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DR. D. Y. PATIL BIOTECHNOLOGY & BIOINFORMATICS INSTITUTE

TATHAWADE, PUNE

SYLLABUS FOR

SEMESTER I

**B. TECH BIOTECHNOLOGY, B. TECH MEDICAL BIOTECHNOLOGY, M. TECH (INT.)
BIOTECHNOLOGY**

(BATCH 2018-19)

DR. D.Y. PATIL VIDYAPEETH, PUNE
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B. TECH BIOTECHNOLOGY, B. TECH MEDICAL BIOTECHNOLOGY, M. TECH
(INT.) BIOTECHNOLOGY

Academic year 2018-2019

SEMESTER I						
Course Code	Course Name	L	T	P	Hr	Cr
BS 101	Physics	3	0	2	5	4
BS 102	Chemistry	3	0	4	7	5
BT 101	Electronics & Instrumentation Engineering	3	0	2	5	4
BI 101	Computers & C Programming	3	0	4	7	5
HU 101	Communication Skills	1	2	0	3	3
BS 103	Maths I – Mathematics	3	1	0	4	4
BT 102	Engineering Graphics	2	0	2	4	3
HU 102	Disaster Management*	0	1	0	1	-
Total		18	4	14	36	28
<i>*Audit course, attendance is must</i>						

TITLE OF THE COURSE: ELECTRONICS AND INSTRUMENTATION ENGINEERING

COURSE CODE: BT 101

L T P Hr C

MARKS: 150

3 0 2 5 4

OBJECTIVE:

Objective of the course is to familiarize students with the basic concepts of electronic engineering and electronics engineering.

This knowledge would help them in applying them in various biological techniques. Also the Knowledge of this subject will form a profound base for the instrumentation used in various advanced courses of Biotechnology and Bioinformatics.

LEARNING OUTCOME:

At the end of this course student should be able to understand the engineering electronics and instruments.

PREREQUISITES:

Since the course is very basic in nature, school level knowledge of physics and mathematics is required.

COURSE DESCRIPTION

Sr. No	Topic	Description	Hrs
1	Basics	History and scope of electronics, Electrical signals, passive electronic components, resistors, capacitors, inductors, Biosignals	4
2	Semiconductor devices	Diode circuits, P-N junction diode, biasing, half wave and full wave rectification, BJT types pnp, npn	6
3	Linear integrated circuits	Introduction to operational –amplifiers, characteristics of op-amp, virtual short and virtual ground, concept of feedback, inverting and non-inverting amplifier, applications of op-amp, addition, subtraction, integration, and differentiation	9
4	Digital electronics	Digital circuits, AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR, Boolean algebra, half adder, full adder, multiplexers and de-multiplexers, flip-flops, shift registers, counters, block diagram of microprocessor and microcontroller	10
5	Basic instrumentation	Sensors and transducers, basic measurement system, static and dynamic characteristics of an instrument, signal conditioning devices	8

6	Power devices and transducers	Basics of Power devices, displacement transducer, pressure transducer, temperature transducer, RTD, Thermistor and thermocouple	8
Total Number of lectures			45

METHODOLOGY:

The course will be covered through lectures, demonstration and practicals.

EVALUATION SCHEME (THEORY)

Examination	Duration	Marks
I Internal	60 minutes	20
II Internal	45 minutes	15
Attendance		5
End Semester Exam	2 hours 30 minutes	60
Total		100

BOOKS RECOMMENDED:

1. Digital Electronics by R. K. Jain, Tata Mc Graw Hill, 3rd Edition, 2003.
2. Grob's Basic Electronics – M. E. Schultz., Tata McGraw Hill, 10th Edition 2006.
3. Principals of electronics By V. K. Mehta , S. Chand Publisher , 1st Edition , 2010.
4. Op Amps and linear integrated circuits By R. Gaikwad, McGraw –Hill publishing company limited, 4th Edition, 2002.
5. Integrated Electronics By Millman and Halkias. Mcgraw-Hill, 3rd Edition 1972 .
6. The Z 80 Microprocessor By R. Gaonkar,. Penram Publisher , 3rd Edition, 1988.
7. A course in electrical and electronic measurements and instrumentation by A. K. Sawhney, P. Sawhney, Rai publisher, 1996.

**PRACTICAL: ELECTRONICS AND INSTRUMENTATION ENGINEERING (2
Hrs. PER WEEK)**

MARKS 50

Sr. No.	Name of the experiment	Learning objective	Literature/ Web links for reference and videos
1	Study of passive components in electronics Resistors, Inductors, capacitors, relay, switches, transformers and connectors.	Students should able to learn different passive components, their classification, symbol, and unit.	Principles of Electronics by V.K.Mehta and R. Mehta, S. Chand, 2005
2	Study of basic electronics measuring instruments DMM, CRO and function generator.	Students should able to operate CRO, function generator to generate different electrical signals. They should able to measure Voltage, current, frequency and time period of waveforms.	
3	Study of semiconductor devices, P-N junction Diode. Plot VI characteristics of P-N junction diode.	Students should able to learn different semiconductor devices like diode, transistors and also working of PN junction diode. They should able to plot VI characteristics graph.	
4	Study of operational amplifier Part I : Op-amp IC741 Part II: Op-amp as inverting and non-inverting amplifier.	Students should able to learn basic working principle of op-amp, pin diagram of IC 741.	
5	Study of digital logic circuits.	Students should able to learn different logic gates, their truth table and timing diagram.	
6	Study of pH electrode.	Students should able to understand operation of pH electrode for the measurement of pH.	

7	Study of resistance type temperature transducers.	Students should able to learn working principle of different resistance type temperature transducers like PRT, RTD, Thermistor, thermocouple	Basic electronics by J.S. Katre, Techmax publication, 2014
8	Study of conductivity meter electrode.	Students should able to understand the operation of conductivity meter electrode to measure conductivity of a solution.	Theory and applications of conductivity http://www.evisdom.com/
9	Study of 8085 microprocessor.	Students should able to understand pin diagram, block diagram and architecture of 8085 microprocessor.	http://8085projects.info/

PRACTICAL EVALUATION SCHEME

Examination

Practical : 10 marks

Attendance : 5 marks

Journal writing : 5 marks

End semester examination : 30

Total :50