

## ***Mechatronics Engineering***

### Institutional Mission Statement:

Provide quality higher technological education, developing well-rounded proficient professionals, with high sense of social responsibility, solid education in science, technology and innovation, who contribute to the sustainable development of the country.

### Department Mission Statement:

Train professionals of excellence in the areas of mechanical engineering and mechatronics engineering, able to develop and apply scientific and technological knowledge in order to respond effectively and with the highest quality to the requirements of the different sectors of society.

### Program Educational Objectives (PEO's):

- **Ethics.** The alumni practice their profession with a sense of legality and social responsibility, in accordance to national and international norms.
- **Leadership.** The alumni coordinate and lead multidisciplinary teams for the development and implementation of mechatronic systems, by applying scientific principles in different technological contexts.
- **Creativity.** The alumni are creative and proactive in taking decisions for planning and organizing the activities related with their professional field.
- **Professional Development.** The alumni are involved in their continuous and autonomous professional update, in order to be at the forefront of the scientific and technological changes occurred in the practice of their profession.

### Student Outcomes:

- (a) An ability to apply knowledge of mathematics, science, and engineering.
- (b) An ability to design and conduct experiments, as well as to analyze and interpret data.
- (c) An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
- (d) An ability to function on multidisciplinary teams.
- (e) An ability to identify, formulate, and solve engineering problems.
- (f) An understanding of professional and ethical responsibility.
- (g) An ability to communicate effectively.
- (h) The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
- (i) A recognition of the need for, and an ability to engage in life-long learning.
- (j) A knowledge of contemporary issues.
- (k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

### Courses of the Study Plan:

| <b>Year 1 – Semester 1</b>        |   |
|-----------------------------------|---|
| Differential Calculus             | Chemistry                                 |
| Ethics Seminar                    | Computer Aided Drawing                    |
| Metrology and Standardization     | Research Fundamentals                     |
| <b>Year 1 – Semester 2</b>        |   |
| Integral Calculus                 | Linear Algebra                            |
| Materials Science and Engineering | Basic Programming                         |
| Statistical Quality Control       | Business Management and Accounting        |
| <b>Year 2 – Semester 1</b>        |   |
| Vector Calculus                   | Manufacturing Processes                   |
| Electromagnetism                  | Statics                                   |
| Numerical Methods                 | Sustainable Development                   |
| <b>Year 2 – Semester 2</b>        |   |
| Differential Equations            | Dynamics                                  |
| Electrical Circuits Analysis      | Mechanics of Materials                    |
| Fundamentals of Thermodynamics    | Research Seminar I                        |
| <b>Year 3 – Semester 1</b>        |   |
| Electric Machines                 | Mechanisms                                |
| Analog Electronics                | Fluid Analysis                            |
| Advanced Programming              | Research Seminar II                       |
| <b>Year 3 – Semester 2</b>        |   |
| Applied Power Electronics         | Mechanical Vibrations                     |
| Design of Mechanical Elements     | Digital Electronics                       |
| Instrumentation                   | Maintenance Management                    |
| <b>Year 4 – Semester 1</b>        |   |
| System Dynamics                   | Advanced Manufacturing                    |
| Hydraulic and Pneumatic Circuits  | Maintenance                               |
| Microcontrollers                  | Computer Aided Design                     |
| <b>Year 4 – Semester 2</b>        |   |
| Control                           | Formulation and Evaluation of Projects    |
| Programmable Logic Controllers    | Advanced Manufacturing Systems            |
| Industrial Networks               |   |
| <b>Year 5 – Semester 1</b>        |   |
| Robotics                          | Selected Topics for Industrial Automation |
| Internship                        |   |

Statistics of the Program:

| <b>Year</b> | <b>Freshman enrollment</b> | <b>Program Enrollment</b> | <b>Awarded</b> |
|-------------|----------------------------|---------------------------|----------------|
| 2010        | 228                        | 1023                      | 80             |
| 2011        | 285                        | 1133                      | 114            |
| 2012        | 188                        | 1105                      | 124            |
| 2013        | 166                        | 1098                      | 146            |
| 2014        | 171                        | 1052                      | 167            |
| 2015        | 248                        | 1067                      | 145            |
| 2016        | 402                        | 1209                      |                |