

List of capstone projects (102)

	Project Title	Advisor (s)	Project Description	Pre-requisites and Requirements
A.	RF Energy harvesting system	Dr. Essam Hassan Dr. Hassan Ragheb	In wireless sensors placed in remote areas, charging their power source (Batteries) is a serious problem since accessing their location may be almost impossible. One way to power their energy source is by using a strong RF signal that is picked up by an antenna then is matched to several voltage doublers followed by a rectifier circuit which is to feed the power source.	EE203 and 340
B.	Investigating the Low Voltage Cable outages causes for Eastern Province	Dr. M H Shwehdi	Enhance background about Cables and how they are manufactured and operated. Receive all Data and records of outages of low voltage cable. Complete statistical analysis and physical derivation of what would be the most proper cause that led to such outages. 4-5 areas of the eastern province namely Dammam, Al Khobar, Qatif and Al Jubail will be under the study. Data will be requested from Saudi Electricity Company.	EE 465 is a plus
C.	Design OF an AC Filter for a PV System	Dr. Ibrahim Elamin Dr. Belahadj Chokri Dr. Mahmoud Kassas	PV systems produces DC voltage and which has to be converted into AC system by the use of inverters . Inverters produce harmonics which have to be filtered. Students are required to measure the harmonics produced from an existing PV system and to design and test a filters at the terminals of the PV system. be converts DC sources into AC.	Students may simulate the system through ETAP

D.	Remote Audio Listening Device	Dr. Husain A. Jamid	An electronic audio listening device is proposed for the purpose of listening to relatively distant sounds. A working distance of at least 75 meters is required. The device should utilize a parabolic dish no larger than 40 cm in diameter. The purpose of the parabolic dish is to concentrate the sound, so that it can easily be picked up by a microphone placed at the focal point of the dish. It also serves to filter out surrounding audio sources, due to the directionality of the dish.	EE 203 and EE 303
E.	Measurements of RF radiation from mobile base stations	Dr. Mahmoud M. Dawoud Dr. Alaa Hussain Mr. Umar Johar	Measurement and analysis of RF radiation from mobile base stations will be performed. The results will be compared to international standards of safe exposure to RF radiation. Design of report generation using LABVIEW software will be implemented.	Familiarity with LABVIEW software will be helpful. Training will be provided.
F.	Design of Antenna Array for Traffic Monitoring System.	Dr Sheikh Sharif Iqbal Dr M A Al-Suniadi Mr Umar Johar	<p>In this project a linear antenna array will be designed for traffic monitoring system. The array will include combined digital and analogue scanning mechanism to monitor different lanes of the road.</p> <p>Using standard theory, the array antenna will designed. The design process will consist of following:</p> <ol style="list-style-type: none"> (1) Design of the patch antenna for given dimensions (2) Design of the phase shifter (analogue and digital) (3) Design of the array feeder <p>Once designed, professional simulator will be used to optimize the array antenna. Finally the antenna array will be fabricated and tested.</p>	Lecturers will be given on the basic theory related to the project

G.	Design and Implementation of a Microcontroller-Based Multifunction Relay	Dr. M Abido Dr. Alaa Hussain	Overcurrent relays are the most common type of protective relays. They are being used for protecting Feeders, Motors, Generators, Transformers,...etc. Microcontrollers are being used nowadays by all manufacturers for realizing such relays. In this project a prototype is to be implemented and tested for such relay with added functions such as Metering, negative sequence protection and overload protection.	EE390 EE 466 (or currently registered)
H.	Curve tracer	Dr. Munir Al-Absi	Curve tracers are used in electronics labs to check if the transistors are working or not. The commercially available curve tracers found in the websites are very expensive (around 70,000SAR). The objective of this project is design and implement a Labview based a curve tracer. The total cost of the proposed curve tracer will not exceed 4000SAR including the computer.	EE 303
I.	Secure voice channel	Dr. Alakhdhar	Design and test a secure voice channel	EE303 and EE370
J.	Design of a system for car noise reduction	Dr. M. Deriche Dr. A. Zerguine Dr. S. Abdul-Jauwad	Design of a system for car noise reduction using adaptive filtering techniques	Some basic knowledge of MATLAB and Signal Processing
K.	Automatic signature recognition system	Dr. M. Mohandes Dr. M. Deriche	Design of an automatic signature recognition system	Some basic knowledge of MATLAB and Signal Processing

L.	Recognizing License Plates	Dr. M. Deriche Dr. A. Balghonaim	A system for Recognizing License Plates with Arabic Letters	Some basic knowledge of MATLAB and Signal Processing
M.	Design and Implementation of a Microcontroller-Based Negative Sequence Relay	Dr. Ibrahim Habiballah Dr. Alaa Hussain	<p>Negative sequence relays are the most common type of protective relays that detect the system unbalance conditions. In case of low unbalanced load, a warning is given after an adjustable time delay. In case of inadmissible high unbalanced load, the relays trip in accordance with the set characteristic. Negative sequence relays are being used for protecting Motors, Generators, Transformers,...etc. Microcontrollers are being used nowadays by all manufacturers for realizing such relays.</p> <p>In this project a prototype is to be designed, implemented and tested for such relay with added functions such as overcurrent and overload protection.</p>	EE390 EE 466 (or currently registered)
N.	Physical Layer Simulation of WiMAX	Dr. Samir Al-Ghadhban	In this project, student will be exposed to the physical layer operation of WiMAX devices. Simulation in Matlab software is required. Transmitters and receivers will be implemented in Matlab.	EE 370 Matlab Programming Skills

O.	Investigation of High Resolution Real Time Location System	Dr. Ali Muqaibel Mr. Umar Johar	Real time location systems are very important as they enable tracking of objects. They find applications in store houses, hospitals, security, sports...etc. The goal of this project is to investigate a real time location system (RLTS) based on a high resolution wideband commercial system by UBISENSE ®. The project involves understanding of how the system works and how to install it. It also includes finding the probability of error under different scenarios like obstructed and non-line-of-sight (NLOS) scenarios. The work includes the impact of different conditions and filters on the performance of the tracking system.	
P.	Water level Detection and Control	Dr. Zidouri	Design and implementation of a multi-level water Detection and Control. Traditional water level controller uses floating balls as the sensors for level detection. It is desirable to detect and control the water level in a digital manner, this will overcome the disadvantages of traditional systems.	

Q.	Wideband Channel Characterization	Dr. Saad Al-ahmadi Dr. Asrar Sheikh	Wideband channel characterization is very essential for the design and analysis of wireless communication schemes that operates over such channels. The availability of channel sounding equipment in the TRL lab makes it possible for our students to practice channel measurements and subsequent modeling. In this project, the students are expected to conduct the measurements and use these measurements in extracting the basic temporal and possibly spatial parameters of measured channels.	EE 370 and EE 315.
R.	Design of Distortion Analyzer	Dr. Al-Zaher	The objective of this project is to design a system that determines the harmonic distortion components of a signal and displays the result. The project involves designs of both analog and digital circuits to realize the desired system. Also, it includes digital/analog systems interfacing.	EE303 and EE390
S.	Practical vision system using NI CVS camera	Dr. Zidouri Dr. Deriche Dr. Badr	Image processing techniques are extensively used in multimedia applications such as compression of images and video, recognition of objects or persons from images or video, disease diagnosis from medical images, etc. The problem is that image processing techniques can be computationally very demanding. The aim of the project is to develop a suite of image processing algorithms that are not computationally expensive and which could be implemented in real time. The project will be implemented using the National Instruments Compact Vision System (NI CVS-1450) which was recently acquired by the EE Dept.	

