

## CE 519 BOUNDARY ELEMENT METHOD (BEM)

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### Course Information

- Course Website : [http : // faculty.kfupm.edu.sa / CE / hqahtani / CE519](http://faculty.kfupm.edu.sa/CE/hqahtani/CE519)
- Meeting times: 3:20 - 4:35 PM Su & Tu
- Class location: 3-109
- Lab location: 3-226
- Assignments: submitted every Tuesday class
- Lab location: 3-226
- Grading:

10 Hws @ 2	= 20
2 Major exams @20	= 40
Project	= 10
Final exam	= 30
Total	=100

## Course Outline

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### 1. Preliminaries

- Introduction
- Indicial notation
- Divergence theorem
- Numerical integration
- Fundamental solution
- *Mathematica* Workshop
- *Matlab* Workshop

## Course Outline

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### 2. BEM for Potential Problems

- Laplace equation
- Boundary integral equations
- Boundary discretization
- Boundary element equations
- Constant boundary elements
- Development of computer code "LABECON"
- Numerical examples & applications
- Linear boundary elements
- Development of computer code "LABELIN"
- Poisson equation
- Treatment of domain integrals
- Code development for Poisson equation
- Other differential equations

## Course Outline

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### 3. BEM for Plane Elasticity

- Boundary integral equation
- Boundary element equations
- Constant boundary elements
- Computer code "ELBECON"
- Linear boundary elements
- Computer code "ELBELIN"
- Numerical examples

## Course Outline

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### 4. Boundary Point Method (BPM)

- Laplace equation
- Formulation
- Development of code “ LABP”
- Applications
- Poisson equation
- Treatment of domain integrals
- Code development
- Numerical examples

## Course Outline

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### 5. Introduction to Advanced Topics

- Time - dependent problems
- Non - linear problems
- Mesh - less methods