Course Description: Chemistry of cellular constituents; introduction to the chemical processes in living systems.

Learning Objectives:

1. You will develop an appreciation for the properties of amino acids, nucleic acids, carbohydrates and lipids, and the physicochemical forces that drive macromolecules (e.g., proteins, DNA, RNA, polysaccharides and lipids) to adopt specific two and three dimensional structures. You will learn how macromolecules are organized into higher ordered structures, and methods to purify and study the 2- and 3-dimensional structures of macromolecules.

2. You will learn how proteins catalyze enzymatic reactions, the synthesis of DNA, RNA and proteins, and principles behind the regulation of these processes.

3. You should be able to extrapolate knowledge that is presented in lectures, and discussions for solving theoretical problems, and be able to interpret the meaning of sets of theoretical data that is presented. This does not mean that you must memorize every bit of information, but rather that you should understand the underlying logic of how cellular processes are studied and how this knowledge can be applied to solve important scientific questions.

4. More generally, this course aims to prepare you to be a scientist. As a graduate student, you will develop skills in seeking more advanced information in the scientific literature and in your own lab work. For this course, this means that you should be able to appreciate the experimental foundations of the study of macromolecules and molecular biology. You should be able to critically assess the limits of this knowledge, and to creatively think about how you could gain further information through new experimentation and interpretation of new data. Finally, it is vital that you can communicate your own thoughts effectively, both in written and oral forms: that is to know the language and terminology used in this field of study.

I. Introduction (Chapt. 1, 3-19)
II. Thermodynamics and Free Energy (Chapt. 3, 52-63)
III. Water - Structure and forces (Chapt. 2, 40-45)
IV. Amino acids (Chapt. 2, 45-51, Chapt. 4, 67-81, Chapt. 6, 144-147, Chapt. 7, 169-171)
V. Proteins
   A. Structures
      1. Primary (Chapt. 7, 163-169, 170-175)
      2. Secondary (Chapt. 8, 221-232, Chapt. 9, 302-304)
      3. Tertiary (Chapt. 8, 232-266)
      4. Quaternary (Chapt. 8, 266-270, Chapt. 10, 331-334)
   B. Purification (Chapt. 6, 129-156)
   C. Folding and dynamics (Chapt. 9, 278-302, 306-319)
VI. Enzymes
A. Introduction (Chapt. 13, 469-473)
B. Catalysis (Chapt. 14, 484-487, Chapt. 15, 506-516)
C. Kinetics (Chapt. 13, 482-484, 487-505)
D. Allosterism (Chapt. 13, 474-479, Chapt. 10, 325-331, 334-341, 347-355)
E. Classification (Chapt. 13, 479)
F. Examples of mechanisms (Chapt. 15, 517-538, Chapt. 17, 600-603)

VII. Lipids (Chapt. 12, 386-399)

VIII. Membranes and transport (Chapt. 12, 399-411, 416-420, Chapt. 20, 744-771)

IX. Carbohydrates (Chapt. 11, 359-385)

X. Nucleic acids
A. Genetics and DNA (Chapt. 1, 19-28; Chapt. 5, 82-88)
B. Structures (Chapt. 5, 88-90, Chapt. 29, 1145-1151; Chapt. 34, W-53-W-68)
C. Physical properties (Chapt. 5, 90-94; Chapt. 6, 156-159; Chapt. 29, 1151-1172; Chapt. 34, W-68-W-74)
D. Hydrolysis (Chapt. 5, 104-108)
E. Cloning and Sequencing (Chapt. 5, 108-128; Chapt. 7, 176-185)

XI. Molecular biology
A. DNA replication (Chapt. 5, 90-91, 101-104; Chapt. 30, 1173-1213)
B. Mutation and repair (Chapt. 30, 1213-1225; Chapt. 34, W-134-W-135)
C. RNA synthesis (Chapt. 5, 95-98; Chapt. 31, 1260-1283; Chapt. 34, W-83-W-96)
D. RNA processing (Chapt. 31, 1301-1337)
E. Protein synthesis (Chapt. 5, 98-101; Chapt. 32, 1338-1398)

XII. Regulation of Gene expression
A. Transcription regulation (Chapt. 31, 1260-1264, 1283-1301; Chapt. 34, W-74-W-83, W-93-W-121)
B. Post-translational regulation and modification of proteins (Chapt. 32, 1398-1428; Chapt. 34, W-119-W-121, W-145-W-155)

EXAMS:
Exam I: 16 September, Tuesday –6:30-8:30 PM  Sections I - V
Exam II: 14 October - Tuesday –6:30-8:30 PM  Sections VI - VIII
Exam III: 11 November Tuesday –6:30-8:30 PM  Sections IX – XI.A
Final exam 25 November Tuesday –6:30-8:30 PM  66% Material from Exam I & II, 34% Material from Exam III;

Exam IV: 10 December, Wednesday 10-11:50 AM  Sections XI.B-XII

GRADING: All 2 hour exams are worth 20% of total.

TEXTS: Biochemistry, 4th Ed., D. Voet & J. G. Voet (+other assigned readings)

POSSIBLY USEFUL: Core Topics in Biochemistry, J. Stenesh

D2L: http://oc.okstate.edu/
IMPORTANT DATES
Last day to add a class (without instructor permission) 8/25/2014
Last day to drop a course with no grade and 100% refund 8/25/2014
Last day to add a class (requires instructor & advisor permission) 8/29/2014
Last day to drop a course or withdraw from the University with an automatic "W" and receive a partial refund (requires advisor signature) 8/29/2014
Last day to post 6 week grades 9/30/2014
Last day to file diploma application (for name to appear in Fall Commencement program) 11/3/2014
Last day to drop a class or withdraw from the University with an automatic "W" 11/7/2014
Last day to withdraw from all OSU classes with an assigned grade of "W" or "F" 11/21/2014
Pre-Finals week 12/1 - 12/5/2014
Final examinations 12/8 - 12/12/2014
Note: Outreach, internet, and short courses have unique drop/add and refund deadlines; lookup the specific deadlines for these courses on the Short, Internet and Outreach Class Schedules page of the Registrar’s website.

Fall Semester Holidays
University Holiday 9/1/2014
Students’ Fall Break 10/24/2014
First day of students’ Thanksgiving break (no classes) 11/26/2014
University Holiday 11/27 - 11/28/2014

DROPPING A COURSE AND WITHDRAWING FROM THE UNIVERSITY, students often confuse these terms.

Dropping a Course (or courses) may occur during the first twelve weeks of the semester. This means, however, that you are still enrolled in at least one other OSU course. Exceptions to the deadlines above may only be considered by petition due to documented extraordinary circumstances and committee approval. The Retroactive Drop/Withdraw Petition and the Petition for a Refund of Tuition and Fees forms are available on the Registrar’s website.

Withdrawing from the university means that you are dropping all of your courses and are no longer enrolled for the current semester. This may occur until the Friday before pre-finals week. The withdrawal process is initiated with your academic advisor in your student academic services office. For additional information and dates, go to: http://academicaffairs.okstate.edu/policies-a-procedures/35-adding-a-dropping-policy

ALERTS AND RESCHEDULING
If the OSU campus officially closes due to inclement weather or other emergencies, alerts are provided to local news media and are posted on the OSU website. Exams, classes, or assignments that are missed in these circumstances may be rescheduled at times that are outside the normal meeting schedule for the class. If valid, documented circumstances prohibit students from attending the rescheduled classes, instructors should provide reasonable alternative means for makeup.

ACADEMIC INTEGRITY POLICY
Oklahoma State University is committed to the maintenance of the highest standards of integrity and ethical conduct of its members. This level of ethical behavior and integrity will be maintained in this course. Participating in a behavior that violates academic integrity (e.g., unauthorized collaboration, plagiarism, multiple submissions, cheating on examinations, fabricating information, helping another person cheat, unauthorized advance access to examinations, altering or destroying the work of others, and fraudulently altering academic records) will result in an official academic sanction. Violations may subject you to disciplinary action including the following: receiving a failing grade on an assignment, examination or course, receiving a notation of a violation of academic integrity on your transcript, and being suspended from the University. You have the right to appeal the charge. Contact the Office of Academic Affairs, 101 Whitehurst, 405-744-5627. Go to http://academicintegrity.okstate.edu/ for a video on OSU’s academic integrity policy and additional information.

COPYRIGHT & FAIR USE POLICY OF COURSE MATERIALS
Course materials may not be published, leased, sold to others, or used for any purpose other than appropriate OSU-related individual or group study without the written permission of the faculty member in charge of the course and other copyright holders. This paragraph grants you a limited license giving you access to materials for this course, including PowerPoint slides, audio/video recordings, written, or other materials, for appropriate OSU-related educational use only. Lectures should not be recorded without permission from the faculty member and must not be further disseminated or shared.

CLASS ATTENDANCE
Class attendance is a critical component of learning; therefore, you are expected to attend and participate fully in all scheduled class meetings. Many instructors consider attendance so essential that your grade may be affected by your absence. SOME DEPARTMENTS AND PROFESSORS HAVE MANDATORY ATTENDANCE POLICIES. If no written attendance policy is provided before the last day to add a class without instructor permission, no penalty may be assessed for class absences although you may not be permitted to make up certain in-class activities. If you are required to participate in official university-sponsored activities or military training, you should receive an excused absence unless the written course attendance policy indicates otherwise. If you will be absent from class for sponsored activities, you must provide prior notification of the planned absence to the instructor. You may be required to submit assignments or take examinations before the planned absence.

PRE-FINALS WEEK POLICY
Final examinations are scheduled at the end of each semester and are preceded by pre-finals week, which begins seven days prior to the first day of finals. During pre-finals week, all normal class activities will continue; however, no assignment, test, or examination accounting for more than 5% of the course grade may be given; and no activity or field trip may be scheduled that conflicts with another class. This excludes makeup and laboratory examinations, out-of-class assignments (or
projects) made prior to pre-finals week, and independent study courses.
No student or campus organization may hold meetings, banquets,
receptions, or may sponsor or participate in any activity, program, or
related function that requires student participation. For additional
information, contact the Office of Academic Affairs, 405-744-5627,
101 Whitehurst.

FINAL EXAM OVERLOAD POLICY
In the event that you have three or more final exams scheduled for a
single day, you are entitled to arrange with the instructor of the highest
numbered course (4 digit course number) or two highest, if you have
four finals on one day, to re-schedule that examination(s) at a time and
place of mutual convenience during final exam week. If the final exam
overload includes a common final exam, the common final exam is
excluded from rescheduling unless multiple common exams are
scheduled at the same time. You should submit this request in writing,
with a copy of your class schedule, at least two weeks prior to the
beginning of final exam week. The instructor has one week prior to the
beginning of final exam week to arrange a mutually convenient time
and place for administration of the final exam. After one week, if an
agreement cannot be reach, take the request to the department head.

INFORMATION TECHNOLOGY

Student Email - OSU uses your OKSTATE.EDU email address as a
primary form of communication. Students are expected to check their
OSU email on a frequent and consistent basis to remain informed of
their official university business. If you do not use the OSU email
system you must redirect your okstate.edu email using the Orange-Key
System (www.okkey.okstate.edu). Failure to maintain an accurate email
address may result in missed or lost university communications. For
email assistance contact the IT Helpdesk at 405-744-HELP (4357).

Computer Labs - A complete description of computer labs and hours of
operations are available at their website:
https://it.sharepoint.okstate.edu/TechnologySupport/DeskSide/default.a
spx. Lab information is also available by calling the Information
Technology Help Desk, 405-744-HELP (4357).

LIBRARY HOURS
Edmon Low Library (405-744-6812)
Digital Library Toll Free: (1-877-744-9161)
Monday-Thursday 7:00 a.m.-2:00 a.m.
Friday 7:00 a.m.-10:00 p.m.
Saturday 9:00 a.m.-10:00 p.m.
Sunday 9:00 a.m.-2:00 a.m.
*For holiday and intersession hours, check
http://www.library.okstate.edu/services/hours.htm

*Contact the following for information on hours of operation:
Architectural Library 405-744-6047
Curriculum Materials Library 405-744-6310
Veterinary Medicine Library 405-744-6655
Library web address: www.library.okstate.edu

GENERAL EXPECTATIONS OF STUDENTS
By enrolling at Oklahoma State University, you accept responsibility
for complying with all University policies and contracts, and for local,
state and federal laws on- or off-campus that relate to the University's
mission. The Student Rights and Responsibilities Governing
Student Behavior document explains the standards of behavior
expected of you, processes in place for enforcing the rules, and the
University's response to violations http://studentconduct.okstate.edu/

In general, the University expects you to respect the rights of others and
authorities, represent yourself truthfully and accurately at all times,
respect private and public property, and take responsibility for your
own actions and the actions of your guests. Call 405-744-5470 for
more information.

SEEK ANSWERS TO YOUR QUESTIONS
The OSU faculty and staff want you to be successful in your educational
pursuits. If you have questions or concerns, seek help EARLY. We are here
to assist you.

WHERE TO GO FOR HELP
Instructor - If you have questions regarding your class, talk to your
instructor. Faculty members usually include their office hours and/or phone
number in the class syllabus. If you cannot locate this information, set a
time to meet with your instructor by speaking with him/her prior to or
immediately following your class session or check with the departmental
office on when the instructor may be available.

Academic Advisor - All students will benefit by conferring with an advisor
on a regular basis. If you do not know your advisor, or are unhappy with
your advisor, talk to the Student Academic Services Director for your
college.

Academic911.okstate.edu - Your online resource for academic and
personal success, sponsored by Student Affairs.

Mathematics Learning Success Center
5th Floor, Edmon Low Library/405-744-5818
http://www.math.okstate.edu/
Tutors are available to answer questions for classes ranging from Beginning
Algebra through Calculus II. Tutoring for Differential Equations and
Linear Algebra is offered at specific times.

Writing Center
440 Student Union/405-744-6671
http://osuswritingcenter.okstate.edu/
The Writing Center helps writers throughout the composing process; you
should plan to visit early and often throughout the semester, not just the day
before an assignment is due. Tutors will work with you to improve your
brainstorming, organizational, and composing techniques.

Learning & Student Success Opportunity (LASSO) Tutoring Center
021 Classroom Building/405-744-3309
http://lasso.okstate.edu/
LASSO offers free individual tutoring for a variety of courses.

University Counseling Services
320 Student Union/405-744-5472 or 405-744-7007
http://ucs.okstate.edu/
Professional counselors offer confidential personal and/or career
counseling.

Office of Student Disability Services
315 Student Union/405-744-7716
http://ods.okstate.edu/
According to the Americans with Disabilities Act, each student with a
disability is responsible for notifying the University of his/her disability and
requesting accommodations. If you think you have a qualified disability
and need special accommodations, you should notify the instructor and
request verification of eligibility for accommodations from the Office of
Student Disability Services. Please advise the instructor of your disability
as soon as possible, and contact Student Disability Services, to ensure
timely implementation of appropriate accommodations. Faculty have an
obligation to respond when they receive official notice of a disability but
are under no obligation to provide retroactive accommodations. To receive
services, you must submit appropriate documentation and complete an
intake process during which the existence of a qualified disability is
verified and reasonable accommodations are identified.

Office of Equal Opportunity
408 Whitehurst/405-744-9153
Oklahoma State University policy prohibits discrimination based upon
gender, race, color, ethnicity, age, religion, national origin, veteran’s status,
disability, or sexual orientation. If you believe that you are being
discriminated against, please contact this office.

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