Republic of Iraq

Ministry of Higher Education & Scientific Research

Supervision and Scientific Evaluation Directorate

Quality Assurance and Academic Accreditation

International Accreditation Dept.

Academic Program Specification Form For The Academic Year 2017-2018

Universitiy: Baghdad

College : Engineering

Number Of Departments In The College : 07 seven

Date Of Form Completion : 9/26 / 2017

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  **TEMPLATE FOR COURSE SPECIFICATION**

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| HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW |

 **COURSE SPECIFICATION**

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| This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.  |

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| College of EngineeringUniversity of Baghdad | ***1. Teaching Institution*** |
| Department of Water Resources  | ***2. University Department/Centre*** |
| Water Resources Engineering Program (WRE) | ***3. Course title/code & Description*** |
| B Sc in Water Resources Engineering | ***4. Program(s) to which it Contributes*** |
| Annual System: There is only one mode of delivery, which is a "Day Program". The students are full time students and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects. Each graduating student has to successfully complete 147 credits. Each subject credit is one 50-minute lecture per week or 3 hours of laboratory work per week. There is no on-line subject which may be used as supplementary material for the class room instruction. | ***5. Modes of Attendance offered*** |
| 2 | ***6. Semester/Year*** |
| 3315 | ***7. Number of hours tuition (total)*** |
| 2017 | ***8. Date of production/revision of this specification*** |
| ***9. Aims of the Course***1. 1. Graduate water resources engineers to serve in water resources sectors, Agriculture, and other related private sectors.
2. 2. Improving the teaching and administrative activities to meet international accreditations standards and the mission of the department.
3. 3. Improving the academic abilities of the faculty and attracting highly skilled personnel.
4. 4. Improving the abilities of management and technical supporting staff and attracting the highly skilled for employment.
5. 5. Optimizing the use of resources and potentials of the department.
6. 6. Cooperating, exchanging academic programs, and participating with other universities and academic centers in developed countries.
7. 7. Establishing viable applied research that generates knowledge for local and foreign users.

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| ***10. Learning Outcomes*** Following a review of the ABET Criteria and the program objectives, it has been decided by the water resources department that the ABET Criteria (a – k) encompass the spirit of our vision. Therefore, outcomes (a – k) were adopted as the WR POs. The Department POs are:1. An ability to apply knowledge of mathematics, science, and engineering.
2. An ability to design and conduct experiments as well as to analyze and interpret data.
3. An ability to design a system, or components, or process to meet desired needs.
4. An ability to function on multi-disciplinary teams (multi-disciplinary teams mean teams of individuals with similar educational backgrounds focusing on different aspects of a project as well as teams of individuals with different educational backgrounds).
5. An ability to identify, formulates, and solves engineering problems.
6. An understanding of professional and ethical responsibility.
7. An ability to communicate effectively.
8. The broad education necessary to understand the impact of engineering solutions in a global and societal context.
9. A recognition of the need for and an ability to engage in life-long learning (this includes teaching students that the underlying theory is important because the technology changes, coupled with enhancing their self-learning ability).
10. Knowledge of contemporary issues (this includes presenting students with issues such as the impact of globalization, the outsourcing of both engineering and other supporting jobs as practiced by modern international users).
11. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Water Resources Engineering Programs develops the knowledge and skills that will enable students to:* Apply basic mathematical and scientific concepts for the description and solution of engineering problems.
* Develop initial proficiency in water resources engineering disciplines.
* Develop the ability to conduct experiments and critically analyze and interpret data.
* Perform water resources engineering integrated design of systems, components, or processes by means of practical experiences (group projects).
* Identify, formulate, and solve water resources engineering problems by using modern engineering tools, techniques, and skills.
* Collaborate in group projects.
* Develop written and oral communication skills of students through presentations of project results.
* Acquire an appreciation for some of the ethical problems that arise in the exercise of the profession.
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|   ***11.*** ***Teaching and Learning Methods*** |
| 1. Lectures
2. Tutorials
3. Homework and assignments
4. Laboratory experiments
5. Tests and examinations
6. In-class questions and discussions
7. Connection between theory and application
8. Field trips
9. Extra-curricular activities
10. Seminars
11. In- and out-class oral conversations
12. Reports, presentations, and posters
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|   ***12. Assessment Methods*** ***Program Outcome Assessment Techniques:**** Survey of Alumni
* The related committees in the department such as scientific-, student affairs, social committees
* Employment trends of our graduates will be tracked, e.g., place of employment and job title, every year
* Survey of Employers of Graduates will be given at least every year to determine if the POs are still relevant to the employers of our graduates
* The POs themselves will be re-evaluated every few years first by the faculty and then with the Council Presidency Department. Informal review of the POs will occur in conversations with alumni.

***Summary of Student Outcomes Assessment Techniques:**** Alumni survey.
* Co-op Employer evaluation data is obtained at the end of the student co-op experience from co-op employer surveys regarding student performance.
* Student co-op evaluation data is obtained from students at the end of their co-op experience regarding the students’ perception of their performance.
* Senior Exit Survey are given every year to determine how well students feel they have achieved the student outcomes.
* Summary of student performance is gathered in the form of final grades of the water resources engineering courses.
* Evaluation of student data, specifically of transcripts for each graduate, is analyzed for time to graduation and retention rate as well as performance in water resources engineering courses.
* Embedded assessment is performed in every class, every year. Not all student outcomes are evaluated in every single class but a representative sample is chosen. This will be accomplished by assess student assignments, quizzes, examinations, laboratory reports, projects, and presentations.
* Examinations, Tests, and Quizzes.
* Extracurricular Activities.
* Student Engagement during Lectures.
* Responses Obtained from Students, Questionnaire about Curriculum and Faculty Member (Instructor).
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| 1. ***Program Structure***

The Department offers engineering programs leading to the degree of Bachelor of Science (B Sc), Mater of Science (M Sc), and Doctor of Philosophy (Ph D) in Water Resources Engineering). The B Sc degree covers the general aspects of specialization in the field of water resources engineering, while the M Sc degree involves four different areas of specialization and these are Hydraulics, Irrigation and Drainage, Hydrology, and Hydraulic Structures. The Ph D degree covers two main areas of specialization and these are Water Resources Engineering and Irrigation and Drainage Engineering.The annual system of study is followed in the department for the (B Sc) undergraduate study. The study period is 4 years with 147 units distributed over the four years of study.Table 1 shows the course curriculum for the B Sc degree in water resources engineering.Table 1. Course curriculum for the B Sc degree in water resourcesengineering.

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| --- | --- | --- | --- | --- | --- |
| **1st year** | **Subject** | **Units** | **2nd year** | **Subject** | **Units** |
| 101WRAL | Arabic Language | 2 | 210WRMA | Mathematics II | 6 |
| 102WRMA | Mathematics I | 6 | 211WRCO | Computer Programming | 6 |
| 103WRCO | Computer Programming | 6 | 212WRSM | Strength of Materials | 4 |
| 104WREM | Engineering Mechanics | 6 | 213WRCS | Components of Hydraulic Structures | 2 |
| 105WRED | Engineering Drawing | 6 | 214WRSU | Surveying | 6 |
| 106WRES | Engineering Statistics | 4 | 215WRSP | Soil Physics | 3 |
| 107WRME | Materials Technology | 3 | 216WRLR | Land Reclamation | 3 |
| 108WREG | Engineering Geology | 2 | 217WRWM | Water Quality and Treatment | 6 |
| 109WEIR | Introduction to Water Resources | 4 | 218WRDF | Democracy and Freedom | 2 |
| 110 WREN | English Language | 2 | 219 WREN | English Language | 2 |
|  | **Total Sum** | **41** |  | **Total Sum** | **40** |
|  |
| **3rd year** | **Subject** | **Units** | **4th year** | **Subject** | **Units** |
| 319WRHY | Hydrology | 4 | 429WRDH | Design of Hydraulic Structures | 6 |
| 320WRSF | Soil Mechanics and Foundation | 7 | 430WRDI | Design of Irrigation Systems | 4 |
| 321WRIE | Irrigation Engineering | 4 | 431WRGW | Ground Water | 2 |
| 322WRID | Irrigation and Drainage Networks | 2 | 432WRDE | Drainage Engineering | 2 |
| 323WRFM | Fluid Mechanics | 7 | 433WREP | Engineering Project | 4 |
| 324WRSA | Structural Analysis | 2 | 434WRPM | Project Management | 4 |
| 325WRDS | Design of Concrete Structures | 2 | 435WRAS | Analysis of Water Resources Systems | 4 |
| 326WREA | Engineering Analysis | 3 | 436WRDE | Dam Engineering | 4 |
| 327WRSC | Soil Conservation | 2 | 437WRAH | Elective Course/e Application n Hydraulics | 2 |
| 328WRNM | Numerical Methods | 3 | 438WREE | Engineering Economy | 3 |
| 329WREN | English Language | 2 | 439WREC | Elective Course/ Water Quality Management | 3 |
|  |  |  | 440 WREN | English Language | 2 |
|  | **Total Sum** | **38** |  | **Total Sum** | **40** |

Table 2 shows the distribution of units of the undergraduate curricula among the various special areas included in the undergraduate study.Table 2. Distribution of units of the undergraduate curricula.

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| --- | --- | --- | --- | --- | --- |
| **Stage** | **University requirements** | **Basic Sciences** | **General Engineering** | **Major Specialization** | **Sum** |
| First | 4 | 12 | 19 | 6 | 41 |
| Second | 4 | 12 | 10 | 14 | 40 |
| Third | 2 | - | 17 | 19 | 38 |
| Fourth | 2 | - | 13 | 25 | 40 |
| **Sum** | **12** | **24** | **59** | **64** | **159** |

1. ***Personal Development Planning***

***Actions to Improve the Program***Continuous improvement is the goal of the Department of Water Resources Engineering. The curriculum of the department has been continuously updated to meet the needs of the field of work. Meetings and discussion are usually held with employers of the graduates of the department in order to get acquainted with their needs and trying to incorporate those needs in the curriculum of the department. The following specific actions have either been successfully implemented or are in process ;1. Comprehensive changes in curriculum.
2. Continuous improvement of faculty through training programs.
3. Promoting a number of faculty members to higher scientific ranks.

4. Purchasing a number of laboratory equipment and measuring instruments.1. Purchasing a number of books for the library of the department.
2. Purchasing a number of computers.
3. Establishing computer network access by using LAN network of the Center of the University of Baghdad in the form of Wireless terminals available now in the Department.
4. Employing a number of faculty, engineering, and technical staff.
5. Setting up an increase in extra-curricular activities for students such as scientific conferences and seminars.

10.Reconstructing and rehabilitating class rooms and offices in the Department, aswell as services and infrastructure.***15. Admission Criteria***An applicant for admission to an undergraduate program of WRE in the Department of Water Resources Engineering – College of Engineering – University of Baghdad must satisfy the following minimum requirements:1. He / she should have an Iraqi secondary school certificate, or its equivalent, and majored in natural or technological sciences. The students must obtain a high rate qualifies for admission to engineering colleges.
2. Acceptance is centrally controlled by the Ministry of Higher Education and Scientific Research ( MOHESR ).
3. Application to the Department of Water Resources is made directly through the MOHESR and independently from the application to the college of engineering. The number of students accepted is limited to the number of seats available as decided by the College Council based on the capacity of resources of the Department. The capacity plan of the Department of Water Resources in the last three years was 40 - 60 students.
4. Also included a plan to accept the top students from Technical Institutes Foundation and the outstanding employees from state institutions and ministries.
5. The applicant must submit the required documents within a specified period.
6. An applicant who has graduated from a secondary school system outside Iraq must have completed twelve years of combined primary and secondary school studies from a recognized school. He/she is also required to provide an equivalency certificate from the Iraqi Ministry of Education.

Admission to the Department of Water Resources is highly competitive. As explained above, applicants are granted admission in accordance with an overall evaluation on the basis of their rating record, but only to the extent permitted by the maximum number of new admissions established for that academic year.1. ***Key sources of Information about the Program***
2. Department page in the website of the college.
3. Guide of the Department of Water Resources Engineering.
4. College of Engineering Catalog.
5. Minutes of some Committee meetings of the Department of Water Resources Engineering.
6. Subjects portfolios for Water Resources Engineering subjects.
7. Documentation Committee in the Department.
8. Staff and students of the Department.
9. Examinations Committee in the Department.

**Learning Outcomes:** Skills acquired by students and methods of measurementareshown in Table (3).Table (3). Skills acquired by the students and methods of measurement.

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| **Acquired Skills** | **Lessons through which Skills Acquired** | **Method of Assessing the Skills** |
| 1. **An ability to apply knowledge of mathematics, science, and engineering**
 |
| * Use mathematics to solve engineering problems
* Apply mathematics and engineering science in engineering matters, evaluation, planning, and engineering design
 | 102WRMA, 106WRES, 210WRMA, 326WREA, 435WRAS | Home works and assignments, quizzes, and examinations |
| 1. **An ability to design and conduct experiments as well as analyze and interpret data**
 |
| * Design and conduct experiments to verify the presence of engineering problems
* Conduct experiments with different scales to obtain data simulated reality
 | 103WRCO,105WRED,107WRME,213WRCS,211WRCO,214WRSU,215WRSP,217WRWM,320WRSF,323WRFM,438WREE | Laboratory experiments, writing reports, examination, and quizzes |
| 1. **An ability to design a system, component, or process to meet desired needs within**

**realistic constraints such as economic, environmental, social, political, ethical,****health and safety, manufacturability, and sustainability** |
| * Determine the design requirements
* Explain the selection of design parameters
* Determine the possibility of multiple solutions for one design and demonstrate best choice for design
* Clarify the functions of the final design to meet the requirements
 | 213WRCS,322WRID,324WRSA,325WRDS,430WRDI,432WRDE,436WRDE | Home works, reports, graduation projects, examinations, and quizzes |
| 1. **An ability to function on multidisciplinary teams**
 |
| * Learn basic concepts related to collective action, such as leadership, cooperation, objectives, and results
* Knowledge of basic concepts related to team disputes such as differences in attitudes, personal goals, dependency, and lack of participation
* Learn basic concepts related to the management team such as managing effective meetings, listening skills, and positive communication, setting goals, and assess the level of progress
* Clarify the ability to organize and good management of the project team with different specialties
 | 109WRIR,322WRID,438WREE | Reports, graduation projects, extracurricular activities |
| 1. **An ability to identify, formulate, and solve engineering problems**
 |
| * The ability to identify issues that can be resolved through engineering concepts and models
* The ability to develop standards and specifications with solutions and to identify the determination of issues
* The successful application of engineering techniques to solve engineering problems
 | 322WRID,435WRAS,438WREE,439WREC,437WRAH | Home works, quizzes, and examinations |
| 1. **An understanding of professional and ethical responsibility**
 |
| * Understanding engineering profession and responsibility
* Knowledge of engineering responsibility in terms of risk assessment and safety, honesty and reliability, loyalty, and opposition in the workplace
 | 109WRIR,434WRPM,438WREE | Meetings and direct dialogues between students and faculty |
| 1. **An ability to communicate effectively**
 |
| * Possess technical writing skills
* Possess oral skills that make it able to effectively communicate his knowledge of technical information about the planning and engineering design
* The ability to communicate complex ideas to engineering designs for people from outside
 | 109WRIR, 438WREE,434WRPM | Reports, discussions, graduation projects, examinations |
| 1. **The broad education necessary to understand the impact of engineering solutions**

**in a global and social context** |
| * Application of knowledge and engineering skills needed to deal with engineering issues and their impact on the cultural and ethical factors
* Understand the positive and negative effects on the engineering and technology on society and how these effects associated with economic reality and political
 | 109WRIR,216WRLR,322WRID,438WREE | Meetings and direct dialogues between students and faculty |
| 1. **A recognition of the need for and an ability to engage in life-long learning**
 |
| * Take advantage of the learning opportunities outside the formal classroom activities by attending professional lectures, seminars, and training courses
 | 438WREE | Meetings and direct dialogues between students and faculty |
| 1. **Knowledge of contemporary issues**
 |
| * Identify and describe the challenges faced by engineers
* Clarify important trends and issues in the field
* Determine the potential applications of knowledge engineering in the design and analysis of contemporary engineering operations
 | 438WREE | Meetings and direct dialogues between students and faculty, discussions, and graduation projects |
| 1. **An ability to use the techniques, skills, and modern engineering tools necessary for**

**engineering practice** |
| * The ability to use modern methods of analysis and design in modern engineering applications
* The ability to use computer programs in engineering applications
 | 103WRCO,211WRCO,435WRAS | Laboratory experiments, home works, quizzes, and examinations |

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