

UMBC UGC New Course Request: BIOL 487: Medical Case Studies

Date Submitted: 9/20/2015

Proposed Effective Date: Fall 2016

| | Name | Email | Phone | Dept |
|-------------------|------------------|-------------------|----------|---------|
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COURSE INFORMATION:

| | |
|--------------------------------|---|
| Course Number(s) | BIOL 487 |
| Formal Title | Medical Case Studies |
| Transcript Title (≤30c) | Medical Case Studies |
| Recommended Course Preparation | |
| Prerequisite | BIOL 303, CHEM 351, PHYS 112 or 122, and MATH 151 or 155, all with a “C” or better |
| Credits | 4 |
| Repeatable? | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Max. Total Credits | 4 |
| Grading Method(s) | <input type="checkbox"/> X Reg (A-F) <input type="checkbox"/> X Audit <input checked="" type="checkbox"/> X Pass-Fail |

Proposed catalog description: In this course, students integrate their knowledge of physics, chemistry, mathematics, and biology to work on complex medical case studies. Working in teams, students apply information they know, seek out new information, hear from experts in each case, and write up their conclusions about each case. At the end of the course, teams will design and present novel case studies of their own.

Rationale: Please explain the following:

a) Why is there a need for this course at this time?

There is currently no course that integrates understanding across the natural sciences. This is a serious deficiency in our preparation of students to excel in scientific research and medicine, fields that are increasingly interdisciplinary. This gap in preparation has also been noted as a problem for STEM majors nationwide by both the American Association for the Advancement of Science¹, the Howard Hughes Medical Institute and the Association of American Medical Colleges². This course builds on the recent curriculum reform that has taken place in the Biological Sciences Department to address this deficiency. Further, medical schools and medical-education organizations have recently begun to emphasize the importance of interdisciplinary problem-solving in preparation for medical training and the MCAT has recently been revised to reflect this new emphasis.

b) How often is the course likely to be taught?

We anticipate the course being taught every Fall semester.

c) How does this course fit into your department's curriculum?

This will be a capstone course that students take in their final year at UMBC, after having completed the entire biology core, as well as their physics, chemistry, and mathematics requirements. Students will need to use all of this foundational information to succeed in this course.

d) What primary student population will the course serve?

This course is intended for pre-medical students, who will both achieve the greatest benefit and be the most interested in a course using medical case studies. However, those interested in pursuing graduate research in biomedically related disciplines would also be attracted to this course. As most of our undergraduates are interested in entering the medical health professions this should be an extremely popular course.

e) Why is the course offered at the level (ie. 100, 200, 300, or 400 level) chosen?

The 400-level designation is an indication that the course requires understanding and information integrated from 100-, 200-, and 300-level courses in many different disciplines. Our 400-level courses are usually small, not lecture-based, and rely on examination of primary research and/or student research and presentations to successfully complete the course.

f) Explain the appropriateness of the recommended course preparation(s) and prerequisite(s).

In order to solve complex interdisciplinary problems students must have learned to reason quantitatively, as they will have in math and physics; to apply quantitative thinking to life sciences-based problems, as they will have in some physics and chemistry classes, and have a solid understanding of biological systems (from the biology core courses) and organic molecules (from general and organic chemistry).

g) Explain the reasoning behind the P/F or regular grading method.

As far as we know there is no reason to restrict the grade options for this course; students may take it pass/fail or for a grade, or audit it.

h) Provide a justification for the repeatability of the course.

The course will use at least most of the same cases every semester, so it does not make sense to have it be repeatable.

References:

1. Brewer CA, Smith DS. 2010. Vision and Change in Undergraduate Education: A call to action. American Association for the Advancement of Science, Washington D.C.
2. Report of the AAMC-HHMI Committee: Scientific Foundations for Future Physicians.
<https://www.aamc.org/download/271072/data/scientificfoundationsforfuturephysicians.pdf>

Course Outline: Provide a syllabus with main topics and a weekly assignment schedule which includes complete citations for readings with page numbers as appropriate. Explain how students' knowledge and skills will be assessed.

Please see syllabus below. Course objectives are listed on the first page. Assessment of students' knowledge and skills will consist of readiness assessment tests at the beginning of a case, quality of student answers to case questions, student performance as a team member, and quality of the novel case study each group will develop in the course.

BIOLOGY 487

**Medical
Case Studies**

Fall 2016



WHY ARE WE HERE? | Course Objectives

The purpose of this course is to help you get better at:

- Integrating information across many disciplines you've studied to solve real, clinical problems
- Evaluating and analyzing real-world data related to human health
- Determining how to assess what you need to know to solve a problem, compare that with what you already know, and evaluate where to obtain the additional information
- Working productively with a team of other individuals, diverse with respect to knowledge, approach, personality, and other factors, to solve complex problems

HOW WILL WE DO THAT? | Course Activities

Working in your **awesome teams**, your activities will follow this sequence:

- 1) **Read the case and its related reading.**



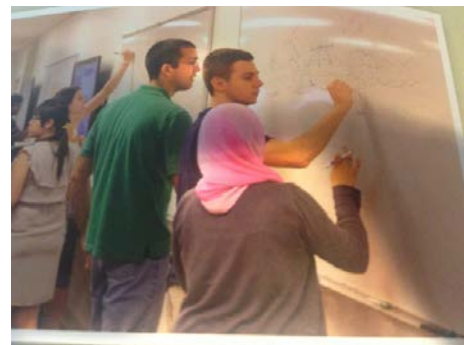
- 2) **Take a readiness assessment test (RAT),** then take it again with your team

A sample of an Immediate Feedback Assessment Test (RAT) form. The form has a header "IMMEDIATE FEEDBACK ASSESSMENT TEST" and fields for "Name" and "Subject". Below the header is a table with columns labeled "A", "B", "C", and "E". The rows are numbered 1 through 6. Each cell in the table contains a small image of a document or book cover. A yellow speech bubble points to the form with the text "Hint! Our Reading Guides help you prepare for the RAT!". A purple arrow points from the form towards the bottom.

- 4) **Ask questions** of an expert, then discuss your conclusions with the class.



- 3) **Work through the case** with your team and assess evidence from the primary literature.



Then the cycle repeats for the next case.

CLASS SCHEDULE

| WEEK | TUESDAY | THURSDAY |
|----------------|---------------------------------------|---|
| Aug 29 | Intro to course; form teams | Pre-learner evaluation; intro to case studies |
| Sept 5 | <i>RAT 1: It's in the Units</i> | It's in the Units |
| Sept 12 | It's in the Units: Expert | <i>It's in the Units: Wrap Up and Assessment</i> |
| Sept 19 | <i>RAT 2: Shallow Water Blackout</i> | Shallow Water Blackout |
| Sept 26 | Shallow Water Blackout: Expert | <i>Shallow Water Blackout: Wrap Up and Assessment</i> |
| Oct 3 | <i>RAT 3: Bad Blood</i> | Bad Blood |
| Oct 10 | Bad Blood: Expert | <i>Bad Blood: Wrap Up and Assessment</i> |
| Oct 17 | <i>RAT 4: Milk: Promise or Peril?</i> | Milk: Promise or Peril |
| Oct 24 | Milk: Promise or Peril: Expert | <i>Milk: Promise or Peril: Wrap Up and Assessment</i> |
| Oct 31 | <i>RAT 5: Smart Pills</i> | Smart Pills |
| Nov 7 | Smart Pills: Expert | <i>Smart Pills: Wrap Up and Assessment</i> |
| Nov 14 | Case Development: Introduction | Develop Case with Your Team |
| Nov 21 | Develop Case with Your Team | <i>Thanksgiving Break</i> |
| Nov 28 | Peer Review of Cases and Feedback | Case Study Revision |
| Dec 5 | Presentation of Cases | Presentation of Cases |
| Dec 12 | Course Celebration | ----- (no class) ----- |

The Details

Class prerequisites: BIOL 303, CHEM 351, PHYS 112 or 122, and MATH 151 or 155, all with a “C” or better

Class Meeting Time: Monday and Wednesday 1-3 p.m.

Instructors: Sarah Leupen, Jeff Leips and Kathleen Hoffman

Office #: Leupen BS 467; etc.

Office Hours: Leupen Tuesday 1-3 and Thursday 11:30-12:30; Leips Friday 10-12; Hoffman Monday and Wednesday 10-11; or email for an appointment.

Email: leupen@umbc.edu

Office Phone #: Leupen 455-2249 (Email is a better way to contact me, though).

Computers: Please bring your laptop to each class meeting; there are a couple of laptops in the classroom if you do not have one to bring. They will be useful in looking up information as you work through the case study.

Grading: Your grade is a weighted average of the following grade components:

Individual RATs (4 of 5; lowest dropped) 10%

Team RATs (4 of 5; lowest dropped) 10%

Case Assessments (5) 40%

Your Team’s Case Study 30%

Peer Evaluation 10%

Grades are assigned on a straight 90/80/70/60 basis with no curving, so your grade is dependent on YOUR understanding of the material, not other people’s, and there’s no limit on the number of good grades-- everyone can do well through hard work and focus. It also means that we’re “on your team” and **want** you to do well!

Case Assessments: Most of your time in class, as well as some of your time out of class, will be spent in analysis of the five cases that form the framework of this course and build in complexity as the semester goes on. Working with your team, you will analyze each of the cases, working through a series of steps including: a) answering specific questions we provide to you about the case; b) writing and asking questions of the case’s expert; c) summarizing in written form the expert’s responses and how they change your assessment of the case; and d) provide and defend your views of the case in whole-class discussion. Each of these four steps will be assessed, collectively forming the case assessment part of your grade, and feedback provided to you by the course instructors on each step.

Attendance and Late Work Policies: If you miss a class, you miss whatever your team did and whatever else happened. Most teams, in real life and here, will forgive a single absence for which you have a good reason, and be **less forgiving** of multiple or casual absences; these judgments come out on the peer evaluation. Remember, [you come to this class not just for yourself, but also for your team members](#). If you show up late for a RAT (anytime after the first person has finished), you miss the RAT. If you miss a RAT, that's the one that gets dropped. If you miss two or more, you lose those points; RATs can't be made up because everyone instantly sees what the right answers are in class.

Support is Available! UMBC is committed to eliminating discriminatory obstacles that disadvantage students based on disability. **Student Support Services (SSS)** is designated to receive and maintain confidential files of disability-related documentation, certify eligibility for services, and determine reasonable accommodations. If you have a disability and want to request accommodations, contact SSS in the Math/Psych Bldg., room 213 or at 410-455-2459. If you require accommodations for this class, make an appointment to meet with me to discuss your SSS-approved accommodations, or any other concerns that you have.