

كلية الحاسبات وتقنية المعلومات

الدكتوراه في تقنية المعلومات (بالرسالة وبعض المقررات)

ج- المقررات الدراسية الإختيارية (12) وحدة معتمدة:

يختار الطالب بتوجيه من المشرف وموافقة رئيس القسم ما مجموعه (12) وحدة معتمدة من المقررات الاختيارية التالية :

وحدة	اسم المقرر	رمز ورقم المقرر	
		En.	عر بي
3	الحوسبة المتنقلة	CPIT 721	تم 721
3	مواضيع متقدمة في الشبكات اللاسلكية	CPIT 722	تم 722
3	المستجدات الحديثة في الحوسبة السحابية	CPIT 723	تم 723
3	شبكات الاستشعار اللاسلكية	CPIT 724	تم 724
3	المستجدات الحديثة في الشبكات	CPIT 725	تم 725
3	نمذجة وتطوير البرمجيات المتقدمة	CPIT 730	تم 730
3	هندسة برمجيات النظم الموزعة	CPIT 731	تم 731
3	التحقق والاختبار	CPIT 732	تم 732
3	هندسة البرمجيات والنظرية الاقتصادية	CPIT 733	تم 733
3	المستجدات الحديثة في هندسة البرمجيات	CPIT 734	تم 734
3	إدارة قواعد البيانات المتقدم	CPIT 740	تم 740
3	برمجة قواعد بيانات على شبكة الويب	CPIT 741	تم 741

المتطلبات العامة للبرنامج:

للحصول على درجة دكتوراه الفلسفة في تقنية المعلومات يجب أن يكمل الطالب ما لا يقل عن (39) وحدة دراسية معتمدة بما فيها رسالة الدكتوراه. وتكون موزعة على النحو الآتي:

الدرجات العلمية:

- (6) وحدة معتمدة للمقررات الإلزامية .
- (12) وحدة معتمدة للمقررات الاختيارية .
- (21) وحدات معتمدة لرسالة الدكتوراه .

أ- المقررات الدراسية الإلزامية (6) وحدة معتمدة :

الوحدات الدراسية	اسم المقرر	رمز ورقم المقرر	
		English	عربي
3	الاحتمالات والإحصاء المتقدم	CPIT 701	تم 701
3	النمذجة والمحاكاة	CPIT 702	تم 702

ب - الرسالة (21) وحدات معتمدة:

الوحدات الدراسية	اسم المقرر	رمز ورقم المقرر	
		English	عربي
21	الرسالة	CPIT 799	تم 799



دليل برامج الدراسات العليا

ج- (تابع) المقررات الدراسية الاختيارية (12) وحدة معتمدة:

وحدة ت	اسم المقرر	رمز ورقم المقرر	
		En.	عر بي
3	التشفير وأمن شبكات الحاسب	CPIT 750	تم 750
3	أمن الحوسبة السحابية	CPIT 751	تم 751
3	كشف التسلل	CPIT 752	تم 752
3	الدلائل الجنائية للأجهزة المتقلة	CPIT 753	تم 753
3	المستجدات الحديثة في أمن المعلومات	CPIT 754	تم 754
3	أجهزة تفاعلية ابتكارية	CPIT 760	تم 760
3	الواقع المختلط	CPIT 761	تم 761
3	معالجة الصور والرؤية بالحاسب	CPIT 762	تم 763
3	الأمن والخصوصية في الاستخدام	CPIT 763	تم 763
3	المستجدات الحديثة في تفاعل الإنسان والحاسب	CPIT 764	تم 764
3	أساليب الذكاء الاصطناعي في تقنية المعلومات	CPIT 770	تم 770
3	معمارية الحاسوب المتقدمة	CPIT 771	تم 771
3	النظم المدمجة المتقدمة	CPIT 772	تم 772
3	مواضيع مختارة في تقنية المعلومات	CPIT 791	تم 791

وحدة ت	اسم المقرر	رمز ورقم المقرر	
		En.	عر بي
3	الحوسبة المتقلة	CPIT 721	تم 721
3	مواضيع متقدمة في الشبكات اللاسلكية	CPIT 722	تم 722
3	المستجدات الحديثة في الحوسبة السحابية	CPIT 723	تم 723
3	شبكات الاستشعار اللاسلكية	CPIT 724	تم 724
3	المستجدات الحديثة في الشبكات	CPIT 725	تم 725
3	نمذجة وتطوير البرمجيات المتقدمة	CPIT 730	تم 730
3	هندسة برمجيات النظم الموزعة	CPIT 731	تم 731
3	التحقق والاختبار	CPIT 732	تم 732
3	هندسة البرمجيات والنظرية الاقتصادية	CPIT 733	تم 733
3	المستجدات الحديثة في هندسة البرمجيات	CPIT 734	تم 734
3	إدارة قواعد البيانات المتقدم	CPIT 740	تم 740
3	برمجة قواعد بيانات على شبكة الويب	CPIT 741	تم 741
3	تحليل البيانات الكبيرة المتقدم	CPIT 742	تم 742
3	التنقيب ومستودعات البيانات المتقدم	CPIT 743	تم 743
3	محركات البحث على الويب ونظم التذكية	CPIT 744	تم 744
3	مستجدات حديثة في نظم قواعد البيانات	CPIT 745	تم 745

Courses Description

<i>Course Code</i>	<i>Course Title</i>	<i>Credits</i>	<i>Prerequisites</i>
CPIT 701	Advanced Probability and Statistics	3	-
Description	<p>The course is intended to provide students with probability and statistics knowledge for research. Topics covered include: Probability theory, Probability Distributions (Discrete and Continuous), Convergence and limits, Kolmogorov Theorem, Central Limit Theorem, Martingales, Parametric theory and Nonparametric theory (Regression, Classification, Clustering), CART (Classification and Regression Trees), Correlation, Autocorrelation, Confidence Intervals, Graphical Models, Minimax Theory, Jackknife, Collinearity, Bootstrap, Time Series Methods, Markov Chains and Queueing theory.</p> <p>Lab/Practical Coverage: Standard datasets available online will be used and evaluated using parametric and nonparametric tests. Further, the data will be analyzed for correlation and other aspects.</p>		

<i>Course Code</i>	<i>Course Title</i>	<i>Credits</i>	<i>Prerequisites</i>
CPIT 702	Modeling and Simulation	3	-
Description	<p>The course is intended to provide student with a reasonable grounding in how to make use of modelling techniques in order to evaluate the dynamic behavior of real systems. Topics include: Discrete and Continuous Modelling, Sources and Propagation of Error, Graph or Network Transitions Based Simulations, Mesh Based Simulations, Performance evaluation methods, Markovian queueing models, Model verification and validation; Model output analysis, design of simulation experiments; Validation of Model Results.</p> <p>Lab/Practical Coverage: Implement simulation studies like Markovian models, queueing systems along with verification and validation of the proposed model.</p>		

<i>Course Code</i>	<i>Course Title</i>	<i>Credits</i>	<i>Prerequisites</i>
CPIT 720	Advanced Concepts and Structures in Internet Computing	3	-
Description	<p>In this course, students will be exposed to the latest and most exciting developments in the areas of Internet computing and advanced topics that have direct influences of its future structure such as Internet of Things (IoT) framework, Big Data concepts, future Social media architectures, Intelligent Agents, and Internet Computing with Distributed Components.</p>		

<i>Course Code</i>	<i>Course Title</i>	<i>Credits</i>	<i>Prerequisites</i>
CPIT 721	Mobile Computing	3	-
Description	<p>This course provides students with a deep understanding of techniques, mechanisms, protocols and overall network architectures for future Internet design. Special emphasis is given to mobility aspects of future Internet and current research trends and their case studies in the mobile internet computing area. It will focus on the underlying concepts and standards of mobile computing and current technologies for mobile and distributed systems. It discusses cellular networks, wireless networks and their standards and technologies, context-aware computing, location-awareness, wireless sensor networks, internet mobility, web services and service-oriented technology.</p>		

<i>Course Code</i>	<i>Course Title</i>	<i>Credits</i>	<i>Prerequisites</i>
CPIT 722	Advanced Topics in Wireless Networks	3	-
Description	<p>This course is an advanced research-oriented course designed for graduate students with computer wireless networks background. It will cover various topics relevant to a cutting-edge technology, namely, Wireless Ad Hoc Networks, which include Mobile Ad Hoc Networks (MANET), Wireless Sensor Networks (WSN) and Wireless Mesh Networks (WMN). Through this course, students can learn the state of art of wireless ad hoc networks research, and enhance their potential to do research in this exciting area. The material covered in the lectures is mainly derived from research papers published in top journals and conferences.</p>		

<i>Course Code</i>	<i>Course Title</i>	<i>Credits</i>	<i>Prerequisites</i>
CPIT 723	Recent Advances in Cloud Computing	3	-
Description	<p>This course will evaluate the recent achievements having fundamental importance in the field of cloud computing. The course will be divided into two phases. In the first phase, introductory discussions and recent research topics regarding cloud computing will be introduced to the students. In the second phase, every student should give research paper presentations after going through a thorough literature review, actively contribute to the overall discussions and finally ends up a term paper.</p>		

<i>Course Code</i>	<i>Course Title</i>	<i>Credits</i>	<i>Prerequisites</i>
CPIT 724	Wireless Sensor Networks	3	-
Description	<p>This course will cover a broad range of topics in the emerging field of wireless sensor networks. Topics include radio communication; networking protocols: transport layer protocols, routing protocols, medium access control protocols; energy management and applications: multimedia wireless sensor networks, underwater acoustic sensor networks and underground sensor networks.</p>		

<i>Course Code</i>	<i>Course Title</i>	<i>Credits</i>	<i>Prerequisites</i>
CPIT 725	Recent Advances in Networking	3	-
Description	<p>This course will familiarize the students with the most recent developments in computer networks. Major topic areas include data center networking, virtualization, VPN, software defined networking, cloud computing, advanced LAN/WLAN technologies (power over Ethernet, link aggregation, etc.), storage area network technologies, optical networking, IPv6 implementation and operation, multipath TCP, networks for mobile and wireless devices including different network types: ad hoc, cell phone, access point, sensor networks, etc.</p>		

<i>Course Code</i>	<i>Course Title</i>	<i>Credits</i>	<i>Prerequisites</i>
CPIT 730	Advanced Software Modeling and Development	3	-
Description	<p>In-depth study of modern software development concepts for requirements and software modelling and software development that promote reuse of software development artefacts. Such concepts include, Domain Specific Languages (DSL), Model Driven Development (MDD), Meta Object Facility (MOF), Object Constrain Language (OCL), Action Language for Foundational UML (ALF), Architecture patterns and Design Patterns and automated software testing.</p>		

<i>Course Code</i>	<i>Course Title</i>	<i>Credits</i>	<i>Prerequisites</i>
CPIT 731	Software Engineering for Distributed Systems	3	-
Description	<p>This course presents the state of art techniques and programming interfaces for distributed software engineering and its application on the World Wide Web. The course will present a detailed study of the methods and technologies for the production of web-based applications that excels in all areas of software quality and especially in the areas of security, reliability, usability, scalability and maintainability.</p>		

<i>Course Code</i>	<i>Course Title</i>	<i>Credits</i>	<i>Prerequisites</i>
CPIT 732	Verification and Testing	3	-
Description	<p>This course presents various research areas and its leading representatives, for verification and testing. The course is divided into two parts; the first part covers Empirical Software Engineering, model-based testing and search-based testing. The second part is focusing on verification and algorithms, and it covers modeling and verification, state-based refinement, concurrent refinement, Non-Turing computation and evolutionary algorithms.</p>		

<i>Course Code</i>	<i>Course Title</i>	<i>Credits</i>	<i>Prerequisites</i>
CPIT 733	Software Engineering and Economic Theory	3	-
Description	<p>Software Engineering Economics are about making decisions related to software engineering in a business context. Success of any software engineering project is partly dependent on effective business management. Software engineering economics provides a way to examine the attributes of software and software processes in a systematic way that relates them to economic measures. These can be weighted and analyzed when making decisions within the scope of a software engineering project and its organization. The essence of software engineering economics is aligning software technical decisions with the business goals of the organization. This course examines the key aspects of software engineering economics, including life cycle economics; risk and uncertainty; economic analysis methods and practical considerations, which tie concept and theory to contemporary software economic realities.</p>		

<i>Course Code</i>	<i>Course Title</i>	<i>Credits</i>	<i>Prerequisites</i>
CPIT 734	Recent Advances in Software Engineering	3	-
Description	<p>The course covers the current methods and practices for good design of software systems. Software design patterns, frameworks, architectures, and designing systems to apply these multi-level abstractions. Advanced topics in systems analysis and design; alternative methodologies such as agile development, extreme programming, Rational Unified Process; Unified Modeling Language; bench marking and best practices for systems development; cost/benefit analysis, estimation and budgeting for software systems; testing; patterns, domain-driven design; process modeling; service-oriented architecture and cloud computing.</p>		

<i>Course Code</i>	<i>Course Title</i>	<i>Credits</i>	<i>Prerequisites</i>
CPIT 740	Advanced Database Management	3	-
Description	<p>Studying advanced database languages and models, theory and design of databases, transaction processing, database recovery, concurrency control, distributed databases, database security and integrity. Discussion of recent developments in databases and research directions.</p> <p>Practical/Lab Coverage: The practical part will cover a number of advanced topics in big data, databases, and modern data-intensive systems and projects. The specific topics lab activities include:</p> <ul style="list-style-type: none"> • Applying and implementing the concurrency control techniques. • Implement the query processing and optimization strategies for relational database systems in different OS environments such as Linux, UNIX, Solaris 2, and Mac OS X. • Implementing the indexing methods, parallel and distributed database systems, map-reduce/hadoop, NoSQL, database-as-a-service (DB clouds). • Building the data mining models on large databases, data on the web. • Implementing an advance topics and strategies of database security and access control such as DAC, MAC, RBAC, and LBAC. 		

<i>Course Code</i>	<i>Course Title</i>	<i>Credits</i>	<i>Prerequisites</i>
CPIT 741	Database Programming for the World Wide Web	3	-
Description	<p>Information systems accessible through web and Internet are becoming prevalent. This course focuses on technologies and industry standards for accessing and manipulating persistent data that are suitable for web applications. Topics include data storage; XML data specification, parsing and validation; data and language translation; networking and Web technology overview; software framework technology for controlling software system complexity; and a roadmap for the enterprise computing technologies.</p>		

<i>Course Code</i>	<i>Course Title</i>	<i>Credits</i>	<i>Prerequisites</i>
CPIT 742	Advanced Big Data Analytics	3	-
Description	<p>The course will introduce different ways of handling analytics algorithms on different platforms. Subsequently visualization issues and mobile issues on Big Data Analytics will be covered. Students will then have fundamental knowledge on Big Data Analytics to handle various real-world challenges. The course will zoom in to discuss large-scale machine learning methods that are foundations for artificial intelligence and cognitive networks. The course will discuss several methods to optimize the analytics based on different hardware platforms, such as Intel & Power chips, GPU, FPGA, etc. The lectures will conclude with introduction of the future challenges of Big Data, especially on the ongoing Linked Big Data issues that involves graphs, graphical models, spatio-temporal analysis, cognitive analytics, etc. Students will choose the topics of their own for a final project to apply what they learned in the class for their needs, either for the future work requirements or for the research problems at hand.</p> <p>Lab/Practical Coverage: Practical coverage will start with fundamental tools such as Hadoop, Spark and/or related tools. Further data management will be based on HDFS, HBase, KV stores, document database and graph database.</p>		

<i>Course Code</i>	<i>Course Title</i>	<i>Credits</i>	<i>Prerequisites</i>
CPIT 743	Advanced Data Mining and Data Warehousing	3	-
Description	<p>This course emphasizes advanced concepts and techniques for data mining and their application to large-scale data warehouse. This course covers advanced topics on data mining; mining patterns from temporal data, semi-supervised learning, active learning and boosting. In addition to computational aspects of algorithm implementation, the course will also cover architecture and implementation of data warehouse, data pre-processing (including data cleansing), and the choice of mining algorithms for applications.</p> <p>Lab/Practical Coverage:</p> <ol style="list-style-type: none"> 1. Design and implement a data warehouse database (4 weeks) 2. Explore Extraction, Transformation, Loading tasks in data warehousing (1 week) 3. Explore data mining algorithms implementation (3 weeks) 4. Design and implement data mining application (3 weeks) <p>Use data mining tools (4 weeks).</p>		

<i>Course Code</i>	<i>Course Title</i>	<i>Credits</i>	<i>Prerequisites</i>
CPIT 744	Web Search Engines and Recommender Systems	3	-
Description	<p>Study of Web-based search engines and recommender systems. Topics include traditional information retrieval methods, Boolean retrieval systems, ranking-based retrieval systems, search engine performance metrics, Web crawling/bots, link analysis, anatomy of a search engine, fundamentals of classification-based recommender systems, learning user information interests, object properties, and case studies.</p> <p>Lab/Practical Coverage: Standard data collections will be used to analyze for various aspects discussed in the lecture. Retrievals obtained using various techniques will be tested for precision, recall, etc.</p>		

<i>Course Code</i>	<i>Course Title</i>	<i>Credits</i>	<i>Prerequisites</i>
CPIT 745	Recent Advances in Database Systems	3	-
Description	<p>Identification of the association between traditional relational databases and other query languages and/or data models. Formal handling of de-normalization and normalization, advanced query processing techniques and optimization, advanced data modeling, physical database design and indexing, XML databases and query engines, and object-oriented database systems. Management of spatiotemporal data, including index structures and continuously streaming and sensor-based data.</p>		

<i>Course Code</i>	<i>Course Title</i>	<i>Credits</i>	<i>Prerequisites</i>
CPIT 750	Cryptography and Computer Network Security	3	-
Description	<p>Topics include need for security services in computer networks, basic concepts of cryptology, modern symmetric ciphers, public key cryptography (RSA, ElGamal, Elliptic Curve Cryptosystems), efficient hardware and software implementations of cryptographic primitives, requirements for implementation of cryptographic modules, side-channel attacks, data integrity and authentication, digital signature schemes, key exchange and key management, quantum key distribution, the web and electronic payments, security aspects of mobile communications, zero-knowledge identification schemes, and smart cards.</p> <p>Lab/Practical Coverage: This lab includes programming assignments to implement and test several cryptographic algorithms. The suggested algorithms are AES for symmetric encryption, and either RSA or ECC for asymmetric encryption. SHA-2 is suggested for implementing a digital signature scheme. The asymmetric algorithms should use large numbers to provide an acceptable security level.</p>		

<i>Course Code</i>	<i>Course Title</i>	<i>Credits</i>	<i>Prerequisites</i>
CPIT 751	Cloud Computing Security	3	-
Description	<p>This course provides students with the state-of-the-art on cloud security issues, the common threats and associated risks to clouds and the known attacks and their countermeasures. Challenges on privacy and reliability in cloud computing security will be presented. This includes personal data privacy and security, trust properties of cloud computing, reliability of the cloud computing network, service delivery models (IaaS, PaaS, and SaaS), and the key factors affecting the security risks. The latest research in cloud computing security will be reviewed, and students will discuss open research problems related to the security in the cloud.</p>		

<i>Course Code</i>	<i>Course Title</i>	<i>Credits</i>	<i>Prerequisites</i>
CPIT 752	Intrusion Detection	3	-
Description	<p>The course explores the use of intrusion detection systems (IDS) as a security tool. It presents different intrusions affecting availability, confidentiality and integrity of computing resources. A variety of methodologies will be presented including signature-based and anomaly-based intrusion detection systems. Additionally, many detection approaches are reviewed and compared including Statistics-based, Pattern-based, Rule-based, State-based and Heuristic-based IDS. The course examines existing types of IDS technologies such as Host-based IDS, Network-based IDS, Wireless-based IDS, and cloud-based IDS. Students will do IDS projects using a popular and open source tool (Snort).</p> <p>Lab/Practical coverage: Students should select a tool that facilitates using several classification algorithms to implement an anomaly-based IDS prototype. Standard datasets are available for training and testing the developed prototype. For real-time testing, students should use attacking tools against isolated systems such as personal computers and/or local area networks to evaluate the effectiveness of the developed prototype.</p>		

<i>Course Code</i>	<i>Course Title</i>	<i>Credits</i>	<i>Prerequisites</i>
CPIT 753	Mobile Forensics	3	-
Description	<p>This course provides students with solid understanding on how the popular Mobile OSs is hardened to defend against common attacks and exploits. It covers advanced topics of today's Mobile Forensics that experts require such as file system structure and recovery procedure, data carving techniques on data in physical memory, the intricacies of manual acquisition (physical vs. logical) and advanced analysis using reverse engineering.</p>		

<i>Course Code</i>	<i>Course Title</i>	<i>Credits</i>	<i>Prerequisites</i>
CPIT 754	Recent Advances in Information Security	3	-
Description	<p>This course will familiarize the students with the most recent developments in information security. Major topic areas include biometrics security, big data security, network security, data center security and software security. This includes looking at issues of physical security, Internet of Things security and management. Additionally, the course covers recent advances of today's penetration testing, formal verification of systems, distributed system authentication, continuous authentication, protocol design and attack, computer viruses and malware.</p>		

<i>Course Code</i>	<i>Course Title</i>	<i>Credits</i>	<i>Prerequisites</i>
CPIT 760	Innovative Interactive Devices in HCI	3	-
Description	<p>This course will cover new techniques and technologies for creating high quality user interfaces. It will consider current work in this area, emphasizing readings from the research literature as well as practical projects involving the implementation of new concepts in user interface software or other technology. Typical topics to be covered might include: advanced interaction techniques, ubiquitous computing, tangible interfaces, mobile and wearable computing, web-based interaction, information visualization, virtual and augmented reality, new input devices, audio, speech, and other new interaction modalities.</p> <p>Students should create multiple concepts of integrated technologies to produce innovative service and assess their technical feasibility, financial viability, and desirability. Then they choose a single service idea and produce a plan with a business model and a video sketch suitable for posting on a crowd funding site.</p>		

<i>Course Code</i>	<i>Course Title</i>	<i>Credits</i>	<i>Prerequisites</i>
CPIT 761	Mixed Reality	3	-
Description	<p>This course covers the recent and future trends in the areas of Virtual and Augmented Reality including the developments at both theoretical and practical levels. The course is divided into three parts. The first part focuses on the elements of design and development of mixed reality virtual worlds as well as introducing the latest tools used in this area. The second part focuses on the human interaction with the virtual worlds including sensors and feedback devices. The last part covers case studies and cutting edge research work in the area.</p> <p>Lab/Practical Coverage: During the lab sessions, students will be introduced to the latest technologies used in the area of mixed reality including the latest input devices (such as controllers and other sensors) and output devices (helmets, haptics feedback, etc.). The students will develop applications that utilize these technologies using the most popular game engines and design software/hardware solutions that enhance the experience of mixed reality.</p>		

<i>Course Code</i>	<i>Course Title</i>	<i>Credits</i>	<i>Prerequisites</i>
CPIT 762	Image Processing and Computer Vision	3	-
Description	<p>This course is intended to provide to the students the capability of analyzing images of different types (medical, fingerprint, satellite image, compressed images, encrypted/watermarked images, etc.) apply some transformations, extract needed information, locate objects of interest in an image and analyze the objects motions in a video. Students will deal with some concrete examples such as detecting a pathological region in a medical image, recognize a fingerprint, identify some objects of interest in satellite images, use of some techniques allowing the compression of an image, encrypt an image using cryptographic algorithms and use some techniques for image watermarking. Students will be familiar with different problems in the image processing field that facilitate them their contribution in this area during their research projects.</p> <p>Lab/Practical Coverage: For the purpose of a good assimilation of the theoretical notions and a concrete exploration of the image processing problems, lab activities using the MATLAB language will be conducted and will cover the content seen during the course: filtering and image enhancement techniques, segmentation and image processing in the frequency domain.</p>		

<i>Course Code</i>	<i>Course Title</i>	<i>Credits</i>	<i>Prerequisites</i>
CPIT 763	Usable Privacy and Security	3	-
Description	<p>There is growing recognition that technology alone will not provide all of the solutions to security and privacy problems. Human factors play an important role in these areas, and it is important for security and privacy experts to have an understanding of how people will interact with the systems they develop. This course will introduce the students to secure interaction design, trust and semantic attacks, privacy design, making the privacy visible, web browser privacy and security, authentication and alternatives to text passwords, and usable security. Additionally, students will be exposed to a variety of usability and user interface problems related to privacy and security to give them experience in designing and enhancing the security and privacy in the interactive models.</p>		

<i>Course Code</i>	<i>Course Title</i>	<i>Credits</i>	<i>Prerequisites</i>
CPIT 764	Recent Advances in HCI	3	-
Description	<p>This course presents the advanced topics and practices of Human Computer Interaction (HCI), which include: Conceptualizing and modeling interaction; Cognitive aspects of interaction; Interaction design opportunities and weaknesses, Prototyping, and construction; and Evaluation frameworks.</p>		

<i>Course Code</i>	<i>Course Title</i>	<i>Credits</i>	<i>Prerequisites</i>
CPIT 770	Artificial Intelligence Methods for IT	3	-
Description	<p>This course is meant to teach the practical side of machine learning for applications, such as mining newsgroup data or building adaptive user interfaces. The emphasis will be on learning the process of applying machine learning effectively to a variety of problems rather than emphasizing an understanding of the theory behind what makes machine learning work.</p> <p>Lab/Practical Coverage: The course is intended to be lab intensive in the sense that each of the techniques considered will be followed by exercises and labs using appropriate software tools. Topics include decision trees, decision rules, Bayesian learning and related topics, clustering, association rules and instance based learning, rough set techniques, reinforcement learning, data mining techniques, WEKA and ROSETTA machine learning tools, plus more.</p>		

<i>Course Code</i>	<i>Course Title</i>	<i>Credits</i>	<i>Prerequisites</i>
CPIT 771	Advanced Computer Architecture	3	-
Description	<p>The course presents the essence of computer design and instruction set architecture. Presents techniques for pipeline and vector processors. It demonstrates memory hierarchy and I/O subsystem and explores the hardware and software associated with high-performance computing. The course will allow students to practice programming for HPC using parallel and vector algorithms.</p> <p>Lab/Practical coverage The lab of the course will explore parallel programming and synchronization of the multicore system; also, multicomputer programming to explore the basics of the message-passing programming paradigm. Vector computer programming and understanding of pipelining using WinDLX simulator.</p>		

<i>Course Code</i>	<i>Course Title</i>	<i>Credits</i>	<i>Prerequisites</i>
CPIT 772	Advanced Embedded Systems	3	-
Description	<p>The course aims to provide the concept of embedded system programming. In addition, it provides embedded systems developers the necessary skills to develop complex embedded systems and enables them to improve their designs by using the tools available. Interfacing to external memory and sensors as well as keyboard and LCD. Introducing the interrupt based programming. The course will present the cutting edge of the hardware technology in the field and available tools.</p> <p>Lab/Practical coverage: Exploring one of microcontroller and practice its programming and interfacing with peripheral devices and sensors, and embed it in building applications. Programming PLD and PLA for different purposes. Learning FPGA and Verilog, and embed FPGA in implementing solution for different applications. Exploring the new trends of technologies for embedded system devices.</p>		

<i>Course Code</i>	<i>Course Title</i>	<i>Credits</i>	<i>Prerequisites</i>
CPIT 791	Selected Topics on Information Technology	3	-
Description	<p>This course provides the required background to important theoretical and applied issues in information technology. It aims to deepen the candidate's grasp of the theories, techniques and methods commonly employed in a certain emerging area of information technology. It is possible that we have many sections with different titles and contents and may have one single student (if situation mandates).</p>		

<i>Course Code</i>	<i>Course Title</i>	<i>Credits</i>	<i>Prerequisites</i>
CPIT 799	Thesis	3	-
Description	<p>A thesis/dissertation is a requirement for all Doctor of Philosophy (Ph.D.) students. It is considered as primary evidence of the student's capacity for research, independent thought and of his/her ability to write professionally in the language of instruction.</p>		