



UNIVERSITY OF DUHOK
COLLEGE OF ENGINEERING



ENGINEERING DESIGN DAY



15TH OF MAY 2016
UOD CAMPUS
STUDENTS CENTRE
10:00 AM TO 04:00 PM

PROJECT ABSTRACTS

3RD ENGINEERING DESIGN DAY

web.uod.ac/ac/c/coe



CIVIL ENGINEERING DEPARTMENT

GRADUATION PROJECTS

CE01 Design of Concrete Mixes Basing on Maximum Density of Combined Aggregate

By: Shilan Hazim Abdi, Kani Izzadeen Ameen, Younus Amer Younus, Faris Farooq Muhammed Ameen

Supervisor: Mr. Ghanim Hussein

Mix design can be defined as the process of selecting suitable ingredients of concrete and determining their relative properties with the object of producing concrete of certain minimum strength and durability as economically as possible.

It was realized that the use of aggregate having less voids, in other words aggregate that do not have a large deficiency or excess of any size and give a smooth grading curve produce the most satisfactory results. This can be explained by the so called maximum density or minimum voids.

To optimize the particle packing density of concrete, the particle should be selected to fill up the voids between large particles with smaller particles and so on, in order to obtain a dense and stiff particle structure.

Higher degree of particle packing leads to minimum voids, maximum density and requirement of cement and water will be less.

In this work, the optimum bulk density was obtained at proportion of 37% fine aggregate and 63% coarse aggregate (20 mm downsize). Fine different grades of concrete selected for this work normally (M20, M25, M30, M35 and M40) with different water cement ratio and paste contents in excess of void cement. The finished mix proportions for each grade of concrete was used to cast the cube specimens for 7 and 28 days curing age. While at the same time, a comparison was made with mixes designed by the ACI method.

The compressing strength results obtained by the present method and ACI method are nearly same.

The co-relation curves were plotted between compressive strength versus water cement ratio at 7 and 28 days curing age and compressive strength versus paste content at 7 and 28 days ago.

Very good co-relation is obtained and these curves can be used to decide the water cement ratio and paste content for the specified grade of concrete in case of maximum density method thus reducing the material and time.

CE02 Design of Mechanically Stabilized Retaining Walls of Batel Interchange

By: Kavin Ahmed Waysi, Anfal Islam Saleem, Noora Talb Saeed, Roja Abdulwahd Abdullah
Supervisor: Dr. Najdat Sabri

Mechanically stabilized earth or MSE is soil constructed with artificial reinforcing. It can be used for retaining walls, bridge abutments, seawalls, and dikes. Although the basic principles of MSE have been used throughout history, MSE was developed in its current form in the 1960s.

Mechanically Stabilized Earth (MSE) wall is a simple method of construction which relies on minimally reinforcing a soil structure such that the reinforcement will effectively carry a portion of the resultant loads caused by the weight of the soil and any additional external forces. That what in turn minimize, for retaining walls, the excavation required for casting the foundation and the structural reinforcing of the wall.

While all the conventional retaining walls require external design element such as the sliding, overturning, bearing and general failure; the mechanically stabilized earth walls require in addition to the external stability check, the internal stability check which include the design of the reinforcing against pullout and rupture.

This project is focusing on design details and sections of the mechanically stabilized earth wall required for assessing the Interchange of Batel Road which is one of the important element of the development and improvement of Dohuk-Zakho highway project. Batel is a small village about 30 km Northwest of Duhok city, because of the agricultural nature and the potential industrial planned land use of the village too much traffic expected to



interference from and to the highway between Duhok and Zakho

In this project the design elements and requirements is conducted by establishing an Excel Sheets hyperlinks for the external design and Excel VBA program for the internal design. The program is organized so as to be able to automatically provide the segmental panel distribution guide and the number and length of steel strips for each panel after ensuring the external and internal stability requirements.

The excel sheet also provide a guide for the segmental panel distribution over the wall for any required height over the sections of the interchange. The segmental precast element that form the facing of the walls of the project have been also designed so as to give the walls aesthetic appearance.

CE03 Performance of Hybrid Concrete Beams

By: Khidir Khudeda Hussein, Kawa Shuker Bsi, Dilgash Mustafa Mohammed, Sabah Shuker Sulaiman

Supervisor: Dr. James H.Haido

Concrete materials deterioration due to environmental conditions can be regarded as one of the main problems in concrete structures. To face this shortcoming, fine materials (silica fume or glass powder) can be used to produced high strength concrete (HSC) as repairing material. Waste glass powder was used in present endeavour as alternative material to silica fume to show the efficiency of this waste material in hybrid beam behaviour. These beams were made with ordinary concrete and HSC, the later was made with waste glass to produce eco-technology (green) material. Twenty six beams were cast with size of 40x10x10cm, where half of member was fabricated by normal concrete and the rest by HSC. Contact inclined surface between normal concrete (which is represented old concrete) and HSC (new concrete part) was treated by different ways such as grooves, holes, sand blast, steel brush and control one without treatment. The composite beams were tested in four points loading to induce pure flexural moment. Results indicate that the waste glass powder plays a good role in improvement the structural performance as alternative material to silica fume.

CE04 The Effects of Elevated Temperature on Mechanical Properties of Reactive Powder Concrete (RPC) Structural Elements

By: Mohammed Abdulmalek Noori, Delhin Salah Ramadhan, Songul Sadiq Mohammed, Nigar Abdulmajeed Mohammed, Haveen Idrees Mohammed

Supervisor: Mr. Msheer Hassan

The project is consists of an experimental investigation on the mechanical properties of Reactive Powder Concrete (RPC) and it's resistance to elevated temperature, mainly the explosive spalling occurrence and residual mechanical properties. To investigate the effects of elevated temperature on compressive strength, flexural strength, modulus of elasticity and Poisson's ratio of RPC, twenty four cylinders of (100 mm * 200 mm) and the same number of prisms of (100 mm * 100 mm * 330 mm) were casted and to be test in standard conditions. The main parameters of this study are the range of exposing temperature i.e. (200, 400, 600, 800 and 1000 °C) and the type of powder used as a Pozzolanic material i.e. (Silica fume and Glass powder).

CE05 A Comparison Study of Using Digital Level to GPS for Estimating Earthworks

By: Chinar Sulaiman Murad, Merna Alec Zaya, Rania Saad Ali, Hussein Muhammad Ali
Supervisor: Mr. Yousif Youkhanna

Earthwork is a process of excavating, hauling and placing materials from one place to another using economical methods. Any earthwork measurement have to pass through two stages which are, firstly, gathering data using surveying instrument, for instance, level instrument, total station, Global Positioning System (GPS), and laser scanning. These technologies could effect on quality, time and cost for construction projects where these aspects are the most important points. Secondly, measurement of figuring volumes using either manual methods or software method.

In this project, field test was carried out to gather data for estimating earthworks and two technologies were used which are, Digital Level (DNA 03) and



GPS. A path of almost 200m was chosen and divided into 20 stations with 10m interval. On each station, the elevation was taken for 5m and 10m for both sides using digital level. On the same path, random points were taken using GPS.

The purpose of the project was to compare between the two technologies used. Based on the result from tools used and using Auto CAD Civil 3D program to computing volumes, digital level is more accurate than GPS and the difference between the two equipment is 21.5 m³. However, digital level consumes more time and require more man power to gather data than GPS.

CE06 Potential of Municipal Solid Waste for Renewable Energy Production

By: Dakhil Hussein Alyas, Bakhtiar Taher Thahir, Aziz Bajo Ghanem, Dakhil Khalaf Findi
Supervisor: Dr. Maha Alghaban

Environmental project with economic benefit contributes to maintaining the cleanliness of the environment and at the same time waste utilization in power generation.

And it handles class basis on methane emission to the fact that this gas has many downsides if put in the air because the gas shorthand the ozone layer at a rate of more than 22 times the Shorthand my caused by CO₂ and thus lead to global warming occurs.

At the same time it has many benefits in the event of exploitation for a good fuel for many electric power systems.

Here we focus on the production of methane gas from the decomposition of organic waste and use in electric power generation in remote areas.

It was relying in this search on the data that taken from Duhok province and adopted in the accounts on the theoretical equation to calculate the gas quantity and this equation used nationally by a lot of researchers and linking the amount of wastes, quantity and temperature of the region and used matlab program for programming this equation linking the differences in variables The amount of gas production while giving clarifications graphical and statistical

CE07 An Investigation about Construction Safety in Duhok and Effectiveness of Using Personal Protection Equipment (PPE) in Construction.

By: Shang Ezat Arif, Amilda Ismail Khadida, Saveen Noori Petrus, Abeer Loay Alyas
Supervisor: Mr. Hishyar Ali

An Investigation about Construction Safety in Duhok and the effectiveness of using Personal Protection Equipment (PPE) in construction, To protect the employees and workers from the hazards the best way is that to control on the source of the hazards, depending on the worksite and hazards conditions it recommends that to use the engineering or work practice controls to manage minimize the incoming hazards to the greatest extent as possible.

Employees and workers during their working time at the site are the work practice control. When the control on the hazards are not required and sufficient protections are not provided from the engineering, work practice and administrative, the employers have to provide the Personal Protective Equipment (PPE) to the employees and workers and it have to ensure its use to provide the best protective to the workers and employees during the work.

First, start data collection from the resource about the personal protection equipment and in site safety tools, this process is called (secondary research).

After finishing from the data collection and knowing all about the PPE and in-site safety tools, Observation process have to be done which is that to visit a number of construction and noted the use of PPE and then make tables for proofing the use and effective of PPE for construction in the Duhok City.

CE08 Pedestrian Safety and Comfort on Sidewalk

By: Hassan Khalaf Kecho, Asaad Ahmed Hussain, Ali Akram Yaseen
Supervisor: Dr. Raad Kattan

Our study concern with the walkway conditions within Duhok city. Regulations put certain design specification for sidewalk including sidewalk height, slope, width and surface materials type. However



many sidewalks have been built outside the specification limits.

In this study we made a general survey for the sidewalk state in a selected area within Duhok city. In the survey we locate places with larger specification disobedience. We measure and photograph the places of a very high elevation sidewalk, very high cross slope and places with very slippery surfaces.

During building construction, sidewalks are completely occupied to store building materials. This will not allow for pedestrians a space to walk. Pedestrians are forced to walk on the road way.

CE09 Effect of Plastic Waste Materials on Geotechnical Properties of Clayey Soil

*By: Suhaila Gharib, Parween Akrem, Ikhlas Faruq Kajo, Yunis Muhammed Ali
Supervisor: Mr. Hussein Jalal*

Use of plastic products such as polyethylene bottles is increasing day by day leading to various environmental concerns. Therefore, the disposal of the plastic wastes without causing any ecological hazards has become a real challenge to the present society. Utilization of plastic as stabilizer provides new opportunities in economical soil stabilization.

This study presents a simple way of using polyethylene waste material (500 ml water bottle) in soil stabilization in the form of fibers. The effect of the stabilizer was evaluated by performing standard laboratory tests. These tests were conducted on natural and stabilized soil with two fiber contents (0.4% and 0.8%) of soil weight. The tests consisted of: Standard Compaction test, Unconfined Compressive Strength (UCS) test, and CBR (Unsoaked) test. In all tests, each fiber content percentage was added in two lengths (1cm and 2cm).

Laboratory test results showed an improvement in Maximum Dry Density (MDD), and a slight improvement in Optimum Moisture Content (OMC) of soil. Also, there was significant improvement in the UCS of soil. Results of CBR tests demonstrated that inclusion of plastic fibers in soil with appropriate amounts improved strength and deformation behaviour of soil substantially.

The percentage at which the maximum value of MDD, OMC, UCS and CBR (Unsoaked) is obtained is known as the optimum percentage of plastic fiber. For each test, the length of plastic fiber has a significant effect on the optimum percentage of plastic fiber.

CE10 Strengthening of Low Strength Reinforced Concrete Beam Using Compression Steel Bar and Steel Plate

*By: Paiman Ezat Abdulaziz, Jwan Naif Hamdi, Dilmen Elyas Yousif, Shaveen Habib Hussien
Supervisor: Mr. Idress Mohammed*

Strengthening of damaged or vulnerable reinforced concrete structures is important in order to guarantee the safety of residents or users. Beams are important structural elements for withstanding loads, so finding the efficient repair and strengthening methods are necessary in terms of maintaining the safety of the structures.

This project investigated various strengthening techniques for low reinforced concrete beams. The comparison and summary of each strengthening method are provided in this project.

The project involves the literature review of current experimental test strengthening techniques for reinforced concrete beams. The experimental studies were summarized by describing the specimens and loading details, All the methods in the research were categorized into four chapters: introduction, literature review, experimental program, discussion of the result.

The main purpose of experimental program is to investigate the strengthening of low strength beam having lack in the compression side by adding compression steel bar or steel plates or angels.

To investigate whether if we can convert the case of the beam failure from compression to tension failure in order to avoid sudden failure.

Fifteen over-reinforced beams of low strength (design strength of concrete is designed for $f_c' = 15$ Mpa) of cross section (height=170 mm, width= 200) mm and length 1.3 m will be cast. In order to obtain control beam that fail in compression all beams were reinforced with 3 \emptyset 16 mm bar in the bottom and 2 \emptyset 12 mm in top portion. Stirrups of \emptyset 10mm bars were



provided at a spacing of 100 mm c/c to prevent the shear failure of beam, The cover of beam will be maintained 25 mm for top and bottom while the side cover was 20 mm at both sides for all specimens. The rate of each materials is determined from several trail mix to obtain the specified f_c' , and checked by compressive strength test,

The parameters used in the project is the effect of the compression steel ratio (no bar, 1Ø12, 2Ø12 and 3Ø12) the style of the strengthening by steel bars(Near surface mounted, externally reinforced above the actual beam and externally reinforced after removing 2 cm of the top cover and the effect of the strengthening method (by sika monotop only, by sika monotop with steel bar, by steel plate and angle)

The beams are to be loaded by applying point load at the mid span of the beam in order to obtain the ultimate load of the beams accompanied by measuring the deflection at the mid span.

The final result of the project is estimated to convert the compression failure of the beam before strengthening, which is not preferable, to tension failure which is the request of design to give noticeable attention before failure. It's also supposed that this strengthening will increase the ultimate capacity and ductility of the beams by noticeable amount.

At the end we will discuss our result and draw the relation between load and deflections for beams and obtain the efficiency ness of these methods and choosing the better one between the suggested methods in this project.

CE11 Solid Waste Leachate Characterization at Kashee Landfill Site in Duhok City, and its Application on Treatment

By: Mohammed Rahman Sharif, Sangeen Omer Hasan, Hevi Hersh Noori, Huda Majeed Issa
Supervisor: Dr. Nashwan Shawkat

The Kashee landfill is locates nearby the west of Duhok, which is deliver 1500-2000 ton/day of solid waste which is collected from domestic, industrial, and hospital waste. The leachate coming out from this landfill, at winter around 22694.4 m³/day, usually contains large quantities of harmful pollutant

and contains high concentration of dissolved organic (BOD, COD, TOC), ammonium, toxic compounds and heavy metals.

The aim of this project is to characterize different types of leachate from Duhok landfill to evaluate the capacity and efficiency of the exiting leachate treatment system, to suggest potential treatment methods for the leachates from the two sites, sanitary landfill and dumping site, and to evaluated the methods and make comparison of the methods.

CE12 Mapping our Community: Making a Guide Map for the University of Duhok Campus.

By: Diyar Dashti M.S., Yousif Owenan Yousif, Haval Khairy Simo, Zeena Taha Yousif
Supervisor: Dr. Sarhat Mustafa

Guide maps of a university Campus may Shift the life of a student to a whole new level by being one of the most enlightening and fun tools used to get around the campus area. One of the most intriguing questions when a student is first accepted to a department at a specific university is simply

“How do I get there?”. Since the campus is growing, the necessity of making such a map is vital due to the large spaces and different departments and building's the university has to offer. Besides that, guide maps are able to support decision making between friends and colleagues to get to a destination the quickest and best way possible with ease and comfort.

CE13 Carwash Waste Water Treatment and Reuse in Duhok City

By: Raveen Fared Salih, Jivan Iskandar Haji, Lolav Obaidullah, Ibrahim Muhsin Salih
Supervisor: Mrs. Jwan Noori

The aim of this project is to determine the water consumption by professional car washes (Full-service and In-bay automatics) in Duhok city. This project is a design for Italian Car wash wastewater treatment and reuse (WWTP) which is located in Duhok city. The treatment plant will treat grey water from the professional car washes 100 car/day. The quantity of flow ranged from (2.402) m³/min. Wastewaters were generally mixed and contained high contaminant loads (oil and grease, COD and



Total Suspended Solids). Gravity oil separators used in the car washing facilities were able to reduce the pollutant loads (showing an 80 % efficiency) but usually not enough to meet the sewer discharge standards or reuse requirements.

The components of the WWTP were sized in order to cater for the quantity of wastewater entering the different treatment processes. The treatment plant consisted of bar screen chamber, conventional oil/water separators, Inclined Plate Settlers, Dual media filter, Activated Carbon filter Ultra filtration system.

Water reclaim (or water recycling) is a way to reduce upfront costs, reduce ongoing discharge costs, and/or meet requirements to reduce water consumption. A properly designed water reclaim system can be very efficient in its use of water without a great deal of maintenance and ongoing costs. The days of using "dirty" water to wash cars are gone. Today's reclaim equipment provides filtered and treated water that can be used in almost every application in the wash bay. The reclaim system can be designed to meet the needs of the wash and provide the right quality and quantity of water to best suit the needs of the site.



WATER RESOURCES ENGINEERING DEPARTMENT

GRADUATION PROJECTS

WRE01 Design of Irrigation and Drainage Network for Summel Stadium

By: Sara Askander Rasheed, Pari Chiavan Abd-Al Razaq, Mulkiya Jasim Hasan, Samir Aiub Majeed, Pola Ameen Raof

Supervisor: Sayran Ahmed Ibrahim

In general, Irrigation sprinklers are sprinklers providing irrigation to vegetation, or for recreation, as a cooling system, or for the control of airborne dust. Sprinkler irrigation is a method of applying irrigation water which is similar to natural rainfall. Sprinkler irrigation is a suitable method for supplying water to farms, gardens, play grounds, parks and sport pitches. This project is focused on supplying the water to sport pitch (football pitch) in Summel stadium by designing a network of pipe line consists of main pipe, laterals, sprinklers and a pump which delivers the water from a storage tank to the irrigation network.

The estimated number of the sprinklers is 20 sprinklers with irrigation radius of 18m for each one and the best sprinkler is TORO TR70XT rotor type which has the following specifications: radius is 12.5-21m, flow rate is 19.5- 101 L/min , trajectory is 50- 250 and recommended operating pressure range is 1.7-7 bar.

In order to get a green sport turf, the excess water from irrigation or rain should be disposed of; this is satisfied by the surface drainage and subsurface drainage. The surface drainage is satisfied by the slope surface which is at least 1-2% and in four directions, while the subsurface drainage consists of a network of a network of pipes surrounded by a filter. By an efficient irrigation and drainage, the grass will grow well without any problem which improves the player's performance.

WRE02 Design of Water Treatment Plant

By: Avan Nosrat Younis, Ayaz Fariq Ali, Barzan Joma, Khalid Nadir, Mohamed Qharib Ah

Supervisor: Ayub Mirza

Demand for the clean water is rising dramatically as people tend to live in urbanized localities mainly in big cities.

As the population of civilized people is growing sharply, people are in need of more water. The main purposes of consuming water is drinking, bathing, washing, gardening, etc.

The water treatment plant is essential wherever people live to provide them with the clean water and also with the quantity of their desire.

The demand for clean and also for the adequate quantity of water is going up steadily, therefore It is crucial that the civil engineer specifically water resources engineer to know, understand and learn the different processes of the water treatment.

The student will know through this project how to estimate the demand for the water throughout different periods of the day, month and year, and what are the best processes to make water potable, how to choose a proper layout of the plant and what are the possible sources for provision of water.

Moreover by completing this project students will know the important notes of the different treatment units to produce clean water.

WRE03 Design of Water Supply for University of Duhok Campus by WaterCad V8i Program

By: Farant Faraj Khalaf, Twana Hassan Ibrahim, Chneen Jalal Muhammed Hussien, Janan Ashqar Hassan Hassan, Layla Idrees Muhammed

Supervisor: Sarhan Abdulsitar Sarhan

The aim of the project is to design the water supply project for the University of Duhok campus.

Steps of the project:

1. Investigation of the area.
2. Selection the source of water (deep well).
3. Selection 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 buildings.
5. Design of pipes network through the buildings (WaterCAD V8i) program.

The project process will include also the design of:

- a. Submersible pump for the well.
- b. Supply pipes between the pump and storage tank.

WRE04 Design of Sanitary Sewer System for a Peshasazie District in Duhok City

By: Jwan Hussni Muhammed Ali, Khalida Khalo Lazgeen, Lawand Naso Masto, Kalina Saleem Sharow, Basman Samo Nafkhosh

Supervisor: Mr. Khairi Ali Omar

The aim of this project paper is to design a sanitary sewer system for a Peshasazie District in Duhok City. The design project demonstrates the success at designing of sanitary sewer systems. The report first provides brief introduction regarding the need of wastewater disposal. This involves the project city profile including location, condition of existing water supply and sanitation and current infrastructure. The paper also highlights the main objectives of the project. In the second stage the procedures of sanitary sewer system designs are presented. The major portion of the project is the detailed design of sanitary sewage and network. This involves detailed design of dry discharge flow, size of sewer pipe, sewer material, sewer appurtenances and design considerations are undertaken. On the basis of the results of this project, it can be concluded that putting this project into practice for Peshasazie district in special, and the whole Duhok city in general provided an improved infrastructure for liquid waste management.

WRE05 Design of Irrigation System for Olives Plantation

By: Hawre Karim Abdulla, Jalal Shekha Qadr, Aras Nuri Muhammad, Zhewar Muktar

Supervisor: Shaker Jalil

The Olives trees are traditional plantations in region to encourage farmers to increase these economic benefit trees a sample area near the college

laboratories is selected to study the design needs and to evaluate the quantity of water need for such plantation. For this purpose a topographic digital map is imported from Google Earth to Civil 3D, the map has been checked with actual field. Additional building in the field is measured by total station equipment and projected on the map to update it. 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.

WRE06 Design of Rainfall Storm System for the Area Located in the University Campus

By: Shan Teali Yahya, Sindis Ismail, Rojeen Mohammed, Fatima Mohammed, Karwan Salim

Supervisors: Dr.Farsat Heeto Abdulrahman, Mr.Fawaz Khalil Aswad

This project aims is to investigate the best solution for the problem of rainfall storm system water in the downhill locations of the specific area at the University of Duhok campus. This project aims assessed through investigating the objective of design of an open channel and sewer pipe line system in 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 includes two main parts. Part 1: Address the topographic survey of the area of interest through the high precision survey techniques. While the parte 2, design of an open channel and the storm sewer system in such area. The idea of using of both methods of design will be addressed to find the best solution in term of cost, accuracy and speed. In addition to sustain the integration between the construction of future building and landscape of that areas.



After the collecting data, the topographic surface of the entire area of study will be created, also the open channel and storm sewer system designed by using AutoCAD civil 3D software and Hydra flow storm sewer extension will be analysed.

WRE07 Design of Waste Water Treatment Plant

By: Omed Salim Khalaf, Suza Mofaq Soleiman, Shavin Tahsin Mohammad, Sulav Sabri Ramadan
Supervisor: Ayub Mirza

As people be apt to live in urbanized locations mainly in big cities, people are consuming water and producing waste water. Moreover as the living standard of individuals is rising people are utilizing more water and ultimately produce more waste water.

The waste water treatment plant becomes essential wherever people reside to treat the waste water they produce, to prevent water borne diseases, to preserve the aesthetic of the city and to recycle the water as the maximum rate.

It is crucial that the civil engineer specifically water resources engineer to know, understand and learn the different processes of the waste water recycling.

The student will know through this project how to know the strength of the waste water, what are the necessary parameters that they should consider and accordingly how to choose a proper scheme for the treatment.

Additionally by completing this project students will know the mechanisms of the different treatment units and also it will be a good back ground for them to further their knowledge in the advance treatment of the waste water.

WRE08 Determine the Flow Characteristics of Khabour river basin by using computer programming

By: Sandy Adil Butrus Suliman, Murad Khairy Murad Hajy, Mirza Hajo Murad Khalf, Ghazala Abdulwahed Hami Seso, Mafaz Mohammed Younis Thanwn
Supervisor: Fawaz Khaleel

A flood is a high stage in a river, normally the level at which the river overflows its banks and inundates

the adjoining area. The damages caused by floods in terms of loss of life, property and economic loss due to disruption of economic activity are very great. So the peak of extreme floods and stages corresponding to flood peaks provide valuable data for purposes of hydrologic design drought or minimum flow data is a hydrological extreme phenomenon like flood and is a natural disaster. the consequences of droughts on the agricultural production, hydropower generation and the regional economy in general are great.

WRE09 Design of a Rockfill Dam for Gali Bandawa

By: Bayar Najeeb Hassan Haji, Bilal Hussein Musa Hussein, Nawzat Shafeeq Othman, Sherzad Ramadhan Dakhaz Fathi, Farsat Majid Abdulah Musa

Supervisor: Siyamand Mohammed Ali

Dams has been constructed since humans struggled with the scarcity of water especially in arid and semi-arid areas. Embankment dams, both earth fill and rock fill dams has been of the first types that has been constructed for more than millennia. This is because this type of dams are easy for construction and suitable for most topography settings. Furthermore, the material for construction is available naturally.

Gali Bandawa, has a seasonal river that flows during winters. The valley is located at 12 Km South East of the Duhok city. It is proposed to construct a dam in the valley to store water during winters and exploit it for irrigation in summers.

Rock fill type of embankment dam is selected for this valley. As, the foundation at the dam site is composed of strong rock strata. Furthermore, rocks of appropriate quality are available naturally and in abundance. The height of dam is 32 m with a crest length of 10m and a total length of 354 m. The total capacity of the reservoir is 5 million m³. A chute spillway is provided to discharge a peak flow of 157 m³/sec. The crest length is designed to be 8 m.



WRE10 Creating DEM and Visual 3D View of the Bed of Duhok Reservoir Using Hypack System

By: Nijen Taha Ahmed, Awar Esmat Ali, Golav Ahmad Mohamad, Revan Tahir Rajab, Neeroj Abdulwahid Abdullah

Supervisors: Dr.Farsat Heeto Abdulrahman, Mr. Siyamand Mohammed Ali

The results from a hydrographic survey are normally plotted to produce a bathymetric contour map, which is a plan of the depth of the sea bed arranged in such a manner as to show lines of equal depth from the coastline. In a hydrographic survey, the actual measurement of the water depth is the easy part. The main problem is not knowing how far the survey boat is from the coastline when the depth is recorded. For each vertical depth recording, a horizontal position is also required. Both vertical depth measurements and horizontal position measurements may be carried out either manually (low tech, low cost) or using sophisticated depth and position fixing equipment (high tech, high cost), depending on the end use of the survey. Hydrographic surveys are required for a wide variety of purposes, ranging from simple reconnaissance (at project formulation, for instance) to payment for work carried out underwater, such as dredging or reclamation. The size of the area to be surveyed also influences the methodology to be used and hence the equipment required.

WRE11 Characteristics of Flow over Different Shapes of Sharp Crested Weirs Using Experimental and Numerical Simulation

By: Muhammad Wa'ad Omar, Ali Omar Ali, Muhammad Bahzad, Hajar Abid Hayder, Bawer Sarhan Hassan

Supervisor: Rondik Adil Ja'afar

Weirs are hydraulic obstruction used across an open channel. It can be used for many hydraulic problems such as increase of water level at upstream and measurement of flow rate (discharge).

In this project four types of sharp crested weir were built and tested experimentally, rectangular, triangular, trapezoidal and semi-circular weir. All models have the same height (20 cm), same length

of contraction ($L=20$ cm) and same depth of flowing water ($s=10$ cm).

Because nowadays attention to numerical models was increased in many engineering application so commercial computational fluid dynamic software (flow 3d) is applied to all models.

Finally, the results of numerical model were compared with physical model (experimental data).

WRE12 Hydraulic Applications Using MATLAB

By: Areen Farsat Ameen, Shahreeban Ibraheem, Firas Hussain Joqi, Kavi Shareef Rasheed, Haja Muhammed Ibraheem

Supervisor: Jihan Mahmood Qasim

In this project the MATLAB software is applied to different hydraulic situations in open-channels and in pressurized closed-conduits. The flow problems studied in rectangular, triangular, trapezoidal and circular open-channels include: geometric elements of channels; flow properties; alternate depth of flow; critical depth of flow; drawing specific energy diagram; drawing specific force diagram; sequent depth of hydraulic jump; normal depth of flow; drawing the gradually varied flow profile using: direct-step method and standard-step method.

The pressurized-pipe flow problems include: determining type of flow in pipes; limit critical velocities; pipe sizing; friction head loss in a single pipe; total head loss in a system of pipes connected in series; pressure drop in a system of pipes connected in series; shear stress distribution across a pipe section; velocity distribution across a pipe section; drawing a simple Moody diagram; drawing the hydraulic elements diagram of a pipe.

The MATLAB programs of the two types of hydraulic problems are connected to generate one general code. The designed MATLAB code is a useful tool for serving engineering practice and engineering education. It can solve efficiently a wide range of hydraulic problems, handle increased volume of data, check the validity of user-defined input data, and yield highly accurate graphical and tabular results.



ARCHITECTURAL ENGINEERING DEPARTMENT

GRADUATION PROJECTS

AR01 Residential Zone at Zawa Mountain

By: Mustafa Abdulghafoor Sulaiman, Halat Mohmmmed Zaki, Mahera Mohammed Salih, Zeyad Ibrahim

Supervisor: Mr. Aram Omer

The task aims to design a Tourist city on Mount Zawa within plan of urban development for Zawa mountain with all services including state departments, with in two steps:

The first step : The design begins with the very first basic elements of the urban design to the details in buildings, elevations and open spaces, the master plan contains six major zones, over 3 kilometers long on the top of the mountain, every zone consists of five projects from small buildings to complex of function and units,

The second step is to move from the general master plan to a zone to work on it in details and apply an architecture style on the primary elements in the zone.

AR02 Urban Design in Zawa Mountain – Cultural Zone

By: Hawsang Khudhir Mama, Salih Ismael Salih, Sahand Khalil Ismael

Supervisor: Mr. Hussein Yousif

The Project is Urban Design in Zawa Mountain in Duhok, and we designed a master

plan for mountain and then we start designing the cultural Zone, and our Architecture Style for this Design is Neo- Modern Style.

The Cultural Zone Containing 5 Building, and the Buildings are: Technology Research Center, Performing Art center, Celebration Center with Monument, Cinemas Complex and cinema production City.

At the first semester we worked as a group for designing the master plan, and Cultural Zone, and in Second Semester we worked individual for that each one design his project and building.

AR03 A Tourism City on Zawa Mountain

By: Hejar Safar Seto, Lubna Abdulkhaliq Muhammed, Rami Ismail Jameel, Avend Sadeq Hassan

Supervisor: Mr. Hussain Ahmed

The task is contain of design a Tourist city on Mount Zawa within plan of urban development for Duhok city from all services including state departments, recreational areas and tourist, and sports, include the region an area of approximately 3 square kilometers and has been all the streets and roads passages leading design to Mount. Design methodology is about how to design an urban area in the mountain environment and how to use urban elements and apply the concept of the design according to the theoretical stream because of the schools and the modern trends and heritage.

AR04 Mountain Zawa Master Plan

By: Zinar Muhi aldeen Fadil, George Merza Nona, Emmanuel Sargon Khnano

Supervisor: Mrs. Rana Fathi

As the Duhok region develops and its economy diversifies, more business and government travelers will create conference and business based tourism opportunities, through for example the use of convention centres and the need for relevant accommodation and other supporting infrastructure

A mixed-use development which features a range of cultural and entertainment amenities alongside landscaped parklands will build upon the existing cultural significance of the mountain whilst providing a new dynamic for Duhok

The project site covers a vast territory of undeveloped natural land stretching eastward. The development of the Zawa Masterplan will investigate a limited part of the mountain on the West side looking at the potentials to accommodate and focus on leisure and recreational program that provides a variety of activities.

This proposed program encompasses:



Entertainment Sector: A multitude of recreational and entertainment activities.

This sector will be the main design project of the group

- Cultural Sector: Tourism cultural activities.
- Commercial Sector: commerce based facilities.
- Residential Sector: residential chalets, Motels
- Sport Sector
- General Building (Services)

The Concept of Zawa Masterplan and Land-use layout will explore the different development principles and design approaches and options that could be implemented on Mount Zawa and progressively establish the development strategies for future expansion.

Low impact, outdoor recreational activities are key development opportunity as they exploit the natural assets that the area thrives of, without adversely affecting it.

It would include various outdoor activities.

Conference and culture-based tourism constitutes a significant tourism segment that would attract large groups of affluent travelers.

AR05 Urban Design on Zawa Mountain - Administration Zone

By: Viyan Tarid Sediq, Soleen Rajab, Wasan Sabah,

Supervisor: Mrs. Rana Fathi

The urban design project is on the Zawa mountain .the project is designed within plan of urban development of Duhok city .project related to the local environment and culture either within the future planes of public sector .environment friendly and symbolic nature area us 3 square kilometers and it's incudes 5 point of urban design (paths .edges .landmark . nodes .district.)and also include 6 zone (commercial . residential . sport .general building .culture and entertainment) each project approximately area is 30 m² or 50 m² and is designed as a post-modern style

AR06 Commercial Zone at Zawa Mountain

By: Jowan Asmaat, Adnan Sulaiman

Supervisor: Mr. Aram Omer

The task of this project is to design a modern master plan in Zawa mountain, the project has six major zone, and each zone contains five single projects on the top of the mountain, starting with the basic elements of the urban design. The project focuses on architectural style which is Organic Architecture and introduce it as a modern trend in nowadays architecture, then we moved into a detailed zone of the six as a commercial zone and the distribution of the projects and people circulation to solve the most challenge of the local commercial areas.

FOURTH YEAR PROJECTS

AR07 Child Hospital

By: Kawkab Naser Hasan

Supervisors: Dr. Najih Mohammed Mohammed, Mr. Rojhat Khalil Ibrahim

The project was designed including 100 beds. With a total area of 6000 square meters.

The concept is. ((How to reduce the fear factor of child when go to the hospital.... It can be done through.. the use of colors and forms close to the child's personality))

The building consist of (7) storeys which are

- Basement : for services
- Ground floor : emergency, administration, X-rays and clinics
- 1st floor : cafeterias , laboratories, playing areas and operations
- 2nd floor : intensive care and a part of patient's rooms
- 3rd , 4th, 5th, : patient's rooms

AR08 Rehabilitation Center

By: Lozan Aref Hassan

Supervisor: Dr. Najih Mohammed Mohammed

The rehabilitation center is for people who need psychological treatment (care)

It contains many different section (drug rehabilitation, consulting clinics, physical therapy,



occupational therapy, vocational rehabilitation, playing area, GYM and inpatient area)

My concept was (Recovery)

The aim of this concept to make a project into two contrast section:

Depend on people who come to center (patient) (confused patient)

People after treatment becomes (confident)

And the other aim of choosing this form to avoid building type of classic healthcare center (hospital)

I worked at deconstruction architectural style

THIRD YEAR PROJECTS

AR09 Shopping Center in Duhok city

By: Aya Shukri Muhammed

Supervisor: Dr. Layla M. Raswol

Notion:

Creating a building to service people around.

Idea:

Creating a building witch be attractive to attract people from the main axis.

Concept:

Using the movement of shoppers in the shops and using that movement for the masses of the building and also using the malls method (court surrounded with the shops).

AR10 Shopping Center in Duhok -A1

By: Sevan Sabah Mustafa

Supervisor: Dr. Layla M. Raswol

Notion:

Creating a mall with large court and this court share the landscape from outside and creating a mall with many entrances to solve traffic problems.

Idea:

The idea is how to make a mall with simple circulation like a large court and surrounded by shops and cafés etc.

Concept:

The concept is creating a gate for Duhok by forming this mall. I take the height of the mountains in Duhok and I translate it for forming the mall. and I wanted to make something attractive to attract people.

AR11 Shopping Center in Duhok –A3

By: Zana Ibrahim Islam

Supervisor: Dr. Layla M. Raswol

My project is shopping centre locate in K.R.O, the area of project is 29000m², the project is three story building with two story basements, my concept for project is using 2 shapes (triangle an squire) because the site is 2 parts and I connected the 2 sides of site by this two shapes.

AR12 Shopping Mall Project - B1

By: Ammr Abdul Menaf Majid.

Supervisors: Mr. Khalid Salih, Dr. Layla Raswol

A Three storey Shopping Mall Centre project in Duhok city, on KRO road, the area of project is 36000 square meters. It includes large, medium and small shops, restaurants, cafeteria, cinema and sport halls. The Project located on four roads and it includes over and underground Car parking. Project Surrounding includes (residential, commercial, sport field, and mosque).

AR13 Shopping Mall Project - B2

By: Kajiyan Abdulrahman Hussain

Supervisor: Mr. Khalid Salih

My project is Shopping Center in Zrka Street in Duhok , the Area is 34000 SqM , and I designed it just for that's district not for all of the Duhok city , and it containing : shops, restaurants, Café, Entertainment places, Social District, Administration and Services., and I designed car parking inn underground the project.

AR14 Shopping Mall Project – B3

By: Rekan Abdulbaqi Ahmed

Supervisor: Dr. Layla M. Raswol

My project is shopping centre locate in Gavarke ,the area of project is 53000m², the project is three story building with one story basements, the concept of the



project is taken from circulation and movement inside the project since it is shopping mall circulation and movement are important for visitors so they can find everything easily

SECOND YEAR PROJECTS

AR15 Desert Villa – 2

By: Hivi Salim Hussein

Supervisors: Haval Abdullah, Sarbast Khalil

The project is located in a hypothetical desert area with a total area of 2500 sqm(50X500,

The concept is a tree that appeared in desert cities which is (tumble weed),

The block of the building came from the lines of the concept. Also for the site it used the same technic of the lines that mirrored the concept.

AR16 Lake Villa – 1

By: Asma Mawlod Hassan

Supervisors: Sarbast Khalil, Naram Murqis

My villa project was in an area with a water surface nearby. The concept is based on the shapes of boat sails and nets

Total area is 1400 msq 5% of it is construction and 50% is landscape .

AR17 Primary School in Duhok - Masik - S3

By: Omed Hakim Abdulrahman

Supervisors: Haval Abdullah, Lawand Kamal

Starting from the basic ideas of school continuity + step by step ideology mixing it with a drawing perspective of an admire and influence by (victor vaserly etudes de Bauhaus painting) using the factor of depth and containment shown by rectangles in his painting + line in between the rectangle, resulting a mass with a deep relationship with the site , giving the (Masik) citizen a monument along with a school, so they look it as precious and high standing as it is and more .

AR18 Mountain Villa – 2

By: Havta Ahmad Bidakh

Supervisors: Haval Abdullah, Sarbast Khalil

This project is in a hypothetical mountainous territory with an area of 2000 msq the concept was horizontal tree section exploded into pieces which later became parts of building the landscape is extended from the same lines into the air supported by columns.

AR19 Primary School Duhok Malta - S1

By: Dleen Lazim Muhammad Salih

Supervisors: Sarbast Khalil, Lawand Kamal

My project is located in Duhok, Malta the area is 9000 sqm .

The school is designed for 240 students in 12 classes.

The concept is inspired by a sculpture made of metal frame in the shape of horizontal and vertical lines.



ELECTRICAL AND COMPUTER DEPARTMENT

GRADUATION PROJECTS

ECE01 Design and Implementation of Small Dancing Fountain

By: Mohammed Amin Seido Tamar, Mohamad Sardar Kamal, Haval Shamal Mohammed
Supervisors: Dr. Oday Adnan Abo, Mr. Mohammed Subhi Hadi

The purpose of our project is to model a musical dancing fountain that work with the tone of music, this will give a nice and attractive view when water rises up and down with music and LEDs blinks, music will be subdivided into frequency bands and amplitude of each band will be measured and water will rise up and down with the selected band according to its amplitude, project contains a fountain basin with size 80x80x60 cm³ and a microcontroller real-time with computer that control music bands and equalize it and give variable low voltage according to the amplitude of music band to an AC drive that will control the 3_phase motor speed, inside fountain basin there is 2 nozzles and the water will rise in full speed approximately 60-65 cm.

ECE02 Design of a Solar Updraft Tower

By: Rashid Abdulkarim Rashid, Omar Mohammed Hussain, Alend Shukri Abdi, Bryar Hasan Mohammed_Saleem
Supervisors: Dr. Lokman Hadi Hassan, Dr. Ody Adnan Abbo

A Solar updraft tower is proposed as a robust renewable-energy power plant for generating electricity based on harnessing solar radiation. The prototype consists of a collector to warm the air flow, a central updraft tower and a turbine unit. The tower is utilized to produce solar induced air flow which drives turbines to generate electricity.

In order to determine the temperature distribution along the prototype surface, an analysis of heat transfer phenomena between all sides of updraft tower and collector for radiation, convection and

conduction is investigated by using a microcontroller.

The fluid flow across the tower in ideal case is analyzed and compared with the flow in real case.

ECE03 Multichannel RF Remote Control

By: Burhan Anwar Abdulrazaq, Hayder Arif Mohammad Amin, Nasrat Salih Hassan
Supervisor: Mr. Namiq Sultan Abdullah

The project aims to design and implement a multichannel remote control that uses Radio Frequency. The system will be composed of one transmitter and many receivers. Each receiver can be connected to a device that will be switched ON and OFF remotely. The range of the transmitter is approximately 120m (open area) outdoors. Indoors, the range is approximately 60m, and will go through most walls. The controller can be used in various places and for controlling different devices.

ECE04 Notifying Doorbell with PushingBox

By: Walaa Abdulkader Yaktab, Payman Abdulkhalq Muhammed Sharif, Zhivan Fadhell Ahmed
Supervisor: Dr. Mohammed Ahmed Shakir

This project will help you to hack your doorbell to send Push notification and an email with an attached picture when somebody's at the door. It use the free PushingBox service to delegate all the programming part and make things easy.

How does it work?

1. When the doorbell is pushed, the Arduino sends an HTTP request to the PushingBox API.
2. PushingBox launches the user's scenario and gets a picture from the web camera.
3. PushingBox sends a Push notification to the user's phone and a mail message with the picture attached.





ECE05 Ultrasonic Radar System

By: Gulan Muhsin Ahmed, Fatima Saadi Tayeb, Miqdad Ahmed Musleh

Supervisors: Dr. Mohammed Ahmed Shakir, Mr. Fars Esmat Fathel samann

Radar is an object detection system that uses electromagnetic waves to identify the range, altitude, direction, or speed of both moving and fixed objects such as aircraft, ships, motor vehicles, weather formations, and terrain and when instead of electromagnetic waves, we use ultrasonic waves, it is called an ultrasonic radar. The main components in any Ultrasonic radar are the Ultrasonic Sensors. Ultrasonic sensors work on a principle similar to radar or sonar which evaluates attributes of a target by interpreting the echoes from radio or sound waves respectively. Ultrasonic sensors generate high frequency sound waves and evaluate the echo which is received back by the sensor. Sensors Calculate the time interval between sending the signal and receiving the echo to determine the distance to an object. This technology can be used for measuring: wind speed and direction (Anemometer), fullness of a tank and speed through air or water. Further applications include: humidifiers, sonar, medical ultra pornography, burglar alarms and non-destructive testing. Systems typically use a transducer which generates sound waves in the ultrasonic range, above 20,000 hertz, by turning electrical energy into sound, then upon receiving the echo turn the sound waves into electrical energy which can be measured and display.

ECE06 Study and Design Reconfigurable Patch-Antenna for Wireless Applications

By: Dawod Tawer Dawod, Barzan Simo Khalaf, Berivan Omar Omar

Supervisor: Mr. Fayyadh Hussein Ahmed

A new configuration of multi-state switchable wideband /multi-narrowband is demonstrated. The proposed antenna is based on a printed rectangular monopole antenna (PRMA) that covers wideband 3.3 GHz WiMAX frequency range. To generate a multi-state switchable antenna, center part of PRMA has been removed without distorting the PRMA behavior, in order to become several quarter wavelength strips form. Three PIN diode switches implemented and are placed to break or connect

strips. octa-operating modes, 2n modes (n is number of switches) are achieved by setting the switches ON or OFF. The penta- multiband operations are achieved due to the different lengths and widths of planar monopole patch as well as the one coupling side. The selection of the different modes is achieved by switching or breaking of the different antenna's part connection. The merit of the antenna design is that it allows various groups of its operating frequency bands to be selected using different switches states. In particular, each group of frequency bands, or mode, can be made to serve several different communication systems simultaneously. These systems may include various combinations of GSM1800, Universal Mobile

Telecommunications System (UMTS), DCS, PCS, Wireless Local Area Network (WLAN), and Worldwide interoperability for Microwave Access (WiMAX) applications. Therefore, by selecting different antenna modes, a variety of communication systems can be conveniently served by only one antenna.

The designed antenna has a simple planar structure and compact size of 30×50 mm². Simulation shows that realized gain in all operating bands is varied from -0.5 to 3.5 dB. The proposed antenna demonstrates good impedance matching, stable radiation pattern and reasonable gain at all frequency bands.

Simulation results have been obtained from commercially CST-2014 Microwave Studio.

For verification of simulation results, the proposed antenna is fabricated and the prototype is measured using R&S ZVL 13 Vector Network Analyzer. The results show a good agreement between simulated and measured results.

ECE07 Arduino Based Digital Multi-Function Power Meter

By: Dilkhaz Tayar Sadiq, Bahya Jamil Jebraail, Rojeen Adnan Arif

Supervisor: Prof. Dr. Ahmed Khorsheed Mohammed

Monitoring energy consumption with an Arduino based power-meter. It is a technique which can be used to figure out how much energy a device, a residence or an office is consuming. It's a very useful



method to keep the track of the power consumed by the appliances at any place. It can be used to find out the capacity of the things being operated and can help to find optimal solutions to consume electrical energy in a much more efficient way.

The final assembled Arduino digital power-meter, it's a device used to monitor the various parameters of the electrical energy being consumed at residences or offices or electrical devices. It is not required to connect different expensive meters to measure the how much electrical energy is consumed by device or in a building. A single energy monitor can provide all the valuable information which can help to monitor the energy consumption. The quantities which are shown by energy monitor are real power, apparent power, power factor, the supplied voltage and the current.

Power cannot be measured directly. It is not a simple task. Power is the product of current and voltage in the system. Therefore, to measure power, it is needed to sense both current and voltage in the system and find their product. Further to find active (watts) and reactive power (VARs), the phase difference between voltage and current is required, which is normally a cumbersome job. However in this article we will show how to design digital power meter which can measure all three types of powers.

Our digital power-meter was designed on an Arduino UNO with compiled various programming codes on it. A few of circuit diagrams were available for this project but the major components that we used in our design were: voltage transformer, current sensor, electronic relay, transistor, 16x2 LCD display, Arduino UNO board and etc.

The final calculations of our programming code analysis, shows the requested parameters on LCD display with acceptable error of used materials. At the end of the project we succeed to display measured electric network parameters, such as:

Voltage (V), Current (A), Active power (kW), Reactive power (KVAR), Apparent power (KVA), Power factor (PF)

ECE08 RFID Based Elevator

*By: Vanteen Abnowel Yalda, Kareen Zuher Abdulrahman, Media Mohammad Abdulrahman
Supervisor: Mr. Fars Esmat Fathel Samann*

The elevator is a piece of equipment, usually in the form of a small room or box, that carries people or goods straight up and down in tall buildings. These elevators allow free access to all floors all the times which provide no security. Our project is to develop an RFID (Radio Frequency Identification) based elevator. The objective of this project is to provide security and safety system based on RFID application. This project is suitable for hospitals, companies, office building, organizations, hotels...etc, because it only allow the authorized staff and users to access the elevator. Each user has its own tag and tags have unique serial number that identifies the tag user. The RFID system is integrated with a microcontroller and the results are displayed at the LCD display. The project upgrades the safety management level of the building, reduces the spinning times of the elevator and realizes the goal of intelligence, safety and energy conservation. Four floor elevator was used to test the task. Two methods of checking the request button were used in this project, polling and interrupt method.

ECE09 Simulation of Antennas Using Finite Difference Time Domain (FDTD) Method

*By: Adullah Yaseen Mirza, Avraz Salah Mahmood, Saleem Idres Saleem
Supervisor: Dr. Yasser Ahmed Fadhel*

This project is oriented on investigating the Finite difference time domain (FDTD) method to simulate antennas and using either software C++ or MATLAB code to write a programs that simulate one of the most important devices in any communication system named antenna. The FDTD is a method which solves electromagnetic problems that divides the space around any device into a tiny cubes and solving for Maxwell equations in each single cube. Eventually these solutions will be accumulated to get the total solution. Verification will be done via either CST software package or implementation and practical measurements.





ECE10 Home Automation System

By: Awad Ismail Jamil, Ahmed Mahmoud Abdal, Hiba Nahid Istefan, Mariana Auni Oraha, Israa Abdulbaqi Abdulhafedh
Supervisor: Dr. Sagvan Ali Saleh

Smart home that is used information technology to monitoring the environment, controlling the electric appliance and communicates remotely with the outer world. Smart home has been developed to automatically achieve some activities performed frequently in daily life to obtain more comfortable and easier life environment.

This project implement the real-time smart home system using microcontroller to control the electronic devices at home remotely with the help of a mobile device, it is getting alerts on any movement in the specified premises as well as gas leakage and make air conditioner system work automatically depending on temperature degree with remotely adjust the decision threshold. Four main units are used to implement the system: It is Arduino microcontroller board, mobile phone, GSM and sensors with some output devices such as fan, LEDs, GLCD and buzzer. Mobile unit act as user interface by sending orders to microcontroller via SMS and receiving alerts, microcontroller act is central processing unit, GSM used to make the communication between mobile phone and microcontroller and finally sensors which used as detectors. Any mobile phone can be used and it doesn't need any special features, six sensors used as heat, IR receiver, LDR, gas leakage, RFID and motion detector to make the house more security, safety and change the desired threshold as user need.

ECE11 Game Solver Robot

(Second Year Project)

By: Hana Hana Marbina , Maryana Franso Esho, Aysin Abdal Qasim, Pawan Jameel Hameed, Mohammed Akram Mohammed, Mohammed Omer Mohammed
Supervisor: Mr. Mohammed Subhi Hadi

Automation and robotics field has been progressively essential in industry, first step to enter this field always should be early, and this project is the challenge needed to start in this field. In this project a robot has been assembled and programmed to solve Rubik's Cube puzzle, a complex 3-D

combination puzzle which need an advanced algorithm to carry out the deciphering process, Lego Mindstorm EV3 kit has been used in this project to build the robot and programming it. Using the motors and sensors included in the kit, the robot was able to solve the puzzle in 2-3 minutes.

ECE12 Heat Loses Measurement Through Resistance Heater

(Third Year Project)

By: Araz Azad Khaleel, Omar Waleed Yaseen, Halbjar Hassan Mustafa, Younis Khalid Shukri
Supervisor: Dr. Ody Adnan Abbo

A device which is used to measure the losses of heaters in all fields is illustrated by using a Temperature controller. An ideal and experimental case is investigated by using 1st law of Thermodynamics and compare it with the experimental results to find the efficiency of heaters.

We can use this device as a quality control for all instrumentation that contain heaters to keep losses of power as low as possible.

ECE13 Numeric Water Level Indicator

(Third Year Project)

By: Marwan Idrees Hasan, Kurdistan Mohsin Salih, Sumaya Esam Esmaeel, Halala Moheaddin Othman
Supervisor: Mr. Namiq Sultan Abdullah

Water level indicator is an electronic device which senses water level inside the water tank and indicates the level on the seven segment display.

This uses the conducting nature of water as tap water is good conductor of electricity. Here we have used seven wires which indicate seven different levels that are full, mid-levels and empty. The low, mid-levels and full level are indicated on seven segment displays 7, 6, 5, 4, 3, 2, 1, 0 respectively. The ground potential is at the lowest level of the water tank. If water rises then respective number will be displayed. User can see present level of water on seven segment display. He can become alert by the numbers on the seven segment display.



ECE14 Baby Monitor with Sleep Aid System Based on White Noise

(Third Year Project)

By: Ninwi Bihnan Khoshaba, Karam Sulaiman Khalaf, Zainab Khalid Mohammed, Iman Dzuar Arif, Santa Nader Hasqial
Supervisor: Mr. Fars Esmat Fathel Samann

White noise is the most effective way to reduce stress in babies. Besides, it helps babies to sleep and cry less. Shushing sound is basically a White noise that has been used universally to make babies sleep. The aim of this project is to develop baby monitor system which informs the parents by sending message to them when the baby starts crying. This baby monitor system comes with new feature. This new feature is basically sleep aid system that help babies to go to sleep again by playing white noise, when they start to cry. In this project, mic sensor has been used to measure the noise level in the baby's room. When the noise level is above the threshold, it means the baby might be crying. After this, the baby monitor system will send message to inform the parents, and white noise will be played for specific duration. This will give enough time for parents to go to baby's room.

ECE15 Face Detection Using Raspberry Pi

(Third Year Project)

By: Salar Faiq Basi, Hishyar Majeed Shamo, Nazdar Mohammed Numan, Dakhil Khairy Khalaf, Raja Hafthullah Sabri
Supervisor: Dr. Shavan Kamal Askar

Face detection is concerned with finding whether or not there are any faces in a given image and, if present, returns the image location and content of each face. Most face detection algorithms are designed in the software domain and have a high detection rate, but they often require several seconds to detect faces in a single image, a processing speed that is insufficient for real-time applications. This project is a simple and easy hardware implementation of face detection system using Raspberry Pi, which itself is a minicomputer of a credit card size and is of a very low price.

The system is programmed using Python programming language. Both real time face detection and face detection from specific images, i.e. Object Recognition, is carried out and the proposed system is tested across various standard face databases, with and without noise and blurring effects. Efficiency of the system is analysed by calculating the Face detection rate for each of the database. The results reveal that the proposed system can be used for face detection even from poor quality images and shows excellent performance efficiency.

ECE16 Smart Cane for Blinds

(Third Year Project)

By: Dejeen Mohammed Tahr, Lolav Amer Abdulrahman, Mona Ibrahim Hussein, Alaa Tatarkhan Abdulrahman, Marwa Mohamed Hasan
Supervisor: Mr. Mohammed Subhi Hadi

Visually impaired individuals have problems when they need to navigate, they depend on other senses of human body or another person to avoid obstacle they face during moving. This project assist blinds in detecting obstacles during their walking this will enhance their productivity in community. Smart cane depend on ultrasonic waves to find obstacles by measuring the time between the send and receiving echo, using Arduino board, vibrator motor and buzzer a complete system has been constructed to alarm individual when there is an obstacle in his/her way and how far they are. There are three stages of alarm which can be differentiate, each representing a distance to the obstacle.

