Biochemistry 2BB3 (2010)
Protein Structure and Enzyme Function

Course Coordinator: Dr. Murray Junop
HSC 4N20A, Ext. 22912, please send ‘email’ to main LearnLink course folder

Course Textbook: Garrett and Grisham, updated 4th Edition. Please note that although this text is not required for this course, it will most likely be used and perhaps required in other BIOCHEM courses.

Although no particular text book is required for this course, some reading may be assigned that is intended to help in understanding the course content. Any basic Biochemistry text book will be fine.

Course Objectives:

Our goal in delivering Biochemistry 2BB3 is to NOT BORE students with “useless” and disjointed facts that will be memorized and then quickly forgotten soon after examination periods. Instead we want to get you TURNED ON to the amazing world of proteins and to walk away from this course with a set of KEY CONCEPTS that govern a true understanding and appreciation of why it is that PROTEINS RULE! In addition, these concepts will serve you well for your future courses and research within Biochemistry and Biomedical Sciences. Students will be exposed to these concepts in both traditional lecture and small group inquiry environments. Some of the key concepts we want you to take with you, include: 1) understanding basic protein structure and the forces that govern its formation, 2) methods for protein structure prediction and experimental determination, 3) protein folding, 4) enzyme mediated chemical reactions and their associated kinetic parameters.

The first 8 weeks (Jan 4 – March 5) will be lecture format. Weeks 9, 10 and 11 (March 8 – 26) are being made available for students to undertake more self-directed learning. During these three weeks, students will be placed into small groups based on common interest and then given the opportunity to ask and answer questions regarding aspects of proteins that have or have not been already touched on in the previous 9 weeks of lectures. Inquiry courses emphasize both process and content, and therefore a secondary objective of this course is to develop your inquiry skill set. Throughout this course, with guidance from your TA and the course instructors, you will refine your verbal and written communication skills, your ability to find and critically evaluate information, and your ability to work effectively as a member of a group.

How to EARN your marks:

I. Challenging Stages (35%) Each Friday starting January 8th and ending March 5th (ie. a total of 8 weeks), you will have a challenging stage to complete that is worth 5% of your final mark. Since the lowest mark will be dropped, the final mark will be the result of 7 weeks x 5% per challenge = 35% of final mark. The one challenging stage which will be dropped is to cover emergencies etc. that prohibit a student from being present; therefore, no excuses for missing more than one challenging stage will be accepted. All marks will be posted using partial student I.D numbers on LearnLink. NOTE: By attending class you are agreeing to this method of grade disclosure.

II. Assignment 1 (15%) Due Friday February 12 by 4pm in drop box, worth 15% of final mark.

Assignment 2 (15%) Due Friday March 12 by 4pm in drop box, worth 15% of final mark.

III. Inquiry (35%)

* Final Group Presentation: weeks 12 and 13 (5% of final mark)
* Final Written Report (Individually): due Thursday April 8th by 4pm in labeled drop boxes outside of room HSC 4H39 (25% of final mark)
* Peer Evaluations: individual contribution to your group (5% of final mark)
**Important Details:**

This course will rely heavily on the use of LearnLink [http://learnlink.mcmaster.ca](http://learnlink.mcmaster.ca). If you have difficulty gaining access, or for further assistance, please contact Colin ([support@learnlink.mcmaster.ca](mailto:support@learnlink.mcmaster.ca), ext. 27492).

I. **Weekly Challenging Stages:** As mentioned above, each Friday starting January 8, we will be having a short, 10 minute, in-class challenging stage. Students will pick up an OMR sheet on their way into class. During the last 10 minutes of class, you will have 5 multiple-choice questions to answer. OMR sheets will be placed in a collection box at the end of class. Marks will be posted on LearnLink ASAP and answers will be taken up during the following class. Please note that material covered in each challenging stage will be cumulative throughout the entire course, meaning that you will be responsible for all material covered from the start of the course up to and including the class preceding the Friday challenge. There will be a total of 8 challenges, the last being Friday March 5. Only the results from the best 7 challenges will count toward your final mark (ie. 7 x 5% per quiz = 35% of final mark). Since one challenging stage will be dropped, no excuses will be accepted for missed challenges.

II. **Assignments:** Each assignment will be worth 15% of your final mark. The first assignment is due on Friday February 12 by 4pm. The second assignment is due on Friday March 12 by 4pm. Please note that assignments must be placed in our designated drop boxes outside room HSC 4H39 no later than 4pm. Since you will have lots of time to complete the assignments, no part marks will be given for late assignments.

III. **Inquiry:** During the first 8 weeks of class, students will be exposed to different fundamental aspects of proteins. In order to make this course as interesting and useful to students as possible, students will be allowed to choose a preferred area of interest (from a list of 4 broad topics/areas given below) in which they would like to carry out a more in-depth, small group, inquiry based study. Each student will post to LearnLink their preference from 1 to 4 (with 1 being the highest) for each of the 4 broad topics/areas. Priority for a given area of interest will be based on a first-come first-served basis. We will begin taking student preferences at **10pm Friday February 12th**. Please note that to ensure complete fairness, uploaded lists from students prior to 10pm will be considered with lowest priority. Students who have not sent in their list of preferences by midnight Sunday February 14th will be assigned randomly to groups based on availability. Final group assignments will be posted on LearnLink Friday February 19th. Although designated inquiry will not begin until the week of March 8th, I strongly suggest that you use this time to orient yourselves with your other group members and start considering a common question for your group to answer. Each group will be assigned a TA and will be expected to meet with their TA once a week for 20 minutes during weeks 9, 10 and 11 (see page 8 for details).

**LearnLink:** A LearnLink folder labeled ‘INQUIRY’ will be set up for communicating important information from the facilitators as the course unfolds. Within the INQUIRY folder, there will be 4 folders (one for each large topic area) labeled A-D and an additional folder labeled GENERAL INFORMATION - be sure to check this general conference folder weekly for important announcements. Within folders A-D, additional folders will be set up for each group (there will be 4 independent groups assigned for each larger topic area, A-D). Here each group can communicate with their members, schedule meetings, and share information, or direct specific questions to their TA.

**Group Assignment:** There will be 16 groups, assigned A1-4, B1-4, C1-4, and D1-4. Students will be asked to choose their preferred area of interest (from the list of 4 topics/areas given below, A-D) in which they would like to carry out a more in depth, small group, inquiry based study. Each student will post to LearnLink their preference from 1 to 4 (with 1 being the highest) for each of the 4 areas. Priority for a given area of interest will be based on a first come basis. We will begin taking student preferences at **10pm Friday February 12th**. Please note that to ensure complete fairness, uploaded lists from students prior to 10pm will be considered with lowest priority. Students who have not sent in their list of preferences by midnight Sunday February 14th
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### Topics/Areas:

- **A** – Protein Structure (secondary and/or tertiary) and Determination – Experimental Methods
- **B** – Impact of a Protein(s) on Health and Society
- **C** – Protein-Protein Interactions
- **D** – Enzyme Reaction Mechanisms and Kinetics

#### Progress Meetings with TA:
During weeks 9, 10 and 11, groups will be scheduled to meet with their TA for 20 minutes to report on their recent work, review progress and set/refine direction. Exact meeting times and locations are provided on page 8. To ensure that TAs have enough time to help students during those 3 short meetings, each group is asked to upload a short summary of their progress, questions etc. to their LearnLink folder one day prior to their designated TA meeting. You should come prepared to show any evidence of your research and learning, ie. you may bring a copy of key papers or review articles that have guided you. A brief one-page, double-spaced, typewritten report is required from the group at the beginning of each meeting. The report and any key articles will be placed in your group’s file to track your progress. Meetings will be informal. Because the success of the group depends on the full participation of all members, attendance at all meetings is mandatory. Failure to provide documentation to the Assistant Dean for medical or legal conflicts will result in an automatic zero for group participation. I will also attend one of your group’s three meetings.

#### Final Group Presentations:
Starting March 29th, each group will deliver a final presentation. A maximum of two members from a group will be permitted to make the group presentation; however, following the presentation, all members of the group will proceed to the front of the room to answer questions from the audience. The presentation CANNOT exceed 10 minutes total, leaving 2 to 5 minutes for questions. Roughly 1/3 of the presentation should focus on the background you must communicate to your audience, and roughly 2/3 on answering the ‘Question’ your group decided to pursue. Be sure to use references appropriately. Any information (including figures) or ideas that are not your own, must be referenced to the primary source (not a general textbook). Should you choose to give a PowerPoint presentation, you must send your presentation file to your group’s LearnLink folder by 10:00 am, the DAY BEFORE your presentation. All PowerPoint presentations will be loaded onto the laptop being used that day, as time will not allow for each group to use individual computers. The final presentations will be organized as part of a symposium on each of the six general topics. Each presentation can build on, or refer to one of the other three talks within their broader general topic section, as they will have some common ground, should you choose to coordinate your presentation with other groups. The order of the presentations is indicated in the schedule near the end of the course outline. Marks will be given based on the following criteria:

**Content**
- Was the background material appropriate, not excessive, and helped the audience’s comprehension of the topic?
- Did the group demonstrate creativity in their approach to the question?
- Did the group use adequate results from original research to support their contention?
- Did the group demonstrate an understanding of basic biochemical principles?
- Did the group critically evaluate the literature, integrate and reconstruct the new knowledge?
ORGANIZATION AND FORMAT

- Was the format of the presentation well organized and presented in a logical, easy-to-follow sequence?
- Was the presentation indicative of a clearly defined set of objectives?
- Was the use of visuals appropriate and legible?

CLARITY AND DELIVERY

- Clear, appropriate use of scientific language, terminology
- Was the speaker clear and audible?
- Did the speaker remain attentive and enthusiastic throughout the presentation to make it rewarding for the audience and sustain interest?
- Was the delivery practiced and smooth?

POST-PRESENTATION

- Ability to answer questions
- Demonstrated knowledge of Biochemistry

Final Written Report (Individual): Each person will write a final report on their group inquiry project. The report should demonstrate a logical progression from the question, through to the conclusion. Roughly 2/3 of the report should focus on the biochemical background you must communicate to your audience, and roughly 1/3 on ‘What’s next’. Any information (including figures) or ideas that are not your own, must be referenced to the primary source (not a general textbook). A textbook may be referenced for general background information. Do not provide a bibliography, but a proper reference section (see journals like the Journal of Biological Chemistry, etc... www.asbmb.org). The final report should be a maximum of 5 pages, double-spaced. Figures and tables may be included within the main text, or included as appendices, and do not count toward the final page count. Each group is required to submit a digital copy of the report to the appropriate folder via LearnLink, as well as one hard copy. All hard copies should be stapled, 12-point Times New Roman font, with one-inch margins and placed in the designated drop box NO later than 4pm on Thursday April 8th.

Marks will be assigned as follows:

- **OVERALL STRUCTURE (3 marks):** organization and logical flow
- **FIGURES AND TABLES (3 marks):** good use of
- **BACKGROUND (5 marks):** description and background of relevant material for setting up the question
- **ANALYSIS (8 marks):** level of depth and analysis in addressing question
- **SUMMARY (3 marks):** clear and concise, including future directions
- **REFERENCING (3 marks):** proper use of

Peer Evaluations: You will be asked to reflect on each member’s participation and preparation, knowledge acquisition, group dynamics and overall contribution to the group. Keep these important aspects in mind throughout the term as you work within your group. At the conclusion of the term, each student will be required to assess contributions made by individual group members, including themselves. In the **hard copy ONLY** of each student’s final report, an additional page should be attached that gives a list of each group member’s name, student number and your evaluation of their level of contribution to the group indicated as a mark from 0 to 5, with 0 indicating absolutely no contribution and 5 indicating a fair and equitable contribution. This mandatory evaluation will be used as a tool to ‘flag’ any group conflicts that were not obvious to the TAs, or when there is a consensus among the group that a member(s) of the group has not participated fully in the project. These evaluations will be taken into account when evaluating group work components.
**Academic Dishonesty:**

Plagiarism of your classmate’s work (be it from this year or previous years), or any text from books, the internet, or journals, is unacceptable conduct and is subject to penalty if observed by the course facilitators. Academic dishonesty consists of misrepresentations by deception or by other fraudulent means and can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: “Grade of F assigned for academic dishonesty”), and/or suspension or expulsion from the university.

It is your responsibility to understand what constitutes academic dishonesty. For information on the various kinds of academic dishonesty please refer to the Academic Integrity Policy, specifically Appendix 3, located at [http://www.mcmaster.ca/univsec/policy/AcademicIntegrity.pdf](http://www.mcmaster.ca/univsec/policy/AcademicIntegrity.pdf)

The following illustrates only three forms of academic dishonesty:

1. Plagiarism, e.g. the submission of work that is not one’s own, any text or ideas from books, the internet or journals, or work for which other credit has been obtained.
2. Improper collaboration in group work.
3. Copying or using unauthorized aids in tests and examinations.

**Schedule, Submissions and Important Due Dates:**

**IMPORTANT:** Questions regarding the marking or addition of the challenging stages (quizzes) and assignments must be brought to the attention of the TA within **ONE** week of their return to you.

**Challenging Stages:**
**To be held on the Fridays of:**
- January 8, 15, 22, 29, February 5, 12, 26, and March 5

**Assignments:**
Assignment 1 – Deadline: **Friday February 12th by 4pm** in drop box outside of room HSC-4H39
Assignment 2 – Deadline: **Friday March 12th by 4pm** in drop box outside of room HSC-4H39

**Student Ranking List of Inquiry Topics:**
After 10 pm on Friday February 12th until midnight Sunday February 14th posted to “Post Inquiry choices here” folder on LearnLink

**Assigned Group Posting:**
Posted on LearnLink Friday February 19th

**Progress Meetings with TA’s:**(See page 8 for schedule)

**Final Group Presentations (to be held during regular class time):**
- Group A (1-4) – Monday March 29
- Group B (1-4) – Wednesday March 31
- Group C (1-4) – Monday April 5
- Group D (1-4) – Wednesday April 7

**Final Written Report (Individual)/ Peer Evaluations:**
Deadline: **Thursday April 8th by 4pm** in drop box outside of room HSC-4H39

**PLEASE NOTE:**

"The instructor and university reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes."

More information and guidelines for course outlines can be found in the Undergraduate Course Management policies at: [http://www.mcmaster.ca/uniysec/policy/UGCourseMgmt.pdf](http://www.mcmaster.ca/uniysec/policy/UGCourseMgmt.pdf)
### Calendar of Important Dates

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- **Week #1**: First Class
- **Week #2**: Challenge #1
- **Week #3**: Challenge #2
- **Week #4**: Challenge #3

#### ~ February 2010 ~

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- **Week #5**: Challenge #5
- **Week #6**: Challenge #6
- **Week #7**: Assigned group topics posted on Learnlink

#### ~ March/April 2010 ~

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- **Week #8**: Group Progress Mtgs Groups A-D (1-2)
- **Week #9**: Group Progress Mtgs Groups A-D (3-4)
- **Week #10**: Group Progress Mtgs Groups A-D (1-2)
- **Week #11**: Group Progress Mtgs Groups A-D (3-4)
- **Week #12**: Group Progress Mtgs Groups A-D (1-2)
- **Week #13**: Group Progress Mtgs Groups A-D (3-4)
- **Week #14**: Group Presentations Groups A (1-4)
- **Week #15**: Group Presentations Groups B (1-4)
- **Week #16**: Group Presentations Groups C (1-4)
- **Week #17**: Group Presentations Groups D (1-4)

- **April 1**: Final Written Report due by 4pm in drop box
- **Good Friday**: April 2

**Notes:**
- **Assignment #1 due by 4pm in drop box**
- **Final Written Report due by 4pm in drop box**
- **Send group topic preferences to Learnlink from Fri Feb 12 at 10pm until Sunday midnight**
- **Group Progress Mtgs Groups A-D (1-2)**
- **Group Progress Mtgs Groups A-D (3-4)**
**TA Progress Meeting Schedule**

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Please refer to this course outline frequently, as it contains a great deal of important information, specific guidelines, instructions and due dates!

Enjoy