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**Information Technology programes**

**Institute of graduate studies and research**

**Alexandria University**

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**كلمة الأستاذ الدكتور رئيس مجلس القسم**

**جميعنا يعرف ما للعلم من تأثير إيجابي علي حياة ورفاهية الشعوب ودائما وأبدا ما يكون تقدم وإزدهار الشعوب مصاحبا لتقدم العلم والعلماء لدي هذه الشعوب ومن هذا المنطلق يأتي دور الجامعات في وطننا الحبيب كمبراس للعلم وقبلة للباحثين والعلماء وقسم تكنولوجيا المعلومات بمعهد الدراسات العليا والبحوث أنشئ لكي يكون نافذة علي تكنولوجيا القرن الحالي ألا وهي تكنولوجيا المعلومات التي أصبحت العامل المشترك في كافة مظاهر الحياة وهدفنا في قسم تكنولوجيا المعلومات هو إعداد الكوادر القادرة علي مواكبة التقدم الهائل في المجالات المتعددة لتكنولوجيا المعلومات مثل الإتصالات والشبكات والوسائط المتعددة والأنظمة المحمولة والذكية وغيرها وهدفنا الأعلي دائما هو خريج متميز قادر علي المنافسة في سوق العمل المحلي والإقليمي والدولي بما يكتسبه من قدرات نظرية وعملية من خلال التعمق في الإتجاهات البحثية الحديثة والنشر العلمي المتميز الذي بالتأكيد ينعكس علي جودة البحث العلمي في القسم.**

**Vision:**

Information changes life pattern. The world that relies on extracting and utilizing information with the best possible efficiency is a necessity to stimulate all for discovery, learning, innovation, and problem solving, and eventually enjoying a better life.

**Mission:**

Our mission is to make information work. We prepare researchers in all information technology areas and investigate problems and all available chances to use it; and we build solutions to for informatics challenges.

**Strategy:**

The strategy of the Information technology department is based on activating modern research directions and market requirements on both internal and external levels. To achieve this strategy, the research plan in the department adopts  digital communications, computer networks, multimedia systems and its application, intelligent decision support systems, digital image processing, design if advanced information systems, applications of artificial intelligence, knowledge based systems, information security and web technology.

**Diploma program in Information Technology**

**1. General statement of the professional role of the graduate:**

**Diploma in Information Technology presents a variety of challenges, because of the huge range of organizations who use IT as part of their business.** It is designed for graduates with a bachelor degree .The course offers continuing education at a graduate level for professionals from all disciplines.

Successful completion of this program will give students the foundation, knowledge and skills to:

* Be familiar with the theoretical basis of Information Technology
* Demonstrate the programming skills required to architect and implement complex computer systems
* Analyze, design and implement software systems, including functional, relational and object-oriented methodologies
* Discuss the latest developments in IT

**2. Graduate attributes**

**Graduates of the Information Technology Diploma Program should have the ability to:**

2.1 Implement acquired specialized- knowledge in his professional practice.

2.2 Specify professional problems and propose solutions to them.

2.3 Perfect professional skills and use the appropriate technological means in his professional practice.

2.4 Communicate and lead team works through systemic professional work.

2.5 Take decision by using available information.

2.6 Allocate resources efficiently.

2.7 Awareness of his role in Society development and preservation of the environment.

2.8 Behave in such a way that reflects respect for Integrity and credibility and the rules of profession.

2.9 Rules of the profession and Accountability accepting.

2.10 Realize the necessity of self-development and getting involved in continuous learning.

#### 3.The aims of this programme are to:

* Introduce students to the basic research areas in IT.
* Graduate students that are capable of analyzing, designing, and developing information systems for various needs.

#### 4. Programme Intended Learning outcomes (ILOs)

1. **Knowledge and understanding:**

**Upon Completion, graduates will:**

1. Define the key aspects of Information Technology and its scientific basis.
2. Discuss the tools and techniques for efficient information handling.
3. Describe aspects pertaining to intellectual property rights.
4. Appraise Quality Assurance concepts of different information systems development phases.
5. Discuss Social effects of information technology.
6. **Intellectual skills:**

**Upon Completion, graduates will:**

1. Select and evaluate the available information to rank problems.
2. Apply the most appropriate problem solving methodology.
3. Compare published articles and research concerning information technology.
4. Evaluate scientific results and conclusions clearly and correctly.
5. Evaluate pros and cons of given methodologies for information systems development.
6. Compile potential solutions to the aspects to be handled in a given problem according to the available data,
7. Apply acquired knowledge in systems analysis, design and development.
8. **Professional skills**

**Upon Completion, graduates will:**

1. Practice and develop state of the art information systems
2. Solve problems related to information systems troubleshooting.
3. Report specialized research topics in information technology.
4. **General and transferable skills**

**Upon Completion, graduates will:**

1. Communicate with the scientific community and research team in the related fields to Information Technology.
2. Self-assess the required learning needs in information technology aspects.
3. Handle different forms of information to obtain knowledge.
4. Collaborate in activities within a team setting.
5. Handle time effectively.
6. Supervise a group task in a related information technology aspect.
7. Learn within a setting of self-learning such as e-learning.

#### 5. Courses contributing to the programme

**Compulsory courses**

|  |  |  |  |
| --- | --- | --- | --- |
| Code | Course Title  | No. of weekly hours | Credit Hours |
| Lec. | Prac. |
| 1404601 | Multimedia technology and applications | 2 | 2 | **3** |
| 1404602 | Networks and information security | 2 | 2 | **3** |
| 1404603 | Web-based Information Systems | 2 | 2 | **3** |

**Optional courses**

|  |  |  |  |
| --- | --- | --- | --- |
| Code | Course Title  | No. of weekly hours | Credit Hours |
| Lec. | Prac. |
| 1404604 | E-Commerce Systems | 2 | 2 | **3** |
| 1404605 | Computer Simulation | 2 | 2 | **3** |
| 1404606 | Knowledge – based Systems | 2 | 2 | **3** |
| 1404607 | Smart Decision Support Systems | 2 | 2 | **3** |
| 1404608 | Software Metrics and Quality Systems | 2 | 2 | **3** |
| 1404609 | Diploma Project | 6 |  | **6** |

#### 6. Programme admission and registration requirements

#### The candidate should hold a B.Sc. or License degree from one of the Egyptian Universities with at least a general grade of "fair" or "C" granted by a faculty or an institute accredited by The Supreme Council of Universities in Egypt.

#### After completion of the total credit hours required for the degree, the student may submit the project plan.

#### The candidate submits the project plan with the suggested supervising committee to the board of the scientific department.

#### 7. Regulations for programme progression and completion

#### The enrolled students are offered the degree when:

* Attending 24 credit hours (18 CH for courses and 6 CH for the project) and passing the courses examination with a CGPA of at least C.
* Successfully preparing and orally presenting the project in front of a committee assigned by the board of scientific department.

**M.Sc. program in Information Technology**

**1. General statement of the professional role of the graduate:**

The Master in Information Technology is an intensive program to provide an opportunity for graduates of computing and non-computing subjects to develop key specialist skills for a career in Computing. It is ideal for complementing your expertise with core computing skills.

Computing Science has strong links with industry and is host to world-class research in different areas.

The Master Information Technology Program aims:

* To graduate students capable of doing research in IT.
* To produce research that can contribute to solving practical problems using Information Technologies.

**2. Graduate attributes**

**Graduates of the Information Technology M.Sc. Program should have the ability to:**

* 1. Be proficient in the application of the fundamentals and methodologies of scientific research and the use of various tools.
	2. Apply the analytical method and use it in the area of specialization.
	3. To apply specialized knowledge and combine it with relevant knowledge in professional practice.
	4. Show awareness of the current problems and modern visions in the area of ​​specialization
	5. Identify professional problems and find solution for them.
	6. Master an appropriate range of professional skills, and use of appropriate technological means to serve the professional practice.
	7. Communicate effectively and the ability to lead a team work.
	8. Take decisions in different professional contexts.
	9. Employ available resources to achieve the highest benefit and preservation of resources.
	10. Show awareness of his role in community development and environmental conservation in the light of global and regional variables.
	11. Act in a way that reflects a commitment to integrity and credibility and abide by the rules of professional.
	12. Develop himself academically, professionally and capable of continuous learning.

#### 3. The aims of this programme are to:

* Graduate students that are capable of doing research work in IT.

Produce research that can contribute to solving practical problems using Information Technologies

#### 4. Programme Intended Learning outcomes (ILOs)

***A. Knowledge and understanding:***

**By the end of this programme, graduates should be able to:**

1. Comprehend the major aspects of Information Technology and its scientific basis.
2. Distinguish the discipline and application of Information Technology.
3. Understand social effects of Information Technology.
4. Investigate Potential applications of advanced information systems
5. Recognize new advances in programming methodologies and application paradigms.
6. Review aspects pertaining to intellectual property rights including national and international regulation interrelationship.
7. Identify Quality standard of different information systems relevant to Information Technology.
8. Recognize research methodologies in Information Technology
9. Apply the code ethics in scientific publications.

***B. Intellectual skills:***

**By the end of this programme, graduates should be able to:**

1. Analyze and evaluate the available information and the different methodologies to select the most appropriate solution method
2. Interpret and manipulate information from a variety of sources.
3. Assess alternatives solutions for specific problems.
4. Integrate solutions for a given problem.
5. Analyze research topic covering scientific plan, research methodology, data analysis to present scientific results and conclusions clearly and correctly.
6. Evaluate pros and cons of given methodologies for information systems development.
7. Use standard approaches for communication and planning among professionals.
8. Deduce acquired knowledge in systems analysis, design and development.

***C. Professional and practical skills:***

**By** **the end of this programme, graduates should be able to:**

1. Design and develop state of the art information systems
2. Solve technical problems related to information systems development.
3. Outline key measures that must be met in a given system development
4. Present specialized research reports.
5. Report the most suitable approach for solving a particular problem in the field of information technology.
6. Sketch potential enhancements of a given information system.

***D. General and transferable skills:***

**By the end of this programme, graduates should be able to:**

1. Communicate with the scientific community and research team in the related fields to Information Technology.
2. Self-assess the required learning needs in information technology aspects.
3. Compile different forms of information to acquire knowledge.
4. Work in a team in Information Technology projects.
5. Utilize time effectively.
6. Lead ask groups in a related information technology aspect.
7. Learn within a setting of self-learning such as e-learning.
8. Communicate with scientific community and research teams in Information Technology.

#### 5. Courses contributing to the programme

**Compulsory courses**

|  |  |  |  |
| --- | --- | --- | --- |
| Code | Course Title  | No. of weekly hours | Credit Hours |
| Lec. | Prac. |
| 1404770 | Research Methodology | 2 | 2 | **0** |
| 1404780 | Technical Writing | 2 | 2 | **0** |

**Optional courses**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Code | Course Title  | No. of weekly hours | Credit Hours | prerequisite |
| Lec. | Prac. |
| 1404701 | Web technologies | 2 | 2 | **3** |  |
| 1404702 | Analysis and Design of Algorithms | **2** | **2** | **3** |  |
| 1404702-1 | Problem solving | **2** | **2** | **3** |  |
| 1404703 | Communication systems and computer networks | 2 | 2 | **3** |  |
| 1404704 | Information system analysis and design | 2 | 2 | **3** |  |
| 1404705 | Neural networks and genetic programming | 2 | 2 | **3** |  |
| 1404706 | Database systems | **2** | **2** | **3** |  |
| 1404707 | e-commerce systems | 2 | 2 | **3** |  |
| 1404708 | Multimedia technology and applications | **2** | **2** | **3** |  |
| 1404709 | Networks and information security | **2** | **2** | **3** |  |
| 1404710 | Web-based information systems | **2** | **2** | **3** |  |
| 1404711 | Data structures | 2 | 2 | **3** |  |
| 1404712 | Pattern recognition | 2 | 2 | **3** |  |
| 1404713 | Data compression and cyphering | **2** | **2** | **3** |  |
| 1404714 | Image processing, graphics and visualization | 2 | 2 | **3** |  |
| 1404715 | Computer simulation | 2 | 2 | **3** |  |
| 1404716 | Selected Topics in Artificial Intelligence | 2 | 2 | **3** |  |
| 1404716-1 | Knowledge-based systems | 2 | 2 | **3** |  |
| 1404717 | Smart decision support systems | 2 | 2 | **3** |  |
| 1404718 | Operating system security | 2 | 2 | **3** |  |
| 1404719 | Software engineering | 2 | 2 | **3** |  |
| 1404720 | Software metrics and quality systems | 2 | 2 | **3** |  |
| 1404721 | Data mining and data warehousing | 2 | 2 | **3** |  |
| 1404722 | Advanced programming | 2 | 2 | **3** |  |
| 1404723 | Advanced database systems | 2 | 2 | **3** | 1404706 |
| 1404724 | Advanced Communication Systems and Computer Networks | 2 | 2 | **3** | 1404703 |
| 1404725 | Advanced information system analysis and design | **2** | **2** | **3** | 1404704 |
| 1404726 | Advanced e-commerce systems | **2** | **2** | **3** | 1404707 |
| 1404727 | Advanced multimedia technology and applications | **2** | **2** | **3** | 1404708 |
| 1404728 | Advance networks and information security | **2** | **2** | **3** | 1404709 |
| 1404729 | Advanced web-based information systems | **2** | **2** | **3** | 1404710 |
| 1404730 | Advanced data structures | **2** | **2** | **3** | 1404711 |
| 1404731 | Advanced pattern recognition | **2** | **2** | **3** | 1404712 |
| 1404732 | Advanced data compression and cyphering | **2** | **2** | **3** | 1404713 |
| 1404733 | Advanced image processing, graphics and visualization | **2** | **2** | **3** | 1404714 |
| 1404734 | Advanced neural networks and genetic programming | **2** | **2** | **3** | 1404705 |
| 1404735 | Advanced computer simulation | **2** | **2** | **3** | 1404715 |
| 1404736 | Advanced knowledge-based systems | **2** | **2** | **3** | 1404716/1404716-1 |
| 1404737 | Advanced smart decision support systems | **2** | **2** | **3** | 1404717 |
| 1404738 | Advanced software engineering | **2** | **2** | **3** | 1404719 |
| 1404739 | Advanced software metrics and quality systems | **2** | **2** | **3** | 1404720 |
| 1404740 | Advanced data mining and data warehousing | **2** | **2** | **3** | 1404721 |

#### 6. Programme admission and registration requirements

#### The candidate should hold a B.Sc. or License degree from one of the Egyptian Universities with at least a general grade of "Good" or C+ or any equivalent degree granted by a faculty or an institute accredited by The Supreme Council of Universities in Egypt.

* A candidate holding a B.Sc. or License degree with grade of “Fair” can be enrolled for M.Sc. degree in the institute departments provided that the candidate obtains the academic diploma with a grade of at least C+ or pass additional supplementary courses with a grade of at least C+.
* After success in at least 18 credit hours registration for the research plan is allowed.
* The candidate submits the research plan with the suggested supervising committee to the board of the scientific department after presenting a seminar.

#### 7. Regulations for programme progression and completion

The candidate has to present his thesis to an examination committee which is formed according to the suggestion of the department and approval of the Institute board and endorsed by the university council.

The enrolled candidates are offered the degree when:

* Attending 32 credit hours (24 CH for courses and 8 CH for the thesis) and passing the courses examination with a CGPA of at least C+.
* Passing an exam of English language from a granted center that is approved by the University.
* Successfully preparing and defending the master dissertation

**Ph.D. program in Information Technology**

**1. General statement of the professional role of the graduate:**

The department of Information Technology at the institute of Graduate Studies and Research is the oldest Information technology department in the Egyptian universities. The aim of the doctoral program is to provide students with deep knowledge of their research subject and the ability to conduct independent work in academia and industry. Applicants are expected to have background in IT related fields.  In addition to writing a thesis, students are required to study advanced courses and pass a comprehensive exam in Information Technology. The doctoral program is subject to a continuous process of improvement through evaluation of courses, of student progress, and of the adequacy of supervision and theses produced.

**2. Graduate attributes**

**Graduates of the Information Technology Ph.D. Program should have the ability to:**

* 1. Perfect using scientific research methodologies and basics.
	2. Work continuously on adding to knowledge in the field of specialization.
	3. Implement the analytical and Critical approach in the field of specialization and the related fields.
	4. Integrate specialized knowledge with the related fields and develop interrelationships among them.
	5. Show deep -realization of current problems and modern theories in the field of specialization.
	6. Specify professional problems and find Innovative solutions to them.
	7. Perfect a wide scope of professional skills in the field of specialty.
	8. Develop new tools, methods and ways for professional practice.
	9. Use appropriate technological means to serve career professional practice.
	10. Communicate efficiently and lead a team work in different contexts..
	11. Take decisions using available information.
	12. Allocate available recourses efficiently and work on finding new resources.
	13. Realize his role in society development and environment conservation.
	14. Behave in such a way that reflects respect for Integrity and credibility and rules of profession.
	15. Commit to continuous self-development and transfer of knowledge and experience to others.

#### 3. Programme Aims

####  The aims of this programme are to:

* Graduate high quality researchers who are able to work in academic and research institutions locally and internationally.
* Promote interdisciplinary research between information technology department and various information demanding researchers.
* Enhance technology transfer between the university and technology & businesses communities through joint research, student internships, faculty externships, and committee participation.

#### 4. Programme Intended Learning outcomes (ILOs)

***A. Knowledge and understanding:***

**By the end of this programme, graduates should be able to:**

1. Master the key aspects of Information Technology and its scientific basis.
2. Master tools and techniques for efficient information handling.
3. Articulate new advances in development methodologies and application paradigms
4. Forecast the social effects of information technology
5. Undertake in-depth aspects pertaining to intellectual property rights
6. Reproduce Quality Assurance concepts of different information systems development phases
7. Review the code of ethics in scientific publications.
8. Recognize aspects of intellectual property right.

***B. Intellectual skills:***

**By the end of this programme, graduates should be able to:**

B1- Investigate available information and formulate deductions related to different disciplines of in information technology.

B2- Optimize state of the art solutions to both structured and unstructured problems.

B3- Draw conclusion from scientific research that adds to the knowledge of information technology.

B4-Synthesize scientific article(s)/ paper(s) covering an appropriate information technology topic.

B5- Predict risks during information system development.

B6- Plan for performance enhancement in information systems development.

B7- Deduce the most appropriate solution to a given information technology problem.

B8- Devise different competent solutions to enrich the information technology field

B9- Deduce integrated approaches to scientific problem solving and make evidence when needed.

***C. Professional and practical skills:***

**By the end of this programme, graduates should be able to:**

1. Acquired recent professional skills in information technology.
2. Review scientific reports in information technology.
3. Construct specialized research reports relevant to multi-disciplinary issues in information technology.
4. Investigate the suitable approaches for solving a particular information technology p problem.
5. Design courses or seminars in information technology that add to the professional knowledge and needs of coworkers.

***D. General and transferable skills:***

**By the end of this programme, graduates should be able to:**

1. Communicate with the scientific community and research team in the related fields to Information Technology
2. Coach a discussion group and negotiate norms of evaluation.
3. Self-assess the required learning needs in information technology field.
4. Deduce different forms of information to acquire knowledge.
5. Manage a group task in a related information technology aspect.
6. Collaborate in activities within a team setting.

#### 5. Programme Academic reference standards

The IGSR developed Ph.D. program's specific academic standards. In preparing these standards, the General Academic Reference standards (GARS) for postgraduate programs were adopted. These standards set out the graduate attributes and academic standards that are expected to be achieved.

#### 6. Courses contributing to the programme

**Compulsory courses**

|  |  |  |  |
| --- | --- | --- | --- |
| Code | Course Title  | No. of weekly hours | Credit Hours |
| Lec. | Prac. |
| 1404770 | Research Methodology | 2 | 2 | **0** |
| 1404780 | Technical Writing | 2 | 2 | **0** |

**Optional courses**

|  |  |  |  |
| --- | --- | --- | --- |
| Code | Course Title  | No. of weekly hours | Credit Hours |
| Lec. | Prac. |
| 1404801 | AI-Based Decision Making | **2** | **2** | 3 |
| 1404802 | Advanced Computer and Network Security  | **2** | **2** | 3 |
| 1404803 | Database Mining | **2** | **2** | 3 |
| 1404804 | Advances in Software Engineering | **2** | **2** | 3 |
| 1404805 | Distributed Systems | **2** | **2** | 3 |
| 1404806 | Information Systems Policy | **2** | **2** | 3 |
| 1404807 | Advances in Database Systems Design | **2** | **2** | 3 |
| 1404808 | Applied Computer Simulation and Modeling | **2** | **2** | 3 |
| 1404809 | Research Methods in Information Technology | **2** | **2** | 3 |
| 1404809-1 | Research Methods in Analysis and Design | **2** | **2** | 3 |
| 1404810 | Computer vision | **2** | **2** | 3 |
| 1404811 | Human Computer Interaction | **2** | **2** | 3 |
| 1404812 | Special Topics | **2** | **2** | 3 |

#### 7. Programme admission and registration requirements

#### The candidate should hold a M.Sc. degree in the field of specialization from an Egyptian university, or any equal scientific degree granted by a faculty or an institute accredited by The Supreme Council of Universities in Egypt.

* A candidate holding a M.Sc. degree in one of the fields outside those specified can be enrolled for Ph.D. degree in the institute departments provided that the candidate successfully passes additional supplementary courses approved by the department board.
* The candidate submits the research plan with the suggested supervising committee to the board of the scientific department after presenting a seminar.
* After successfully completing the courses, the student sits for a comprehensive exam in the area of specialty.

#### 8. Regulations for programme progression and completion

The candidate has to present his thesis to an examination committee which is formed according to the suggestion of the department and approval of the Institute board and endorsed by the university council.

The enrolled candidates are offered the degree when:

* Attending 42 credit hours (18 CH for courses and 24 CH for the thesis) and passing the courses examination with a CGPA of at least C+.
* Passing the comprehensive exam.
* Successfully preparing and defending the doctoral dissertation.