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ABET Addendum

1. List two to four Desired Needs of your project that led to your final design objectives.
    - To track T cells location and migration in response to transplants/T cell associated diseases
    - To increase specificity and uptake towards T cells
    - To reduce ex vivo manipulation to protect functionality of T cells

2. List the major Constraints on your design/project

a) Safety/Regulatory Affairs: Nanoparticle biocompatibility

b) Risks: Limited T cell uptake endocytosis, phagocytosis, and T cell function alteration

c) Global Impact: MRI infrastructure in clinics

d) Manufacturability: SPION production and expense

e) Quality Control/Marketability: Invasive procedure due to injection and clinical benefit over existing methods.

3. List the major Engineering Standards on your design/project
    - Animal welfare requirements. (ISO 10993-2:2022)
    - Specification of characteristics and measurements for magnetic nanosuspensions. (ISO/TS 19807-1:2019)

4. Explain Ethical, Environmental, or Societal concerns for practical applications of your project.
    - Potential patient reaction to iron oxide nanoparticles
    - Expensive treatment due to cost of nanoparticles and access to MRI may limit equitable treatment

5. Describe Active Teamwork and Leadership in your design group

a) collaboration and inclusion of diverse opinions?
    - All team members' opinions were considered and evaluated equally, and all team members collaborated on experiments.

b) delegation of leadership on subprojects?
    - Different team members took on different leadership roles on subprojects based on personal experience and skills that would best fit the responsibilities.

c) establishing and reaching goals and deadlines?
    - Deadlines were set by the team members and mentors and updated as progress continued throughout the project.

d) received or given constructive feedback?
    - Weekly meetings with mentors allowed team members to gain constructive feedback. Team members reviewed each other’s progress that helped align our goals together.

6. What were the most significant motivating factors that led you to

a) acquire new knowledge: Need to understand the procedure and experimental techniques.

b) be self-initiating: To help my team members and mentors in obtaining quality results.

c) persist against challenges and setbacks: The desire to pursue an innovative research topic and present a solution that I am proud of.