

# REQUEST FOR APPROVAL TO USE W-DESIGNATION

LSC # 14-786  
Action App 10/19/14  
SENATE: App 12/2/14

## COVER SHEET: Request for Approval to Use W-Designation

### TYPE I. PROFESSOR COMMITMENT

Professor \_\_\_\_\_ Phone \_\_\_\_\_

Writing Workshop? (If not at IUP, where? when?) \_\_\_\_\_

Proposal for one W-course (see instructions below)

Agree to forward syllabi for subsequently offered W-courses?

### TYPE II. DEPARTMENT COURSE

Department Contact Person Cuong Diep Phone 7-2269

Course Number/Title BIOL 203 Principles of Biology: Genetics and Development

Statement concerning departmental responsibility

Proposal for this W-course (see instructions below)

### TYPE III. SPECIFIC COURSE AND SPECIFIC PROFESSOR(S)

Professor(s) \_\_\_\_\_ Phone \_\_\_\_\_

Course Number/Title \_\_\_\_\_

Proposal for this W-course (see instructions below)

### SIGNATURES:

Professor(s) Cuong Diep UWSU & Gail Sedquist 10/28/14

Department Chairperson B. W. J. 9/24/14

College Dean Deane Surf 9/25/14

Director of Liberal Studies D. H. Ford 10/9/14

### COMPONENTS OF A PROPOSAL FOR A WRITING-INTENSIVE COURSE:

- I. "Writing Summary"--one or two pages explaining how writing is used in the course. First, explain any distinctive characteristics of the content or students which would help the Liberal Studies Committee understand your summary. Second, list and explain the types of writing activities; be especially careful to explain (1) what each writing activity is intended to accomplish as well as the (2) amount of writing, (3) frequency and number of assignments, and (4) whether there are opportunities for revision. If the activity is to be graded, indicate (5) evaluation standards and (6) percentage contribution to the student's final grade.
- II. Copy of the course syllabus.
- III. Two or three samples of assignment sheets, instructions, or criteria concerning writing that are given to students. Limit: 4 pages. (Single copies of longer items, if essential to the proposal, may be submitted to be passed among LSC members and returned to you.)

**Please number all pages.** Provide one copy to Liberal Studies Committee.  
**Before you submit:** Have you double-checked your proposal against "The Liberal Studies Committee's Most Frequently Asked Questions"?

Received

SEP 25 2014

Liberal Studies

## CHECK LIST FOR WRITING-INTENSIVE PROPOSALS

The Liberal Studies Committee's Most Frequently Asked Questions,  
Based on the Senate Criteria for Writing-Intensive Courses

For All Writing-Intensive Courses:

- yes Are the writing assignments integral parts of the course, rather than exercises that seem tacked on artificially? Are they assignments that promise to enhance student learning?
- yes Have you considered various forms of writing such as case studies, laboratory reports, journals, letters, memos, formal essays, research articles, project or grant proposals, and so forth?
- yes Does one of your course objectives explicitly mention the improvement of writing?
- yes Will you distribute written instructions, including criteria for evaluation, for major assignments?
- yes Will students receive guidance in conceiving, organizing, and presenting written material in ways appropriate to the subject being studied?
- yes Will students produce at least 5000 words (15-20 typed pages) of writing that you evaluate? Have you clarified this by giving us the minimum number of pages that you expect for each writing assignment?
- yes Are there at least two, and preferably more, different writing assignments?
- yes Will students revise at least one assignment after receiving your review comments?
- yes Does at least one assignment require students to produce finished, edited prose (as differentiated from whatever informal or draft writing you have included)?
- yes Are written assignments (in-class; out-of-class) worth at least 50% of the course grade?

For Type I (Professor Commitment) Writing-Intensive Courses:

- \_\_\_\_\_ Have you attended a writing workshop either at IUP or elsewhere? [If not, have you indicated at least equivalent preparation based on such things as graduate education, teaching experience in writing courses, publications, conference attendance, or other professional activities?]

For Type II (Departmental) Writing-Intensive Courses:

- yes Does your "statement of departmental responsibility" explain how the department will ensure that the writing component is present regardless of who is teaching? Does it identify the specific department group or individual who is responsible for ensuring this?

### Summary Chart for Writing Assignments\*

<b>A. Writing Assignments</b>					
Assignment Title	# of Assignments	# of total pages	Graded (Yes/No)	Opportunity for Revision (Yes/No)	Written Assignment represents what % of final course grade
Lab Reports	3	14	Yes	Yes	20
Review papers	2	4	Yes	No	20
Problem sets	4	13	Yes	No	5
Group presentation	1	10	Yes	No	5
<b>Totals</b>			NA	NA	50

**B. Examinations** (Complete only if you intend to use essay exams/short answers as part of the required number of pages of writing.)

Exams	Approx.% of exam that is essay or short answer	Anticipated # of pages for essay or short answer, or approx. word count	Exam constitutes what % of final course grade
1.	100	4	17
2.	100	4	17
3.	100	5	16
<b>Totals</b>	100	13	50

*\*Total writing assignments should contain at least 5000 words (approximately 15-20 typed pages) in two or more separate assignments; written assignments should be a major part of the final grade—at least 50% or more.*

### **Biology Department Commitment to Type II Writing Intensive Courses:**

The Biology Department is committed to providing students with writing intensive course experiences. The department chair will assign instructors to Type II courses. If the designated instructor has not attended a writing workshop, the chair and the department undergraduate curriculum committee will provide the instructor with a current course syllabus and explain the writing intensive course requirements as well as current theory and practice in writing-across-the-curriculum. The instructor will also be encouraged to attend a writing workshop. Additionally, the instructor will be asked to submit samples of student writing to the department undergraduate curriculum committee at the end of the semester for assessment purposes. The undergraduate curriculum committee will work with the chair to ensure that suitable instructors are assigned to teach Type II designated courses.

## Writing summary – BIOL 203 Principles of Biology: Genetics and Development

BIOL 203 Principles of Biology: Genetics and Development is proposed to as a “W” course. The course is offered every spring semester as a core requirement for a B.A. or B.S. in Biology. Most students will be a sophomore or junior. Class size will range from 50 – 75 students.

There will be five types of writing in the course:

### 1. WRITING FOR EVALUATION

There will be three semester exams and one final exam, each one having two types of questions. The first type will require essay-style answers where students explain the basic principles of genetics and development, and also discuss seminal experiments. The second type will require solving genetic problems. Students have 90 minutes to finish the exams. (50% of grade)

### 2. WRITING TO ENHANCE ESSAYS AND PROBLEM SOLVING

There will be four assignments in which students have to answer questions in essay form. Some assignments will also involve solving genetics problems. Both types of assignments will help prepare students for taking the exams. (5% of grade)

### 3. WRITING TO UNDERSTAND RESEARCH PAPERS

Students will write two review papers summarizing research papers. They will summarize what they read from primary scientific literature. This will help them develop the ability to read published papers and interpret the data in a written format. (20% of grade)

### 4. WRITING TO REPORT RESEARCH DATA

Students will write three reports summarizing their experiments in lab. They will format this similarly to a published article. The writing style will also resemble real research papers. Students will be able to interpret their own data and express their thoughts in a formal scientific paper. (20% of grade)

### 5. WRITING FOR ORAL PRESENTATIONS

Students will do one oral presentation as a group. They will work together to make a Power Point presentation on a topic that they choose related to genetics or development. They will research the topic and organize the information into a presentation. (5% of grade)

BIOL 203 Writing Assignment #1  
Review Paper One

Carefully read the research article that was sent to you. You may have to read it several times in order to fully grasp the content. Write a 2-page (single space, 12 point font, Arial, 1-inch margins) summary of the article. In the first page, discuss the research problem/question that the scientists were addressing. Then explain what they did to address this problem/question. What results did they find, and what did they conclude from the data? In the second page, discuss the purpose for each of the following sections: Abstract, Introduction, Methods and Materials, Results, and Discussion. Make sure to discuss the **GENERAL** purpose, not the specific information in the article that you read. This assignment is worth 20 points.

BIOL 203 Writing Assignment #2  
Lab Report One

Your Lab Report One will include experiments from Lab 3, Lab 4A, Lab 4B, and Lab 4C. It should be formatted like a published research article with the following sections: Title, Authors, Abstract, Introduction, Methods and Materials, Results, Discussion, and Literature Cited. Use 12-point Arial fonts with 1-inch margins. The title should be descriptive and succinct. The authors should include all of your lab partners, with your name appearing first in the list. The abstract is a summary of the entire report without any references listed. It should be 200 words or less. The introduction should include background information that is relevant to the report. End the introduction with a few sentences summarizing your results. The methods and materials should include all reagents and equipment used. It should also have enough procedural details so that someone else is able to replicate your work easily. In the results section, summarize the experiments that you performed and the data that you observed. You can divide this section into subsections if it helps you to organize the data. This section should also include any representation of the data, such as tables, pictures, graphs, sketches, ect. For each item, make sure you include a title (Table 1. "title"; Figure 1. "title"; ect.) and a legend describing the item. Do not describe the significance of the results in this section. In the discussion, you should write about the interpretation and significance of the results. Everyone needs to write his/her own report and in your own words. This assignment is worth 40 points.

## **Syllabus of Record**

### **I. Catalog Description**

**BIOL 203 Principles of Biology: Genetics and Development**

**3c-3l-4cr**

**Prerequisites: BIOL 202 or permission of instructor**

Introduction to the science of genetics, with an emphasis on the basic principles of Mendelian genetics, the genetics of populations, molecular genetics and the genetics of development. For Biology majors.

### **II. Course Outcomes**

Students will be able to:

1. Explain how the major concepts in genetics are relevant to the other disciplines in Biology. This may be assessed by exams, in class assignments, homework, and/or laboratory activities.
2. Explain how individual traits are inherited between generations, as well as elucidate the mechanisms by which genetic traits flow in a large population. This may be assessed by exams, in class assignments, homework, and/or laboratory activities.
3. Discuss the role of genetics in the development of organisms.
4. Formulate hypotheses based on observations of natural phenomena, design experiments to test hypotheses, collect and analyze data, and interpret experimental results. This will be assessed by laboratory activities.
5. Communicate effectively in writing (prose, graphs and tables) their experimental methodology, results, and conclusions. This will be assessed by laboratory activities.

### **III. Detailed Course Outline**

#### **Lecture Schedule**

##### **A. Mendelian Genetics**

- |  |      |
|--|------|
| 1. Introduction to the field of genetics | 1 hr |
| 2. The formation of gametes- meiosis     | 1 hr |
| 3. The two Mendelian laws                | 2 hr |
| a. The organism used                     |      |
| b. Segregation of alleles                |      |
| c. Independent assortment of genes       |      |
| 4. Extensions of Mendelian Genetics      | 3 hr |
| a. Variations in dominance               |      |
| b. Lethal alleles                        |      |



c. Multiple alleles	
d. Epistasis	
e. Environmental influences	
5. Chromosomal theory of inheritance	1 hr
Exam 1	1 hr
6. Extranuclear Genetics	2 hr
a. Mitochondrial genetics	
b. Maternal inheritance	
c. Infectious particles	
7. Linkage, Crossing Over and Mapping	3 hr
a. Linkage	
b. 3 factor mapping	
c. Modern mapping techniques	
8. Quantitative Genetics	2 hr
a. Polygenic inheritance	
b. Variation	
9. Population and evolutionary genetics	2 hr
a. Hardy-Weinberg Equilibrium	
b. Genetic Drift	
c. Gene Flow	
Exam 2	1 hr
<b>B. Mutations</b>	
1. Chromosomal Variation and Sex Determination	1 hr
a. Polyploidy	
b. Polysomy	
c. Genes involved in sex determination	
2. Gene Mutations and Repair	3 hr
a. Base substitutions	
b. Induced vs. spontaneous mutations	
c. DNA repair mechanisms	
3. Transposable Elements	2 hr
a. Bacterial insertion elements and transposons	
b. Eukaryotic transposons and retrotransposons	
<b>C. Control of gene expression</b>	
1. Review of DNA structure and transcription	2 hr
2. Genetic Regulation in Prokaryotes and Eukaryotes	4 hr
a. The lac operon in <i>E. coli</i>	
b. Eukaryotic gene regulation- transcriptional control	
c. Eukaryotic gene regulation- post-transcriptional control	
3. RNA Interference- the new regulation	2 hr
a. The mechanism	
b. miRNA control of gene expression	
4. Epigenetics	2 hr
a. DNA modifications	
b. Epigenetic inheritance	
Exam 3	1 hr

D. Developmental genetics	
1. Brief review of development in multicellular organism	1 hr
2. Coordinate gene patterning of the anterior-posterior axis	1 hr
3. Regulation of pair rule genes	1 hr
4. <i>Hox</i> genes	1 hr
5. The genetics of development in <i>C. elegans</i>	2 hr
Exam 4 (Final Exam)	2 hr

#### Tentative Lab Schedule

Week 1	Introduction to genetics in the laboratory
Week 2	The cell cycle and life cycle of yeast
Week 3	Dihybrid crosses of yeast mutants: The concept of epistasis
Week 4	Mutagenesis in yeast: the determination of mutagen dosage
Week 5	Isolation of novel mutants in yeast
Week 6-7	Analysis of mutants
Week 7	Transformation in yeast: plasmid structure
Week 8	Characterization of plasmids from transformed yeast
Week 9	Bioinformatics and the yeast genome
Week 10	Gene expression in bacteria: The use of GFP-tagged genes
Week 11	Characterization of transformed bacterial colonies
Week 12	DNA fingerprinting: the use of human DNA as a means of personal identification
Week 13	Analysis of DNA products
Week 14	Group presentations

IV. Evaluation Methods (Individual faculty may modify the number of exams and the proportion of exams and homework, but the lab will remain 25% of the course grade regardless of instructor.)

- 25% Lab (60 points) - Lab grades will be based upon quizzes, review papers, and a group presentation. Lab instructors will determine the proportions of various assignments.

- 50% Exams (Exam 1 = 60 points; Exam 2 = 60 points; Exam 3 = 60 points; Exam 4 = 60) - Exams may include a variety of question types, depending on the lecture professor's choices.
- 5% In class assignments or Homework (60 points) - These may be variable among lecture professors. An example would be points associated with problem sets that test the students understanding of the material.
- 20% Lab reports (90 points) – There will be several written reports that summarize the experiments carried out in lab.

#### V. Example Grading Scale

≥ 90% A; 80 – 89% B; 70 – 79 % C; 60 -69% D; <60% F

#### VI. Undergraduate Course Attendance Policy

The semester syllabus will include an attendance policy that is distributed in writing during the first week of the course. Students are expected to attend class. However, the policy will recognize students' need to miss class because of illness or personal emergency. Also, the policy will define some limited level of allowable absence, normally at least a number of clock hours equal to course semester [credit] hours. Additional attendance policies will be at the instructor's discretion and will be included in the semester syllabus.

#### VII. Required Textbook(s), Supplemental Books and Readings

Brooker, R.J. 2009. *Genetics: Analysis and Principles*, 3<sup>rd</sup> edition. McGraw-Hill, Boston, Massachusetts.

Individual instructors may require a non-textbook reading. Examples are:

Fox-Keller, E. 2000. *The Century of the Gene*. Harvard Press, Cambridge, Mass.

Gillham, N.W. 2011. *Genes, Chromosomes and Disease: From Simple Traits to Complex Traits, to Personalized Medicine*. FT Press, New Jersey.

#### VIII. Special Resource Requirements

None. The PASSHE does not allow for the collection of lab fees.

#### IX. Bibliography

Brown, T.A. 2007. *Genomes 3*. Garland Science, New York.

Cummings, M.R. 2006. *Human Heredity: Principles and Applications* 7<sup>th</sup> edition. Thomson Brooks/Cole Belmont CA.

Eldridge, N. 2000. *The Pattern of Evolution*. Freeman and Co., New York.

Gilbert, S.F. 2000. *Developmental Biology*, 7<sup>th</sup> edition. Sinauer Associates, Inc. Sunderland, Massachusetts.

- Hartl, D.L. and Ruvolo, M. 2012. *Genetics: Analysis of Genes and Genomes*, 8<sup>th</sup> edition. Jones and Bartlett Learning, Burlington, Massachusetts.
- Hartl, D.L. and Clark, A.G. 1989. *Principles of Population Genetics*, 2<sup>nd</sup> edition. Sinauer Associates, Inc. Sunderland, Massachusetts.
- Lewin, B., Cassimeris, L., Lingappa, V. and Plopper, G., editors. 2007. *Cells*. W.H. Freeman and Company, New York.
- Lewin, B. 2004. *Genes VIII*. Pearson/Prentice Hall, Upper Saddle River, New Jersey.
- Snustad, D.P. and Simmons, M.J. 2006. *Principles of Genetics*, 4<sup>th</sup> edition. Wiley Press.
- Watson, J. 2003. *DNA: The Secret of Life*. Arrow Books, London.
- Wilson, D.S. 2007. *Evolution for Everyone: How Darwin's Theory Can Change the Way We Think About Our Lives*. Delta Trade Paperbacks.