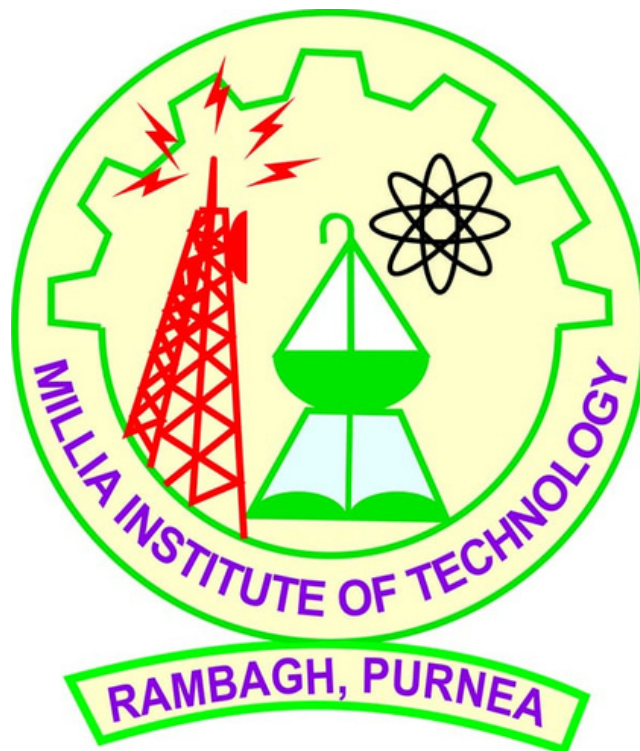


# **Millia Institute of Technology Rambagh, Purnea**

**Affiliated to Bihar Engineering University, Patna**

**NAAC Accredited & ISO 9001:2015**



## **SYLLABUS**

**Department of  
Electronics & Communication Engineering  
6th SEMESTER**

**Semester VI (Third year]**  
**Branch/Course Electronics & Communication Engineering**

<b>Course Code</b>	<b>Paper Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Credits</b>	<b>branch</b>
	Biology for Engineers	2	1	0	3	104
	Computer Organization and Architecture	3	0	0	3	104
	Digital Communication	3	1	2	5	104
	Disaster Management	3	0	0	0	104
	Electronics Instruments and Measurement	3	1	2	5	104
	MOOCs / SWAYAM / NPTEL Courses - 2	2	0	0	2	104
	Program Elective- I	3	0	0	3	104
	Workshop/heads on Training/Soft Skill	3	0	0	0	104

**Semester VI (Third year]**  
**Branch/Course Electronics & Communication Engineering**

**EC115 Digital Communication**

**3L: 1T: 0P**

**3 Credits**

**Contents**

**Hours**

**1 Introduction:** Block Diagram of Digital Communication System, Advantages of Digital communication system over Analog communication systems, Sampling theorem, Signal reconstruction in time domain, Practical and Flat Top Sampling, Sampling of Band-pass Signal, Aliasing Problem, Uniform and Non-uniform quantization. Signal to Quantization ratio of Quantized Signal. 7 Hrs.

**2 Baseband Transmission:** Line Coding and its properties, Various types of PCM waveforms. Attributes of PCM waveforms, Many Pulse Modulation waveforms, Differential Pulse Code Modulation, Multiplexing of PCM signals, Delta modulation, Idling noise and slope overload, Adaptive Delta Modulation, Adaptive DPCM, Comparison of PCM and DM 9 Hrs.

**3 Baseband Detection:** Error performance degradation in communication systems, Eb/NO parameter, Matched filter and its derivation, Inter-Symbol Interference (ISI), Nyquist criterion for zero ISI and raised cosine spectrum, Correlation detector : Decision threshold and Error probability for Binary, Unipolar (on-off ) signalling 7 Hrs.

**4 Band-pass Modulation and Demodulation:** Types of digital modulation, Waveforms for Amplitude, Frequency and Phase Shift Keying, Method of generation and detection of coherent and non-coherent binary ASK, FSK and PSK, Differential phase shift keying, Quadrature modulation techniques, M-ary FSK, Minimum Shift Keying (MSK), Probability of error and comparison of various digital modulation techniques 9 Hrs.

**5 Error:** A base band signal receiver, Probability of error, The Optimum filter, Matched Filter, Probability of error in Matched filter, Coherent reception, Coherent reception of ASK, PSK and FSK, Non-Coherent reception of ASK, FSK, PSK and QPSK, Calculation of bit error probability of BPSK and BFSK, Error probability for QPSK 6 Hrs.

**6 Multiple Access Techniques:** Time division multiplexing, Frequency division multiplexing, Code division multiplexing, Introduction to upcoming techniques of transmission 2 Hrs.

**Sl. No. Name of Authors / Books /Publishers**

1. "Communication Systems", Simon Haykin, Wiley publication, 4th Edition, 2004
2. "Digital Communication Fundamentals and Applications", Bernard Sklar, Pearson Education India, 2nd Edition, 2009

3. "Modern Electronic Communication", Miller Gary M, Prentice-Hall, 6th Edition, 1999
4. "Digital Communications", John Proakis, Tata Mc Graw Hill, 5th Edition, 2007
5. "Electronic Communication Systems, Fundamentals Through Advanced", Wayne Toms, Pearson Education, 4th Edition, 2001

**Digital Communication Lab** are according to the theory mentioned above. **0L: 0T: 2P** **1**  
**Credit**

**EC116 Electronics Instruments and Measurements** **3L: 1T: 0P** **3 Credits**

Contents	Hours
1 Introduction to Standards of Measurement, Errors and their evaluation. Calibration, Accuracy, Precision Sensitivity, Resolution, Noise, etc.	3 Hrs.
2 Measurements of voltage, current, power and energy: Moving iron, moving coil, thermal, Induction and Rectifier type.	
Measurements of power factor and frequency: Dynamometer and moving iron single and three phase power factor meters, Resonance, moving coil and moving iron frequency meters.	
Range extension of voltmeter, ammeter, Wattmeter and Energy meter: Voltmeter multipliers, Ammeter shunt, Current and Potential Transformers	10 Hrs.
3 Galvanometer: D' Arsonval, Vibration and Ballistic galvanometers	5 Hrs.
4 Bridges: D.C. bridges: Kelvin double bridge, Wheatstone bridge and Carey-Foster bridge; A.C. bridges: Maxwell Bridge, Hay and Owen bridges, Anderson Bridge, Wien Bridge, Schering Bridge and Heaviside-Campbell Bridge	7 Hrs.
5 Potentiometer's Principle, Standardization and application: D.C. Potentiometers: Crompton and Vernier potentiometers, A.C. Potentiometers: Coordinate type and Polar type	5 Hrs.
6 Magnetic measurements: Measurement of magnetic flux by ballistic galvanometer and fluxmeter, Determination of B-H curve and hysteresis loop, Separation of iron loss into hysteresis and eddy current losses, Measurement of iron loss and its separation on Lloyd-Fisher squares	5 Hrs.
7 Digital measurements: Digital voltmeter and multimeter Universal counter and its uses for measurements of frequency, ratio of two frequencies, Time period and Pulse width.	5 Hrs.

**Name of Authors / Books /Publishers**

- 1 "Measurement System, Application and Design", E O Doebelin, TMH
- 2 "Course in Electrical and Electronic Measurement and Instrumentation", A K Sawhney, Dhanpat Rai and Sons
- 3 "Electronic Measurements and Instrumentation", Rajendra Prasad, Khanna Publishers
- 4 "Basic Electrical Measurements", M.B. Stout, Prentice Hall

**Electronic Instruments and Measurement Lab are according to the theory mentioned above.**

**0L: 0T: 2P 1 Credit**

**EC117Computer Organization and Architecture 3L: 0T: 0P 3 Credits****Contents****Hours**

- 1 Introduction: Computer Arithmetic, Instruction sets, Introduction to computer organization, CPU Design. Micro programmed Control: Control Memory, Address sequencing, Micro programming, sequencing and execution of microinstructions. 10 Hrs.
- 2 Memory system: Hierarchical memory structure, Cache memories, Set Associative memory, Virtual Memory, Paging, Segmentation, Input-Output Inter- face, Asynchronous Data Transfer, Programmed I/O, Interrupts, Direct Memory Access 8 Hrs.
- 3 Input-Output Organization: Basic Input/Output Structure of Computers, serial and parallel communications, Asynchronous Data Communication, Programmed I/O, Interrupt Driven I/O, Interrupt Controller, DMA, Device Drivers, Buses. 10 Hrs.
- 4 Introduction to Parallel Processing: Evolution of computer systems (RISC vs. CISC), Parallelism in uniprocessor systems, Architectural classification schemes. 5 Hrs.
- 5 Principles of Pipelining and Vector processing: Pipeline strategy, Pipeline performance, Controls and Data paths, Overlapped parallelism, Principles of designing pipelined processors, Vector processing requirements 7 Hrs.

**Name of Authors / Books /Publishers**

- 1 Computer system architecture by M. Morris Mano
- 2 Computer Architecture and parallel processing by Kai Hwang, Briggs, McGraw
- 3 Hill
- 4 Computer Architecture by Carter, Tata McGraw Hill.
- 5 Computer System Organization and Architecture by John D. Carpinelli, Pearson Education

<b>BSC109</b>	<b>Biology for Engineers</b>	<b>3L:0T:0P</b>	<b>3 credits</b>
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[3 credit course; 2 (one hour) lectures and one (one hour) tutorial per week. Only lecture hours are shown]

#### **Module 1.** (2 hours)- Introduction

**Purpose:** To convey that Biology is as important a scientific discipline as Mathematics, Physics and Chemistry

Bring out the fundamental differences between science and engineering by drawing a comparison between eye and camera, Bird flying and aircraft. Mention the most exciting aspect of biology as an independent scientific discipline. Why we need to study biology? Discuss how biological observations of 18<sup>th</sup> Century that lead to major discoveries. Examples from Brownian motion and the origin of thermodynamics by referring to the original observation of Robert Brown and Julius Mayor. These examples will highlight the fundamental importance of observations in any scientific inquiry.

#### **Module 2.** (3 hours)- Classification

**Purpose:** To convey that classification per se is not what biology is all about. The underlying criterion, such as morphological, biochemical or ecological be highlighted. Hierarchy of life forms at phenomenological level. A common thread weaves this hierarchy Classification. Discuss classification based on (a) cellularity- Unicellular or multicellular (b) ultrastructure- prokaryotes or eucaryotes. (c) energy and Carbon utilization -Autotrophs, heterotrophs, lithotropes (d) Ammonia excretion – aminotelic, uricotelic, ureotelic (e) Habitata- aquatic or terrestrial (e) Molecular taxonomy- three major kingdoms of life. A given organism can come under different category based on classification. Model organisms for the study of biology come from different groups. E.coli, S. cerevisiae, D. Melanogaster, C. elegans, A. Thaliana, M. musculus

#### **Module 3.** (4 hours)-Genetics

**Purpose:** To convey that “Genetics is to biology what Newton’s laws are to Physical Sciences”

Mendel’s laws, Concept of segregation and independent assortment. Concept of allele. Gene mapping, Gene interaction, Epistasis. Meiosis and Mitosis be taught as a part of genetics. Emphasis to be give not to the mechanics of cell division nor the phases but how genetic material passes from parent to offspring. Concepts of recessiveness and dominance. Concept of mapping of phenotype to genes. Discuss about the single gene disorders in humans. Discuss the concept of complementation using human genetics.

#### **Module 4.** (4 hours)-Biomolecules

**Purpose:** To convey that all forms of life has the same building blocks and yet the manifestations are as diverse as one can imagine

Molecules of life. In this context discuss monomeric units and polymeric structures. Discuss about sugars, starch and cellulose. Amino acids and proteins. Nucleotides and DNA/RNA. Two carbon units and lipids.

**Module 5.** (4 Hours). Enzymes

**Purpose:** To convey that without catalysis life would not have existed on earth

Enzymology: How to monitor enzyme catalyzed reactions. How does an enzyme catalyze reactions. Enzyme classification. Mechanism of enzyme action. Discuss at least two examples. Enzyme kinetics and kinetic parameters. Why should we know these parameters to understand biology? RNA catalysis.

**Module 6.** (4 hours)- Information Transfer

**Purpose:** The molecular basis of coding and decoding genetic information is universal Molecular basis of information transfer. DNA as a genetic material. Hierarchy of DNA structure- from single stranded to double helix to nucleosomes. Concept of genetic code. Universality and degeneracy of genetic code. Define gene in terms of complementation and recombination.

**Module 7.** (5 hours). Macromolecular analysis

**Purpose:** How to analyse biological processes at the reductionistic level

Proteins- structure and function. Hierarchy in protein structure. Primary secondary, tertiary and quaternary structure. Proteins as enzymes, transporters, receptors and structural elements.

**Module 8.** (4 hours)- Metabolism

**Purpose:** The fundamental principles of energy transactions are the same in physical and biological world.

Thermodynamics as applied to biological systems. Exothermic and endothermic versus endergonic and exergonic reactions. Concept of  $K_{eq}$  and its relation to standard free energy. Spontaneity. ATP as an energy currency. This should include the breakdown of glucose to  $CO_2 + H_2O$  (Glycolysis and Krebs cycle) and synthesis of glucose from  $CO_2$  and  $H_2O$  (Photosynthesis). Energy yielding and energy consuming reactions. Concept of Energy charge

**Module 9.** (3 hours)- Microbiology

Concept of single celled organisms. Concept of species and strains. Identification and classification of microorganisms. Microscopy. Ecological aspects of single celled organisms. Sterilization and media compositions. Growth kinetics.

**Module 10:** Plant Physiology covering, Transpiration; Mineral nutrition (3 Lectures)

**Module 10B:** Ecology covering, Ecosystems- Components, types, flow of matter and energy in an ecosystem; Community ecology- Characteristics, frequency, life forms, and biological spectrum; Ecosystem structure- Biotic and a-biotic factors, food chain, food web, ecological pyramids; (3 Lectures)

**References:**

1. Biology: A global approach: Campbell, N. A.; Reece, J. B.; Urry, Lisa; Cain, M, L.; Wasserman, S. A.; Minorsky, P. V.; Jackson, R. B. Pearson Education Ltd
2. Outlines of Biochemistry, Conn, E.E; Stumpf, P.K; Bruening, G; Doi, R.H., John Wiley and Sons
3. Principles of Biochemistry (V Edition), By Nelson, D. L.; and Cox, M. M.W.H. Freeman and Company
4. Molecular Genetics (Second edition), Stent, G. S.; and Calender, R.W.H. Freeman and company, Distributed by Satish Kumar Jain for CBS Publisher
5. Microbiology, Prescott, L.M J.P. Harley and C.A. Klein 1995. 2nd edition Wm, C. Brown Publishers