**Course description form**

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| 1. **Course Name** | | | | | | | | |
| Digital signal processing | | | | | | | | |
| 1. **Course Code** | | | | | | | | |
| EP411 | | | | | | | | |
| 1. **Semester/Year** | | | | | | | | |
| 1st Semester/Fourth Year | | | | | | | | |
| 1. **The date this description was prepared** | | | | | | | | |
| 17 / 9 / 2023 | | | | | | | | |
| 1. **Available forms of attendance** | | | | | | | | |
| Face-to-Face theoretical lectures | | | | | | | | |
| 1. **Number of study hours (total) / number of units (total)** | | | | | | | | |
| 30/2 | | | | | | | | |
| 1. **Name of the course administrator** | | | | | | | | |
| Name: Lect. Saja Mazin Sami Email: **S.M.sami**[@uodiyala.edu.iq](mailto:assamasahib@uodiyala.edu.iq) | | | | | | | | |
| 1. **Course objectives** | | | | | | | | |
| The digital signal processing curriculum aims to introduce the student to the skills of the digital signal processing subject and how to design types of filters . | | | | **Objectives of the study subject** | | | | |
| **9. Teaching and learning strategies.** | | | | | | | | |
| 1 - Providing students with the basics and additional topics related to the previous educational outcomes and skills to solve practical problems.  2- Solving a group of practical examples by the academic staff.  3- During the lecture, students participate in solving some practical problems.  . | | | **The Strategy** | | | | | |
| **10. Course Structure.** | | | | | | | | |
| Interpolation and solving differential equations. | **Learning method** | **Required learning outcomes** | | | | **Name of the unit or topic** | **Hours** | **Wek** |
| Daily, oral, monthly, written examinations and reports | Whiteboard and Data show | The student learns an introduction to the subject and applications of the digital signal processor | | | | Introduction to digital signal processing : Basic elements of DSP, DSP vs. ASP, application of DSP, Continues time signals vs. discrete time signals | 4 | Week 1 to Week 2 |
| Daily, oral, monthly, written examinations and reports | Whiteboard and Data show | The student learns the basic types of signs | | | | Standard of discrete time signals (sequences): Unit sample sequence, Unit step sequence, Unit ramp sequence, Exponential sequence  (classification of discrete time signals )System properties: Static and dynamic system, shift invariant and shift variant system, Causal and non-causal system, linear and nonlinear system, stable and unstable system.  Convolution : Direct form method, graphical method, slide rule method  Discrete Fourier transform (DFT), Linear convolution using DFT | 8 | Week3 to Week 6 |
| Daily, oral, monthly, written examinations and reports | Whiteboard and Data show | The Fourier transform and Z transform, as well as digital filters, are explained. | | | | Inverse Discrete Fourier transform (IDFT)  Fast Fourier transform(FFT): Butterfly computation , Invers Fast Fourier transform (IFFT)  Introduction to Z transform: Definition of Z transform and ROC, Properties of Z transform,  Inverse Z transform  Digital Filters | 10 | Week 7 to Week 11 |
| Daily, oral, monthly, written examinations and reports | Whiteboard and Data show | FIR &IIR filter is explained | | | | Realization of digital filter:  Basic FIR filter structure, direct form of FIR structure, Cascaded form of FIR structure | 8 | Week 12 to Week 15 |
| 1. **Course Evaluation** | | | | | | | | |
| 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** | | | | | | | | |
| * B. A. Shenoi, Introduction to Digital Signal processing and filter Design, Wiley-Inter science, 2006. | | | | | Required textbooks (methodology, if any) | | | |
| * Digital Signal Processing: principles, algorithms, and applications, third edition, by John G. Proakis and Dimitris G. Manolakis. * Digital Signal Processing, fundamentals and applications, 2008, by Li Tan. | | | | | Main references (sources) | | | |
| British BS-Std American IEEE, ANSI and German VDE. | | | | | Recommended supporting books and references (scientific journals, reports....) | | | |
| Any other materials available on the web. | | | | | Electronic references, Internet sites | | | |