**CIVL 528: Masonry Structures Design (3 Credits)**

This course focuses on the analysis and design of masonry beams, retaining walls, shear walls, bearing walls and columns. Topics also include use of allowable stress and strength design methods, structural system analysis and lateral design of masonry buildings. *(Prerequisites: CIVL 301 and CIVL 321)*

**Course Learning Outcomes:**

By the end of the course, students will be able to:

A1. Acquire and apply new knowledge as needed, using appropriate learning strategies.

A2. Identify, formulate and solve complex civil engineering problems by applying principles of engineering, science, and mathematics.

A3. Apply Health and Safety legislation to masonry structures.

B1. Regularly evaluate own strengths and weaknesses and pursue opportunities to develop in necessary areas.

B2. Formulate conceptual designs in masonry. Analyze and design beams, columns, and connections under various loading configurations.

B3. Design vertically, laterally and reinforced masonry walls.

B4. Design masonry to perform well, thermally and acoustically.

C1. Function effectively as part of a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks and meet objectives.

**Course Learning Materials:**

* Design of Reinforced Masonry Structures by Narendra Taly.
* Masonry Design and Detailing for Architects, Engineers, and Builders by Christine Beall.
* Masonry Structural Design by Richard E. Klingner.
* Reinforced Masonry Engineering Handbook: Clay and Concrete Masonry by John M. Melander and James E. Amrhein

**Course Content:**

1. Masonry Fundamentals
2. Materials
3. Empirical Design
4. Masonry Bending
5. Masonry Shear
6. Masonry Compression
7. Timber Lateral Design
8. Assessment of the thermal and acoustic performance of masonry
9. Masonry Anchorage
10. Serviceability Limit State
11. Ultimate Limit State