CURRICULUM

FOR

ELECTRICAL & COMMUNICATION ENGINEERING

SEMESTER - VI (ELECTRICAL COMMUNICATION & ENGINEERING)

S.No	Paper Code	Paper Title	L	T	P	Credits
1	100601	Biology For Engineers	3	0	0	3
2	104601	Computer Organization And Architecture	0	0	2	1
3	104602	Digital Communication	3	0	0	3
4	104603	Disaster Management	3	1	0	4
5	104604	Electronics Instruments And Measurement	3	0	0	3
6	100604	Moocs / Swayam / Nptel Courses -2	3	0	0	3
7	1046xx	Program Elective- I	3	0	0	3
8	100605	Workshop/Heads On Training/Soft Skill	3	0	0	0
9	104602P	Digital Communication	0	0	2	1
10	104604P	Electronics Instruments And Measurement	0	0	2	1

PAPER CODE - 103202

BC109	Biology For Engineers	L:3	T:0	P:0	Credit:3

Detailed contents:

Module 1

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 Do We Need To Study Biology? Discuss How
Biological Observations Of 18th 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

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
Eukaryotes. (C) Energy And Carbon Utilization -Autotrophs, Heterotrophs, Lithotrophs
(D) Ammonia Excretion – Ammonotelic, Uricotelic, Ureotelic (E) Habitat- Aquatic Or Terrestrial (E) Molecular Taxonomy- Three Major Kingdoms Of Life. A Given Organism
Can Come Under Different Categories Based On Classification. Model Organisms For The
Study Of Biology Come From Different Groups. E.Coli, S.Cerevisiae, D. Melanogaster, C. Elegance, A. Thaliana, M. Musculus.

Module 3

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 Passed 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

Biomolecule: 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

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
Catalyzed 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

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

Macromolecular Analysis: Purpose: How To Analyze 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

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 Keq And Its Relation To Standard Free Energy. Spontaneity. Atp As An
Energy Currency. This Should Include The Breakdown Of Glucose To Co2 + H2o
(Glycolysis And Krebs Cycle) And Synthesis Of Glucose From Co2 And H2o (Photosynthesis). Energy Yielding And Energy Consuming Reactions. Concept Of Energy Charge.

Module 9

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 10A

Plant Physiology Covering, Transpiration; Mineral Nutrition

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 Abiotic Factors, Food Chain, Food Web, Ecological Pyramids; **Suggested Text Books:**

- 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

- ➔ Outlines Of Biochemistry, Conn, E.E; Stumpf, P.K; Bruening, G; Doi, R.H., John Wiley And Sons.
- ➔ Principles Of Biochemistry (V Edition), By Nelson, D. L.; And Cox, M. M.W.H. Freeman And Company.
- ➔ Molecular Genetics (Second Edition), Stent, G. S.; And Calendar, R.W.H.

Freeman And Company, Distributed By Satish Kumar Jain For Cbs Publisher.

- ➔ Microbiology, Prescott, L.M J.P. Harley And C.A. Klein 1995. 2nd Edition Wm, C. Brown Publishers.

PAPER CODE - EC117

EC117	Computer Organization And Architecture	L:3	T:0	P:0	Credit:3

Detailed contents:

Module 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

Module 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.

Module 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.

Module 4

Introduction To Parallel Processing: Evolution Of Computer Systems (Risc Vs. Cisc), Parallelism In Uniprocessor Systems, Architectural Classification Schemes.

Module 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.

Suggested Text Books:

- ➔ Computer System Architecture By M. Morris Mano
- ➔ Computer Architecture And Parallel Processing By Kai Hwang, Briggs, Mcgraw Hill.
- ➔ Computer Architecture By Carter, Tata Mcgraw Hill.
- ➔ Computer System Organization And Architecture By John D. Carpinelli, Pearson Education.

PAPER CODE - 103201

EC111	Digital Communication	L:3	T:1	P:0	Credit:3

Detailed contents:

Module 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.

Module 2

Baseband Transmission: Line Coding And Its Properties, Various Types Of Pcm Waveforms. Attributes Of Pcm Waveforms, Mary 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.

Module 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

Module 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.

Module 5

Error: A Baseband 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

Module 6

Multiple Access Techniques: Time Division Multiplexing, Frequency Division Multiplexing, Code Division Multiplexing, Introduction To Upcoming Techniques Of Transmission.

Suggested Text Books:

- ➔ "Communication Systems", Simon Haykin, Wiley Publication, 4th Edition, 2004.
- ➔ "Digital Communication Fundamentals And Applications", Bernard Sklar, Pearson Education India, 2nd Edition, 2009.
- ➔ "Modern Electronic Communication", Miller Gary M, Prentice-Hall, 6th Edition, 1999.
- ➔ "Digital Communications", John Proakis, Tata Mc Graw Hill, 5th Edition, 2007.

➔ "Electronic Communication Systems, Fundamentals Through Advanced", Wayne
Tomsi, Pearson Education, 4th Edition, 2001

104602P	Digital Communication Lab	L:0	T:0	P:2	Credit:1

Hands-on experiments related to the course contents of 104602.

PAPER CODE - 100104

EC116	Electronics Instruments And Measurements	L:3	T:1	P:0	Credit:3

Detailed contents:

Module 1

Introduction To Standards Of Measurement, Errors And Their Evaluation.
Calibration, Accuracy, Precision Sensitivity, Resolution, Noise, Etc.

Module 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.

Module 3

Galvanometer: D' Arsonval, Vibration And Ballistic Galvanometers.

Module 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.

Module 5

Potentiometer's Principle, Standardization And Application: D.C. Potentiometers: Crompton And Vernier Potentiometers, A.C. Potentiometers: Coordinate Type And Polar Type.

Module 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.

Module 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.

Suggested Text/Reference Books:

- "Measurement System, Application And Design", E O Doeblin, Tmh
- "Course In Electrical And Electronic Measurement And Instrumentation", A K Sawhney, Dhanpat Rai And Sons.
- "Electronic Measurements And Instrumentation", Rajendra Prasad, Khanna Publishers.
- "Basic Electrical Measurements", M.B. Stout, Prentice Hall

	Electronics Instruments And Measurements Lab	**L:0**	**T:0**	**P:2**	**Credit:1**

Hands-on experiments related to the course contents of EC116.

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