**ASSIGNMENT**

**1. Discuss in details not more than one page the relationship between Software Engineering and Mechatronics Engineering.**

According to French standard NF E 01-010, Mechatronics Engineering is a multidisciplinary approach aimed at the synergistic integration of mechanics, electronics, control theory, and computer science within product design and manufacturing, in order to improve and/or optimize its functionality.

The Bureau of Labor Statistics—IEEE Systems and software engineering – Vocabulary defines Software Engineering as the systematic application of scientific and technological knowledge, methods, and experience to the design, implementation, testing, and documentation of software.

Both fields are similar and involve the programming of systems while trying to achieve control and automation. Applications similar to both fields include machine vision, automation, embedded systems, sensing systems, medical imaging systems, robotics and Computer Aided Design.

However, Software Engineering is more software oriented and involves more advanced programming and software architectures. Mechatronics Engineering is more hardware oriented and involves usage of electromechanical components like relays, actuators and sensors.

Applications unique to Software Engineering include professional software, data mining, cheque processing, operating systems, telecommunication, computer graphics, databases, information systems and servers.

Applications unique to Mechatronics Engineering include servo-mechanics, anti-lock braking system in cars, CNC machines, structural dynamic systems, automated transportation, packaging and microcontrollers/PLCs/PIDs.

**2. Explain the following and how they relate a) computer science, computer engineering and software engineering.**

* **Computer engineering** is a branch of engineering that integrates several fields of computer science and electronic engineering required to develop computer hardware and software. It deals with designing, developing, and operating computer systems.  At its core, Computer Engineering concentrates on digital hardware devices and computers, and the software that controls them.  Advanced courses focus on standard designs and techniques for specific application domains. In contrast to Computer Science and Software Engineering, Computer Engineering emphasizes solving problems in digital hardware and at the hardware-software interface.
* **Computer Science** is the study of processes that interact with data and that can be represented as data in the form of programs. It enables the use of algorithms to manipulate, store, and communicate digital information. It focuses on understanding, designing, and developing programs and computers. At its core, Computer Science concentrates on data, data transformation, and algorithms. Advanced courses present specialized programming techniques and specific application domains. The Computer Science program is less structured than the Computer Engineering and Software Engineering programs, giving students more flexibility to build depth in a variety of application domains or in the fundamentals of Computer Science. Computer Science involves more math courses and is more theoretical than the engineering programs.
* **Software Engineering** is the application of a systematic, disciplined and quantifiable approach to the development, operation, and maintenance of software. It deals with building and maintaining software systems. It is more software-oriented and has a greater emphasis on large software applications than Computer Engineering. Software Engineering is a lot less focused on the hardware than Computer Engineering. It is more applied than Computer Science, placing greater emphasis on the entire software development process, from idea to final product ensuring that programs work as they should and are safe.  It is also more disciplined than Computer Science, applying more systematic practices to help ensure that products are reliable and safe.

In summary, Computer Engineering is based on the hardware and software, Computer Science is based more on the algorithms and theory behind programming and Software Engineering is a mix of both, teaching the applications of programming while still having a basic science background