

ABET Addendum (Brandon Affan)

1. List two to four Desired Needs of your project that led to your final design objectives
 - a) Develop an osteochondral graft that combines hydrogel and a mineralized bone interface
 - b) Form a biocompatible extracellular matrix from proteoglycan and type II collagen extraction
 - c) Achieve controlled hydroxyapatite mineralization at the hydrogel-bone interface
 - d) Design a bioreactor that supports reproducible tissue formation and mechanical integrity

2. List the major Constraints on your design/project
 - a) Biological materials and reagents handled with appropriate lab protocols, consider ISO and FDA standards
 - b) Contamination, inconsistent crosslinking, inconsistent mineralization, bioreactor leakage
 - c) Long-term joint repair benefits, affordable, biocompatible
 - d) Reproducible extractions, hydrogel formation, mineral formation, flow consistency
 - e) Quantitatively validate matrix composition, mineral uniformity, and mechanical integrity

3. List the major Engineering Standards on your design/project
 - a) ASTM F2150, ASTM F2451, ASTM F2900, ISO 13485
 - b) ASTM F2077, ISO 10993, ISO 13485
 - c) ASTM standards for imaging-based evaluations, FDA standards for pre-clinical testing of tissue-engineered devices

4. Explain Ethical, Environmental, or Societal concerns for practical applications of your project.
 - a) Ensure biocompatibility, ethically source biological tissues
 - b) Appropriate disposal of chemicals
 - c) Improve patient mobility, remain safe, accessible

5. Describe Active Teamwork and Leadership in your design group
 - a) Project was divided into subprojects to evenly distribute work
 - b) Workload was distributed to allow parallel progress
 - c) Consistent communication between subprojects to maximize efficiency
 - d) Constructive feedback between projects to guide overall project improvement

6. What were the most significant motivating factors that led you to
 - a) Interest in medical devices and improving patient outcomes
 - b) Separating into subprojects increased sense of responsibility
 - c) Constant troubleshooting and design refinement were necessary

7. What are your most innovative and/or entrepreneurial ideas for this project
 - a) Use a simple double diffusion system to isolate elements and identify specific issues
 - b) Quantitative validation using imaging, colorimetric assay, and mechanical testing