Program Learning Outcomes/Competencies

**1. General Competencies for Program Graduate (Level A)**

*Graduates of the Mechatronics Program should be able to demonstrate the following general competencies:*

PC1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.

PC2. Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.

PC3. Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.

PC4. Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.

PC5. Practice research techniques and methods of investigation as an inherent part of learning.

PC6. Plan, supervise and monitor implementation of engineering projects, taking into

consideration other trades requirements.

PC7. Function efficiently as an individual and as a member of multi-disciplinary and multicultural teams.

PC8. Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.

PC9. Use creative, innovative and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.

PC10. Acquire and apply new knowledge, and practice self, lifelong and other learning strategies.

**2. Specialty Competencies for Program Graduate (Level D)**

*Graduates of the Mechatronics Program should be able to demonstrate the following specialized competencies:*

PC11. Model, analyze and design Mechatronics systems by applying the concepts of: Thermodynamics, Heat Transfer, Fluid Mechanics, solid Mechanics, Material Processing, Material Properties, Measurements, and Instrumentation.

PC12. Model, analyze and design an electrical/electronic/digital device(s) or component(s) as a subsystem of a whole Mechatronics system and identify the tools required to optimize this design.

PC13. Utilize both traditional means and modern computer-aided tools and software to plan, manage and carry out designs of mechanical systems and machine elements using suitable materials.

PC14. Design and implement: elements, modules, sub-systems or systems of Mechatronics considering the principals of electrical/electronic/digital engineering and using technological and professional tools.

PC15. Integrate synergistically, mechanical engineering design, electronics, and modern microprocessor based control with the needed software to design, build, test, and operate a whole mechatronics system.

PC16. Adopt suitable national and international standards and codes and integrate legal, economic and financial aspects to: design, build, operate, inspect and maintain mechatronics components and systems including: Mechanical, Electrical, Electronics, Digital, microprocessor based control units software and interfacing.