1. **Basic Information:**

|  |  |
| --- | --- |
| **Program Title** | Civil Engineering Department |
| **Department Offering the Program** | Civil Engineering Department |
| **Department Responsible for the Course** | Civil Engineering Department |
| **Course Title** | Properties and strength of materials |
| **Course Code** | CIE 302 |
| **Year/Level** | level 3 |
| **Specialization** | Major |
| **Authorization Date of Course Specification** |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Teaching hours** | **Lectures** | **Tutorial** | **Practical** |
| 2 hours | 1 hour/week | 1 hour/week |

1. **Course Aims:**

|  |  |
| --- | --- |
| **No.** | **Aims** |
| 5 | Consider the impacts of engineering solutions on environment to select appropriate building materials from the perspective of strength, durability, suitability of use to location, temperature, weather conditions and impacts of structures. |

1. **Intended Learning Outcomes (ILO’S):**
2. **Knowledge and understanding:**

|  |  |
| --- | --- |
| **No.** | **Knowledge and understanding** |
| A3 | List the engineering materials related to the characteristics in engineering analysis |
| A13 | List the different engineering principles related to the design of reinforced concrete and metallic structures in addition to geo-technical and foundations, water projects, and sanitary engineering. |

1. **Intellectual Skills:**

|  |  |
| --- | --- |
| **No.** | **Intellectual Skills** |
| B3 | Analyzeideas, views, and knowledge from a range of sources to evaluate the characteristics and performance of components material. |

1. **Professional Skills:**

|  |  |
| --- | --- |
| **No.** | **Professional Skills** |
| C9 | Observe rescored and analyze data in laboratory and in the field. |

1. **General Skills:**

|  |  |
| --- | --- |
| **No.** | **General Skills** |
| D1 | Collaborate effectively within multidisciplinary team. |

**4. Course Contents:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Topics** | **Lect.** | **Lab.** | **Exer.** |
| 1 | Materials classifications, standard specifications of engineering materials and products, testing and Inspection | 2 | 1 | 1 |
| 2 | Testing machines, calibration of testing machines, and strain gages. | 2 | 1 | 1 |
| 3 | Main properties of engineering materials (physical chemical, mechanical, .. etc | 2 | 1 | 1 |
| 4 | Tension test  Compression test, and flexural test | 2 | 1 | 1 |
| 5 | Shear test, and surface hardness of metals | 2 | 2 | 2 |
| 6 | Structural and reinforcing steel, and welded splice | 2 | 1 | 1 |
| 7 | Physical and mechanical properties of wood | 2 | 1 | 1 |
| 8 | Properties and testing of building stones, and bricks | 2 | 1 | 1 |
| 9 | Concrete aggregates | 2 | 1 | 1 |
| 10 | Cement: types, manufacturing and testing | 4 | 1 | 1 |
| 11 | Lime and gypsum | 2 | 1 | 1 |
| 12 | Plastering and surface coatings | 2 | 1 | 1 |
| 13 | Testing of wires and ropes | 2 | 1 | 1 |
| total | | 28 | 14 | 14 |

**5. Teaching and learning methods:**

|  |  |
| --- | --- |
| **No.** | **Teaching Methods** |
| 1 | Lectures |
| 2 | Discussion sessions |
| 3 | Information collection from different sources |
| 4 | Research assignment |
| 5 | Case studies |

**6. Teaching and learning methods for disable students:**

|  |  |  |
| --- | --- | --- |
| **No.** | **Teaching Methods** | **Reason** |
| 1 | Presentation of the course in digital material | Better access any time |
| 2 | Asking small groups to do assignments; each composed of low, medium, and high performance students. | Knowledge and skills transfer among different level of students. |

7**. Student evaluation:**

**7.1 Student evaluation method**:

|  |  |  |
| --- | --- | --- |
| **No.** | **Evaluation Method** | **ILO’s** |
| 1 | Mid Term Examination | A13, B3 |
| 2 | Semester work | C9, D1 |
| 3 | Final term Examination | A3, A13, B3 |

**7.2 Evaluation Schedule:**

|  |  |  |  |
| --- | --- | --- | --- |
| **No.** | **Evaluation Method** | | **Weeks** |
| 1 | semester work | exercises an assignments | , , |
| quizes |
| 2 | Mid Term examination | |  |
| 3 | Final term examination | |  |

**7.3 weighting of Evaluation:**

|  |  |  |
| --- | --- | --- |
| **No.** | **evaluation method** | **Weights** |
| 1 | Mid-term examination | 20% |
| 2 | Semester work | 20% |
| 3 | Final-term examination | 60% |
| TOTAL | | 100% |

**8. List of References:**

|  |  |
| --- | --- |
| **No.** | **Reference List** |
| 1 | **Course notes**   * Egyptian Code for design and construction of reinforced concrete structures – Appendix No.3: Guide for laboratory testing of concrete materials.   الكود المصري لتصميم وتنفيذ المنشآت الخرسانية ، دليل الإختبارات المعملية للخرسانة ، وزارة الإسكان والمرفقات والمجتمعات العمرانية ، كود رقم (203) اصدار 2003   * Lecture Notes, Staff of Properties and Testing of Materials * Egyptian standard specifications, Ministry of Industrial, Latest Version.   المواصفات القياسية المصرية للمواد (مواصفات الركام ، الأسمنت ، الأحجار الطبيعية ، الطوب ....الخ) ، وزارة الصناعة بجمهورية مصر العربية ، هيئة التوحيد القياسى ، أخر إصدار  دليل التفتيش علي صناعه الاسمنت " 2002- وزاره الدوله لشئون البيئه – جهاز شئون البيئه  الكود المصري لتصميم وتنفيذ المنشات الخرسانيه المسلحه " كود 203- التحديث الثاني 2001- وزاره الإسكان والمرافق والمجتمعات العمرانيه – مركز بحوث الإسكان والبناء والتخطيط العمراني – جمهوريه مصر العربيه  احمد العريان وعبد الكريم عطا " تكنولجيا الخرسانه " 1967 الناشر: عالم الكتب , القاهره – الجزء الأول والثاني. |
| 2 | **6.3- Recommended books**   * Prasad, I. , "A Text Book of Strength of Materials" Delhi Khanna ,1975 * Komar, A. **, "**Building Materials and Components", Moscow Mir ,1987 * Printice Hall, New Jersey, 1988. * Abdul-Rahman, Ali, “Fundamentals of Reinforced Concrete,” Faculty of Engineering, Cairo University. * Hilal, M., Theory and Design of Reinforced Concrete Tanks. |

**9. Facilities required for teaching and learning:**

|  |  |
| --- | --- |
| **No.** | **Facility** |
| 1 | Lecture classroom |
| 2 | seminar |
| 3 | White board |
| 4 | Data Show system |

**10. Matrix of knowledge and skills of the course:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **No.** | **Topic** | **Aims** | **Knowledge and understanding** | **Intellectual Skills** | **Professional Skills** | **General Skills** |
| 1 | Materials classifications, standard specifications of engineering materials and products, testing and Inspection | 5 | A3 | B3 | C9 | D1 |
| 2 | Testing machines, calibration of testing machines, and strain gages. | 5 | A13 | B3 | C9 | D1 |
| 3 | Main properties of engineering materials (physical chemical, mechanical, .. etc | 5 | A3, A13 | - | C9 | - |
| 4 | Tension test  Compression test, and flexural test | 5 | A3, A13 | B3 | C9 | D1 |
| 5 | Shear test, and surface hardness of metals | 5 | A13 | B3 | C9 | D1 |
| 6 | Structural and reinforcing steel, and welded splice | 5 | A3 | B3 | C9 | D1 |
| 7 | Physical and mechanical properties of wood | 5 | A3 | B3 | - | D1 |
| 8 | Properties and testing of building stones, and bricks | 5 | A13 | B3 | - | - |
| 9 | Concrete aggregates | - | A3 | B3 | - | D1 |
| 10 | Cement: types, manufacturing and testing | 5 | A3 | B3 | C9 | - |
| 11 | Lime and gypsum | 5 | A13 | B3 | - | D1 |
| 12 | Plastering and surface coatings | - | A3 | B3 | C9 | D1 |
| 13 | Testing of wires and ropes | 5 | A3 , A13 | B3 | C9 | D1 |

**Course Coordinator:** dr / Ayman Helal

**Head of Department:** As**s.** Prof. dr / khaled fawzy

**Date of Approval:**  jan 2017