**Course description form**

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| 1. **Course Name**
 |
| **Control Theory I** |
| 1. **Course Code**
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| EP311 |
| 1. **Semester/Year**
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| Spring Semester/Third Year |
| 1. **The date this description was prepared**
 |
| 17 / 9 / 2023 |
| 1. **Available forms of attendance**
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| Face-to-Face theoretical lectures |
| 1. **Number of study hours (total) / number of units (total)**
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| 60/3 |
| 1. **Name of the course administrator**
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| Name: Assist. Prof. Dr. Zeyad A. ObaidEmail: Zeyad.a.obaid@uodiyala.edu.iq  |
| 1. **Course objectives**
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| 1. Developing problem-solving skills, understanding the principles of control and control systems, and the method of analyzing the stability of control systems and modeling systems.
2. Understanding the types of response of time systems and how to analyze them.
3. Simplifying systems through diagrams and blocks for the purpose of reaching the main goal of the course, which is to extract the final systems equation for the purpose of analyzing and developing their stability.
 | **Objectives of the study subject** |
| 1. **Teaching and learning strategies**
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|  Weekly lectures included providing students with the basics and topics related to the pre-skills education outcomes to solve practical problems through presentation, lecture, or conducting experiments. Solve a group of practical and applied examples by faculty members. Through discussion, students participate in solving some practical problems. Practical laboratories in the department are monitored by faculty members in the department. Asking the student to visit the library and the international information network (the Internet) to obtain additional knowledge of academic subjects.Giving a seminar to the student in front of his fellow students to enhance his self-confidence. | **The Strategy** |
| 1. **Course structure**
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| **Evaluation method** | **Learning method** | **Required learning outcomes** | **Name of the unit or topic**  | **Hours** | **Week** |
| Daily examsseminarMonthly exams | LecturesExamples of field practical cases | A general definition of control systems in general and power systems in particular, explaining the types of control systems | Basic Definition of Transfer functions of control systems, closed and open loop | 4 | 1 |
| Daily examsseminarMonthly exams | LecturesExamples of field practical cases | Study of transitional circuits for electrical systems and how to convert them into differential equations(part One) | electrical system, | 4 | 2 |
| Daily examsseminarMonthly exams | LecturesExamples of field practical cases | Study of transitional circuits for electrical systems and how to convert them into differential equations(The second part) | electrical system, | 4 | 3 |
| Daily examsseminarMonthly exams | LecturesExamples of field practical cases | Study of transitional circuits for mechanical systems and how to convert them into differential equations | mechanical system & servo system | 4 | 4 |
| Daily examsseminarMonthly exams | LecturesExamples of field practical cases | First month exam | An in-person theoretical exam with a practical exam in the laboratory separate from the theoretical one | 4 | 5 |
| Daily examsseminarMonthly exams | LecturesExamples of field practical cases | Studying the simplification of systems through the use of block simplification theory for the purpose of extracting the final equation of the system(part One) | Block Diagram reduction rules | 4 | 6 |
| Daily examsseminarMonthly exams | LecturesExamples of field practical cases | Studying the simplification of systems through the use of block simplification theory for the purpose of extracting the final equation of the system( part two) | Block Diagram reduction rules | 4 | 7 |
| Daily examsseminarMonthly exams | LecturesExamples of field practical cases | Studying the simplification of systems through the use of signal transmission diagram theory for the purpose of extracting the final equation of the system(part One) | Signal flow graph & mason's rule | 4 | 8 |
| Daily examsseminarMonthly exams | LecturesExamples of field practical cases | Studying the simplification of systems through the use of signal transmission diagram theory for the purpose of extracting the final equation of the system(part two) | Signal flow graph & mason's rule | 4 | 9 |
| Daily examsseminarMonthly exams | LecturesExamples of field practical cases | Second month exam | An in-person theoretical exam with a practical exam in the laboratory separate from the theoretical one | 4 | 10 |
| Daily examsseminarMonthly exams | LecturesExamples of field practical cases | Studying the types of entries for systems | The steady-state error due to step, ramp & parabolic inputs. | 4 | 11 |
| Daily examsseminarMonthly exams | LecturesExamples of field practical cases | Practical examples from industry of types of control and their uses in power systems | Real industrial example of control system especially in power systems | 4 | 12 |
| Daily examsseminarMonthly exams | LecturesExamples of field practical cases | Study of the time response of second-order functions | Transient Response of Second Order Systems. | 4 | 13 |
| Daily examsseminarMonthly exams | LecturesExamples of field practical cases | Third month exam | An in-person theoretical exam with a practical exam in the laboratory separate from the theoretical one | 4 | 14 |
| Daily examsseminarMonthly exams | LecturesExamples of field practical cases | Discussing the course outcomes for each student and identifying weak points by comparing answers in exams, general assignments, and the laboratory | General discussion for the course output for each student to compare the grades and outcomes of both class and lab exams. | 4 | 15 |
| 1. **Course Evaluation**
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| Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation, daily, oral, monthly, written exams, reports, etc. |
| 1. **Learning and teaching resources**
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| Modern control system by “OGATA.Advanced control system by ’ROLAND S.BURNS” | Required textbooks (methodology, if any) |
| Modern control system by “OGATA.Advanced control system by ’ROLAND S.BURNS” | Main references (sources) |
| YouTube Channel for the Lecturer | Recommended supporting books and references (scientific journals, reports....) |
| Search by keywords:Control theory, Root locus, bode plot, control design, PID controller | Electronic references, Internet sites |