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 Phone Number: 703-993-5934

Teaching Assistant: Matthew Bird
Email address: mbird2@masonlive.gmu.edu
Office hours and location: Tuesdays 2:30 - 4:30 pm in ENGR 3303

Lecture (Sec 001): Monday and Wednesday: 10:30 am - 11:45 am, Robinson Hall A412
Recitation (Sec 301): Tuesday: 12:00 - 12:50 pm, ENGR 5358
Recitation (Sec 302): Tuesday: 1:30 - 2:20 pm, ENGR 5358

Important Notes and Dates:
  - Final Exam: Dec 13th – 10:30 am - 1:15 pm
  - Holidays: Sept 4th (Labor Day), Nov 22nd – 26th (Thanksgiving)
  - Reading Days: Dec 11th and 12th

Textbook: Biomedical Engineering: Bridging Medicine and Technology by W. Mark Saltzman, Cambridge University Press, c. 2015. (Book is also on reserve at the Gateway Library in the Johnson Center.)

Required software: Matlab

Course Description:
Surveys the field of bioengineering and the global impact of technology innovation in solving problems in biology and medicine with an emphasis on engineering tools and concepts. Introduces mathematical modeling and analysis of bioengineering problems through the use of standard software packages for simulation. Other topics include: prototyping and design, ethics and regulatory affairs, and history and career paths in Bioengineering. (University catalog)

Prerequisites: None

Requirement or Elective:
While this class may be open to all interested University students, it is a core class for the bioengineering major or associated majors.
Course Objectives:
- To survey and familiarize students with the many facets of bioengineering
- To discuss the breadth of activities and career paths in bioengineering.
- To explore biological systems with an emphasis on quantitative and engineering tools and concepts
- To illustrate the impact of bioengineering on biological research, health care, and medicine, through devices, diagnostic tools, and methods.
- To allow students to develop skills in using computational tools and engineering design to solve bioengineering problems.

Student Learning Outcomes: Upon completion of this course, students will:
- Be able to identify various career paths and activities in the bioengineering and related fields.
- Be able to identify different types of research done in the department and in the field in general.
- Be able to give examples of the impact of bioengineering on biological research, health care, and medicine.
- Demonstrate a basic understanding of Matlab programming including writing and executing Matlab functions and scripts.
- Be able to apply various design and computational tools to solve a bioengineering problem.
- Comprehend the importance of ethics and proper research conduct in engineering and be aware of some of the ethical issues surrounding their chosen field of study.
- Demonstrate teamwork, oral, and written communication skills.

Course Topics:
Classroom and practical experiences will be delivered via lectures and recitations that focus on: biological systems, medical imaging, biomechanics, biomaterials, neuroengineering, nanotechnology, and medical devices (e.g. 3D printing, prototyping).

Assignments and Examinations:
- Quizzes: There will some in-class quizzes.
- Matlab Assignments: There will be at least four Matlab assignments that should be completed and turned in at the end of recitation to receive credit (unless otherwise indicated).
- In-class Activities: There will be at least three in-class activities that should be turned in at the end of the recitation to receive credit.
- Team Project: There will be one team project.
- Exams: There will be one midterm and one final exam.
**Grading Structure:**
- The final grade will be based on:

<table>
<thead>
<tr>
<th>BENG 101</th>
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<tbody>
<tr>
<td>Quizzes</td>
<td>10%</td>
</tr>
<tr>
<td>Attendance</td>
<td>5%</td>
</tr>
<tr>
<td>Matlab Assignments</td>
<td>20%</td>
</tr>
<tr>
<td>In-class Activities</td>
<td>10%</td>
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<tr>
<td>Midterm Exam</td>
<td>20%</td>
</tr>
<tr>
<td>Team Project</td>
<td>15%</td>
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<tr>
<td>Final Exam</td>
<td>20%</td>
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</tbody>
</table>

- 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>Percentage</th>
<th>Grade</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>
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* 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.

**Extra Credit opportunities:**
Extra credit will only be considered after final grades are calculated based on attendance or participation to the following:

- Presentations of bioengineering senior design projects
- Bioengineering seminars hosted by George Mason University, a nearby University bioengineering program or regional association.

Only those students whose final grade falls within 1% point of a grade transition (for example, 82, or a B-minus) will be considered eligible for extra credit only to help assist them to the next higher grade level (83 or B).
All extra credit opportunities must be performed before Dec 9th. Each person must declare one of these extra credit opportunities in advance that will be considered after final grades are calculated. Proof attendance/participation of the seminars/ senior design presentations must be demonstrated by signing the attendance form that will be at the seminars and senior design presentations.

Attendance:

- Students are expected to attend and participate in lecture and recitations. In particular, many assignments will be done in the recitation and turned in at the end to receive credit. Failure to attend either lectures or recitations will lower your final grade.
- If you are unable to attend class due to medical reasons or GMU-sanctioned travel/activity please let me know beforehand. If it is a medical emergency, please let me know asap.

<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 recitations</td>
<td>Misses 1 recitation</td>
<td>Misses 2 recitations</td>
<td>Misses 3 recitations</td>
<td>Misses 4 recitations</td>
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Policies:

- Students will NOT be allowed to make up activities, assignments or examinations. Exceptions might be made on a case-by-case basis only under extenuating circumstances, with prior approval from the instructor. If it is a medical emergency, contact me asap explaining what has happened.

- All formal assignments are to be treated as individual and not collective efforts, unless specified otherwise. A severe penalty will be given to any assignment which indicates collusion or cheating. The usual penalty for cheating is failure in the course.

- Every assignment must be completed, working, and turned in. For each assignment that is not, the final grade in the course will be lowered.

Late Policy:

- All assignments will be submitted via blackboard by the submission deadline. 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. However, once a homework assignment is discussed in class or the solution is posted, submissions will no longer be accepted. (This late policy will apply to all assignments for which no application for extension has been made).
Email Policy:

- I can also be reached via email (sross20@gmu.edu). In your email: **put “BENG 101” 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.

**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.

Additional policies and resources for students:

- 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 practices, 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

o 703-360-7273 (Fairfax County Office for Women and Domestic and Sexual Violence Services 25 hotline)
o 703-237-0881 (Arlington County Domestic Violence Services Hotline)
o 703-368-4141 (Prince William County Sexual Assault Victims Advocacy Services (SAVAS) hotline)
o 1-800-838-8238 (Virginia Family Violence and Sexual Assault Hotline)
o 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.
o For consultation or emergency assistance during office hours call 703-993-2380.
o For assistance during non-office hours, call University Police at 703-993-2810.
o 703-527-4077 (CrisisLink)
o 1-800-273-8255 (National Suicide Prevention Lifeline)
o 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