1. **Basic Information:**

|  |  |
| --- | --- |
| **Program Title** | **Civil Engineering** |
| **Department Offering the Program** | **Civil Engineering** |
| **Department Responsible for the Course** | **Basic Science and Engineering** |
| **Course Title** | **Fluid Mechanics** |
| **Course Code** | **ENG301** |
| **Year/Level** | **3rd level** |
| **Specialization** | **Major** |
| **Authorization Date of Course Specification** |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Teaching hours** | **Lectures** | **Tutorial** | **Practical** |
| 2 | 1 | 1 |

1. **Course Aims:**

|  |  |
| --- | --- |
| **No.** | **Aims** |
| 1 | Apply knowledge of science and engineering concepts to study fluid properties, fluid statics and fluid dynamics |

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

|  |  |
| --- | --- |
| **No.** | **Knowledge and understanding** |
| **A1** | Define concepts of energy, momentum equations and dimensional analysis (laminar and turbulent flow). |

1. **Intellectual Skills:**

|  |  |
| --- | --- |
| **No.** | **Intellectual Skills** |
| B3 | Analyze different ideas, views, and for forces on immersed bodies. |

1. **Professional Skills:**

|  |  |
| --- | --- |
| **No.** | **Professional Skills** |
| **C1** | Apply knowledge of Bernoulli and continuity equations for experiments such as Venturi meter and losses in pipes. |
| **C9** | Analyze data in laboratory and in the field pipes, pumps such as pump characteristics and flow measuring apparatus . |

1. **General Skills:**

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

**4. Course Contents:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Topics** | **Lectures** | **Tutorial** | **Practical** |
| 1 | Fluid properties, fluid statics, kinematics | 2 | 2 | - |
| 2 | Fluid dynamics including energy and Momentum equations | 4 |  | 4 |
| 3 | Dimensional analysis, Laminar flow, Turbulent flow and its applications | 2 | 2 |  |
| 4 | Forces on immersed bodies, Introduction to compressible flow | 4 |  | 4 |
| 5 | Applications to filtration and fluidization | 4 | 4 |  |
| 6 | Laboratory course in Fluid Mechanics includes experiments on venture-meter, friction losses in pipes | 6 |  | 6 |
| 7 | Center of pressure, Flow measuring apparatus, multi-pump test (Pump characteristics) and losses in piping systems | 6 |  | 6 |
| Total | | 28 | 8 | 20 |

**5. Teaching and learning methods:**

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

**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 | Web communication with students | Better communication with certain cases |
| 3 | Asking small groups to do assignments; each composed of low, medium and high performance students. | Knowledge and skills transfer among different levels of students |

7**. Student evaluation:**

**7.1 Student evaluation method**:

|  |  |  |
| --- | --- | --- |
| **No.** | **Evaluation Method** | **ILO’s** |
| 1 | Midterm examination | A1, B3, C1 |
| 2 | Semester work | C1, C9, D1 |
| 3 | Final term examination | A1, B3, C1 |

**7.2 Evaluation Schedule:**

|  |  |  |
| --- | --- | --- |
| **No.** | **Evaluation Method** | **Weeks** |
| 1 | Midterm examination | **08th** |
| 2 | Semester work | **2nd ,7th,9th,14th** |
| 3 | Final term examination | **15th** |

**7.3 weighting of Evaluation:**

|  |  |  |
| --- | --- | --- |
| **No.** | **evaluation method** | **Weights** |
| 1 | **Mid-term examination** | **10%** |
| 2 | **final examination** | **60%** |
| 3 | **Practical examination** | **10%** |
| 4 | **Semester work** | **20%** |
|  | **Total** | **100%** |

**8. List of References:**

|  |  |
| --- | --- |
| **No.** | **Reference List** |
| 1 | **Kundu & Cohen - Fluid Mechanics, Academic Press 2002 Munson** |
| 2 | **Fundamentals of Fluid Mechanics 4th Edition - John Wiley and Sons** |
| 3 | **White, Frank M. - Fluid Mechanics, 4th Ed, McGraw Hill vol 2**  **Nakayama** |
| 4 | **Introduction fo Fluid Mechanics [Butterworth Heinmann 1999]** |

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

|  |  |  |  |
| --- | --- | --- | --- |
| **Facility** | | | |
| 1 | Lecture classroom | 3 | White board |
| 2 | Seminar | 4 | Data Show system |

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

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **No.** | **Topic** | **Aims** | **Knowledge and understanding** | **Intellectual Skills** | **Professional Skills** | **General Skills** |
| 1 | Fluid properties, fluid statics, kinematics | 1 | A1 | B3 | C1 | D1 |
| 2 | Fluid Dynamics including Energy and Momentum equations | 1 | A1 | B3 | C1 | D1 |
| 3 | Dimensional analysis, laminar flow, turbulent flow and its applications | 1 | A1 | B3 | C1 | D1 |
| 4 | forces on immersed bodies, introduction to compressible flow | 1 | A1 | B3 | C1 | D1 |
| 5 | applications to filtration and fluidization | 1 | A1 | B3 | C1 | D1 |
| 6 | Laboratory course in Fluid Mechanics includes experiments on venture-meter, friction losses in pipes | 1 | A1 | B3 | C1 | D1 |
| 7 | center of pressure, flow measuring apparatus, multi-pump test (Pump characteristics) and losses in piping 1systems | 1 | A1 | B3 | C1 | D1 |

**Course Coordinator: Dr. Mohammed Saad Elkady**

**Head of Department: Dr. Mohammed Saad Elkady**

**Date of Approval:**