MNGN-404 Tunnel and Shaft Construction
Course Revision and Syllabus

BACKGROUND
MNGN-404, is a replacement for a combination of two courses, MNGN-404 and MNGN-408 that focuses on underground construction and tunneling. The class was offered with the typical lectures and limited number of homework and exam. Not much in class activities was planned.

EXPECTED RESULTS

Course Outcomes:
- Identify Tunnel application and select tunnel profile and Alignment
- Develop a preliminary plan for the geotechnical site investigation and select:
  - Tunnel method selection:
    - Interpret the results of geotechnical site investigation pertinent to selection of the tunneling method
    - Develop the outline of the geotechnical reports including the data report and baseline report.
  - Select the ground support type for the tunneling method of choice and identify the required analysis and calculation method
- For soil/soft ground or rock tunneling be able to identify main issues and common risks and best methods to address them
- Select the suitable shaft/raise design and construction method
- Develop project planning and evaluate constructability issues and risks, Identify the cost components of a tunneling project and be able to offer a preliminary estimate the cost of tunnel / shaft construction.

WHAT IS CHANGING

Approach:
- The course teaching method will be different and more focus will be on the Educational Outcomes to drive the content
- The course will be more interactive and will involve more reading of the material by the students and review in the class
- Will look for possibilities of project based learning experience

EMPHASIS ON

- Ability to perform qualitative and quantitative analysis
- Preliminary selection of the tunneling methods for Civil and Mining projects
- Discussion of ongoing projects in the US and around the world to make the course more tangible and real for the students
- Use of out of class resources for learning various tunneling methods and their applications. This includes:
  - Online videos
  - Journals and articles
  - Term Project as a practice run

TERM PROJECT RUBRIC

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Weight (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Taking all the relevant application geological information into consideration</td>
<td>15</td>
</tr>
<tr>
<td>2 Selection of the proper tunneling method</td>
<td>20</td>
</tr>
<tr>
<td>3 Calculations and justification as needed</td>
<td>15</td>
</tr>
<tr>
<td>4 Explanation of the thought process</td>
<td>20</td>
</tr>
<tr>
<td>5 Addressing the risk and cost</td>
<td>10</td>
</tr>
<tr>
<td>6 Quality and organization of the report</td>
<td>10</td>
</tr>
<tr>
<td>7 Presentation</td>
<td>10</td>
</tr>
<tr>
<td>Contribution to final grade of 45 pts</td>
<td>100</td>
</tr>
</tbody>
</table>

Teaching Philosophy
We have to treat student time as our main capital, which is limited, and we should plan on best use of this capital for the highest gain, which is well rounded education of the students in general, and meeting course expected outcomes of the, in particular

Incremental Improvements
The course will be offered in Fall 2017 and the content + delivery as well as activities will be modified based on the observation of the student reactions and feedbacks.

Jamal Rostami, Mining Engineering Dept., CRCSE
Mining Engineering, Excavation Engineering Track, Core Course for the Track option

Summer 2017 Cohort