Innovative Course Application Form

(1) Course Title Introduction to Biotechnology (2) Campus Leander I.S.D

3. A) Description of the course and its essential knowledge and skills:

An introduction to biotechnology includes career exploration, history, and applications of DNA/RNA technology, molecular biology, bioethics, and laboratory safe practices. The course is supplemented with laboratory exercises, demonstrations and field trips that illustrate the basic techniques of biotechnology. The course concludes with a consideration of bioethical issues relating to this powerful new technology.

B) Rationale and justification for the request in terms of student need:

Recent survey data collected and analyzed by the Texas Healthcare and Bioscience Institute (THBI), in conjunction with the Texas A&M Center for Business and Economic Analysis estimated that the Texas Healthcare technology and bioscience industry generates nearly $11.6 billion per year, providing employment to over 154,000 Texans. In 1998, biotechnology companies in Texas projected job growth of 24%. This course will be implemented as the first step toward a career pathway that will serve a wide variety of student needs. Students served will include those who wish to attain an undergraduate degree, associate degree or enter the workforce. In addition, students who have interests in pursuing health careers ranging from nursing to medical school, agricultural careers and/or graduate studies in molecular biology, biochemistry or immunology.

C) Description of activities, major resources, and materials to be used:

Students will be competent in basic biotechnology laboratory techniques including:

- Making accurate measurements in laboratory setting
- Use of common biotechnology lab equipment such as microscopes, thermocyclers, fume and sterile hoods, pH meters, autoclaves, electrophoresis apparati and power supplies, bacteriological incubators, Bunsen burners, microcentrifuges
- Performance of standard, reproducible assays for diagnostic work in biotechnology, immunology, cell biology, molecular biology and microbiology lab settings
- Use of titration and pipetting techniques
- Documentation of laboratory procedures and tests
- Following safe procedures according to safety checklists
- Performance of sterile techniques
- Preparation of solutions, media, buffers and reagents for assay work
- How to communicate professionally, using correct technical terms
- How to store and maintain equipment properly
- How to interpret lab results and trouble shoot problems

Because this course is designed to be articulated with Austin Community College (ACC), they will be the major source of curriculum, information and training. ACC currently has a grant funded by the National Science Foundation for the implementation of biotechnology programs in the region. The Austin Competency Analysis Profile (ACAP) for Biotechnology identifying the occupational, academic and employability skill will be used. The primary textbook will be DNA Technology, The Awesome Skill by Edward I. Alcamo. In addition, they are several biotechnology companies in the Austin area that we will use for additional information and expertise. Equipment and supplies will be purchased through local, federal and grant monies.

This course will have at least 40% laboratory investigation and fieldwork using appropriate scientific inquiry.

D) Methods of evaluating student outcomes:

Students will be evaluated on how well they master the competencies and will be expected to master each competency of the project before moving on to the next project. Students will also be evaluated by visual observation based on how they follow protocol, observe safety, stay on task and how they work with their fellow students in-group projects.

E) Qualifications of teachers:

Teachers will have certification in Composite Science or Biology at the secondary level or Health Science Technology.

Additional training in biotechnology content knowledge and laboratory techniques will be offered through professional development.

F) Amount of credit requested:

This is a Health Science Technology course for science elective credit. Students will receive 1-3 credits. When articulated with Austin Community College, students will receive three hours of college credit.

G) School years for which approval is requested:

2001-2002
2002-2003
2003-2004
2004-2005
2005-2006