

Computer Science

This specialization trains engineers to analyze, design, develop and implement computational systems. They will perfectly control the methods and techniques of their discipline and put them into practice in various realms of application, of which they know the technical vocabulary and the constraints.

Two principles lie at the base of the pedagogical organization: computer engineering is not to be seen as a separate and closed discipline and its interdisciplinary nature must be apparent at all points in the implementation process.

After a solid basic training as general computer engineers, students finish their curriculum in specific programs constantly updated to meet the demands of the professional environment, and its emerging openings.

Career prospects: software engineer, databases, telecommunication, Internet, Intranet, networks, pictures, multimedia.

Software and knowledge engineering

ILC

✉ Convener : Abder KOUKAM

Changing demands and computational systems lead industrial professionals to use development tools and methods of ever increasing complexity. The mastery of such tools and methods allows an amelioration of the productivity and the quality of software, while assuring a suitability of function to the needs of its users, as well as an adaptability and a flexibility of use. These latter two qualities refer to the man/machine interface which must be natural, transparent and instinctive.

The SKE program integrates all of these considerations, completing the basic training in computer engineering through instruction in software engineering, expert systems, databases and client/server architectures. The aspect of man/machine interfacing is integrated into this training through the study of software ergonomics, associated environments (XWindow, Motif, Windows,...) and multimedia interfaces

Networks & Telecommunications

R&T

✉ Convener: Oumaya BAALA

The current developments in telecommunication come to depend more and more on computational techniques. We see a progressive fusion of the two fields, and an ever increasing demand for specialists highly qualified in both areas. The aim of this program is to develop this double competence, both in fundamental terms as well as in terms of the technical aspect of communication.

The fundamental part of the program offers a treatment of the physical aspects of communication (line propagation and hertzian propagation, fiber optics) as well as an in-depth consideration of methods of information representation (information theory; coding, encryption, data compression).

The technological part of the program presents the various substrates, physical or software-based, currently in use (INTERNET and INTRANET, switched network, high-speed networks, fixed and

mobile radio communications, etc.).

Relevance to diverse areas of telecommunication are considered, in particular to audiovisual applications. Furthermore, network infrastructures have to be able to deal with multimedia applications that manipulate heterogeneous data flows: text, video and audio. The management and verification of these data flows, and the parametric organization of quality of service required by these kinds of applications represent the principle problems in the study of high-speed networks. The N&T program trains engineers capable of designing, installing, connecting, and administering not only computer networks, but also telecommunication systems.

Real Time Control Command

TRC

✉ Convener: Jaafar GABER

The objectives of this program are the following: to develop competence in the engineering of real-time applications, to assure an advanced level in the domain of on-board systems and mobile networks, and to train students in the appropriate use of computational equipment in industry. For example, we might consider the use of number-crunchers in industrial processes or the presence of computers in intelligent vehicles.

The design and implementation of on-board applications requires the consideration of time: the response of the computer has to be correct in functional terms, but must also occur at the right moment. Hence the importance of knowledge belonging to the domain of Real-Time computer engineering. Equally important is knowledge relative to the engineering of mobile networks, as well as that of material interfaces between the on-board computer and its physical environment.

The themes covered in this program can be presented in three groups. Firstly, languages, tools and methods necessary for the design of robust Real-Time systems. Secondly, systems, languages and tools for the design and implementation of on-board applications. Finally, programmable industrial systems, basic material and

software components for the interfacing of the computer with its physical processes.

Image, Communication, & Information

ICI

✉ Convener: Bernard MIGNOT

Progress in our society is making computer science evolve towards new disciplines – the information and communication sciences.

Digital imaging is no longer a scientific tool exclusive to engineers. It is a means of representation used in all disciplines, industries, leisure products and entertainment. Imaging is becoming commonplace in products available to the general public. It will serve us in future in our homes, our cars or in portable digital interface devices.

Communication has gone beyond the limits of business. Texts, sounds, data, digital images and video come together in multimedia information systems accessible to all, and used in Internet exchanges.

Information is widespread in all sectors. Storage, file management, classification, data access and manipulation are the problems of today and tomorrow. Technical databases, technological development, economic understanding and decision making are all based on new approaches to data manipulation.

The ICI program trains students for new careers in image and sound processing and in communication: digitizing, processing and integrating images into new industrial or public products; developing web sites, designing and developing new applications, products and services on distributed architectures; and managing, processing, searching and protecting data in information systems



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