Department:	**Mechanical Engineering – Mechatronics**	
Project:	Maximum power tracking for solar collector	
Supervisor:	**Dr. Ibrahim Mohamed Hassan**	
Students:		

ABSTRACT

During the project, the students have designed the mechanical part of the machine. This includes the preparation of engineering drawing, workshop drawings and calculation sheets. The mechanical parts have been manufactured and assembled according to the design. The control strategy and control system have been developed by the students. The control system consists from hardware, such as electronic circuits, and software, such as motion control and user interface. The system has been established and tested. The tests prove the system workability and accuracy.

The project contains all the mechatronics branches. It contains mechanical system, which is controlled using electronic circuits. The control strategy is contained in software. All the system parts have been developed and executed by the students.

Department:	**Mechanical Engineering (Mechatronics)**	
Project:	**Design and manufacturing of Remotely Operated Vehicle (ROV)**	
Supervisor:	**Assoc. Prof. Dr. Sameh Shaaban**	
Students:		

ABSTRACT

Remotely operated vehicles are now commonly used in many under water activities. They can be used for search and rescue applications as well as for engineering applications like the underwater welding.

The present project aims at designing and manufacturing of an ROV that can be used for a water depth down to 10 m below the free water surface. The project includes the selection and sizing of different components as well as the design and manufacturing of the required control system. Insulated DC motors were used in the project. Speed and direction control circuits were designed and manufactured. A live video camera was also installed on the ROV. Thereby, the ORV can be derived from a long distance. A robot arm was also attached to the ROV in order to perform different operations under the water surface.

Department:	**Mechanical Engineering (Mechatronics)**	
Project:	**Design and manufacturing of an underwater cleaning robot**	
Supervisor:	**Assoc. Prof. Dr. Sameh Shaaban**	
Students:		

ABSTRACT

Under water cleaning robots are used for cleaning closed deep tanks as well as swimming pools. Cleaning is performed by the robot other than by a human being that dives inside the deep tank. The present project aims at designing and manufacturing of an underwater cleaning robot that can be used for cleaning tanks or swimming pools with a maximum depth of 10 m. The project includes the selection and sizing of different components as well as the design and manufacturing of the required control system. Insulated DC motors were used in the project. Speed and direction control circuits were designed and manufactured. A live video camera was also installed on the robot. Thereby, the robot can be derived from outside the tank. A robot arm with a cleaning tool was also attached to the robot in order to perform different cleaning operations.

Department:	**Mechanical Engineering – Mechatronics**	
Project:	autonomous mobile robot	
Supervisor:	**Dr. Mohamed Ibrahim**	
Students:	**Loai nasser**	
	Islam osama	
	Ahmed salah	
	Ahmed hesham	
	Adbullah ali	

ABSTRACT

This project consists of designing and implementing a full autonomous mobile robot, its application is to vacuum the floor of a room or any area without any human interaction based on Infrared and ultrasonic sensors for tracking, highly programmed microcontroller for control and well-chosen motors for movement and power efficiency with optimum cost. This robot will take decision by itself and this will assist people at home who are too busy for daily or weekly floor cleaning, especially for families with children. In particular for the elderly who live by themselves and do not have the strength or ability to clean, as it doesn't require any physical effort and it is very better alternative than expensive housekeeping services. It is also ideal for people with disabilities or Mobility Issues.

During the project, the students have designed the mechanical part of the machine. This includes the preparation of engineering drawing, workshop drawings and calculation sheets. The mechanical parts have been manufactured and assembled according to the design. The control strategy and control system have been developed by the students. The control system consists from hardware, such as electronic circuits, and software, such as motion control and user interface. The system has been established and tested. The tests prove the system workability and accuracy.

The project contains all the mechatronics branches. It contains mechanical system, which is controlled using electronic circuits. The control strategy is contained in software. All the system parts have been developed and executed by the students.

Department:	**Mechanical Engineering – Mechatronics**	
Project:	Sorting production line	
Supervisor:	**Dr. Mohamed Ibrahim**	
Students:	Ahmed Adel Ali	
	Mario Maged	
	Michael Medhat	
	Mohamed Samir Hassan	

ABSTRACT

PLCs are very important in industry and they are characterized of their ease of usage. But they are expensive. Our project is manufacturing a high specifications PLC with the lowest possible price. A PLC with twenty one inputs (cut off frequency 100 Hz) , four selective inputs (high or low) frequencies and sixteen double outputs.

A sorting production line application is used to test the components of the PLC and guarantee it`s working abilities.

During the project, the students have designed the mechanical part of the machine. This includes the preparation of engineering drawing, workshop drawings and calculation sheets. The mechanical parts have been manufactured and assembled according to the design. The control strategy and control system have been developed by the students. The control system consists from hardware, such as electronic circuits, and software, such as motion control and user interface. The system has been established and tested. The tests prove the system workability and accuracy.

The project contains all the mechatronics branches. It contains mechanical system, which is controlled using electronic circuits. The control strategy is contained in software. All the system parts have been developed and executed by the students.

Department:	**Mechanical Engineering – Mechatronics**	
Project:	**CD Cutting Machine**	
Supervisor:	**Dr. Mostafa Rostom A. Atia**	
Students:	Yousef Mostafa AbdElFatah Ghorab	11104176
	Eslam Mohamed Mounir	11104619
	Ahmed Tareq AbdElFatah	11105182
	Ahmed Khaled AbdElMoniem	11104534

ABSTRACT

In advertising industry CD is an important media. CD shape is important in advertising language. Cutting the CD to the required shape with accuracy suitable to be driven in the CD reader is not easy task. In this project the student are required to design and manufacture a CNC CD cutting machine based on polar coordinates. The CD is still readable after cutting. The machine is designed, manufactured and tested in real cases. The control system is based on microcontroller.

During the project, the students have designed the mechanical part of the machine. This includes the preparation of engineering drawing, workshop drawings and calculation sheets. The mechanical parts have been manufactured and assembled according to the design. The control strategy and control system have been developed by the students. The control system consists from hardware, such as electronic circuits, and software, such as motion control and user interface. The system has been established and tested. The tests prove the system workability and accuracy.

The project contains all the mechatronics branches. It contains mechanical system, which is controlled using electronic circuits. The control strategy is contained in software. All the system parts have been developed and executed by the students.

Department:	**Mechanical Engineering – Mechatronics**	
Project:	**Design and manufacturing of a rapid prototyping Machine**	
Supervisor:	**Dr. Mostafa Rostom A. Atia**	
Students:	Ahmed Esam EDin El Fakharany	
	Moammed Mahmoud Sobhy Ibrahim	
	Omar Mohamed Abd El Aziz	
	Amr Magdy Mahmoud El Banna	
	Rawfik Mohamed Saad Zaghloul	

ABSTRACT

Rapid prototyping machine is a modern mean for printing 3D model from the computer to the real world. The generated prototype is used as a demonstration mean, tool for producing other products or product for direct use. A wide variety of materials are used for printing operation. In this project a new material is used, which is the glue tab. blanking of glue tab generate the dots of printing material. The developed machine contains three Cartesian axis and a head for generate the blanked glue dots.

During the project, the students have designed the mechanical part of the CNC system. This includes the preparation of engineering drawing, workshop drawings and calculation sheets. The mechanical parts have been manufactured and assembled according to the design. The control strategy and control system have been developed by the students. The control system consists from hardware, such as electronic circuits, and software, such as motion control and user interface. The system has been established and tested. The tests prove the system workability and accuracy.

The project contains all the mechatronics branches. It contains mechanical system, which is controlled using electronic circuits. The control strategy is contained in software. All the system parts have been developed and executed by the students.

Department:	**Mechanical Engineering (Mechatronics)**	
Project:	**Mechatronics of semi-active vehicle suspension systems**	
Supervisor:	**Assoc. Prof. Dr. Hassan Ahmed Metered.**	
Students:	Ahmed Mohamed Sherif Elkady	Shady Mohie Abd El Hamid
	Ahmed Tarek El Masry	
	Ahmed Waheed Mohamed	
	Ali Ibrahim Hassan Badr	

ABSTRACT

Vehicle suspension systems are responsible for ride comfort and vehicle stability as the suspension carries the vehicle-body and transmits all forces between body and road. The vehicle shock absorber was shown to be very important to ride comfort and road handling of a vehicle. In order to investigate the mechatronics of semi-active vehicle suspension, magnetorheological (MR) damper is used to adapt various driving conditions. The project covers the following aspects:

MR fluid damper is fabricated for a semi-active automotive suspension system in order to improve its ride quality. A twin-tube MR damper is developed and tested. Simulation is carried out by solving the Modified Bouc-Wen MR damper model to assess the proposed MR damper and evaluate its performance.

A theoretical investigation of the control of vehicle suspension systems using a quarter car suspension equipped with MR damper is offered. To achieve the best performance, a control method made of two nested controllers is used. PID and LQR control techniques are studied as system controllers in conjunction with a Heaviside step function as the damper controller. A mathematical model of a two degree-of-freedom MR-damped vehicle suspension system is derived and simulated using Matlab/Simulink software.

System performance criteria are evaluated in time domain, in order to verify the effectiveness of the proposed semi–active control algorithm. The generated results show that the proposed PID and LQR controller offers a considerable enhancement of the ride comfort and vehicle stability.

Department:	**Mechanical Engineering (Mechatronics)**	
Project:	**Side Way Tracking Robot** **Object Avoidence**	
Supervisor:	**Dr. Khaled Mohamed Seif Eldeen Sakkoury**	
Students:	Abdullah Mohamed Abdelwahed	11104366
	Ahmed Belal Abu ElFotouh	11102703
	Ahmed Mohamed Helmy	11104521
	Mohamed Ehab Afifi	11104433

ABSTRACT

The Side Way Tracking Robot is a robot with a high precision sensors and control technique. It is used to model a real auto pilot robot to be used further in the automobile cars and such machines.
The low power system (Electronic) consists of a microcontroller (Arduino) which is the robot brain that controls the robot's reactions in response to surroundings environment. The sensors and data transmission equipments are also part of the control system.
The high power system (Electrical) is represented in actuators (2 DC motors) to control the robot's speed and direction by specified drivers (H-Bridge). The battery supplies all the required power of the device.

The objectives of the project are:

1) To Control the vehicle to avoid obstacles.
2) To move on a constant distance from the wall.
3) To turn right or left according to the available space.
4) To collect data from the surrounding environment.
5) To send the data to the monitoring station.

Department:	**Mechanical Engineering – Mechatronics**	
Project:	OPTIMIZATION IN THE REFREGIRATION CYCLE	
Supervisor:	Dr. Essam El gendy	
Students:	Ahmed Hesham fouad	
	Mark Milad	
	Ahmed Hesham fouad	
	Mark Milad	

ABSTRACT

In Egypt, at least 32% of the electrical energy used in domestic sector is for refrigeration and air-conditioning systems. Since the vapor compression refrigeration system (VCRC) is the most common used system, many researchers carried out many investigations to improve its performance. There are several methods to enhance performance of the vapor compression refrigeration cycle. The use of a heat exchanger for sub-cooling and superheating is a conventional method. Recently, several researchers use an inverter to regulate the motor rotation of compressor according to cooling load in the cooled compartment. However, due to no moving parts, low cost, simple structure and low maintenance requirements, the use of two-phase ejector is a promising cycle modification. Use of ejector as an expansion device by replacing the throttling valve in the vapor compression refrigeration cycle reduces the throttling loss. Moreover, ejector also reduces the compressor specific work by raising its suction pressure and consequently increases the system coefficient of performance.

During the project, the students have designed the mechanical part of the machine. This includes the preparation of engineering drawing, workshop drawings and calculation sheets. The mechanical parts have been manufactured and assembled according to the design. The control strategy and control system have been developed by the students. The control system consists from hardware, such as electronic circuits, and software, such as motion control and user interface. The system has been established and tested. The tests prove the system workability and accuracy.

The project contains all the mechatronics branches. It contains mechanical system, which is controlled using electronic circuits. The control strategy is contained in software. All the system parts have been developed and executed by the students.

Department:	**Mechanical Engineering – Mechatronics**	
Project:	Performance Assessment of Solar Energy Driven Refrigeration Systems	
Supervisor:	Dr. Essam El gendy	
Students:		

ABSTRACT

During the project, the students have designed the mechanical part of the machine. This includes the preparation of engineering drawing, workshop drawings and calculation sheets. The mechanical parts have been manufactured and assembled according to the design. The control strategy and control system have been developed by the students. The control system consists from hardware, such as electronic circuits, and software, such as motion control and user interface. The system has been established and tested. The tests prove the system workability and accuracy.

The project contains all the mechatronics branches. It contains mechanical system, which is controlled using electronic circuits. The control strategy is contained in software. All the system parts have been developed and executed by the students.

Department:	**Mechanical Engineering (Mechatronics)**	
Project:	**Design and control of a Rotary Smart Parking System**	
Supervisor:	**Dr. Yasser Elshaer**	
Students:	Mohamed Hussam Eldeen	Bashayer Mohamed
	Abd Elrahman Mousa	
	Mohamed Sead	
	Shaymaa Mohamed	

ABSTRACT

Unavailability of parking space has always been a problem in urban areas and major cities. In order to handle the issue of parking in busy places; various types of vehicle parking systems are developed worldwide, namely Multi-level Automated Car Parking, Rotary Parking System and many more.

The following project presents mechanical design and control of a rotary car parking system with a capacity of 8 cars within the space of approximately the parking area of only 2 cars. The system was designed, assembled and simulated using advanced computer aided design (CAD) tools.

Autodesk inventor program was used for various design procedures including part and assembly modeling, stress analysis, and Simulation. and generating working drawings). Design accelerator tools were used in design and selection of different mechanical components required for the system including sprocket, drive chain, rolling bearings, supporting frames, car carriage, and entry platform. Finally, detail drawings were generated for documentation and production purposes.

After designing, a scale down model was manufactured from steel plate using CNC plasma cutting machine; the parts were assembled together to obtain the desired system construction.

The prototype was powered using stepper motor, controlled using Raspberry Pi micro-controller and the programing was using Matlab. Also, the system includes an interface Raspberry Pi board and RFID card. Different security and safety considerations were added to the control algorithm to fulfill appropriate operation of the parking system.

Department:	**Mechanical Engineering – Mechatronics**	
Project:	Hydraulic Scissor Lift	
Supervisor:	**Dr.** Ahmed El Senbary	
Students:		

ABSTRACT

During the project, the students have designed the mechanical part of the machine. This includes the preparation of engineering drawing, workshop drawings and calculation sheets. The mechanical parts have been manufactured and assembled according to the design. The control strategy and control system have been developed by the students. The control system consists from hardware, such as electronic circuits, and software, such as motion control and user interface. The system has been established and tested. The tests prove the system workability and accuracy.

The project contains all the mechatronics branches. It contains mechanical system, which is controlled using electronic circuits. The control strategy is contained in software. All the system parts have been developed and executed by the students.

Department:	**Mechanical Engineering – Mechatronics**	
Project:	Design and Implementation of a Modular Deep wells Solar Driven Pumping System for Cultivating Lands Applications	
Supervisor:	**Dr.** Ahmed Salah	
Students:		

ABSTRACT

During the project, the students have designed the mechanical part of the machine. This includes the preparation of engineering drawing, workshop drawings and calculation sheets. The mechanical parts have been manufactured and assembled according to the design. The control strategy and control system have been developed by the students. The control system consists from hardware, such as electronic circuits, and software, such as motion control and user interface. The system has been established and tested. The tests prove the system workability and accuracy.

The project contains all the mechatronics branches. It contains mechanical system, which is controlled using electronic circuits. The control strategy is contained in software. All the system parts have been developed and executed by the students.

Department:	**Mechanical Engineering – Mechatronics**	
Project:	Vision-Based Motorized Security/Surveillance Camera System	
Supervisor:	**Dr. Amged Bauiomy**	
Students:		

ABSTRACT

During the project, the students have designed the mechanical part of the machine. This includes the preparation of engineering drawing, workshop drawings and calculation sheets. The mechanical parts have been manufactured and assembled according to the design. The control strategy and control system have been developed by the students. The control system consists from hardware, such as electronic circuits, and software, such as motion control and user interface. The system has been established and tested. The tests prove the system workability and accuracy.

The project contains all the mechatronics branches. It contains mechanical system, which is controlled using electronic circuits. The control strategy is contained in software. All the system parts have been developed and executed by the students.

Department:	**Mechanical Engineering – Mechatronics**	
Project:	Vision-Based Autonomous Unmanned Ground Vehicle (UGV)	
Supervisor:	**Dr. Amged Bauiomy**	
Students:		

ABSTRACT

During the project, the students have designed the mechanical part of the machine. This includes the preparation of engineering drawing, workshop drawings and calculation sheets. The mechanical parts have been manufactured and assembled according to the design. The control strategy and control system have been developed by the students. The control system consists from hardware, such as electronic circuits, and software, such as motion control and user interface. The system has been established and tested. The tests prove the system workability and accuracy.

The project contains all the mechatronics branches. It contains mechanical system, which is controlled using electronic circuits. The control strategy is contained in software. All the system parts have been developed and executed by the students.

Department:	**Mechanical Engineering (Mechatronics)**	
Project:	**Atmospheric de-humidification for the generation of a Controlled quantity potable water**	
Supervisor:	**Dr. Jean Khalil**	
Students:	Wassim Waguih	Ahmed Hassan Khatab
	Ahmed Moussa ahmed	
	Seif Wael	
	Omar hussein	

ABSTRACT

Potable water is in some cases difficult and costly to get hold of. In some applications like coast guards and nature reserve officers, a relatively small amount of potable water is required to cater for a group of people. In this case, one efficient means of supplying the necessary potable water is to condensate the atmospheric humidity. This project consists of building a machine that induces air into a cooled tunnel where the atmospheric humidity is allowed to condensate in a tank therefore, some necessary minerals may be added and the water becomes perfectly suitable for human consumption. The device is not a mere realization of the idea but also serves as a research tool where input variables may be changed and hence the variation in the monitored output may be detected. The efficiency of the device is in the heart of the project since it offers a clear view of the feasibility of its use and it allows the user to produce potable water at a pre-determined high cost should it be necessary.

Department:	**Mechanical Engineering – Mechatronics**	
Project:	Design and implementation of a dual function (CPM/CAM) bike for limp recovery	
Supervisor:	**Dr.** Mohamed Mabrook	
Students:		

ABSTRACT

During the project, the students have designed the mechanical part of the machine. This includes the preparation of engineering drawing, workshop drawings and calculation sheets. The mechanical parts have been manufactured and assembled according to the design. The control strategy and control system have been developed by the students. The control system consists from hardware, such as electronic circuits, and software, such as motion control and user interface. The system has been established and tested. The tests prove the system workability and accuracy.

The project contains all the mechatronics branches. It contains mechanical system, which is controlled using electronic circuits. The control strategy is contained in software. All the system parts have been developed and executed by the students.

Department:	**Mechanical Engineering – Mechatronics**	
Project:	Design and implementation of a six DOF steel tubes laser cutting machine	
Supervisor:	**Dr.** Mohamed Mabrook	
Students:		

ABSTRACT

During the project, the students have designed the mechanical part of the machine. This includes the preparation of engineering drawing, workshop drawings and calculation sheets. The mechanical parts have been manufactured and assembled according to the design. The control strategy and control system have been developed by the students. The control system consists from hardware, such as electronic circuits, and software, such as motion control and user interface. The system has been established and tested. The tests prove the system workability and accuracy.

The project contains all the mechatronics branches. It contains mechanical system, which is controlled using electronic circuits. The control strategy is contained in software. All the system parts have been developed and executed by the students.

Department:	**Mechanical Engineering (Mechatronics)**	
Project:	**Remotely Operated Vehicle (ROV)**	
Supervisor:	**Dr.Wessam Hussein**	
Students:	Khaled Ahmed Shokry	
	Mostafa Hashish	
	Loai Hegazi	
	Abdelrahman Nagib	

ABSTRACT

The ROV is a robotic submarine used for underwater exploration & applications. It is used mostly used by the oil companies for pipes installations & inspection, also used in scientific research, retrieving sunken artifacts, etc.

The ROV is connected to the surface through a tether cable which transmits power & data up to the surface to the power supply & control computer containing the control program & connected to the joystick which manually controls the vehicle.

The work done upon constructing the ROV consists of the following:

1. Mechanical design & manufacturing, where CAD software was used for design and manufactured from light aluminum bars.
2. Water isolation system consisting of acrylic box, artelon end caps, epoxy, etc.
3. Electronics for control & adjustment like Arduino Microcontroller, h-bridges, sensors ,camera, etc.
4. Waterproof DC motors & servo motors were used for thrust control & arm Control.
5. The system was modeled using Matlab and tested under different conditions.