be required with the exception for those students with a borderline grade. Any student(s) who are borderline A/B will be required to take Exam IV. "Border Line" is defined as within +three (+3) points (average) of the professor's designated cut-off for "A" and "B" grades.

X. Attendance/Tardiness:

Attendance policy: **Students arriving later than 5 minutes after class start or start of a review session or problem set discussion will be considered absent.**

The university views class attendance as an individual student responsibility (<http://student-rules.tamu.edu>). Students are expected to attend class and to complete all assignments. Instructors are expected to give adequate notice of the dates on which major tests will be given and assignments will be due. This information should be provided on the course syllabus, which should be distributed at the first class meeting.

7.1 The student is responsible for providing satisfactory evidence to the instructor to substantiate the reason for absence. Among the reasons absences are considered excused by the university are the following: to view Rule 7, please go to <http://student-rules.tamu.edu/rule7.htm>

For this class a Texas A&M University Explanatory Statement for Absence from Class form (<http://attendance.tamu.edu>) and a Confirmation of visit to a health care professional affirming date and time of visit will need to be obtained and presented to the Instructor.

Utilization of Health Center services does not indicate that a class excuse will be given. Each patient is given a receipt upon payment for services; however, this is not a class excuse and is solely for insurance purposes should the student choose to file a claim. Students are encouraged to communicate with their instructors if they are going to miss class for any reason. A copy of *Student Rules* may be obtained from Student Activities in the Koldus Building or at the following website: <http://student-rules.tamu.edu>

7.1.7 Required participation in military duties.

7.1.8 Mandatory admission interviews for professional or graduate school which cannot be rescheduled.

7.2 If the student is found to be too ill to attend class by a Health Center physician, the director of the Health Center or his/her representative will, on request of the student, confirm this fact.

7.3 If an off-campus physician provides evidence of a student's illness, the excuse documentation must contain the date and time of the illness and doctor's opinion that the student was too ill to attend class. If a physician determines that the student is not ill, he or she will not receive an excuse. If no evidence is available, the instructor will decide whether makeup work will be allowed.

7.4 The associate dean for undergraduate programs, or the dean's designee, of the student's college may provide a letter for the student to take to the instructor stating that the dean has verified the student's absence as excused.

7.5 If the student is seeking an excused absence, the student must notify the instructor as soon as possible after the absence, but no later than the end of the second working day after the last date of absence. If the absence occurs the same day as a scheduled exam or other graded procedure, the student must notify his/her instructor or department by the end of the next working day after the absence in order to ensure full rights. The student is responsible for providing satisfactory evidence to the instructor within one week of his or her absence return to substantiate the reason for absence.

7.6 The instructor is under no obligation to provide an opportunity for the student to make up work missed because of an unexcused absence.

7.7 See Part III, Grievance Procedures: 49 <http://student-rules.tamu.edu/part3.htm> Unexcused Absences, for information on appealing an instructor's decision.

7.8 If the student is absent for excused reasons for an unreasonable amount of time during the semester, the academic dean of the student's college may consider giving the student a grade of W during the semester enrolled or a NG (no grade) following posting of final grades.

7.9 Whenever a student is absent for unknown reasons for an extended period of time, the instructor should initiate a check on the welfare of the student by reporting through the head of the student's major department to the dean of the student's college.

Religious Observances: <http://dof.tamu.edu/faculty/policies/religiousobservance.php>

X. Other Class Procedures:

Tutoring assistance and support services: **Center for Academic Enhancement**
Texas A&M University
525 Blocker
College Station, Texas 77843-4230
(979) 845-2724
<http://slc.tamu.edu/>

The Center for Academic Enhancement offers, at no cost to the student, a variety of learning assistance programs designed to develop and improve skills necessary for success in college-level courses. Assistance available includes:

- **Academic Assistance Clearinghouse** - The Texas A&M University Academic Assistance Clearinghouse at <http://www.tamu.edu/aac> provides students with information on the academic assistance programs and services available, free of charge, from academic departments.
- **Supplemental Instruction** - regularly scheduled, out-of-class, study and review sessions for selected core curriculum courses. SI sessions are open to all students in the course section, and attendance is voluntary. Traditionally difficult courses are targeted for the program with study sessions being led by professionally trained students who have demonstrated competence in the course. National evaluation data show that the average course grade of SI

participants is between one-half and one full letter grade higher than the average course grades of students not participating in SI. Local data are consistent with national evaluation data.

- **CAEN 101: Succeeding in College** - a two credit hour which is a study of critical theories of learning with application to academic performance. Eligible students may register on-line or students can be referred by an academic advisor.
- **CAEN 102: Career Awareness** - a two credit hour course which introduces students to the concepts of career planning, employment trends, and methods of researching and preparing for the job market.
- **CAEN 289: Special Topics** – variable credit courses offered by CAE staff or other faculty on campus to meet specific needs for academic support or student development a two credit hour course which introduces students to the concepts of career planning, employment trends, and methods of researching and preparing for the job market.

To register for courses or for more information, contact the Center for Academic Enhancement, 845-2724, or come by 525 Blocker.

ATmentors Program Office

Henderson Hall
Texas A&M University
College Station, TX 77843-1263
(979) 845-6900/1-800-828-0888
<http://mentors.tamu.edu/>

MENTORS are Texas A&M faculty, staff, and administrators who volunteer extra office hours to make themselves available to students who “just want to talk to someone.”

MENTORS are available to talk with, listen to, and help each student feel a part of the Aggie community. MENTORS advise students in their areas of experience and competence, and they are trained to be effective referral sources to other Texas A&M services for specific problems or needs.

With almost 400 MENTORS, you can find at least one in almost every department and every location on campus. The MENTORS have complete directories of every MENTOR’s name, department, location, and telephone number. To find a mentor for Biology go to: <http://mentors.tamu.edu/> Complete lists of MENTORS are available from your Resident Director, the Housing Programs Office, the Off Campus Center, the Area Offices, the Library Reserve section, and the Student Counseling Service.

The MENTORS program does not attempt to replace or substitute for in any way the programs provided by departmental advisers, the Student Counseling Service, and the many other valuable student services available at Texas A&M University. On the contrary, MENTORS works hand-in-hand with all of these services, helping students to locate and use them. Representatives from various student services participate in discussion groups and share their particular expertise with participating MENTOR faculty, staff, and administrators, who work with these programs to help students.

Student Counseling Service

Henderson Hall
Texas A&M University
College Station, TX 77843-1263
(979) 845-4427

Help Line: (979) 845-2700 <http://www.scs.tamu.edu>

Students are invited to talk with professional counselors and psychologists about any concerns that affect their academic progress, educational goals, choice of career, personal-social effectiveness or emotional well-being. In counseling, the focus is on assisting students with developing academic, career planning, and personal skills; understanding themselves and their concerns; and making decisions and changes that they judge are best for them.

The following services are provided for students:

- **Learning Skills Assistance** - Individual assistance with and workshops on study skills, test taking, time management, etc. Also available is information about academic support services such as tutoring, help desks, etc.
- **Educational Planning** - Choosing an academic major (departmental academic advisers assist students with selecting classes).
- **Career Counseling** - Learning about one's interests, personality, values and various career opportunities in order to make informed career decisions.
- **Computer Assisted Career Guidance** - Assistance with clarifying one's values in order to identify career alternatives.
- **Personal-Social Counseling** - An opportunity to talk about personal values and beliefs, relationships, sexual development and concerns, and behaviors that are problematic. Couples, premarital, marriage and divorce counseling are also available.
- **Relaxation Training** - Learning to cope better with stress in order to become a more effective student and person.
- **Group Counseling** - Includes, among other experiences, choice of academic major workshops, career decision-making workshops, and groups focusing on the development of effective personal-social skills and the resolution of various specific concerns.
- **Emergency Counseling** - From 8 a.m. to 5 p.m., Monday through Friday, come to the Student Counseling Service (Cain Hall). At night and on weekends call the HelpLine (979) 845-2700.
- **Test Interpretation** - Study skills, career interest, and personality inventories are provided and are interpreted by a counselor to assist the student with improving learning skills, selecting a major and career, and developing self-understanding.
- **Information Libraries** - Up-to-date and comprehensive libraries of academic, educational, career, and personal self-help information are available for use without an appointment.
- **CounselLine Self-Help Program** - Provides basic information about a wide variety of academic, career, and personal concerns. Call (979) 845-2958 to anonymously request any tape(s) or information about available tapes.
- **Referral Resource** - Counselors can refer students to other specialized services, including long-term counseling resources, found within the University and the surrounding geographic area.

The Student Counseling Service respects the confidential nature of counseling sessions to the limits provided by law, and no record of a student's visits is made on an academic transcript or in a placement file. Except for certain special services, no fees are charged for counseling.

Appointments for limited duration counseling services may be arranged by calling (979) 845-4427, or by going to the Student Counseling Service located in Cain Hall. In a CRISIS/EMERGENCY situation, the student should come to the Student Counseling Service during weekday, daytime service hours. At night or on weekends the student should call HelpLine at 979-845-2700.

XI. Academic Dishonesty: <http://student-rules.tamu.edu>

From Texas A&M University Student Rules

Scholastic Dishonesty

Students in MCB213:200 are expected to carry out course responsibilities in compliance with the Aggie Honor Code: "An Aggie does not lie, cheat, or steal or tolerate those who do."

Honor Council Rules and Procedures on the Web at: <http://www.tamu.edu/aggiehonor>

Misconduct in research or scholarship includes fabrication, falsification, or plagiarism in proposing, performing, reviewing, or reporting research. It does not include honest error or honest differences in interpretations or judgments of data.

Texas A&M University students are responsible for authenticating all work submitted to an instructor. If asked, students must be able to produce proof that the item submitted is indeed the work of that student. Students must keep appropriate records at all times. The inability to authenticate one's work, should the instructor request it, is sufficient grounds to initiate an academic dishonesty case.

Academic dishonesty includes the commission of any of the following acts. This listing is not, however, exclusive of any other acts that may reasonably be called academic dishonesty. Clarification is provided for each definition by listing some prohibited behaviors.

1. Cheating

Intentionally using or attempting to use unauthorized materials, information, notes, study aids or other devices or materials in any academic exercise.

2. Fabrication

Making up data or results, and recording or reporting them; submitting fabricated documents.

3. Falsification

Manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented in the research record.

4. Multiple Submissions

Submitting substantial portions of the same work (including oral reports) for credit more than once without authorization from the instructor of the class for which the student submits the work.

5. Plagiarism

The appropriation of another person's ideas, processes, results, or words without giving appropriate credit.

General information pertaining to plagiarism:

Style Guides:

Instructors are responsible for identifying any specific style/format requirement for the course.

Examples include, but are not limited to, American Psychological Association (APA) style and Modern Languages Association (MLA) style.

Direct Quotation:

Every direct quotation must be identified by quotation marks or appropriate indentation and must be properly acknowledged in the text by citation or in a footnote or endnote.

Paraphrase:

Prompt acknowledgment is required when material from another source is paraphrased or summarized, in whole or in part, in one's own words. To acknowledge a paraphrase properly, one might state: "To paraphrase Locke's comment..." and then conclude with a footnote or endnote identifying the exact reference.

Borrowed facts:

Information gained in reading or research, which is not common knowledge, must be acknowledged.

Common Knowledge:

Common knowledge includes generally known facts such as the names of leaders of prominent nations, basic scientific laws, etc., basic historical information (e.g., George Washington was the first President of the United States.) Common knowledge does not require citation.

Works Consulted:

Materials which add only to a general understanding of a subject may be acknowledged in the bibliography, and need not be footnoted or end-noted. Writers should be certain that they have not used specific information from a general source in preparing their work unless it has been appropriately cited. Writers should not include books, papers, or any other type of source in a bibliography, "works cited" list, or a "works consulted" list unless those materials were actually used in the research. The practice of citing unused works is sometimes referred to as "padding."

Footnotes, endnotes, and in-text citations:

One footnote, endnote, or in-text citation is usually enough to acknowledge indebtedness when a number of connected sentences are drawn from one source. When direct quotations are used, however, quotation marks must be inserted and acknowledgment made. Similarly, when a passage is paraphrased, acknowledgment is required.

Graphics, design products, and visual aids:

All graphics, design products, and visual aids from another creator used in academic assignments must reference the source of the material. General information pertaining to plagiarism:

6. Complicity

Intentionally or knowingly helping, or attempting to help, another to commit an act of academic dishonesty.

For additional information please see: <http://www.tamu.edu/aggiehonor/>

XII. Americans with Disabilities Act (ADA):

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Office of Support Services for Students with Disabilities. The phone number is (979) 845-1637 or visit their website at: <http://disability.tamu.edu>

XIII. Course Units/Calendar: <http://admissions.tamu.edu/registrar/general/calendar.aspx>
<http://www.wiley.com/college/karp> - **Online Access to the Course Textbook**

Monday August 31	Class 1	Introduction to course: Syllabus, Prerequisites, Grading, Exam Schedule, Cells: Prokaryotes, Eukaryotes; Viruses, Model Organisms Reading: Pages 1-30; techniques 727-742 Handouts: http://www.tamu.edu/summerslab/ - "Teaching" link - Lecture 1
Wednesday September 2	Class 2	Major classes of Biological Molecules, Chemistry of Cells Reading: 31-49, techniques 742-744 Handouts: http://www.tamu.edu/summerslab/ - "Teaching" link - Lecture 2
Friday September 4	Class 3	
Friday September 4		Last day to drop/add.
Monday September 7	Class 4	Major classes of biological Molecules, Chemistry of Cells: Protein structure; Chemical bonds important in biological molecules; Functional groups. Reading: 51-75; techniques 744-753 Handouts: http://www.tamu.edu/summerslab/ - "Teaching" link - Lecture 3
Wednesday September 9	Class 5	
Friday September 11	Class 6	Major classes of Biological Molecules, Proteins (cont.); bases, nucleosides, nucleotides Reading; 75-84 Handouts: http://www.tamu.edu/summerslab/ - "Teaching" link - Lecture 4
Monday September 14	Class 7	Chromosomal organization of DNA Reading: 388-428 Handouts: Lecture 5
Wednesday September 16	Class 8	
Friday September 18	Class 9	Genetic code; Transcription, translation; regulation of gene expression. Reading: 429-484
Monday September 21	Class 10	Handouts Lecture 6
Monday September 21		Review for Exam I Minnie Belle Heep Building, Room 413 (6 to 9 p.m.)

Wednesday September 23	Class 11	EXAM I
Friday September 25	Class 12	Gene cloning and engineering Reading: 753-776 Problems Set Bioinformatics I
Monday September 28	Class 13	Handouts: Lecture 7
Wednesday September 30	Class 14	Gene cloning and engineering, (cont.) Handouts: Lecture 8
Friday October 2	Class 15	
Monday October 5	Class 16	Biological Reactions, Enzymes Reading: 85-119 Handouts: Lecture 9
Wednesday October 7	Class 17	Replication of the genome: DNA, genes, replication, mutation, repair. Reading: 542-564; techniques 758-763 Handouts: Lecture 10
Thursday October 8		PROBLEM SET I ~ HELP SESSION MINNIE BELLE HEEP BUILDING, ROOM 413 (6 to 9 p.m.)
Friday October 9	Class 18	Regulation of gene expression, transcription and post transcriptional regulation Reading: 485-541
Monday October 12	Class 19	Handouts: Lecture 11
Wednesday October 14	Class 20	Rearrangement and exchange of genetic information Reading: 409-415 & 607-609 Handouts: Lecture 12
Wednesday October 14		REVIEW FOR EXAM II MINNIE BELLE HEEP BUILDING, ROOM 413 (6 to 9 p.m.)
Friday October 16	Class 21	EXAM II

Monday October 19	Class 22	Structure of cell membranes; membrane proteins, membrane biogenesis. Reading: 120-147 Mid Semester Grades Due
Wednesday October 21	Class 23	Handouts: Lecture 13
Friday October 23	Class 24	Membrane transport; active transport, passive transport, cell communication. Reading: 147-178
Monday October 26	Class 25	Problems Set I – DUE (Oct. 17) – submit at class Handouts: Lecture 14
Wednesday October 28	Class 26	Protein processing, sorting; vesicle transport, secretion Reading: 274-310 Handouts: Lecture 15 Problem Set II Handout
Friday October 30	Class 27	Endocytosis, exocytosis Reading: 311-327 Handouts: Lecture 16
Monday November 2	Class 28	Signal Transduction: cell communication, cell surface receptors; cell signaling cascades. Reading: 616-653
Wednesday November 4	Class 29	Handouts: Lecture 17
Friday November 6	Class 30	Cell Surface Interactions Reading: 239-273 Handouts: Lecture 18
Friday November 6		Last day to drop with no penalty (Q-drop)
Monday November 9	Class 31	Cell Surface Interactions (cont.)
Monday November 9		REVIEW FOR EXAM III MINNIE BELLE HEEP BUILDING, ROOM 413 (6 to 9 p.m.)
Wednesday November 11	Class 32	EXAM III

Thursday November 12		PROBLEM SET II ~ HELP SESSION MINNIE BELLE HEEP BUILDING, ROOM 413 (6 to 9 p.m.)
Friday November 13	Class 33	Cell cytoskeleton: Reading: 328-387 Handouts: Lecture 19
Monday November 16	Class 34	Cell cytoskeleton (cont.)
Wednesday November 18	Class 35	During the remaining weeks of the course lecture series, the students will be expected to have achieved a level of maturity and understanding of the course material. If time, schedule and size of class allows. The professor, on occasion, will select a student to lead discussion on a particular aspect of the lecture. The student will be graded by the professor and the class. Glycolysis, fermentation, citric acid cycle. Reading: 179-213 Handouts: Lecture 20
Friday November 20	Class 36	Photosynthesis: Reading: 214-238 Handouts: Lecture 21
Monday November 23	Class 37	Cell cycle, cell cycle regulation, apoptosis Reading: 570-599; 654-659 Handouts: Lecture 22
Wednesday November 25	Class 38	Problems Set II - DUE
November 26/27		Thanksgiving Holiday
Monday November 30	Class 39	Cell cycle (cont.) oncogenes, characteristics of cancer. Reading: 662-692 Handouts: Lecture 23
Monday November 30		REVIEW FOR EXAM IV MINNIE BELLE HEEP BUILDING, ROOM 413 (6 to 9 p.m.)

Wednesday December 2	Class 40	The Immune Response. Reading: 692-726 Handouts: Lecture 24
Friday December 4	Class 41	EXAM IV
November 26/27		Thursday – Friday Thanksgiving Holiday
Monday December 7		No Class
Monday December 21		Final Grades due

Final Exam Schedule: <http://admissions.tamu.edu/registrar/general/finalschedule.aspx>

XIV. Disclaimer:

THE ABOVE SCHEDULE AND PROCEDURES IN THIS COURSE ARE SUBJECT TO CHANGE IN THE EVENT OF EXTENUATING CIRCUMSTANCES.

ANY MATERIAL DISCUSSED OR PRESENTED WITHIN THE SUBJECT UNDER CONSIDERATION IS CONSIDERED TO BE IMPORTANT AND SUBJECT TO EXAMINATION. BECAUSE OF THE RAPIDLY DEVELOPING STATE OF SCIENCE, SUCH DISCUSSION AS RELEVANT TO COURSE CONTENT MAY BE FREQUENT AND MAY VARY IN DETAIL AND COMPREHENSIVENESS.

ON THE RARE OCCASION IT MAY BE NECESSARY FOR THE PROFESSOR TO BE ABSENT FROM LECTURE (E.G., ILLNESS OR PROFESSIONAL OBLIGATIONS JUSTIFYING THE PROFESSOR'S ABSENCE), THE PROFESSOR IN CHARGE OF INSTRUCTION WILL MAKE EVERY REASONABLE EFFORT TO OBTAIN A SUBSTITUTE FOR THE LECTURE.

XV. Appendices/Extras:**MOLECULAR AND CELL BIOLOGY DEGREE PLAN (Bachelor of Science)**

http://www.tamu.edu/admissions/catalogs/08-09_UG_Catalog/science/dept_biology/molec_cell_biology.htm

Texas A&M University

Undergraduate Catalog, 2008-2009

Course #	Course Name	Cr Hrs	Course #	Course Name	Cr Hrs
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Freshman Year

BIOL 111	Introductory Biol	4	BIOL 112	Introductory Biol	4
CHEM 101 plus CHEM 111	Fundamentals of Chem I	4	CHEM 102 plus CHEM 112	Fundamentals of Chem II	4
ENGL 104	Composition & Rhetoric	3	HIST 105	History of the U.S.	3
MATH 166 ¹	Topics in Contemporary Math II	3	MATH 131	Mathematical Concepts- Calculus	3
KINE 198	Health and Fitness Activity	1	KINE 199	Required Physical Activity	1
Total:		15	Total:		15

Sophomore Year

BIOL 213	Mol Cell Biol	3	BIOL 214	Genes, Ecology and Evolution	3
CHEM 227	Organic Chem I	3	CHEM 228	Organic Chem II	3
CHEM 237	Organic Lab	1	CHEM 238	Organic Lab	1
HIST 106 ²	History of the U.S.	3	PHYS 202	College Physics	4
PHYS 201	College Physics	4	ELEC	Communication	3
Total:		14	Total:		14

Junior Year

BICH 410	Comprehensive Biochem I	3	BICH 411	Comprehensive Biochem II	3
GENE 302	Genetics	4	BICH 414	Biomedical Techniques	2
POLS 206	American National Government	3	BICH 431	Molecular Genetics	3
STAT 302	Statistical Methods	3	MICR 351	Fundamentals of Microbiology	4
ELEC	Visual/Perform Arts	3	HUM ELEC		3
Total:		16	Total:		16

Senior Year

BIOL 413	Cell Biology	3		BIOL ELEC		3
BIOL 414	Dev. Biol	3		MCB ELEC		3
BIOL 423	Cell Biol Lab	1		Social Sci. ELEC		3
POLS 207	State & Local Government	3		ELEC		5
MCB ELEC		4				

Total: 14

Total: 14

TOTAL Hours: 120

Bibliography:

Max D. Summers
Distinguished Professor
Endowed Chair in Agricultural Biotechnology

Wilmington College, Wilmington, OH	A.B.	1962	Biology
Purdue University, West Lafayette, IN	Ph.D.	1968	Entomology

RESEARCH AND PROFESSIONAL EXPERIENCE:

1969-73 Assistant Professor of Botany, The University of Texas at Austin
 1973-77 Associate Professor of Botany, The University of Texas at Austin
 1976 Visiting Associate Professor and Associate Insect Pathologist, Department of Entomology, University of California, Berkeley (Invited)
 1977- Professor of Entomology, Department of Entomology, Texas A&M University
 1983- Distinguished Professor of Entomology
 1986- Endowed Chair in Agricultural Biotechnology
 1988-00 Director, Center for Advanced Invertebrate Molecular Sciences
 1991- Professor of Biology
 1992- Professor of Biochemistry and Biophysics
 2001-04 Associate Vice President for Research

FEDERAL GOVERNMENT PUBLIC ADVISORY COMMITTEES:

1986-90 US Department of Commerce, Biotechnology Technical Advisory Committee
 1992-95 National Academy of Sciences, Council of the Government-University-Industry Research Roundtable
 2000-01 Member, American Academy of Microbiology, Chiron Corporation Biotechnology Research Award Nominating Committee
 2000-01 Committee on Science, Engineering and Public Policy (COSEPUP) Panel: Government Performance and Results Act (GPRA) Panel on Accountability and Federally Funded Research, Panelist
 2005-08 Board of Governors Nominating Committee, American Society for Microbiology
 2004-09 Advisory Committee on Research Programs (ACORP) - Texas Higher Education Coordinating Board
 2008-11 Board of Directors, The Texas Academy of Medicine, Engineering and Sciences

HONORS:

1983-03 Editor, *Virology*
 1986-87 Foundation for Microbiology Lecturer, The American Society for Microbiology
 1988 Fellow, American Association for the Advancement of Science
 1988 First John V. Osmun Alumni Professional Achievement Award in Entomology, 1988
 1989 National Academy of Sciences of the United States of America
 1991-92 President, American Society for Virology
 1991-94 Chair of Class VI, National Academy of Sciences
 1992-00 Executive Editor, *Protein Expression and Purification*
 1992 Fellow, American Academy of Microbiology
 1992 First Distinguished Alumni Award, Purdue University, School of Agriculture
 1999 Inventor of the Year Award, Houston Intellectual Property Law Association
 2001 Most Highly cited in the World, Top 250 researchers in Microbiology
 2003 Spirit of Innovation Award for Global Outreach, Texas A & M University System
 2007 TAMU/AgriLife Vice Chancellor's Award for Research, the Researcher of the Year

PUBLICATIONS (Selected from over 150 publications):

Braunagel, S.C., Williamson, S.T., Ding, Q., Wu, Wu, X. and Summers, M.D. 2007. Early sorting of inner nuclear membrane proteins is conserved. *Proc. Natl. Acad. Sci. USA* **104**:9307-9312.

Burks, J.K., Summers, M.D. and Braunagel, S.C. 2007. BV/ODV-E26: a palmitoylated, multifunctional structural protein of *Autographa californica* nucleopolyhedrovirus. *Virology* **361**:194-203.

Saksena S., Summers M.D., Burks J.K., Johnson A.E. and Braunagel S.C. 2006. Importin- α 16 is a translocon-associated protein involved in sorting membrane proteins to the nuclear envelope. *Nat. Struct. Molec. Biol.* **13**:500-508.

Saksena, S., Shao Y., Braunagel S.C., Summers, M.D. and Johnson, A.E. 2004. Co-translational integration and initial sorting at the ER translocon of proteins destined for the inner nuclear membrane. *Proc. Natl. Acad. Sci. USA*. **101**:12537-12542.

Braunagel S.C., Williamson S.T., Saksena S., Zhong Z., Russell W.K., Russell D.H. and Summers M.D. 2004. Trafficking of ODV-E66 is mediated via a sorting motif and other viral proteins: facilitated trafficking to the inner nuclear membrane. *Proc. Natl. Acad. Sci. USA*. **101**:8372-8377.

Braunagel, S.C., Russell, W.K., Rosas-Acosta, G., Russell, D.H. and Summers, M.D. 2003. Determination of the Protein Composition of the Occlusion-Derived Virus of *Autographa californica* nucleopolyhedrovirus. *Proc. Natl. Acad. Sci., USA*. **100**:9797-9802.

Braunagel, S.C., Guidry, P.A., Rosas-Acosta, G., Engelking, L. and Summers, M.D. 2001. Identification of BV/ODV-C42: a structural protein of *Autographa californica* nucleopolyhedrovirus (*orf 101*) is present in infected cell complexes which include ODV-EC27 and p78/83. *J. Virol.* **75**:12331-12338.

Rosas-Acosta, G., Braunagel, S.C. and Summers, M.D. 2001. Effects of deletion and over-expression of the AcMNPV *FP25K* gene on the synthesis of two occlusion-derived virus envelope proteins and their transport into virus-induced intranuclear membranes of two ODV envelope proteins. *J. Virol.* **75** (22): 10829-10842.

Braunagel, S.C., Burks, J.K., Rosas-Acosta, G., Harrison, R.L., Ma, H. and Summers, M.D. 1999). Mutations within the *Autographa californica* nucleopolyhedrovirus *FP25K* gene inhibits nuclear transport of ODV-E66. *J. Virol.* **73**:8559-8570.

Belyavskyi, M., Braunagel, S.C. and Summers, M.D. 1998. The structural protein ODV-EC27 of *Autographa californica* nucleopolyhedrovirus is a multi-functional cyclin. *Proc. Natl. Acad. Sci. USA* **95**:11205-11210.

Braunagel, S.C., Parr, R., Belyavskyi, M. and Summers, M.D. 1998. *Autographa californica* nuclear polyhedrosis virus infection results in Sf9 cell cycle arrest at G/M phase. *Virology*, **244**:195-211.

Beniya, H., Braunagel, S.C. and Summers, M.D. 1998. *Autographa californica* nuclear polyhedrosis virus: subcellular localization and protein trafficking of BV/ODV-E26 to plasma membrane, intranuclear membranes and viral envelopes. *Virology* **240**, 64-75.

Hong, T., Summers, M.D. and Braunagel, S.C. 1997. N-terminal sequences from *Autographa californica* nuclear polyhedrosis virus envelope proteins OVD-E66 and OVD-E25 are sufficient to direct reporter proteins to the nuclear envelope, intranuclear microvesicles and the envelope of occlusion derived virus. *Proc. Natl. Acad. Sci., USA*, **94**:4050-4055.

Harrison, R.L., Jarvis, D.L. and Summers, M.D. 1996. The role of the AcMNPV 25K gene in baculovirus *polh* and *p10* gene expression. *Virology* **226**:34-46

Braunagel, S.C., He, H., Ramamurthy, P. and Summers, M.D. 1996. Transcription, translation, and cellular localization of three *Autographa californica* nuclear polyhedrosis virus structural proteins: ODV-E18, ODV-E35 and ODV-EC27. *Virology* **222**:100-114