**Course Description Form**

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| 1. Course Name: DIGITAL SIGNAL PROCESSING | | | | | | | | |
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| 1. Course Code: | | | | | | | | |
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| 1. Semester / Year: Master MSc. Class | | | | | | | | |
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| 1. Description Preparation Date:01-05-2024 | | | | | | | | |
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| 1. Available Attendance Forms: Weekly , Mandatory attendance | | | | | | | | |
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| 1. Number of Credit Hours (Total) / Number of Units (Total): 3 Credit hour | | | | | | | | |
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| 1. Course administrator's name (mention all, if more than one name) | | | | | | | | |
| Name: Yahiea M.H. Al Naiemy  Email: yahiea.alnaiemy@uodiyala.edu.iq | | | | | | | | |
| 1. Course Objectives | | | | | | | | |
| **Course Objectives** | | | | Specific outcomes of instruction (The student will be able to):  1-Understand basic discrete-time systems, linearity, linear time-invariance,  stability, impulse response, and discrete convolution.  2-Implement discrete time systems, recursive and non-recurse realizations.  3-Perform Z transform and finding the inverse Z transform including its properties.  4- Understand frequency analysis of both continuous and discrete signals.  5-Understand frequency response of linear time invariant (LTI) systems.  6-Understand discrete Fourier transform, its properties, and applications.  7-Design digital filters both FIR, IIR filters.  8-Understand of multi-rate signal processing. | | | | |
| 1. Teaching and Learning Strategies | | | | | | | | |
| **Strategy** | | -Active lectures  - Tutorials  - presentation Exercises | | | | | | |
| 1. Course Structure | | | | | | | | |
| **Week** | **Hours** | | **Required Learning Outcomes** | | **Unit or subject name** | | **Learning method** | **Evaluation method** |
| 1 | 2Hr | | A,B,C,D | | Introduction to discrete linear  systems techniques, Arithmetic operation of Binary numbers including 1’s & 2’s complements | | Lecturing , exercises, experiments | Exam |
| 2 | 2Hr | | A,B,C,D | | Discrete-Time Fourier Transform and Linear Time Invariant Systems | | Lecturing | Exam |
| 3 | 2Hr | | A,B,C,D | | The Z transform | | Lecturing | Exam |
| 4 | 2Hr | | A,B,C,D | | Properties of digital filters | | Lecturing | Exam |
| 5 | 2Hr | | A,B,C,D | | Fourier transforms, sampling | | Lecturing | Exam |
| 6 | 2Hr | | A,B,C,D | | Sampling continuous-time signals: the sampling theorem. | | Lecturing | Exam |
| 7 | 2Hr | | A,B,C,D | | A/D conversion and quantization | | Lecturing | Exam |
| 8 | 2Hr | | A,B,C,D | | The Discrete Fourier Transform. | | Lecturing | Exam |
| 9 | 2Hr | | A,B,C,D | | The Fast Fourier transform | | Lecturing | Exam |
| 10 | 2Hr | | A,B,C,D | | Digital filter design | | Lecturing | Exam |
| 11 | 2Hr | | A,B,C,D | | Finite impulse response (FIR) filters | | Lecturing | Exam |
| 12 | 2Hr | | A,B,C,D | | Infinite impulse response (IIR) filters | | Lecturing | Exam |
| 13 | 2Hr | | A,B,C,D | | Structures and properties of FIR and IIR filters and review | | Lecturing | Exam |
| 14 | 2Hr | | A,B,C,D | | IIR - Direct, parallel and cascaded realizations | | Lecturing | Exam |
| 15 | 2Hr | | A,B,C,D | | Coefficient quantization effects in digital filters | | Lecturing | Exam |
| 1. Course Evaluation | | | | | | | | |
|  Exams   Quizzes   Presentations | | | | | | | | |
| 1. Learning and Teaching Resources | | | | | | | | |
| Required textbooks (curricular books, if any) | | | | | | Discrete-Time Signal Processing by A. V. Oppenheim and R. W. Schafer, with M. T.  Yoder and W. T. Padgett (PrenticeHall/Pearson, 2009, ISBN: 978-0131988422. | | |
| Main references (sources) | | | | | | Digital Signal Processing: A Computer-Based Approach, S. K. Mitra, McGraw-Hill, | | |
| Recommended books and references (scientific journals, reports...) | | | | | | Schaum's Outline of Digital Signal Processing, M. Hays, McGraw-Hill, 1999: This complements  Mitra with lots of worked examples and summaries of each topic as well as a large number of additional problems. | | |
| Electronic References, Websites | | | | | |  | | |