King Saud University
College of Applied Medical Sciences
Development and Quality Unit

Course Syllabus: to given to students at the first week of the semester
1st semester, 1438 /1439 H

Course title and code: Biomedical Signal Processing 415 BMT

Program in which the course is offered: Biomedical Technology-instruments

Credit hours 3

total contact hours per semester: 56

Level at which this course is offered: 7

Course prerequisites: 222-223 BMT

Time: Thursday - 10 Am to 12

Location: room 17

College member responsible for the course Dr. Ali Saad

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Course Description

The course is dedicated to introduce the digital signal processing and applications in biomedical field. An introduction about transforming an analog signal to digital one including sampling and quantization, digital frequency and Nyquist Frequency are also introduced.
Operation on digital signal like time shift, flip, interpolation decimation, symmetry and fractional delay are included.
Linear systems operations, impulse response convolution and some application to finite and infinite systems are described.
Fourier Transform is described and application to medical signal is proposed.
Z-Transform and its application are also introduced.

Course Objectives

- Understand basics of digital signal processing.

- Application of digital signal processing to biomedical signals

- Develop an ability to design and analyze signal processing systems.

Teaching strategies

PowerPoint presentation, Lecture, debates,
Group Discussion, whole group and small group discussion
brainstorming, small group work; projects Team work
individual presentation

Learning Resources

1. List Required Textbooks **Understanding Digital Signal Processing,** Richard G. Lyons, Prentice Hall, 2010,
2. List Essential References Materials (Journals, Reports, etc.) Analog and Digital signal processing, second edition, Ashok Ambardar, brooks/Cole publishing company, 1999.
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc) http://www.dspguide.com/
4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.) http://www.freetechbooks.com/signal-processing-f51.html
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software. Computers + software (Matlab student version)

1 Topics to be Covered

List of Topics	No of Weeks	Contact hours
Discrete Signals Decimation and interpolations Aliasing and sampling **Sampling and Quantization, operation on signals,**	3	12
Discrete Convolution	2	8
The Z-transform	2	8
Applications of the z-transform	2	8
Discrete Fourier Transform (FT)	1	4
Application on FT system analysis	2	8
FIR (Finite Impulse response)	1	4

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
a.	Written exam 1	6	15%
b.	Written exam 2	12	15%
c.	Homework	Cont.	5%
d.	Quiz	Cont.	5%
e.	Practical exam	12	20%
f.	Final written exam	16	40%