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— COLLEGE OF TECHNOLOGY —

Educators since 1983

DIPLOMA
PROGRAM

Mechatronics Diploma

33 Cr (9 months)

I-   Semester Plan

Semester 1	Microcontrollers Programming	Engineering Physics and Electronics	Introduction to Automotive	Statics and Dynamics
Semester 2	Sensors and Instrumentation	PLC Programming	Control Systems	Computer Aided Design
Semester 3	Mechatronics Systems	Automotive maintenance and Repair	Robotics Systems	

II- What can I work with this Diploma?

- New product Developer
- Product Installer and tester
- Robot Design
- Automation specialist
- Machine programmer and Assembler
- Control system designer
- Mechanical design
- Electromechanical worker
- Consumer goods repair
- Automotive Repair
- Medical Assistive technologist
- Computer Aided Designer

III- Where can I work with this Diploma?

- Advanced Manufacturing and Robotics Firms
- Telecommunications and Information Services
- Agriculture Sector
- Biotechnology Field (Labs, hospitals…)
- Renewable Energy Industry
- Transportation and Logistics Field
- Homeland Security
- Automotive Industry
- Factories
- Engineers' offices
- Oil & Gas companies

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IV-   Course Description

Semester 1	Microcontrollers Programming	Engineering Physics and Electronics	Introduction to Automotive	Statics and Dynamics

Microcontrollers Programming: (36 hours- 12 weeks)

This course deals with concepts in the programming and the interfacing of microprocessors/microcontrollers to the outside world. It covers the architecture of processors and the many I/O peripherals. Understanding, analyzing, and designing microcontroller based systems. Application: Arduino.

Engineering Physics and Electronics: (36 hours- 12 weeks)

This course introduces the basic physics concept needed for an engineering student, covering the following three main physics areas: mechanics, Temperature & Heat and electricity. It familiarizes the student with physical units, terms and phenomena.

Introduction to Automotive: (36 hours- 12 weeks)

An introduction to the automotive industry including automotive history, safety practices, shop equipment and tools, vehicle subsystems, service publications, fasteners, professional responsibilities and automotive maintenance.

Statics and Dynamics: (36 hours – 12 weeks)

Is an introductory mechanics course that is designed to introduce students to concepts of engineering based on forces in equilibrium and in motion. Topics include concentrated forces, distributed forces, inertia, center of gravity. In the second part of the course students will be exposed to dynamics of particles and rigid bodies along with applications of free-body diagrams, Newton's second law, Kinematics and equations of motion.

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Semester 2	Sensors and Instrumentation	PLC Programming	Control Systems	Computer Aided Design

Sensors and Instrumentation: (36 hours- 12 weeks)

This course introduces students to the basics of Instrumentations of control systems which are the sensors. It familiarizes the students with sensing principles for the measurement of position, velocity, acceleration, angular velocity, strain, torque, force, pressure, flow rate. The course will use the theory of major sensors to adapt the students on the applicability of measurements and instrumentations used in real life.

PLC Programming : (36 hours- 12 weeks)

An introductory to Programmable Logic Controls (PLC), focusing on the underlying principles of how PLCs work and providing practical information and skills about installing, programming, and troubleshooting a PLC system.

Application: PLC delta

Control Systems: (36 hours- 12 weeks)

This course provides an introduction to modelling, analysis, and design of feedback control systems. This course not only focuses on mathematical concepts in continuous-time linear control systems, including Laplace Transform, transfer functions and controller design, but also provides students with hands-on experience in analysis and design of feedback control systems. After this course, students are expected to know how to analyze the performance of feedback control systems and design controllers to meet the required system specifications.

Computer Aided Design: (36 hours- 12 weeks)

This is an introductory course in freehand sketching and computer-aided drafting/ design. Students will be taught basic CAD commands, tools, multi-view drawing and dimensioning techniques.

Semester 3	Mechatronics Systems	Automotive maintenance and Repair	Robotics Systems

Mechatronics Systems: (36 hours- 12 weeks)

Mechatronic systems engineers use precision mechanical, electrical, computer engineering, as well as math and physics, to design high performance and sophisticated products and equipments demanded by competitive marketplace. Modern products (such as automobiles, dishwashers, cameras, ATMs, medical equipment, space craft, communication satellites, etc.) and manufacturing equipments (such as 3D printers, CNC machines, industrial robotics and autonomous systems, etc.) contain numerous computers and mechatronics modules.

Robotics Systems: (36 hours- 12 weeks)

Robotics is a lab based course that uses a hands on approach to introduce the basic concepts of robotics, focusing on the construction and programming of autonomous mobile robots. Course information will be tied to lab experiments; students will work in groups to build and test increasingly more complex mobile robots, culminating in an end of semester robot contest.

Automotive maintenance and Repair: (36 hours- 12 weeks)

The Automotive Equipment Maintenance and Repair pathway prepare individuals for employment as entry level transportation service technicians. The program provides an introduction to transportation industry careers and increases student awareness of the diverse technologies associated with this dynamic and challenging field. Course work may include transportation systems theory, braking systems, climate control, design parameters, drive trains, electrical/electronic systems, engine repair, engine performance, environmental regulations, materials, product finish, safety, steering/suspension, transmission/transaxles, and sustainable transportation, depending on the program major area chosen

V- Contact

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