

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

Spring 2022

Instructor: Prof. Niema M. Pahlevan

Office: 470 Michelson Bldg.

Email: pahlevan@usc.edu

Lecture hours: MW 5:00-6:50, RTH105

Office hours: M 2:30-4:30; or by appointment.

Zoom link for office hours:

<https://usc.zoom.us/j/97578810855?pwd=S05CbHdjR3doZEprMDcxT3dWb2I2QT09>

Meeting ID: 975 7881 0855

Passcode: will be given in the class

Midterm Exam: February 28th 2022

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-20221/finals/>

TA: Coskun Bilgi (bilgi@usc.edu)

TA Office Hours: Tuesday (5:00-6:00 PM) and Friday (1:00-2:00 PM)

Zoom link for TA office hours:

<https://usc.zoom.us/j/97940710805?pwd=aWlzSjFuQmpXbU9pV1VoSkJmd1ZrZz09>

Meeting ID: 979 4071 0805

Passcode: will be given in the class

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"

<https://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:

Counseling and Mental Health - (213) 740-9355 – 24/7 on call

<https://studenthealth.usc.edu/counseling/>

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

National Suicide Prevention Lifeline - 1 (800) 273-8255 - 24/7 on call

<http://www.suicidepreventionlifeline.org>

Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-9355(WELL), press "0" after hours - 24/7 on call

<https://studenthealth.usc.edu/sexual-assault/>

Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office of Equity and Diversity (OED) - (213) 740-5086/Title IX - (213) 821-8298

<https://equity.usc.edu/>, <http://titleix.usc.edu/>

Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

Reporting Incidents of Bias or Harassment - (213) 740-5086 or (213) 821-8298

https://usc-advocate.symplicity.com/care_report/

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office of Equity and Diversity | Title IX for appropriate investigation, supportive measures, and response.

The Office of Disability Services and Programs - (213) 740-0776

<http://dsp.usc.edu>

Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

USC Campus Support and Intervention - (213) 821-4710

<https://uscса.usc.edu/>

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity at USC - (213) 740-2101

<https://diversity.usc.edu/>

Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call

<http://dps.usc.edu/>, <http://emergency.usc.edu>

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-1200 – 24/7 on call

<http://dps.usc.edu>

Non-emergency assistance or information.