EECE 503 – Mathematical Methods in EECE (Fall 2015)
T/R 4 – 5:30 pm Whitaker 216

A. Instructor: Dr. J. Brennan (jbrennan@wustl.edu, 935-9447)
   Office: Brauer Hall, 3018B
   Office Hrs. M, F (Time TBD) or by appointment

   TA: Siyuan An (ansiyuan@wustl.edu)
   Office: Brauer Hall, 1039
   Office Hrs. W 12-2 pm or by appointment

B. Catalog Description: The course will introduce students to mathematical principles
   essential for graduate study in any engineering discipline. Applied mathematical concepts
   will be demonstrated by applications to various areas in energy, environmental, biomedical,
   chemical, mechanical, aerospace, electrical, and civil engineering.

C. Prerequisites: Equivalent of one semester each of differential equations and matrix algebra

D. Course Webpage: Course materials and grades will be posted in the course page on
   Blackboard Learn (bb.wustl.edu)


F. Course Objectives
   Develop a strong understanding of equation solving and mathematical analysis methods
   that will serve as a basis for graduate coursework and for modeling and theory
   development during graduate study.

G. Course Topic List
   Chapters indicate recommended reading in Greenberg. Items in italics will not be explicitly
   covered in class.
   - ODEs (Chs 1-2)
   - Systems of equations (Ch 8)
   - Vectors (Ch 9)
   - Matrices (Ch 10)
   - Higher-order ODEs (Ch 3)
   - Power series solutions (Ch 4)
   - Laplace transforms (Ch 5)
   - Numerical solutions (Ch 6)
   - Phase planes (Ch 7)
   - Eigenvalue problems (Ch 11)
   - Vectors in 3-space (Ch 14)
   - Scalar and vector fields (Ch 16)
   - Fourier series (Ch 17)
   - Diffusion eqn (Ch 18)
   - Laplace eqn (Ch 20)
   - 1st order PDEs
   - Complex variable theory (if time)

   Course topics and schedule are subject to change.

H. Assessment of Course Outcomes: Homework and Exams
I. **Homework Grading**
Homework will be graded on the basis of 10 points per problem. A problem worked perfectly or with 1 or 2 minor errors will get 10 points. A problem with more than 2 minor errors but no major (logic) errors will get 7.5 points. A problem with 1 major error or more than 3 minor errors will get 5 points. A problem with more than 1 major error will get 2.5 points. A problem with no credible effort will get zero points.

J. **Late Homework**
Homework is due to me before lecture begins on the assigned day (generally every Thursday). If you are late to class or miss class due to an unexcused absence, your homework is late. Late homework will be graded with a maximum grade of 50% of the possible total and will be accepted no more than two days past the due date. Only two late homework assignments will be accepted for grading.

K. **Exams**
Prior to each exam, the class as a whole will be responsible for constructing a set of relevant equations which will be supplied to you during exams. The equation sheet may take up one or more pages and should not contain solved problems. The final equation sheet(s) (one version for the entire class) should be provided to me **at least one class period (or at least 48 hours) before the exam.** I will not edit or correct the sheet(s) in any way except to remove any inappropriate material (e.g., solved example problems).

No other materials (textbooks, notes, etc.) will be permitted during exams. This means that during the exam, all you will be allowed to have on your desk is the exam itself, the equation sheets I provide, the paper on which you are writing solutions, and something with which to write. For the final exam, all previous equation sheets will be provided. All electronic devices are forbidden, including calculators, cell phones, and pagers. These must be turned off and may not be removed from your backpack/bag at any time during the exam. Anyone caught with other materials in their possession during an exam will be assumed to be cheating.

If you miss an exam for any reason other than a medical emergency or any other excused absence (emergency in immediate family, etc.), you will not be permitted to make up the exam. Documentation of the reason for your absence will be required.

**Exam Dates**
- Exam 1: 9/24 (R), in class
- Exam 2: 10/20 (T), in class
- Exam 3: 11/17 (T), in class
- Final Exam: 12/16 (W), 6-8 pm, location TBD
L. Grading and Regrades

**Contribution of assessments:**

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>20%</td>
</tr>
<tr>
<td>Exams (3)</td>
<td>20% (each)</td>
</tr>
<tr>
<td>Final Exam</td>
<td>20%</td>
</tr>
</tbody>
</table>

**Grading scale**

- A: $\geq 85\%$
- B: 75 – 85\%
- C: 65 – 75\%
- D: 55 – 65\%
- F: below 55\%

If I feel an exam or homework was too difficult, I may scale everyone upwards (i.e., add points to everyone’s final score). There is no preset distribution of final grades. **If >85% of the class completes the end-of-semester evaluation, I will award a 2% bonus to everyone’s grade.**

**Regrades must be submitted within one week after the exam or homework has been returned. After this time, I will not discuss any regrades.** If you believe work was graded incorrectly, resubmit the entire original work to me (i.e., the complete original homework or exam), including a separate sheet of paper on which you have a written description of the error. I will not negotiate your grade on any problem in a face-to-face discussion. Whenever you submit work for regrade, I will review the issue extremely carefully and correct any mistakes made. Please do not submit any regrades until after you have compared your work to the posted solution. Also, please note that if you resubmit work for a regrade, I will regrade the entire document (not just the problem of concern).

M. Academic Integrity

Effective learning, teaching, and research all depend on the ability of members of the academic community to trust one another and to trust the integrity of work that is submitted for academic credit or conducted in the wider arena of scholarly research. Such an atmosphere of mutual trust fosters the free exchange of ideas and enables all members of the community to achieve their highest potential.

In all academic work, the ideas and contributions of others must be appropriately acknowledged, and work that is presented as original must, in fact, be original. Faculty, students, and administrative staff all share the responsibility of ensuring the honesty and fairness of the intellectual environment at Washington University.

For more information, visit [https://engineering.wustl.edu/current-students/student-services/Pages/academic-integrity-policy.aspx](https://engineering.wustl.edu/current-students/student-services/Pages/academic-integrity-policy.aspx).

N. Academic Accommodations

Any accommodations for students with special needs must be initiated via the Accommodation Request Form submitted to the Disability Services Office. In addition, please notify me of any necessary accommodations during the first week of class.

O. Conduct

As a graduate student, you are expected to behave with professionalism and integrity both in and out of class. As such, please arrive to class on time. If you arrive late, please enter with minimal disruption to the class. While in class, you are expected to engage in all class activities and
exhibit consideration and respect towards other students, the TAs, and myself. If you need to miss class for any reason, please notify me in advance.

**P. Accommodations based upon sexual assault:**
The University is committed to offering reasonable academic accommodations to students who are victims of sexual assault. Students are eligible for accommodation regardless of whether they seek criminal or disciplinary action. Depending on the specific nature of the allegation, such measures may include but are not limited to: implementation of a no-contact order, course/classroom assignment changes, and other academic support services and accommodations. If you need to request such accommodations, please direct your request to Kim Webb (kim_webb@wustl.edu), Director of the Relationship and Sexual Violence Prevention Center. Ms. Webb is a confidential resource; however, requests for accommodations will be shared with the appropriate University administration and faculty. The University will maintain as confidential any accommodations or protective measures provided to an individual student so long as it does not impair the ability to provide such measures.

If a student comes to me to discuss or disclose an instance of sexual assault, sex discrimination, sexual harassment, dating violence, domestic violence or stalking, or if I otherwise observe or become aware of such an allegation, I will keep the information as private as I can, but as a faculty member of Washington University, I am required to immediately report it to my Department Chair or Dean or directly to Ms. Jessica Kennedy, the University’s Title IX Coordinator. If you would like to speak with the Title IX Coordinator directly, Ms. Kennedy can be reached at (314) 935-3118, jwkennedy@wustl.edu, or by visiting her office in the Women’s Building. Additionally, you can report incidents or complaints to Tamara King, Associate Dean for Students and Director of Student Conduct, or by contacting WUPD at (314) 935-5555 or your local law enforcement agency.

You can also speak confidentially and learn more about available resources at the Relationship and Sexual Violence Prevention Center by calling (314) 935-8761 or visiting the 4th floor of Seigle Hall.

**Q. Bias Reporting:**
The University has a process through which students, faculty, staff and community members who have experienced or witnessed incidents of bias, prejudice or discrimination against a student can report their experiences to the University’s Bias Report and Support System (BRSS) team. See: brss.wustl.edu

**R. Mental Health:**
Mental Health Services’ professional staff members work with students to resolve personal and interpersonal difficulties, many of which can affect the academic experience. These include conflicts with or worry about friends or family, concerns about eating or drinking patterns, and feelings of anxiety and depression. See: shs.wustl.edu/MentalHealth