BINGHAMTON UNIVERSITY
STATE UNIVERSITY OF NEW YORK

Thomas J. Watson
School of Engineering
and Applied Science

Watson Capstone Projects Program Description

Computer, Electrical, and Mechanical Engineering
2017-2018 Version

Each year approximately 4,000 students graduate from Binghamton University, including 300 engineers from the Thomas J. Watson School of Engineering and Applied Science. These engineers are the product of a rigorous education in engineering fundamentals and engineering practice and are highly sought by U.S. Industry.

The Watson School's undergraduate program is unique in that students are admitted to a common freshman engineering program where they develop an informed understanding of the types of engineering before selecting a major. Throughout the remainder of their undergraduate education, culminating in a capstone multi-disciplinary senior design experience, students will develop specialization in an engineering discipline while attending one of the premier colleges in the United States.

The senior design project course is one of the most important courses in the four-year curriculum. Students work beyond the traditional classroom setting to apply technical knowledge to actual engineering problems. Teams are graded on their requirements analyses, feasibility studies, financial analyses, system designs, engineering drawings, prototype hardware, computer programs, presentations, demonstrations, and reports. The experience helps students bridge the gap between their academic and professional careers by exposing them to realistic design processes, teamwork, and expectations of practicing engineers.

Watson Capstone Projects, which we have the honor of directing, is a joint effort of our Electrical and Computer Engineering (ECE) and Mechanical (ME) engineering programs. Combined projects are encouraged but not required. Project teams typically consist of three to five seniors, with a variety of our Computer, Electrical, and Mechanical Engineering students as appropriate. Occasionally, Biomedical Engineering, Industrial Systems Engineering, General Engineering Minor, and Computer Systems students also participate in our projects.

The project teams perform requirements definition, conceptual and detailed design, and modeling, simulation, and risk-abatement prototyping during the fall semester, and building, integration, and testing during the spring semester. This allows for a wider range of projects and a more complete requirements/design/prototype/test cycle.

Industry-based design projects are essential as they provide engineering students with the opportunity to apply their technical knowledge to actual engineering problems. These projects have been increasingly successful, and provide real value to the sponsoring companies by supplying students that can provide direct project engineering effort. Student teams may also generate a variety of ideas with possible applicability far beyond the project's scope. And finally, these projects will provide the opportunity for project management experience for your junior

staff engineers. Of course, the fact that you will also have the opportunity to work closely with tomorrow's engineers is its own benefit.

The ideal project is the design of a product or process that involves technical analysis, financial justification, and physical prototyping. Projects need to have a strong design component with clear, well-defined objectives. The required project work must be sufficiently short term so that it may be completed within two semesters (30 weeks).

Non-profit organizations are often the recipients and venues for industry-sponsored projects. You may already have established relationships with such organizations, or have projects in mind that would benefit a worthy cause. Please contact us about such projects if you need any assistance. We have excellent contacts among such local organizations and can help you find a mutually beneficial arrangement.

Projects will be undertaken for a sponsorship fee of $2,000 each ($1,000 for nonprofit and Watson School-affiliated small business sponsors), payable during the fall semester. This fee is used to cover the costs of unsponsored student- and faculty-initiated projects. It is also expected that the sponsor will pay for any materials needed in project development. (Lab equipment, on the other hand, is rarely an issue as the university provides the students with a wide range of equipment). Sponsors should work closely with their teams to develop budgets early in the fall semester and to clearly identify funding responsibilities.

The University and Watson Capstone Project course instructors will take reasonable precautions to keep a corporate partner's information confidential and not divulge it to third parties unless required by law or legal process. Although the final product will be delivered to the sponsor (or if applicable, their nonprofit client), the students' work on all projects will be placed in the public domain.

The Watson Capstone Projects program enhances the Watson School's relationship with industry. While the engineering seniors at Binghamton have been increasingly successful at producing fully working prototype systems over the past few years, sponsors should bear in mind that these projects are not meant to be consulting projects. The University and Watson Capstone Projects course instructors cannot guarantee the success of any particular project, and thus sponsors should not necessarily expect to receive a fully working deliverable from each team every year. The goal is to provide engineering students with real life experiences, while allowing local companies to develop working relationships with potential future employees.

Please review the *Watson Capstone Projects Master Statement of Work* document and the *Watson Capstone Projects Project Proposal Form (*both available online at WCP.Binghamton.edu). The project proposal form should be completed and submitted by July 15th for full consideration; please email us if you need an extension. Our goal is to identify projects that will challenge the skills of our students but can be completed successfully thanks to their academic experiences. You will be sent a confirmation email once your proposal has been received, and will be contacted in late August regarding the final project selections and team assignments. Should your project be selected, initial meetings with your project team will commence promptly in the fall semester.

Thank you for your consideration of our students and their preparation for careers in engineering.

Best Regards,
Jack Maynard and Colin Selleck

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