New Course Request

Indiana University

IUPUI Campus

Check Appropriate Boxes: Undergraduate credit [ ] Graduate credit [X] Professional credit [ ]

1. School/Division Graduate

2. Academic Subject Code GRAD

3. Course Number G77 (must be cleared with University Enrollment Services)

4. Instructor Bidwell/Pavalko

5. Course Title: Biomedical Science III - Cellular Basis of Systems Biology

   Recommended Abbreviation (Optional) Biomed III

6. First time this course is to be offered (Semester/Year): Fall 2007

7. Credit Hours: Fixed at 3 or Variable from

8. Is this course to be graded SF (only)? Yes [X] No [ ]

9. Is variable title approval being requested? Yes [X] No [ ]

10. Course description (not to exceed 50 words) for Bulletin publication: Third of a group of three biomedical science core courses intended for incoming doctoral graduate students in School of Medicine programs or other graduate programs. Organization and function of cells, tissues and physiologic systems using disease examples. Topics include neurophysiology, musculoskeletal, renal, cardiovascular, gastrointestinal, endocrine and pulmonary systems, and cancer.

11. Lecture Contact Hours: Fixed at 36 or Variable from

12. Non-Lecture Contact Hours: Fixed at 0 or Variable from

13. Estimated enrollment: 40 of which 100 percent are expected to be graduate students.

14. Frequency of scheduling: Annually

15. Justification for new course: Restructuring of graduate program requirements.

16. Are the necessary reading materials currently available in the appropriate library? Yes [X] No [ ]

17. Please append a complete outline of the proposed course, and indicate instructor (if known), textbooks, and other materials. Attached

18. If this course overlaps with existing courses, please explain with which courses it overlaps and whether this overlap is necessary, desirable, or unimportant. None

19. A copy of every new course proposal must be submitted to departments, schools, or divisions in which there may be overlap of the new course with existing courses or areas of strong concern, with instructions that they send comments directly to the originating Curriculum Committee. Please append a list of departments, schools, or divisions thus consulted. Attached.

Submitted by: [Signature] Date 11/7/06

Department Chairman/Division Director

Date 11/7/06

Dean of Graduate School (when required)

Approved by: [Signature] Date

Dean

Date

Chancellor/Vice-President

Date

University Enrollment Services

After School/Division approval, forward the last copy (without attachments) to University Enrollment Services for initial processing, and the remaining four copies and attachments to the Campus Chancellor or Vice-President.

University Enrollment Services Final—White; Chancellor/Vice-President—Blue; School/Division—Yellow; Department/Division—Pink; University Enrollment Services Advance—White
New Course Request

I. **Title:** Biomedical Science III – Cellular Basis of Systems Biology  
   **Course number:** G717  
   **Instructors:** Joseph Bidwell & Fredrick Pavalko  
   **Prerequisites:** none

II. **COURSE DESCRIPTION AND RATIONALE**  
   Third of a group of three introductory biomedical science, lecture-based, core courses intended for all incoming basic science doctoral graduate students in the School of Medicine programs or other interested graduate or GCND students. Covers organization and function of cells, tissues and physiologic systems using disease-based examples. The course will explore topics including the organization of cells, neurophysiology, musculoskeletal biology, renal, cardiovascular and pulmonary systems, gastrointestinal and endocrine biology, and cancer biology. The course will emphasize the role of cells and molecules in regulating the function of tissues and physiologic systems. Course presentations will include PowerPoint computer presentations, overhead presentations, as well as web-based exercises.

III. **EDUCATIONAL OBJECTIVES**  
   - Know the function of cellular structures and understand how they are organized in the cell.  
   - Know the types of cytoskeletal structures in cells and understand how they function in cell-cell and cell-matrix interactions.  
   - Understanding basic concepts about the cell biology of cancer.  
   - Understand how tissues develop and how they form organs.  
   - Understand the cellular control of the nervous system.  
   - Understand how cells control the function of systems in the body including bone, muscle, heart, kidney and lung.  
   - Know the cells and molecules that affect function of the gastrointestinal tract.  
   - Know how glucose homeostasis is controlled.  
   - Understand fundamental aspects of cancer biology and intervention treatments.

IV. **COURSE CONTENT:**

**Cellular Structures and Organization**  
**Topic 1.** Organelles-structure/function  
**Topic 2.** Cytoskeleton-actin, microtubules, microfilaments  
**Topic 3.** Cell cycle, meiosis/mitosis, regulation of cell growth in cancer  
**Topic 4.** Extracellular matrix (cell-matrix interaction)  
**Topic 5.** Cell-cell interaction (adherens, tight junctions etc)  
**Topic 6.** Cells of the immune system.  
**Topic 7.** Cellular inflammatory response  
**Topic 8.** Development- Movements of cells to form tissue layers & organs

**Systems: Musculoskeletal biology**  
**Topic 9.** Musculoskeletal system: skeletal, smooth, cardiac muscle cell structure.  
**Topic 10.** Organization and regulation of cardiac muscle function
Topic 12. Control of Muscle Function: excitation-contraction coupling and mechanics
Topic 15. Musculoskeletal disease: Myasthenia gravis; osteoporosis, MD/interventions

**Systems: Neurobiology**
Topic 16. Neurophysiology: autonomic nervous system, reflex actions
Topic 17. Neurophysiology: sensory/somatosensory
Topic 18. Integrative neurophysiology: pain/reflex pathway, interventions

**Systems: Renal**
Topic 20. Renal biology: renal cell structure/function, organization/renal function
Topic 21. Renal biology: kidney nephron & tubules, glomerular filtration
Topic 22. Renal regulation: Na+/K+ balance, acid-base balance
Topic 23. Renal disease: glomerulonephritis, polycystic kidney disease / interventions

**Systems: Cardiovascular and Respiratory**
Topic 24. Organization of the cardiovascular system
Topic 25. Cardiovascular biology: circulation, anatomy / structure / function
Topic 27. Respiratory biology: organization of the respiratory system, ventilation/mechanics
Topic 28. Respiratory biology: alveolar function/gas exchange
Topic 29. Cystic fibrosis/interventions

**Systems: GI and Endocrine Biology**
Topic 30. Gastrointestinal physiology, basic functional gross & microscopic anatomy of the digestive
Topic 31. Microbiology of GI tract-H. pylori, digestion and absorption in the intestine
Topic 32. Glucose homeostasis, disruptions of homeostasis (e.g. diabetes) / Interventions

**Cancer Biology**
Topic 33. Cell Biology of Cancer
Topic 34. Effects of cellular microenvironment on cancer progression
Topic 35. Cancer/interventions and treatments

**V. REQUIRED AND RECOMMENDED TEXTS:**

Recommended: Molecular Cell Biology (5th edition) by Harvey Lodish, publisher W. H. Freeman.


**VI. EVALUATION AND GRADING:**

Student grades in the course will be determined by three examinations, each covering approximately one-third of the material with no comprehensive final.
Exam will be a combination of short answer/fill in the blank questions and short essay questions. Each exam will contribute one-third of the final grade. Objectives covered in the lectures will be the source of all examination questions.

Grading Scale:

<table>
<thead>
<tr>
<th>Letter grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>93-100</td>
</tr>
<tr>
<td>A-</td>
<td>90-92.99</td>
</tr>
<tr>
<td>B+</td>
<td>87-89.99</td>
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<tr>
<td>B</td>
<td>75-86.99</td>
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<tr>
<td>C</td>
<td>60-74.99</td>
</tr>
<tr>
<td>D</td>
<td>50-59.99</td>
</tr>
<tr>
<td>F</td>
<td>&lt;50</td>
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</tbody>
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Note that grades of C and lower are not passing grades in graduate level courses.

VII. BIBLIOGRAPHY:

Representative sample of the selected readings related to the course:


VIII. CHEATING AND PLAGIARISM:

Students are instructed to make themselves aware of University regulations concerning plagiarism, the maintenance of academic honesty and the definitions of unacceptable behavior and cheating. Academic misconduct of any sort will not be tolerated and will be dealt with as outlined in the IU/IUPUI Code of Student Rights, Responsibilities, and Conduct, which can be viewed at:

http://www.life.iupui.edu/help/docs/Part3all.html

Examples of misconduct include but are not limited to:

1. Cheating
   A student must not use or attempt to use unauthorized assistance, materials, information, or study aids in any academic exercise

2. Fabrication
   A student must not falsify or invent any information or data in an academic exercise including, but not limited to, records or reports, laboratory results, and citations to the sources of information.

3. Plagiarism
   A student must not adopt or reproduce ideas, words, or statements of another person without appropriate acknowledgment. A student must give credit to the originality of others and acknowledge an indebtedness whenever he or she does any of the following:
   a. Quotes another person's actual words, either oral or written
b. Paraphrases another person's words, either oral or written
c. Uses another person's idea, opinion, or theory; or
d. Borrows facts, statistics, or other illustrative material, unless the information is common knowledge.

4. Interference
   a. A student must not steal, change, destroy, or impede another student's work.
   b. A student must not give or offer a bribe, promise favors, or make threats with the intention of affecting a grade or the evaluation of academic performance.

Potential consequences for academic misconduct:

If the instructor has information that one of his/her students committed an act of academic misconduct, the faculty member will hold an informal conference with the student. The conference will be prompt and private. If the faculty member concludes that the student is responsible for the misconduct, then the faculty member will impose an appropriate academic sanction (i.e., lower or failing grade on the assignment, assessing a lower or failing grade for the course).

IX. AMERICANS WITH DISABILITIES ACT:

If you need any special accommodations due to a disability, please contact Adaptive Educational Services at (317)-274-3241. The office is located in CA 001E.
From: Lees, Norman D  
Sent: Monday, October 23, 2006 5:46 PM  
To: Rhodes, Simon J  
Subject: Re: new course requests

Simon,

I see no significant overlap among the courses you are proposing and the ones we offer in Biology.

Doug

Dear Doug and Frank,

Please find attached a Word file that outlines three proposed graduate level courses in biomedical sciences. These three courses will be the core series that incoming IUSM PhD students will take in their first semester when we switch to a common entry system for our PhD programs. They are each three credits. I expect that the typical enrollment will be mostly the incoming PhD student class (~35-40 students) plus perhaps a few prospective students that might be "sampling" the curriculum. All of the classes will be open to any IUPUI student that wants to take them but I do not really expect a significant enrollment from non-IUSM students. I do not think that the courses conflict with your course offerings.

I would like to submit course requests to the IUPUI graduate committee (GAC) as soon as possible. This committee typically wants to know that proposed new courses will not conflict with existing campus course offerings. I am therefore writing to ask if you would review the course outlines and please let me know if you agree.

A reply by e-mail would be fine.

Please let me know if you have any questions.

Thanks very much,

Simon

Simon J. Rhodes, Ph.D.  
Associate Dean for Graduate Studies  
Indiana University School of Medicine

Attachment converted: Macintosh HD:BioMed Series - Lees#356DC1.doc (WDBN/«IC») (00356DC1)
Letter from IUPUI Chemistry and Chemical Biology

From: schultz@chem.iupui.edu
Sent: Wednesday, October 25, 2006 3:58 PM
To: Rhodes, Simon J
Subject: Re: new course requests

Simon

I do not foresee any conflicts with our course offerings.

Best wishes,

Frank

Franklin A. Schultz
Professor and Chair
Department of Chemistry and Chemical Biology
Indiana University Purdue University Indianapolis
402 North Blackford Street, LD 326
Indianapolis, IN 46202
Phone: 317-278-2027 or 317-274-6875
Fax: 317-274-4701
schultz@chem.iupui.edu

On Sunday, October 22, 2006, at 10:24 AM, Rhodes, Simon J wrote:

Dear Doug and Frank,

Please find attached a Word file that outlines three proposed graduate level courses in biomedical sciences. These three courses will be the core series that incoming IUSM PhD students will take in their first semester when we switch to a common entry system for our PhD programs. They are each three credits. I expect that the typical enrollment will be mostly the incoming PhD student class (~35-40 students) plus perhaps a few prospective students that might be "sampling" the curriculum. All of the classes will be open to any IUPUI student that wants to take them but I do not really expect a significant enrollment from non-IUSM students. I do not think that the courses conflict with your course offerings.

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A reply by e-mail would be fine.
Please let me know if you have any questions.
Thanks very much,

Simon

Simon J. Rhodes, Ph.D.
Associate Dean for Graduate Studies
Indiana University School of Medicine

<BioMed Series - Lees_Schultz.doc>