

Current Situation	Educational Innovation	Future Situation
<p>A senior capstone design course is the last bridge between a theory-based education and a problem-solving profession.</p> <p>Traditional design courses are open-ended and team-based, but have a number of <u>limitations</u>.</p> <ul style="list-style-type: none"> • Students work with non-clinical professionals. • Project budgets are limited to none with donated project supplies. • Teams are formed and begin the design process in the academic year. • During this process, they learn engineering design without a clinical setting. 	<p>This innovation seeks to achieve the purpose of the National Institutes of Health's Team-Based Design in Biomedical Engineering Education Program. The <u>educational objectives</u> are:</p> <ul style="list-style-type: none"> • Address a critical barrier to progress in the biomedical engineering field • Shift current undergraduate biomedical engineering education paradigms • Teach the process of solving clinically-based problems using engineering designs <p>The <u>learning activities and materials</u> are:</p> <ul style="list-style-type: none"> • A new, 10-week period of clinical immersion and planning over the summer • Project deliverables based on different design phases • Instruction on scientific integrity and ethical principles • Unique multi-institutional environment in a 10-mile radius of the University of Tennessee (UT) <div data-bbox="820 850 1177 1186" style="text-align: center;"> </div>	<p>The desired <u>educational outcomes</u> are for students to have abilities to:</p> <ul style="list-style-type: none"> • Design future biomedical innovations to meet desired needs within realistic constraints • Function on diverse, multidisciplinary teams • Communicate well • Be professionally and ethically responsible • Identify, formulate, and solve engineering design problems • Use techniques, skills, and modern engineering tools necessary for engineering practice
<div data-bbox="45 1144 402 1438" style="text-align: center;"> </div> <p>A gap exists between the education of biomedical engineers and their roles in the engineering workforce.</p> <div data-bbox="45 1648 402 1936" style="text-align: center;"> </div>	<p>Course execution: This innovation program has experiential components of design projects with a balance of challenge, complexity, and required work. Faculty identify potential projects. Students define project preferences and their cognitive modes are used to form optimal teams. Faculty mentor student teams using meetings to report progress, present deliverables, discuss issues, and create action items. Team progress is evaluated through project management, reports, and demonstration of a biomedical innovation prototype.</p> <div data-bbox="925 1207 1193 1480" style="text-align: center;"> </div> <p>Funding: A recent Research Education (R25) Award was granted by the National Institute of Biomedical Imaging and Bioengineering within the National Institutes of Health.</p> <div data-bbox="454 1638 706 1921" style="text-align: center;"> </div>	<div data-bbox="1291 1092 1485 1396" style="text-align: center;"> </div> <p>This innovation will help overcome a critical barrier to progress in scientific knowledge, new graduates' technical capabilities, and future clinical practice in biomedical engineering.</p> <div data-bbox="1218 1638 1567 1921" style="text-align: center;"> </div>

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