**TEMPLATE FOR COURSE SPECIFICATION**

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| HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW |

**Course Instructor: Asst. Prof. Dr. Mohanad J. M-Ridha**

 **COURSE SPECIFICATION**

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| The course offers specialization in selected areas of engineering hydrology. It addresses classification and evaluation of hydrological data, such as: water cycle, measurements, and variation of metrological data, humidity, wind, precipitation, streamflow and unit hydrograph, groundwater flow, mechanism of transport pollutants, and transportation of contaminants through soil particles.  |

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| University of Baghdad /College of Engineering | 1. Teaching Institution |
| Environmental Engineering Department | 2. University Department/Centre |
| Engineering Hydrology EnE  | 3. Course title/code  |
| Annual System: They attend in electronic mode 2 hrs. a Week. | 4. Modes of Attendance offered |
| Annual  | 5. Semester/Year |
| 60 hrs./ 2 hrs per week | 6. Number of hours tuition (total) |
| 2019 | 7. Date of production/revision of this specification  |
| **8. Aims of the Course** |
| The main objectives of the course are: 1. To understand hydrology fundamentals, 2. To understand the principles, instrumentation and applications of hydrology.3. To perform analysis and calculations of hydrological data. |

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| **9· Learning Outcomes, Teaching, Learning and Assessment Method**1. **Cognitive goals.**

**At the end of the year, the students should gain:**A1. Ability to solve hydrology problems by different techniques and skills in calculation tables and curves for representing hydrological results.A2. Studying humidity.A3. Measuring average precipitation over catchment area.A4. Finding the missing data. A5. Groundwater flow direction and the expectation of the transportation of pollutants through soil A6. Attract and welcome undergraduate students to our Bachelor of Science program in Environmental Engineering and to graduate B.S. students who are innovative problem solvers, who become leaders in their organizations and possess the knowledge and skills required for a wide range of careers and career changes. |
| **B. The skills goals special to the course****B1.** Ability to solve hydrology problems by different techniques and skills in calculation tables and curves for representing hydrological results.**B2.** Concentrating on scientific research and its leading role in helping to serve the society and solving its problems through conducting application researches **Teaching and Learning Methods**1- Lectures.2- Homework and Assignments.3- Tests and Exams.4- In-Class Questions and Discussions.5- Connection between Theory and software.6- In- and Out-Class oral conservations. |
| **Assessment Methods**1. Examinations, Tests, and Quizzes.2. Student Engagement during Lectures.3. Responses Obtained from Students, Questionnaire about curriculum and faculty member (Instructor)***.***4***.*** Home work related to problem-solving. |
| C. Affective and value goalsC1.Practical skills to learn to calculate average precipitation, missing data, surface runoff, and groundwater movement.C2.Research and analytical techniques**.**C3. Prepare students for successful careers in environmental engineering.  |
| Teaching and Learning MethodsIntensive studies of regulations |
| Assessment methods |
| Case studies |
| D. General and rehabilitative transferred 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** |
| Assessment Method | TeachingMethod | Unit/Module or Topic Title | ILOs | Hours | Week |
| Questions during the lectures ,quiz, exam, present in the class | Electronic | Review of fundamental concepts | 1&2 | 2 (Theo.)  | 1 |
| Questions during the lectures ,quiz, exam, present in the class |  Electronic | Water cycle | 1 &2 | 2 (Theo.) | 2 |
| Questions during the lectures ,quiz, exam, present in the class |  Electronic | Measurements and variation of metrological data | 1 &2 | 2 (Theo.) | 3 |
| Questions during the lectures ,quiz, exam, present in the class |  Electronic | Vapor pressure | 1 &2 | 2 (Theo.) | 4 |
| Questions during the lectures ,quiz, exam, present in the class |  Electronic | Humidity | 1 &2 | 2 (Theo.) | 5 |
| Questions during the lectures ,quiz, exam, present in the class |  Electronic | Humidity | 1,2,&3 | 2 (Theo.) | 6 |
| Questions during the lectures ,quiz, exam, present in the class |  Electronic | wind | 1,2,&3 | 2 (Theo.) | 7 |
| Questions during the lectures ,quiz, exam, present in the class |  Electronic | Exam  | 2,3 &4 | 2 (Theo.) | 8 |
| Questions during the lectures ,quiz, exam, present in the class |  Electronic | Precipitation missing data | 2,3 &4 | 2 (Theo.) | 9 |
| ------------- |  Electronic | Precipitation calculation | -------- | 2 (Theo.) | 10 |
| Questions during the lectures ,quiz, exam, present in the class |  Electronic | Precipitation calculation | 2,3 &4 | 2 (Theo.) | 11 |
| Questions during the lectures ,quiz, exam, present in the class |  Electronic | Precipitation calculation | 2,3 &4 | 2 (Theo.) | 12 |
| Questions during the lectures ,quiz, exam, present in the class |  Electronic | Precipitation calculation | 2,3 &4 | 2 (Theo.) | 13 |
| Questions during the lectures ,quiz, exam, present in the class |  Electronic | Exam  | 2,3 &4 | 2 (Theo.) | 14 |
| Questions during the lectures ,quiz, exam, present in the class |  Electronic | Streamflow measurements  | 2,3 &4 | 2 (Theo.) | 15 |
| Questions during the lectures ,quiz, exam, present in the class |  Electronic | Streamflow routing | 2,3 &4 | 2 (Theo.) | 16 |
| Questions during the lectures ,quiz, exam, present in the class |  Electronic | Streamflow routing | 2,3 &4 | 2 (Theo.) | 17 |
| Questions during the lectures ,quiz, exam, present in the class |  Electronic | Streamflow | 2,3 &4 | 2 (Theo.) | 18 |
| Questions during the lectures ,quiz, exam, present in the class |  Electronic | Streamflow measurements  | 2,3 &4 | 2 (Theo.) | 19 |
| Questions during the lectures ,quiz, exam, present in the class |  Electronic | Exam | 2,3 &4 | 2 (Theo.) | 20 |
| ------------------ |  Electronic | Groundwater | ------- | 2 (Theo.) | 21 |
| Questions during the lectures ,quiz, exam, present in the class |  Electronic | Ground water | 5 | 2 (Theo.) | 22 |
| Questions during the lectures ,quiz, exam, present in the class |  Electronic | Ground water direction | 5 | 2 (Theo.) | 23 |
| Questions during the lectures ,quiz, exam, present in the class |  Electronic | Transport the contaminant in groundwater | 5 | 2 (Theo.) | 24 |
| Questions during the lectures ,quiz, exam, present in the class |  Electronic | Transport models | 5 | 2 (Theo.) | 25 |
| ---------------------- |  Electronic | Exam  | --------- | 2 (Theo.) | 26 |
| Questions during the lectures ,quiz, exam, present in the class |  Electronic | Environmental sampling |  | 2 (Theo.) | 27 |
| Questions during the lectures ,quiz, exam, present in the class |  Electronic | Environmental sampling |  | 2 (Theo.) | 28 |
| Questions during the lectures ,quiz, exam, present in the class |  Electronic | Applications | 1,2,3,4&5 | 2 (Theo.) | 29 |
| Questions during the lectures ,quiz, exam, present in the class |  Electronic | Applications | 1,2,3,4&5 | 2 (Theo.) | 30 |

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| 11. Infrastructure |
| 1. Hydrology for Engineers by “ Ray K. Linsley , Max A. Kohler and Joseph L. H. Paulhus” 2nd edition
 | 1. Books required reading:
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| 1. Unsaturated zone hydrology for scientists and engineers by James A. Tindall
 | 1. Main references (sources)
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| 1. Unsaturated zone hydrology for scientists and engineers by James A. Tindall
 | A- Recommended books and references (scientific journals, reports…). |
| <https://theconstructor.org/water-resources/hydrology/engineering-hydrology-scope-applications/37597/> | B-Electronic references, Internetsites |

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| 12. The development of the curriculum planNot to relay on traditional examinations but the creation of reports following the reading of textbooks. These reports are validated and transformed into academic credits for graduation purposes. |