UNIVERSITY OF DUHOK
FACULTY OF ENGINEERING

2nd ENGINEERING DESIGN DAY

PROJECTS ABSTRACTS

2nd Engineering Design Day

Wednesday 20th of May, 2015
09:00 AM to 4:00 PM
Student Center, University of Duhok
uod-edd.com

CIVIL ENGINEERING DEPARTMENT

CE01 Mechanical Properties of Hybrid Concrete

By: Arezo Hussein, Bahra Warda, Jowan Adnan and Dina Marqus
Supervisors: Dr. James Hassado Haido and Mr. Youkhana Zaya

In any concrete structure that has been built or under construction; the engineers may face main problem in engineering history which is deterioration of reinforced concrete material . , the suitable solution for this problem is represented by good bond repairing or retrofitting with a material with high compressive strength with reasonable durability . This type of concrete and in our project is achieved by mixing proportion of cement, sand , super plasticizer ,water ,fine material (silica fume, or may be replaced by a cheap material which is waste glass powder) . Another objective is to evaluate the rule of waste glass powder as an alternative filler material to silica fume in enhancing the mechanical properties of hybrid concrete made with ordinary old concrete retrofitted new very high strength concrete and to investigate the effect of contact surface treatment on the related hybrid concrete properties like compression strength and corresponding slant shear.

In methodology, we Mix design of ordinary old concrete and very high compressive strength (new concrete) , Casting of ordinary concrete as a part of hybrid concrete and we provide contact surfaces by holes, groove and ordinary surface as control. Waiting for the curing of it for 28 days after that Casting of very high compressive concrete on old concrete to make hybrid concrete. The curing of this new concrete part for 7 days .finally we test the samples for measuring the compression strength and slant shear to find the best contact surfacing .

CE02 Complete Construction, Structure and Service Design of Multistory Building (Plan No. 3)

By: Jwan Salah
Supervisors: Dr. Ahrar Botan, Mr. Youkhanna Zaiya, Mrs. Jwan Noori

The theme of the bachelor's project are a design and mainly a project documentation of a multistory residential building in Duhok province .An architectural study are parts of these project.

Step by the building are converted from horizontal to vertical structures because of increases of population in Duhok which reach double population especially after the second half of 2014 year. This double of population was expected but not now, it's expected to reach this number of population after 40-20 next years.

The object consist of five aboveground and one underground floor (basement) the underground floor is used as storage space and technical equipment like central heating .

Ground floor like each typical upper floor consist of two apartment. The roof of the building is flat (Non trafficable). The horizontal load bearing structural element designed as two way beam system. The vertical load bearing structural element designed as primary beams and columns. The vertical enclosure of the building consist of insulated hollow block with exterior thermal. insulation polystyrene board which are finished with cement plaster. The design of sanitary services consist of water supply and waste water disposal.

CE03 Complete Construction, Structure and Service Design of Multistory Building (Plan No. 3)

By: Nadia Mahmood
Supervisors: Dr. Ahrar Botan, Mr. Youkhanna Zaiya, Mrs. Jwan Noori

The theme of the bachelor's project are a design and mainly a project documentation of a multistory residential building in Duhok province .An architectural study are parts of these project .

Step by the building are converted from horizontal to vertical structures because of increases of population in Duhok which reach double population especially after the second half of 2014 year. This double of population was expected but not now , it's expected to reach this number of population after 40-20 next years.

The object consist of five aboveground and one underground floor (basement) the underground floor is used for storage and technical services such as central heating . All the building is supported by raft foundation.

Ground floor like each typical upper floor consist of four apartment. The roof of the building is flat (extensive trafficable green roof). The horizontal load bearing structural element designed as beams and hollow blocks (50*50*25)cm . The vertical load bearing structural element designed as transversal primary beams and columns . The vertical enclosure of the building consist of partial insulated cavity walls (with air gap) fair faced with perforated bricks. Also the design of sanitary system consist of the design of water supply and waste water disposal.

CE04 Complete Construction, Structure and Service Design of Multistory Building (Plan No. 3)

By: Manar Akram
Supervisors: Dr. Ahrar Botan, Mr. Youkhanna Zaiya, Mrs. Jwan Noori

The themes of my bachelor's project are design and mainly project documentation of three floors residential building placed in Duhok province. The project comprises from main building construction details (architectural study), structural design and sanitary services documentation.

The construction details of the building (architectural study) is undertaken as a first part of the project. The building consists of three aboveground floors and one underground floor (basement) which is used for storage space for all apartments and technical services such as (heating equipment). Each story consists of four apartments .The roofs of the building are flat extensive trafficable green roofs. The vertical enclosures of the building consist of insulated Hollow blocks with exterior thermal insulation polystyrene boards which are finished with cement plaster.

The second part of this project is the structural design. The horizontal load bearing structural elements are designed as two way beam system. The vertical load bearing structural elements are designed as transversal primary beams and columns. The foundation is designed as raft foundation.

The sanitary service documentation is carried out as a third part of this project.

The main purpose is to design and construct the project in an economical, high quality and energy efficient manner.

CE05 Updating the Topographic Map for Faculty Site

By: Omed Ibrahim , Bemal Muhammed, Shivan Hassan, Hajan Muhammed
Supervisor: Mr. Sami Mamlouk, Mr. Yousif Youkhanna

Standard topographic maps show a variety of information including roads, land-use classification, elevation, rivers and other water bodies, political boundaries, and the identification of houses and other types of buildings . Traditional definitions require

A topography map to show both natural and man-made features. a topographic map is typically published as a map series , made up of two or more map Sheets that combine to form the whole map . a counter line is a combination of two Line segment that connect but do not intersect , these represent elevation on a topographic Map.

In this particular research , site field method was used to collect data to produce A topographic map for faculty of engineering using (INSTRUMENT) We used two machine (DJPS & TOTAL STATION), to get elevations from faculty of engineer And we used (AutoCAD Civil 3D) for our elevation , the topography of the engineer that we have was In 2010 , i.e the building of ECE was not in topography , in our project we add this new building in topography.

CE06 Complete Construction, Structure and Service Design of Multistory Building (Plan No. 2)

By: Niroj Hassan Mohamed
Supervisors: Dr. Ahrar Botan, Mr. Youkhanna Zaiya, Mrs. Jwan Noori

The themes of my bachelor's project are design and mainly project documentation of a six floors residential building placed in Duhok province.

Beside the own project documentation, an architectural study is a part of my project. The object consist of six aboveground floors and one underground floor(basement) which is used for storage space for all apartments and technical services such as (heating equipment). Each story consists of four apartments.

The project comprises from main building construction details, concrete calculations and design and sanitary services documentations. All enclosures (wall and roof covering) are designed to provide best thermal and acoustic resistance. The roof of the building is (extensive trafficable green roof)and wall is (cavity wall).

The vertical loadbearing structural elements are designed as framed. The horizontal loadbearing structural elements are designed as one- way ribbed slab system (beam and hollow block). The foundation is designed as raft foundation.

The main purpose is to design and construct the project in an economical, high quality and energy efficient manner.

CE07 Complete Construction, Structure and Service Design of Multistory Building (Plan No. 1)

By: Alind Flamerz
Supervisors: Dr. Ahrar Botan, Mr. Youkhanna Zaiya, Mrs. Jwan Noori

The theme of graduation project are a design and mainly a project documentation of a multi-story administration building in Duhok province. An architectural studying is part of graduation project.

The building consist ground floor , 3 floors above the ground and a basement each 3.45m high , the basement floor is used for storages and technical services , such as central heating. All the building is constructed over spread foundation.

Ground floor consist of 10 room plus 2 WC the main WC rooms are the same for each floor and each floor has 2 WC one for men and the other for women except basement .

The roof of the building is supported on beams and columns with non-trafficable roof . The horizontal load bearing structural elements designed as flat slab with 25cm thick. The vertical load bearing structural elements designed as transversal primary beams and columns.

The external wall of the building is a simply wall with solid brick of 10 cm isolated with 5 cm spray foam and the internal walls used is AAC blocks with 20 cm thick , and WC partition are made from MDF 18 mm thick wood wall. Floor are tiled with porcelain for all floors but the WC tiled with ceramic.

The structural design done using the direct method manually and using Etabs software , and detailing with AutoCAD.

CE08 Compressive Strength of Cylinders & Cubes Made of Natural Waste Materials Compared to Plain Concrete

By: Khalid Esmaeel, Rami Arkan, Nehren Saeed
Supervisor: Dr. Kan'an Seliwa

Everything (including the kitchen sink) from soda cans to sewer pipes has been reclaimed to form the basis of buildings, including pavilions , pods and full-sized homes. These unusual structures made of reclaimed materials continue to prove that so-called trash can still have all sorts of uses When its initial purpose is completed.

The purpose of the project is to calculate the compressive strength of cans in different cases and compare the compressive strength with the compressive strength of standard cubic and standard cylinder of plain concrete, as well as with the compressive strength of block and brick which are available in markets.

Results obtained during the examination of the models (Soda cans and other of different cans) were acceptable within the limits compared with concrete.

CE09 Complete Construction, Structure and Service Design of Multistory Building (Plan No. 1)

By: Ahmed Thanoon
Supervisors: Dr. Ahrar Botan, Mr. Youkhanna Zaiya, Mrs. Jwan Noori

The theme of graduation project are a design and mainly a project documentation of a multi-story residential building in Duhok government . An architectural studying is part of graduation project.

Step by step the buildings are converted from horizontal to vertical structures because of increases of population in Duhok which reach double population especially after the second half of 2014 year. this double of population was expected but not now , it's expected to reach after 40 - 50 next years.

The multi-story residential building consist of Six above ground and a basement below these grounds , the basement floor is used for storages and technical services , such as central heating. All the building is constructed over Raft foundation.

Ground floor like each typical upper floors which consist of 4 apartments.

The roof of the building is supported on beams and columns with non-trafficable roof .

The horizontal load bearing structural elements designed as simple slab with 15cm thick. The vertical load bearing structural elements designed as transversal primary beams and columns.

The external wall of the building is a simply wall with solid brick of 20cm thick and unit weight equal to 15 kn/ and the internal walls used is AAC blocks with 15cm thick and unit weight of 6 kn/ .

CE10 Complete Construction, Structure and Service Design of Multistory Building (Plan No. 2)

By: Noora Tahir
Supervisors: Dr. Ahrar Botan, Mr. Youkhanna Zaiya, Mrs. Jwan Noori

The themes of my bachelor's project are design and mainly project documentation of a five floors residential building placed in duhok province.

Beside the own project documentation, an architectural study is a part of my project. The object consist of five aboveground floors and one underground floor(basement) which is used for storage space for all apartments and technical services such as (heating equipment). Each story consists of six apartments.

The project comprises from main building construction details, concrete calculations and design and sanitary services documentations. All enclosures (wall and roof covering) are designed to provide best thermal and acoustic resistance. The roof of the building is non-trafficable.

The vertical loadbearing structural elements are designed as framed. The horizontal loadbearing structural elements are designed as beam-slab system. The foundation is designed as raft foundation.

The main purpose is to design and construct the project in an economical, high quality and energy efficient manner.

CE11 Effect of Fine Contents in Fine Aggregate upon the Compressive Strength and Workability of Concrete in Duhok Region

Prepared by: Rogash Mahdi, Rondik Mohamed, Shilan Hussen, Keser Saeed
Supervisor: Mr. Ghanim Hussein Qoja

Due to harmful effect of fine contents in aggregate upon concrete properties and because of continuous failure in concrete cubes that have been tested in Duhok city ,the present study investigates and studies the effect of fine contents that present in fine aggregate upon the properties of concrete like compressive strength and workability .

This study has considered many ratios of fine content (0%, 2%, 4%and 6%) of the fine aggregate weight added to concrete mixes and observed the governed values of compressive strengths and workability.

Three basic mixes (1:2:4, 1:1.5:3 and 1:1.2:2.4) were tried with different water cement ratios that gave a slump range of (50_100mm). A series of cubes were casted and tested in compression at two ages, namely (7and 28 days). The specimens were tested by non-destructive apparatus like Ultrasonic pulse velocity and Schmidt Hammer prior to testing destructively.

It was found that as the ratio of fine content increases, slump decreases for all mixes.

While the compressive strength is very affected at height ratios of fine existence. The decrease in compressive strength is very clear within the methods of testing either destructively or non-destructively apparatus.

CE12 Design of R.C. Multi-Story Building Manually and by ETABS

By: Dindar Abdi, Hemn Azad, Hogir Sleman and Zaid Abdulla
Supervisor: Dr. Ali Flayeh and Mr. Msheer Hasan

The Multi-Story building (seven-story Reinforced concrete building) is consist of (8 bays by 2 bays), is designed by manual following ACI 318-11 and Etabs which based on Finite element methods. Type of building is Apartment.

The objective of this project except Designing is to make comparison between results obtained from manual designing and Etabs Results.

The building is consisting of columns, Beams, Two way slabs, Elevator, Shear wall and foundation (raft foundation). The Loads were calculated from ASCE 7-10 and loads combination According ACI 318-11.

For two way slab we use coefficient method two and simplified method for columns.

For slabs and foundations were designed by (safe-V12 program).

Obviously that the primary results of manual and etabs approximately are the same.

CE13 Domestic Grey Water Characterization from Kendal Camp in Duhok City and Its Implication on Treatment and Reuse

By: Muhammed Bazian, Suzan Hamza and Heja Hussein
Supervisors: Dr. Nashwan Shawkat and Dr. Maha Muhammed

Kurdistan Region / Duhok Government received huge numbers of Internal Displaced people (IDP), of about 1250000 people displaced in 16 camps in Duhok city.

Camps were provided with the primary Infrastructure requirements, drinking water was the most important of these, and as a result large quantities of wastewater were generated and needed to be treated in order to prevent pollution.

Kendal camp was selected for this study as no wastewater systems considered. About 7078 persons were displaced there, they used about 264 m3/day that is mean about 211 m3/d of waste water produced. The black water were collected in septic tanks, while grey water flows free without any treatment.

The aim of this project is to characterize important grey water quality parameters (TSS, pH, DO, Ca++, Mg++, TDS and EC-conductivity) and to suggest simple treatment system.

Grey water is the water coming from bathtubs, showers, kitchen and washing machines. Where as in some studies grey water also includes the kitchen wastewater. Grey water represents about (50-80) % of the total wastewater.

Experience from the neighbored countries and overseas indicate that grey water can be cost effective alternative of water. It would be possible to reuse it in Gardening and irrigation, toilet flushing, washing machines, and other applications (car washing, firefighting, industrial use).

At the end of this study, we will suggest suitable treatment process for grey water.

CE14 Complete Construction, Structure and Service Design of Multistory Building (Plan No. 2)

By: Khawla Diab
Supervisors: Dr. Ahrar Botan, Mr. Youkhanna Zaiya, Mrs. Jwan Noori

The project consists of 6 stories, every story has 5 apartments, there is a basement and isolated foundation is used.

The parts of the project:

1. Architecture part : (plans)
2. Concrete part : details plans & Design:
   - Design of slab, beams
   - Design of columns
   - Design of footing
   - Design of walls (basement & shear wall)
3. Service part : plans and design.

CE15 Design of High Rise Building (Business Center)

By: Kaiwan Zuher, Muhammed Sarhan, Nibar Lazgin and Shivan Zuber
Dr. Alaa Alsaad

The project is to learn how to model, analysis and design of reinforced concrete structures using structural engineering software. High-rise building (Business Center) of 25-floor with land area of about 7000m2 has been selected as a case study. The building consists of: (i) basement for car parking, (ii) ground floor for services and utilities and (iii) 23-floor offices. The structural system for tower is based on reinforced concrete core at the center and periphery columns connected by a wide ring beam. Different types of slabs were used including; one way slab, two way slab and hollow core slab (precast pre-stressed). The modeling, analysis and design of building were achieved by using two structural engineering software; ETABS-2013 for analysis and design of superstructure (including beams, columns and shear walls), and SAFE-12 for analysis and design of slab and foundation. The software is based on numerical method (finite element). All design procedure based on the latest version of ACI-code (ACI-318).

CE16 Structural Design of Mat Foundation Using SAFE Software

By: Ghazwan Darweesh and Samea' Gabalee
Supervisor: Dr. Rafi' Mahmoud

In this study, a full discussion and clarification of manual and SAFE software design of mat foundation of two selected buildings; the first one is a five-story storage building and the second one is a six-story residential building constructed on soils of low bearing capacities are presented in details. The columns loads calculation for the mat of the first design example is shown in terms of the turbidity area of the columns. Final design and detailing are shown at the end of the project with SAFE software design out files attached.

CE17 Highway Design Using Autodesk AutoCAD Civil 3D

By: Alhan Saifadeen and Sarah Ghasan
Supervisor: Dr. Raad Kattan

The first step in highway selection and design is the measurement and collection of digital terrain model, DTM. Several known techniques can be used to create the DTM, among which are: GPS data collection, direct ground measurements using total station instrument, and the use of either aerial or satellite imagery.

DTM collection through the above mentioned techniques are difficult, time consuming and expensive. In this project the Google Earth image was utilized as a ground data source. Although this source is not as accurate as the other methods, it can provide the source for preliminary study.

We select a new highway connecting the Besira area on the north of Duhok city to the Duhok dam road. This highway will provide an addition access to the city from the north and east to the city center.

The area image from Google Earth was inserted to the AutoCAD Civil 3d program. The program create a surface, contour lines. Alignment is selected and profile, design profile, corridor, basic assembly were created.

The final output is the required cross sections, table of cut and fill volume, mass diagram.

CE18 Design of R.C.C Rectangular Overhead Water Tank

By: Shayan Hikmat Ameen, Blind Khurshid Abdullah, Ashty Abdullah Hifthllah, and Rizgar Shawkat Issa
Supervisor: Mr. Abduljalil Sulaiman

The purpose of the project is to analyze all loads that acting on the water tank including the self weight of beams, column, and base slab. Etc. and design all column and beams and the raft (mat) foundation and the design of the water tank walls and slab .The tank should be designed to serve 35,000 people. The tank will be constructed over 25 reinforced concrete column. The height of the tank will be 20m from top of footing the bottom of the base of the tank. The work is done by hand using academic method that we studied before.

ARCHITECTURAL ENGINEERING DEPARTMENT

ARCH01 First Year Project – Architectural Design

By: Hafta Ahmed Bedakh, Sahand Tahir Qasim, Rawan Hasen Ibrahim, Bahra Kheo Aziz, Abdul-Hamid Shamsedeen and Hivi Salim Husain.

The project is the first step for student's perception of the Architectural design, by transforming a random composition into a functional, on scale designed composition.

ARCH02 Second Year Project – Architectural Design

By: Sevan Sabah

The general concept has been taken from the maze, I took the outlines of the idea and the shapes that generates from these outlines, which is all about what Mystery is. I chose this concept because of the pattern that the tree position make resembling maze lines which leads to complexity mystery and lost in the site.

Four frames that are elevated from the ground starting from zero level .The shapes that generates from the frames become masses with different heights and the frames continue to make the site outlines , the motion of the frames that make the site outline is restricted by the general idea of site witch is forest and from the forest the positions of the trees .

ARCH03 Third Year Project - Student Housing (Dormitory)

By: Kwkab Naser Hasan
Supervisors: Khalid Dosky, Jowan B. Khorsheed, Sarbast Khalil, Dler Haji, Basna, Nazar

The main objective of the project is to provide a comfortable and convenient environment for students who live in it. Architecturally, the concept of this form is a form strongly referring to the vitality and activity where different form of neighboring buildings …

The concept refers that is necessary to make a mixing between cultures, languages, believes and make a link between the students to commutate these elements .and as student housing include these all elements it is possible to use it in other means ..

ARCH04 Fourth Year Project - University Health Center Design Project

By: Lubna A. Mohammed
Supervisors: Dr. Najeh, Aram, Awar

Location: University of Duhok near the Faculty of Medicine and pharmacy.

Concept of the Project: The idea of the project is taken from the principle of care and incubation because the health center within the University of Duhok provides care for students.

ARCH05 Duhok Expo / Kurdistan Pavilion

By: Masuod Mohammad Said Mohammad

A world expo (aka world exposition, internationals fair) is a three-to-six month, one-time public event on a grand scale. It is a monumental and magnificent undertaking that can have significant positive world, that participated a large number of countries around the world by showing a lot of types of different products. the particular benefits are Attracting large numbers of people , creating jobs and economic opportunities and Transfer of technology from place to another place.

ARCH06 Businessmen Hotel

By: Baybeen Shakr

They are situated in the heart of the city in busy commercial areas so as to get good and high business or the most of the business hotels are near the airport or near of the middle of major cities or medium –sized cities this hotel offers its services primarily to business travelers and those who have short trips
A lot of these hotels have luxury surroundings and a wide area of services

The idea of the project has been taken from the name of duhok [The naming of the city of Dohuk

came from dialect of Kurdish Krmenjah Some attributed this label, which means. (Dohuk) to the presence of large mountains in the city in the form of two eggs (do) means two (hook) or (heck) and mean egg.] and Because the site of Duhok city old was trade route this route trade was between two mountains and because of this project for businessmen.

ARCH07 Kurdish Writers and Poets Forum in Duhok

By: Ahmed Mustafa Ali

The project is a literature center that includes cultural and literary activities , as a gathering place for events collect authors, poets and the intellectuals of Kurdistan region.

The project includes a museum for the Kurdish literature, theater for the events and poetry symposium, multipurpose hall, library , magazine and café.

The idea was developed from the journey of the Kurdish literature that was inspired by the conflict between immortality and mortality in the Kurdish literature , the difficulties and the challenges that the Kurdish literature had faced.

ARCH08 Art Center

By: Amed Udban Abdullah

Art center is a collector building for collecting and organizing kinds of art in the suitable spaces such as visual arts of the: (drawing , painting ,sculpture , architecture, photography , film, printmaking and performance art) And the decorative arts of: (ceramics , jewelry making , metal crafting and wood working) , also its cultural center .

The design concept comes from art itself, that is art is a message it contains many feelings and awareness of artists to the people. For the building form I took the message envelope shape and began to change the shape of paper

ARCH09 Bugatti Complex

By: Abdulrhman Ayman

It's legend Italian brand, the project contain 3 section (cars show, shopping and entertainment) this kind of project makes Erbil city as a land mark and attraction to the city and economic income for the region and increase the tourism movement

ARCH10 Commercial Entertainment Center (In Duhok)

By: Alind Jalal Hossain

Definition: commercial centers is a type of commercial buildings combine a range of markets and selling sections interconnected through other key complementary spaces such as restaurants and cafeteria and gymnasiums in addition to an open and green areas for resting shoppers and visitors spaces.

Concept: It was taken from the movement of the commercial chart, rise and fall and shows the profits and losses in commerce.

Applied on design: The rise and fall movement shown in the roof and walls of the project, that is in different heights, and also applied the movement inside the project, contains of many levels inside that shown in the section of the project.

ARCH11 Islamic Culture Center

By: Duaa Yahya

Definition: Cultural Center, is a public building (part of the public buildings) which is comprising the components of a set of spaces with function relevant cultural events, Ltd. With these centers include a variety of events recreational.

Goals:

- To maintain the spirit of religious and Islamic culture in the new integrated project
- The development of Islamic education
- The desire to enrich the city of Dohuk project aims to develop and enrich the culture,
- The project will be a hub to hold ceremonies and religious events awareness
- These centers are one of the pillars of the Islamic cities which has a religious character

Concept: The idea is taken from Surat Al_qalim (ن والقلم وما يسطرون). The letter Noon refer to inkwell and the pen is the first thing that the God created after the throne. This scheme is formed in the basic framework and principle for the project comes from the definition of the mosque, which is a place of prayer goes from the body to the soul The mosque has become a symbol of the movement, a spirit ascending from the soil code to heaven.

Lighthouse represents the highest point of the project is to represent pray to heaven and closer to God. And I applicate my idea in this plan section and 3D.

ARCH12 Governorate Building Project in Dohuk

By :Hawar Muhemed Kak Hussen

The building of the province, a government administrative building, which is considered the most important administrative authority in the county, this is the most important building of the governorate building reflects the interface to maintain administrative authority.

Concept: The concept from symbol related to the shape of castle in Kurdistan that have the identity Historical places the philosophy of its meaning. the project borrowed from the shape and design Kurdistan castle.

The form depends on the concept that follows particular shape of castle and follows the function and the number of spaces that makes the parts of the building whether separated or connected together . specialty of place and to attract.

ARCH13 Kurdish Heritage Museum In Duhok

By: Hazim Rasheed Khamo

Duhok city needs this project because the city has one museum and small sized. The museum's collection consists of some three thousand artifacts although the museum's current facility displays only about one thousand of those. Plans are currently underway for a move to a new location with a park and a much larger exhibit space. Also, show to the people of the city life of their ancestors and their work.

Concept: From the site of the city of Duhok took three main elements that determine the identity of the city, two mountains and medial River.

From the history I took the idea from one of the artifacts in the Museum of Dohuk , is grave shaped egg, dates back to the Mitanni state that rule the city of Dohuk at that time, were found in the southwestern city of Dohuk.

The philosophy of this artifacts is the (human created from the egg must return to the egg when they die, so bury their dead in graves oval).

ARCH14 Olympic sport village

By: Jvat Nazar MohammedAmin

Definition: An Olympic village is an accommodation center built for an Olympic games, usually within an Olympic park or elsewhere in a host city, Olympic villages are built to house all participating athletes ,as well as officials, athletic trainers , and other staff, in addition to several indoor hall and outdoor fields for training , Olympic village is about project containing three major parts; residential, sport and administrative part. In such a project, the horizontal movement and circulation are more then vertical circulation, and that to know the relation between the main spaces, since the recreation and training projects should be on the main streets and highways, the task away from housing where local and international match are done

Concept: Taking the concept of the idea of the human body, when the man's self-confidence to reach their ambitions no matter how long the road and make a lot of fractures and loss and anything that destroys ambitions, and expressed through the long road which crossed to achieve their dreams and aspirations, a full long and difficult road of difficulties and competition, and respect for the Great Spirit human, and this idea combine with Olympic logo represent the five continents and brings together competitors in one place with the use of the Kurdish motifs in the project refers to the origins of the Kurdish values and the definition of the world Kurdish heritage and the richness of the history of the Kurdish, and use the torch symbol success of the banquet hall and the arrival of the summit, which is not easy Everyone accessible

ARCH15 College of Fine Art in University of Zaxo

By: Kajeen Ferhad Salih

Objectives: Education: the development and refinement of talent and developed through the teaching of art and teaching methods practiced, motivate talent and technical skill of the artists.

-Preparing academics and specialists are able to provide technical and implementation of projects and meet the needs of the state departments of staff and labor market specialist cadre holding bachelor's degree in fine arts.

Civilized: Contribute to the advancement of the art movement in Iraq and the Arab world on the basis of objective and scientific-based research and experimentation and art committed by graduate and Theo environment and climate-university academic appropriate for students.

Concept: The concept for the design retrieved from the concept that not of science where to science since the end found that found human science and to the end of the life of science remains and there is no limits or end of his conception taken from the infinity symbol.

ARCH16 Kurdistan Region Presidency (KRP)

By: Sherzad Khodaida Elias

The presidency of the Kurdistan region is a political, administrative, and legal intuition that was promulgated by the Kurdistan national assembly , the national parliament

Concept Layout comes from the symbols of Zoroastrianism (zaradashtian symbol)

The Faravahar or Frawahr is one of the symbols of Zoroastrianism.

Faravahar (or Ferohar), one of the primary symbols of Zoroastrianism, believed to be the depiction of a Fravashi (guardian spirit).

ARCH17 Peacebuilding Institution in Duhok

By: Naz Abdulkarim Mohammad

The project is an independent institute and a complex of different activates that leads and contributes to Peacebuilding and promoting the concept of coexistence.

Goals of the Project

1. Instituting strategies for all different ethnic groups, religions political ideologies to coexist in a democratic peaceful middle east.
2. Intellectual aim in promoting the concept of peace in the society.
3. Strategic aim in the concept of coexistence that protects people's rights and strengthens them.

Concept: War is a state of absence of peace, peace can not earn its meaning only when there is self defence of each side in a conflict.

Peace that lacks self defence expresses surrender and slavery , Peace doesn't mean absence of war and not the glory of one side but the coexistence of all.

The sharp – angled lines and shapes represent the sides in conflict and the circle represents the peaceful space that is strong enough not to be broken by the sharp elements..

ARCH18 Air sailing club project

By: Noor Janan

Definition: The project air Sailing Club is an entertaining and educational and sports featuring the most diverse and the Paragliding Aviation and light motor sports (balloon, Alhank Alidr, Altrick antenna and has a motor, small personal aircraft, etc.). It also contain a leisure and sports and educational sections of variety for visitors and viewers followers of such sports as well as for athletes belonging to this club (a variety of gym, gardens and parks open swimming pool, a sports stadium thatched, Cafeteria, and others.

Objectives: definition of the sport of paragliding and make it more familiar among the people, especially fans of adventures. The project is a forum to bring together athletes practitioners of the

sport from different regions. Create a recreational area and a new point of attraction for the city of Duhok rise the architectural value of this region spreading the culture of awareness through pregnancy and educational guidance and statements by the airline showing the progress in construction methods and new technology in the world domestic tourism support by participating in the tourist festivals

Idea: The idea was taken from the role of flying which is the action and reaction

Equaled in quantity and opposite in direction and it lies on one line also the body of sailing airplane in all the project giving the idea of the bird trying to take off and goes through the air.

ARCH19 Student Center

By: Noor Yousif Khalil

The project definition: Student centers is one of the most important elements that are involved in the development of university cities and urban communities, like all other social and health fields because it represents a point of contact between individuals (university students). The cultural buildings is a new concept of modern buildings and configuration appearing in the physical structure of a building where students exercise their activities in various cultural and entertainment types and meet different needs.

Project idea: Since the project is targeted at students in the University of Dohuk, which activity Student Center Vantalegt idea of vigor and vitality and dynamism of the fact that events in the center need to vigor and vitality, such as sport of lines soft and long lines dynamic which refers to the speed and movement. plus that human movement path while walking be any soft lines painted curved path became this human instinct breakthrough point.

ARCH20 Integrity Commission

By: Nazar Haji

Definition of project: Is the government independed office building belong to council of ministers , responsible of financial and administration transparency , and that obtain by the following – up and investigate with each directorate and directors , learning citizen and resident behavior and show respect for the legitimate and regular.

Design Concept: قال تعالى.. (ان هذا صراطي مستقيما فاتبعوه ..... الانعام١٥٣)

The concept of the project is directed people to the orders (the straight path) and this system will be stages, initially be at the level of the site as main entrance and then be ground floor level, as we know that the straight path is linked to the sky. There will be account for the liquidation of the corrupt person and honest person and before boarding the sky needed to be clean so that it passes into the water. If successful the account rises to the top (heaven) and if it did not succeed back to the corrupted place which is detection.

ARCH21 Centre for the Special Need Children

By: Rojman Shukri Tamar

The project is about creating a suitable building for the disabled children by different type of disability like (Physical disability, sensory disability, and mental disability) and provide them all needs from the educational point, health care need, social point and integrate them with the others member of society.

The concept: The concept is taken from the name and function of the project Cause of disability A defect in chromosome and chromosomes are contain two parts DNA and GENES

ARCH22 Ministry of Labor and Social Affairs

By: Ronak Ibrahim Ahmed

The ministry is responsible for a range of activities, cooperative societies, charities, social counseling, social benefits, childhood orphans, elderly care, care of the disabled, care events, social protection, social security, Job creation and operation of the unemployed, to find a working environment, and control laboratories and companies to improve working conditions, which creates far from work accidents safe environment

Goals:

1. Design a building to be a symbol for solving the social issues.

2. Help people through charities such as associations of education and dealing with the community.
3. Increase field work.

Concept: Taking the concept from wheat and water, this ministry is security of life therefore wheat and water keep the life security of human.

ARCH23 National Library – Erbil

By: Raad Awni

A **national library** is a library specifically established by the government of a country to serve as the preeminent repository of information for that country, to reflect the heritage of the nation.

Concept: Taken from the process of development of library (book) from the oldest (tablet, manuscript) to the newest (digital library).

I used the continued shape starts from the exhibition of manuscript, table and ends from digital part in the library… also the form is mixed of local architecture with contemporary direction.

ARCH24 Church and Convent Project

By: Rose Waseem Kanoon.

It's a Christian Religious complex used for those who believe in God and a place to help and support them. The churches and convents usually are built with different activities in addition to the prayer spaces to create an active community, such as educational, cultural, administrative and residential function.

Concept: The idea was taken from the boat anchor where the early Christians adapted and used the anchor in there manuscripts and letters as a sample of Jesus.

Similarly, Jesus is the anchor of the church and the church is the boat of this world where the ocean waves hit it, and without the anchor, that supports it against the hardships of life, it would draw.

And thus, Jesus the Christ is the anchor and saver who guarantees the stability of the church.

There are twelve columns distributed at the front of the building which represents the twelve apostles of Christ who embraced the church and preached of Jesus teachings (using the embracement logic)

ARCH25 Cultural Centre in Raniyah City

By: Shalaw Yaseen Ali

Definition: Cultural center is a part of awareness area to make cultural movement in the region. it can keep the high level of art and culture, its main parts are education area and art area. The message of this center is the same message of literature and art, the message is giving aesthetic. The aim of the project:

- To make a movement of human awareness.
- To keep beautiful parts of our culture and folklore.
- To make good social activity.
- A good entertainment.

Concept: The project concept comes from culture itself. Over all culture and art will work on human soul to show the unseen sides and to understanding human from himself. Culture will show human as partied and complicated creature.

ARCH26 Geology Research and Studies Center

By: Shlier Rasheed

Definition: Its geological Research studies Center consists of different sections and , studying everything related to the land , earth composition , its history and its components, Will be a center for the preservation of the environment and the earth. consist of education department, laboratories, and museum.

Concept: The idea is taken from the forces in the ground and its direct and strong impact on the Earth's surface.

these forces restrict in certain point inside the ground because of high temperature earth components moving and rise to higher levels until it reaches the earth's surface and is called ground cracks , through this complex process between the

ground and inside I wanted to show the power of the land and its relationship between each other and how to influence.

So I take forms that formed through this process called mass specially central earth mass.

ARCH27 Early Learning and Research Center

By: Xanda

Definition: An institute responsible developing and testing curricula and interactive educational methods through the participation of different interested parties for transferring up-to-date knowledge efficiently and mental possibility for students ,and participate community in learning process

Design Concept: The concept taken from human brain function because the project goals is to development human brain skills , Human brain consists of two part each one have deferent function :

Design Process: Because the brain has two parts connecting with each other in center my project also will be two blocks and there is connection between them in center. the form of the right block will more smooth and there is not right angle because the function of this part is innovation and art so I express that by smooth lines. while the left part form will be more regular line and have right angle because the function of this part is more logic order so I express these functions by regular and lines

ARCH28 Civil Defense Directorate

By: Zainab Issa Shawqi

Device takes a set of procedures and actions to protect the population and public and private property from fire and disasters, wars and various accidents and disaster relief and ensure the safety of transportation and communication and workflow in the public utilities and the protection of national sources of wealth in times of peace

Concept: Is a relationship between water and fire because water is one of the most element uses in extinguishing fire and fire have hard character but water is completely different is soft component and have strong integration with us.

ARCH29 Bank Project

By: Zina Bashar

The need of more developed banks in Duhok city. Stock market is not available in Duhok city with a required level of functions. Relatively speaking ,the ratio of unemployment is high. Necessity to find relations with foreign companies and commercial transactions and world countries

The idea of design is taken from chart shares on the Stock Exchange of any decline and rises in stock and the expression of transparency and even contradiction with the bank, which shows the hardness, strength, protection is room fortified idea taken from the Treasury and expressed the bank block snapped same formic fortified and the expression in the Treasury symbols and make its in the center of the project and highlight in the project, mainly because it is the main part of the project a mid-project

ARCH30 Airport Domestic in Rovia

By: Khalid Ahmed
Supervisors: Dr. Layla Rasol, Mr. Rojhat Barwary and Mr. Mohammed Al-Ghazi

There are a number of reasons for choosing this project:

1. The local area lacks the vital airport a world-class The salient features are an icon of the region.
2. Growing commercial in the region and its reflection of the growing passenger traffic in the future and the large number of domestic commercial flights, tourism and investment purposes.

Led all this to the need to find a vital airport is identical to international standards to be the icon reflect the region and the gate civilized her and expressing the spirit of the times and technology and the degree of urbanization and the characteristic element in the city and that leaves the impression travelers have across it to be a symbol of that city.

Concept of Design: metaphor of some elements of nature a bird or some of its parts, such as wing and be a metaphor in the form of the building structure and structural inspired by the structure of the bird skeleton of the plane where the streamlined shape helps it to penetrate the air and can be invested in the building

ELECTRICAL AND COMPUTER DEPARTMENT

ECE01 Arduino Based Car Security System

Dr. Ahmed Khorsheed

These days' car theft cases are higher than ever, give your car an excellent protection with the only reliable anti-theft device. Car central locking system ensures the best guarantee to protect your car from different kinds of theft cases. It is a car security device that offers excellent protection to your car. A car with central locking security system helps the user to lock and unlock doors at the press of a button. It desired to design a car security system such that a siren (hazard sound) will come on when it is stimulated by one or more sensors or inputs. This project will be pre designed using Simulink. Then a real system will be designed using sensors and hardware components controlled by Arduino board.

ECE02 Design of Dual Axis Solar Tracker

Dr. Lokman Hadi

Different techniques of increasing absorption of solar power have been utilized by many researchers for different practical applications. In this project, a design of a microcontroller-based solar panel tracking system is proposed. The project will allow the Photovoltaic (PV) panel remain aligned to the sun in order to improve the efficiency of the panel during the day light timing.

ECE03 Obstacle Avoidance Robot

Mr. Mohammed Subhi

This project aims to control over a small toy car using digital processing platform (Myrio form NI) the car should be able to avoid obstacle that confirm it. Sensors will be used to measure the distance from the objects and control algorithm will be implemented to steer the car, it will be driven by two D.C motor ultra-sonic transceiver will be used to sense the obstacles.

ECE04 A Proposed System for the ECE Department Library

Mrs. Anar Auda

The Goal of this project is to build an easy system for the Department library with its processes like (searching, borrowing, returning books, others) to make it easy for students to find books. It has realized the processing of book cataloging, book circulating, and book retrieval.

ECE05 Load Duration Curve for Duhok City

Mr. Auda Ablahad

The power developed of different consumers vary in accordance with their activity. The curve showing the variation of load with respect to time known as load curve (daily, monthly, yearly). When the load demand of a load curve are arranged in the order of descending magnitude, the curve thus obtained is called load duration curve. The load duration curve obtained from the same data on the load curve i.e. maximum load is represented to the left and decreasing load are to the right in descending order. The load duration curve gives the data in more presentable form. In other words, it shows the number of hours during the given load has prevailed.

ECE06 Mines and Metal Detector

Dr. Yasser Fadhel

This project is oriented on designing a simple metal detector to find out mines or hunt hidden treasures such as metal coins, iron ore, aluminum or even silver and gold buried under the earth. The instrument can be used by expert terms, hobbyists and treasure hunters alike. It can also be used to detect buried cables and concealed wiring. The electronic circuit is very simple and comprises two oscillators,

search coil, few transistors and biasing of 9V battery. Practical implementation is intended to verify the detector.

ECE07 Experimental Analysis of Pin Fin Heat Sink

Dr. Auday Abo and Mr. Raafat Habeeb

This project study the thermal performance for different diameter of pins. The coefficient of heat transfer and the performance with pins and without pins are investigated with different shape analytic. Experimental work investigate by using a set of thermocouples interface to Arduino.

ECE08 Design and Construction of an Electronic Length Meter

Mr. Raafat Habeeb

In some cases it needs to measure a length of long distance which is greater than any mechanical devices, such as measuring the length of fault cable distance. The meter based on a dedicated shaft encoder, that the student will design and construct it. The shaft encoder sends a two types of pulses to microcontroller depending whether the forward or backward rolling. The students has to design , construct a shaft encoder run it in lab and then based on this encoder the student transfer to design, program the prototype model of the meter. Since the device is battery operated, the student has to select the proper microcontroller that consume less power and efficient , the length of distance is displayed on two rows LCD for the above reason.

ECE09 High Frequency Induction Heating Sealing Machine

Dr. Auday Abo and Mr. Hassan Haji

Induction heating is a non-contact heating process. It uses high frequency current source to heat material that are electrically conductive. Since it is non-contact, the heating process does not contaminate the material being heated. It is also very efficient since the heat is actually generated inside the work piece. This can be contrasted with other heating methods where heat is generated in flame or heating element, which is then applied to the work piece. For these reasons induction heating lends itself to some unique applications in industry. The aim of the project is to build a single phase half bridge inverter operating at high frequency connected to high inductive load to generate a variable magnetic field which is used as heat source.

ECE10 Home Security Alarm system

Mrs. Delan Sherzad

Is a system designed to detect intrusion – unauthorized entry – into a building or area. Security alarms are used in residential, commercial, industrial, and military properties for protection against burglary (theft) or property damage, as well as personal protection against intruders. Prisons also use security systems for control of inmates.

ECE11 Design and Construction of Line Follower Car

Mr. Namiq Sultan

Line follower car is a car that can follow a colored path. The path can be visible like a white line on the black surface (or vice-

versa). It is an integrated design from the knowledge of mechanical, Electrical and computer engineering. This project Arduino uno microcontroller for controlling the movement and direction of the car to follow the line. Third sensor is used for stopping the car if it goes outside the path accidently. The car is driven by two dc motors whose speed are controlled by the microcontroller.

WATER RESOURCES ENGINEERING DEPARTMENT

WRE01 Channel Network Analysis Using HEC-RAS

By: Dler N. Hassan, Piroz H. Ali, Buhar N. Ali and Ali H. Hussein
Supervisor: Jihan M. Qasim

This project aims at using the (HEC-RAS) software to simulate the fluid flow in a network of interconnected open channels. The channels are different in their sizes. The shapes of the channel cross sections are: rectangular, trapezoidal and compound. In addition, a number of hydraulic structures were incorporated into the network: culvert, weir, bridge and gate.

The results of the HEC-RAS simulation include: water surface profiles, rating curves, 3D plots of the network and the structures, plots of velocity distribution, detailed output tables of hydraulic properties and a complete report showing input data, computations and final results.

The results of the project showed a successful HEC-RAS simulation of the water flow in the channel network and through the hydraulic structures. The developed model has many advantages for engineering practice; it is capable of modeling subcritical, supercritical, and critical flow regimes along with the effects of culvert, weir, bridge, and gate.

WRE02 Design of Barrages

By: Roj Raaof, Bawer Saeed, Bayan Bashar and Kajal Ismael
Supervisors: Dr. Bahzad Noori, Shimal Khalid

Barrages are structures constructed at the head of a river in order to divert river water towards a canal so as to ensure a regulated continuous supply of silt free water with a certain minimum head into the canal. Generally, barrages have two main purposes: diversion works and storage works. The diversion works are located across the river so as to raise the normal water level of the river and to divert the required supply into the canal. In addition to diversion, storage works to store surplus water when available in the river in excess of demand and supplement the direct flow of a river during keen demand. Design of barrages includes the design of undersluice, Canal head regulator, divide wall, fish ladder, piers and abutments, protection works and river training works.

In this project, the design of the barrage is concentrated on the hydraulic design in respect to subsoil flow and respect to surface flow. In the respect to subsoil flow includes determination of uplift pressures and exit gradient. While, in respect to surface flow includes: (a) design of crest levels of other barrage portion (weir) and undersluice, (b) determination of optimum waterway, afflux and discharge, (c) evaluation of retrogression effect, (d) design on the consideration of hydraulic jump including (1) determination of downstream floor level, (2) determination of downstream floor length, (3) determination of uplift pressures. (d) design with consideration of scour which includes (1) determination of minimum depth of upstream and downstream sheet piles, and (2) design of protection works.

Finally, detailed sketches for all components of the barrage are plotted and presented with different sections to show the full design.

WRE03 Design of Drip Irrigation System for Azadi Park

By: Sarhad Ali, Ibrahim Ismael, Hemin Mahmoud, and Talal Ibrahim
Supervisor: Shaker Abdulatif

Park Azadi is a large public green area in Duhok City. The art design of Parks has direct effect on recreation, as the trees are important element of the green area, irrigation work throughout spring and summer is important to keep Park healthy and viable. The data needed for the design of the irrigation system such as topographic map, water consumptive use and soil properties are studied. Digital map for the Park is imported from Google Earth to Civil 3D software. Surveying equipments were used to add new features to map including the trees position according to project. Study and analysis of soil samples, classification of soil and finding the soil water holding capacity based on by laboratory test. Searching for climate data and

plants properties to find the water needs by employing FAO CROPWAT 8 Software. Finally, the project includes the design of a drip irrigation system, which set the number of drippers for each tree, laterals length and diameters. Depending on the design output the time of operation and system cost were calculated.

WRE04 Design of Rainfall Storm System for the Area Located in the Faculty of Engineering

By: Kovan J., Saja Akram, and Banaz Jalal
Supervisors: Dr. Farsat Heto and Mahdi Salih

This project aims is to investigate the best solution for the problem of rainfall storm system water in the down hell locations of the faculty of engineering located at the University of Duhok campus. This project aims assessed through investigating the objective of design of an open channel and sewer pipe line systemin such area.

To fulfill the above objective the following research methodology is considered to be necessary such as surveying, hydrological design, hydraulic design and construction.

The project was divided into two main parts. Part 1: Addresses the topographic survey of the area of interest through the high precision survey techniques. While the part 2, design of an open channel and the storm sewer system in such area. The idea of combination of both methods of design was addressed to sustain the integration between the constructed of existing building and future landscape of that areas.

After the data were collected, the topographic surface of the entire area of interest was created, also the open channel and storm sewer system designed by using AutoCAD Civil3D software and Hydra flow storm sewer extension.

Finally the results of design show all dimensions of trapezoidal section of the open channel and storm sewer system of the entire area of the project as well as the BOQ(Bill Of Quantities)were prepared of the project as a tender for implementation.

WRE05 Design of Sanitary Landfill Unit in Quashe

By: Fatima Sh., Fatima Muwafaq, Nawroz A., and Valentin Wathiq
Supervisors: Sayran Ahmed and Khamleen Abdulqadir

Domestic solid waste management is one of the environmental problems that world care about it, so this project deals with this problem and their treatment methods. Over the world there are different methodsfor disposing off the domestic wastes by burning or sanitary land fill. In current project the design study concerning on the sanitary landfill which has different methods such as anaerobic sanitary landfill, Improved anaerobic sanitary landfill (Improved sanitary landfill), semi-aerobic landfill and aerobic landfill. In this project the semi- aerobic landfill was designed in Quashe at the eastern north of Duhok City to dispose off the wastes of Duhok ,Sumeil and Zakho Cities which is equal to 1200 ton per working day or equal to 300,0000 ton per year,50% of these wastes become landfill residuals (non-biodegraded) and the other 50% of these wastes are sorting and composting. This process is adopted by the unit of sorting. The gas emitted from the wastes is controlled by special pipes, also the leached waste water is controlled by a network of drainage pipes.

Sanitary landfill is an improvement method that obtained by compacting the non- biodegradable solid waste in layers over a base of an impermeable soil. Good design of landfill site will prevent, or reduce as far as possible, negative effects on the environment, as well as the risks to human health.

WRE06 Design of Waste Water Treatment Plant

By: Basi Jasim, Janiya Aido, Rajwa and Hasan
Supervisor: Ayub Anwar

The principal objective of waste water treatment is generally to allow human and industrial effluents to be disposed off without danger to human health or unacceptable damage to the natural environment..

The treatment's goals are:

1. Reach acceptable levels for the disposed domestic waste water.

2. Achieve safe levels for reuse of the treated waste water in different fields.
3. Insure a sufficient degree of protection of public health.

WRE07 Design of Water Supply for the Sector of a City by WaterCADV8i Program

By: Hussein A., Gilan Bahzad, Vahin Taha, and Zeri Bahzad
Supervisor: Sarhan Abdulsitar Sarhan

The aim of the project is to design the water supply project for the sector of a city in Dohuk governorate, concluding the:

a. Submersible pump for the well and centrifugal pumps for buildings of apartments.
b. Supply pipes between the pump and storage tank.
c. Network of pipes through the city by the computer program (WaterCADV8i).

Steps of the project:
1. Investigating the area.
2. Selecting the source of water(deep well).
3. Selecting an appropriate place for storage tank.
4. Surveying process between the source of water (deep well) and storage tank, and between storage tank and the city sector.
5. Design of pipe network using computer program (WaterCADV8i).

WRE08 Evaluation the Best Random Component in Modified Thomas – Fiering Model in Generation Rainfall Data for Akre station.

By: Firya Azaiz, Omar Muthafar, Kaywan Yunis, and Zindan Ghazi
Supervisors: Ali Abduljabar and Fawaz

This project, studied the effect of random component in the modified Thomas - Fiering model to generate daily rainfall data for Akre station. A random component with a special distributions of normal random numbers, Wilson – Harferty transformation, Truncated Wilson - Harferty and Kirby modification to Wilson – Harferty transformation has been used. The model was applied on the daily rainfall data of Akre station for available years (2000 - 2006) to generate rainfall data of the year 2006 - 2007. The results showed that generated and observed data, have a convergence between generated and observed data and the calculations of the correlation coefficient between the generated data and observed data for all random component distributions were as following (0.82, 0.77, 0.89 and 0.87), respectively. The tests Chi - Square test, Kolomogrov – Siminrov test, RMSE & MAE were used to compare between observed and generated data. All the results have passed the test Chi - Square test & Kolomogrov – Siminrov, where the calculated values are less than the tabular value at 5% significance. For the test RMSE & MAE we found, the Truncated Wilson - Harferty transform has the minimum values in this tests. It was found that, the Truncated Wilson - Harferty transform is the best for generating the rainfall data for Akre station.

WRE09 Flow Characteristics of Khazir River Basin

By: Payman Haji, Burhan Hawas, Birin Luwis and Randa Nafi'
Supervisor: Dr. Khalid Mahmoud

The project deal with study of some flow characteristics of Khazir river basin ,upstream of Asmara discharge site, which are related with:

a. Flood, drought, using the following probability distributions: normal, Gamble and Pearson type III distribution and then test the result using efficiency method to choose the best one for estimating the expected flood and drought for different return periods which can be used for design purposes of different hydraulic structures.
b. Amount and ratio of runoff and groundwater contribution using average monthly flow data for separating for a year represent the average annual flow within the recorded water year between 2005-2014, beside
c. Developed a mathematical relations between daily flow and antecedent 5 days daily rainfall ,daily flow and stage of the flow and daily flow versus site.

The results of the projects is very important due to lack of hydrological information related with Khazir river basin upstream of Asmawa discharge site in Kurdistan region.

WRE10 Qualification of a Power Plant Haul Route for Rigging Loads

By: Ghariba Salih, Lislaf Talaat, Jilan Muhammed and Ilham A.
Supervisor: Dr. Abdulrazaq Sadiq

Power Plant ROJLINE is engaging in the remodeling project to update all the equipment's. As part of this process, the haul route of the power plant must be checked for new haul loads. Two 80 ton capacity Grove RT880E hydraulic cranes, and a Liebherr LR1100 crawler crane will be used to carry the demolished parts of the main generators. The parts will be loaded on 40-ft flat bed trailers with 100 ton capacity.

There are some utility pipes buried under the haul route. These pipes are 1m diameter CMP storm drain pipe buried at 1.5m under ground, 20cm diameter PVC pipe at 75 cm under ground, and a 1m diameter concrete pipe at 1.75m under ground. The purpose of this calculation is to evaluate the structural integrity of these utility pipes and make sure that they can resist the imposed loads listed above.

WRE11 Estimation of Factor of Safety for the Upstream Face of Duhok Dam

By: Reder Jibrael, Suzan S. Taha, Lina Edwar, and Farah Riyadh
Supervisor: Dr. Azat Salam

DUHOK DAM: is located at the center city of Duhok. Which is 60.5m high , this make it classified as large dam .The dam is zoned earth dam, constructed from earth fill materials. The shell is constructed from gravel materials with clay core.

SLIP CIRCLE: the method used to analyze this type of dam is the slip circle method, which space that the surface occurs in the body of the dam takes shape of circle.

How to use: many proposal surface were taken to be checked for factor of safety of Duhok dam and analyzed analytically

Conclusion: it's found that the minimum factor of safety computed for the dam was minimum (1.11) which make the dam safe during the steady seepage