Instructor:
Dr. Shani Ross
- E-mail: sross20@gmu.edu
- Office: 431 Research Hall
- Office hours: Mondays, Wednesdays 12:00 - 1:00 pm or by appointment
- Office telephone: 703-993-5934

Lectures:
- Friday: 11:00 am - 12:50 pm, Art and Design Building L008

Important Notes and Dates:
- Final Presentations: Friday, Dec 1st 10 am – 12 pm, RSCH 163
- Final Demonstrations: Friday, Dec 8th, 10 am – 12 pm, RSCH 163
- Final Report Due: Friday, Dec 15th, on Blackboard
- Holidays: Sept 4th (Labor Day), Nov 22nd – 26th (Thanksgiving)

Required Textbooks:
- None

Course Description:
Implementation of project for which preliminary work was done in BENG 492. Projects include designing and constructing hardware, writing required software, conducting experiments or studies, and testing complete system. This requires oral and written reports during the project period and at completion. (University catalog)

Prerequisites:
- Senior standing, 90 credits applicable to Bioengineering, and COMM 100/101
- BENG 492, preferably in the preceding semester.

Requirement or Elective:
- This course is required and is a capstone design experience for bioengineering students.

Course Objectives:
- Students will be able to build system components (hardware and software) and integrate them into an operational system.
- Students will be able to evaluate system performance through testing, results analysis, and comparison against requirements.
- Students will understand multi-disciplinary aspects of their projects.
Students will be able to work on a team, organize their team, and assume different roles. Students will gain familiarity with engineering practice in writing progress reports, a final report, and giving oral presentations.

Course Topics (in addition to the BENG 492 course topics):
- Project management
- Testing and test cases
- Analysis and representation of results
- Dissemination of findings
- In-progress review
- Final report preparation
- Final presentation

Students Outcomes:
- Students will be able to design a system, component or process to meet desired needs. They will develop a satisfactory solution to stated problem, apply engineering and/or scientific principles in solving this problem, and will be able to use acquired knowledge in identifying and designing system components (“outcome c”).
- Students will function on a multi-disciplinary team. They will be able to organize the team effectively and engage in meaningful participation by team members of different knowledge and skills, and respect and recognize others. Students will be able to carry projects involving multi-disciplinary aspects (“outcomes d and f”).
- Students will be able to identify and solve engineering problems. They will formulate a problem and identify technical issues and non-technical aspects contributing to a problem solution. They will be able to analyze a problem, decompose it, and understand how the various pieces of the problem relate to each other. They will be able to evaluate their design and the success of the project based on experimental data/results (“outcome e”).
- Students will communicate effectively both orally and in writing (“outcome g”).
- Students will be able to integrate information to benefit the society (“outcome k”).

RS Student Learning Outcomes:

Scholarly Inquiries
- Apply appropriate scholarly conventions during scholarly inquiry (“inquiry 3c”)
- Assess the validity of key assumptions and evidence (“inquiry 4a”)
- Situate the scholarly inquiry within a broader context (“inquiry 4b”)

Scholarly Rubrics for Research and Scholarships Courses
- Justify that the project intends to be engaging and novel to a particular audience
- Take responsibility for executing the project
- Present their understandings from a scholarly perspective for a specific audience
- Demonstrate awareness of broader implications
Assignments, Reports, Examinations, and Grading:

Assignments:
- There will be a few homework assignments. These consist of questions and exercises which are intended to assist the student in mastering the course content. Most of these assignments will be collected and graded.
- The website will also be graded as an assignment so ensure it is maintained throughout the semester.
- A severe penalty will be given to any individual assignment which indicates collusion or cheating. The usual penalty for cheating is failure in the course.

Progress Reports:
- There will be one progress report and one final report, which document your ongoing project and final project, respectively. Both reports will be collected and graded. The final report will be in the form of a scientific paper – IEEE format.

Exams: None

Projects:
- This class is the second part of your senior design project based on a team of 3-5 students.
- All teams must have the same team members as BENG 492.
- Each group will give a progress presentation (15 minutes).
- Each group will give a final presentation (20 minutes).
- Each group will give a demonstration of their final design
- Each group will submit a progress report and final report (see “Progress Reports” above)
- Every project must be completed, working, and turned in. For each project that is not, the final grade in the course may be lowered.

Meeting with Advisor:
- A weekly meeting with each group’s respective advisor(s) is mandatory.
- Each meeting will comprise the presentation of a few slides summarizing the weekly progress of the project.

Make-up policy:
- Students will NOT be allowed to make up assignments or presentations. If there is a medical emergency, the student should contact their instructor and group members (if applicable) as soon as possible.
Late Submission Policy:
- All assignments will be submitted via Blackboard by their due date. Any assignments turned in after the submission deadline will be graded as late.
- The penalty for late assignments is a **10% reduction for each day (or part thereof) following the due date.** (This late policy will apply to all assignments for which no application for extension has been made).

Grading Structure:
- The final grade will be based on:

<table>
<thead>
<tr>
<th>Attendance and Participation</th>
<th>5%</th>
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</thead>
<tbody>
<tr>
<td>Contribution to the project</td>
<td>15%</td>
</tr>
<tr>
<td>Assignments</td>
<td>10%</td>
</tr>
<tr>
<td>Report(s)</td>
<td>20%</td>
</tr>
<tr>
<td>Presentations(s)</td>
<td>25%</td>
</tr>
<tr>
<td>Dissemination</td>
<td>5%</td>
</tr>
<tr>
<td>Quality of final design</td>
<td>20%</td>
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</tbody>
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Note: Mentor’s feedback will also be taken into consideration in final grade.

- Letter grades will be based on a 10 point scale ([90, 100] = A, [80, 90) = B, ...). The grading scale for this course is:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>97-100%</td>
<td>A +</td>
</tr>
<tr>
<td>93-97%</td>
<td>A</td>
</tr>
<tr>
<td>90-93%</td>
<td>A -</td>
</tr>
<tr>
<td>87-90%</td>
<td>B +</td>
</tr>
<tr>
<td>83-87%</td>
<td>B</td>
</tr>
<tr>
<td>80-83%</td>
<td>B -</td>
</tr>
<tr>
<td>77-80%</td>
<td>C +</td>
</tr>
<tr>
<td>73-77%</td>
<td>C</td>
</tr>
<tr>
<td>70-73%</td>
<td>C - *</td>
</tr>
<tr>
<td>60-70%</td>
<td>D *</td>
</tr>
<tr>
<td>0-60%</td>
<td>Failing *</td>
</tr>
</tbody>
</table>

* Grades of "C-" and "D" in this course are considered unsatisfactory. According to departmental policy, no C- or D in ECE, BENG, BIOL, CS or ENGR courses can be submitted for the degree in Bioengineering. You will need to repeat the course if you obtain a grade of C- or lower.
Attendance and Class Participation:

Students are expected to attend and actively participate in class, team, and mentor meetings, and on the project. Failure to attend and participate without an approved reason for absence will lower your final grade:

<table>
<thead>
<tr>
<th>100 points</th>
<th>80 points</th>
<th>60 points</th>
<th>40 points</th>
<th>20 points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never misses classes</td>
<td>Rarely misses classes</td>
<td>Sometimes misses classes</td>
<td>Absent for most classes</td>
<td>Rarely attends classes</td>
</tr>
<tr>
<td>Never misses meetings</td>
<td>Rarely misses meetings</td>
<td>Sometimes misses meetings</td>
<td>Absent for most meetings</td>
<td>Rarely attends meetings</td>
</tr>
<tr>
<td>Actively contributes to the project</td>
<td>Semi-actively contributes to the project</td>
<td>Sometimes contributes to the project</td>
<td>Rarely contributes to the project</td>
<td>Never contributes to the project</td>
</tr>
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Note: the instructor reserves the right to make any changes in the course she determines academically advisable. Changes will be announced in class and updated in the syllabus and class outline (where appropriate). It is your responsibility to keep up with any changed policies.

Email policy:

- I can also be reached via email (sross20@gmu.edu). In your email: put “BENG 493” in the subject line. This will allow me to better filter your emails and respond faster to your request.
- In general, I will respond to emails between 9 am and 11:59 pm, daily. Please allow up to 24 hrs for a response. If I do not respond within 48 hours, please resend your email. If you email after 8 pm on Friday, please do not expect a response until Sunday. Also keep in mind that it will be most reliable to send e-mails from your MasonLive account as some e-mail servers may be filtered into the spam folder.
- I can answer quick, brief questions about the course material via email, but questions that may require a lengthy or complex response will be better addressed in-person (either during/after class, or office hours). Also, remember that the answer to your question may already be in the syllabus, class outline, or announced in class or on Blackboard, so check those first.
Additional policies and resources for students:

- Students should get approval from their mentors before presenting their project at any external event.
- Students must adhere to the guidelines of the George Mason University Honor Code [See http://oai.gmu.edu/the-mason-honor-code-2/].
- Students must follow the university policy for Responsible Use of Computing [See http://universitypolicy.gmu.edu/all-policies/].
- Students are responsible for the content of university communications sent to their George Mason University email account and are required to activate their account and check it regularly. All communication from the university, college, school, and program will be sent to students solely through their Mason email account.
- The George Mason University Counseling and Psychological Services (CAPS) staff consists of professional counseling and clinical psychologists, social workers, and counselors who offer a wide range of services (e.g., individual and group counseling, workshops and outreach programs) to enhance students’ personal experience and academic performance [See http://caps.gmu.edu/].
- If you require any special accommodations due to religious practices, learning or other disabilities, medical needs, physical requirements, athletic requirements or other, please inform me in writing within the first three weeks of the semester. Students with disabilities who seek accommodations in a course must also be registered with the George Mason University Office of Disability Services (ODS). [See http://ods.gmu.edu/].
- Students must follow the university policy stating that all sound emitting devices shall be turned off during class unless otherwise authorized by the instructor. The George Mason University Writing Center staff provides a variety of resources and services (e.g., tutoring, workshops, writing guides, handbooks) intended to support students as they work to construct and share knowledge through writing [See http://writingcenter.gmu.edu/].

Professional Dispositions:
- Students are expected to exhibit professional behaviors and dispositions at all times. Students engaged in disruptive behavior will be given a warning and then will be asked to leave if the behavior continues, as this negatively affects other students.

Core Values Commitment:
- The College of Education & Human Development is committed to collaboration, ethical leadership, innovation, research--based practice, and social justice. Students are expected to adhere to these principles. [See http://cehd.gmu.edu/values/].

WAVES: Wellness, Alcohol and Violence Education and Services:
WAVES promotes wellness within the Mason community through health education, alcohol/drug assessment and education, and violence awareness, prevention and sexual assault response. We help students make healthy, safe choices and encourage lifelong, thoughtful healthy decision-making through individualized support, creative programming, and evidence-based education and outreach.

WAVES office 703-993-3686
SUB I, Suite 3200
24-Hour Sexual and Intimate Partner Violence Crisis Line 703-380-1434  
waves.gmu.edu  

- 703-360-7273 (Fairfax County Office for Women and Domestic and Sexual Violence Services 25 hotline)  
- 703-237-0881 (Arlington County Domestic Violence Services Hotline)  
- 703-368-4141 (Prince William County Sexual Assault Victims Advocacy Services (SAVAS) hotline)  
- 1-800-838-8238 (Virginia Family Violence and Sexual Assault Hotline)  
- 1-800-656-HOPE (Rape, Abuse and Incest National Network)  

https://ohl.rainn.org/online/  

CAPS: Counseling and Psychological Services:  
Counseling and Psychological Services (CAPS) provides a wide range of free confidential services to students, faculty, and staff. Services are provided by a staff of professional clinical psychologists, social workers, counselors, learning specialists, and psychiatric providers. CAPS individual and group counseling, workshops, and outreach programs are designed to enhance students’ personal experience and academic performance.  
Visit us at caps.gmu.edu for additional resources.  
- For consultation or emergency assistance during office hours call 703-993-2380.  
- For assistance during non-office hours, call University Police at 703-993-2810.  
- 703-527-4077 (CrisisLink)  
- 1-800-273-8255 (National Suicide Prevention Lifeline)  
- 1-877-838-2838 (Veterans' Crisis Hotline)  

Student Health Services (SHS) — Provides confidential health care to enrolled students in emergency and non-emergency circumstances on the Fairfax, Arlington and Prince William campuses. If there is a medical emergency and Student Health Services (SHS) is closed, please contact the free after-hours nurse (703-993-2831), a hospital emergency room, an urgent care facility, or call 911.  

SUB 1, Suite 2300  
703-993-2831  

University Police:  
Emergency: 911  
Non-Emergency: (703) 993-2810  
Reporting a Crime (Crime Solvers Anonymous Tip Hot-Line): (703) 993-4111  
Mason Police Website: http://police.gmu.edu/  
Carl Rowan, Chief of Police  
Phone: (703) 993-3840  
E-mail: crowan2@gmu.edu