**TEMPLATE FOR COURSE SPECIFICATION**

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

Course Instructor :Assisst.prof. Dr.Hayder M. Abdul-Hameed

**COURSE SPECIFICATION**:

To get a good knowledge and information about fluid mechanics and behavior from the environmental eng. perspevtives

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| 1. Teaching Institution | College of engineering |
| 2. University Department/Centre | Environmental Eng.Dept. |
| 3. Course title/code | Fluid mechanics |
| 4. Modes of Attendance offered | 3 hours per week(theoretical)  2 hours per week(lab) |
| 5. Semester/Year | year |
| 6. Number of hours tuition (total) | 84 hr.( theoretical)  48hr(lab) |
| 7. Date of production/revision of this  specification | 2019 |
| 8. Aims of the Course | |
| 1-understanding the fluid behavior in both static and dynamic state | |
| 2-fluid flow energy balance calculations | |
| 3-designing of the pipes networking | |
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9· Learning Outcomes, Teaching ,Learning and Assessment Methode

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| |  | | --- | | A1. After completion of the year students should be able to design the piping networks | | A2. Determination of the fluid flow distribution patterns |   A3. Knowing of the all flow measurements devices and equipment |
| B.  B1.Understanding the fluid static and dynamic behavior under different conditions.  B2.measuring flowing fluid potential and dynamical energy  B3.awaring about the water distribution networks systems |
| Teaching and Learning Methods |
| Class lecturing ,lab experiments, case studies applications |
| Assessment methods |
| 1. problems  2.homeworks  3.lab reports |
| C. Affective and value goals:  C1.to be more aware fluid behavior  C2.knowing the pipes network operational conditions |
| Teaching and Learning Methods |
| Lecturing , lab expirements |
| Assessment methods |
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D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)

D1. Improve their knowledge, awareness, motive and skills for environmental management

D2.learning how to be good decision makers regarding any action related to environmental problems

D3. Learn how to make,EMP,ESIA,WQI,AQI,RAR, environmental monitoring and auditing

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| 10. Course Structure | | | | | |
| Week | Hours | ILOs | Unit/Module or  Topic Title | Teaching  Method | Assessment  Method |
| 1 | 3 | Fluid properties | Explanation of the properties | Electronic | Exams ,quiz, |
| 2 | 3 | Static fluid | Static pressure exerted on fluid | Electronic | Exams ,quiz, |
| 3 | 3 | Static fluid pressure | Contd. | Electronic | Exams ,quiz, discussions |
| 4 | 3 | Forces on the submerged surfaces | Calculation of the forces exerted on pumps ,valves,pipes | Electronic | Exams ,quiz, |
| 5 | 3 | Curved surfaces structure | Contd, | Electronic | Exams ,quiz, |
| 6 | 3 | Pressure measurments devices structure | Piezometer,U-tube,manometers | Electronic | Exams ,quiz, |
| 7 | 2 | Dimensional analysis | Case study | Electronic | Exams ,quiz, |
| 8 | 3 | Scale up units | Case study | Electronic | Exams ,quiz, discussions |
| 9 | 3 | Fluid flow | Fluid flow dynamics | Electronic | Exams ,quiz, |
| 10 | 3 | Continuity eq | Contd. | Electronic | Exams ,quiz,reports, discussions |
| 11 | 3 | Energy eq | Bernoli eq | Electronic | Exams ,quiz, |
| 12 | 3 | Momentum eq | Newton eq | Electronic | Exams ,quiz, |
| 13 | 3 | Major head losses | Darcy eq. | Electronic | Exams ,quiz, |
| 14 | 3 | Minor losses | Manning, Chezy formulas | Electronic | Exams ,quiz,reports, discussions |
| 15 | 3 | Flow measurments devices | Venture meter,pitot tube, orifice | Electronic | Exams ,quiz, |
| 16 | 3 | Three tanks problems | **Case study** | Electronic | Exams ,quiz, |
| 17 | 3 | Network design | **Hardy cross method** | Electronic | Exams ,quiz, |
| 18 | 3 | Open channels | **Manning formula** | Electronic | Exams ,quiz, |

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| 11. Infrastructure | |
| 1. Books Required reading: | 1. fluid flow mechanics , Bansal H  2.Fluid dynamics , streeter G |
| 2. Main references (sources) | As above |
| A- Recommended books and references (scientific journals, reports…). | AS ABOVE |
| B-Electronic references, Internet  sites… | https://www.britannica.com/science/fluid-mechanics |

The development could concentrate on more applications

12. The development of the curriculum plan