**Proposal:** To dual list the current BBMB645 as BBMB545/445. We are proposing the dual list with the understanding that we will reduce the course number for BBMB 645 to BBMB 545 during spring catalog edit and modify the description to reflect the dual list. The course has drifted toward the 500 level over the past few years and the renumbering will better reflect the level at which it will be offered I the future. The difference between the 500 and 600 level is in the amount of guidance the students receive in developing their proposals, such as feedback on hypothesis development at early stages and references to papers that they can use for their proposal development. At the 500 level the students will receive more guidance compared to the expectations at the 600 level.

1. **Full catalog information.**

Current course:

[**BBMB 645: Molecular Signaling**](http://catalog.iastate.edu/azcourses/bbmb/)

***(2-0) Cr. 2. Alt. S., offered odd-numbered years.***

*Prereq:*[*BBMB 405*](http://catalog.iastate.edu/search/?P=BBMB%20405)*or*[*BBMB 420*](http://catalog.iastate.edu/search/?P=BBMB%20420)*; or*[*BBMB 506*](http://catalog.iastate.edu/search/?P=BBMB%20506)*and*[*BBMB 507*](http://catalog.iastate.edu/search/?P=BBMB%20507)  
Molecular mechanisms of cellular signaling including receptor activation, desensitization and cross talk, signal transduction pathways, and nuclear receptors. Discussion includes a variety of cell surface receptors and their hormone; growth factor and extracellular matrix activators; protein kinases; caspase and transcription factor downstream signals; lipids, gases and cyclic nucleotides as regulators of cell signaling. Course content includes current literature, student and instructor presentations and research proposal writing.

After catalog edits in the Spring the course will be:

[**BBMB 545: Molecular Signaling**](http://catalog.iastate.edu/azcourses/bbmb/)

***(2-0) Cr. 2. Alt. S., offered odd-numbered years.***

*Prereq:*[*BBMB 405*](http://catalog.iastate.edu/search/?P=BBMB%20405)*or*[*BBMB*](http://catalog.iastate.edu/search/?P=BBMB%20420) *314 or BBMB 510 or equivalent*  
Molecular mechanisms of cellular signaling including receptor activation, desensitization and cross talk, signal transduction pathways, nuclear receptors, growth factor and extracellular matrix activators, protein kinases, caspase and transcription factor downstream signals, and lipids, gases and cyclic nucleotides as regulators of cell signaling. Course content includes current literature, student and instructor presentations and, for graduate students only, research proposal writing and review.

**2. Graduate faculty status of the proposed instructor.**

Member of the graduate faculty

**3. Number of the dual-listed course credits the department will permit to be used to meet the requirements for an advanced degree.**

BBMB has no such policy regulating this number.

**4. The differential expectations for graduate students and undergraduates.**

* Undergraduate students are expected to attend lectures, read and discuss assigned literature papers and research and make one class presentation on a topic of their choice
* Graduate students are expected to attend lectures, read and discuss assigned literature papers and research and make one class presentation on a topic of their choice *AND write a research proposal and participate in the review of research proposals written by others.*

Grading for the course will be different for graduate and undergraduate students as summarized in the following table:

|  |  |  |
| --- | --- | --- |
|  | **BBMB 445** | **BBMB 545** |
| Verbal Presentation | 50% | 30% |
| Journal Discussions | 40% | 20% |
| Research Proposal/Review | n/a | 30% + 10% |
| Class Participation | 10% | 10% |

**5. Reason(s) the course is considered sufficiently rigorous**

In addition to requirements for reading and reviewing research publications, the course requires that graduate students formulate hypotheses based on their reading and establish a means of testing their hypotheses. These latter activities will be formalized in the required research proposal. Graduate students will also be required to review research proposals submitted by other students to evaluate soundness of hypotheses, logical progression of analysis and reasonable likelihood of valid conclusions to be derived by a proposed research investigation. These activities present the level of rigor expected for our graduate students but are beyond expectations for undergraduates. Thus, they are ideal for the differential requirements for graduate students.

**6. Academic advantages and disadvantages accruing to graduate students taking this course with undergraduates.**

This course is only expected to be taken by advanced undergraduates. Undergraduates frequently have a different and sometimes broader academic background than do graduate students, particularly when the graduate students have received their undergraduate training abroad in more focused science programs. The course involves critical analysis of the research literature in a team setting for which a broad exposure to other areas of science and social sciences can be advantageous. It is the instructors experience that the undergraduates who have attended the course previously have contributed to the conversation and performed equally well or better as the graduate students.

**7. The place of the course in a graduate student’s program of study**

This course is not required for any graduate program but provides an opportunity to fulfill a graduate requirement (such as the cell biology requirement for the MCDB program) or as an elective for a student in a variety of departments to understand signal transduction in cell biology (for example, several engineering labs are now using mammalian cells in their research). BBMB645 is already listed as an option for the cell biology requirement in MCDB, but as a 500-level course, it will be more consistent with the other options, which are all at the 500 level.

**8. The role of the course in an undergraduate’s degree program and the academic qualifications undergraduates must have to take this course.**

This would be an elective for an undergraduate to fulfill the graduation requirement of 45.0 crs of 300+ courses or the advanced science electives.

**9. The name of the person writing the proposal.**

Marit Nilsen-Hamilton