Computer Science

Professional Standards of a Bachelor

1. General characteristics of computer science graduates

"Computer Science (CS) experts of high quality able to handle the increasing demands imposed upon computer-based systems by scientific, technological and commercial development in the new millennium" would be an apt description for CS graduates. We expect that they will be in high demand in every sort of company and enterprise dependent on computer technology.

Degree programmes in CS can take various forms, each of which could prepare students for different, but valid careers. At one extreme, a degree programme might provide opportunities for students to take courses on a wide range of topics spanning the entire area of CS. At another extreme, a programme might take one specific aspect of CS and cover it in greater depth. The objective of this programme 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 information processing systems that they study. The graduates from such programmes would typically tend to seek opportunities in the areas of industry, education, the public and private sectors, banking, transport, healthcare, ecology, etc. The bachelors of CS would have a basic knowledge of economics, management and marketing. They would be able to design, develop, implement, support, extend, adapt and localize computer and information technologies (C&IT).

Computer Science 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 CS 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. Common skills

The Computer Science graduates would obtain expertise to:

- demonstrate knowledge and understanding of essential facts, concepts, principles, and theories relating to CS;

- 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 C&IT.

3. Practical skills

The Computer Science graduates would acquire abilities to:
- work with office applications;
- specify, design, and implement software 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 human-computer interaction techniques to the design and implementation of a wide range of C&IT;
- deploy effectively the tools used for the construction and documentation of 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;
- understand the fundamentals of Market Economy and Business Management.

5. CS Body of Knowledge

The CS graduates' education is based on:
- Fundamental training that includes studies in the following areas:

- o Mathematics
- o Programming Fundamentals
- o Discrete Structures
- o Principles of Management
- o Social & Professional Issues

- Specialized training that includes studies in the following areas:
  - o Algorithms & Complexity
  - o Computer Graphics
  - o Software Engineering
  - o Programming Languages & Methodologies
  - o Databases and Information Systems
  - o Operating Systems
  - o Computer Architecture
  - o Computer Networks
  - o Computer Security
  - o Human-Computer Interaction
  - o Artificial Intelligence
  - o Internet Technologies

CS graduates are expected to be highly qualified and motivated, with in-depth knowledge and understanding of C&IT. They may be expected to take up positions such as, but not limited to: system developers of computer based systems, system programmers, system analysts, project managers.

References:

IEEE Computer Society/ACM   *http://www.computer.org/education/cc2001*

Bologna Declaration, Lisbon Recognition Convention

Diploma Supplement, ECTS

Computer Science

Professional Standards of a Master

1. General characteristics of MSc in Computer Science

The professional suitability of a Master in Computer Science (CS) is to carry out investigations; to design, assemble and utilize; to perform manufacturing, technological, company and service activities; to do research and to 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 CS should possess professional expertise.

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 programme objectives and their area of interest.

2. Common skills

Upon graduation, the MSc in CS should have the following most common skills to:
- identify and present his/her own solutions to problems in the field of Computer and Information Technologies (C&IT);
- apply creatively in practice the acquired knowledge;
- 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;
- adopt a complex technical and economical approach and use modern methods and tools when solving an assigned task.

3. Specific skills

Upon graduation, the MSc in CS should also possess the following more specific skills to:
- create, develop and maintain modern software applications for standard and specialised computer equipment;
- expand the functional capabilities of the software of modern computer systems;
- develop, adapt and implement modern computer technologies in different fields of application - industry, science, trade, education, banking, etc.;

- demonstrate a sound understanding of the main areas of the body of knowledge and the theory of CS, with an ability to exercise critical judgement across a range of issues;
- produce work involving problem identification, user requirements specification, analysis, design and development of a software application, 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. CS Body of Knowledge

The CS Master's education is based on training in the following areas with in-depth studies in at least one of them:

- Advanced Mathematics for CS
- Modern Methods in Software Engineering
- Parallel Programming
- Distributed Systems
- Advanced Databases
- Advanced Intelligent Systems
- Modelling and Simulations
- Advanced Internet Technologies
- Multimedia Systems and Technologies
- Vision and Imaging

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

References:

IEEE Computer Society/ACM   http://www.computer.org/education/cc2001
Bologna Declaration, Lisbon Recognition Convention

Diploma Supplement, ECTS