**Form no. (13)**

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| **Program Specification for Construction Engineering and Management Program** |

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| Pharos University in Alexandria | | **University/ Academy:** | |
| Faculty of Engineering | | **Faculty/Institute:** | |
| Construction Engineering and Management Program | | **Department :** | |
| Prof. Dr. Hassan Elghazoly | | **Program Coordinator** | |
| 6/1/2016 | | **Date of Approval** | |
|  | | **A-Basic Information:** | |
|  | Construction Engineering and Management Program | **Program :** | **1.** |
|  | Double | Program Type: | **2.** |
|  | Construction Engineering and Management | **Department:** | **3.** |
|  | The Academic Reference Standards (ARS) for the Construction Engineering and Management program approved by NAQAAE in Decree (148) on Dec.,28th 2015. | **Adopted Academic standards :** | **4.** |

**B-Specialized Information:**

1. Program Objectives:
2. Vision of the department

Construction Engineering and Management Department (CEM) – Faculty of Engineering -Pharos University in Alexandria adopts vision to be a pioneer in the fields of construction engineering and project management and their applications. CEM department focuses on scientific research to gain access to the latest techniques in these fields to attend scholars and researchers at both the local, regional, and international levels. In addition, CEM department vision is to provide scientific advice to all institutions working in the fields of construction engineering and project management.

1. Mission of the department

The mission of CEM department is to upgrade the level of engineering education in the fields of construction engineering and project management according to national standards and in consistent with international standards. Another mission is to expand the horizon of knowledge among students through continuous research and technology transfer. It aims to serve the needs of the community through the cooperation with the industrial sector and the government. The Department seeks 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. Aims of the department

The main objective is to provide the labor market in Egypt and the Arab world with qualified construction and project management (PM) engineers. Graduates will become principals in the industries associated with civil engineering and professional engineers starting-up and growing their own new firms.They will become recognized experts working in government, consulting firms, and international organizations around the country and around the world addressing some of the most challenging problems of our times. In addition, the department offers training programs for the engineers, already employed in the construction and project management fields, in Egypt and in the Arab world. Graduates will pursue lifelong learning, such as graduate work and other professional education.

1. Attributes of the Graduates of Construction Engineering and Management program:

*By the end of his study the graduate must 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.
12. Understand global, ethical, and social implications of the profession in regards to public safety and sustainability issues
13. Acquire and utilize personal, communication, and leadership skills and be able to work collaboratively in a multidisciplinary team
14. Pursue distinguished employment as well as lifelong learning
15. Act professionally in design and supervision of construction engineering practice.
16. Design, construct, Manage and protect site works, excavations and underground structures
17. Use the codes of practice of construction engineering disciplines effectively and professionally
18. Select appropriate building materials from the perspective of strength, durability, suitability of use to environmental and loading conditions
19. Implement quality assurance and quality control systems in engineering projects.
20. Lead and supervise a group of engineers and site technicians.
21. Master the concepts, methods and techniques of the construction processes
22. Configure, manage, construct and protect all types of structures and public works
23. Program Intended Learning Outcomes (ILOs)
24. Knowledge and Understanding:

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

A1. Concepts and theories of mathematics and sciences, appropriate to the discipline.

A2. Basics of information and communication technology (ICT).

A3. Characteristics of engineering materials related to the discipline.

A4. Principles of design including elements design, process and/or a system related to specific disciplines.

A5. Methodologies of solving engineering problems, data collection and interpretation

A6. Quality assurance systems, codes of practice and standards, health and safety requirements and environmental issues.

A7. Business and management principles relevant to engineering.

A8. Current engineering technologies as related to disciplines.

A9. Topics related to humanitarian interests and moral issues.

A10. Technical language and report writing

A11. Professional ethics and impacts of engineering solutions on society and environment

A12. Contemporary engineering topics.

A13. The essential construction processes and the technologies and techniques used in construction engineering and management field.

A14. Principles of construction engineering and management sciences as applied to civil engineering principles;

A15. Properties, behaviour & fabrication of construction materials.

A16. Principles of design specific to building and construction.

A17. Projects management, including planning, finance, bidding, contract procedures, cost estimators and quality systems.

A18. The different analytical and computer methods that can be applied to the various areas of building and construction engineering

A19. Information and communication technology; covering networks and software related to construction engineering

A20. Properties, behaviour and fabrication of construction materials.

A21. Codes of practice and design principles of; reinforced concrete structures, metallic structures, geotechnical aspects and foundations.

A22. Environmental impact of construction engineering solutions

A23. Civil engineering principles related to fluid mechanics, sanitary engineering, water and wastes treatment, control and management

1. Intellectual Skill

***On Successful completion of the* Construction Engineering and Management *program, graduates must be able to:***

1. Select appropriate mathematical and computer-based methods for modelling 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. Identify and solve construction engineering problems.
14. Solve environmental and socioeconomic problems.
15. Determine levels, types and systems of building foundations. Determine levels, types and systems of building foundations based on geotechnical techniques and codes of practice.
16. Evaluate and integrate information and processes through individual and group project work.

B17. Solve a wide range of problems related to the analysis, design, and the construction of buildings and civil engineering projects.

B18. Analyze and interpret financial information.

B19. Suggest solutions and designs on a conceptual level and in detail that consider sustainability and other issues of importance

B20. Select and Implement appropriate approaches and codes of practices in modeling, analyzing and design of different types of structures.

B21. Adopt geotechnical techniques and codes of practice in designing foundations, undergrounds and earth structures

B22. Assess and evaluate different techniques and strategies for solving construction engineering and management problems

B23. Access, analyze and manage construction risks.

B24. Plan, conduct and report construction management techniques

B25. Implement cost engineering, accounting, and financing concepts

1. Professional and Practical Skills

***On Successful completion of the Construction Engineering and Management, 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 modelling 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 control, environmental control and construction management procedures and follow codes and standards.
11. Exchange knowledge and skills with engineering community and industry.
12. Prepare and present technical reports.
13. Prepare and undertake individual construction engineering projects. the Construction Engineering and Management program
14. Use laboratory and field equipment competently and safely.
15. Observe record and analyze data in laboratory as well as in the field.
16. Use appropriate computer-based support tools and software packages for problem-solving and analysis of results.
17. Prepare technical drafts and finished drawings both manually and using CAD.
18. Prepare quantity surveying reports, cost estimates, and construction schedules.
19. Administer contracts and control time, cost and quality of projects.
20. Schedule work to meet multiple deadlines in complex activities
21. Identify and select appropriate construction methods and building materials
22. Implement computer programs and digital algorithms, and use effectively software packages for problem solving and analysis.
23. Adopt risk management concepts in construction sites and civil projects.
24. Practice professionally construction management skills.
25. Prepare quantity surveying reports, cost estimates and construction schedules.
26. Manage design works of civil engineering projects
27. General and Transferable Skills

***On Successful completion of the Construction Engineering and Management 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. ACADEMIC REFERENCE STANDARDS (ARS) FOR *CONSTRUCTION ENGINEERING AND MANAGEMENT* PROGRAM.
    1. Knowledge and Understanding:

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12. Contemporary engineering topics.
13. The essential construction processes and the technologies and techniques used in construction engineering and management field.
14. Principles of construction engineering and management sciences as applied to civil engineering principles;
15. Properties, behaviour & fabrication of construction materials.
16. Principles of design specific to building and construction.
17. Projects management, including planning, finance, bidding, contract procedures, cost estimators and quality systems.
18. The different analytical and computer methods that can be applied to the various areas of building and construction engineering
19. Information and communication technology; covering networks and software related to construction engineering
20. Properties, behaviour and fabrication of construction materials.
21. Codes of practice and design principles of; reinforced concrete structures, metallic structures, geotechnical aspects and foundations.
22. Environmental impact of construction engineering solutions
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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.
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17. Solve a wide range of problems related to the analysis, design, and the construction of buildings and civil engineering projects.
18. Analyze and interpret financial information.
19. Suggest solutions and designs on a conceptual level and in detail that consider sustainability and other issues of importance
20. Select and Implement appropriate approaches and codes of practices in modeling, analyzing and design of different types of structures.
21. Adopt geotechnical techniques and codes of practice in designing foundations, undergrounds and earth structures
22. Assess and evaluate different techniques and strategies for solving construction engineering and management problems
23. Access, analyze and manage construction risks.
24. Plan, conduct and report construction management techniques
25. Implement cost engineering, accounting, and financing concepts
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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 modelling methods to engineering problems.
8. Apply safe systems at work and observe the appropriate steps to manage risks.
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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. Relation between ARS vs Program ILO’s

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|  | A1 | A2 | A3 | A4 | A5 | A6 | A7 | A8 | A9 | A10 | A11 | A12 | A13 | A14 | A15 | A16 | A17 | A18 | A19 | A20 | A21 | A22 | A23 |
| **ARS 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 | B19 | B20 | B21 | B22 | B23 | B24 | B25 |
| **ARS 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 | C17 | C18 | C19 | C20 | C21 | C22 | C23 | C24 | C25 | C26 |
| **ARS ILO’s (PRACTICAL & PROFESSIONAL SKILLS)** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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1. Program Contents

5-1 البرنامج يعتمد على نظام الساعات المعتمدة موزعة على خمسة مستويات دراسية(Five Academic Levels)أو عشرة فصول دراسية 10 Academic Semesters)).

* 1. يشترط للحصول على درجة البكالوريوس من كلية الهندسة تخصص هندسة التشيد و البناء أن يقضى الطالب فترة دراسية لا تقل عن 5 سنوات و عدداً من الفصول الدراسية لا يقل عن 10 فصول , يحقق فيها الطالب بنجاح عدد من الساعات المعتمدة لا تقل عن 178 ساعة بمعدل تراكمى 2 على الأقل.
  2. عدد الساعات المعتمدة (Credit Hours) :

|  |  |  |
| --- | --- | --- |
| **إجمالى178 Cr** | **إلزامي 160 Cr** | **إختياري18 Cr** |

|  |  |  |  |
| --- | --- | --- | --- |
| **متطلبات التخرج من الساعات المعتمدة** | | | **الإجمالى** |
| متطلبات الجامعة | | | 12 |
| متطلبات الكلية | متطلبات إجبارية | 33 | 39 |
| متطلبات إختيارية (علوم إنسانية) | 6 |
| المتطلبات الإجبارية | متطلبات القسم | 56 | 115 |
| متطلبات التخصص | 59 |
| المتطلبات الإختيارية للتخصص | | | 12 |
| **إجمالى متطلبات التخرج من الساعات المعتمدة** | | | **178** |

* 1. محتويات البرنامج مقسمة على خمسة مستويات دراسية و عشرة فصول دراسية :

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

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Code** | **Course Title** | **Credit** | **Teaching** | | | **Subject Area** | | | | | | |
| **Lecture** | **Tutorial** | **Practical** | **Hum &Soc** | **Math & Basic** | **Basic Engineering** | **Applied Engineering** | **Comp. App & IT** | **Project&Practice** | **Discretionary** |
| UGE01 | 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 and Descriptive Geometry (1) | 3 | 2 | 4 | 0 |  | 3 |  |  |  |  |  |
| HU121 | History of Engineering and Technology | 2 | 1 | 0 | 2 | 2 |  |  |  |  |  |  |
|  |  | **18** | **15** | **9** | **9** | **4** | **12** | **0** | **0** | **2** | **0** | **0** |

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

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Code** | **Course Title** | **Credit** | **Teaching** | | | **Subject Area** | | | | | | |
| **Lecture** | **Tutorial** | **Practical** | **Hum &Soc** | **Math & Basic** | **Basic Engineering** | **Applied Engineering** | **Comp. App & IT** | **Project& Practice** | **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 and Descriptive Geometry (2) | 3 | 2 | 3 | 1 |  | 3 |  |  |  |  |  |
| BE131 | General Chemistry | 2 | 2 | 0 | 2 |  | 2 |  |  |  |  |  |
| ME170 | Introduction to Manufacturing Processes | 2 | 2 | 0 | 2 |  | 3 |  |  |  |  |  |
| UEC02E | Computer Skills and Programming Concepts (2) | 2 | 1 | 0 | 2 |  |  |  |  | 2 |  |  |
| UGE02 | English Language (2) | 2 | 1 | 0 | 2 | 2 |  |  |  |  |  |  |
|  | | **19** | **15** | **8** | **12** | **2** | **15** | **0** | **0** | **2** | **0** | **0** |

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

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Code** | **Course Title** | **Credit** | **Teaching** | | | **Subject Area** | | | | | | |
| **Lecture** | **Tutorial** | **Practical** | **Hum &Soc** | **Math & Basic** | **Basic Engineering** | **Applied Engineering** | **Comp. App & IT** | **Project& Practice** | **Discretionary** |
| BE103 | Engineering Mathematics (3) | 3 | 3 | 2 | 0 |  | 3 |  |  |  |  |  |
| BE114 | Statics and Dynamics of Rigid Bodies | 3 | 3 | 2 | 0 |  |  | 3 |  |  |  |  |
| CM101 | Engineering Materials | 3 | 2 | 2 | 1 |  |  | 3 |  |  |  |  |
| CM102 | Structural Analysis (1) | 3 | 2 | 2 | 0 |  |  | 3 |  |  |  |  |
| CM103 | Introduction to CAD Systems | 3 | 2 | 0 | 2 |  |  |  |  | 3 |  |  |
| HU113 | Technical Report Writing and Presentation Skills | 2 | 2 | 0 | 2 |  |  |  |  | 2 |  |  |
| EGE03 | English Language (3) | 2 | 1 | 0 | 2 | 2 |  |  |  |  |  |  |
|  | | **19** | **15** | **8** | **7** | **2** | **3** | **9** | **0** | **5** | **0** | **0** |

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

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Code** | **Course Title** | **Credit** | **Teaching** | | | **Subject Area** | | | | | | |
| **Lecture** | **Tutorial** | **Practical** | **Hum &Soc** | **Math & Basic** | **Basic Engineering** | **Applied Engineering** | **Comp. App & IT** | **Project& Practice** | **Discretionary** |
| BE204 | Engineering Mathematics (4) | 3 | 3 | 2 | 0 |  | 3 |  |  |  |  |  |
| CM 104 | Civil Engineering Drawing | 3 | 2 | 0 | 2 |  |  |  |  | 3 |  |  |
| CM 105 | Introduction to Construction Engineering. | 3 | 2 | 2 | 0 |  |  | 3 |  |  |  |  |
| CM 106 | Surveying for Engineers | 3 | 2 | 1 | 2 |  |  |  |  |  | 3 |  |
| CM 107 | Structural Analysis (2) | 3 | 2 | 2 | 0 |  |  | 3 |  |  |  |  |
| CM 113 | Strength of Materials | 3 | 2 | 2 | 0 |  |  | 3 |  |  |  |  |
| HU | **Humanities Elective (table 2)** | 2 | 2 | 0 | 0 | 2 |  |  |  |  |  |  |
|  | | **20** | **15** | **9** | **4** | **2** | **3** | **9** | **0** | **3** | **3** | 0 |

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

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Code** | **Course Title** | **Credit** | **Teaching** | | | **Subject Area** | | | | | | |
| **Lecture** | **Tutorial** | **Practical** | **Hum &Soc** | **Math & Basic** | **Basic Engineering** | **Applied Engineering** | **Comp. App & IT** | **Project& Practice** | **Discretionary** |
| BE 208 | Applied probability and Statistics | 3 | 3 | 2 | 0 |  | 3 |  |  |  |  |  |
| CM 202 | Concrete Materials | 3 | 2 | 2 | 2 |  |  |  |  |  | 3 |  |
| CM 203 | Construction Project Management | 3 | 2 | 2 | 0 |  |  |  |  |  | 3 |  |
| CM 208 | Building Technology-I | 3 | 2 | 2 | 0 |  |  | 3 |  |  |  |  |
| PE 389 | Introduction to Environmental Engineering | 3 | 2 | 2 | 0 |  |  | 3 |  |  |  |  |
| ME 251 | Fluid Mechanics (1) | 3 | 2 | 2 | 1 |  |  | 3 |  |  |  |  |
|  | | **18** | **13** | **12** | **3** | **0** | **3** | **9** | **7** | **0** | **6** | **0** |

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

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Code** | **Course Title** | **Credit** | **Teaching** | | | **Subject Area** | | | | | | |
| **Lecture** | **Tutorial** | **Practical** | **Hum &Soc** | **Math & Basic** | **Basic Engineering** | **Applied Engineering** | **Comp. App & IT** | **Project& Practice** | **Discretionary** |
| CM 204 | Soil Mechanics (1) | 3 | 2 | 2 | 0 |  |  | 3 |  |  |  |  |
| CM 205 | Construction Planning and Scheduling | 3 | 2 | 2 | 0 |  |  |  |  | 3 |  |  |
| CM 206 | Reinforced Concrete Design (1) | 3 | 2 | 2 | 0 |  |  |  | 3 |  |  |  |
| CM 207 | Open Channels Hydraulics | 3 | 2 | 2 | 1 |  |  |  | 3 |  |  |  |
| CM 210 | Introduction to Mechanical and Electrical Systems in Construction | 3 | 2 | 2 | 0 |  |  | 3 |  |  |  |  |
| UC 01 | Communication Skills | 2 | 2 | 0 | 0 | 2 |  |  |  |  |  |  |
| UGA03 | Arabic Language | 2 | 2 | 0 | 0 | 2 |  |  |  |  |  |  |
|  | | **19** | **14** | **10** | **1** | **4** | **0** | **6** | **6** | **3** | **3** | **0** |

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

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Code** | **Course Title** | **Credit** | **Teaching** | | | **Subject Area** | | | | | | |
| **Lecture** | **Tutorial** | **Practical** | **Hum &Soc** | **Math & Basic** | **Basic Engineering** | **Applied Engineering** | **Comp. App & IT** | **Project& Practice** | **Discretionary** |
| CM 301 | Steel Structures Design (1) | 3 | 2 | 2 | 0 |  |  |  | 3 |  |  |  |
| CM 302 | Reinforced Concrete Design (2) | 3 | 2 | 2 | 0 |  |  |  | 3 |  |  |  |
| CM 303 | Project Cost Analysis | 3 | 2 | 2 | 0 |  |  |  |  | 3 |  |  |
| CM 304 | Highway Engineering | 3 | 2 | 2 | 1 |  |  |  | 3 |  |  |  |
| CM | **CM - Elective (table 1)** | 3 | 2 | 2 | 0 |  |  |  | 3 |  |  |  |
| HU 142 | Legalization and Contracts | 2 | 2 | 0 | 0 | 2 |  |  |  |  |  |  |
|  | | **17** | **13** | **10** | **1** | **2** | **0** | **0** | **12** | **3** | **0** | **0** |

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

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Code** | **Course Title** | **Credit** | **Teaching** | | | **Subject Area** | | | | | | |
| **Lecture** | **Tutorial** | **Practical** | **Hum &Soc** | **Math & Basic** | **Basic Engineering** | **Applied Engineering** | **Comp. App & IT** | **Project& Practice** | **Discretionary** |
| CM 305 | Steel Structures Design (2) | 3 | 2 | 2 | 0 |  |  |  | 3 |  |  |  |
| CM 306 | Water and Waste Water Engineering | 3 | 2 | 2 | 0 |  |  | 3 |  |  |  |  |
| CM 307 | Construction Productivity | 3 | 2 | 2 | 0 |  |  |  | 3 |  |  |  |
| CM | **CM- Elective2 (table 1)** | 3 | 2 | 2 | 0 |  |  |  | 3 |  |  |  |
| HU | **Humanities Elective2 (table 2)** | 2 | 2 | 0 | 0 | 2 |  |  |  |  |  |  |
| HU | **Humanities Elective3 (table 2)** | 2 | 2 | 0 | 0 | 2 |  |  |  |  |  |  |
|  | | **16** | **12** | **8** | **0** | **4** | **0** | **3** | **9** | **0** | **0** | **0** |

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

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Code** | **Course Title** | **Credit** | **Teaching** | | | **Subject Area** | | | | | | |
| **Lecture** | **Tutorial** | **Practical** | **Hum &Soc** | **Math & Basic** | **Basic Engineering** | **Applied Engineering** | **Comp. App & IT** | **Project& Practice** | **Discretionary** |
| CM 401 | Design of Temporary Structures | 3 | 2 | 2 | 0 |  |  |  | 3 |  |  |  |
| CM 402 | Engineering Risk and Uncertainty | 3 | 2 | 2 | 0 |  |  | 3 |  |  |  |  |
| CM 403 | Repair and Maintenance of Buildings | 3 | 2 | 2 | 0 |  |  |  |  |  |  | 3 |
| CM400-1 | Graduation project I | 4 | 3 | 0 | 3 |  |  |  |  |  | 4 |  |
| CM | **CM- Elective3 (table 1)** | 3 | 2 | 2 | 1 |  |  |  | 3 |  |  |  |
|  | | **16** | **11** | **8** | **4** | **0** | **0** | **3** | **6** | **0** | **4** | **3** |

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

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Code** | **Course Title** | **Credit** | **Teaching** | | | **Subject Area** | | | | | | |
| **Lecture** | **Tutorial** | **Practical** | **Hum &Soc** | **Math & Basic** | **Basic Engineering** | **Applied Engineering** | **Comp. App & IT** | **Project& Practice** | **Discretionary** |
| CM 404 | Construction Methods and Equipment | 3 | 2 | 2 | 0 |  |  |  | 3 |  |  |  |
| CM 405 | Construction Contracting | 3 | 2 | 2 | 0 |  |  |  |  |  |  | 3 |
| CM 410 | Quality Control of Construction Materials | 3 | 2 | 2 | 0 |  |  |  |  |  |  | 3 |
| CM400-2 | Graduation project II | 4 | 3 | 0 | 3 |  |  |  |  |  | 4 |  |
| CM | **CM- Elective4 (table 1)** | 3 | 2 | 2 | 0 |  |  |  |  |  |  | 3 |
|  | | **16** | **11** | **6** | **6** | **0** | **0** | **0** | **3** | **0** | **4** | **9** |

**Table 1: Elective Courses For Construction Engineering and Management Specialization**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Code** | **Course Title** | **Credits** | **Prerequisites** |
| CM 310 | Introduction to Transportation Engineering | 3 | CM 106 |
| CM 311 | Engineering Geology | 3 | CM 101 |
| AE 312 | Theory of City Planning | 3 | AE 121 |
| CM 313 | Advanced Topics in Materials | 3 | CM 202 |
| CM 314 | Structural Analysis (3) | 3 | CM 107 |
| CM 315 | Pre-stressed Concrete | 3 | CM 302 |
| CM 406 | Computer Aided Design | 3 | CM 206 & CM 301 |
| CM 412 | Reinforced Concrete Design (3) | 3 | CM 302 |
| CM 413 | Soil Mechanics-2 | 3 | CM 309 |
| CM 414 | Decision and Risk Analysis | 3 | CM 402 |
| CM 415 | Finite Element Methods | 3 | CM314 |
| CM 416 | Earthquake and Fire Resistant Design | 3 | CM 305 & CM 302 |
| CM 417 | Bridge Structures | 3 | CM 305& CM 302 |
| CM 420 | Independent Study | 3 | Senior Standing |
| **Total Credits** | | **12** |

**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** |

1. توزيع الساعات المعتمدة (بإجمالى 178 ساعة معتمدة) بالموضوعات طبقا للمعايير الأكاديمية القومية المرجعية (Credits by Topics of NARS)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Semester** | **Credit** | **Subject Area** | | | | | | |
| **Hum &Soc** | **Math & Basic Science** | **Basic Engineering** | **Applied Engineering** | **Comp. App & IT** | **Project& Practice** | **Discretionary** |
| **1st** | 18 | **4** | **12** | **0** | **0** | **2** | **0** | **0** |
| **2nd** | 19 | **2** | **15** | **0** | **0** | **2** | **0** | **0** |
| **3rd** | 19 | **2** | **3** | **9** | **0** | **5** | **0** | **0** |
| **4th** | 20 | **2** | **3** | **9** | **0** | **3** | **3** | **0** |
| **5th** | **18** | **0** | **3** | **9** | **0** | **0** | **6** | **0** |
| **6th** | **19** | **4** | **0** | **6** | **6** | **3** | **0** | **0** |
| **7th** | **17** | **2** | **0** | **0** | **12** | **3** | **0** | **0** |
| **8th** | **16** | **4** | **0** | **3** | **9** | **0** | **0** | **0** |
| **9th** | **16** | **0** | **0** | **3** | **6** | **0** | **4** | **3** |
| **10th** | **16** | **0** | **0** | **0** | **3** | **0** | **4** | **9** |
| **Program in Cr** | **178** | **20** | **36** | **39** | **36** | **18** | **17** | **12** |
| **Program in per** | **100%** | 11.24 | 20.22 | 21.90 | 20.22 | 10.11 | 9.55 | 6.79 |
| **NARS in per** | | 9-12% | 20-26% | 20-23% | 20-22% | 9-11% | 8-10% | 6-8% |

1. 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 و لجان الأطراف المجتمعية لتوفير فرص التدريب العملى للطلاب بالمؤسسات الهندسية من خلال لجنة التدريب العملى الصيفى للطلاب التى تقوم بالإتصال بجهة التدريب وإرسال الطلبة مع أستمارات التقييم الخاصة بكل طالب.
* يتم إعداد نماذج تقارير متابعة الطلاب و تقييم الأداء أثناء تنفيذ برنامج التدريب العملى، و يتم التنسيق مع مشرفى برامج التدريب العملى بالمؤسسات الهندسية لمتابعة جدية الجهة التدريبية فى تنفيذ البرنامج العملى المعتمد و متابعة مدى إلتزام الطالب فى الدوام والتعود على الإنضباط والجدية فى العمل.
* يتم إعداد إستبيانات للطلاب لقياس مدى فاعلية البرامج التدريبية و تحديد المشاكل التى تعوق تهيئة الطالب مهنياً وتعميق معارفه.
* كما تقوم الكلية بإعداد برامج التدريب الداخلى للطلاب فى معامل الأقسام العلمية المختلفة خلال الإجازة الصيفية بالتنسيق مع رؤساء الأقسام العلمية و لجنة المعامل و الورش الهندسية و الإمكانيات المادية بالكلية.
* وعلى الطالب ان يقضي فتــرة التــدريب المـحــــددة لـــــــدى جهـــة التــدريب التــي عــينت لــــه أو تمت الموافقــة عليهــا مـــن قبــل لجنة التدريب العملى الصيفى للطلاب وعـــدم الإنتقــال إلـى جهة أخرى إلا بعــد الحصول علــى موافقـــة رسميـــة من كل اللجنة وجهـــة التدريـــب و إعلام عضو هيئة التدريس المشرف على التدريب. والإلتزام 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)**

|  |  |  |
| --- | --- | --- |
| **5-1** | **كودأو رقم المقرر:** | ( طبقا لما ورد بالفقرة 3-5) |
| **5-2** | **اسم المقرر:** | (طبقا لما ورد بالفقرة 3-5) |
| **5-3** | **المحتويات :** | (تفاصيل المحتويات طبقا لما هو مذكورفى اللائحة و إستمارات توصيف المقررات رقم-10) |
| 1. متطلبات الالتحاق بالبرنامج:    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.   1. متطلبات التخرج من الساعات الأكاديمية موزعة كالآتى:  |  |  |  |  | | --- | --- | --- | --- | | **متطلبات التخرج من الساعات المعتمدة** | | | **الإجمالى** | | متطلبات الجامعة | | | 12 | | متطلبات الكلية | متطلبات إجبارية | 33 | 39 | | متطلبات إختيارية (علوم إنسانية) | 6 | | المتطلبات الإجبارية | متطلبات القسم | 56 | 115 | | متطلبات التخصص | 59 | | المتطلبات الإختيارية للتخصص | | | 12 | | **إجمالى متطلبات التخرج من الساعات المعتمدة** | | | **178** | | | |

* لابد أن يقدم الطالب ما يفيد أداؤه فترة التدريب الصيفي 60 يوما أو 8 أسابيع.

1. القواعد المنظمة لإستكمال البرنامج:

* طبقا للمتطلبات المذكورة فى اللائحة الداخلية للكلية (الباب الأول و الثانى).
* لإستكمال متطلبات التخرج و الحصول على درجة البكالوريوس فى هندسة التشييد والبناء يجب أن يتم الطالب بنجاح الحصول بما لا يقل عن 178 ساعة معتمدة خلال خمسة أعوام أكاديمية موزعة على عشرة فصول دراسية.
* يمكن للطلاب المتفوقين (بمتوسط معدل تراكمى أعلى أو يساوى 3.5) إتمام متطلبات التخرج خلال أربعة أعوام أكاديمية و نصف (بما يوازى تسعة فصول دراسية).

1. طرق وقواعد تقييم الملتحقين بالبرنامج

|  |  |  |  |
| --- | --- | --- | --- |
| **طريقة التقويم**  **Method of Assessment** | | | **ما تقيسه من المخرجات التعليمية المستهدفة**  **As Measured by ILOs** |
| 1- | **إمتحانات تحريرية**  **Written Exams** | | **Knowledge and understanding skills**  **Intellectual skills**  **Professional and Practical skills** |
| 2- | **تقييم الإختبارات المعملية**  **Practical Lab Assessment** | | **Knowledge and understanding skills**  **Intellectual skills**  **Professional and Practical skills**  **General skills** |
| 3- | **تقييم شغل الأعمال الفصلية (Semester Works)** | **الإمتحانات القصيرة**  **Quizzes** | **Knowledge and understanding skills**  **Intellectual skills**  **Professional and Practical skills** |
| **تقييم تكليفات الطلاب**  **Assignment problems**  **solution** | **Knowledge and understanding skills**  **Intellectual skills**  **Professional and Practical skills** |
| **تطبيقات الحاسب الآلى**  **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 مشروع التخرج (graduation projects)** | | **Knowledge and understanding skills**  **Intellectual skills**  **Professional and Practical skills**  **General skills** |

1. طرق تقويم البرنامج:

|  |  |  |  |
| --- | --- | --- | --- |
| **القائم بالتقويم** | | **الوسيلة** | **العينة** |
| 1- | طلاب الفرقة النهائية | Questionnaires & Meetings | Minimum 50% of total number of students |
| 2- | الخريجون | Program coordinator, Meeting staff member & Questionnaires | 10% of all students |
| 3- | أصحاب الاعمال | Program coordinator, Meetings & Questionnaires | Stack holders |
| 4- | ممتحن خارجى | Revising final year exams | One external examiner |
| 5- | مراجع خارجى | نموذج مراجع خارجى للمرحلة الجامعية الأولى (نموذج-14) | One external reviewer (professor) |
| 6- | مراجع داخلى | نموذج مراجع داخلى | One internal reviewer (professor) |

منسق البرنامج:-

أ.د/ حسن الغزولى

(رئيس قسم هندسة و إدارة التشييد)

**إعتماد عميد الكلية :-**

أ.د/ محمد جابر أبوعلى