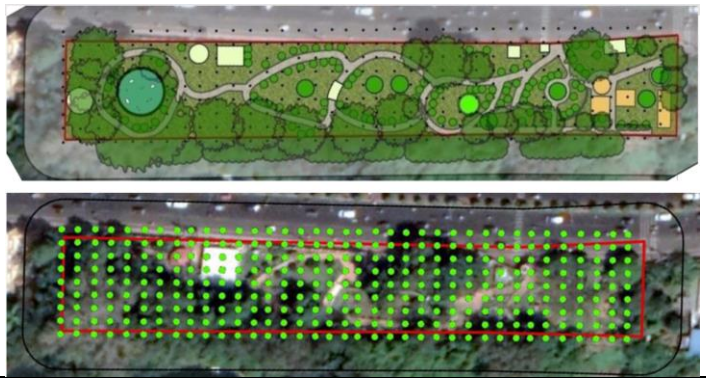
Qassim Engineering College

Civil Engineering Department SDP – CE-491-PROPOSAL

Academic year: 1442-1443 (2021 - 2022) Semester 432: □Fall ■ Spring

Project Title	**Design of safe pumping rates for Saq Aquifer using MODFLOW in Qassim Region by proposing several scenarios of water consumptions**	
Brief description	Scarcity of water resources is becoming a threatening issue in arid regions like Saudi Arabia. Accurate prediction of quantities and quality of groundwater is the first step towards better design of water supply parameters of a region where groundwater is the main source of supply. In this senior design project groundwater modelling with respect to its quantity and quality will be performed using MODFLOW. Some part of Saq Aquifer lying in Qassim Region will be taken as the study area. Modern tools including Geographical Information System (GIS) and Digital Elevation Model (DEM) will be applied to process the required data for modelling. Climatic and geographical data will be obtained from local and national authorities. Design of aquifer parameters for safe pumping rates will be the main objective of this project. Data available on various internet sites will also be used. The results of research will be useful for the community and experts working in the field of water resources engineering, planning and management in arid regions.	
Prerequisite Courses	As per the study bylaw	
Co-requisite Elective Courses	**CE459** **CE457 or CE 490**	
Design Content of the SDP	• **Estimation of Saq Aquifer parameters** • **Design of pumping rates and aquifer parameters for sustainable water supply**	
Constrains of the SDP	- Sustainable considerations - Environmental issues. Climate change issues	
Used Specifications and/or Codes	Local design standards, codes and considerations for water structures available in Saudi Arabia will be used.	
Supervisor(s)	**Name**	**Signature**
	Prof Dr Ibrahim Saleh AlSalamah	

SDP Title	**Design of soundscape environment configuration for an urban park through landscape elements**	
Brief Description	Although many studies have addressed noise pollution in the built environment and its effect on people's lives and health, there is a lack of investigation on how to predict environmental noise in public spaces. The first part of the project will begin with a comprehensive review in the field of noise pollution in the built environment and public gardens in particular in addition to review the Saudi Arabia regulation regarding noise pollution. Then, selection of appropriate public park in Buraidah city to apply the study based on certain criteria. The second part of the project, after determining the appropriate public park in Buraydah city, noise data will be collected using 20 sensitive sensors distributed in different places in the study area. In parallel, the noise sources at each sensor are monitored to assist in the analysis. The project will prepare perception survey of the users of the park to understand their behavior regarding noise pollution. In addition, certain software will be used to make noise predictions that help to generate and design convenient configuration for the park. Following picture shown an example for public park and the points for collecting noise data: 	
Prerequisite Courses	**In accordance with Bylaw**	
Co-requisite Elective Courses	**CE 475**	
Design Content of the SDP	- **To identify the design configuration of public park that could affect noise pollution using simulation software.** - **To reduce noise levels with the help of different barriers and/or landscape elements.**	
Constrains of the SDP	**Environment, instrumental and economical constrains.**	
Used Specifications and/or Codes	**National and international environmental codes (particularly Saudi Arabia Noise Pollutions Regulation).**	
Supervisor(s)	**Name**	**Signature**
	Saleem S. AlSaleem	

SDP Title	**Structural Analysis and Design of a Multi-Story Governmental Steel Building**	
Brief Description	A multi-story governmental steel building has an area of 3780 m^2. The building consists of four parts (three wings and core) separated by expansion joints around the core, three of them are identical rectangular shape with dimensions 15m x 60m, while the core is octagon shape. The octagon shape is equilateral sides with length of each equals 15m.The building looks like **T-Shape**. The building consists of ten stories above ground level and two stories under ground level (basements) used as car parking. The height of each story is 4 m. The ceiling of each floor consists of steel main girders, transverse and secondary steel beams and reinforced concrete slabs resting on steel columns. The building is supported on a reinforced concrete raft foundation. The building is designed under the required design loads Two alternative structural systems are used. ***The first alternative system***: The building is braced using X-bracing systems. In this situation, the connections between beams, and/or girders and columns are assumed simple shear. ***The second alternative system***: The building is braced using R.C. shear walls and/or cores and the connections between beams, and/or girders and columns are assumed rigid (moment frames). ***N.B.*** The first part of the project is to analyze and estimate the preliminary design of the two alternatives. The second part of the project is to choose one of the two alternatives and conduct the final design of all project components and necessary drawings.	
Prerequisite Courses	As per the study bylaw	
Co-requisite Elective Courses	**CE403, CE317**	
Design Content of the SDP	Design of columns, girders, transvers and secondary beams, bracing systems, joints, shear walls, and foundation.	
Constrains of the SDP	Environmental constraints, economical constraints, labor constraints, and corrosion constraints.	
Used Specifications and/or Codes	Saudi Building Code (SBC), American Institute of Steel Construction Specifications (AISC).	
Supervisor(s)	**Name**	**Signature**
	Dr. Gamal Al-Saadi	Gamal Al-Saadi

SDP Title	**Analysis and design of a multi-story reinforced concrete building**	
Brief Description	Analysis and design of reinforced concrete structures is a valuable tool for structural engineers working in the industry. It is expected that the students who will join thissenior design project to gain knowledge and experience indesign of reinforced concrete buildings and relevant codesof practice. The first part of the project includes analysis ofthe whole reinforced concrete building by applying expected loads on the building and determining the resulting action forces on different structural members. Design of floor systems (slabs and beams) using more thanone structural system. Design of short and slender columns. The second part of the project is a continuation of the design process of the remaining structural members.Staircases are designed in the second part of the project along with shear walls and foundations for the building.	
Prerequisite Courses	As per the study bylaw	
Co-requisite ElectiveCourses	**CE403**	
Design Content of the SDP	- **Design of structural systems** - **Design of reinforced concrete beams** - **Design of reinforced concrete slabs** - **Design of reinforced concrete columns** - **Design of reinforced concrete stairs** - **Design of reinforced concrete shear walls** - **Design of reinforced concrete foundations**	
Constrains of the SDP	Producing a safe and economic design in accordance with codesof practice.	
Used Specifications and/or Codes	**Saudi Building Code (SBC301 "Structural- Loading and Forces", SBC303 "Structural – Soil and Foundation",SBC304 "Structural – Concrete Structures"). American**	
	Concrete Institute ACI-318 "Building Code Requirementsfor Structural Concrete".	
Supervisor(s)	**Name**	**Signature**
	Dr. Saleh Alogla	**S. A.**

SDP Title	**Design of routes for bus transport lines based on provisions of bus service between SAR train stations and neighboring cities.**	
Brief Description	The first part of the project • Define and formulate engineering problems. • Gather and extract relevant information and data. • SWOT analysis The second part of the project • Design of proposed routes for bus transport lines • Analysis of proposed routes for bus transport lines • Operational plan • Operational costs and financial statement	
Prerequisite Courses	**In accordance with Bylaw**	
Co-requisite Elective Courses	**In accordance with program committee request**	
Design Content of the SDP	**Study the provision of a bus service includes:** - **Data analysis** - **Design bus routes** - **Detailed Operational plan analysis** - **Detailed Operational costs analysis**	
Constrains of the SDP	**Economics, social, and environmental.**	
Used Specifications and/or Codes	**Relevant Saudi and/or international codes.**	
Supervisor(s)	**Name**	**Signature**
	Dr. Raed Alsalhi	

SDP Title	**Design of a cost-effective drainage system in Qassim**	
Brief Description	Today expenditures for urban drainage facilities are among the largest items in the budgets of most municipalities and represent a significant percentage of the Kingdom's fundingof public works. Design and planning procedures firmlybased on the fundamental processes governing the quantity of urban runoff flows result in the most effective solutions to the problems facing planners and decision makers. In efforts to control the flow of water in urban areas and to prevent water-related disasters, the first part of the project will design a proper stormwater collection system for a location in Qassim region considering related local/national codes/specifications. In the second part of the project, the alternative designs will be developed by redesigning thesystem and changing the layout of the system considering the most recent costs from the market and guided by local Specifications / codes.	
Prerequisite Courses	As per the study bylaw	
Co-requisite ElectiveCourses	**CE 490, CE 457**	
Design Content of the SDP	Main design components of the project include: • Conceptualized project design, • Selection of a study area, • Collecting rainfall data, and land-use data for aspecific location, • The use of a modeling program to constructIntensity-Duration-Frequency (IDF) curves • The use of a commercial software to design thestormwater collection system • Redesign the system considering the cost	
Constrains of the SDP	**Environmental and economical constrains** **Availability of precipitation data**	
Used Specifications and/or Codes	**Applicable local Design Codes**	
Supervisor(s)	**Name**	**Signature**
	Dr. Abdullah Alodah	