This course is designed for students to understand compositions, engineering behaviors, and design methods of various civil engineering materials, including steel, timber, soil, aggregate, portland cement concrete, and asphalt cement concrete. Laboratory section provides hand-on experience on various testing on those materials.

Pre-requisite: MEM 220 (Mechanics of Solid)
CEE 320 is pre-requisite to CEE 410 (Concrete Design I)


Lab Manual: download from CEE320 blackboard and print out before the first lab session.

Topics:
- Introduction (construction materials, engineering properties, testing & measurement)
- Metallic State
- Ferrous Metals
- Timber
- Soil and Mineral Aggregates
- Cements
- Concrete: Strength and Behavior
- Design Procedure in Making Concrete
- Advances in Concrete Technology
- Asphalt Cements

Instructor: Professor Isao Ishibashi, 134 Kaufman Hall
Phone: 683-4641, E-mail: iishibas@odu.edu

Office Hours: 11-12 PM and 1-3 PM on Mondays & Wednesdays, & appointments

Grading:

<table>
<thead>
<tr>
<th></th>
<th>Lab section</th>
<th>Lecture section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments</td>
<td>15 %</td>
<td></td>
</tr>
<tr>
<td>Mid-Term</td>
<td>20 %</td>
<td></td>
</tr>
<tr>
<td>Final (8:30-11:30 AM, Dec. 13)</td>
<td>25 %</td>
<td></td>
</tr>
<tr>
<td>Term Paper (with optional presentation(*))</td>
<td>5 %</td>
<td></td>
</tr>
</tbody>
</table>

(*) note: This will be a several pages (maximum 5) descriptive paper (typed) of any material (old, new, recycled, etc.) to civil engineering applications (structure, construction, environment, earth, space, etc.). More innovative the materials and applications are, the higher the score will be given. Keep eye on engineering and scientific journals or use your imaginations. The readers of the paper shall be the students in this class with a purpose of informing them on new materials and/or innovative civil engineering applications. Due is November 11 (Monday) in the class.

Selected papers will be presented in the class at the end of the semester.

Homework will be assigned and collected in the class.

No late homework will be graded.