Overview of lecture topics: Modern Biology I (Bio 1320) will provide the non-science majors the basic information in Biological principles that every educated individual must be familiar with. Modern Biology I and II (Bio 1320 and 1421) will fulfill the General Education Core Curriculum requirement of seven-credit hours in Natural Science.

In this course you will study about the composition of the cells, the basic units of a living body; you will also know about the molecule of heredity, DNA, and how changes in DNA (mutations) provide the raw materials for evolutionary changes in the living world. Mendelian Genetics, genetic disorders, and Biotechnology (the most talked about field in Biology at present), will take you to issues in Bio-ethics.

The one-way flow of energy through the living world inter-connects all forms of life on earth, and the two important metabolic pathways, photosynthesis and respiration, will give you the basics of the interplay of energy and matter in sustaining life. You will learn how the different organ systems in a multi-celled body regulate its internal environment (maintain homeostasis) in order for the cells to perform life-sustaining activities. A brief look into some of the common infectious diseases and how these infections spread will lead you to questions about how the human body protects itself against infectious agents and what happens when these defenses break-down.

Exams: There will be 3 lecture exams and a final. Final is comprehensive and it will include questions from the topics that we cover after the third exam plus the questions from the 3 class exams (in a slightly altered format). If you miss an exam, you will be allowed to take a make-up test, provided you have a valid reason for your absence on the day of the exam. You must notify me within the day and make necessary arrangements to have the make-up test taken before your next Biology 1320 class. There are some past exams available at the Reference Desk (4th Floor) of Alkek Library. I will also post one practice test on Blackboard one week before the exam.

Exams: You will also be given three Home-Work assignments, which together will be worth 50 points. At the appropriate time, I will give you written questions for which you have to write out meaningful answers. I expect you to do some extra reading, and also use the internet to get information that your text book does not provide while answering those questions in the home-work assignments. I will also post some articles on Blackboard. You will have one week to turn in your assignment after you get the questions.

If you are found cheating during an exam, you will be reported to the Chairman of the Biology Department, and disciplinary action will be taken against you.

Total possible points will be 500. This will be distributed as follows:

- Lecture exams: 300 points
- Final: 150 points
- HW assignments: 50 points

Final grades will based on a percentage scale of the total points.
450 - 500  (90 - 100%)         A
400 - 449  (80 - 89.4%)        B
350 - 399  (70 - 79.4%)        C
300 - 349  (60 - 69.4%)        D
299 and below (below 59.4%)    F

Attendance: Your attendance will be carefully monitored. Please put your initials against your name in one of the sign-out sheets that I will circulate at the start of each day. If you leave the class after signing, I will consider that as cheating and disciplinary actions will be initiated against you. Poor attendance will adversely affect your final grade, especially if you happen to be a borderline case. If you miss 6 classes, your final grade will drop by one letter grade, i.e. A becomes B, or B becomes C: if you miss 9 classes, you will receive F, regardless of the points you score in the exams. If you have a perfect or near-perfect attendance, and if your course average is borderline (i.e. 79% or 89%) you will be given the next higher grade. The deadline for withdrawing from the course is 4/20/06; please see me before you do so.

Reading assignments: Against each lecture topic, I have indicated the text material that you must read. I encourage you to read the text as often as possible. You will use the same text book for Modern Biology II (Bio 1421) and so use the book carefully, make sure you do not lose it at the end of the semester!

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**Bio 1320, 252 Lecture Schedule  Spring 2006**

<table>
<thead>
<tr>
<th>Day/Date</th>
<th>Topics</th>
<th>Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>T 1/17</td>
<td>Introduction. Shared characteristics and inter-relationship Among organisms: Cellularity – prokaryotic/eukaryotic cells. Metabolism, homeostasis, reproduction, DNA and heredity</td>
<td>2 - 8</td>
</tr>
<tr>
<td>T 1/24</td>
<td>Organization of matter; elements and compounds atoms, molecules; radio-isotopes; electron shells</td>
<td>20 - 23</td>
</tr>
<tr>
<td>Th 1/26</td>
<td>Chemical bonds: ionic and covalent; polar and non-polar molecules. Hydrogen bond Water as the best biological solvent; acids and bases; pH scale; buffers.</td>
<td>24 - 27</td>
</tr>
<tr>
<td>T 1/31</td>
<td>Bio molecules (organic); monomers and polymers; condensation and hydrolysis. Carbohydrates, lipids</td>
<td>36 - 40</td>
</tr>
<tr>
<td>Th 2/2</td>
<td>Proteins, nucleic acids. Balanced diet; vitamins and minerals; deficiency disorders; Eating disorders</td>
<td>42 – 50 736-741</td>
</tr>
<tr>
<td>T 2/7</td>
<td>Cell structure and functions; Plasma membrane, Cytoplasm and nucleus. Animal and plant cells,</td>
<td>56 - 70</td>
</tr>
</tbody>
</table>
**Exam 1**

**T 2/14**
Transport across plasma membrane  
Passive processes; hypo, hyper and iso- tonic solutions 86 - 93  
Active process of membrane transport 86 - 93

**Th 2/16**
Flow of energy through the living world; transfer of energy from one group to another; role of enzymes in metabolism; exergonic and endergonic reactions; ATP cycle 98 – 108

**T 2/21**
Photosynthesis, energy “capture” and food production in chloroplasts; Thylakoids and stroma 116 - 121  
Light-dependent and light- independent reactions; C3 and C4 plants 122 - 126

**Th 2/23**
Respiration, energy-releasing process in cells;  
Aerobic, glycolysis, Kreb’s cycle, oxidative phosphorylation. 134 – 140  
Anaerobic, alcoholic and lactic fermentation. 142 - 143

**T 2/28**
Cellular reproduction: cell cycle, mitosis. Cytokinesis 152 -159  
Meiosis and gamete production 164 -170

**Th 3/2**
Mendelian genetics: monohybrid ratio; test cross 178 - 181

**T 3/7**
Dihybrid ratio; gene interactions; incomplete dominance 182 - 186

**Exam 2**

**Spring-break**

**T 3/21**
Genetic disorders, autosomal recessive and dominant. 196 - 204

**Th 3/23**
Sex – linked defects; non-disjunction and trisomy.  
Down syndrome, Turner syndrome, klinefelter syndrome 205 - 212

**T 3/28**
DNA, the molecule of heredity; base triplets, and base pairing 220 - 224  
Sequence; genes or gene loci; DNA replication.

**Th 3/30**
Gene expression,  
Transcription and translation 228 - 233  
Mutations and variations in trait; mutagens and cancer 234 - 235  
248 – 249

**T 4/4**
Viruses, viral reproduction; DNA and RNA virus 356 - 360  
Bacteria, bacterial reproduction; bacterial diversity 348 - 355
<table>
<thead>
<tr>
<th>Day</th>
<th>Date</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Th</td>
<td>4/6</td>
<td>Biotechnology; DNA fingerprinting; genetic engineering; Cloning. Benefits and dangers of biotechnology</td>
</tr>
<tr>
<td>T</td>
<td>4/11</td>
<td>Animal organization; tissues, organs, organ systems in the human Body; functions. Blood circulatory system; heart, blood, and blood vessels. Atria, ventricles, heart valves; pace maker; ECG; systole, diastole, heart rate; coronary circulation</td>
</tr>
<tr>
<td>Th</td>
<td>4/13</td>
<td>Exam 3</td>
</tr>
<tr>
<td>T</td>
<td>4/18</td>
<td>Blood cells and plasma; RBCs, WBCs and blood platelets; RBCs for O2 transport; WBCs for defense; blood platelets for blood clotting; lymphocytes in lymph nodes Arteries, veins and blood capillaries; atherosclerosis, hypertension and heart attacks</td>
</tr>
<tr>
<td>Th</td>
<td>4/20</td>
<td>Reproductive system, male and female. Sex hormones. Development and growth; implantation, placenta; Teratogens: alcohol, cigarette smoke. FAS</td>
</tr>
<tr>
<td>T</td>
<td>4/25</td>
<td>Common infectious diseases, bacterial and viral. Disease vectors, animal, water, air and food Sexually transmitted diseases (STDS)</td>
</tr>
<tr>
<td>Th</td>
<td>4/27</td>
<td>Defense against infections: inflammation, non-specific defenses Specific defenses; CMI and antibody mediated; memory cells, and immunity. Vaccinations</td>
</tr>
</tbody>
</table>

**Tuesday May 9, 2006 Final (8 – 10.30 am)**