

UNIVERSITY OF DETROIT MERCY SCHOOL OF DENTISTRY  
DEPARTMENT OF BIOMEDICAL SCIENCES  
Course Syllabus

BIOCHEMISTRY  
DBS 815

**Course Information**

Course web address: <http://knowledge.udmercy.edu/>

**Course Director**

Michael J. Gleason, PhD, DDS Manning Hall 239 Office Hours: Wednesday 1:00 - 3:00 Phone: 494-6636 Email: <a href="mailto:gleasomj@udmercy.edu">gleasomj@udmercy.edu</a>	
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**Fall Term 2007**

DS1 Students (Class 2011)  
St. Clair Tuesday 10:00 - 10:50  
St. Clair Friday 10:00 - 11:50

**Credit hours:** 3

**Prerequisites:** None

**Lecturers/Support Faculty**

**Lecturers**

Michael J. Gleason, PhD, DDS

**Academic Policies:**

All policies in the School of Dentistry Academic Policies Handbook including but not limited to academic integrity, mandatory attendance, professional decorum & dress code, identification (ID) badges, preclinical and classroom decorum, use of cell phone and electronic devices, examination policies and exam/quiz absences apply.

**Accommodations:**

If you would like to request a classroom, testing, preclinical, clinical, or other accommodation because of a legally protected disability, or if you might require any special assistance in the event of an emergency or evacuation, please contact the University of Detroit Mercy's Office of University Academic Services (UAC) at 313-578-0310 or email your request for information to [gallegem@udmercy.edu](mailto:gallegem@udmercy.edu)

**Student Evaluation of Instruction:**

Student feedback is valued by faculty and the administration. All students are required to complete the School of Dentistry's on-line course evaluation by a specified date. Failure to comply by posted deadline dates will result in the receipt of an F (Failing) grade of record for the Evaluation Responsibility Course. Only constructive, professional recommendations will be reported and considered.

## Course Description:

### Purpose of the Course:

The topics considered in Biochemistry are devoted almost exclusively to human biochemistry. This emphasis is partially due to curriculum time constraints and also to the school and department philosophy that the Dental biochemistry course sequence provides basic information which is subsequently utilized by many other departments. Due to the fundamental nature of much of the material presented, this course is given in the first term of the first year of the dental curriculum. The Biochemistry course sequence is designed to enable dental students to achieve an understanding of the molecular interactions that are ultimately related to dental health and disease.

### Course Goals:

The goals of the Biochemistry sequence are to:

1. provide a basic knowledge of cellular processes
2. enhance the understanding that biological processes are at their root the result of standard chemical reactions
3. provide the basis for further study in basic and clinical sciences
4. foster the understanding that the human system functions under the same set of principles as are taught in standard undergraduate science courses

### Course Objectives:

At the conclusion of this course, the student should have a knowledge of:

1. pH and buffer systems.
2. The role of functional groups of the amino acids, the structure of proteins and its role in function, and the basics of enzyme function and regulation.
3. The classification and chemistry of simple carbohydrates along with the structure and formation of complex carbohydrates, especially those associated with oral structures and disease..
4. The biochemistry of lipid compounds and their roles in membranes, signaling and energy production.
5. The biochemistry of the compounds composing nucleic acids and the general structural characteristics important in an understanding of gene function and control.
6. The principles of energy production and its utilization.
7. The general processes of intermediate metabolism.

### Instructional Methods:

Instructional methods utilized in this course include lecture and class participation exercises. The opportunity for out of class time question and, if requested, review sessions will also be provided. Sample questions for examinations will be posted in a quiz format on the course web site.

### School of Dentistry Competencies

**Competency-based Education:** Assumes that learning to become an entry-level professional is a progression through stages from novice to competent.

**Stages of Progression to Competence:** F or Foundation Knowledge: Basic knowledge, skills, and attitudes needed to begin the journey to competence.

**N or Novice Level:** Ability to articulate or describe the appropriate skills, knowledge, and professional attitudes. Novices need structure, clarity of goals, single and clearly explained approaches.

**B or Beginner Level:** Combines the appropriate skills, knowledge, and professional attitudes, all of which are performed with guidance and correction.

**C or Competent Level:** Combines the appropriate supporting skills, knowledge, and professional attitudes, all of which are performed reliably without assistance.

	<b>Competencies of the Graduating Dental Student</b>	<b>Addressed</b>	<b>Evaluated</b>	<b>Method</b>
1.	The graduating student obtains, records, updates and organizes accurate and completed medical/dental histories including pertinent psychological and socioeconomic information.	NO	NO	NA
2.	The graduating student performs, records and organizes a physical assessment appropriate for dental care.	NO	NO	NA
3.	The graduating student determines differential, provisional or definitive diagnoses by correlating and interpreting examination and assessment findings.	YES	F	WRITTEN
4.	The graduating student develops alternative treatment plans which are sequenced to address the chief complaint, eliminate oral disease, restore function, and maintain health, and prevent oral disease consistent with assessment and diagnoses.	YES	F	WRITTEN
5.	The graduating student establishes with the patient a mutually acceptable treatment plan.	NO	NO	NA
6.	The graduating student monitors and provides for patient comfort associated with dental care.	YES	F	WRITTEN
7.	The graduating student delivers and/or manages the planned treatment in sequence and in accordance with accepted standards of care.	NO	NO	NA
8.	The graduating student promotes health maintenance and disease prevention.	YES	F	WRITTEN
9.	The graduating student applies the principles of infection control and environmental safety.	YES	F	WRITTEN
10.	The graduating student makes professional decisions affecting the practice of dentistry based on values that satisfy legal and ethical principles and service to society.	NO	NO	NA
11.	The graduating student performs routine self evaluation.	NO	NO	NA
12.	The graduating student applies business and practice management skills.	NO	NO	NA
13.	The graduating student demonstrates interpersonal skills to function successfully in a multicultural work environment.	NO	NO	NA
14.	The graduate critically evaluates the validity of new information, new products, and/or techniques and their relevance to the practice of dentistry.	YES	F	WRITTEN

**Course Policies:**

If you are late for class please wait for a pause in the lecture to take a seat, also turn off all cellular phones and audible pagers during lecture. No eating during lecture, drinking is permitted if it does not disturb those around you.

Examinations will be composed of true/false, multiple choice, "multiple-multiple choice", and/or short answer questions. **Questions will be drawn from the assigned readings and the lecture material.**

Online sample quizzes will be posted periodically on the course Blackboard site. The quizzes are intended to provide samples of the types of questions which may appear on the examinations and are NOT included in the course grade calculation.

Missed examinations may be made up if the absence was for good and sufficient reason. Format and timing of the make up exam will depend on the length of time after the original exam date that the make up is

taken. Examinations will **not be returned**, students may review their examination during office hours until the next exam is given.

**All examinations are one hour or less and you are not allowed to leave the room before you have finished your examination.** Once you have entered the classroom for an examination no talking is allowed. Do not open the examination booklet until told to do so. During examinations all books, bags, papers, and electronic devices will be placed at the sides of the room unless otherwise instructed. Not questions of substance or context will be answered during examinations. Should you have a documented medical condition which may necessitate leaving during the examination, inform the course director at least **two days prior** to the examination so that arrangements may be made.

The class room response system, clicker, will be used during each lecture to ask questions concerning the material being covered and as miniquizzes for previous lecture material. Student participation, through the response system, and answers to the questions will be used to determine the participation portion of the final grade. This is a participation not an attendance grade therefore failure to participate, regardless of reason, will result in a zero for that class participation period.

All other policies not mentioned here but appearing in the *University of Detroit Mercy School of Dentistry Academic Policies Handbook* apply, where applicable, to this course. When responding to in class participation questions and taking quizzes or examinations please note that the *University of Detroit Mercy School of Dentistry Academic Policies Handbook* states that "Failure to acknowledge assistance that a student received from a fellow student ... will be regarded as an instance of plagiarism." Using another student's classroom response system/ID to respond will also be regarded as Academic Misconduct. Should such conduct be detected by the instructor but the instructor is unable to determine the individual or individuals involved then ALL STUDENTS WILL BE GIVEN A ZERO PARTICIPATION GRADE FOR THAT LECTURE. If the individual or individuals involved are determined they will receive a zero participation grade for that lecture and the appropriate administrative report will be submitted. This type of activity is viewed by the Course Director, and most faculty members, as a serious breach of the code of professional conduct and as such reflects very poorly on a student's fitness for the profession.

**Textbooks and Resource Materials:**

**Required Text:**

*Medical Biochemistry* by Baynes, JW and Dominiczak, MH Second edition, Elsevier Mosby, 2005.

**Readings:**

Page listings are from the required text; the notation NCBI refers to the National Center for Biotechnology Information Bookshelf (<http://www.ncbi.nlm.nih.gov>). For many topics this semester *Biochemistry* by Berg, Tymoczko, and Stryer on the site will be the most appropriate.

Another good source for topics is *THE Medical Biochemistry Page* at:  
<http://web.indstate.edu/thcme/mwking/home.html>

**Evaluation and Grading:**

**Grading Scale**

Percent	Letter	Percent	Letter
94 - 100	A	77 - 79	C+
90 - 93	A-	73 - 76	C
87 - 89	B+	70 - 72	C-
83 - 86	B	60 - 69	D
80 - 82	B-	0 - 59	F

**Course Grade Components**

Examination 1	30%
Examination 2	30%
Examination 3	30%
Participation	10%

**Course Evaluation Methods:**

Student evaluation will be based two section examinations and a final comprehensive examination (Examination 3 composed of 40-45 questions from new material and 5-10 questions in a case based format covering all material). Scores on examinations will be reported on the web site as simply the number correct. The final grades for the course will be determined by converting each examination grade to a Z-score and the average of the Z-score adjusted percentage for all a student's exams will be used to determine the percentage grade for the course. The percentage will be calculated by adding 80% to the product of the student's average Z-score times lesser of 10% or the class percentage standard deviation. If the class average on an examination is above 80% no adjustment will be made to the scores. Examinations will constitute 90% of the final grade.

Classroom participation will be account for 10% of the final grade. Each lecture period will be assigned 10 participation points. During the lecture questions will be asked which require answering via the clicker transmitter, the percentage of correct responses a student makes will be a factor used to determine the number of participation points awarded the student for the lecture. As noted above, failure to bring the CPS to class, having dead batteries, etc. will be interpreted as a lack of preparation for the class and result in ZERO participation points for the lecture.

The percentage grade for the course will be determined by the following formula:

$$(\% \text{ examination score}) * 0.9 + (\% \text{ participation score}) * 0.1 = \text{Final \% grade}$$

Final letter grades will then be reported based on the scale published in the Academic Policies Handbook reproduced above.

Following the first examination and each subsequent examination the Blackboard site will contain an estimate of your current letter grade standing without the participation score. This estimate assumes that the examinations constitute 100% of the final grade.

**Course Schedule:**

Assigned readings are expected to have been completed prior to the lecture for which they are assigned.

Date	Time	Topic	Reading (pgs)
Tue 8/14	10:00 - 10:50	Introduction	1-12
Fri 8/17	10:00 - 11:50	<b>No class</b>	
Tue 8/21	10:00 - 10:50	Amino acids	NCBI
Fri 8/24	10:00 - 11:50	<b>No class</b>	
Tue 8/28	10:00 - 10:50	Protein chemistry	12-24
Fri 8/31	10:00 - 11:50	Protein structure	NCBI
Tue 9/4	10:00 - 10:50	Enzymes	51-62
Fri 9/7	10:00 - 10:50	Enzymes	
	11:00 - 11:50	Cofactors	NCBI
Tue 9/11	10:00 - 10:50	Carbohydrates	NCBI
Fri 9/14	10:00 - 10:50	Glycolysis	143-150
	11:00 - 11:50	Pentose phosphate pathway	150-155
Tue 9/18	11:00 - 11:50	<b>First Examination</b>	
Fri 9/21	10:00 - 10:50	Glycogen metabolism	157-167
	11:00 - 11:50	Gluconeogenesis, Regulation	167-173
Tue 9/25	10:00 - 10:50	Principals of bioenergetics; Kreb's cycle	NCBI; 175-187
Fri 9/28	10:00 - 10:50	Oxidative phosphorylation and electron transport	93-111
	11:00 - 11:50	Lipid chemistry	NCBI
Tue 10/2	10:00 - 10:50	Fatty acid oxidation/synthesis	189-198;199-203
Fri 10/5	10:00 - 10:50	Triglycerides and ketone bodies	204-208
	11:00 - 11:50	Lipoproteins	226-243
Tue 10/9	10:00 - 10:50	Regulation of fatty acid metabolism	NCBI
Fri 10/12	10:00 - 10:50	Glycerolipids	375-386
	11:00 - 11:50	Sphingolipids/Glyco-Sphingolipid Disease	NCBI
Tue 10/16	10:00 - 10:50	Membranes	77-92
Fri 10/19	10:00 - 11:50	Membranes	
Tue 10/23	10:00 - 10:50	Cholesterol	209-223
Fri 10/26	10:00 - 10:50	Steroids	NCBI
	11:00 - 11:50	Steroids	

Date	Time	Topic	Reading (pgs)
Tue 10/30	10:00 - 10:50	<b>Second Exzm</b>	
Fri 11/2	10:00 - 10:50	Eicosinoids	554-558
	11:00 - 11:50	Eicosinoids	
Tue 11/6	10:00 - 10:50	Urea cycle	245-260
Fri 11/9	10:00 - 10:50	Amino acid degradation	NCBI
	11:00 - 11:50	Amino acid synthesis	NCBI
Tue 11/13	10:00 - 10:50	Biogenic amines	NCBI
Fri 11/16	10:00 - 10:50	Nucleotide structure	413-423
	11:00 - 11:50	Nucleotide metabolism	NCBI
Tue 11/20	10:00 - 10:50	Nucleotide metabolism regulation	NCBI
Fri 11/23	<b>School Closed for Holiday</b>		
Wed 11/28	10:00 - 10:50	DNA structure	425-436
	11:00 - 11:50	DNA synthesis	NCBI
<b>Final Examination</b> (comprehensive) TBA			