Millia Institute of Technology
Rambagh, Purnea

Affiliated to Bihar Engineering University, Patna

NAAC Accredited & ISO 9001:2015

SYLLABUS

Department of
Electronics & Communication Engineering

3rd SEMESTER

3	PCC-EE03	Analog Electronics	3	0	0	3	3
4	PCC-EE04	Analog Electronics Laboratory	0	0	2	2	1
5	PCC-EE05	Electrical Machines – I	4	0	0	4	4
6	PCC-EE06	Electrical Machines Laboratory - I	0	0	2	2	1
7	PCC-EE07	Electromagnetic Fields	3	1	0	4	4
8	ESC 201	Engineering Mechanics	3	1	0	4	4
9	MC	Environmental Sc./ Indian Constitution	0	0	0	4	0
10	PROJ-EE01	1. Industrial Visit/Internship (4 Weeks)	0	0	0	0	4
11		Software Training	0	0	0	4	0
				TOTAL		**33**	**26**

104 ECE

Semester III (Second year)
Branch/Course Electronics & Communication Engineering

Sr. No.	Course Code	Course Title	L	T	P	Contact Hrs./wk.	Credits
1	EC101	Network Theory	3	1	0	4	4
2	EC102	Signals and Systems	3	0	0	3	3
3	BS101	Mathematics-III	3	0	0	3	3
4	EC103	Object Oriented Programming	3	0	0	3	3
5	EC103P	Object Oriented Programming Lab	0	0	2	2	1
6	ES101	Basic Electronics	3	0	0	3	3
7	ES101P	Basic Electronic Science Lab	0	0	2	2	1
8	ES102	Electrical and Electronic Material	3	0	0	3	3
9	ES102P	Electrical and Electronic Material Lab	0	0	2	2	1

10	ECP1	1. Language Lab. (1 Week) 2. Industrial Visit/Internship (2 Weeks) 3. Fundamental Electronics Lab Training (1 Week)	0	0	12	12	4
	TOTAL					37	**26**

104 ECE

EC101	Network Theory	3L:1T:0P	3 Credits

Sl. No.	Contents	Contact Hours
1	Introduction to signals, their classification and properties, different types of systems, LTI systems and their properties, periodic waveforms and signal synthesis, properties and applications of Laplace transform	8
2	System modeling in terms of differential equations and transient response of R, L, C, series and parallel circuits for impulse, step, ramp, sinusoidal and exponential signals by classical method and using Laplace transform.	8
3	Graph theory : Concept of tree, Tie-set matrix, Cut-set matrix and application to solve electric networks. Two port networks – Introduction of two port parameters and their interconversion, Interconnection of two 2-port networks, Open circuit and Short circuit impedances and ABCD constants, Relation between image impedances and Short circuit and Open circuit impedances.	10
4	Network functions, their properties and concept of transfer impedance, Hurwitz polynomial ,Positive real function and synthesis of LC, RC, RL Networks in Foster's I and II, Cauer's I and II forms.	10
5	Introduction of passive filter and their classification, frequency response, Characteristic impedance of low pass, high pass, Band Pass and Band reject prototype section	4
	Total	40

Sl. No.	Name of Authors / Books /Publishers
1	"Engineering Circuit Analysis", by W H Hayt, TMH Eighth Edition
2	"Network analysis and synthesis", by F F Kuo, John Weily and Sons, 2nd Edition
3	"Circuit Theory", by S Salivahanan, Vikas Publishing House 1st Edition, 2014
4	"Network analysis", by M. E. Van Valkenburg, PHI, 2000
5	"Networks and Systems", by D. R. Choudhary, New Age International, 1999
6	"Electric Circuit", Bell Oxford Publications, 7th Edition.

EC102	Signals and Systems	3L:0T:0P	3 Credits

Sl. No.	Contents	Contact Hours
1	Introduction to Signal and System : Definition, classification of systems, standard test signal, properties of system, properties of linear system, Properties: linearity: additivity and homogeneity, Shift-invariance, Causality	10
2	Linear time-invariant (LTI) systems, impulse response and step response, convolution, Characterization of causality and stability of linear time-invariant systems. System representation through differential equations and difference equations.	7

3	Laplace transformation : Laplace transform of some important function, Shift theorem and its application, Laplace transform of periodic signals, Functional analysis of response, Initial and Final value theorems, Response to periodic sinusoidal excitation, Region Of Convergence, Poles and Zeros of system, Laplace domain analysis, Solution to differential equations.	9
4	Analysis of Fourier Methods : Fourier series expansion, Functional symmetry condition, Exponential form of Fourier series, Fourier integral and Fourier transform, Multiplication and their effect in the frequency domain, Magnitude and Phase response, DTFT, Parseval's Theorem	9
5	Z-transformation : Z transform of Discrete time signal, LTI system, solution of difference equation, Application of Z transform to open loop system, Region Of Convergence, z-domain analysis.	5
	Total	40

Sl. No.	Name of Authors / Books /Publishers
1	"Signal and System", A.V Oppenheim, A.S Willsky and I.T Young, Prentice Hall
2	"Signals and Systems - Continuous and Discrete", R.F. Ziemer, W.H. Tranter and D.R. Fannin, 4th edition, Prentice Hall
3	"Analysis of Linear System" by D.K Cheng, Narosa pub. House
4	"Signal & system" by H.P Hsu, Tata McGraw Hill

BS101	Mathematics III	3L:0T:0P	3 Credits

Sl. No.	Contents	Contact Hours
1	Unit1 (6 Lectures): Polynomials: Orthogonal Polynomials –Lagrange's, Chebysev Polynomials; Trigonometric Polynomials; Wavelet transforms : properties, methods, inverses and their applications.	6
2	Unit2 (10 Lectures): Sets, relations and functions: Basic operations on sets, Cartesian products, disjoint union (sum), and power sets. Different types of relations, their compositions and inverses. Different types of functions: Ber and Bei functions; recurrence relations, orthogonality properties.	10
3	Unit3 (6 Lectures): Introduction to Graphs: Graphs and their basic properties – degree, path, cycle, subgraph, isomorphism, Eulerian and Hamiltonian walk, trees.	6
4	Unit4 (10 Lectures): Basic Statistics: Measures of Central tendency: Moments, skewness and Kurtosis ; Probability distributions - Binomial, Poisson and Normal ; evaluation of statistical parameters for these three distributions, Correlation and regression – Rank correlation.	10
5	Unit5 (10 Lectures): Applied Statistics: Curve fitting by the method of least squares- fitting of straight lines, second degree parabolas and more general curves. Test of significance: Large sample test for single proportion, difference of proportions, single mean, difference of means, and difference of standard deviations.	10
	Total	40

Sl. No.	Name of Authors / Books /Publishers
1	1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley and amp; Sons, 2006.
2	2. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
3	4. Veerarajan T., Engineering Mathematics (for semester III), Tata McGraw-Hill, New Delhi, 2010

4	C. L. Liu, Elements of Discrete Mathematics, 2nd Ed., Tata McGraw-Hill, 2000.

EC 103 - Object Oriented Programming

EC103	Object Oriented Programming	3L:0T:0P	3 Credits

Sl. No.	Contents	Contact Hours
1	Introduction to C++ : Object Oriented Technology, Advantages of OOP, Input-output in C++, Tokens, Keywords, Identifiers, Data Types C++, Derives data types. The void data type, Type Modifiers, Typecasting, Constant, Operator, Precedence of Operators, Strings.	3
2	Control Structures : Decision making statements like if-else, Nested if-else, goto, break, continue, switch case, Loop statement like for loop, nested for loop, while loop, do-while loop.	3
3	Functions : Parts of Function, User-defined Functions, Value-Returning Functions, void Functions, Value Parameters, Function overloading, Virtual Functions.	3
4	Classes and Data Abstraction : Structure in C++, Class, Build-in Operations on Classes,Assignment Operator and Classes, Class Scope, Reference parameters and Class Objects (Variables), Member functions, Accessor and Mutator Functions, Constructors, default Constructor, Destructors.	15
5	Overloading and Templates : Operator Overloading, Function Overloading, Function Templates, Class Templates.	5
6	Inheritance : Single and Multiple Inheritance, virtual Base class, Abstract Class, Pointer and Inheritance, Overloading Member Function.	5
7	Pointers and Arrays : Void Pointers, Pointer to Class, Pointer to Object, The this Pointer, Void Pointer, Arrays.	6
8	Exception Handling : The keywords try, throw and catch. Creating own Exception Classes, Exception Handling Techniques (Terminate the Program, Fix the Error and Continue, Log the Error and Continue), Stack Unwinding.	5
	Total	40

Sl. No.	Name of Authors / Books /Publishers
1	"Thinking in C++", Volume 1 and 2 by Bruce Eckel, Chuck Allison, Pearson Education
2	"Mastering C++", 1/e by Venugopal, TataMcGraw Hill.
3	"Object Oriented Programming with C++", 3/e by E. Balaguruswamy, Tata McGraw Hill.
4	"Starting Out with Object Oriented Programming in C++", by Tony Gaddis, Wiley India.

Object Oriented Programming Lab are according to the theory mentioned above.	0L: 0T: 2P	1 Credit

ES101	Basic Electronics	3L:0T:0P	3 Credits

Sl. No.	Contents	Contact Hours
1	PN junction diode : Depletion layer, Barrier potential, Forward and Reverse bias, Breakdown voltage, I-V characteristics of PN junction diode, Knee voltage, Ideal PN junction diode, Diode capacitances, Breakdown diodes (Avalanche and Zener diode). Photodiode and Light Emitting Diode.	8
2	Rectifiers and filters : Half wave and Full wave rectifiers (Centre-tap and Bridge), Regulation, Ripple factor, R-C, L-C and Pi filters. Clipping and Clamping circuits, Voltage multiplier.	8
3	BJT: Basic theory and Operation of PNP and NPN transistors, Characteristics of C-B, C-E and C-C configuration. Biasing : Base bias, Emitter feedback bias, Voltage divider bias, Load line, Operating point, Incremental analysis using hybrid model.	10
4	FET : Introduction, Operation, I-V characteristics, JFET parameters, JFET amplifiers. MOSFET: Introduction, Operation, MOSFET parameters.	8
5	Integrated circuit: Characteristics of an ideal Operational Amplifier. Application as inverting, noninverting amplifiers. Summer, Difference Amplifier, Differentiator, Integrator. Feedback Amplifiers.	8
	Total	42

Sl. No.	Name of Authors / Books /Publishers
1	"Electronic devices and circuit theory" by Boylestead and Nashelsky, Pearson
2	"Electronic principle" by Albert Malvino and Davis J Bates, TMH
3	"Integrated Electronics", By Jacob Millman and Christos Halkias

Basic Electronics Lab are according to the theory mentioned above.

ES102	Electrical & Electronic Material	3L:0T:0P	3 Credits

Sl. No.	Contents	Contact Hours
1	Atomic structure and bonding in materials. Crystal structure of materials, Crystal systems, Unit cells and space lattices, Determination of structures of simple crystals by X-ray diffraction, Miller indices of planes and directions, Packing geometry in Metallic, Ionic and Covalent solids. Concept of amorphous, single and polycrystalline structures and their effect on properties of materials. Crystal growth techniques. Imperfections in crystalline solids and their role in influencing various properties.	8
2	Band theory of Solids : Energy band diagram, E – K Diagram, Reduced E – K Diagram, Insulators, Semiconductors & Conductors.	5
3	Semiconductor : Single Crystal, Polycrystalline and Amorphous, Fermi – Dirac Distribution, Hall effect, Intrinsic & Extrinsic, N type & P type, Crystal growth – (1) Preparation of electronic grade polycrystal in Siemens reactor,(2) Czochrarlski Method & Float Zone method of bulk single crystal ingot preparation (3) Mirror finished wafer preparation (4) Epitaxial film growth – Chemical Vapor phase Deposition & Liquid Phase Epitaxy (5) Molecular Beam Epitaxy.	10
4	Dielectric behavior of materials : Polarization, Dielectric constant at low frequency & high frequency, Dielectric loss, Piezoelectricity & FerroElectricity	5
5	Magnetic Properties : Origin of magnetism in metallic and ceramic materials, Paramagnetism, Diamagnetism, Antiferromagnetism, Ferromagnetism, Ferrimagnetism, magnetic hysteresis, Influence of temperature on magnetic behaviour, domains and Hysteresis.	5
6	Superconductors : Low and High temperature (YBaCuO) superconductors, Meissner effect, Applications.	4
7	Printed Circuit Board : Manufacturing process, Single- & Double-sided boards, surface mounted devices	3
	Total	40

Sl. No.	Name of Authors / Books /Publishers
1	"Solid State Physics", by Kittel, McGraw Hill.
2	"Principles of Electric Engineering Materials & Devices", by S.O. Kasp, McGraw Hill.
3	"Structure & properties of materials (VOL VI), Electronic Properties", by Robert M. Rose, Lawrence A.Shepherd & John Wulf, Wiley Eastern Ltd.

Electrical and Electronics Materials Lab are according to the theory mentioned above.	0L: 0T: 2P	1 Credit