

Course Description – Summer 2024

Title	Digital Signal Processing for Engineering Applications
Faculty	Electrical Engineering
Professor	Prof. Dr. Carsten Roppel
ECTS	5
Level	Master
Requirements	Bachelor Degree Basic knowledge in signals and systems and Python is recommended.
Add. Information	Lecture and laboratory experiments
Content	<ol style="list-style-type: none"> 1 Introduction 2 Sampling und Quantization Filter Refresher Sampling Theorem Sampling of Bandpass Signals Quantization Decibels Refresher ADC Parameters and Types 3 Discrete-Time Signals and Systems Impulse Response and Convolution Fourier-Transform of Discrete-Time Signals Discrete Fourier-Transform (DFT) Energy Signals and Power Signals Random Signals 4 Bearing Vibration Analysis Bearing Geometry and Characteristic Frequencies Sample Signals and Spectra 5 Digital Filters General Structure of Digital Filters Finite Impulse Response (FIR) Filters Infinite Impulse Response (IIR) Filters Improving ADC Resolution by Oversampling and Filtering 6 Representation of Numbers and Quantization of Filter Coefficients