**BioMedical Syllabus Summary**

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The BioMedical Technology course is a STEM course which emphasizes advanced laboratory experiences. Students must have completed a course in biology. The course is appropriate for students interested in medicine, biotechnology, physical therapy, genetics, pharmacy, and related biological sciences. The course includes college level laboratory activities taught at a high school level. These hands-on activities include extensive interaction with the instructor. A high school level textbook on biotechnology is used.

Medical topics are explored using PASCO probe technologies which include heart rate monitoring, breathing rate analysis, and other physiological measures. Digital Microscopes capable of measuring cell structures in micrometers will be used to view human tissues. Web sources will be used to relate the microanatomy to organs and systems. The digital microscopes also allow students to publish digital images of microslides for their lab reports. For example the Sports Medicine unit explores the structure and function of human skeletal and heart muscles, the microanatomy of the tissues, and heart rate and breathing computer analysis. The students will do Web research on heart anatomy and physiology, and heart and muscle diseases. Visits to medical institutions and meetings with medical professionals will be included.

The biotechnology topics of the course include laboratory investigations and research related to DNA and Proteins . For example students will use restriction enzymes for DNA cleavage, gel electrophoresis for DNA and protein analysis, and use a megacycler to do PCR ( Polymerase Chain Reactions).Students will be doing labs involving medical laboratory tests like ELISA and Western Blot.

Advanced laboratory information will be covered, such as; MSDS sheets ( chemical safety information), industrial laboratory procedures, and FDA requirements for recombinant DNA and protein pharmaceuticals. Students will learn web research techniques and proper documentation for crediting sources.

Assessments:

Summative Assessments : 70%

1. 50% Alternative Assessments : Laboratory Performance Assessments with Web Research
2. 20% Tests

Formative Assessments : 30%

1. Web Research Reports
2. Quizzes
3. Lab Data Sheets

Exam :

1. 75% Performance Assessment : Semester Long Independent Laboratory Investigation ( Science Fair Modeled Project)
2. Tri-Board Research Display
3. Research Paper
4. Laboratory Investigation; Data, Analysis, Conclusions
5. 25% Objective Comprehensive Exam

Labs include:

1. Bioluminescent Proteins
2. Cloning of a PCR-amplified Gene
3. Western Blot Analysis for Simulated HIV detection
4. Transformation of *E. coli*
5. Digital microscopy of Human Tissues
6. PASCO heart rate and Sports Medicine
7. PASCO breath rate and Sports Medicine
8. PASCO pH and Temperature effects on Enzymes
9. Gel electrophoresis Technique and Uses
10. Cleavage of DNA Restriction Enzymes
11. Isolation of Human and Plant DNA
12. PCR : Polymerase Chain Reactions
13. PCR –based Identification of Genetically Modified Organisms
14. Standard Lab Operating Procedures and MSDS sheets
15. ELISA technology in medical diagnosis
16. Science Fair ( Semester Long Independent Laboratory Investigation
17. Additional DNA and Protein investigations may be conducted using PCR, gel electrophoresis, and PASCO probes as time allows.