

AME 526: Introduction to mathematical methods in engineering II (4 units)

Spring 2021

Instructor: Prof. Niema M. Pahlevan

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Office hours (via zoom): M 2:30-4:30; or by appointment.

Phone for office hours call: 747-221-6266

Lecture hours: MW 5:00-6:50, Online (Zoom)

Midterm Exam: March 1st 2021

Final Exam: For the date and time of the final for this class, consult the USC Schedule of Classes at <https://classes.usc.edu/term-20211/finals/>

TA: TBD

TA Office Hours: TBD

The course will cover elementary applied mathematical methods for solving partial differential equations that arise in engineering. This course has two major goals: (1) enhance student's ability to perform more complex mathematical analyses of engineering problems; (2) improve students' understanding of how mathematical applications are defined, derived and related. There are 11 parts to the course:

- Review and introductory concepts
- Sturm-Liouville theory
- Method of separation of variables
- Diffusion equation
- Laplace's equation
- Linear wave equation
- Laplace transform method
- Fourier methods
- Helmholtz equation
- Method of characteristics
- Introduction to Green's functions
- The method of images
- Special topics

Textbook:

Applied Partial Differential Equations 5th Ed., R. Haberman

Other recommended books:

- 1- Myint-U, Tyn, and Lokenath Debnath. "*Linear Partial Differential Equations for Scientists and Engineers 4th Edition.*" (2006).
- 2- Debnath, Lokenath. *Nonlinear partial differential equations for scientists and engineers.* Springer Science & Business Media, 2011.
- 3- Duffy, Dean G. *Green's functions with applications.* CRC Press (2015).
- 4- Kreyszig, Erwin. *Advanced engineering mathematics 10th Edition.* John Wiley & Sons, 2011.

Grading: Homework 20+5%; Midterm 40%; Final 40% (Total: %100+%5 bonus)

Curved grading will be applied

No late homework will be accepted.

Your lowest HW grade will be dropped.

Important policies (please adhere):

- Final grade will depend entirely on the performance on the above components, and be independent of the financial support requirements (e.g., minimum grade requirement for tuition reimbursement).
- Please schedule your work-related travel during time periods outside of the mid-term and final exams. Accommodation to take exams on different dates will be made for only family emergencies and documented illness or health-related emergencies. Other exceptions will be considered on a case-by-case basis.

Statement on Academic Conduct and Support Systems

Academic Conduct:

Plagiarism – presenting someone else's ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Part B, Section 11, "Behavior Violating University Standards" policy.usc.edu/scampus-part-b. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct>.

Support Systems:

Student Counseling Services (SCS) – (213) 740-7711 – 24/7 on call

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention. engemannshc.usc.edu/counseling

National Suicide Prevention Lifeline – 1 (800) 273-8255

Provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week. www.suicidepreventionlifeline.org

Relationship and Sexual Violence Prevention Services (RSVP) – (213) 740-4900 – 24/7 on call

Free and confidential therapy services, workshops, and training for situations related to gender-based harm. engemannshc.usc.edu/rsvp

Sexual Assault Resource Center

For more information about how to get help or help a survivor, rights, reporting options, and additional resources, visit the website: sarc.usc.edu

Office of Equity and Diversity (OED)/Title IX Compliance – (213) 740-5086

Works with faculty, staff, visitors, applicants, and students around issues of protected class. equity.usc.edu

Bias Assessment Response and Support

Incidents of bias, hate crimes and microaggressions need to be reported allowing for appropriate investigation and response. studentaffairs.usc.edu/bias-assessment-response-support

The Office of Disability Services and Programs

Provides certification for students with disabilities and helps arrange relevant accommodations. dsp.usc.edu

Student Support and Advocacy – (213) 821-4710

Assists students and families in resolving complex issues adversely affecting their success as a student EX: personal, financial, and academic. studentaffairs.usc.edu/ssa

Diversity at USC

Information on events, programs and training, the Diversity Task Force (including representatives for each school), chronology, participation, and various resources for students. diversity.usc.edu

USC Emergency Information

Provides safety and other updates, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible. emergency.usc.edu

USC Department of Public Safety – UPC: (213) 740-4321 – HSC: (323) 442-1000 – 24-hour emergency or to report a crime.

Provides overall safety to USC community. dps.usc.edu