# CE 526  Engineering Mathematical Methods  29741D, 29742D (3 units)

2019Fall Semester — Course Syllabus

<table>
<thead>
<tr>
<th>Professor</th>
<th>Vincent Lee, <a href="mailto:vlee@usc.edu">vlee@usc.edu</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>Office</td>
<td>KAP 230B</td>
</tr>
<tr>
<td>Phone</td>
<td>(213) 740-0568</td>
</tr>
<tr>
<td>Blackboard</td>
<td>Register at 1) <a href="https://courses.uscden.net">https://courses.uscden.net</a> and 2) <a href="https://piazza.com">https://piazza.com</a></td>
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<tr>
<td>Office Hours</td>
<td>MW9-10am, MW 3-3:30pm at KAP230B or other times through Piazza</td>
</tr>
<tr>
<td>Teaching Assistant</td>
<td>TBA</td>
</tr>
<tr>
<td>Email</td>
<td>Through Piazza</td>
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<tr>
<td>Office Hours</td>
<td>TBA</td>
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## COURSE DESCRIPTION
Engineering Mathematical Methods for solutions of problems encountered in civil, mechanical and aerospace engineering

## COURSE OBJECTIVES
Engineering problems discussed on a physical basis with solutions via mathematical tools: Fourier series; Fourier and Laplace transforms; partial differential equations, wave and Laplace equations. Duplicates credit in CE 525b. **Recommended preparation**: undergraduate multivariable calculus and ordinary differential equations.

## LEARNING OBJECTIVES
After reviewing what we learned in our undergraduate Math/Calculus courses, we learn Fourier series, eigenvalues & functions, systems of ODE. Then we spent almost 2 months on PDE, when we solve the wave, heat and Laplace equations in both rectangular and polar coordinates. We then discuss transform methods in the last month.

## Prerequisite
none

## Days, Time, Location
| Monday         | 3:30 – 6:10 p.m. | RTH105 |

## Required Textbook

## Required Course
Master of Science in Civil Engineering – Structural & other options

## Grading Schema
<table>
<thead>
<tr>
<th>Homework</th>
<th>10%</th>
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<tr>
<td>All Exams</td>
<td>90%</td>
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<tr>
<td>Total</td>
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<tr>
<th>Week</th>
<th>DATE</th>
<th>Topics</th>
<th>Homework</th>
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| 1    | 8/26 | L00 - Review - PreQuiz  
L00A - Math Paradoxes!!!! |  |
| 3    | 9/09 | L01 - Fourier Series,  
Orthogonal Series Expansions | HW#1: L01 |
| 4    | 9/16 | L02- Eigenvalues, Eigenvectors &  
Eigenfunctions | HW#2: L02 |
| 5    | 9/23 | L03 - System of ordinary Differential Equations  
Applications | HW#3: L03 |
| 6    | 9/30 | L04 - Partial Differential Equations (PDE)  
Method of Separation of Variables | HW#4: L04 |
| 7    | 10/07 | L05 5.1-5.3  
- One Dimensional (1D) Wave Equation, |  |
|      |      | **4:55-6:10pm** MIDTERM #1: Weeks 01-06 | HW#5: L5.1-3 |
| 8    | 10/14 | L05 (cont) 5.4-5 - One Dimensional (1D) Beam Equation  
L06 6.1,3 - (2D) Wave Equation | HW#6: L05,06 |
| 9    | 10/21 | L06 (cont) 6.2 - Non-homogeneous PDE  
L07 7.1-4 - 1D Heat Equation | HW#7; L06,07 |
| 10   | 10/28 | L07 7.5 - 2D Heat Equation  
L07 7.6 – Non-homogeneous Heat Equation | HW#8: L07 |
| 11   | 11/04 | L08 8.1,2 – 2D Laplace Equation in Rectangular Coord  
L08 8.3 2D Laplace Equation in Cylind. (Polar) Coord | HW#9: L08 |
| 12   | 11/11 | L09 9.1 – 2D Wave Equation in Cylindrical Coordinates |  |
|      |      | **4:55-6:10pm** MIDTERM #2: Weeks 07-11 | HW#10: L09 |
| 13   | 11/25 | L09 9.2– 2D Wave Equation (cont.):  
Symmetric case | HW#11 L9,10 |
| 14   | 12/2  
12/16 | **Final 2-4pm (to be revised: same time as CE507)** | HW#12 L11,12 |
STATEMENT ON ACADEMIC INTEGRITY

USC seeks to maintain an optimal learning environment. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one’s own academic work from misuse by others as well as to avoid using another’s work as one’s own.

All students are expected to understand and abide by these principles. *SCampus*, the Student Guidebook, contains the Student Conduct Code in Section 11.00, while the recommended sanctions are located in Appendix A:

- [http://www.usc.edu/dept/publications/SCAMPUS/gov/](http://www.usc.edu/dept/publications/SCAMPUS/gov/). Students will be referred to the Office of Student Judicial Affairs and Community Standards for further review, should there be any suspicion of academic dishonesty.

- The Review process can be found at: [http://www.usc.edu/student-affairs/SJACS/](http://www.usc.edu/student-affairs/SJACS/).

STATEMENT FOR STUDENTS WITH DISABILITIES

Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to me (or to TA) as early in the semester as possible.

*DSP Contact Information*

- Office Location: STU 301
- Open: 8:30 a.m. until 5:00 p.m., Monday through Friday.
- Phone number: (213) 740-0776