

BIO 3513 BIOCHEMISTRY section 2 FALL, 2015

Tuesday & Thursday, 2:30-3:45 PM, FLN 2.03.08

Instructor: Dr. Robert Renthal

Office hours: 4:30-6:00 PM Tuesday, BSB 3.03.10; other times by appointment

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Objective: The course introduces students to the chemical components and chemical reactions of living cells. Topics include the chemical structure, biosynthesis and metabolism of amino acids and proteins, nucleic acids, carbohydrates, lipids and vitamins.

Students will be expected to understand the course material on at least three levels: (1) Factual information. Examples: memorization of chemical structures of important compounds, steps in metabolic reactions, structural components of macromolecules, definitions of many new terms. Items to be memorized will be clearly identified during the lectures. (2) Concepts and principles. Examples: conformation of macromolecules, storage and utilization of biochemical energy. These will appear repeatedly in lectures and in the text. (3) Quantitative reasoning. Examples: application to biochemistry of major quantitative concepts from general chemistry, particularly thermodynamics and kinetics. Problem assignments will include calculation of enzyme kinetics and calculation of free energy changes in metabolic reactions.

Format: The class sessions will include lectures, review, and testing. Lecture slides will be available on the Blackboard/Learn web site. Students will be assigned reading and problems in the text. Answers to problems are given in the text. During each lecture there will be frequent class participation, using electronic polling devices (i>clickers), which will test students' knowledge of factual material and provide an interactive forum for learning concepts.

Reading: Text: Tymoczko, Berg, & Stryer, Biochemistry, A Short Course, W.H. Freeman, Second or Third Edition. Chapter assignments are given on the schedule below.

Problems: Problem assignments are indicated on the schedule below. The date of the assignment indicates the lecture covering the material related to the problems. Questions similar to the assigned problems may appear on exams or in class discussions.

Exams: Three midterms plus a final exam. Part of the final will be comprehensive and part will cover the last section of the course. Make-up exams may be arranged if the instructor is notified in writing at least one week prior to the expected absence. Make-up exams for absence due to emergencies will be considered on an individual basis.

Grades: Course average = $0.2 \times (\text{Exam 1 score} + \text{Exam 2 score} + \text{Exam 3 score}) + 0.28 \times (\text{Final Exam score}) + 0.12 \times (\text{class participation score})$. Exam scores are percentages (number right \div total \times 100%). Class participation score is percentage of correct responses and percentage of participation points, equally weighted. Final grade will be determined from the course average as follows: A: 90-100, B: 80-89, C: 70-79, D: 60-69, F: 0-59

Classroom protocol: Only students registered for the course or registered for auditing may be in the classroom during lectures and exams. Audio recording of lectures is permitted. Cell phones, computers, and other electronic devices must be turned off during class except when used for note-taking or recording. Electronic devices, books, notes, calculators, and other aids may not be used during exams. Please consult the Regents' Rules & Regulations (<http://www.utsystem.edu/BOR/rules.htm>), the UTSA Student Code of Conduct (<http://www.utsa.edu/infoguide/appendices/b.html>), and the UTSA Disability Services Offices (<http://www.utsa.edu/disability/students.htm>) for information on rules and services pertaining to classroom activities.

Schedule

Date	Topic	Chapter	Page: problems (2nd ed.)	Page: problems (3rd ed.)
A 18	Introduction	1, 2	<u>32</u> : 4,7,10,11,12,16	<u>32</u> : 4,7,10,11,12,18
20	Amino acids	3	<u>43</u> : 2; <u>44</u> : 3,4,11,13	<u>45</u> : 3; <u>46</u> : 4,5,12,15
25	Proteins	4, 5	<u>64</u> : 2,3,4, 7a-c,g-j; <u>66</u> : 33	<u>66</u> : 2,3,4, 7a-c,g-j; <u>68</u> : 35
27	Hemoglobin	9	<u>152</u> : 1,5,13; <u>153</u> : 16,17; <u>154</u> : 24	<u>161</u> : 1,5,13; <u>162</u> : 17,18; <u>163</u> : 25
S 1	Enzymes	6	<u>103</u> : 3,4,11; <u>104</u> : 17,18,19	<u>107</u> : 3,4,11; <u>108</u> : 17,18,19
3	Enzymes	7	<u>121</u> : 7,10; <u>122</u> : 20	<u>128</u> : 7,10; <u>122</u> : 21
8	Enzymes	8	<u>140</u> : 6,7,13,15	<u>146</u> : 6,7,13,17
10	DNA & RNA	33, 34, 41	<u>595</u> : 4,5,6,17; <u>611</u> : 1; <u>612</u> : 12	<u>625</u> : 4,5,6,18; <u>641</u> : 1, 12
15	Exam I			
17	Protein synthesis	36, 39, 40	<u>642</u> : 10; <u>687</u> : 9,10; <u>688</u> : 13	<u>672</u> : 10; <u>719</u> : 9,10; <u>720</u> : 13
22	Carbohydrates	10	<u>176</u> : 4, 5; <u>177</u> : 12,17	<u>186</u> : 4,5; <u>187</u> : 12, 17
24	Lipids	11	<u>190</u> : 3,12; <u>191</u> :18,19	<u>200</u> : 3; <u>201</u> : 12,18,19
29	Membranes	12	<u>211</u> : 3,4,5,6,21	<u>221</u> : 4,5,6,21
O 1	Signal transduction	13	<u>232</u> : 1; <u>233</u> : 11,12,26	<u>242</u> : 1; <u>243</u> : 11,12,26
6	Metabolism	14, 15	<u>266</u> : 5,9,11; <u>267</u> : 15; <u>268</u> : 30	<u>277</u> : 5,10,12,15; <u>279</u> : 32
8	Glycolysis	16	<u>296</u> : 3,14; <u>297</u> : 23; <u>298</u> : 33	<u>308</u> : 4; <u>309</u> : 14,23; <u>310</u> : 35
13	Gluconeogenesis	17	<u>312</u> : 3,5,10; <u>313</u> : 21,23	<u>326</u> : 3,5,10; <u>327</u> : 23,25
15	Exam 2			
20	Citric acid cycle	18	<u>327</u> : 2; <u>328</u> : 6,16	<u>341</u> : 2,6; <u>342</u> : 17
22	Citric acid cycle	19	<u>344</u> : 14,19; <u>345</u> : 20; <u>346</u> : 24,25	<u>358</u> : 13,19,20; <u>359</u> : 24; <u>360</u> : 25
27	Electron transport chain	20	<u>365</u> : 10; <u>366</u> : 11,17	<u>380</u> : 10,11; <u>381</u> : 17
29	ATP synthesis	21	<u>383</u> : 3,4,5	<u>402</u> : 3,4,5
N 3	Glycogen	24, 25	<u>434</u> : 12; <u>435</u> : 18; <u>448</u> : 5,7	<u>457</u> : 12,18; <u>470</u> : 5,7
5	Pentose phosphate pathway	26	<u>462</u> : 4,8	<u>484</u> : 4; <u>485</u> : 8
10	Fatty acid metabolism	27, 28	<u>479</u> : 8,10,13,28; <u>494</u> : 6,7,15	<u>503</u> : 8,10,13; <u>504</u> : 28; <u>520</u> : 6,7; <u>521</u> : 15
12	Lipid metabolism	29	<u>519</u> : 26, 28	<u>546</u> : 26,28
17	Exam 3			
19	Amino acid degradation	30	<u>539</u> : 1,12	<u>568</u> : 1,12
24	Amino acid synthesis	31	<u>552</u> : 8,9,14	<u>582</u> : 8,9,14
D 1	Nucleotide metabolism	32	<u>571</u> : 3; <u>572</u> : 7; <u>573</u> : 28	<u>602</u> : 3; <u>603</u> : 7; <u>604</u> : 28
10	Final exam, 12:30-3 PM			