**TEMPLATE FOR PROGRAMME SPECIFICATION**

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

Course Instructor : Prof. Dr. Abeer I. Alwared

**PROGRAMME SPECIFICATION**

**Give basic concepts for students about the details of water supply system and sewerage**

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| 1. Teaching Institution |  College of Engineering |
| 2. University Department/Centre | Department of Environmental Engineering |
| 3. Course title/code | Water Supply and Sewerage |
| 4. Modes of Attendance offered | 2 days per week + 1 day lab  |
| 5. Semester/Year |  Year |
| 6. Number of hours tuition (total) | 150 |
| 7. Date of production/revision of this specification | 2021-2022 |
| **8. Aims of the Course**  |
| 1. The course explains the impact of various water quality parameters on human health and ecosystem.
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| 1. Design , operate and maintain working treatment systems
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| 1. The student will be able to apply the knowledge gained from the subject in EIA studies for water component and water pollution control strategies
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| **9. Learning Outcomes, Teaching, Learning and Assessment Methods** |
| A. Cognitive goalsA1. Student should be able to make technology choice to deal with water quality issues A2. Operate and maintain working treatment systems and do troubleshooting of the problems in these systemsA3. Operate and maintain working treatment systems and do troubleshooting of the problems in these systems |
| B. The skills goals special to the Course

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| B1.Understand water supply requirement , quantity and quality of water supply |
| B2.Design ,construction and operation of water and wastewater systems and resource recovery/recycling, transport. |

B3. understanding the methodology test and analysis water and waste water to know water quality characteristics |
| **Teaching and Learning Methods** |
| Classroom teaching will involve black board, power point presentations, and case study analysis.  |
| **Assessment methods** |
| Homework related to problem solving |
| C. Affective and value goalsC1. Optimization of solid waste transport , treatment and disposal techniquesC2. Economics of the onsite vs. offsite waste management optionsC3. Prepare students for successful careers in environmental engineering |
| **Teaching and Learning Methods** |
|  Intensive studies of regulations |
| **Assessment methods** |
|  Case study  |

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| **D. General and Transferable Skills (other skills relevant to employability and personal development)**D1. Become more effective, independent and confident self-directed learnersD2. Improve their general skills for study and career managementD3. Articulate personal goals and evaluate progress towards their achievementD4. An ability to identify, formulate, and solve engineering problems |

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| **10. Course Structure** |
| **Week** | **Hours** | **ILOs** | **Unit/Module or****Topic Title** | **Teaching****Method** | **Assessment****Method** |
| 1 | 3**+****2** | **Introduction****+****Lab** | **Introduction****+****Impurities of water** | **Classroom teaching will involve black board, power point presentations, and case study analysis.** **+** **Lab** | **Questions during the lectures ,quiz, exam, present in the class** |
| **2** | **3****+****2** | **Quantity of water****+****Lab** | **Quantity of water and sewage: Consumption for various purposes, forecasting population****+****Impurities of water** | **Classroom teaching will involve black board, power point presentations, and case study analysis.** **+** **Lab** | **Questions during the lectures ,quiz, exam, present in the class** |
| **3** | **3****+****2** | **Quantity of water****+****Lab** | **Quantity of water and sewage: Consumption for various purposes, forecasting population****+****turbidity** | **Classroom teaching will involve black board, power point presentations, and case study analysis.** **+** **Lab** | **Questions during the lectures ,quiz, exam, present in the class** |
| **4** | **3****+****2** | **Quantity of water****+****Lab** | **Quantity of water and sewage: Consumption for various purposes, forecasting population****+****Turbidity** | **Classroom teaching will involve black board, power point presentations, and case study analysis. Class** **+ Lab** | **Questions during the lectures ,quiz, exam, present in the class** |
| **5** | **3****+****2** | **Quantity of water****+****Lab** | **Quantity of water and sewage: Consumption for various purposes, forecasting population****+****Color** | **Classroom teaching will involve black board, power point presentations, and case study analysis.** **+ Lab** | **Questions during the lectures ,quiz, exam, present in the class** |
| **6** | **3****+****2** | **Collection of water****+****Lab** | **Intakes, intakes of impounding reservoirs, river intakes****+ Color** | **Classroom teaching will involve black board, power point presentations, and case study analysis.** **+ Lab** | **Questions during the lectures ,quiz, exam, present in the class** |
| **7** | **3****+****2** | **Collection of water****+****Lab** | **Intakes, intakes of impounding reservoirs, river intakes****+ Total solid** | **Classroom teaching will involve black board, power point presentations, and case study analysis.** **+ Lab** | **Questions during the lectures ,quiz, exam, present in the class** |
| **8** | **3****+****2** | **Quality and distribution of water supplies****+****Total solids** | **Quality and distribution of water supplies****+****Total solids** | **Classroom teaching will involve black board, power point presentations, and case study analysis.** **+ Lab** | **Questions during the lectures ,quiz, exam, present in the class** |
| **9** | **3****+****2** | **Quality and distribution of water supplies****+****Lab** | **Quality and distribution of water supplies****+****Lab exam** | **Classroom teaching will involve black board, power point presentations, and case study analysis.** **+ Lab** | **Questions during the lectures ,quiz, exam, present in the class** |
| **10** | **3****+****2** | **Quality and distribution of water supplies****+ Lab** | **Quality and distribution of water supplies****+ Conductivity** | **Class Classroom teaching will involve black board, power point presentations, and case study analysis. + Lab** | **Questions during the lectures ,quiz, exam, present in the class** |
| **11** | **3****+2** | **Treatment of water + Lab** | **Treatment of water +conductivity** | **Classroom teaching will involve black board, power point presentations, and case study analysis. +** **Lab** | **Questions during the lectures ,quiz, exam, present in the class** |
| **12** | **3****+****2** | **Treatment of water + Lab** | **Treatment of water****+pH** | **Classroom teaching will involve black board, power point presentations, and case study analysis.** **+ Lab** | **Questions during the lectures ,quiz, exam, present in the class** |
| **13** | **3** | **Treatment of water** | **Treatment of water+****pH** | **Classroom teaching will involve black board, power point presentations, and case study analysis.** **+ Lab** | **Questions during the lectures ,quiz, exam, present in the class** |
| **14** | **3****+****2** | **Treatment of water+ Lab** | **Treatment of water + Lab** | **Class Classroom teaching will involve black board, power point presentations, and case study analysis.****+ Lab** | **Questions during the lectures ,quiz, exam, present in the class** |
| **15** | **3****+****2** | **Treatment of water+ Lab** | **Treatment of water+ Lab** | **Classroom teaching will involve black board, power point presentations, and case study analysis.** **+ Lab** | **Questions during the lectures ,quiz, exam, present in the class** |
| **16** | **3****+****2** | **Amount of storm sewage +****Acidity** | **Amount of storm sewage +****Acidity** | **Classroom teaching will involve black board, power point presentations, and case study analysis.** **+ Lab** | **Questions during the lectures ,quiz, exam, present in the class** |
| **17** | **3****+****2** | **Sewer pipes and appurtenances +Lab** | **Sewer pipes and appurtenances + Acidity** | **Classroom teaching will involve black board, power point presentations, and case study analysis.** **+ Lab** | **Questions during the lectures ,quiz, exam, present in the class** |
| **18** | **3****+****2** | **Design construction and maintenance of sewer system+ Lab** | **Design construction and maintenance of sewer system+ Alkalinity** | **Class Classroom teaching will involve black board, power point presentations, and case study analysis.****+ Lab** | **Questions during the lectures ,quiz, exam, present in the class** |
| **19** | **3****+****2** | **Characteristic of sewage + Lab** | **Characteristic of sewage + Alkalinity** | **Classroom teaching will involve black board, power point presentations, and case study analysis.****+ Lab** | **Questions during the lectures ,quiz, exam, present in the class** |
| **20** | **3****+****2** | **Characteristic of sewage + Lab** | **Characteristic of sewage +Chloride** | **Classroom teaching will involve black board, power point presentations, and case study analysis. +** **Lab** | **Questions during the lectures ,quiz, exam, present in the class** |
| **21** | **3****+****2** | **Sewage treatment and disposal+ Lab** | **Sewage treatment and disposal + Chloride** | **Classroom teaching will involve black board, power point presentations, and case study analysis.** **+ Lab** | **Questions during the lectures ,quiz, exam, present in the class** |
| **22** | **3****+****2** | **Sewage treatment and disposal+ Lab** | **Sewage treatment and disposal+ Hardness** | **Classroom teaching will involve black board, power point presentations, and case study analysis. +** **Lab** | **Questions during the lectures ,quiz, exam, present in the class** |
| **23** | **3****+****2** | **Sewage treatment and disposal+ Lab** | **Sewage treatment and disposal+ Hardness** | **Classroom teaching will involve black board, power point presentations, and case study analysis.** **+ Lab** | **Questions during the lectures ,quiz, exam, present in the class** |
| **24** | **3****+****2** | **Sewage treatment and disposal+ Lab** | **Sewage treatment and disposal+ Water stability** | **Class Classroom teaching will involve black board, power point presentations, and case study analysis.****+ Lab** | **Questions during the lectures ,quiz, exam, present in the class** |
| **25** | **3****+****2** | **preliminary, primary and secondary treatment + Lab** | **preliminary, primary and secondary treatment + Water stability** | **Classroom teaching will involve black board, power point presentations, and case study analysis.** **+ Lab** | **Questions during the lectures ,quiz, exam, present in the class** |
| **26** | **3****+****2** | **preliminary, primary and secondary treatment + Lab** | **preliminary, primary and secondary treatment + Dissolved oxygen** | **Classroom teaching will involve black board, power point presentations, and case study analysis.** **+ Lab** | **Questions during the lectures ,quiz, exam, present in the class** |
| **27** | **3****+****2** | **preliminary, primary and secondary treatment + Lab** | **preliminary, primary and secondary treatment + Dissolved oxygen** | **Classroom teaching will involve black board, power point presentations, and case study analysis. +** **Lab** | **Questions during the lectures ,quiz, exam, present in the class** |
| **28** | **3****+****2** | **preliminary, primary and secondary treatment + Lab** | **preliminary, primary and secondary treatment + COD test** | **Classroom teaching will involve black board, power point presentations, and case study analysis.** **+ Lab** | **Questions during the lectures ,quiz, exam, present in the class** |
| **29** | **3****+****2** | **preliminary, primary and secondary treatment+ Lab** | **preliminary, primary and secondary treatment+ BOD test** | **Classroom teaching will involve black board, power point presentations, and case study analysis.** **+ Lab** | **Questions during the lectures ,quiz, exam, present in the class** |
| **30** | **3****+****2** | **Review and exam** | **Review and exam** | **Classroom teaching will involve black board, power point presentations, and case study analysis.** **+ Lab** | **Questions during the lectures ,quiz, exam, present in the class** |

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| 11. **Infrastructure** |
| **1. Books Required reading:** | **Water Supply and Wastewater Engineering (Part 1 and 2) by: D.Lal and A. K. Upadhyay** |
| **2. Main references (sources**) | Water Supply and Sewerage by: E. W. Steel and T. J. McGhee |
| **A- Recommended books and references (scientific journals, reports…).** | Desalination and water treatment |
| **B-Electronic references, Internet****sites…** | https://www.unicef.org/wash/files/water\_handbook.pdf |