Computer Engineering

Professional Standards of a Bachelor

1. General characteristics of computer engineering graduates

Computer engineers and designers are the architects and implementers of the technological revolution and are in great demand throughout industry, commerce and the public sector. The aim of the Computer Engineering (CE) curriculum is to produce well-educated, imaginative and professionally trained engineers and designers who can meet the challenge the rapid technological development.

Degree programs in CE can take various forms, each of which could prepare students for different, but valid careers. At one extreme, a degree program might provide opportunities for students to take courses on a wide range of topics spanning the entire area of CE. At another extreme, a program might take one specific aspect of CE and cover it in greater depth. The objective of this program is to prepare students either for postgraduate study or for immediate employment, and achievement of professional excellence in the high technology industries, which interface with the computer systems that they study. The graduates from such programs would typically tend to seek opportunities in the areas of the electronic and computer industries, the public and private sectors, banking, transport, healthcare, the media, etc. The bachelors of computer engineering would have a high level of proficiency and knowledge of economics, management and marketing. They would be able to design, develop, implement, support, extend, adapt and localize computer systems, but would also have strong software skills.

CE graduates would develop a high-level understanding of systems as a whole, would understand not only the theoretical underpinning of the discipline but also how this theory influences practice, would possess a solid foundation that allows them to maintain their skills and knowledge as the field of CE evolves.

The curriculum covers the essential practical techniques, together with the deeper principles, which they are based upon. Students are expected to develop a wide range of knowledge and skills. These may be divided in three broad categories: theoretical knowledge, practical skills and additional skills.

2. Theoretical knowledge

The CE graduates would obtain expertise to

- Demonstrate knowledge and understanding of essential facts, concepts, principles, and theories relating to CE;

- Use such knowledge and understanding in the design of computer-based systems in a way that demonstrates comprehension of the tradeoff involved in design choices;

- Identify and analyze criteria and specifications appropriate to specific problems;

- Deploy appropriate theory, practices, and tools for the specification, design, implementation and evaluation of computer systems.

3. Practical skills

The Computer Engineering graduates would acquire abilities to

- Specify, design, and implement computer systems;

- Evaluate systems in terms of general quality attributes;

- Apply the principles of effective information management to information of various kinds of sources, such as textbooks, lecture notes, Internet;

- Apply the principles of advanced communication technologies to the design and implementation of a wide range of CE;

- Deploy effectively the tools used for the construction and documentation of hardware and system software;

- Operate computer hardware and software systems effectively and efficiently.

4. Additional skills

These skills are not concerned with specific computer-related field of study. Instead, they are meant to satisfy general student interests in computing. They would be acquired throughout the whole course of study. These skills include the ability to

- Make succinct presentations to a range of audiences about technical problems and their solutions;

- Work effectively as a member of a development team;

- Understand and explain the quantitative dimensions of a problem;

- Manage one's own learning and development, including time management and organizational skills;

- Keep abreast of current developments in the discipline to continue one's own professional development.

5. CE Body of Knowledge

The CE graduates' education is based on:

- Fundamental training that includes studies in the following areas:
    - Mathematics
    - Physics
    - Electrical Engineering
    - Electronics
    - Principles of Management
    - Digital Systems
    - Programming Fundamentals
    - Social and Professional Issues

- Specialized training that includes studies in the following areas:
    - Discrete Structures
    - Algorithms and Complexity
    - Computer Organization
    - Computer Architecture
    - Computer Networks
    - Circuits and Systems
    - Operating Systems
    - Embedded Systems
    - Software Engineering
    - Computer Systems Engineering
    - Intelligent Systems

CE graduates are expected to be highly qualified and motivated, with in-depth engineering knowledge and understanding. They may be expected to take up positions such as, but not limited to: systems programmers, technical programmers, network programmers, network controllers, operations managers, computer systems designers.

Computer Engineering

Professional Standards of a Master

1. General characteristics of MSc in Computer Engineering

The professional suitability of a Master in Computer Engineering (CE) is to carry out investigations; to design, assemble and utilize; to perform manufacturing, technological, company and service activities; to do research and teach in the field of Computing in view of their application in industry, science, education, the public and private sectors, banking, transport, health care, environment protection, etc. An MSc in CE should possess professional expertise and considerable linguistic competence.

In order to develop a firm understanding of the scientific approach, students must have direct hands-on experience with hypothesis formulation, experimental design, hypothesis testing and data analysis. Student must develop an understanding of the scientific method and experience this mode of inquiry in courses that provide some exposure to laboratory work. They may acquire their scientific perspective in a variety of domains, depending on program objectives and their area of interest.

2. Common skills

Upon graduation, the MSc in CE should have the following most common skills:

- to identify and present his/her own solutions to problems in the field of CE;
- to apply creatively in practice the acquired knowledge;
- to critically analyze and apply a range of concepts, principles and practices of the subject in the context of loosely specified problems, showing effective judgement in the selection and use of tool and techniques;
- to adopt a complex technical and economical approach and use modern methods and tools when solving an assigned engineering task.

3. Specific skills

Upon graduation, the MSc in CE should also possess the following more specific skills:

- to create, develop and maintain modern microprocessor and computer systems;
- to develop and adapt up-to-date system and application software for standard and specialised computer equipment;
- to expand the functional capabilities of the hardware and software of modern computer systems;

- to develop, adapt and implement modern computer technologies in different fields of application - industry, science, trade, education, banking, etc.;
- to produce work involving problem identification, analysis, design and development of a computer system, along with appropriate documentation. The work must show a range of problem solving and evaluation skills, draw upon supporting evidence, and demonstrate a good understanding of the need for quality.

4. Additional skills

These skills are not concerned with specific computer-related field of study. Instead, they are meant to satisfy general student interests in computing. They would be acquired throughout the whole course of study. These skills include the ability to

- Demonstrate the ability to work as an individual with minimum guidance and as either a leader or member of a team;

- Follow appropriate practices within a professional, legal and ethical framework;

- Identify mechanisms for continuing professional development and life-long learning;

- Explain a wide range of applications based upon the body of knowledge.

5. CE Body of Knowledge

The CE Master's education is based on:

- Fundamental training that includes in-depth studies in the following areas:
    - Additional Mathematics
    - Theory of Experiment
    - Business Modelling Systems

- Specialized training that includes studies in the following areas:
    - Software Engineering (advanced course)
    - Distributed Systems
    - Modelling and Simulation
    - Adaptive Intelligent Systems
    - Computer Networks (advanced course)
    - Internet Technologies

- Research and Master's Thesis in accordance with the student's own interests, abilities and development perspectives in the areas of specialized training.