APPLICATION FOR NEW COURSE

1. Submitted by College of A&S ___________________________ Date March 18, 2005

Department/Division offering course Biology ___________________________

2. Proposed designation and Bulletin description of this course
   a. Prefix and Number BIO 401G
   b. Title* Special Topics in Biology for Elementary, Middle and High School Teachers; (subt req)
      *NOTE: If the title is longer than 24 characters (including spaces), write
      A sensible title (not exceeding 24 characters) for use on transcripts Spec Top Bio Elem/Mid/HS
   c. Lecture/Discussion hours per week 2-4
   d. Laboratory hours per week 0-4
   e. Studio hours per week ___________________________
   f. Credits 1-4
   g. Course description

   Selected topics in biology of special interest to teachers such as biological research experiences related to pharmacological assays, collecting behavioral data, compilation and statistically analysis of data. When the course is offered, a specific title with specific credits, the number of hours in lecture-discussion and laboratory, will be given. Lecture/discussion, two-four hours; labotatory, zero-four hours.

   h. Prerequisites (if any)

   By consent of instructor only.

   i. May be repeated to a maximum of 12 credit hours. (if applicable)

4. To be cross-listed as
   no
   Prefix and Number ___________________________
   Signature, Chairman, cross-listing department ___________________________

5. Effective Date May 2005 (semester and year) ___________________________

6. Course to be offered ☐ Fall ☐ Spring ☑ Summer

7. Will the course be offered each year? ☑ Yes ☐ No
   (Explain if not annually)

8. Why is this course needed?

   This is part of the Tiered Mentoring in Math and Science Grant from Kentucky Dept. of Education. PI-David Taylor (Science Coordinator Fayette County Public Schools). I serve as a Teaching Partner on the grant. My role as a UK representative is to mentor High School and Middle School science teachers to learn laboratory and experimental techniques.

9. a. By whom will the course be taught? Robin Cooper, PhD. Biology

   b. Are facilities for teaching the course now available? ☑ Yes ☐ No
   If not, what plans have been made for providing them?
APPLICATION FOR NEW COURSE

10. What enrollment may be reasonably anticipated? 20-25

11. Will this course serve students in the Department primarily? ☑ Yes ☐ No
   Will it be of service to a significant number of students outside the Department? ☑ Yes ☐ No
   If so, explain.

25 Middle and or High school teachers from Fayette County will be enrolled at UK (Biology Dept.) for this course (July-Aug) for 2 weeks,

Will the course serve as a University Studies Program course? ☑ Yes ☐ No
If yes, under what Area? Teachers will be able to use this course to count towards obtaining a MS in Teaching Education

12. Check the category most applicable to this course
   ☑ traditional; offered in corresponding departments elsewhere;
   ☐ relatively new, now being widely established
   ☐ not yet to be found in many (or any) other universities

13. Is this course applicable to the requirements for at least one degree or certificate at the University of Kentucky? ☑ Yes ☐ No

14. Is this course part of a proposed new program:
   If yes, which?

15. Will adding this course change the degree requirements in one or more programs?* ☑ Yes ☐ No
   If yes, explain the change(s) below

16. Attach a list of the major teaching objectives of the proposed course and outline and/or reference list to be used.

17. If the course is a 100-200 level course, please submit evidence (e.g., correspondence) that the Community College System has been consulted. ☑ Check here if 100-200.

18. If the course is 400G or 500 level, include syllabi or course statement showing differentiation for undergraduate and graduate students in assignments, grading criteria, and grading scales. ☑ Check here if 400G-500.

19. Within the Department, who should be contacted for further information about the proposed course?
   Name  Robin L. Cooper
   Phone Extension 7-5950

*NOTE: Approval of this course will constitute approval of the program change unless other program modifications are proposed.
APPLICATION FOR NEW COURSE

Signatures of Approval:

Department Chair

Dean of the College

Date

MAY 22 2005

Date

MAR 22 2005

Date of Notice to the Faculty

*Undergraduate Council

*University Studies

*Graduate Council

*Academic Council for the Medical Center

*Senate Council (Chair)

*If applicable, as provided by the Rules of the University Senate

Date of Notice to University Senate

ACTION OTHER THAN APPROVAL

Rev 3/04
March 18, 2005

Re: BIO401G

Dear Course curriculum committee;

The proposed course is a replica of what is currently in place for PHY401G with the exception of training in Biology instead of Physics.

PHY 401G SPECIAL TOPICS IN PHYSICS AND ASTRONOMY FOR ELEMENTARY AND HIGH SCHOOL TEACHERS. (1-4)
Selected topics in physics and astronomy of special interest to teachers will be discussed. When the course is offered, a specific title with specific credits, the number of hours in lecture discussion and laboratory will be announced. Lecture/discussion, two-four hours; laboratory, zero-four hours. May be repeated to a maximum of eight credits. Prereq: Open only to elementary school and/or high school teachers; consent of instructor.

The course will be run with lectures and laboratory based experiments that the teachers can take back with them to their classrooms. I strongly feel this is an excellent outreaching component for UK.

Since it will take nearly 1 yr to get this course approved I would like to run the course as an A&S 500 for the summer of 2005.

This will initially be run as part of the Tiered Mentoring in Math and Science Grant from Kentucky Dept. of Education. The PI is David Taylor (Science Coordinator Fayette County Public Schools). I serve as a Teaching Partner on the grant. My role as a UK representative is to mentor High School and Middle School science teachers to teach them to learn laboratory and experimental techniques.

I will have each teacher take the on line UK safety tests before coming to UK.

The last week of July and 1st few days of August (July 25- Aug. 3; 8 working days) I will be bringing in about 20 to 25 Middle School teachers from Fayette and surrounding counties for a research experience workshop. The 20-25 will be divided into two groups for conducting 4 day events and then the groups switch and the events are repeated for the following 4 days. This is in conjunction with Mr. David Taylor (Fayette County Science teacher coordinator).

The plan is to have 20 teachers in a lab conducting experiments centered around Drosophila biology as a model organism. This is an inexpensive preparation to use for the teachers when they return to their school. We will make use of the lab space in biology over the summers for this course. Each year we will rotate model animals - fruit flies, crayfish, other insects etc.
This coming summer 2005, the teachers will be paid for this experience by Mr. Taylor's state grant and all supplies are covered by him. We are however trying to find a way that the teachers can register for a course and get credit for it. They will then pay the tuition for the course. The teachers will want to take a course so they can show credit for their National certification. This way UK gets recognition as well in training teachers in the community.

This first year I plan to collect preliminary data with these teachers revolving around the effect of nicotine on Drosophila larvae behavior and learning in adults.

Sincerely yours,

Robin L. Cooper
Associate Professor in Biology
March 18, 2005

OBJECTIVES for BIO401G

The course will be run with lectures and laboratory based experiments that the high school and Middle school teachers can take back with them to their classrooms.

The course structure is designed with the Fayette County Public Schools (FCPS) so that schools can elect to have an entire math or science department undergo content training as a group. The number of students directly benefiting from this is not possible to calculate accurately at this time. Through capacity building and a train-the-trainer process, the number of students benefiting from the program will continue to grow over the years.

Whereas the majority of FCPS math and science teachers have certification in their areas, many of them have not had sufficient content focused professional development. This course will allow the teachers to achieve this goal. **A strong goal is to develop and utilize a core of ‘leading teachers’ to promote content, professionalism, and effective collaborations which promote science and mathematics.** The university's role is to help foster develop professional growth plans, assist in designing and implementing content-based professional development. The instructors will share content expertise, appreciation of the discipline, real world connections and experiences, establish authentic relationships with schools and districts to promote higher education and engage more students in science and mathematics. This course will enhance the ability to work with teachers in middle/high school programs.

Researchers in Biology that might rotate in teaching this course each summer can provide updates in teachers' content knowledge in fast-moving areas of research, developing deeper understanding of current research in bio-related fields, provide for the development of university-secondary science ed. partnerships and collaboratives.

Sincerely yours,

Robin L. Cooper
Associate Professor in Biology
March 23, 2006

re: A&S 500 (later to be named BIO401G)

Content, goals, structure and integration with Fayette County Public Schools

This course is in conjunction with the Fayette County Public Schools (FCPS) and much of the course description is directly taken out of the text developed in the active Tiered Mentoring in Math and Science Grant from Kentucky Dept. of Education (PI-David Taylor, Science Coordinator Fayette County Public Schools).

The course will be run with lectures and laboratory based experiments that the high school and Middle school teachers can take back with them to their classrooms. The course structure is designed with the Fayette County Public Schools (FCPS) so that schools can elect to have an entire math or science department undergo content training as a group.

A professional growth model that addresses both the needs of the students and teachers must contain several critical components. These critical components include deeper conceptual understanding of content, knowledge of leadership style and implementation of appropriate pedagogy. It is clear from past studies that the concept of “one size fits all” does not provide a means for teachers to significantly improve their skills nor those of their students.

Current research, both quantitative and qualitative, points toward a support-oriented model of professional growth. One study by the Urban Teacher Collaborative shows that mentoring can provide success in large urban areas. (Haselkorn and Harris, 1998; Fidelner and Haselkorn, 1999) The teaching mentor provides the model for less experienced teachers to follow in developing their classroom philosophy and practice. A teaching mentor with classroom experience, excellent leadership skills, and a strong desire to work with others can provide the foundation for a supportive professional growth model.

The Kentucky School Board Association Task Force on Enriching Teaching (2001) notes “national data show that most teachers who leave the profession do so within the first five years. Therefore, the Task Force maintains new teachers must receive singular attention in retention strategies”. The FCPS proposed model addresses three of the report’s recommendations: mentoring, assistance with instructional strategies, and opportunities for collegial support and interaction. Volke (2002) recommends in an ASCD Infobrief that policy makers should “create high quality induction programs for new teachers”. This recommendation is supported by findings that “beginning teachers who have access to intensive mentoring by expert colleagues are much less likely to leave teaching in the early years.”

The Fayette County Math Science Program (MSP) views evaluation as an integral element for successful implementation. It is an ongoing process of examining the quality of activities and processes, significance of outcomes, and degree of impact. In addition to providing information on results for reporting purposes, the project’s plan for formative and summative evaluation provides regular feedback into planning and decision-making to keep the project on-course toward its goals.

Teacher work products, including performance tasks in professional development, unit/lesson plans, and individual learning plans for mentors and mentees, to gather evidence of content understanding and teacher reflection on current practice; Observations of a sample of classrooms, professional development sessions, and other project activities to provide direct evidence of content and pedagogy implementation.

Dr. Michael N. Howard is serving as External Evaluator for the Fayette County MSP. While the MSP is ongoing for the next few years the external evaluator will involved. However, in future years this process may change in accordance with how the FCPS would like to proceed. Dr. Howard has extensive experience in evaluation of math/science reform initiatives. He currently serves as lead evaluator for two projects supported by the U.S. Department of Education and four projects supported by the National Science Foundation. His responsibilities in the Fayette County MSP are to oversee evaluation activities occurring at local and project levels; coordinate activities of other persons involved in data gathering; analyze evaluation data and prepare regularly-scheduled reports of results and lessons learned; and participate in project planning and decision-making meetings. Dr. Howard will be assisted in data collection by field observers from the project’s partner institutions, who will assist with interviews, observations, and review of project artifacts (work samples, assessments, etc.). Dr. Howard will submit an annual evaluation report and periodic formative memos to project leaders, detailing evaluation results, implications for the project, and recommendations for addressing issues identified.

Proposed syllabus for A&S 500/BIO 401G
SUMMER 2005

For the Summer 2005 course, the plan is to have 25 Middle School teachers, that David Taylor has already identified within FY county, to come to UK Biology Dept. for an intense 2 week session (July 22- Aug. 5). The day would consist of arriving at 8:00 AM to 4 PM with a working lunch scheduled over the noon hour. This will be a highly organized 2 weeks but with room for on-going change as to insure each participant is keeping up with the pace.

Offered for 3cr hr:  (minimum contact hours for 1 cr hr lecture/2 cr hr lab is
13hrs 20min of lecture/53 hrs 20 lab = total 66 hrs 40 min)
11days x 6-8hr days= 66 to 88 contact hours.

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<th>Grading Scale</th>
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<th>Undergraduates</th>
<th>Graduates</th>
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<tbody>
<tr>
<td>A 100-90</td>
<td>workshop journal</td>
<td>100%</td>
<td>10%</td>
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<tr>
<td>B 89-80</td>
<td>formal lab report</td>
<td>0%</td>
<td>10%</td>
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<td>C 79-70</td>
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*BIO401G: Will have to keep a workshop journal to be graded. These students are also required to write up their research findings in a formal lab report as preparing to submit to a research based science or teaching science peer reviewed journal. These students also must prepare a classroom teaching module to bring back to their schools in hopes of implementing for their students.

Course Objectives (Student Learning Outcomes)
Upon completion of BIO 401G, a student should be able to:

**Explain** the function basic principles of biology in the subject taught in the workshop (i.e., Animal behavior, Pharmacology, Physiology)

**Demonstrate** the proper ability to collect biological data in a meaningful way

**Analyze** given the data collected to be able to compile, analysis and graph for presentation

**Apply** the disseminate what they learned in the workshop to students back at their schools

**Academic Dishonesty**
Academic dishonesty or cheating of any kind will not be tolerated. This is a serious offense and the instructor will make every effort to ensure that the punishment is immediate and severe. This is also the official policy of the Department of Biology.

**Absence Policy**
Students would be expected to attend all classes, but there would be no penalty for absences. Only when there is an excused absence, student would be allowed to make up missed exams and assignments.
Day 1 (Friday, July 22, 2005)
1. Overview of workshop- solve all minor details (housing). Overview of campus/Lexington
2. Laboratory safety- where to go and what to do. Take UK on line lab safety and hazardous waste safety tests.
3. Use of laboratory equipment- general (pH meter, etc.) & detailed use of electrophysiology equipment.
4. Animal care: crayfish and fruit flies (general biology- life history) Set flies up for later studies.
5. Course goals. How to keep a notebook.
6. How to design an experiment, use of statistics, and graphing software implementation on lap top computers.

Day 2 (Monday, July 25)
AM: Each dissect fruit fly larvae & learn to measure behaviors
PM: Learn how to make measures and analysis on the computer of data collected the day before.
BREAK into 3 groups- G1: Behavior of larvae
G2: Heart rate measures of larvae
G3: Adult behaviors

Day 3 (Tuesday, July 26)
AM: Examine effects of neuromodulators on behaviors - sensory functions.
PM: Analysis of data- graph and statistics

Day 4 (Wednesday, July 27)
AM: start on dose-response curves
PM: Analysis of data- graph and statistics

Day 5 (Thursday, July 28)
AM: How to implement what is learned into their classrooms?
PM: HW assignment- write up experimental design for their classroom and list equipment needs. Start to read primary literature on animal behavior and pharmacology.

Day 6 (Friday, July 29)
AM: Discuss HW assignment and literature provided the day before.
PM: Develop detailed information content for Teachers' students in Middle school. Set up for experiments on Monday.

Day 7 (Monday, Aug. 1)
AM-PM: Complete experiments and data gathering. Dose response curves of pharmacological manipulations.

Day 8 (Tuesday, Aug. 2)
AM-PM: Complete experiments and data gathering. Dose response curves of pharmacological manipulations.

Day 9 (Wednesday, Aug. 3)
AM: Statistical computation with Dr. Viele (UK Dept. of Statistics). Ten work stations will be implemented. The goals here are to teach the basics to process data. Which statistical test to use for the data collected? How to describe the data and quantify statistically?
PM: Working on statistical analysis and completing does response experiments.
Teachers mix teams and a partner teacher the other one what experiments they did and go over their data as well as analysis.

Day 10 (Thursday, Aug 4)
AM: Compare wild type and mutant lines of Drosophila.
PM: Graph results, writing up, drafting manuscript. Prepare ppt for presentations.

Day 11 (Friday, Aug 5)

Proposed syllabus for A&S 500/BIO 401G
AM: Behavioral assays in Crayfish. Life history and setting up experiments for classroom use in Middle schools.
PM: Closing session- feed back from teachers. Go over where to obtain the goods they need for their classrooms.
Present some stand ppt files that can be used by the teachers for their classes. Burn CDs and distribute content folders.