

# **BME357 Advanced Biomedical Instrumentation**

**Level:** 3

**Credit Units:** 5 Credit Units

**Language:** ENGLISH

**Presentation Pattern:** EVERY JAN

## **Synopsis:**

This course covers aspects of the concepts of biomedical engineering design used in the design of biomedical instruments. Topics include fit-for-purpose, meeting regulatory requirements and design specifications.

## **Topics:**

- Generation and Acquisition of Electrocardiogram
- Signal Processing of Electrocardiograms
- Digital Filtering
- QRS Complex Detection
- ECG Signal Analysis in Different Domains
- Heart Rate Variability
- Analysis of HRV
- Statistical Analysis
- Ultrasound Imaging
- Generation of MRI signal
- Detection of MRI signal
- Defibrillator and Pacemakers

## **Textbooks:**

BME357 Study Guide (UDC - SUSS) SUSS  
ISBN-13: SG-1464

BME357 Laboratory Manual  
ISBN-13: OT-2211

**Learning Outcome:**

- Illustrate the generation and acquisition of electrocardiogram (ECG)
- Analyze the ECG in time domain, frequency domain and by non-linear method
- Design data mining techniques for the analysis of cardiac arrhythmia
- Evaluate how the ECG changes in different disease subjects
- Examine how the MRI and Ultrasound can be used to image the heart and other vascular system
- Evaluate the different types of defibrillators and pacemakers
- Apply the concept of spectral estimation using MATLAB
- Demonstrate the required skills in Biomedical instrumentation, signal processing and data mining techniques

**Assessment Strategies - Regular Semester (Evening Class):**

<b>Components</b>	<b>Description</b>	<b>Weightage Allocation (%)</b>
Overall Continuous Assessment	CLASS TEST 1	15
	QUIZ 1	15
Overall Examinable Components	Written Exam	70
<b>Total</b>		<b>100</b>

\*The information listed is subject to review and change.