Arab Academy for Science, Technology & Maritime Transport
College of Engineering & Technology
Department of Electronics and Communication Engineering

University/Academy:	Arab Academy for Science, Technology & Maritime Transport
Faculty/Institute:	College of Engineering & Technology
Program:	B.Sc. Mechanical Engineering

Form no. (12)
Course Specification

1- Course Data

Course Code: **EC 534**	Course Title: **Analog and Digital Signal Processing**			Academic Year/Level: **4th** year / **8th** semester
Specialization: **Electronics & Communication Eng.**	No. of Instructional Units	Lecture	Tutorial	Practical
	3 Credits	**2 Hrs.**	**2 Hrs.**	**2 Hrs.**

2- Course Aim

Understanding the basic concepts of analog signal generation and shaping. Data converters, discrete time transforms. Digital filter design.

3- Intended Learning Outcome

a-Knowledge and Understanding	K25. Demonstrate knowledge and understanding of analysis of signal processing. • Define oscillator and identify at least three different types of oscillators • Define Multi-vibrator and identify at least two different types of Multi-vibrators • Explain the concept of signal filtering and defined at least two different kind of analog filters • Define the digital to analog converters and identify at least three of its types. • Define the Z-transform. • Describe the infinite impulse response filters • Describe the finite impulse response filters. K15. Principles of Analyzing and design of electronic circuits and components • Describe the clipping and clamping circuits. • Identify the differentiating and integrating circuits.
b- Intellectual Skills	I1. Select appropriate mathematical and computer-based methods for modeling and analyzing problems. • Analysis and design of analog filters using computer simulation. • Analysis and design of digital to analog converters using computer simulation • Analysis and design of Analog to digital converters using computer simulation. I2. Select appropriate solutions for engineering problems based on analytical thinking. • Analysis and design of Sinusoidal oscillators. • Analysis and design of Multivibrators. • Calculate the frequency domain representation of a signal given its time domain representation. • Calculate the Z-transform of a given signal. • Analysis and design of FIR digital filters.

c- Professional Skills	P15. Use relevant laboratory equipment and analyze the results correctly. • Construction of Multivibrators using lab experiments • Construction of the clipping and clamping circuits using lab experiments. • Construction of integrator and Differentiators using lab experiments • Construction of sampling and hold circuit using lab experiments • Construction of different DAC's circuits using lab experiments. P6. Use a wide range of analytical tools, techniques, equipment, and software packages pertaining to the discipline and develop required computer programs. • Construction of different quantization circuits using computer simulation
d- General Skills	G3. Communicate effectively • Describe the sampling theorem and explain the sampling process of the analog signal using student seminar. • Define Fourier series, Fourier transform, Discrete Fourier transform and fast Fourier transform using student seminar. • Getting familiar with basic operations of analog and digital signals using student seminar.
4- Course Content	• Sinusoidal oscillators • Multivibrators • Clipping And clamping circuits • Differentiating and integrating circuits • Design of analog filters • Sampling of analog signals, S/H circuits • DAC's • Quantization techniques • Analog to digital converters • Introduction to discrete time transform. The DFT and DCT, the FFT • The Z transform, Time and frequency analysis of digital filters • Design of IIR filters using BZT • Design of FIR filters using windowing

5- Teaching and Learning Methods

- Lectures - Tutorials - Reports & sheets - Laboratories - Seminars

6-Teaching and Learning Methods for Students with Special Needs

- Lectures - Tutorials - Reports & sheets - Laboratories - Seminars Academic Support: Dr. Safa Gaser is appointed as an academic supervisor for handicapped students. Constant follow up should be done for handicapped students after each assessment to evaluate their academic level of achievement each assessment to evaluate their academic level of achievement.

7- Student Assessment:

a- Procedures used:	1. Written Examinations 2. Oral Examinations 3. Practical Examinations 4. Class Activities (Assignments, etc ------) 5. Final Examination
b- Schedule:	Assessment 1 7th Week Written Exam Assessment 2 12th Week Written Exam Assessment 3 Practical Examination Assessment 4 16th Week Final Written **Exam**
c- Weighing of Assessment:	7th Week Examination 30 % 12th Week Examination 20 % Final-term Examination 40 % Practical Examination 5 % Semester Work 5 % Total 100%

8- List of References:

a- Course Notes	
b- Required Books (Textbooks)	HAMDY, NADDER, "Applied Signal Processing", CRC, 2008.
c- Recommended Books	H. Baher. "Analog and Digital Signal Processing"
d- Periodicals, Web Sites, ..., etc.	

Course coordinator: **Program Manager:**