

Course Outline for: BIOL 1103 Introduction to Emerging Diseases**A. Course Description**

1. Number of credits: 4
2. Lecture hours per week: 3
Lab hours per week: 3
3. Prerequisites: ENGC 0960 (C- or better) OR READ 0960 (C- or better) OR High School GPA of 2.60+ OR ACT Sub-Score of 21+ OR ACT Sub-Score of 19+ and High School GPA of 2.50+ OR SAT Read/Write score of 480+ OR SAT Read/Write score of 440+ and High School GPA of 2.50+ OR Accuplacer Reading score of 250+ OR Accuplacer Reading score of 236+ and High School GPA of 2.50+ OR MCA Reading score of 1047+ OR MCA Reading score of 1042-1046 and High School GPA of 2.50+
4. Corequisites: None
5. MnTC Goals: #3 Natural Sciences
#8 Global Perspective

A non-majors general education lab course that introduces the global, national, and local factors that cause and influence the emergence and re-emergence of infectious disease. Topics include the scientific method, epidemiology, disease transmission, survey of microorganisms, bioterrorism, food and water safety, and sexually transmitted diseases. Lab exercises mandate following biosafety practices for handling microbial pathogens. Lecture 3 credits, 3-hour lab 1 credit.

B. Date last reviewed/updated: January 2023**C. Outline of Major Content Areas**

Lecture: Subtopics listed under each main topic may vary due to recent developments in the field and current events.

1. Introduction to Emerging Diseases – Why study?
2. History of Emerging Diseases
3. Emerging Diseases – Why now?
4. Disease Prevention
 - a. Basic epidemiology
 - b. Disease transmission
 - c. Risk management – perception vs. real data
 - d. Demographics and disease
 - e. Governmental role in disease prevention
5. Microbes and Infectious Disease
 - a. Bacteria
 - b. Viruses
 - c. Prions

- d. Fungi
- e. Other eukaryotes
6. Methods of Controlling Disease
 - a. Antimicrobial agents
 - b. Other chemical methods
 - c. Physical methods
7. Immunology – The Body's Defenses
 - a. Non-specific defenses
 - b. Specific defenses
 - c. Immunization and vaccine safety
8. Food and Water Safety
9. Sexually Transmitted Diseases
10. Bioterrorism – Past, Present and Future

Laboratory: Students will actively participate in lab by engaging in studies related to:

1. Bacterial morphology
2. Use of the microscope
3. Aseptic transfer
4. Staining of bacterial smears
5. Hand washing and normal flora
6. Microbes and the environment
7. Water quality testing – most probable number
8. Normal flora of the throat
9. Antibiotic sensitivity testing
10. Epidemiology
11. Food plate counts
12. Identification of an unknown enteric bacterium
13. Study of select molds and yeasts
14. Study of selected parasitic protozoa
15. White blood cell differential count
16. Urinalysis
17. Immunology

D. Course Learning Outcomes

Upon successful completion of the course, the student will be able to:

1. Define and demonstrate understanding of basic principles of microbiology. (Goal 3a)
2. Describe the interrelationship between emerging infectious diseases, the factors that allow disease to spread, and social, environmental and political forces. (Goal 3d, 8a, 8b)
3. Practice basic microbiological techniques, data gathering, evaluation of results, identification of microbes in the natural world, and communication in written and oral formats. (Goal 3a, 3b, 3c)
4. Collect, evaluate, and analyze data trends and use the data in predicting future events. (Goal 2b)
5. Examine commonly held ideas and compare them to scientific data. (Goal 2c, 2d, 3a)

6. Analyze current events and their role in emerging diseases including world, national, state and local concerns about emerging diseases. (Goal 3d, 8c, 8d)
7. Describe how the immune system works (and sometimes fails), including principles of immunization. (Goal 3a, 3d)
8. Recognize the role of natural selection on disease pathogenicity, antibiotic resistance, and genetic resistance to disease. (Goal 3a, 3d)
9. Recognize the role of disease and disease prevention in other parts of the world and when traveling. (Goal 8c)
10. Use multiple written and electronic resources to collect data on diseases and scientific studies, evaluate the collected information for its credibility, reliability, and accuracy, and communicate the outcome in written form and oral presentation. (Goal 2a, 3c)

E. Methods for Assessing Student Learning

A variety of evaluation and assessment methods may be used:

1. Written examinations which include multiple choice, true-false, fill-in-the-blank, matching, short answer, and essay questions.
2. Lecture assignments including reports, small group presentations, and presentations to class on a short topic
3. Quizzes
4. Case studies
5. Laboratory assignments and papers including unknown identification
6. Oral laboratory quizzes to show mastery of techniques
7. A final comprehensive exam

F. Special Information

Instructors will include the most recent version of the Departmental Expectations document in their course syllabus.

When offered on-campus:

- The laboratory portion of the course is delivered in the Biology Learning Center (BLC).
- Instructors will include the most recent version of the Biology Learning Center (BLC) Expectations document in their course syllabus
- One or more labs may require the use of Biosafety Level 2 standards.
- Students are required to wear a lab coat and tie hair securely back.
- Several topics require independent research and possible field studies including sampling the student's microbial flora.