Course Name: Foundation Design
Course Code: CE 421
Session: Fall 2016

COURSE AIM

The aim of this course is to give knowledge and understanding of mainly shallow foundation design. This course includes several topics e.g., bearing capacity theories, design of shallow foundations; earth pressure theories, design of retaining wall and earth retaining structures; pile foundations, piles and piles group subjected to vertical load only.

INSTRUCTOR: Prabir K. Kolay, Ph.D., P.E., M. ASCE
Associate Professor

CLASS TIME: Tuesday 8:00 am – 9:15 am
Thursday 8:00 am – 9:15 am

OFFICE: Engineering Bldg. B, Room 24
Phone: 618-453-7843 (office), 618-559-6669 (cell)
E-mail: pkolay@siu.edu

OFFICE HOURS: Monday 10:00 -11:00 am
Wednesday 10:00 -11:00 am
Friday 10:00 – 11:00 am
Any other time please e-mail me or just walk in

TEXT BOOK

Course material has been developed from several textbooks, and research papers will be provided before lecture. References given under bibliography will be used.

BIBLIOGRAPHY


## CE 421 – FOUNDATION DESIGN
### TENTATIVE COURSE OUTLINE

<table>
<thead>
<tr>
<th>Week</th>
<th>Month/Day</th>
<th>Date</th>
<th>Topics</th>
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</table>
| 1    | Aug/Tuesday Thursday | 8-23-2016 8-25-2016 | Introduction to Foundation Design  
Theories of Bearing capacity |
| 2    | Sept/Tuesday Thursday | 8-30-2016 9-01-2016 | Bearing capacity factors  
General Bearing capacity equations |
| 3    | Sept/Tuesday Thursday | 9-06-2016 9-08-2016 | Design of Shallow Foundations  
Effect of water table; |
| 4    | Sept/Tuesday Thursday | 9-13-2016 9-15-2016 | Eccentrically loaded foundation  
Bearing capacity of layered stratum  
**Test I** |
| 5    | Sept/Tuesday Thursday | 9-20-2016 9-22-2016 | Stress increase in soil mass due to new load  
Settlement of shallow foundation |
| 6    | Sept/Tuesday Thursday | 9-27-2016 9-29-2016 | Immediate settlement of shallow foundation  
Consolidation settlement of shallow foundation |
| 7    | Oct/Tuesday Thursday | 10-04-2016 10-06-2016 | Consolidation settlement of shallow foundation (contd.)  
Lateral earth pressure (LEP)  
Lateral earth pressure at rest, active, passive |
| 8    | Oct/Tuesday Thursday | **10-11-2016** 10-13-2016 | **Fall Break**  
Rankine earth pressure theory  
Rankine theory to calculate LEP due to surcharge |
| 9    | Oct/Tuesday Thursday | 10-18-2016 10-20-2016 | Effect of wall movement & sloping backfill on LEP  
Coulomb’s theory to calculate LEP  
**Test II** |
| 10   | Oct/Tuesday Thursday | 10-25-2016 10-27-2016 | Types of Retaining wall  
Design of retaining wall; Stability of retaining wall |
| 11   | Nov/Tuesday Thursday | 11-01-2016 11-03-2016 | Mechanically stabilized retaining walls  
Introduction to deep foundation |
| 12   | Nov/Tuesday Thursday | 11-08-2016 11-10-2016 | Pile foundation and types of piles  
Compression capacity of single pile in sand |
| 13   | Nov/Tuesday Thursday | 11-15-2016 11-17-2016 | Compression capacity of single pile in clay  
Settlement of single pile  
**Test III** |
CE 421 – Foundation Design

<table>
<thead>
<tr>
<th></th>
<th>Date</th>
<th>11-22-2016</th>
<th>Settlement of pile group</th>
<th>11-24-2016</th>
<th>Thanksgiving Break</th>
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<td>14</td>
<td>Nov/Tuesday</td>
<td>11-22-2016</td>
<td>Settlement of pile group</td>
<td>11-24-2016</td>
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<td>Thursday</td>
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<td>11-24-2016</td>
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<td>15</td>
<td>Nov/Dec/Tuesday</td>
<td>11-29-2016</td>
<td>Pile load test; Efficiency of pile group</td>
<td>12-01-2016</td>
<td>Revision class</td>
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<td>Thursday</td>
<td>11-29-2016</td>
<td>Pile load test; Efficiency of pile group</td>
<td>12-01-2016</td>
<td>Revision class</td>
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**Test IV:** Final Exam, date and time to be announced.

**ASSESSMENT AND GRADING**

Final grade will be based on three tests, quizzes and homework assignments.

**Grade Distribution**

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Percentage (%)</th>
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<tbody>
<tr>
<td>Test I</td>
<td>25</td>
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<tr>
<td>Test II</td>
<td>25</td>
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<tr>
<td>Test III</td>
<td>25</td>
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<tr>
<td>Test IV (Optional, comprehensive)</td>
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<tr>
<td>Quizzes</td>
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<td>HW Assignments</td>
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**Final Grade**

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<td>90 % and above</td>
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<td>80 % and above</td>
<td>B</td>
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<tr>
<td>70 % and above</td>
<td>C</td>
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<tr>
<td>60 % and above</td>
<td>D</td>
</tr>
<tr>
<td>Less than 60%</td>
<td>F</td>
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