GOVERNMENT POLYTECHNIC COLLEGE, KOTA (RAJ.)

SYLLABUS BREAK-UP (SESSION 2015-16)

SUBJECT CODE **IE308** SUBJECT NAME : **SIGNAL CONDITIONING**

FACULTY NAME DEEPA MATHUR DESIGNATION : **LECTURER (INSTRUMENTATION)**

TOPIC	PRACTICAL CLASSES REQUIRED TO COVER TOPIC	MONTHS IN WHICH THE TOPIC WILL BE COVERED	ACTUAL DATE OF COVERING OF THE TOPIC	REASON FOR NOT COVERING THE TOPIC IN DUE TIME	E-CONTENTS PROVIDED TO STUDENTS RELATED TO TOPIC
To convert output current of photo cell/ photodiode/ photo multiplier into voltage using operational amplifier current to voltage follower.	6	Sept			
To convert voltage to current using operational amplifier voltage to current follower.	4	Sept			
To use a logarithmic amplifier and draw characteristics.	4	Oct			
To draw the characteristic of a RC low pass filter.	5	Oct			
To draw the characteristic of a RC high pass filter	5	Nov			
To use a voltage to frequency converter	4	Jan			
To use a frequency to voltage converter	4	Jan			
To convert an analog signal into digital signal using ADC.	5	Feb			
To convert digital signal into analog using DAC.	5	Mar			
To use a sample and hold circuit.	4	Mar			
TOTAL	46				

GOVERNMENT POLYTECHNIC COLLEGE, KOTA (RAJ.)

SYLLABUS BREAK-UP (SESSION 2015-16)

SUBJECT CODE **IE303** SUBJECT NAME : **CONTROL THEORY**

FACULTY NAME **Deepa Mathur** DESIGNATION : **LECTURER (INSTRUMENTATION)**

TOPIC	LECTURE CLASSES REQUIRED TO COVER TOPIC	MONTHS IN WHICH THE TOPIC WILL BE COVERED	ACTUAL DATE OF COVERING OF THE TOPIC	REASON FOR NOT COVERING THE TOPIC IN DUE TIME	E-CONTENTS PROVIDED TO STUDENTS RELATED TO TOPIC
1. Introduction to Process Control: 1.1 Transfer Function	1	Aug			
1.2 Signal flow graph	3	Aug			
1.3 Mason's gain formula	1	Sept			
1.4 Block diagram representation	4	Sept			
1.5 Mathematical modelling of physical systems	4	Oct			
2. Time Domain Analysis: 2.1 Test signals	1	Oct			
2.2 Response of first order system	1	Oct			
2.3 Response of second order systems	1	Oct			
2.4 Rouths stability analysis	2	Oct			
2.5 Steady state error analysis	2	Oct			
2.6 Root locus analysis	3	Nov			
3. Frequency Domain Analysis: 3.1 Bode plots	5	Jan			
3.2 Polar plots	3	Jan			
3.3 Nyquist stability criterion	3	Feb			
3.4 System stability	3	Feb			
3.5 Relative stability 3.5.1 Gain margin 3.5.2 Phase margin	4	Feb			
4. Introduction of Advance Control Techniques: 4.1 PLC	1	Mar			
4.2 DCS	1	Mar			
4.3 DDC	1	Mar			
4.4 Data loggers	1	Mar			
4.5 SCADA	1	Mar			

TOTAL	46				

GOVERNMENT POLYTECHNIC COLLEGE, KOTA (RAJ.)

SYLLABUS BREAK-UP (SESSION 2015-16)

SUBJECT CODE **IE306** SUBJECT NAME : **BIO- MEDICAL INSTRUMENTATION**

FACULTY NAME **Deepa Mathur** DESIGNATION : **LECTURER (INSTRUMENTATION)**

TOPIC	LECTURE CLASSES REQUIRED TO COVER TOPIC	MONTHS IN WHICH THE TOPIC WILL BE COVERED	ACTUAL DATE OF COVERING OF THE TOPIC	REASON FOR NOT COVERING THE TOPIC IN DUE TIME	E-CONTENTS PROVIDED TO STUDENTS RELATED TO TOPIC
1. Introduction to Physiology : 1.1 Physiological systems of the human body 1.2 Nerve physiology 1.3 Mechanism of respiration 1.4 Generation, propagation and distribution of action potentials	3	Aug			
2. Medical Electrodes : 2.1 Introduction 2.2 Bio-electrode theory 2.3 Types of electrodes and implantation 2.3.1 Microelectrode 2.3.2 Body surface electrode 2.3.3 Needle electrode	4	Sept			
3. Bio Medical Recording System : 3.1 Introduction 3.2 Construction of centre type PMMC Galvanometer 3.3 Recording mechanism 3.4 Writing techniques and recorder problems 3.5 Constructional features of strip chart recorder 3.6 Recorder electronics 3.7 Stylus protection technique 3.8 X-Y recorder	5	Sept			
4. Electro Cardiograph (E.C.G.) : 4.1 Electrical activity of heart and its construction 4.2 Block diagram of E.C.G. machine 4.3 ECG electrodes 4.4 Lead configuration 4.5 ECG electronics 4.6 ECG controls 4.7 Heart rate measurement 4.8 Artefacts and troubleshooting 4.9 Principle of recording other bioelectric events like EEG and EMG	5	Oct			

5. Pace Makers : 5.1 Need 5.2 Classification 5.3 Block diagram of Demand pacemaker 5.4 Basic circuit of fixed rate and synchronous pacemaker	5	Nov			
6. Blood Pressure Monitoring : 6.1 Blood circulation system 6.2 Blood pressure waveform 6.3 Blood pressure measurement techniques 6.3.1 Direct 6.3.2 Indirect 6.4 Circuit diagram of B.P. processor to indicate diastolic - systolic blood pressure	4	Dec			
7. Defibrillator: 7.1 Need 7.2 Types of defibrillator 7.2.1 A.C. defibrillator 7.2.2 D.C. defibrillator 7.3 Basic defibrillator circuits and control circuits 7.4 Lawn waveform and its synchronization 7.5 Operating controls and precautions	4	Jan			
8. Biomedical Instruments : 8.1 Blood Gas analyser 8.2 Densitometer 8.3 Flame photometer 8.4 Blood flow meter 8.5 Skin and systemic body temperature measurement 8.6 X- Ray machine 8.6.1 Tube construction and housing 8.6.2 High voltage power source 8.6.3 Block diagram of X-Ray machine 8.6.4 Image intensifier 8.7 Concept of Sonography 8.8 Concept of CT scan 8.9 Concept of Magnetic Resonance Indication (MRI) 8.10 Concept of Laproscopic surgery	10	Feb			
9. Bed Patient Monitoring System : 9.1 Introduction 9.2 ICU/ CCU systems	2	Mar			
10. Introduction to Bioinformatics:	2	Mar			
11. Use of Nanotechnology in biomedical (Brief idea).	2	Mar			

TOTAL	46				

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FACULTY NAME DESIGNATION : **LECTURER (INSTRUMENTATION)**

TOPIC	LECTURE CLASSES REQUIRED TO COVER TOPIC	MONTHS IN WHICH THE TOPIC WILL BE COVERED	ACTUAL DATE OF COVERING OF THE TOPIC	REASON FOR NOT COVERING THE TOPIC IN DUE TIME	E-CONTENTS PROVIDED TO STUDENTS RELATED TO TOPIC
1. Introduction : 1.1 Meaning of signal conditioning	1	Aug			
1.2 Necessity of signal conditioning	1	Aug			
1.3 Analog and Digital signal conditioning	1	Aug			
2. Analog Signal Conditioning: 2.1 Principles of Analog Signal Conditioning	1	Aug			
2.1.1 Signal level changes	2	Sept			
2.1.2 Linearization	2	Sept			
2.1.3 Signal conversion	3	Sept			
2.1.4 Filtering and Impedance matching	3	Oct			
2.2. Bridge Circuits	2	Oct			
2.3 R.C. Filters	3	Oct			
2.4 Instrumentation amplifiers 2.4.1 Basic characteristics	1	Oct			
2.4.2 D.C. amplifier	1	Nov			
2.4.3. Op, Amplifier circuits	3	Nov			
2.4.4. Charge amplifier	1	Dec			
2.4.5 Isolation amplifier	1	Dec			
3. Digital Signal Conditioning : 3.1 A/D Conversion	4	Jan			
3.2 D/A Conversion	4	Feb			
3.3 Multiplexer / Demultiplexer	4	Feb			
3.4 Encoder / Decoder	4	Mar			
3.5 Sample and hold	2	Mar			
3.6 Data acquisition system	2	Mar			
TOTAL	46				

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SYLLABUS BREAK-UP (SESSION 2015-16)

SUBJECT CODE **IE306** SUBJECT NAME : **BIO- MEDICAL INSTRUMENTATION**

FACULTY NAME DESIGNATION : **LECTURER (INSTRUMENTATION)**

TOPIC	PRACTICAL CLASSES REQUIRED TO COVER TOPIC	MONTHS IN WHICH THE TOPIC WILL BE COVERED	ACTUAL DATE OF COVERING OF THE TOPIC	REASON FOR NOT COVERING THE TOPIC IN DUE TIME	E-CONTENTS PROVIDED TO STUDENTS RELATED TO TOPIC
Study of different types of electrodes	5	Sept			
Study of different types of recorders	5	Sept			
Study of ECG machine	5	Oct			
Measurement of blood pressure using indirect method.	5	Oct			
Study of blood pressure amplifier	4	Nov			
Measurement of skin systemic temperature	4	Jan			
Study of pacemakers	5	Feb			
Visit to clinical laboratory or hospital	4	Feb			
Visit to a hospital for X-ray machine / Sonography / CT scan.	5	Mar			
Visit to ICU/ CCU of hospital	4	Mar			
TOTAL	46				