Department: Civil & Environmental Engineering **Division: Civil engineering**
Level and Major: Graduate - Structure Engineering

Course Title: Advanced reinforced concrete **Number of Credits: 3**
Prerequisite (Corequisite): Structural analysis (I)**,** Concrete Technology **Lecturer: -**

Course Topics

- Behavior under multi-axis stresses – how to do experiment, check the behavior, modeling-Applied materials and the effect of strength on behavior
- The relation between stress and strain – the effect of enclosure, the effect of loading rate and time
- Formability of reinforced concrete structures, the relation between anchor and curvature for the beam and column, the effect of enclosure, the relation between anchor and rotation, the length of the plastic area, simple equivalent method
- Shear walls – formability and resistance, short and long walls, wall design
- Shrinkage and expansion – different calculation models of shrinkage and expansion, calculate the temporal deformation of the beam and slab
- Rupture lines method – rupture mechanism, rebar slab design
- Fiber reinforced concrete – pressure, strain, bending, impact, fiber reinforced concrete
- Loading experiment – evaluate the strength of existing structures
- Design against fire – the behavior of concrete and rebars at high temperatures fire resistance
- The design of reinforced concrete structures for impact and explosion – resistance and structural relations at very high strain rate, how the load explodes
- Methods of repair and optimization of concrete structures
- Basics of designing special structures – silo, chimney, resources, load – bearing wall structures

Course Description:
Reading Sources:
Course Goals and objectives:
Evaluation:
Course topics:
The course aims to: