REQUEST FOR APPROVAL TO USE W-DESIGNATION

LSC #_____
Action_____

COVER SHEET: Request for Approval to Use W-Designation

TYPE I. PROFESSOR COMMITMENT
(x) Professor Kenneth S. Coles Phone 724-357-5626
(x) Writing Workshop? (If not at IUP, where? when?) Yes, May 2005 at I.U.P.
(x) Proposal for one W-course (see instructions below)
(x) Agree to forward syllabi for subsequently offered W-courses?

TYPE II. DEPARTMENT COURSE
( ) Department Contact Person _____ Phone _____
( ) Course Number/Title _____
( ) 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) Kenneth S. Coles

Department Chairperson _____

College Dean _____

Director of Liberal Studies _____ 11/16/07

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"? YES

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Liberal Studies

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Summary Chart for Writing Assignments*

A. Writing Assignments					
Assignment Title	**# of Assignments**	**# of total pages**	**Graded (Yes/No)**	**Opportunity for Revision (Yes/No)**	**Written Assignment represents what % of final course grade**
Explanation of Astronomical Object or Phenomenon	1	2	Yes	Yes	6%
Lesson Plan	1	4	Yes	Yes	7%
Observing Project	1	4	Yes	Yes	7%
Assignments: Article Critiques	4	2	Yes	First time only	10%
Self-Tests	3	1	No	NA	0%
Lab reports (3 of 12 labs)	3	2	Yes	Yes	5%
Totals		**15**	**NA**	**NA**	**35%**

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.	80	3	15%
2.	80	3	15%
3.	80	4	20%
Totals		**11**	**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.**

Writing Summary

GEOS 342 *Stellar Astronomy* is an upper division course in the Geoscience Department. It is required of Earth and Space Science Education majors. The course is designed to emphasize content knowledge and pedagogy for these future science teachers. The course complements another astronomy course required for these same students, GEOS 341 *Solar System*. Other science education majors (Biology Education, Chemistry Education, and Physics Education) may find the content of GEOS 342 appropriate and have taken the course in past years. Other science majors (most have been Geology majors) are also welcome provided they will conform to the education focus of the course. A lab is an integral part of the course, as are nighttime observations of the sky. Course prerequisites are MATH 121 *Calculus* and PHYS 111 *Physics I* (mechanics and waves) so that rigorous, quantitative descriptions may be used in lecture and lab. The course is capped at an enrollment of 20 and is taught every other Fall semester.

Writing is central to GEOS 342 to describe concepts, report observations, and interpret and synthesize information. Secondary science teachers must have a clear understanding of astronomy concepts before they can effectively teach them. Writing is well suited to organizing these unfamiliar ideas and experiences. The specific writing assignments in the course are as follows.

1. Explanation of Astronomical Object or Phenomenon: One short paper (minimum of two pages, plus figures and references) is assigned in the first weeks of the semester to focus student thinking. This also gives experience with description of the properties and behavior of astronomical objects and processes, a new topic for many students. A correct and complete explanation, along with proper use of English, are the chief grading criteria. Students turn in a draft paper for feedback, after which they revise and turn in a final paper. (6% of final grade)

2. Lesson Plan: The lesson plan is the key tool for organizing instruction in the science classroom. Because GEOS 342 is targeted to future science teachers, this is an essential use of writing to organize ideas. All education majors should practice this form of writing in content courses like GEOS 342. Furthermore, a lesson plan guides the teacher and ensures all steps are included when teaching in the busy environment of a classroom full of students. One complete lesson plan is assigned. The plan itself is about two pages, and the accompanying background paper is 2 to 3 pages, plus references and figures. Students will select a topic and submit it for approval. They next present a draft of their lesson plan and background paper for review, after which they will revise the plan to create the final version that they will present in class. Grading uses the same standards as in the College of Education and Educational Technology for assessing professional-level lesson plans: organization, appropriate level and flow, sound content, match of activities and assessments to objectives. (7% of final grade)

3. Observing Project: In this paper, students will outline an observing project for a student or adult amateur. This assignment requires logic and completeness to yield a credible product. As in the Lesson Plan, writing makes these qualities tangible for the student and professor. Students prepare a draft for review, which they then revise for the final version. The grading criteria emphasize logical flow, clarity, and completeness. (7% of final grade)

4. Assignments - Article Critiques: To supplement the general, introductory-level material in the text, pairs of articles are assigned four times during the semester. Each article comes with a question on the main ideas in the article to serve as a writing prompt. Students turn in a written critique responding to the question. They also apply key ideas in the article to other knowledge, their own experience, and issues in other sciences or other fields of human endeavor. The clarity of the response and depth of application of ideas are the main criteria in scoring the article critiques. The critiques are one-half to one page; the first one is returned with comments for revision so students can check their understanding of the requirements and format. The other critiques are graded as turned in. (10% of final grade)

5. Self-Tests: Study questions are provided with the text. As a check on comprehension and to motivate students to keep up with assigned reading, at least three times during the semester students are given short quizzes with these same questions to answer without reference to text or notes. The class discusses the correct answers afterwards. These self-tests are not collected or graded, and each involves a minimum of one-half page of writing. (not formally graded)

6. Essay Examinations: Each exam is at least 80% short answer and essay questions. A typical essay answer runs 200 to 400 words. The first two tests are at least 800 words and the final exam at least 1000 words. This writing assesses understanding and ability to apply and use ideas from the course. Essay answers also show how well students have synthesized and assembled information about stellar astronomy. Practice questions, at least one of which appears on the test, are provided one week before each test to focus study and allow practice in writing answers. Students who wish guidance on how to compose an answer to a practice question are invited to consult the professor outside of class time. (Three exams together worth 50% of final grade)

7. Laboratory reports: Twelve of the 14 lab meetings are devoted to completing hands-on exercises, documented in writing. (The other two meetings involve observations of the sky and student presentations.) The labs commonly require documentation of calculations, plotting of data, and short (one or two sentence) answers to questions. In three of the labs (Spectra of Elements, Sunspots, and Aurora), several paragraph-length answers are part of the assignment. These are graded for clarity, accuracy, and completeness of the explanations and interpretations. Students have an opportunity to revise this writing. (One-fourth of the total lab grade, or 5% of the final grade)

GEOS 342 - Stellar Astronomy
Syllabus - Fall 2007

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Goal

To build a solid understanding of the fundamentals of astronomy, with emphasis on sun, stars, galaxies, the sidereal universe and use of spectroscopy for gathering astronomical data, so that students will be able to incorporate new material into a cohesive whole.
Prerequisites: MATH 121 and PHYS 111

Objectives

Students will:
1. Relate basic science concepts to their application in astronomy; for example, the laws of motion to binary stars.
2. Understand how the scientific method has been used to solve astronomy questions; for example, how the size and shape of our galaxy were determined.
3. Demonstrate orally and in writing an understanding of evolution of the Sun, other stars, and the universe as a whole.
4. Develop an understanding of the uses of modeling, instrumentation, and technology in astrometric research.
5. Improve written synthesis and application of ideas in astronomy in short essays, papers, and lesson plans.
6. Develop an appreciation for both the beauty and usefulness of the night sky.

Text

Astronomy: A Self-Teaching Guide, Moche. 6th edition (2004). Older editions may also be useful. A schedule of assigned readings will be given in class.
Additional reading from Scientific American Special Edition: The Secret Lives of Stars (2004) and from some of these journals will also be given: Astronomy, Scientific American, and Sky and Telescope.

Lectures Tues and Thurs 3:30-4:20 P.M, Room 134 Weyandt (Planetarium)

Tues	Thurs		
Aug 28	Aug 30	Position and motion in sky	Position, motion
Sept 4	Sept 6	Light, what it tells us	Light
Sept 11	Sept 13	Astronomical instruments	Radio astronomy
Sept 18	Sept 20	Kepler	Newton, Einstein
Sept 25	Sept 27	Measuring distances	**EXAM 1**
Oct 2	Oct 4	The Solar nebula	Sun: description
Oct 9	Oct 11	Sun: behavior	Measuring star properties
Oct 16	Oct 18	Star types	Hertzsprung-Russell plot
Oct 23	Oct 25	Star birth	Evolution of small stars
Oct 30	Nov 1	Evolution of large stars	**EXAM 2**
Nov 6	Nov 8	Wierdness I: neutron stars	Wierdness II: black holes
Nov 13	Nov 15	Discovering our galaxy	Galaxy types, evolution
(November Break)			
Nov 27	Nov 29	Cosmos: the red shift	Microwave Background
Dec 4	Dec 6	Cosmos: future universe	Cosmos: early history

Thursday, December 13, 2007, 12:30 P.M. to 2:30 P.M. - **FINAL EXAM**

Lab Schedule (specific lab schedule will be given in class)
Tues. 8:00-10:45 A.M. Walsh 103 (lab room)

Grading

Test 1	15%	(covers lectures and labs through Sept. 27)
Test 2	15%	(covers lectures and labs from Oct. 2 to Oct. 30)
Final Exam	20%	(a comprehensive test)
Labs	20%	
Assignments	10%	
Papers	20%	

The three tests will include short answer questions, essay questions, and problem solving. They will cover the readings, lectures, and labs. The exams are closed book, closed door. I will provide opportunities to practice writing essay answers if they are new to you. Scores of 90-100% earn an A, 80-89% B, 70-79% C, 60-69% D, 59% and below, F.

Assignments, to be done outside class, will include article critiques and short exercises. The first paper is a short explanation of an astronomical object or phenomenon. There will also be two longer written projects. One will be a plan for teaching a lesson and accompanying background paper on a topic in stellar astronomy. The second will be to design and present in some detail an observing project for a student or amateur. Scoring penalties for late work will apply.

Student outcomes assessment matrix

Conceptual Framework (Danielson Domain)	Content Standard (NSTA Science Teacher Preparation)	Course Objective	Assessment
I, III	1a, 1b	1	*Test 1
I, III	1b, 1d, 2a, 2b, 3a	2	Paper 1, *Paper 2
I, III	1a	3	Test 1, 2, 3, Paper 1, Paper 2
I, III	1c, 2a	4	Labs and Lab quizzes
I, III	1b, 2b	5	Test 3, Paper 2

*Indicates assessments designated for mean and score range aggregated reporting to NCATE and Middle States accreditation bodies. All work submitted for reporting will be anonymous.

Examples of Writing Assignments

Sample Article Critique Questions

Scientific American Secret Lives of Stars, p. 42-49: "Solar Storms"

> Describe a solar storm (including ideas about its cause).
> What are the effects on Earth of solar storms?

p. 92-100: "The Brightest Explosions in the Universe"

> How can astronomers detect the formation of a black hole? How can this be distinguished from other processes that may give off similar electromagnetic radiation?

Sample Essay Exam Questions

How can we learn the temperature, composition, and motion of a distant object in the sky?

What are the various possible fates of a white dwarf star? What determines which fate actually occurs?

You have a perspective on the evolution of the entire universe after studying it this semester. What do you believe to have been the most critical events over the past 13 to 15 billion years that have made it possible for you to be here today, studying astronomy?

SECOND PAPER: ADAPTING A LESSON PLAN

For the second paper you will assemble a lesson plan and background paper for one or more secondary grades (6 to 12). This will require that you locate or come up with a teaching idea and demonstrate that you can adapt it with sufficient detail. As an Education major, you are required, by the time you receive a teaching license, to assemble a portfolio of materials you have developed in compliance with NSTA, INTASC, and PDE guidelines. Your completed lesson plan could easily be used for part of this requirement.

The Project is one of three papers that together are worth 20% of the course grade. You will prepare a lesson plan of two pages (single spaced), , and a background paper, for the teacher or other adult who would be using your lesson plan, of about 600 to 800 words of text. Both the lesson plan and the background paper have no limit on figures or number of references.

TOPIC AND SOURCES

Selecting a topic for your project is the key to success in completing it without lots of unnecessary effort. Choose a specialty of astronomy, a celestial object, process, or phenomenon that interests you. Then focus on a specific lesson you can teach about it. You may remember an interesting lesson or demonstration from school, a museum,

or on educational television or the Web. If you are inexperienced with writing lesson plans, talk to me or one of the students with more experience.

Start looking in the easiest places. After checking the books easily accessible to you, it's time to check the Online Catalog in the library, the Online indexes, and the various other sources (atlases, encyclopedias, U.S. government publications) available to you there. I may be able to give you some references to examine as well.

I know many of you are fond of the World Wide Web as an information source. It is very easy to use. Some topics are well-covered, while others (especially original ideas) are not. I would rather not see you simply search the Web for lesson plans and rewrite one; the highest scores will go for lessons that incorporate some of your original ideas or approaches to teaching. For this reason I'm requiring you to include a copy of the original inspiration for your lesson plan.

ELEMENTS OF A LESSON PLAN

I'm not dogmatic about the order of these elements, but all of them should be present and explicitly labeled. (up to 2 pages single spaced)

Title of the lesson
Grade level(s)
Subject area or area(s) - should include Astronomy or Earth Science!
Objectives: Each educational objective should be clearly stated and straightforward to measure or evaluate.
Standards: Identify one or more standards of the Pennsylvania Department of Education (PDE) that are addressed by your lesson. One good place to look these up is in your portfolio template that you got in COM 103.
Materials required:
Procedure: Outline the steps a teacher would need to follow to conduct the lesson. You are invited, but not required, to include a) extensions for additional teaching, and/or b) adaptations for special needs or gifted/talented students at the end of this section.
Evaluation: List one or more ways to evaluate/assess student learning of the lesson.

On separate page(s) as explained below:
References: This must include any printed inspiration or source for your lesson.
Copies: of any lessons or other ideas that served as your source or idea for the lesson.

BACKGROUND PAPER and COPY OF ORIGINAL INSPIRATION/LESSON IDEA

Any K-12 lesson has (or should have) educational objectives. The background paper serves to 1) justify these objectives in the larger context of what children or adults ought to learn, 2) explain why the particular lesson was chosen as most suitable for meeting the objectives, and 3) give background on the topic that a teacher (other than you) or other adult would need to feel competent to teach the lesson and answer student questions about the subject. Your list of references must accompany your background paper. Citing references within your papers should be familiar by now; see me if you need help on this. Also attach the source of the idea for your lesson.

PROJECT GRADING SHEET
2nd Paper: LESSON PLAN ADAPTATION

TOPIC (5 POINTS) _____
- Topic from astronomy or closely related science
- Topic is specific, appropriate in scope
- Originality evident in adapting lesson

ELEMENTS OF LESSON PLAN
- Lesson plan of two pages (single spaced) (5 POINTS) _____
- Any figures are useful, appropriate

- Title of the lesson (5 POINTS) _____
- Grade level(s) (5 POINTS) _____
- Subject area or area(s) (5 POINTS) _____

- Objectives/Standards: (5 POINTS)
- Each educational objective clearly stated and straightforward _____
- Standards properly identified

- Materials required: (5 POINTS) _____
- Procedure: (10 POINTS) Steps to conduct the lesson. May include
- a) extensions , and/or b) adaptations for special needs. _____

- Evaluation: (5 POINTS) _____

- References (5 POINTS) _____

BACKGROUND PAPER (20 POINTS)
- Justifies choice of objectives, explains how lesson meets objectives, _____
- provides adequate background for person teaching lesson

- Copy of original inspiration for lesson included (5 POINTS) _____

WRITING
- Proper use of spelling, grammar, and expression (5 POINTS)

TOPIC turned in on time (required) (5 POINTS) _____

DRAFT complete and turned in on time (10 POINTS) _____

LATE PENALTY if not on time _____

TOTAL (100 POINTS MAXIMUM) _____

THIRD PAPER: An Observing Project

For the final paper you will outline an observing project for a secondary student or adult amateur. As an Education major, you are required, by the time you receive a teaching license, to assemble a portfolio of materials you have developed in compliance with NSTA, INTASC, and PDE guidelines. Your completed observing project could easily be used for part of this requirement.

Your project should be appropriate for a middle-school student, a high-school student, or an adult amateur. Please choose one of these three audiences for your focus. You may assume the person(s) has/have a basic knowledge of sky motion and know how to find stars or constellations with a star chart or planisphere. The project should be completed in no more than 12 months of observing (shorter times are fine!), and should make allowance for weather and other circumstances we usually deal with while doing astronomy in Pennsylvania.

For equipment, you may assume the availability of a telescope up to 8 inches (20 cm) in diameter that is pointed manually (so be ready to do without a clock drive). Basic photography equipment (a film camera, telephoto lens, and tripod) are OK, as is a digital camera held up to an eyepiece to take an image. A home video camera and tripod are also OK. We need to specifically avoid rare, fancy, or expensive equipment - you want to be able to actually use this plan someday! Of course, many fine observing projects can be done just with binoculars or the eye. If you are unsure whether your equipment will meet these guidelines, please see me.

The magazine article list we compiled has lots of ideas, as do astronomy books and the Internet. This project need not be new research; it would be great to demonstrate a basic principle or help the person understand objects, motions, or processes. The observations should create a record or product of some kind: images, sketches, measurements, locations and times, etc. Using the record or product to demonstrate a principle or discover something about the sky is an essential part of the project.

The Project is one of three papers that together are worth 20% of the course grade. The complete description need not be more than five pages, additional pages for figures, recording sheets, etc. are fine. At our last lab meeting you will have up to 8 minutes to present your project in some detail. Please practice your presentation for length. This time I will simply time you as part of your presentation grade, rather than telling you when time is up.

RUBRIC - PROJECT 3, GEOS 342, Fall 2005

Topic:
- Turned in on time: 10 points
- Turned in late: 5 points
- Not turned in: 0 points

Presentation:
- Complete description of project, under time limit: 13-15 points
- Description incomplete or time exceeded: 10-12 points
- Incomplete and over time limit: 7-9 points
- Serious deficiencies or elements missing: 1-6 points
- No presentation: 0 points

Title: of the observing project
- Suitable title: 4-5 points
- Title missing or incomplete: 0-3 points

Audience: one of the three listed in assignment should be specified
- Suitable audience: 4-5 points
- Audience missing or incomplete: 0-3 points

Objective of the project:
- Objective complete and appropriate: 8-10 points
- Objective missing or incomplete: 0-7 points

Background:
- Sources, history (if any), justification all included: 10 points
- All three elements, but one weak: 8-9 points
- Two elements: 5-7 points
- One element: 1-4 points

Equipment Needed:
- Sufficient and appropriate: 8-10 points
- Items missing or descriptions incomplete: 0-7 points

Steps in the Project:
- Complete steps (preparation, observations, analysis, forms, outcome): 18-20 points
- 4 of 5 elements present: 13-16 points
- 3 of 5 elements present: 9-12 points
- 2 of 5 elements present: 5-8 points
- 1 of 5 elements present: 1-4 points

Tables/Illustrations:
- Sufficient and appropriate: 8-10 points
- Items missing or descriptions incomplete: 0-7 points

References cited
- Goes beyond text and one or two web sites: 4-5 points
- List short or incomplete: 0-3 points