I. **Description of Course:**

1. **Department/Course:** BIOT - 120A
2. **Title:** Introduction to SEM Technology
3. **Cross Reference:**
4. **Units:** 0.5
   - Lec Hrs: 0.5
   - Lab Hrs: 
   - Tot Hrs: 9.00
5. **Repeatability:** No
6. **Grade Options:** Grade Only (GR)
7. **Degree/Applicability:** Credit, Degree Applicable, Not Transferable (D)
8. **General Education:**
9. **Field Trips:** Not Required
10. **Requisites:**
    - Advisory
    - BIOL 130 Introduction to Biology The student would benefit from some knowledge of basic biological principles.

12. **Catalog Description:**
    Students will learn theory and applications of Scanning Electron Microscopy in biological and non-biological disciplines including historical development of electron microscopes and current high technology applications of Scanning Electron Microscopes.

13. **Class Schedule Description:**
    An introduction to Scanning Electron Microscopy theory and applications for biological and non-biological disciplines.

14. **Counselor Information:**
    This course provides a unique opportunity for community college students to learn about Scanning Electron Microscopes. It is a prerequisite for Biological Scanning Electron Microscopy (BIOT 120B), and Engineering Scanning Electron Microscopy (BIOT 120E).

II. **Student Learning Outcomes**

The student will:

1. Discuss the historical development of the Scanning Electron Microscope and current high-technology applications of Scanning Electron Microscopy.
2. Describe the components of a typical Scanning Electron Microscope; discuss its operation.
3. Explain the basic principles of specimen preparation for biological and non-biological specimens.

III. **Course Outline:**

A. Historical development of electron microscopes
B. Electron microscopy theory
   1. Resolving power of electron beam
   2. Limitations imposed by electron beam
C. Scanning electron microscope operation and component systems
1. Overview of operation and imaging theory
2. Overview of component systems and functions
D. Other conventional electron microscopes types and comparisons
   1. TEM vs. SEM
   2. Other SEM signals
   3. SEM and ESEM
E. Introduction to specimen processing
   1. Basic considerations for biological/non-biological specimens
   2. Introduction to processing procedures
   3. Introduction to processing instrumentation
F. Applications of electron microscopes
   1. Biological applications
   2. Non-biological and high-technology applications

IV. Course Assignments:
   A. Reading Assignments
      1. Handouts and online reading. Resource materials will be available to students on
         reserve in the library, online, and in the classroom.
   B. Projects, Activities, and other Assignments
      1. Individual research project will be presented to the class
   C. Writing Assignments
      1. Report to accompany student's research project
      2. In class writing assignments, eg, describe the main steps of proper scientific
         method used by scientists; list the 5 basic component systems of a scanning
         electron microscope and their respective functions.

V. Methods of Evaluation:
   A. In-Class Assignments and participation
   B. Individual Research project
   C. Take home final exam

VI. Methods of Instruction:
   A. Lecture
   B. Discussion
   C. Demonstration
   D. Audiovisual

VII. Textbooks:
   Recommended
   Supplemental

VIII. Supplies:

CID 3485