



Communications and Electronics Department
Graduation Project Abstract

Project No	1
Project Title	Design and implementation of Detection and Tracking System Based on Passive RFID
Supervisors	Prof . Khaled Ali Shehata Dr. Hanady Hussien Issa
Abstract	<p>Radio-Frequency IDentification (RFID) is the technology which employs radio waves to transfer data from an RFID tag which is attached to objects to RFID reader for the purpose of identifying and tracking the object. RFID technology has many practical applications in real time implementation as most of the systems are computerized. RFID technology applications are identify and tracking.</p> <p>This project intend to provide an efficient RFID inventory management and monitoring system. The system can be implemented for different applications such as library management hospitals inventory, etc. The proposed system targets to increase the availability of stock in its stores, boost the efficiency of retail stores, and improve its control of product shrinkage.</p>
Requirements	Good knowledge in Matlab and embedded systems (Arduino, raspberry Pi, etc.)
Courses	



Communications and Electronics Department
Graduation Project Abstract

Project No	2
Project Title	Design and Implementation of Encryption Algorithm for IoT application.
Supervisors	Dr. Hanady Hussien Issa
Abstract	<p>The Internet of Things (IoT) is one of hot topics in the industry. Its concept is based on connecting everything with internet. So if any object is equipped with identifier, sensors and wireless connectivity it can connected with interne. The sensors can use different types of local area connections such as RFID, Wi-Fi, Bluetooth, and Zigbee. In addition these sensors can also have wide area connectivity such as GSM, GPRS, 3G, and LTE. IoT has different applications such as Smart Cities, smart manufacturing, health care and automotive. These applications suffer from threats and hackers if no security is taken into consideration. As a result, user authentication is an important concern to protect data access from unauthorized users. This project concerns the hardware implementation of one of lightweight mutual security algorithm used for IoT application. The hardware platform is Field Programmable Gate Array (FPGA) which is configured (programmed) by VHDL language.</p>
Requirements	Good knowledge in Matlab and VHDL
Courses	VLSI 1



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Graduation Project Abstract

Project No	3
Project Title	Mixed Signal VLSI Test Kit
Supervisors	Prof. Amr Bayomi
Abstract	<p>This project will use Synopsys tools to build a mixed signal test circuit.</p> <p>The students will learn Python to make a design kit using finfets and Verilog-A to write behavioral modeling and compact models for devices. The end result will be a 16nm process design kit for finfets (ipdk) VLSI ASIC which has both digital and analog components.</p>
Requirements	
Courses	



Communications and Electronics Department
Graduation Project Abstract

Project No	4
Project Title	Brain / Eye / Hand gesture Controlled Unmanned vehicle
Supervisors	Prof. Hazem H. Ali
Abstract	To design and implement an Integrated circuit and System to control an unmanned vehicle by human brain signal together with simple eye motion and hand gesture.
Requirements	
Courses	



Communications and Electronics Department
Graduation Project Abstract

Project No	5
Project Title	An Integrated Electronic System to Detect the presence of submersed plants and measure Extracted Gas
Supervisors	Prof. Hazem H. Ali
Abstract	
Requirements	
Courses	



Communications and Electronics Department
Graduation Project Abstract

Project No	6
Project Title	Design and Simulation of CNTFET Inverter
Supervisors	Dr. Mostafa Fedawy
Abstract	Silicon-based integrated circuit technology is approaching its physical limit as the device dimensions scale to the nanometer regime. Carbon nanotube field effect transistor (CNTFET) is a promising candidate for future integrated circuits because of its excellent properties like near ballistic transport, high carrier mobility in semiconducting carbon nanotube (CNTs), and easy integration of high-k dielectric material resulting in better gate electrostatics. CNTFET also shows the high stability, low power circuit design, high signal to noise margin (SNM) and high gain in the circuit design.
Requirements	
Courses	



Communications and Electronics Department
Graduation Project Abstract

Project No	7
Project Title	Single Junction Solar Cell Characteristics
Supervisors	Dr. Mostafa Fedawy
Abstract	Photovoltaic is a most elegant energy source. Light shines on a crystal and produces electricity. The fuel source (sunlight) is free, abundant and widely distributed, available to every country and person in the world. The many advantages of photovoltaics lend itself to being the ultimate energy source. However, it required the semiconductor revolution and advances in manufacturing before photovoltaics could begin to reveal its full potential.
Requirements	
Courses	



Project No	8
Project Title	Interference Immunity of Ultra Wide Band Antennas
Supervisors	Prof: Mohamed Hassan Abd El-Azeem Dr. Mahmoud A. Abdalla
Abstract	<p>In recent years, the use of ultra-wideband (UWB) systems has been increased due to their low power consumption, low price, and their great data rate due to the short pulses of UWB. These systems use a frequency band from 3.1 GHz to 10.6 GHz, which was released in 2002 by the Federal Communication Commission. However, there are many new narrowband wireless services which operate within this frequency spectrum. The UWB antennas should immunize the interference of these narrowband systems.</p> <p>1-Problem definition Design of an UWB antenna for high speed applications with capability of nearby wireless system immunity.</p> <p>2- Main objectives Design, simulate, and implementation of an UWB antenna for high speed applications with capability of nearby wireless system immunity.</p> <p>3- Technology used for implementation Electromagnetic full wave simulation, planar antenna fabrication</p> <p>4- Software programs used for implementation High Frequency Structure Simulations (HFSS) Microwave Studio (CST)</p> <p>5-Main difference between the proposed system and current alternative systems Compact size, high isolation, simple design antenna structure.</p> <p>6-Project Main Steps:</p> <ul style="list-style-type: none">• Theoretical analysis of planar microstrip antennas.• Understanding of the different microwave transmission lines and matching techniques.• Design of planar bandstop filters.• Design verifications using circuit simulator and electromagnetic full wave simulations.• Practical realization of the antenna in microstrip technology.• Experimental measurements of the antenna radiation properties.
Requirements	
Courses	



Project No	9
Project Title	4G MIMO Microstrip Antenna for Laptop Applications
Supervisors	Prof: Mohamed Hassan Abd El-Azeem
Abstract	<p>Introduction: in this project a Microstrip rectangular patch antenna element with proximity feeding technique that works at 2.4 GHz with 28.5% impedance bandwidth that covers the whole ISM 2.4GHz band and gain of 9dBi at the center frequency is designed, optimized, fabricated and measured for 4G MIMO Microstrip Antenna for Laptop Applications.</p> <p style="text-align: center;">1-Problem definition</p> <p>Design of a microstrip antenna for laptop applications</p> <p style="text-align: center;">2- Main objectives</p> <p>Design, simulate, and implementation of a microstrip antenna for laptop applications</p> <p style="text-align: center;">3- Technology used for implementation</p> <p>Electromagnetic full wave simulation, planar antenna fabrication</p> <p style="text-align: center;">4- Software programs used for implementation</p> <p>High Frequency Structure Simulations (HFSS) Microwave Studio (CST)</p> <p style="text-align: center;">5-Main difference between the proposed system and current alternative systems</p> <p>Compact size and simple design antenna structure.</p> <p style="text-align: center;">6-Project Main Steps:</p> <ul style="list-style-type: none">• Theoretical analysis of planar microstrip antennas.• Understanding of the different microwave transmission lines and feeding techniques.• Design of planar patch antenna.• Design verifications using circuit simulator and electromagnetic full wave simulations.• Practical realization of the antenna in microstrip technology.• Experimental measurements of the antenna radiation properties.
Requirements	
Courses	



Communications and Electronics Department
Graduation Project Abstract

Project No	10
Project Title	Mobile Phone Jamming System (MPJS)
Supervisors	Prof. Hesham ElBadawy
Abstract	Nowadays, mobile (or cell) phones are becoming essential tools in our daily life. Needless to say, the wide use of mobile phones could create some problems as the sound of ringing becomes annoying or disrupting. This could happen in some places like conference rooms, law courts, libraries, lecture rooms and mosques. One way to stop these disrupting ringing is to install a device in such places which will inhibit the use of mobiles, i.e., make them obsolete. Such a device is known as mobile phone jammer.
Requirements	
Courses	



Project No	11
Project Title	Mobile/Vehicle Radio Direction Finder (MRDF/VRDF)
Supervisors	Prof. Hesham ElBadawy Dr.Hussein ElAttar
Abstract	<p>MRDF/VRDF units are simple and very useful. These prototypes are so versatile and simple to make. They are so simple; you can build one for each of your vehicles, just to have in case of an emergency transmitter hunted.</p> <p>MRDF/VRDF units work by exploiting the phase shift that occurs when the path length from the transmitter to the MRDF/VRDF prototype elements are unequal. This project will be prepared to investigate the vehicle radio direction finding techniques, methods of implementation, and the design and execution of a prototype VRDF system. The purpose of using VRDF is to be able to detect and locate the source of an enemy (Fox) or unknown signal. The programs such as Matlab and Arduino, or Raspberry PI and suitable Graphical user interface (GUI) may use in the implementation process.</p> <p>The main target is to implement a system to predict that a certain area has unknown transmitter or not. This may be done via the determination the location of a transmitter at a given angle. The accuracy of position finding/tracking is enhanced by adding more receivers, and after that to include the option of frequency scanning.</p>
Requirements	The project group will implement all the stages (may be 4 students or less) by means of discrete components.
Courses	



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Graduation Project Abstract

Project No	12
Project Title	Portable Health Records
Supervisors	Dr.Fadel Digham Dr.Hussein ElAttar
Abstract	The find a solution to upload new patient records from his doctor/lab results to a portable device (e.g., patient's mobile phone) and likewise to retrieve it back by doctors when needed and to synchronize with a central database.
Requirements	
Courses	



Communications and Electronics Department
Graduation Project Abstract

Project No	13
Project Title	Design, Simulation and Implementation of VOIP Networks
Supervisors	Dr.Hussein ElAttar
Abstract	Voice over IP (VoIP) is a technology that permits communication calls to be made over the internet and it is expected to become the mainstream for communication due to its low cost. However, the quality of VoIP is mainly impaired by jitter, delay, packet loss, distortion and many other parameters. As a case study, we simulate a VoIP network and study its behavior and Quality of Service (QoS) under different scenarios as increasing the traffic load and generating more realistic topologies. Furthermore, we study all the potential parameters that can deteriorate the quality of VoIP and evaluate their impact to the overall QoS through simulations in OPNET
Requirements	
Courses	



Project No	14
Project Title	Book scanning and digitization services
Supervisors	Prof. Mohamed El Mahallawy Dr. Safa Gasser
Abstract	<p>The digitization of library collections is transforming the ways that students and researchers discover information and conduct research analysis. OCR short for Optical Character Recognition is the process of taking an image of letters or typed text and converting it into data that computers can understand. Data are generally passed to the computer by using a scanner or other hardware devices, like a digital camera.</p> <p>Sometimes reading from old books can be hard because of worn out papers, ink disappearance due to aging. Thus, recovering these books is necessary to keep their data handy and accessible in every place.</p> <p>The Lego Mindstorms is a series of kits containing powerful software and hardware components to design customizable, programmable robots. Raspberry Pi is a dynamic credit card sized mini PC that can outperform variety of advanced projects.</p> <p>Tasks and Procedures:</p> <ol style="list-style-type: none"><i>1. Image processing background.</i><i>2. Real-time image processing for OCR.</i><i>3. Hardware setup.</i><i>4. Camera interface.</i><i>5. Motors control.</i><i>6. System integration.</i>
Requirements	
Courses	



Communications and Electronics Department
Graduation Project Abstract

Project No	15
Project Title	Gesture Controlled Drone via Microsoft Xbox Kinect
Supervisors	Prof Mohamed El Mahallawy Dr Safa Gasser
Abstract	Drones aka Quadcopters are widely used in remote areas surveillance. They are accustomed to access areas cannot be accessed by humans at the meantime. A lot of worldwide companies are currently manufacturing drones for end users. Drones can be built with different methods and can operate depending upon different techniques. In this project the drone is controlled through Gesture recognition, meaning it moves according to human hand motion. OpenNI (Natural Interaction) and NiTE from PrimeSense are very relevant pieces of software for such kind of Xbox Kinect projects.
Requirements	
Courses	Communication Networks



Communications and Electronics Department
Graduation Project Abstract

Project No	16
Project Title	Effective spectrum utilization using different techniques of AI in 4G cognitive radio networks
Supervisors	Prof. Mohamed El Mahallawy Dr. Hazim Shatela
Abstract	<p>The demand of more spectrum has led to the introduction of the CR to intelligently allocate spectrum for secondary users. In order to do that the cognitive engine of the CR uses different AI techniques to use the spectrum more efficiently.</p> <p>This project will discuss different AI techniques to be used and compare them using different radio knobs</p>
Requirements	
Courses	



Communications and Electronics Department
Graduation Project Abstract

Project No	17
Project Title	Adaptive modulation using cognitive radio in 4G networks
Supervisors	Dr Safa Gasser Dr. Hazim Shatela
Abstract	This project will discuss the use of adaptive modulation using CR in 4G networks and its benefit over using Fixed modulation in terms of spectral efficiency and BER. Adaptive modulation will alter different radio knobs which varies according to the type of channel, transmit power and data rates.
Requirements	
Courses	



Project No	18
Project Title	Handheld Navigation System and data logger with GSM
Supervisors	Dr. Bassem Sheta Dr.Ahmed Mohsen
Abstract	<p>The use of handheld personal navigation devices has been widely used these days in many applications. For example, the workers in the fields need to know their position and send their location to the central monitoring station to be tracked for any emergency cases. In addition, this position information can be augmented into a Geographic Information System (GIS) which can be an added value for positioning and localization of the workers in the field.</p> <p>In this project, a handheld real-time navigation system and data logger with GSM is required to be designed and developed. The developed system will provide real-time positioning data for pedestrian using GPS, IMU, and digital compass sensors.</p> <p>To accomplish this requirement, some sensors will be used such as GPS which will be used for positioning information along with 10 degree of freedom sensors containing IMU, digital compass, and barometric pressure sensor which will be used for attitude, heading, and height information. These sensors will be integrated and interacted with a microcontroller that controls the sensors measurements such that accurate navigation is provided. The position information will be saved and sent via GSM to a central station.</p> <p>Successful development of this project will enhance the capabilities of the candidate in many aspects such as signal processing, real time programming, and microcontroller based applications</p>
Requirements	
Courses	