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**Department of Dams and Water Resources Engineering**

**College of Engineering**

**Salahaddin University – Hawler**

**Subject: Engineering Analysis**

**Course Book –Year 3**

**Lecturer's name: Dr. Abdulla Abdulwahid Abo Botany**

**Academic Year: 2019 -2020**

**Course Book**

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| **1. Course name** | | Engineering Analysis |
| **2. Lecturer in charge** | | Dr. Abdulla Abdulwahid Abo Botany |
| **3. Department/ College** | | College of Engineering-Dams and Water Resources Engineering |
| **4. Contact** | | **e-mail:** abdulla.abo@su.edu.krd  **Tel: (**009647504545708**)** |
| **5. Time ( hr. / week )** | | **For example Theory: 6**  **Practical: 0** |
| **6. Office hours** | | **19** |
| **7. Course overview:**  This course provides a comprehensive, thorough, and up-to-date treatment of engineering mathematics. It is intended to introduce students of engineering, physics, mathematics, computer science, and related fields to those areas of applied mathematics that are most relevant for solving practical problems. A course in elementary calculus is the sole prerequisite. (However, a concise refresher of basic calculus for the student is included  The subject matter is arranged into seven parts as follows: A. Ordinary Differential Equations (ODEs)   1. First O.D.Es. 2. Second O.D.Es. 3. Higher O.D.Es.   B. series solution for An O.D.Es.  C. Integral transform (Laplace transform). Partial Differential Equations (P.D.Es.).  D. Fourier Analysis. Partial Differential Equations (P.D.Es.) E. Partial Differential Equation | | |
| **8. Course Objective:**  A course focuses on the formulate and analysis different engineering physical problems in the nature and how they are engineered. Students work in teams to develop a system of mathematical model and find a suitable tool to solve it.  The "Engineering Analysis" course activity explores an engineering idea which they have many uses and solve many problems in the world. Students work in teams to engineer their own application in a different engineering cases in a classroom such as flow through porous media,  To learn students how to:  -Analyzing the engineering problems  -What is a mathematical model  -to find the particular solution for a given physical engineering problems  -to give them a required mathematical tool in order to solve frequently engineering cases in the nature.  As a result of this activity, students should develop an understanding of:  -A different between physical and mathematical models  -How mathematical model can be formulate  -How formulated mathematical model can be solved  -Teamwork | | |
| **9. Student's Obligation**   * Regular attendance is required according to the university rules. * The use of mobile phone during the class is prohibited. * Only the students who are officially enrolled can attend the class, guests and children are not admitted. * Daily participation and conducting assignments are required.   Once under graduate education, it is no longer the teacher's role to supply the students with the building blocks of literacy. It is no longer their role to coddle students and cater to the slowest in the class at the expense of those who understand. The responsibilities of post-secondary students (under graduate students) are: To be polite in all dealings with the professor, the TAs, and the other students. To show up to class on time and ready to participate in the learning process. This means: Bringing all the paper, pens, pencils, calculators, books, etc. you will need. Reading the required readings before class. Turning off all cell phones and pagers. If there's something more important to you than giving your full attention in class, don't bother to show up, because you're only going to distract those who are there to learn. Not leaving in the middle of class and interrupting everyone in it unless it's crucial. Go to the bathroom before class. It's one thing to have an emergency due to something like colitis, and another to walk out and disrupt everything because you're bored. If you know you may have to leave part way through class, have the courtesy to sit near an exit. To ask questions, participate in discussions, and otherwise speak up when appropriate. If you don't understand something, ask. Chances are, others in the class don't understand either. If the proof is unable to assist you, they should be able to do so after class or during office hours. If you don't ask and as a result you do not understand, that's YOUR fault, not the prof's. If student think the professor has made an error, politely point it out during class. Profs are human. It is easier for them to correct a mistake and set the learning back on track at the same time rather than having to wait until next class. If you are wrong about the mistake, the prof should indicate why the item is correct. If the prof. is rude when you have been polite, that's their fault, but you should make sure your education comes first. This also means that you should certainly not be talking when inappropriate, such as during a lecture. Don't interrupt other students just because you're bored. | | |
| **10. Forms of Teaching**  It is not the job to entertain students, it is vital to engage them in the learning process. Selecting a style that addresses the needs of diverse students at different learning levels begins with a personal inventory — a self-evaluation — of the teacher’s strengths and weaknesses. As they develop their teaching styles and integrate them with effective classroom management skills, teachers will learn what works best for their personalities and curriculum.  My guide encapsulates today’s different teaching styles and helps teachers identify the style that’s right for them and their students. | | |
| **11. Assessment Scheme**  -Attendance of students and the activity 5 marks  **-Quizzes 5 marks**  -First term exam 15 marks  **-Second term exam 15 marks**  -Final exam 60 marks | | |
| **12. Course Reading List:**  References  -E. Kreyszig “Advanced Engineering Mathematics” Book 10th edition 2011.  -R. M. Spiegel “Theory and Problems of Laplace Transforms” Shaum publishing co. 1965 | | |
| **26 Weeks: From the 15th of October to 15th of May** | | |
| **1st , 2nd , 3rd Weeks** | First order differential equations | |
| **4th Week** | Applications of first order differential equations | |
| **5st , 6nd , 7rd Weeks** | Second order differential equations | |
| **8thWeek** | Applications of second order differential equations | |
| **9st , 10nd , 11rd Weeks** | Applications of higher order differential equations | |
| **12th Week** | Applications of higher order differential equations | |
| **13th Week** | Series solutions | |
| **14th, 15th, 16th 17th Weeks** | Integral Transform Laplace transform | |
| **18th, 19th, 20th 21st Weeks** | Integral Transform Laplace transform | |
| **22nd , 23rd, 24th , 25st , 26th Weeks** | Partial differential equation | |