

PART B. REQUIRED COURSE FORM

Course title:	Molecules and Cells
Sponsoring department or unit:	Dept. of Molecular Biology & Genetics
Name of course director:	Jeremy Nathans, Ph.D.

List all organizational units (e.g., physiology department, nursing school, library), including the lead department, with ongoing involvement in the course, and the number of instructional staff from each such unit:

Organizational Unit	Number of Teaching Staff Involved
Department of Biophysics	2
Department of Biophysics & Biophysical Chemistry	2
Department of Biological Chemistry	6
Department of Cell Biology	6
Department of Comparative Biology	1
Department of Molecular Biology & Genetics	6
Department of Medicine	5
Department of Pharmacology & Molecular Science	1
Department of Physiology	2
Department of Pediatrics	6
Institute of Genetic Medicine	1
Oncology Center	1

Course Objectives

Are there written objectives for the course? (check)

Yes	X	No	
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Briefly summarize the objectives/content areas covered in the course.

Content of the Course:

1. Basic structure of proteins, lipids, and nucleic acids. 2. The molecular transformations that affect the major low molecular weight compounds in a cell-amino acids, nucleotides, lipids, and compounds involved in intermediary metabolism. 3. The fundamental processes of macromolecular synthesis. 4. The basic physical chemical/thermodynamic principles that govern biological molecules. 5. The sources and consequences of genetic variation in humans and their bacterial and viral pathogens. 6. The organization of eukaryotic cells and the way in which the constituents-chromosomes, cytoskeleton, organelles, etc. are assembled. 7. The structure, function and biological/medical relevance of the major classes of membrane proteins: ion channels, transporters, and receptors. 8. The medical significance of the common biochemical derangements in intermediary metabolism. 9. The basic structure, regulation, and replication of bacteria and viruses. 10. The basic signaling pathways that control the cell cycle, cell growth and cell

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death. 11. How specialized cells and molecules of the extracellular matrix work together to form the major classes of tissues.

Preparation for Teaching

If graduate students, postdoctoral fellows in the biomedical sciences, or residents teach in the course (as lecturers, small group facilitators, laboratory instructors), describe how they are informed about the course objectives and prepared for their teaching role.

All instructors are full-time faculty (or in a few cases visiting faculty from the NIH)

If the entire course is taught at more than one site (e.g., at geographically separate campuses), describe how faculty members at all sites are oriented to the objectives and grading system.

- Not applicable.

Student Evaluation

If NBME subject (shelf) examinations are used, give the mean scores for the last three classes:

- N/A

Year:			
Score:			

Check all the formats that are used in examinations or other evaluations that students must take in order to pass the course:

<input type="checkbox"/>	Multiple-choice, true/false, matching questions	<input type="checkbox"/>	Laboratory practical items
<input type="checkbox"/>	Fill-in, short answer questions	<input type="checkbox"/>	Problem-solving exercises
<input type="checkbox"/>	Essay questions or papers	<input type="checkbox"/>	Presentations
<input type="checkbox"/>	Oral exams	<input type="checkbox"/>	

Briefly describe any formative assessment activities (practice exams, quizzes, etc.)

- Problem solving small group discussions
- Laboratories
- Quizzes
- Exams at end of each module

Is there a narrative evaluation submitted in addition to the course grade? (check)

Yes	<input type="checkbox"/>	No	<input checked="" type="checkbox"/>
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Course Outcomes/Evaluation

Comment on the adequacy of faculty and other resources to teach the course (e.g., educational space, computer hardware and software, support personnel).

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The key resource is the cadre of highly motivated and talented lecturers and small group instructors. Because medical school faculty hiring and promotion are largely based on skills in research, teaching talent (and interest) is unevenly distributed among faculty. A system for training – the equivalent of master classes among musicians – and a tangible reward for outstanding contributions to medical student teaching might help.

Provide a summary of student feedback on the course (and any other available evaluation data) for the past two years. If the course is new or significantly revised, provide evaluation data for the new version of the course only. If problems have been identified by student evaluations or other data, describe how they are being addressed.

Each lecture is graded by the students (A,B,C,D, or F), and for each quarter of the course (Macromolecules, genetics, cell biology, and metabolism) the labs, small group discussions (and discussion leaders), journal clubs, and clinical correlation sessions are graded (A,B,S,D, or F). In addition students are asked to write comments about each of these items. These grades and comments are collated (without attribution) and handed out to all instructors for discussion. Two representatives from each small group (i.e. 14 students) together meet with all of the course directors at the end of the year to deliver a 1 hour summary of the first year curriculum, focusing on those areas that need improvement and ways to implement that improvement.

The overall assessment by students has been extremely positive. Making the material as clinically relevant as possible is a commonly expressed desire, and lecturers have been actively responding to this desire by teaching with relevant clinical examples (e.g. of enzyme mechanisms or genetic diseases).

The first year Curriculum Committee reviewed this course on November 25,2002. Major points were the high quality of the lecture notes and several details were highlighted as exemplary. Most students felt that the most helpful discussions questions were similar to exam questions. Several examples were selected by the Curriculum Committee to exemplify this method.

Identify major successes in the course and problems to be overcome.

The major success is that we have been able to start with a very heterogeneous group of students (with respect to science backgrounds) and in a bit over two months get them all up to speed in modern molecular and cellular biology. The major challenge is the avalanche of information in these areas that continues to arrive, and arrive and at an ever increasing pace. We have to teach concepts and not just a mountain of facts, and we have to teach students to THINK CRITICALLY and not just memorize.