**Form no. (13)**

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| Program Specification for Computer Engineering Program |

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| Pharos University in Alexandria | | **University/ Academy:** | |
| Faculty of Engineering | | **Faculty/Institute:** | |
| Computer Engineering | | **Department :** | |
| Prof. Dr. Magdy Abdelazim | | **Program Coordinator** | |
| 26/10/2010 | | **Date of Approval** | |
|  | **A-Basic Information:** | | |
|  | Computer Engineering | **Program** | **1.** |
|  | Double | Program Type: | **2.** |
|  | Computer Engineering | **Department** | **3.** |
|  | The National Academic Reference Standards (NARS) for the Computer Engineering program approved on August 2009. | **Adopted Academic standards** | **4.** |

**B-Specialized Information:**

1. **Program Objectives:**

**1-1 Vision of the department**

The Computer Engineering Department – Faculty of Engineering – Pharos University in Alexandria adopts a vision to be professional in the field of Computer Engineering and its applications also focuses on scientific research to gain access to the latest techniques in the field of Computer Engineering to attend scholars and researchers at both the local and regional levels. In addition, we tend to provide scientific advice to all Institutions working in the field of Computer Engineering.

**1-2 Mission of the department**

Computer Engineering Department is looking forward to Upgrading the level of engineering education in the field of Computer Engineering according to National Standards. The department is working to expand the horizon of knowledge among students through continuous research and development and technology transfer to serve the needs of the community through the cooperation with the industrial sector and the government. The department is seeking to create a climate that develops the ability to conduct advanced scientific research and establishes the concept of ethics and sense of belonging to society.

**1-3 Aims of the program:**

The main objective is to provide the labor market in Egypt and abroad with qualified Computer engineers. The aim of the Computer Engineering Program is to graduate engineers that are able to:

1. Exhibit a high level of practical and theoretical skills over a broad range of Computer Science together with knowledge of currently available techniques and technologies.
2. Explore the principles that support developments in a rapidly changing subject.
3. Understand the wide range of research challenges facing Computer Science, as well as the breadth and depth of research undertaken in this top-rated school, so they are prepared to embark on research here or elsewhere.
4. Develop competent professionals able to play a leading part in many different commercial, industrial and academic activities and adapt rapidly to changing technology.
5. Immediate employment in any of the available computer hardware, software engineering, or system engineering branches.
6. Apply related mathematics, physics sciences, electronics, communications, computer hardware and software, networking in solving problems of real applications.
7. Understand the social, business, technical, and human context in which their engineering contributions will be easily utilized and more productive.
8. Meet industry demand for high caliber graduates who will take a lead in continuing technological change.
9. Be prepared for the social, organizational and professional context in which they will be working.

**1-4 Attributes of the Graduates of Computer Engineering Program:**

The graduates of the engineering programs should be able to:

1. Apply knowledge of mathematics, science and engineering concepts to the solution of engineering problems.
2. Design a system; component and process to meet the required needs within realistic constraints.
3. Design and conduct experiments as well as analyze and interpret data.
4. Identify, formulate and solve fundamental engineering problems.
5. Use the techniques, skills, and appropriate engineering tools, necessary for engineering practice and project management.
6. Work effectively within multi-disciplinary teams.
7. Communicate effectively.
8. Consider the impacts of engineering solutions on society & environment.
9. Demonstrate knowledge of contemporary engineering issues.
10. Display professional and ethical responsibilities; and contextual understanding
11. Engage in self- and life- long learning.

***In addition to engineering attributes the graduates of computer engineering program should be able to:***

1. Demonstrate inductive reasoning abilities, figuring general rules and conclusions about seemingly unrelated events
2. Use current advanced techniques, skills, and tools necessary for computing practices to specify, design, and implement computer-based systems.
3. Recognize the information requirements of various business activities on both operational and decision making levels.
4. Tackling business problems using system analysis tools and techniques.
5. Managing projects related to computer systems in diverse fields of applications.
6. Implementing phases of the computer system development life cycle, procurement and installation of hardware, software design, data manipulation and system operations.
7. **Program Intended Learning Outcomes (ILOs)**

According to the National Academic Reference Standards (NARS) for the Computer Engineering program approved on August 2009.

**2-1 Knowledge and Understanding**

***On successful completion of the program, graduates from Computer Engineering specialization will show ability to know and understand:***

1. Concepts and theories of mathematics and sciences, appropriate to the discipline.
2. Basics of information and communication technology (ICT)
3. Characteristics of engineering materials related to the discipline.
4. Principles of design including elements design, process and/or a system related to specific disciplines.
5. Methodologies of solving engineering problems, data collection and interpretation
6. Quality assurance systems, codes of practice and standards, health and safety requirements and environmental issues.
7. Business and management principles relevant to engineering.
8. Current engineering technologies as related to disciplines.
9. Topics related to humanitarian interests and moral issues.
10. Technical language and report writing
11. Professional ethics and impacts of engineering solutions on society and environment
12. Contemporary engineering topics
13. Engineering principles in the fields of logic design, circuit analysis, machine and assembly languages, computer organization and architectures, memory hierarchy, advanced computer architectures, embedded systems, signal processing, operating systems, real-time systems and reliability analysis.
14. Quality assessment of computer systems.
15. Related research and current advances in the field of computer software and hardware.
16. Technologies of data, image and graphics representation and organization on computer storage media.
17. Modern trends in information technology and its fundamental role in business enterprises.

**2-2 Intellectual Skills**

***On Successful completion of the Computer Engineering program, graduates must be able to:***

1. Select appropriate mathematical and computer-based methods for modeling and analyzing problems.
2. Select appropriate solutions for engineering problems based on analytical thinking.
3. Think in a creative and innovative way in problem solving and design.
4. Combine, exchange, and assess different ideas, views, and knowledge from a range of sources.
5. Assess and evaluate the characteristics and performance of components, systems and processes.
6. Investigate the failure of components, systems, and processes.
7. Solve engineering problems, often on the basis of limited and possibly contradicting information.
8. Select and appraise appropriate ICT tools to a variety of engineering problems.
9. Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact.
10. Incorporate economic, societal, environmental dimensions and risk management in design.
11. Analyze results of numerical models and assess their limitations.
12. Create systematic and methodic approaches when dealing with new and advancing technology.
13. Select the appropriate mathematical tools, computing methods, design techniques for modeling and analyzing computer systems.
14. Select, synthesize, and apply suitable IT tools to computer engineering problems.
15. Proposing various computer-based solutions to business system problems. Cost-benefit analysis should be performed especially in sensitive domains where direct and indirect costs are involved.
16. Identifying symptoms in problematic situations.
17. Innovating solutions based on non-traditional thinking and the use of latest technologies.
18. Capability of integrating computer objects running on different system configurations.

**2-3Professional and Practical Skills**

***On Successful completion of the Computer Engineering program, graduates will demonstrate ability to:***

1. Apply knowledge of mathematics, science, information technology, design, business context and engineering practice integrally to solve engineering problems.
2. Professionally merge the engineering knowledge, understanding, and feedback to improve design, products and/or services.
3. Create and/or re-design a process, component or system, and carry out specialized engineering designs.
4. Practice the neatness and aesthetics in design and approach.
5. Use computational facilities and techniques, measuring instruments, workshops and laboratory equipment to design experiments, collect, analyze and interpret results.
6. Use a wide range of analytical tools, techniques, equipment, and software packages pertaining to the discipline and develop required computer programs.
7. Apply numerical modeling methods to engineering problems
8. Apply safe systems at work and observe the appropriate steps to manage risks
9. Demonstrate basic organizational and project management skills.
10. Apply quality assurance procedures and follow codes and standards.
11. Exchange knowledge and skills with engineering community and industry.
12. Prepare and present technical reports.
13. Design and operate computer-based systems specifically designed for business applications.
14. Use appropriate specialized computer software, computational tools and design packages throughout the phases of the life cycle of system development;
15. Write computer programs on professional levels achieving acceptable quality measures in software development.
16. Conducting user support activities competently.

**2-4 General and Transferable Skills**

***On Successful completion of the Computer engineering program, graduates will demonstrate ability to:***

1. Collaborate effectively within multidisciplinary team.
2. Work in stressful environment and within constraints.
3. Communicate effectively.
4. Demonstrate efficient IT capabilities.
5. Lead and motivate individuals.
6. Effectively manage tasks, time, and resources.
7. Search for information and engage in life-long self-learning discipline.
8. Acquire entrepreneurial skills.
9. Refer to relevant literatures.
10. **NATIONAL ACADEMIC REFERENCE STANDARDS (NARS) FOR COMPUTER ENGINEERING PROGRAMS**

**3.1 KNOWLEDGE & UNDERSTANDING**

***The graduates of the engineering programs should be able to demonstrate the knowledge and understanding of:***

1. Concepts and theories of mathematics and sciences, appropriate to the discipline.
2. Basics of information and communication technology (ICT)
3. Characteristics of engineering materials related to the discipline.
4. Principles of design including elements design, process and/or a system related to specific disciplines.
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8. Current engineering technologies as related to disciplines.
9. Topics related to humanitarian interests and moral issues.
10. Technical language and report writing
11. Professional ethics and impacts of engineering solutions on society and environment
12. Contemporary engineering topics.

***In addition to the knowledge and understanding of engineers, the graduates of computer engineering program should demonstrate knowledge and understanding of:***

1. Engineering principles in the fields of logic design, circuit analysis, machine and assembly languages, computer organization and architectures, memory hierarchy, advanced computer architectures, embedded systems, signal processing, operating systems, real-time systems and reliability analysis.
2. Quality assessment of computer systems;
3. Related research and current advances in the field of computer software and hardware
4. Technologies of data, image and graphics representation and organization on computer storage media
5. Modern trends in information technology and its fundamental role in business enterprises.

3.2 **INTELLECTUAL SKILLS**

***The graduates of the engineering programs should be able to:***

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2. Select appropriate solutions for engineering problems based on analytical thinking.
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4. Combine, exchange, and assess different ideas, views, and knowledge from a range of sources.
5. Assess and evaluate the characteristics and performance of components, systems and processes.
6. Investigate the failure of components, systems, and processes.
7. Solve engineering problems, often on the basis of limited and possibly contradicting information.
8. Select and appraise appropriate ICT tools to a variety of engineering problems.
9. Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact.
10. Incorporate economic, societal, environmental dimensions and risk management in design.
11. Analyze results of numerical models and assess their limitations.
12. Create systematic and methodic approaches when dealing with new and advancing technology.

***In addition to the intellectual skills of engineers, the graduates of computer engineering program should be able to:***

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3. Proposing various computer-based solutions to business system problems. Cost-benefit analysis should be performed especially in sensitive domains where direct and indirect costs are involved.
4. Identifying symptoms in problematic situations.
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6. Capability of integrating computer objects running on different system configurations.

3.3 **PRACTICAL & PROFESSIONAL SKILLS**

***The graduates of the engineering programs should be able to:***

1. Apply knowledge of mathematics, science, information technology, design, business context and engineering practice integrally to solve engineering problems.
2. Professionally merge the engineering knowledge, understanding, and feedback to improve design, products and/or services.
3. Create and/or re-design a process, component or system, and carry out specialized engineering designs.
4. Practice the neatness and aesthetics in design and approach.
5. Use computational facilities and techniques, measuring instruments, workshops and laboratory equipment to design experiments, collect, analyze and interpret results.
6. Use a wide range of analytical tools, techniques, equipment, and software packages pertaining to the discipline and develop required computer programs.
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4. Conducting user support activities competently.

**3.4 GENERAL AND TRANSFERABLE SKILLS**

***The graduates of the engineering programs should be able to:***

1. Collaborate effectively within multidisciplinary team.
2. Work in stressful environment and within constraints.
3. Communicate effectively.
4. Demonstrate efficient IT capabilities.
5. Lead and motivate individuals.
6. Effectively manage tasks, time, and resources.
7. Search for information and engage in life-long self-learning discipline.
8. Acquire entrepreneurial skills.
9. Refer to relevant literatures.

**40 Relation between NARS vs Program ILO’s**

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|  | **Program ILO’s (KNOWLEDGE & UNDERSTANDING)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | A1 | A2 | | A3 | | A4 | | A5 | | A6 | | A7 | | A8 | | A9 | | A10 | | A11 | | A12 | | A13 | | A14 | | A15 | | A16 | | A17 | |
| **NARS ILO’s (KNOWLEDGE & UNDERSTANDING)** |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
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|  | **Program ILO’s (INTELLECTUAL SKILLS)** | | | | | | | | | | | | | | | | | | |
|  | B1 | B2 | B3 | B4 | B5 | B6 | B7 | B8 | B9 | B10 | B11 | B12 | B13 | B14 | B15 | B16 | B17 | B18 |
| **NARS ILO’s (INTELLECTUAL SKILLS)** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|  | **Program ILO’s (PRACTICAL & PROFESSIONAL SKILLS)** | | | | | | | | | | | | | | | | |
|  | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 | C13 | C14 | C15 | C16 |
| **NARS ILO’s (PRACTICAL & PROFESSIONAL SKILLS)** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|  | **Program ILO’s (GENERAL AND TRANSFERABLE SKILLS)** | | | | | | | | | |
|  | D1 | D2 | D3 | D4 | D5 | D6 | D7 | D8 | D9 |
| **NARS ILO’s (GENERAL AND TRANSFERABLE SKILLS)** |  |  |  |  |  |  |  |  |  |  |
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1. **Program Contents مكونات البرنامج**
   1. البرنامج يعتمد على نظام الساعات المعتمدة موزعة على خمسة مستويات دراسية (Five Academic Levels) أو ( 10 فصول دراسية 10 semesters).
   2. يشترط للحصول على درجة البكالوريوس من كلية الهندسة تخصص هندسة الحاسب أن يقضى الطالب فترة دراسية لا تقل عن 5 سنوات و عددا من الفصول الدراسية لا يقل عن 10 فصول ، يحقق فيها الطالب بنجاح عدد من الساعات المعتمدة لا تقل عن 182 ساعة بمعدل تراكمى 2 على الأقل.
   3. عدد الساعات المعتمدة (Credit Hours):

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| --- | --- | --- |
| إجمالي Cr 182 | إلزامي Cr 158 | إختياري Cr 24 |

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| **متطلبات التخرج من الساعات المعتمدة** | | | **الإجمالى** |
| متطلبات الجامعة | | | 12 |
| متطلبات الكلية | متطلبات إجبارية | 33 | 39 |
| متطلبات إختيارية (علوم إنسانية) | 6 |
| المتطلبات الإجبارية | متطلبات القسم |  | 113 |
| المتطلبات الإختيارية للتخصص | | | 18 |
| **إجمالى متطلبات التخرج من الساعات المعتمدة** | | | **182** |

* 1. محتويات البرنامج مقسمة علي خمسة مستويات دراسية وعشرة فصول دراسية:

**1st Year (Semester-1)**

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| **Code** | **Course Title** | **Credit** | Teaching | | | Subject Area | | | | | | |
| **Lecture** | **Tutorial** | **Lab.** | **Hum &Soc** | **Math & Basic** | **Basic Engineering** | **Applied Engineering** | **Comp. App & IT** | **Proj. &Pratice** | **Discretionary** |
| UGE 01 | English language (1) | 2 | 1 | 0 | 2 | 2 |  |  |  |  |  |  |
| UEC01 | Computer Skills and Programming Concepts 1 | 2 | 1 | 0 | 2 |  |  |  |  | 2 |  |  |
| BE101 | Engineering Mathematics (1) | 3 | 3 | 2 | 1 |  | 3 |  |  |  |  |  |
| BE111 | Engineering Mechanics (1) | 3 | 3 | 2 | 0 |  | 3 |  |  |  |  |  |
| BE121 | Engineering Physics (1) | 3 | 3 | 1 | 1 |  | 3 |  |  |  |  |  |
| BE141 | Engineering Drawing & Descriptive Geometry ( (1) | 3 | 2 | 4 | 0 |  |  | 3 |  |  |  |  |
| HU121 | History of Engineering & Technology | 2 | 1 | 0 | 2 | 2 |  |  |  |  |  |  |
|  |  | 18 | 14 | 9 | 8 | 4 | 9 | 3 | - | 2 | - | - |

**1st Year(Semester-2)**

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| **Code** | **Course Title** | **Credit** | Teaching | | | Subject Area | | | | | | |
| **Lecture** | **Tutorial** | **Lab.** | **Hum &Soc** | **Math & Basic** | **Basic Engineering** | **Applied Engineering** | **Comp. App & IT** | **Proj. &Pratice** | **Discretionary** |
| BE102 | Engineering Mathematics (2) | 3 | 3 | 2 | 1 |  | 3 |  |  |  |  |  |
| BE112 | Engineering Mechanics (2) | 2 | 2 | 2 | 0 |  | 2 |  |  |  |  |  |
| BE122 | Engineering Physics (2) | 3 | 2 | 1 | 2 |  | 3 |  |  |  |  |  |
| BE142 | Engineering Drawing & Descriptive Geometry (2) | 3 | 2 | 3 | 1 |  |  | 3 |  |  |  |  |
| BE131 | General Chemistry | 2 | 2 | 1 | 2 |  |  | 2 |  |  |  |  |
| ME170 | Introduction to Manufacturing processes | 2 | 2 | 0 | 2 |  |  | 2 |  |  |  |  |
| UGE02 | English language (2) | 2 | 1 | 0 | 2 | 2 |  |  |  |  |  |  |
| UEC02E | Computer skills & Programming Concepts 2 | 2 | 1 | 0 | 2 |  |  |  |  | 2 |  |  |
|  |  | 19 | 15 | 9 | 12 | 2 | 8 | 7 | - | 2 | - | - |

**2nd Year (Semester-3)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Code** | **Course Title** | **Credit** | Teaching | | | Subject Area | | | | | | |
| **Lecture** | **Tutorial** | **Lab.** | **Hum &Soc** | **Math & Basic** | **Basic Engineering** | **Applied Engineering** | **Comp. App & IT** | **Proj. &Pratice** | **Discretionary** |
| BE 103 | Engineering [Mathematics (3)](http://www.pua.edu.eg/Page.aspx?Page=Faculties-%3eEngineering-%3eCourses-%3eBE+103) | 3 | 3 | 2 | 0 |  | 3 |  |  |  |  |  |
| CE132 | [Structured Programming](http://www.pua.edu.eg/Page.aspx?Page=Faculties-%3eEngineering-%3eCourses-%3eCE+132) | 4 | 4 | 1 | 1 |  |  |  |  | 4 |  |  |
| EE 215 | [Electric Circuits and Systems](http://www.pua.edu.eg/Page.aspx?Page=Faculties-%3eEngineering-%3eCourses-%3eEE+215) | 4 | 4 | 1 | 1 |  |  | 4 |  |  |  |  |
| CE 171 | [Discrete Mathematics](http://www.pua.edu.eg/Page.aspx?Page=Faculties-%3eEngineering-%3eCourses-%3eCE+171) | 4 | 4 | 2 | 0 |  | 4 |  |  |  |  |  |
| CE121 | Introduction to digital logic design | 4 | 4 | 1 | 1 |  |  | 4 |  |  |  |  |
|  |  | 19 | 19 | 7 | 3 | - | 7 | 8 | - | 4 | - | - |

**2nd Year (Semester-4)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Code** | **Course Title** | **Credit** | Teaching | | | Subject Area | | | | | | |
| **Lecture** | **Tutorial** | **Lab.** | **Hum &Soc** | **Math & Basic** | **Basic Engineering** | **Applied Engineering** | **Comp. App & IT** | **Proj. &Pratice** | **Discretionary** |
| BE 204 | Engineering Mathematics (4) | 3 | 3 | 2 | 0 |  | 3 |  |  |  |  |  |
| EE 232 | Electronics | 4 | 4 | 1 | 1 |  |  | 4 |  |  |  |  |
| CE 233 | Algorithms and Data structures | 4 | 4 | 1 | 1 |  |  |  | 4 |  |  |  |
| CE222 | Advanced Digital Logic Design | 4 | 4 | 1 | 1 |  |  |  | 4 |  |  |  |
| BE104 | Linear Algebra | 3 | 2 | 2 | 1 |  | 3 |  |  |  |  |  |
| EGE03 | English Language (3) | 2 | 1 | 0 | 2 | 2 |  |  |  |  |  |  |
|  |  | 20 | 18 | 7 | 6 | 2 | 6 | 4 | 8 | - | - | - |

**3rd Year (Semester-5)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Code** | **Course Title** | **Credit** | Teaching | | | Subject Area | | | | | | |
| **Lecture** | **Tutorial** | **Lab.** | **Hum &Soc** | **Math & Basic** | **Basic Engineering** | **Applied Engineering** | **Comp. App & IT** | **Proj. &Pratice** | **Discretionary** |
| BE 123 | Modern Physics | 3 | 3 | 2 | 0 |  | 3 |  |  |  |  |  |
| [CE 234](http://www.pua.edu.eg/Page.aspx?Page=Faculties-%3eEngineering-%3eCourses-%3eCE+234) | [Object Oriented Programming](http://www.pua.edu.eg/Page.aspx?Page=Faculties-%3eEngineering-%3eCourses-%3eCE+234) | 4 | 4 | 1 | 1 |  |  |  |  | 4 |  |  |
| [BE 207](http://www.pua.edu.eg/Page.aspx?Page=Faculties-%3eEngineering-%3eCourses-%3eBE+207) | [Numerical Analysis](http://www.pua.edu.eg/Page.aspx?Page=Faculties-%3eEngineering-%3eCourses-%3eBE+207) using MATLAB | 3 | 2 | 2 | 2 |  | 3 |  |  |  |  |  |
| [BE 208](http://www.pua.edu.eg/Page.aspx?Page=Faculties-%3eEngineering-%3eCourses-%3eBE+208) | [Applied Probability and Statistics](http://www.pua.edu.eg/Page.aspx?Page=Faculties-%3eEngineering-%3eCourses-%3eBE+208) | 3 | 3 | 2 | 0 |  | 3 |  |  |  |  |  |
| EE230 | Linear Signals & Systems | 4 | 4 | 1 | 1 |  |  | 4 |  |  |  |  |
| HU | HU elective 1 table 2 | 2 | 2 | 0 | 0 | 2 |  |  |  |  |  |  |
|  |  | 19 | 18 | 8 | 4 | 2 | 9 | 4 | - | 4 | - | - |

**3rd Year (Semester-6)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Code** | **Course Title** | **Credit** | Teaching | | | Subject Area | | | | | | |
| **Lecture** | **Tutorial** | **Lab.** | **Hum &Soc** | **Math & Basic** | **Basic Engineering** | **Applied Engineering** | **Comp. App & IT** | **Proj. &Pratice** | **Discretionary** |
| HU | HU elective 2 table 2 | 2 | 2 | 0 | 0 | 2 |  |  |  |  |  |  |
| EE 214 | Electro-mechanical Energy Conversion | 4 | 4 | 1 | 1 |  |  | 4 |  |  |  |  |
| CE 241 | Systems Programming | 4 | 4 | 1 | 1 |  |  |  | 4 |  |  |  |
| CE 211 | Computer Organization | 4 | 4 | 1 | 1 |  |  |  | 4 |  |  |  |
| CE 235 | Advanced Algorithms and Data structures | 4 | 4 | 1 | 1 |  |  |  | 4 |  |  |  |
|  |  | 18 | 18 | 4 | 4 | 2 | - | 4 | 12 | - | - | - |

**4th Year (Semester-7)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Code** | **Course Title** | **Credit** | Teaching | | | Subject Area | | | | | | |
| **Lecture** | **Tutorial** | **Lab.** | **Hum &Soc** | **Math & Basic** | **Basic Engineering** | **Applied Engineering** | **Comp. App & IT** | **Proj. &Pratice** | **Discretionary** |
| CE | CE elective 1 table 1 | 4 | 4 | 1 | 1 |  |  |  |  |  |  | 4 |
| CE 342 | Operating Systems | 4 | 4 | 1 | 1 |  |  |  | 4 |  |  |  |
| CE359 | Programming Language & Translator | 4 | 4 | 2 | 0 |  |  |  | 4 |  |  |  |
| UGA03 | Arabic Language Skills | 2 | 2 | 0 | 0 | 2 |  |  |  |  |  |  |
| HU113 | Technical Report Writing and Presentation Skills | 2 | 2 | 0 | 2 | 2 |  |  |  |  |  |  |
| CE | CE elective 2 table 1 | 2 | 2 | 1 | 1 |  |  |  |  |  |  | 2 |
|  |  | 18 | 18 | 5 | 5 | 4 | - | - | 8 | - | - | 6 |

**4th Year (Semester-8)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Code | Course Title | Credit | Teaching | | | Subject Area | | | | | | |
| **Lecture** | **Tutorial** | **Lab.** | **Hum &Soc** | **Math & Basic** | **Basic Engineering** | **Applied Engineering** | **Comp. App & IT** | **Proj. &Pratice** | **Discretionary** |
| CE 361 | Data and Computer Communications | 4 | 4 | 2 | 0 |  |  |  |  |  | 4 |  |
| CE 313 | Computer Architecture | 4 | 4 | 2 | 0 |  |  |  | 4 |  |  |  |
| CE 351 | Database Management Systems | 4 | 4 | 1 | 1 |  |  |  |  | 4 |  |  |
| CE 362 | Digital Signal Processing | 4 | 4 | 1 | 1 |  |  | 4 |  |  |  |  |
| CE | CE elective 2 table 1 | 2 | 2 | 1 | 1 |  |  |  | 2 |  |  |  |
|  |  | 18 | 18 | 7 | 3 | - | - | 4 | 6 | 4 | 4 | - |

**5th Year (Semester-9)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Code | Course Title | Credit | Teaching | | | Subject Area | | | | | | |
| **Lecture** | **Tutorial** | **Lab.** | **Hum &Soc** | **Math & Basic** | **Basic Engineering** | **Applied Engineering** | **Comp. App & IT** | **Proj. &Pratice** | **Discretionary** |
| CE 363 | Communications and Computer Networks | 4 | 4 | 1 | 1 |  |  |  |  |  | 4 |  |
| CE 352 | Software Engineering | 4 | 4 | 2 | 0 |  |  |  |  |  |  | 4 |
| CE 400-1 | Graduating Project (1) | 3 | 2 | 0 | 4 |  |  |  |  |  | 3 |  |
| CE | CE elective 3 table 1 | 4 | 4 | 1 | 1 |  |  | 4 |  |  |  |  |
| UC01 | Communication Skills | 2 | 2 | 0 | 0 | 2 |  |  |  |  |  |  |
|  |  | 17 | 16 | 4 | 6 | 2 | - | 4 | - | - | 7 | 4 |

**5th Year (Semester-10)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Code | Course Title | Credit | Teaching | | | Subject Area | | | | | | |
| **Lecture** | **Tutorial** | **Lab.** | **Hum &Soc** | **Math & Basic** | **Basic Engineering** | **Applied Engineering** | **Comp. App & IT** | **Proj. &Pratice** | **Discretionary** |
| HU | HU elective 3 table 2 | 2 | 2 | 1 | 0 | 2 |  |  |  |  |  |  |
| CE312 | Embedded Systems | 4 | 4 | 1 | 1 |  |  |  | 4 |  |  |  |
| CE 400-2 | Graduating Project (2) | 4 | 2 | 0 | 6 |  |  |  |  |  | 4 |  |
| CE | CE elective 4 table 1 | 2 | 2 | 1 | 1 |  |  |  |  |  |  | 2 |
| CE | CE elective 5 table 1 | 4 | 4 | 1 | 1 |  |  |  |  | 4 |  |  |
|  |  | 16 | 14 | 4 | 9 | 2 | - | - | 4 | 4 | 4 | 2 |

**Table 1: Tables of Elective Courses for computer program specialization:**

| **Code No.** | **Course Title** | **Cr** | **Prerequisites** |
| --- | --- | --- | --- |
| CE 201 | Computer Programming | 3 | UEC 02 |
| CE 202 | Data Structure | 2 | CE 201 |
| CE 343 | Workflow management | 4 | CE 233, CE 234 |
| CE 353 | Distributed Systems & Web Services | 4 | CE 234, HU 162 |
| CE 365 | Computer Security | 4 | CE 363, CE 171, CE 342 |
| CE 372 | Computational Models | 4 | CE 235 |
| CE 381 | Computer Graphics and Visualization | 4 | CE 234, BE 204, CE 233 |
| CE 382 | Introduction to Biomedical Engineering | 2 | CE 235, EE 232 |
| CE 383 | Intelligent Systems | 2 | CE 235, CE 234 |
| CE 384 | Modeling and Simulation | 2 | CE 233, CE 342, BE 208 |
| CE 385 | E-business | 2 | CE 234 |
| CE 386 | Multimedia Systems | 4 | CE 362, CE 361, CE 234 |
| CE 387 | Decision Support Systems | 4 | CE 351 |
| CE 388 | Introduction to Mechatronics | 4 | EE 290, CE 222, BE 112 |
| EE 326 | Introduction to Robotics | 3 | EE 290 |
| EE 391 | Digital Control Systems | 3 | EE 390 or EE 230, CE 222 |
| **Total** | | **18** |

**Table 2: Faculty elective courses**

|  |  |  |
| --- | --- | --- |
| **Code** | **Subjects** | **Cr. Hrs.** |
| HU 131 | Project Management | 2Cr |
| HU 132 | Accounting and Costs for Engineers | 2Cr |
| HU 133 | Engineering Statistics | 2Cr |
| HU 134 | Engineering Economy | 2Cr |
| HU 135 | Sales, Marketing and Communication Techniques | 2Cr |
| HU 142 | Legislations and Contracts | 2Cr |
| HU 143 | Principles of Law | 2Cr |
| HU 144 | Communications Laws and Rules | 2Cr |
| HU 151 | Industrial Safety | 2Cr |
| HU 161 | Environment and Society | 2Cr |
| HU 162 | Human Computer Interaction | 2Cr |
| HU 163 | Astronomy and Space Sciences | 2Cr |
| HU 164 | Research Methods | 2Cr |
| HU 170 | Risk Management | 2Cr |
| HU141 | Ethics and human rights | 2Cr |
| **مجموع الساعات المعتمدة التي يختارها الطالب** | | **6Cr** |

5-6 توزيع الساعات المعتمدة (بإجمالي 182 ساعة) بالموضوعات طبقا للمعايير الأكاديمية القومية المرجعية(Credits by Topics of NARS)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Semester** | **Credit** | | Subject Area | | | | | | |
| **Hum &Soc** | **Math & Basic** | **Basic Engineering** | **Applied Engineering** | **Comp. App & IT** | **Proj. &Pratice** | **Discretionary** |
| 1st | 18 | | 4 | 9 | 3 | - | 2 | - | - |
| 2nd | 19 | | 2 | 8 | 7 | - | 2 | - | - |
| 3rd | 19 | | - | 7 | 8 | - | 4 | - | - |
| 4th | 20 | | 2 | 6 | 4 | 8 | - | - | - |
| 5th | 19 | | 2 | 9 | 4 | - | 4 | - | - |
| 6th | 18 | | 2 | - | 4 | 12 | - | - | - |
| 7th | 18 | | 4 | - | - | 8 | - | - | 6 |
| 8th | 18 | | - | - | 4 | 6 | 4 | 4 | - |
| 9th | 17 | | 2 | - | 4 | - | - | 7 | 4 |
| 10th | 16 | | 2 | - | - | 4 | 4 | 4 | 2 |
| Program in Cr | | 182 | 20 | 39 | 38 | 38 | 20 | 15 | 12 |
| Program in per | | 100% | 10.98% | 21.4% | 20.88% | 20.88% | 10.98% | 8.24% | 6.6% |
| NARS in per | | | 9-12% | 20-26% | 20-23% | 20-22% | 9-11% | 8-10% | 6-8% |

6- التدريب الميدانى خلال العطلة الصيفية

* تبلغ مدة التدريب الصيفي (60) ستون يوما أو(8) ثمانية اسابيع توزع على العطل الصيفية من المرحلة الأولى حتى وصول الطالب الى المرحلة الرابعة. ويبدأ التسجيل للتدريب الصيفي عادةً في بداية شهرأبريل ويستمر لنهاية شهر مايو من الفصل الدراسي الثاني.
* يتم التنسيق مع رؤساء الأقسام بالكلية ولجان الأطراف المجتمعية لتوفير فرص التدريب العملي للطلاب بالمؤسسات الهندسية من خلال لجنة التدريب العملي الصيفي للطلابالتي تقوم بالإتصال بجهة التدريب وإرسال الطلبة مع إستمارات التقييم الخاصة بكل طالب.
* يتم إعداد نماذج تقارير متابعة الطلاب وتقييم الأداء أثناء تنفيذ برنامج التدريب العملي، ويتم التنسيق مع مشرفي برامج التدريب العملي بالمؤسسات الهندسية لمتابعة جدية الجهة التدريبية في تنفيذ البرنامج العملي المعتمد ومتابعة مدى إلتزام الطالب في الدوام والتعود على الإنضباط والجدية في العمل.
* يتم إعداد إستبيانات للطلاب لقياس مدى فاعلية البرامج التدريبية وتحديد المشاكل التي تعوق تهيئة الطالب مهنيا وتعميق معارفه.
* كما تقوم الكلية بإعداد برامج التدريب الداخلي للطلاب في معامل الأقسام العملية المختلفة خلال الأجازة الصيفية بالتنسيق مع رؤساء الأقسام العملية ولجنة المعامل والورش الهندسية والإمكانيات المادية بالكلية.
* وعلى الطالب ان يقضي فتــرة التــدريب المـحــــددة لـــــــدى جهـــة التــدريب التــي عــينت لــــه أو تمت الموافقــة عليهــا مـــن قبــل إدارة التدريب الصيفـــي وعـــدم الانتقــال إلـى جهة أخرى إلا بعــد الحصول علــى موافقـــة رسميـــة من كل مــن إدارة التدريب الصيفـــي بالكليــة وجهـــة التدريـــب. والالتزام بقـواعــــد وأنظمـــة العمــل لـــدى جهــة التدريــب. وان يقــوم الطالب بجمع المعلومات والعناصر اللازمة لكتابــة التقريـر النهائــي للتدريــب الصيفـــي.

1. **محتويات المقررات**

**طبقا لما هو وارد فى اللائحة و استمارات توصيف المقررات(Form no.10: Course Specification)**

|  |  |  |  |
| --- | --- | --- | --- |
| **كود أو رقم المقرر:** | | | ( طبقا لما ورد بالفقرة 3-5) |
| **اسم المقرر:** | | | (( طبقا لما ورد بالفقرة 3-5) |
| **المحتويات :** | | | (تفاصيل المحتويات طبقا لما هو مذكور في اللائحة وإستمارات توصيف المقررات رقم -10) |
| **8** | **متطلبات الالتحاق بالبرنامج** | | | | |
| 8-1 | **متطلبات الإلتحاق بالبرنامج طبقا لتعليمات المجلس الأعلى للجامعات الخاصة و قواعد و شروط الجامعة كالآتى**   * الحصول على شهادة اتمام الثانوية العامة (رياضيات) من المدارس المصرية، أو شهادة معادلة معترف بها من المجلس الأعلى للجامعات المصرية. * تخضع شروط القبول بالكلية للقواعد التى يحددها مجلس الجامعات الخاصة و الأهلية . * تخضع شروط القبول بالكلية بالنسبة للطلاب غير المصريين للقواعد التى تحددها وزارة التعليم العالى و مجلس الجامعات الخاصة و الأهلية . | | | | |
|  | * تحقيق كافة المتطلبات والقواعد والشروط التى تضعها الجامعة. * التفرغ الكامل للدراسة شرط أساسى لجميع الطلاب. | | | | |
| 8-2 | **متطلبات التخرج من الساعات الأكاديمية موزعة كالآتي:**   |  |  |  |  | | --- | --- | --- | --- | | **متطلبات التخرج من الساعات المعتمدة** | | | **الإجمالى** | | متطلبات الجامعة | | | 12 | | متطلبات الكلية | متطلبات إجبارية | 33 | 39 | | متطلبات إختيارية (علوم إنسانية) | 6 | | المتطلبات الإجبارية | متطلبات القسم |  | 113 | | المتطلبات الإختيارية للتخصص | | | 18 | | **إجمالى متطلبات التخرج من الساعات المعتمدة** | | | **182** | | | | | |
|  | | **لابد أن يقدم الطالب ما يفيد أداؤه فترة التدريب الصيفي 60 يوما أو 8 أسابيع.**  **القواعد المنظمة لإستكمال البرنامج**   * طبقاللمتطلبات المذكورة فى اللائحة الداخلية للكلية (الباب الأول و الثانى). * لإستكمال متطلبات التخرج و الحصول على درجة البكالوريوس فى هندسة الحاسب يجب أن يتم الطالب بنجاح الحصول بما لا يقل عن 182 ساعة معتمدة خلال خمسة أعوام أكاديمية موزعة على عشرة فصول دراسية. * يمكن للطلاب المتفوقين إتمام متطلبات التخرج خلال أربعة أعوام أكاديمية و نصف (بما يوازى تسعة فصول دراسية). | | |
|  | |

1. **طرق وقواعد تقييم الملتحقين بالبرنامج**

|  |  |  |  |
| --- | --- | --- | --- |
| **الطريقة** | | | **ما تقيسه من المخرجات التعليمية المستهدفة** |
| 1 | إمتحانات تحريرية  Written Exams | | **Knowledge and understanding skills**  **Intellectual skills**  **Professional and Practical skills** |
| 2 | تقييم الأختبارات المعملية  Practical | | **Knowledge and understanding skills**  **Intellectual skills**  **Professional and Practical skills**  General skills |
| 3 | Semester Work | الأمتحانات القصيرة  Quizzes | **Knowledge and understanding skills**  **Intellectual skills**  **Professional and Practical skills** |
| تقييم تكليفات الطلاب  Assignment problems solutions | **Knowledge and understanding skills**  **Intellectual skills**  **Professional and Practical skills** |
| تطبيقات الحاسب  IT – application Labs | **Knowledge and understanding skills**  **Intellectual skills**  **Professional and Practical skills** |
| المشروعات الصغيرة  Mini -Projects | **Knowledge and understanding skills**  **Intellectual skills**  **Professional and Practical skills**  General skills |
| 4 | مناقشة مشروعات التخرج  Graduation Project Discussion | | **Knowledge and understanding skills**  **Intellectual skills**  **Professional and Practical skills**  General skills |

1. **طرق تقويم البرنامج**

|  |  |  |  |
| --- | --- | --- | --- |
| **القائم بالتقويم** | | **الوسيلة** | **العينة** |
|  | طلاب الفرقة النهائية | Questionnaires& Meetings | Minimum 50% of total number of students |
|  | الخريجون | Program coordinator, Meeting staff member &Questionnaires | 10 % of all Graduates |
|  | أصحاب الاعمال | Program coordinator, Questionnaires & Meetings | Stack holders |
|  | ممتحن خارجى | Report for revising final year Exams | One external Examiner |
|  | مراجع خارجي | نموذج مراجع خارجي للمرحلة الجامعية الأولى (نموذج 14) | One external Reviewer  (Professor) |
|  | مراجع داخلي | نموذج مراجع داخلي | One internal Reviewer  (Professor) |

**منسق البرنامج:**

**أ.د/مجدي عبد العظيم أحمد**

**(المشرف الأكاديمي على القسم)**

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