APPLICATION FOR NEW COURSE

1. Submitted by College of Engineering | Date 09-01-00 |
   Department/Division offering course Civil Engineering |

2. Proposed designation and Bulletin description of this course
   a. Prefix and Number CE655 |
   b. Title* Water Sanitation & Health |
      *NOTE: If the title is longer than 24 characters (including spaces), write a sensible title (not exceeding 24 characters) for use on transcripts |
   c. Lecture/Discussion hours per week | 3 |
   d. Laboratory hours per week |
   e. Studio hours per week |
   f. Credits 3 |
   g. Course description
   Prevention of water-related diseases by appropriate supply and sanitation practices with designs applicable to small systems and rural areas of developing nations |
   h. Prerequisites (if any)
   Previous college level courses in chemistry and/or biology, CE451, or consent of instructor |
   i. May be repeated to a maximum of | (if applicable) |

4. To be cross-listed as

Prefix and Number | Signature, Chairman, Cross-listing department |

5. Effective Date Spring 02 | (semester and year) |

6. Course to be offered | Fall | Spring | Summer |
   | Yes | No |

7. Will the course be offered each year? (Explain if not annually) |

8. Why is this course needed?
Water supply/sanitation is at the core of environmental engineering and public health. |
This course provides basic education required for sustainable development. |

9. a. By whom will the course be taught? Dr. Gail Montgomery Brion |
   b. Are facilities for teaching the course now available? Yes No |
   If not, what plans have been made for providing them? |
10. What enrollment may be reasonably anticipated? 10-20 students

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.

This course meets requirements for the Graduate programs in Public Health as well as those for graduate study in Environmental Engineering.

Will the course serve as a University Studies Program course? □ Yes □ No
If yes, under what Area? ____________________________

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 part of a proposed new program? □ Yes □ No
If yes, which?
This course listed curriculum for the School of Public Health MPH effective Fall 00.

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

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

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

17. Within the Department, who should be contacted for further information about the proposed course?
Name: Gail Brion | Phone Extension: 257-4467 |

*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:

[Signatures]

Department Chair

Dean of the College

[Dates]

10/18/01

10/27/02

10/29/02

Date

Date

Date

Date of Notice to the Faculty

*Undergraduate Council

*University Studies

*Graduate Council

*Academic Council for the Medical Center

*Senate Council (Chair)

Date of Notice to University Senate

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

ACTION OTHER THAN APPROVAL

Rev 11/98
Professor:  Gail Brion  
Asst. Professor  
Dept. Civil Engineering  
Univ. of Kentucky  

Office:  New Civil Engineering C367  
Phone:  257-4467  
Fax:  257-4404  
email:  gbrion@engr.uky.edu  

Note:  If I am not in my office, I can usually be found in my lab on the third floor of the New Civil Engineering Building, CE 316.  

Office Hours: M, T, W, Th 4-5 PM, or by appointment  

Objectives: This course introduces students to the water related areas of Environmental Health Engineering while examining applicable solutions to the problems presented. Graduate engineering/public health students will be educated about waterborne, water-scarce, and water-related diseases, and the engineering practices and principles that affect public health. Special emphasis is placed on sustainable, low-tech, engineering methods and practices for water supply and sanitation. Students will be taught how to prevent disease and lower infant mortality with designs applicable to small systems and rural areas of developing nations. The processes of slow sand filtration, and disinfection will be covered in depth. Selection of water supply, spring protection, well development, and VIP latrine construction with locally available materials will be addressed. Students will learn about the use of surrogate indicator organisms for the evaluation and regulation of water quality and treatment processes. As well, students will learn about essential laboratory techniques in microbiology needed by environmental engineers and public health specialists for isolation, identification, and quantification of pathogenic and indicator microorganisms from the environment.  

Learning Outcomes: At the successful conclusion to this course, students will:  
- Have the ability to design low-tech, sustainable water treatment and sanitation systems.  
- Have knowledge about the treatment efficiencies, sources, transmission, and impact of major waterborne and water-related diseases.  
- Be able to design and apply surrogate/indicator systems for the monitoring of water quality.  

Text: Two texts are required:  
Medical Microbiology, 22nd edition, authors: Jawetz, Brooks, Melnick, Butel, Adelberg, Ornston  
McGraw Hill publisher, isbn 0 838 56298 1  
Environmental Health Engineering in the Tropics, 2nd edition, authors: Cairncross and Feachem  
Wiley Publishers, isbn 0 471 93885 8.  

I will place reference materials in the engineering library if and when appropriate. The library has many books that can help you answer the questions, and you are encouraged to learn how to use the electronic literature searches available. What follows is a list of texts I have found useful in developing this course and that may provide interesting outside reading and paper resource material:  

Microbiology: Fundamentals and Applications, Second Edition,  
Ron Atlas, Macmillan Publisher
Laboratory Methods: One of the most difficult tasks facing public health specialists is that of defining when a water supply is safe for consumption when considering all of the pathogens that can be present. The field relies upon surrogate indicators of pathogens, and as we will learn, these surrogates are wholly inadequate to the task specified. Therefore, several sessions of the class will be dedicated to the investigation of laboratory methods for indicator organism testing and there will be 4-6 sets of questions that must be answered about the current methods used to test for microorganisms. Outside reading or laboratory investigation will be required to answer these questions.

In addition, a large multivariable database from a treatment plant intake will be distributed. This database contains information on the concentrations of encysted protozoa (Cryptosporidium and Giardia) and several surrogate indicator organisms in a river system used to provide drinking water. Your job will be to analyze the database provided and try to apply an indicator system model for use in predicting spikes of protozoa (either one or both) from the data provided. You will need to perform statistical analysis find out which variables are predictive and how they relate to protozoan concentrations. You will present your data analysis to the class in a presentation during dead-week and be graded by myself and your peers on your analytical assessment. To do this effectively, you will have to review the past few years of information on encysted protozoa and learn more about the relative sources and surrogate indicators. You will also have to use a statistical program that I have loaded on a laboratory computer. As I have a great deal of this information, a visit to my office may be one of the best starting points. This assignment is not due until dead week, but beware....Several other researchers and I have tried to find significant correlations between surrogate indicators in this database and protozoa, and it has proven difficult.
Exams: In total there will be 3 exams over lecture material and reading. All exams in this class are a mixture of multiple choice “concept” questions, short answer/essay, true/false, fill in the blank, and simple problem solving. Exams will be discussed and reviewed in class, but students cannot keep or make copies of exams. Exams will be kept on file in my office and may be viewed during office hours.

Paper: The purpose of the paper is to have students investigate in depth the life cycle of this important pathogen and the disease incidence, impact, costs, and control/eradication solutions to malaria in developing countries, which is a topic we do not have time to go over in detail in class. You will collect information and present a comprehensive, minimum 20 pages of text, 12 point font, 1 inch standard margins, double-spaced paper complete with references and a detailed bibliography (note, the bibliography or figures do not count as report pages). Web-page references should be kept to a minimum, but web-journal articles are encouraged. Copies of all references will be attached to the paper in an addendum. Standard formats for headings, footnotes, references and bibliography will be used. This paper you will turn in by no later than noon on Friday, March 23rd to my office or mailbox. You can always turn your paper in early, but I will wait to grade them until everyone has turned their paper in to me as part of your grade will be a ranking against each other.

Grades: In addition to the 3 exam grades, there will be a laboratory grade given for the indicator questions, grades for the data analysis report and presentation, and another grade for the malaria paper.

| Indicator Questions: | 10% |
| Exams (3 @ 20%)       | 60% |
| Malaria Paper         | 20% |
| Data Analysis Presentation | 10% |

I will tell you statistics (mean, standard deviation, range) for class grades on each exam, but will not assign letter grades until the end of the semester. My grading policy is to set the difficulty of the exams to be such that curving is unnecessary and to follow a policy of 90% and above being assigned a grade of A, 80% and above being assigned a B, etc…. I do not have a policy of assigning grades so a certain percentage of my class gets As, Bs, or Cs. You will get the grade you earn. If the class performs well, it is possible for all students to get an A if they score over 90% when the grades are all tallied. Before the midterm withdrawal date all students will be informed of their current grade and advised for withdrawal.

Cheating and Plagiarism: Do not try to cheat in this class since very unpleasant things will invariably result. At a minimum you will be assigned an “E” for the course. You are encouraged to visit me during office hours to discuss any problems that you are having with the class. Plagiarism has also become a big problem with the electronic age making access to the written word so easy; just a cut and paste from your favorite website and you’re an author. Wrong! Using someone else’s words, ideas, and thought processes is unethical and unscholarly behavior. There are painful university procedures that can be brought to bear if plagiarism is suspected, so just don’t do it. Use your own words and thoughts! Find your own voice! If someone else has said exactly the right words, directly quote them in your text rather than plagiarize their writing, but be sure that your thoughts are primary in your paper. It is difficult for many students to understand when paraphrasing results in plagiarism. Excessive use of paraphrasing often results in what is known as “accidental plagiarism”. If you are in doubt as to if your writing could be considered plagiarism, please come and see me for clarification, or look at the following website for examples and clarification [http://depthome.brooklyn.cuny.edu/career/acadintg.htm](http://depthome.brooklyn.cuny.edu/career/acadintg.htm).
<table>
<thead>
<tr>
<th>Dates</th>
<th>Main Topic</th>
<th>Subtopics</th>
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<tbody>
<tr>
<td>Introduction to</td>
<td>A brief review of critical concepts in</td>
<td>history of</td>
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<tr>
<td>Prokaryotes and</td>
<td>microbiology: history of microbiology,</td>
<td>disease theory, types of organisms, structures of organisms, methods of</td>
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<td>Microbiology</td>
<td>disease theory, types of organisms,</td>
<td>measurement, growth, nutrition, energetics. Emphasis is on prokaryotic</td>
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<td>structures of organisms, methods of</td>
<td>bacteria.</td>
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<td>measurement, growth, nutrition,</td>
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<td>TBA-early Feb</td>
<td>Test 1</td>
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<td>Water-related Diseases</td>
<td>Classification of water related diseases and a detailed description of</td>
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<td>the most important bacterial, viral, parasitic, insect-borne diseases of</td>
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<td>people, their reservoirs, vectors, routes of transmission, and effective</td>
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<td>March 12-16</td>
<td>Spring Break</td>
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<td>March 23rd</td>
<td>Malaria Paper Due</td>
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<td>TBA- late March</td>
<td>Test 2</td>
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<td>Appropriate small system water supply,</td>
<td>Selecting water supply. Design and appropriate use of roughing filters,</td>
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<td>treatment, and sanitation</td>
<td>slow sand filters, springs, hand-dug wells, pumped wells, cisterns, and</td>
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<td>disinfection. Sanitary Survey.</td>
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<td>4-24</td>
<td>Data Analysis due</td>
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<td>4-24 to 4-28</td>
<td>Presentations</td>
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<td>5-2 10:30 am</td>
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