

# **BIOL 3462 BIOCHEMISTRY II online**

## ***Syllabus***

### **Course Information**

|                              |                                |
|------------------------------|--------------------------------|
| <i>Course Number/Section</i> | <b>BIOL 3462.U25</b>           |
| <i>Course Title</i>          | <b>Biochemistry II</b>         |
| <i>Course Credits</i>        | <b>4 semester credit hours</b> |
| <i>Term</i>                  | <b>Spring 2025</b>             |

### **Professor Contact Information**

|                            |  |
|----------------------------|--|
| <i>Professor</i>           | <b>Mehmet Candas</b>                   |
| <i>Office Phone</i>        | <b>972-883-6338</b>                    |
| <i>Email Address</i>       | <b>candas@utdallas.edu</b>             |
| <i>Office Location</i>     | <b>FN 3.206</b>                        |
| <i>Online Office Hours</i> | <b>With appointment only via Teams</b> |

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### **Course Pre-requisites, Co-requisites, and/or Other Restrictions**

Biochemistry I – BIOL 3461 or CHEM 3461

This course is the second semester of a required sequence for all biology majors.

### **Course Description**

Biochemistry II is the second course in a two-part series, offering an in-depth understanding of macromolecules and key metabolic pathways. It aims to provide students with a working knowledge of macromolecules and fundamental metabolic pathways. Students will master nitrogen fixation, amino acid metabolism, nucleotide metabolism, DNA replication, repair, recombination, lipid structure and function, biological membranes, biosynthesis, and catabolism. The course emphasizes the integration of metabolism and energy homeostasis, framed by threshold concepts such as evolution, energy transformations, information flow, and biological organization. Essential for careers in medicine and biomedical research, this course highlights the chemical and physical laws governing biological systems, energy use in synthesis, and the synthesis of vital biomolecules.

Overall, the course is devoted to mastering:

1. Nitrogen fixation and nitrogen assimilation.
2. The metabolism of amino acids and nucleotides.
3. The structures of nucleic acids.
4. The structure, function, biosynthesis, and catabolism of lipids.
5. Structural and functional organization of biological membranes.
6. Dynamic remodeling of cell membrane and transport across cell membrane.
7. Energy charge system of the cell and integration of metabolism in the cells and the body.

### **Student Learning Objectives/Outcomes**

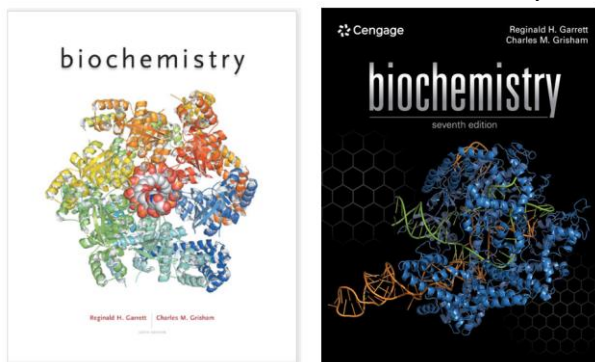
Upon completing this course, students will be able to:

1. Identify the structures of the major metabolites involved in photosynthesis, carbon fixation, the nitrogen cycle, ammonia assimilation, amino acid synthesis, the urea cycle, purine and pyrimidine synthesis, breakdown and synthesis of fatty acids, lipid signaling, eicosanoids, prostaglandins, isoprenoids, cholesterol, and steroid hormones.

2. Describe the major metabolic pathways and related regulatory aspects involving the above compounds.
3. Explain dynamic processes involving membrane structure and function, membrane permeability, membrane proteins, ion channels, and transport across membrane.
4. Recognize the structural features of proteins, nucleic acids, and membranes and relate these features to their functions, e.g., catalysis and information storage (i.e., heredity).
5. Understand homeostatic responses in terms of integration of metabolism, endocrine regulation of energy metabolism and factors influencing metabolism.

### Required Textbooks and Materials

*R.H. Garrett and C.M. Grisham: Biochemistry, 6<sup>th</sup> or 7<sup>th</sup> edition*



Each learning module is based on 1-2 selected chapters from the textbook *Biochemistry* by *R.H. Garrett and C.M. Grisham*. Lecture slides, class notes, and study guides are posted according to the lecture and exam schedule.

Communication and announcements are conducted through official channels used by the University, including [utdallas.edu](mailto:utdallas.edu) email and [utdallas.edu](http://utdallas.edu) website as well as the course's Microsoft Teams channel. Changes in course activities such as modifications and/or adjustment of exam and/or meeting schedules, or events that may require suspension of activities are communicated to all students in the class. You do not need to send an email message to the instructor as appropriate changes, actions and guidelines are promptly communicated with all students.

Textbook can be obtained from Cengage or [UT Dallas Bookstore](#).

### Technical Requirements

In addition to a confident level of computer and Internet literacy, certain minimum technical requirements must be met to enable a successful learning experience. Please review the important technical requirements on the [Getting Started with eLearning](#) webpage.

### Course Access and Navigation

This course can be accessed using your UT Dallas NetID account on the [eLearning](#) website.

Please see the course access and navigation section of the [Getting Started with eLearning](#) webpage for more information.

To become familiar with the eLearning tool, please see the [Student eLearning Tutorials](#) webpage.

UT Dallas provides eLearning technical support 24 hours a day, 7 days a week. The [eLearning Support Center](#) includes a toll-free telephone number for immediate assistance (1-866-588-3192), email request service, and an online chat service.

### **Communication**

This course utilizes online tools for interaction and communication. Some external communication tools such as regular email and a web conferencing tool may also be used during the semester. For more details, please visit the [Student eLearning Tutorials](#) webpage for video demonstrations on eLearning tools.

Student emails and discussion board messages will be answered within 3 working days under normal circumstances.

### **Email Use**

The University of Texas at Dallas recognizes the value and efficiency of communication between faculty and students through electronic mail. At the same time, email raises some issues concerning security and the identity of everyone in an email exchange. The university encourages all official student email correspondence to be sent only to a student's U.T. Dallas email address and that faculty and staff consider email from students official only if it originates from a UTD student account. This allows the university to maintain a high degree of confidence in the identity of all individuals corresponding and the security of the transmitted information. UTD furnishes each student with a free email account that is to be used in all communication with university personnel. The Department of Information Resources at U.T. Dallas provides a method for students to have their U.T. Dallas mail forwarded to other accounts.

### **Distance Learning Student Resources**

Online students have access to resources including the McDermott Library, Academic Advising, The Accessibility Resource Center, and many others. Please see the [eLearning Current Students](#) webpage for more information.

### **Server Unavailability or Other Technical Difficulties**

The University is committed to providing a reliable learning management system to all users. However, in the event of any unexpected server outage or any unusual technical difficulty which prevents students from completing a time sensitive assessment activity, the instructor will provide appropriate accommodation based on the situation. Students should immediately report any problems to the instructor and also contact the online [eLearning Help Desk](#). The instructor and the eLearning Help Desk will work with the students to resolve any issues at the earliest possible time.

If you experience any issues with your UT Dallas account, contact the UT Dallas Office of Information Technology Help Desk: [assist@utdallas.edu](mailto:assist@utdallas.edu) or call 972-883-2911. UT Dallas provides eLearning technical support 24 hours a day/7 day a week. The services include a toll-free telephone number for immediate assistance (1-866-588-3192), email request service, and an online chat service. Please use this link to access the UTD eLearning Helpdesk: <http://www.utdallas.edu/elearning/eLearningHelpdesk.html>.

## Academic Calendar

Topics are covered in 8 learning modules addressing 10 chapters from the textbook Biochemistry by Garrett & Grisham. Each module is based on 1-2 selected chapters. Modules are released in sequence and each module becomes available to review after the previous module assessment deadline. Please note the schedule so you can review the topics accordingly at your own pace and complete the module specific assessments on the dates given.

| MODULES | TOPICS | READINGS  | TESTS  |
|---------|--------|---|--|
| 1       | 1.1    | Nitrogen fixation and nitrogen assimilation               | June 12 <sup>th</sup><br>8:00 AM-12:00 PM noon   |
|         | 1.2    | Amino acid synthesis                                      |  |
|         | 1.3    | Amino acid catabolism                                     |  |
| 2       | 2.1    | Nucleotides   | June 20 <sup>th</sup><br>8:00 AM-12:00 PM noon   |
|         | 2.2    | Synthesis and catabolism of purines                       |  |
|         | 2.3    | Synthesis and catabolism of pyrimidines                   |  |
| 3       | 3.1    | Base pairing, and structural flexibility of nucleic acids | June 30 <sup>th</sup><br>8:00 AM-12:00 PM noon   |
|         | 3.2    | Restriction endonucleases, RNA structure-function         |  |
|         | 3.3    | DNA replication and repair                                |  |
|         | 3.4    | Telomeres and DNA repair                                  |  |
| 4       | 4.1    | Fatty acids   | July 7 <sup>th</sup><br>8:00 AM-12:00 PM noon    |
|         | 4.2    | Glycerophospholipids, sphingolipids                       |  |
|         | 4.3    | Isoprene, isoprenoids, sterols                            |  |
|         | 4.4    | Phospholipases and lipid signaling                        |  |
| 5       | 5.1    | Organization of lipids in water                           | July 17 <sup>th</sup><br>8:00 AM-12:00 PM noon   |
|         | 5.2    | Dynamic organization of cell membrane lipids              |  |
|         | 5.3    | Cell membrane proteins                                    |  |
|         | 5.4    | Transport across cell membrane                            |  |
| 6       | 6.1    | Digestion and absorption of lipids                        | July 25 <sup>th</sup><br>8:00 AM-12:00 PM noon   |
|         | 6.2    | Oxidation of fatty acids                                  |  |
|         | 6.3    | Ketone bodies and thermogenesis                           |  |
| 7       | 7.1    | Acetyl-CoA carboxylase, fatty acid synthase               | August 4 <sup>th</sup><br>8:00 AM-12:00 PM noon  |
|         | 7.2    | Synthesis, elongation, & desaturation of fatty acids      |  |
|         | 7.3    | Synthesis of complex lipids                               |  |
|         | 7.4    | Mevalonate pathway and sterol synthesis                   |  |
|         | 7.5    | Transport of lipids in the body                           |  |
| 8       | 8.1    | Integration of metabolic functions                        | August 13 <sup>th</sup><br>8:00 AM-12:00 PM noon |
|         | 8.2    | Organ specialization                                      |  |
|         | 8.3    | Control of energy homeostasis                             |  |

**Remember, tests are accessible only on the days and hours indicated. Each test is timed with questions presented one at a time. They must be completed between 8:00 AM - 12:00 PM noon on the days indicated in the schedule. Tests are not available after the 12:00 PM noon deadline and there is no make-up or retake for missed or not taken tests. Scores for missed or not taken tests are recorded as “zero”. No score is dropped from final letter grade determination.**

## **Class Materials**

The Instructor may provide class materials that will be made available to all students registered for this class as they are intended to supplement the classroom experience. These materials may be downloaded during the course; however, these materials are for registered students' use only. Classroom materials may not be reproduced or shared with those not in class or uploaded to other online environments except to implement approved Accessibility Resource Center accommodation. Failure to comply with these University requirements is a violation of the [Student Code of Conduct](#).

## **Class Recordings**

Students are expected to follow University policies appropriately and maintain the security of passwords used to access recorded lectures. Unless the AccessAbility Resource Center has approved the student to record the instruction, students are expressly prohibited from recording any part of this course. Recordings may not be published, reproduced, or shared with those not in the class, or uploaded to other online environments except to implement an approved AccessAbility Resource Center accommodation. Failure to comply with these University requirements is a violation of the [Student Code of Conduct](#).

## **Copyright Notice**

It is the policy of the University of Texas at Dallas to adhere to the requirements of the United States Copyright Law of 1976, as amended, (Title 17, United States Code), including ensuring that the restrictions that apply to the reproduction of software are adhered to and that the bounds of copying permissible under the fair use doctrine are not exceeded. Copying, displaying, reproducing, or distributing copyrighted material may infringe upon the copyright owner's rights. Unauthorized distribution of copyrighted material, including unauthorized peer-to-peer file sharing, may subject students to appropriate disciplinary action as well as civil and criminal penalties. Usage of such material is only appropriate when that usage constitutes "fair use" under the Copyright Act. For more information about the fair use exemption: <http://copyright.lib.utexas.edu/copypol2.html>.

As a UT Dallas student, you are required to follow UT Dallas' copyright policy (UTDPP1043 at <http://policy.utdallas.edu/utdpp1043>) and the UT System's policy, UTS107 at <http://www.utsystem.edu/board-of-regents/policy-library/policies/uts107-use-copyrighted-materials>.

## **Tests and Grading Policy**

- There are 8 online tests. Each test covers the topics specified in the corresponding learning modules. There is no comprehensive final test.
- Tests are open for access in eLearning on the dates and hours specified in the schedule.
- Tests have 33 questions with multiple choice, true/false, and matching questions. Questions are presented one at a time.
- Tests are timed for 35 minutes, and they must be completed between 8:00 AM - 12:00 PM noon on the dates given. Do not try to start the test too close to 12 PM noon deadline. Tests are not accessible after 12:00 PM noon deadline.
- Tests must be completed with only one attempt and answers must be submitted during access.
- At the end of the test time, the test closes and answers are submitted automatically.
- Submissions are final; no change is applied to submitted tests.
- Scores are posted automatically based on a total of 100 points for each test.

- Partially completed tests receive a score according to the completed portion of the test.
- Scores for missed or not taken/not completed tests are registered “zero”.
- There is no make-up or retake for tests, and no test score is dropped from final grade calculation.
- Completion of all 8 tests is required. There is no extra credit.
- Letter grades are based on the average of test scores, and are determined according to the following scale:

| Letter Grade | Percentage grade |
|--------------|------------------|
| A+           | 95-100           |
| A            | 90-94            |
| A-           | 85-89            |
| B+           | 80-84            |
| B            | 75-79            |
| B-           | 70-74            |
| C+           | 65-69            |
| C            | 60-64            |
| C-           | 55-59            |
| D+           | 50-54            |
| D            | 45-49            |
| D-           | 40-44            |
| F            | <40              |

- Midterm letter grades will be based on the test scores available at the time of midterm grade posting. End of semester final letter grade will be based on an average of five test scores. If the average numerical score is fractional, it will be rounded off to the nearest integer value, i.e., 0.5 - 0.9 will be rounded up to the next highest whole number. For example, 84.5 would be rounded to 85, but 84.4 would be rounded to 84.

### **Classroom Citizenship**

The University of Texas System and The University of Texas at Dallas have rules and regulations for the orderly and efficient conduct of their business. It is the responsibility of each student and each student organization to be knowledgeable about the rules and regulations which govern student conduct and activities. General information on student conduct and discipline is contained in the UTD publication, A to Z Guide, which is provided to all registered students each academic year.

The University of Texas at Dallas administers student discipline within the procedures of recognized and established due process. Procedures are defined and described in the Rules and Regulations, Board of Regents, The University of Texas System, Part 1, Chapter VI, Section 3, and in Title V, Rules on Student Services and Activities of the university’s Handbook of Operating Procedures. Copies of these rules and regulations are available to students in the Office of the Dean of Students, where staff members are available to assist students in interpreting the rules and regulations (SU 1.602, 972/883-6391).

A student at the university neither loses the rights nor escapes the responsibilities of citizenship. He or she is expected to obey federal, state, and local laws as well as the Regents’ Rules, university regulations, and administrative rules. Students are subject to discipline for violating the standards of conduct whether such conduct takes place on or off campus, or whether civil or criminal penalties are also imposed for such conduct.

### **Academic Integrity**

The faculty expects from its students a high level of responsibility and academic honesty. Because the value of an academic degree depends upon the absolute integrity of the work done by the student for that degree, it is imperative that a student demonstrate a high standard of individual honor in his or her scholastic work.

Scholastic dishonesty includes, but is not limited to, statements, acts or omissions related to applications for enrollment or the award of a degree, and/or the submission as one's own work or material that is not one's own. As a general rule, scholastic dishonesty involves one of the following acts: cheating, plagiarism, collusion and/or falsifying academic records. Students suspected of academic dishonesty are subject to disciplinary proceedings.

Plagiarism, especially from the web, from portions of papers for other classes, and from any other source is unacceptable and will be dealt with under the university's policy on plagiarism (see general catalog for details). This course will use the resources of turnitin.com, which searches the web for possible plagiarism and is over 90% effective.

### **Comet Creed**

This creed was voted on by the UT Dallas student body in 2014. It is standard that Comets choose to live by and encourage others to do the same:

*“As a Comet, I pledge honesty, integrity, and service in all that I do.”*

### **Withdrawal from Class**

The administration of this institution has set deadlines for the withdrawal of any college-level courses. These dates and times are published in that semester's course catalog. Administration procedures must be followed. It is the student's responsibility to handle withdrawal requirements from any class. In other words, we cannot drop or withdraw any student. You must do the proper paperwork to ensure that you will not receive a final grade of "F" in a course if you choose not to attend the class once you are enrolled.

### **Accommodation for Students with Disabilities**

Please review [the section](#) within the UT Dallas Syllabus Policies and Procedures webpage.

### **Academic Support Resources**

Please visit the [Academic Support Resources](#) page to view the University's academic support resources for all students.

### **UT Dallas Syllabus Policies and Procedures**

Please visit the [Syllabus Policies](#) page to view the University's policies and procedures segment of the course syllabus.

Please review the catalog sections regarding the [credit/no credit](#) or [pass/fail](#) grading option and withdrawal from class.

## STUDY SUGGESTIONS

### **Timely and systematic engagement with the course material is crucial.**

- Completing an online course successfully demands a disciplined approach. It requires setting a consistent schedule to study, attentively following each module, and actively reviewing the material. By staying organized and committed, you can ensure that you grasp the concepts thoroughly and make the most of the learning experience. The key to success in online learning is maintaining focus and dedication throughout the course.

### **View the recorded lecture presentations to enhance your learning and success.**

- Attentively viewing the slides and listening to the explanations facilitate metacognition by allowing you to reflect on your understanding and identify areas needing further review. After watching the recorded presentations, review the lecture slides in conjunction with the study guide. This will further reinforce key concepts and ensure a comprehensive grasp of the material.

### **You will need 2-3 hours to review each learning module and an additional 1-2 hours to prepare yourself for the test with the study guide.**

- Each learning module highlights topics from a chapter in the textbook. Topics for the learning module are presented with 3-5 lectures. You will have 8-10 days to review each learning module and prepare yourself for the module's test. Depending on your learning style, you may go over one lecture of that learning module every day and review the related subjects that are emphasized in the study guide. Alternatively, you may listen to several lectures for a given learning module and review the related topics emphasized in the study guide. Regardless of how you complete the learning modules, remember that if you study timely, organized and systematically, you will have plenty of time to review the topics covered in each learning module and prepare for the tests.

### **The tests cover the topics outlined in the study guides.**

- To ensure success in the tests, it is necessary that you are prepared for the tests. A thorough review of the topics covered in the study guide is essential. Understand the concepts pertinent to questions in the study guide. Remember, tests are timed; you have 35 minutes to answer 33 questions.

**This combination of strategies not only solidifies knowledge but also promotes active engagement and better retention, ultimately leading to greater academic success.**