Department: Civil & Environmental Engineering **Division: Civil engineering**
Level and Major: Graduate - Water Resources Management and Engineering

Course Title: Water resources system analysis **Number of Credits: 3**
Prerequisite (Corequisite): Structural analysis (I), Concrete Technology Lecturer: -

Course Topic

- Generalities(basic concepts of water resources planning ,system concept and its components, system approach, comprehensive IWRM water resources management and sustainability)
- Modeling systems(challenges and advances in modeling water resources systems, modeling methods, simulation and optimization modeling steps)
- Classic optimization(basics of optimization and optimization conditions :kunh-Tucker, linear planning method, linear optimization models, simplex method, sensitivity analysis)
- Non-linear optimization and planning (lagrangian, multipliers method ,non-linear optimization models, integer and binary programming ,dynamic programming ,introduction of optimization problem solving software and their application(LINGO,GAMS)
- Network planning(network optimization models, critical path and project management(
- Modeling water resources systems (familiarity with types of water resources models, single-purpose and multi-purpose models, special – purpose and multi –purpose models)
- Modeling surface water reservoirs(design of single tank system by simulation and optimization methods ,optimize the operation of the single tank system :operational-management –rule carve
- Modeling river water resources (an introduction to optimizing river water resources,river quality managemen(t
- **Modeling groun dwater resources) a nintroductio nt ooptimizin ggroun dwater resources**,ground water management ,aquifer management)
- Introducing basin simulation software (MODSIM,WEAP,MIKE-BASIN,HEC RESPRM)

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