New Course Request

Indiana University
Indianapolis Campus

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

1. School/Division Medicine/Graduate
2. Academic Subject Code GRAD
3. Course Number 724 (must be cleared with University Enrollment Services)
4. Instructor B. Herbert, PhD
5. Course Title Molecular Cancer Genetics

Recommended Abbreviation (Optional) (Limited to 32 Characters including spaces)

6. First time this course is to be offered (Semester/Year): Spring 2008
7. Credit Hours: Fixed at 1 or Variable from — to —
8. Is this course to be graded S-F (only)? Yes [ ] No [x]
9. Is variable title approval being requested? Yes [ ] No [x]
10. Course description (not to exceed 50 words) for Bulletin publication: An introduction to cancer focusing on genetics. Topics include causes and effects of chromosome instability (including centromere/telomere failures and chromosomal translocations), epigenetic changes and genetic risk factors during cancer progression.

11. Lecture Contact Hours: Fixed at 15 or Variable from — to —
12. Non-Lecture Contact Hours: Fixed at 0 or Variable from — to —
13. Estimated enrollment: 10 of which 100 percent are expected to be graduate students.
14. Frequency of scheduling: Annually
15. Justification for new course: Elective module in new open admissions PhD curriculum
16. Are the necessary reading materials currently available in the appropriate library? Yes [ ]
17. Please append a complete outline of the proposed course, and indicate instructor (if known), textbooks, and other materials.
18. If this course overlaps with existing courses, please explain with which courses it overlaps and whether this overlap is necessary, desirable, or unimportant.
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.

Submitted by: [Signature]
Date 5/16/07
Department Chairman/Division Director
Dean of Graduate School (when required)

Approved by: [Signature]
Date 5/18/07
Dean
Chancellor/Vice-President
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.

UPS 724
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:** Molecular Cancer Genetics  
   Course number: G724  
   Course Directors: Brittney-Shea Herbert and Brenda Grimes  
   Instructors: Brittney-Shea Herbert, Brenda Grimes, Virginia Thurston, Marc Mendonca, and Gail Vance  
   Prerequisites: Permission of course director(s)

II. **COURSE DESCRIPTION AND RATIONALE**

   **Brief Synopsis:** This graduate level course on Molecular Cancer Genetics will focus on the molecular genetic basis of cancer. Topics will include causes and effects of chromosome instability (including centromere/telomere failures and chromosomal translocations), epigenetic changes and genetic risk factors in cancer progression. Primary research papers will be discussed in this course.

   This is a lecture-based course intended for any incoming basic science doctoral graduate student in the School of Medicine programs or other graduate or GCND students interested in cancer biology. This course focuses on the molecular genetic basis of cancer. It covers the principles of genomic instability with special emphasis on the role of centomeres/telomeres, genetic aberrations, risk factors, and epigenetics in our understanding of human cancer. Other topics that cover objectives required for a comprehensive cancer biology training program, such as genetic tools, therapeutics, pathology, and systems biology, will be covered in various lectures. A goal of this modular course will be to engage students to the “Socratic” method of learning (discussion, critical reading, interpretation, and problem solving) in addition to didactic learning as it applies to molecular cancer genetics. Original research papers will be discussed in each lecture.

III. **EDUCATIONAL OBJECTIVES**

   - A working knowledge of the historical and fundamental molecular genetics that underlie cancer research
   - Be familiar with the most recent advances in the field as well as the main challenges
   - Ability to efficiently and critically evaluate original scientific literature
   - Develop mental tools to evaluate current and future hypotheses and to define unanswered questions; develop problem solving skills and apply them to new challenges or questions
   - Discuss applications of recent findings in basic/translational research and how to apply them to other scientific questions
### IV. COURSE CONTENT:

| Lecture 1: Herbert | **General overview of principles** | - Cancer as a genetic disease  
- Hallmarks of cancer  
- Original hypothesis, experiments, and questions (Boveri, Nowell, etc)  
- Genetic techniques developed for cancer research (forward and reverse genetics) |
| Lecture 2: Thurston | **Genomic instability and cancer: chromosomal structure and function** | - overview (normal function and what can go wrong, replication, fusions)  
- Cytogenetic tools for cancer diagnostics and research (FISH, CGH, SKY) |
| Lecture 3: Grimes | **Centromeres and genomic instability** | - Nondisjunction  
- Current models  
- Ploidy status and cancer (early vs. late; diploid vs. tetraploid)  
- Effect of centromere function in cancer progression |
| Lecture 4: Herbert | **Telomeres and genomic instability** | - Role in aging and cancer  
- Telomere structure, maintenance, and dysfunction  
- Role in fusions and genomic instability  
- In situ detection (histopathology)  
- Targeted therapy |
| Lecture 5: Mendonca | **Irradiation, instability, and cancer** | - Radiation biology and cancer incidence (historical accounts)  
- IR induced genomic instability  
- IR treatment and secondary cancer incidence |
| Lecture 6: Herbert | **Acquired and inherited mutations** | - Multi-step process of cancer (Vogelgram, creation of tumor models in vitro)  
- Loss of Heterzygosity (LOH)  
- Risk factors  
- Susceptibility genes (Li-Fraumeni Syndrome, BRCA1/2, Rb, NF1, FAP, etc) |
| Lecture 7: Vance | **Translocations** | - Hematological malignancies  
- CML (Philadelphia chromosome)  
- |
| Lecture 8: Herbert | **Amplifications/Deletions** | - Her2  
- Gene signatures (microarrays, Perou data, metastasis gene signature)  
- Gene/ targeted therapy; multi-drug resistance gene |
| Lecture 9: Grimes/Herbert | **Epigenetics and cancer** | - Chromatin  
- Global changes  
- Methylation (e.g. p16 and effects in different cancers) |
| Lecture 10 | **Exam** | - Short essay questions |

### V. REQUIRED AND RECOMMENDED TEXTS:

VI. EVALUATION AND GRADING:

Student grades in the course will be determined by a final examination. The exam will be a combination of short answer/fill in the blank questions and short essay questions. 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>
</tr>
<tr>
<td>B</td>
<td>75-86.99</td>
</tr>
<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>
</tr>
</tbody>
</table>

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/Part_3all.html](http://www.life.iupui.edu/help/docs/Part_3all.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.
Letter from Dr. N. Douglas Lees (Chair of Biology, IUPUI)

From: Lees, Norman D
Sent: Friday, May 04, 2007 12:30 PM
To: Rhodes, Simon J
Subject: Re: biomedical science courses

Simon,

I see no conflicts among the new and revised courses you have listed and existing courses in Biology.

Doug

Dear Doug and Frank,

Please find attached a Word file that outlines some proposed graduate level courses in biomedical sciences. Please note that some are not new course requests but will be requests to change existing courses (or courses not often taught but that have approved numbers) - I have included both types and noted the situation in the file. These are short, modular (mostly 1 credit, some 2 credit) courses that will be part of a first year, spring semester modular series that incoming IUSM PhD students will chose from as we switch to a common entry system for our PhD programs. I expect that the enrollment will be varied depending on the area - some will be very small and taught in a more informal tutorial style. In addition to our PhD students, there will perhaps be a few prospective students that might be "sampling" the curriculum. All of the classes will be open to any IUPUI graduate student with the appropriate prereqs that wants to take them. 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.
There will be a few more but this is the bulk of it. I will send the others to you soon.
Thanks very much,

Simon

********************************************************************
Simon J. Rhodes, Ph.D.
Associate Dean for Graduate Studies
Indiana University School of Medicine
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Attachment converted: Macintosh HD:SPRING COURSE drafts.doc (WDBN/«IC»)
(0042A42E)
Letter from Dr. Franklin Schultz (Chair of Chemistry and Chemical Biology, IUPUI)

From: schultz@chem.iupui.edu
Sent: Monday, May 07, 2007 3:21 PM
To: Rhodes, Simon J
Subject: Re: biomedical science courses

Simon
There are no conflicts with existing courses in the Department of Chemistry and Chemical Biology.
With best regards,

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: 317-274-6875; Fax: 317-274-4701
chair@chem.iupui.edu

On Wednesday, May 2, 2007, at 07:37 PM, Rhodes, Simon J wrote:

Dear Doug and Frank,

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Please let me know if you have any questions.
There will be a few more but this is the bulk of it. I will send the others to you soon.
Thanks very much,

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

<SPRING COURSE drafts.doc>