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Analysis and design of algorithms (0102721)

The course introduces students to a variety of computer problems and ways to solve them. Further, it enables them to assess the complexity of problems and algorithms. Special attention is given to some advanced problems and algorithms for graphing, text searching and counting. The course discusses the concepts of parallel and distributed algorithms and some related examples.

Advanced Computer Engineering (0102731)

Computer architecture and organization, programmed control, CPU (instruction formats, addressing patterns, CISC and RISC computers), pipeline and vector processing, memory organization, and multiprocessors.

Advanced Operating Systems (0102733)

In this course, important problems in the design and implementation of the operating system are studied as the operating system provides a known, appropriate, and effective interface between user programs and computers on which they are run. The operating system is responsible for allowing sharing of resources (for instance, disks, networks, and processors), providing common services that are required by many different programs (for instance, serving files, being able to start or stop processes, and accessing a printer), and protecting individual programs from each other. The course begins with a brief historical perspective of the evolution of operating systems over the past 50 years, and then covers the major components of most operating systems. This discussion will cover trade-offs that can be made between performance and functionality during the operating system design and implementation. Particular emphasis will be placed on three major operating system subsystems: process management (processes, threads, CPU scheduling, synchronization, and deadlocks), memory management (fragmentation, paging, and swapping), file systems, and OS support for distributed systems.

Advanced Databases (0102741)

This course covers the design and implementation of conventional relational database systems and advanced data management systems. Additionally, it covers the basic principles of databases: relational model, conceptual design, query languages, and selected theoretical topics. It also covers basic database implementation issues, including storage, indexing, query handling and optimization, as well as transaction management, concurrency, and recovery. Additional topics will address the challenges of modern Internet-based data management. These include data mining,

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source and information integration, incomplete and probabilistic databases, and database security.

Advanced Data Network Communications (0102742)

This course focuses on advanced principles and methods of computer networks. The type of networks covered includes; Local Area Network (LAN), Metropolitan Area Network (MAN), and Wide Area Network (WAN). The focus will be on layers 2, 3, and 4 of the OSI network model, with an emphasis on the TCP/IP suite of the Internet. Some important topics comprise; Ethernet and high-speed networking technologies, IPv6, traffic congestion and flow control, and QoS support in modern networks. The course also covers the UNIX network programming. At the end of this course, students will be able to comprehend the technical features pertaining to the main LAN and WAN technologies. They will be also able to comprehend the basic Internet protocols for flow and congestion control, including the analysis of algorithms for quality of service in the internet. Further, they will be able to write network programs under the UNIX platform and implement projects in groups according to the topics being included.

A symposium on computer science topics (0120763)

This course presents different studies in emerging areas and specialized topics in computer science.

Advanced Internet Technologies (0102771)

The World Wide Web was originally proposed as a collection of static documents interconnected by hyperlinks. Presently, the web has grown into a rich platform, has been built on a variety of protocols, standards, and programming languages, that aims to replace many of the conventional services, which are provided by a desktop operating system. Selected topics will include: producing dynamic content using a server-based language, serving content databases and XML documents, managing session state, web-based multi-level architectures, web security, and core technologies including HTTP, HTML5, CSS, JavaScript, and SQL. This course will also study concepts and technologies, including AJAX, social networking, mashups, JavaScript libraries (eg jQuery), and web security. Moreover, the course is practical and project-based where students are expected to create a large dynamic web application based on various concepts and techniques introduced during their lecture.

Research Project (0102791)

The objective of this course is to introduce different techniques in conducting research, academic writing, and presentation, particularly, in the field of computer science. This course will provide guidance to students in selecting a research title or problems by understanding the research process and techniques, including the tools that can be used to support the research. It also includes information on the methods

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that are commonly used in research such as questionnaires, comparisons, proposals, case studies and experiments as well as the implementation of an efficient research project. These methods include analyzing data and conducting evaluation on the results that are either obtained qualitatively or quantitatively to prove the contribution of the research based on the research design and hypothesis. This course will also provide guidance on the submission of research materials, paper quality and dissertation writing. Students must work under the supervision of a specialized academic member. This course is a prerequisite for the dissertation.

Advanced Programming Languages (0102712)
This course develops the individual skills required to design, implement, test, and modify larger software, including: the use of integrated design environments, design strategies and patterns, testing, working with large code bases and libraries, code refactoring, and the use of debugging tools and other tools for version control. In this course, there will be important programming, midterm and final exams.

Parallel Programming (0102711)
This course provides a foundation of the concepts of parallel computing and parallel programming, including several paradigms such as the shared memory (no threads), threads, distributed memory/message passing, parallel data, hybrid, multi-program data and multi-program data.

Smart Systems (0102732)
Intelligent Systems provide a broad coverage to the MSc Intelligent Systems course by using the expertise of a global research group. Thus, students will study areas such as advanced reasoning, computational biology, smart robots, vision, and graphics and visualization. In particular, these areas are designed to be practical where this cutting-edge course contains a mix of works that is geared towards building intelligent systems rather than just learning about them.

Having graduated from this course, the candidate will have mastered the latest theoretical concepts in intelligent systems, and gained first-hand experience designing and directing real-life applications. This course also ensures that the graduates are so well-versed in the philosophical, ethical and legal issues that surround matters of AI, and ensures that they possess a comprehensive understanding of such a fascinating subject.

The well-designed course meets the evolving needs of industry, business and government. Graduates should be highly successful in a competitive job market precisely as they will have professional experiences in the latest technologies, which are highly valued by eminent employers. The course also seeks to develop interpersonal, communication and research skills so that the candidate will have the adaptability to thrive in an ever persistently changing work environment where team dynamics and individual excellence play their part toward success of any project.

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Furthermore, this course will provide graduates with an outstanding education in the theory and application of intelligent systems computing, which is supported by a cache of practical, technical and soft skills, and will put them in an excellent position to pursue in further studies, public sector organizations and private companies.

Computer and Information Security (0102743)

The course provides an overview of the history, concepts, practices, and theoretical foundations of modern cryptographic algorithms. The course also addresses the issue of using trusted computers to provide various computer security services. The first part of the course covers the historical background, basic concepts, and symmetric cryptography (including DES, Blowfish, AES, and other ciphers). The second part of the course covers the science of asymmetric cryptography and discuss ways of addressing elementary cryptographic elements (symmetric, asymmetric, and non-cryptographic) such as confidentiality, integrity, authentication, and non-repudiation. In the third part of the course, the class analyzes the most popular cryptographic implementations used in the Internet such as PGP, SSL/TLS, IPSec, Kerberos, etc.

Wireless Networks (0102744)

This course introduces the basic concepts of the followings; the wireless network engineering, WLAN, wireless distribution systems, roaming, and wireless applications.

Computer Animation (0102751)

Adobe After Effects are mainly used to create motion graphics and visual effects. This course allows users to animate, modify, and superimpose media in 2D and 3D space using several built-in tools and third-party plug-ins, including individual attention to variables such as parallax and user-adjustable angle of observations.

Additionally, the course allows students to learn the essential elements of the after effects' interface, including global performance cache, 3D camera tracker, ray-traced 3D rendering, variable mask overlay, tight integration with Adobe Illustrator, rolling shutter fix, and importing Pro files from the Avid Media Composer, Final Cut Pro 7, improved mocha AE workflow, and many more.

Scientific Research Methodology (0102761)

This course introduces different research methods to students in computer science. It enables them to efficiently come up with a master's thesis and to efficiently write a research paper, including research evaluations, citations, H Index, Impact Factor, Scopus, Web of Science. Students are expected to read the assigned material where lectures aim to clarify concepts, answer students' questions, and address some particular related issues.

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Each chapter builds on the previous elements and this makes it significant to comprehend each concept as the course progresses. It is crucial that students read the assigned material on a daily basis.

Software Engineering (0102781)

Programs have become ubiquitous in our society. It controls vital movement, such as air traffic control and marine medical, and is of central importance in communications, refrigeration and refrigeration. Students are scheduled to take over the training course from their prospective program. Students are expected to initially search for techniques for testing and analyzing serial software, and following that, they are expected to examine the limitation that arises from the distributed software. Students will be asked for the energies of continually attempting homework assignments and exams, and taking on a new group project without the need for text. Consequently, students are expected to allocate related articles derived from the open literature upon their availability.

Principles of Virtual Reality (0102782)

Virtual reality is changing the interface between people and information technology by offering new ways to communicate information, visualize processes, and creatively express ideas. This course focuses on the basics of Virtual Reality (VR) and introduces the latest VR technologies that are currently available in the academia and industry. Further, the course provides an introduction in physical principles, technological challenges, possibilities, and limitations of creating virtual environments. The projects emphasize the visualization and exploration of scientific data through different virtual environments.

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