M. Sc. (Electronics)

Course Structure & Syllabi

Department of Physics
School of Applied Sciences
Babu Banarasi Das University, Lucknow226 028

BABU BANARASI DAS UNIVERSITY, LUCKNOW

M.Sc. Electronics
COURSE STRUCTURE
(Effective 2017-18 and after)

Course Category	Course Code	Course Name	Teaching			Evaluation			Credits
			L	T	P	CIA	ESE	Total	
SEMESTER – I									
Core	ME 1101	Mathematical Techniques in Electronics	4	-	-	40	60	100	4
Core	ME 1102	Fundamentals of Semiconductor Devices	4	-	-	40	60	100	4
Core	ME 1103	Programming in C	4	-	-	40	60	100	4
Core	ME 1104	Advance Digital Electronics	4	-	-	40	60	100	4
Lab	ME 1152	Semiconductor Devices Lab	-	-	4	40	60	100	2
Lab	ME 1153	Programming in C Lab	-	-	2	40	60	100	1
Lab	ME 1154	Digital Electronics Lab	-	-	2	40	60	100	1
									20
SEMESTER – II									
Core	ME 1201	Electromagnetic, Antenna and Propagation	4	-	-	40	60	100	4
Core	ME 1202	Advance Electronics Circuits	4	-	-	40	60	100	4
Core	ME 1203	Electronics Measurements	4	-	-	40	60	100	4
Core	ME 1204	Network Analysis	4	-	-	40	60	100	4
Lab	ME 1252	Advance Electronics Circuits Lab	-	-	4	40	60	100	2
Lab	ME 1253	Electronics Measurements Lab	-	-	2	40	60	100	1
Lab	ME 1254	Network Analysis Lab	-	-	2	40	60	100	1
									20
SEMESTER – III									
Core	ME 1301	Analog and Digital Communication	4	-	-	40	60	100	4
Core	ME 1302	Microprocessors and interfacing	4	-	-	40	60	100	4
Core	ME 1303	Optoelectronics and optical Communication	4	-	-	40	60	100	4
DSE		Discipline Specific Elective - I	4	-	-	40	60	100	4
Lab	ME 1351	Communication Lab	-	-	4	40	60	100	2
Lab	ME 1352	Microprocessors Lab	-	-	4	40	60	100	2
Lab	MES13	Seminar	-	-	-	100	-	100	1
									21
SEMESTER – IV									
Core	ME 1401	Control Systems	4	-	-	40	60	100	4
Core	ME 1402	VLSI Technology and Design	4	-	-	40	60	100	4
DSE		Discipline Specific Elective - II	4	-	-	40	60	100	4
Lab	ME 1451	Control Systems Lab	-	-	4	40	60	100	2
Lab	ME 1452	VLSI Design Lab	-	-	4	40	60	100	2
Lab	MEP14	Thesis	-	-	-	50	50	100	4
Lab	MEV14	Viva Voce	-	-	-	-	100	100	1
									21

ELECTIVE COURSES – M. Sc. Electronics

Code	Title	Teaching			Evaluation			Credits
					Theory		Total	
		L	T	P	CIA	ESE		
Discipline Specific Elective – I								
ME 1351	Power Electronics	4	-	-	40	60	100	4
ME 1352	Radar ,TV and Satellite	4	-	-	40	60	100	4
ME 1353	Microwave	4	-	-	40	60	100	4
Discipline Specific Elective – II								
ME 1454	Advance Digital Signal Processing	4	-	-	40	60	100	4
ME 1455	Microcontroller	4	-	-	40	60	100	4
ME 1456	Computer Networks	4	-	-	40	60	100	4

Course Name	Mathematical Techniques in Electronics		
Category: Core	Code: ME 1101	Credits: 4	L-4 T-0 P-0
Exam: Theory 3 Hrs	ESE: 60 Marks	CIA: 40 Marks	

SYLLABUS

Module I:

Differential Equations

Power series, Series solution of differential equation, Legendre differential equation and its solutions, Legendre polynomials, Generating function, Recurrence relations, Bessel differential equation and its solutions

Module II:

Integral Transform

Fourier integral and Fourier Transform, Inverse Fourier-transform, Laplace transform of elementary function (Dirac delta & Green's function), Inverse Laplace-transform,Application of Laplace-transform, Z transform and its properties, Z- transform of unit step sequence, shifting property, convolution property, Inverse Z-transform, Application of Z-transforms.

Module III:

Methods of Numerical Analysis:

Finite difference with equal and unequal intervals,Interpolation formulae, Errors and accuracy tests in numerical analysis, the iterativealgorithms for solving equations and finding roots

Module IV:

Practical Consideration

Convergence rate accuracy, Introduction to linear systems,triangular system, Factorization methods for solving AX: b: partial pivoting strategySolving Linear system using Gaussian elimination methods.

Recommended Books:

1. E. Kreyszig, Advanced engineering mathematics, Wiley India (2008)
2. Murray Spiegel, Seymour Lipschutz, John Schiller, Outline of Complex Variables, Schaum Outline Series, Tata McGraw Hill (2007)
3. R. K. Jain, and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publishing House(2007)
4. C .R. Wylie and L. C. Barrett, Advanced Engineering Mathematics, Tata McGraw-Hill (2004)
5. B. V. Ramana, Higher Engineering Mathematics, Tata McGraw Hill Publishing Company Limited (2007)

Course Name	Fundamentals of Semiconductor Devices		
Category: Core	Code: ME 1102	Credits: 4	L-4 T-0 P-4
Exam: Theory 3 Hrs	ESE: 60 Marks	CIA: 40 Marks	

SYLLABUS

Module I:

Semiconductor Material Properties & Special diodes:

Introduction to Semiconductor Materials, Crystal Structure, Metals, Semiconductors and Insulators, Direct and indirect semiconductors, Concept of Effective Mass, Carrier Concentration at Normal Equilibrium in Intrinsic semiconductors, Derivation of Fermi Level for Intrinsic & Extrinsic Semiconductors, Dependence of Fermi Level on Temperature and Doping Concentration, Temperature Dependence of Carrier Concentrations. Carrier Transport Phenomena: Conductivity & Mobility, Carrier Drift, Resistivity, Hall Effect, Diffusion Process, Current Density Equation, Einstein Relation, Diffusion And Recombination Processes: Continuity Equation, Carrier Injection,Metal Semiconductor Junction: Rectifying Contact and Ohmic Contact, Heterojunctions.

Module II:

Diode circuits & Power Supply:

Ideal and Practical diode, Power Supply: Block diagram of Power Supply, Half wave Rectifier and Full wave Rectifier, Clipper, Clamper, Filter circuits, Voltage regulation, Voltage regulation using shunt & series regulator circuits ,Voltage regulation using IC Special diodes**:** Tunnel diode, Varactor diode, Schottky diode, Photo diode, Photo-detector.

Module III:

BJT Amplifiers

BJT Working and Operations**,** Biasing circuits**,** BJT models**:** Ebersmoll model**,** The "r_e" model of transistor**,** Analysis of transistor amplifier using h- parameters, BJT amplifier : CE,CB,CC configuration**,** Midband analysis of small signal amplifiers**,** Frequency response of Amplifier**.** Multistage Amplifier**,** Power Amplifier, Tuned Amplifier.

Module IV:

FET Amplifiers:

Operation, working and characteristics of JFET, Analysis and design of different biasing circuits for FET amplifiers. Small-signal model of FET: CS, CG, CD configuration, Low-frequency & High-Frequency analysis of CS, CG and CD amplifiers. MOSFET: Basic Structures, Working & Characteristics, MOSFET Biasing: Fixed bias, Self bias and Voltage divider bias.

Recommended Books:

1. Robert L. Boylested , Louis Nashelsky , Pearson Education (2011)
2. Ben G Streetman and S. Banerjee, Solid State Electronic Devices, Pearson Education (2006)
3. Adel S. Sedra& Kenneth C. Smith, "Microelectronic Circuits", Oxford.

4. Millman&Halkias, “Electronic Devices And circuits”, TMH.
5. Salivahanan, Kumar &Vallavaraj, “Electronic Devices & Circuits”, TMH.
6. Kanaan Kano, Semiconductor Devices, Pearson Education (2004)
7. Robert F. Pierret, Semiconductor Device Fundamentals, Pearson Education (2006)

Course Name	Programming in C		
Category: Core	Code: ME 1103	Credits: 4	L-4 T-0 P-0
Exam: Theory 3 Hrs	ESE: 60 Marks	CIA: 40 Marks	

SYLLABUS

Module I: Programming environment, Strategy for designing algorithms, Top-down development, Stepwise refinement, Concept of algorithm, Flowchart.

Types of programming languages, Types of translators: Assembler, Compiler, Interpreter.

Systematic development of programs, Program writing and execution, Structured Programming Concept.

Working with Binary, Octal and hexadecimal numbers.

Introduction to C language, C Tokens: Identifiers, Keywords, Constants and Variables in C, Fundamental data types in C, integer, short, long, char, single and double precision floating point.

Module II: Storage Classes in C: Automatic, register, static, extern.

Operators and Expressions in C: Arithmetic, Relational, Logical, Assignment, Bitwise, Conditional, Increment and Decrement, Special operators such as comma, sizeof etc. Operator precedence and associativity, Mixed mode operations.

Type conversion and Type casting in C, Standard Input/Output functions: printf(), scanf(), getch(), getchar(), getche(), etc.

Control Statements: Conditional - if statement, if-else statement, nested if-else statement, else if ladder, switch statements, restrictions on switch values, Use of break and default statement with switch. Iteration - while, for and do-while loops, nesting of loops. Jump statements - use of break and continue statements.

Module III: Array, notation and representation using one dimensional, two dimensional and multi-dimensional arrays, Arrays of unknown and varying size, Sparse matrices. Searching and sorting in arrays.

Strings: String declaration and initialization, String taxonomy, String manipulation.

Structures: Utility and usage, Array of structures, Arrays within structures.

Union: Utility and usage, Union of structures. Enumerated data types.

Pointers: Introduction to Pointers, Declaration and initialization of pointer variables, Null pointer, Wild pointer, Generic pointer, Accessing the address of the variable, Pointer arithmetic, Pointers and arrays.

Dynamic Memory Allocation: Memory allocation process, Allocating a block of memory, Releasing the used space, Stack, Linked list.

Module IV: Function declaration, Function definition, Function call, Return statement, Scope of variables, Passing values between functions, Call by value and call by reference. Recursive function and their types. Pointers to functions, Declaration of a pointer to a function, Initialization of function pointers, Calling a function using a function pointer, Passing a function to another function, returning a function pointer.

Standard C library functions: Math functions, String handling functions.

The C preprocessor: Preprocessor directives, Defining and calling macros, Conditional compilation, Passing values to the compiler.

File Handling in C: Types of files, defining, opening and closing of a file, Reading data from files, Writing data to files, Multiple file handling in C, Function for selecting a record randomly.

Text Book:

[1] E Balaguruswamy, Computer Concepts and Programming in C, TataMcGraw Hill Publications
[2] Yashavant P. Kanetkar, ‖Let UsC , BPB Publications

Reference Books:

[1] Jeri R. Hanly, Elliot B.Koffman, Problem Solving and ProgramDesign in C, Pearson Addison-Wesley.
[2] BehrouzA.Computer Science-A Structured Programming Approach Using C.

Course Name	Advance Digital Electronics		
Category: Core	Code: ME 1104	Credits: 4	L-4 T-0 P-0
Exam: Theory 3 Hrs	ESE: 60 Marks	CIA: 40 Marks	

SYLLABUS

Module - I:

Boolean algebra, Logic gates,Gate-level minimization: The map method up to five variable, don't care conditions, POS simplification, NAND and NOR implementation, QuineMc-Clusky method (Tabular method).

Combinational Logic: Combinational circuits, analysis procedure, design procedure, binary adder-subtractor, decimal adder, binary multiplier, magnitude comparator, decoders, encoders, multiplexers

Module - II:

Flip Flop and Application:

Mono-stable and bi-stable multi vibrators, Schmitt trigger, latches, flip flops, analysis of clocked sequential circuits, state reduction and assignments, design procedure. Shift registers, ripple counter, synchronous counter, other counters.

Module - III:

D/A converter and A/D converter. Simultaneous andCounter method of A/D converter, Successive Approximation method, Memory and programmable logic: RAM, ROM, PLA, PAL.Design at the register transfer level: ASMs, design example, design with multiplexers.

Module - IV:

Transistor as a Switch,TTL integratedcircuits, CMOS integrated circuit, Logic families and their characteristics, comparing Logic families, Introduction of HDL and Programming techniques(VHDL).

Recommended Books:

1. M. Morris Mano Digital System Design, Pearson Education Asia,(Fourth Edition)
2. M Morris Mano, "Computer System Architecture" PHI 3rd Edition.
3. S. Salivahanan& S. Arivazhagan, "Digital Circuits and Design", Vikas Publishing.

Course Name	Semiconductor Devices Lab		
Category: Lab	Code: ME 1152	Credits: 2	L-0 T-0 P-4
Exam: Practical 2 Hrs	ESE: 60 Marks	CIA: 40 Marks	

Experiment List

1. To obtain a static characteristics of a PN junction diode and then obtain the forward resistance of the diode at a given operating point.
2. To obtain V-I characteristics of a Zener diode and note down its breakdown potential.
3. To study the I-V characteristics of infrared, blue and red LEDs.
4. To design Rectifier using capacitor filter (a) Half wave Rectifier (b) Full wave Rectifier
5. To study the Clipping circuits as positive and negative logic.
6. To study the Clamping circuits as positive and negative logic.
7. To study and plot the BJT characteristics and evaluate: a. Input resistance b. Output resistance c. Current gain.
8. To bias a given transistor in active region in CE configuration.
9. To study the transistor as a switch.
10. To study the characteristics of JFET in common source configuration & evaluate— a. AC drain resistance, 2. Amplification factor and 3. Drain Resistance.

Course Name	Programming in C Lab			
Category: Lab		Code: ME 1153	Credits: 1	L-0 T-0 P-2
Exam: Practical 2 Hrs		ESE: 60 Marks	CIA: 40 Marks	

Suggested Lab Exercises:

1. WAP to print the sum and product of digits of an integer.
2. WAP to compute the sum of the first n terms of the following series S = 1+1/2+1/3+1/4+……
3. Write a function that checks whether a given string is Palindrome or not. Use this function to find whether the string entered by user is Palindrome or not.
4. Write a function to find whether a given no. is prime or not. Use the same to generate the prime numbers less than 100.
5. Write a program to swap two numbers using function and pointers.
6. WAP to compute the factors of a given number.
7. WAP to print a triangle of stars as follows (take number of lines from user):

   *
   ***
   *****
   ****
   ****
8. WAP to perform following actions on an array entered by the user:
   i) Print the even-valued elements
   ii) Print the odd-valued elements
   iii) Calculate and print the sum and average of the elements of array
   iv) Print the maximum and minimum element of array
   v) Remove the duplicates from the array
   vi) Print the array in reverse order

   The program should present a menu to the user and ask for one of the options. The menu should also include options to re-enter array and to quit the program.
9. WAP that prints a table indicating the number of occurrences of each alphabet in the text entered as command line arguments.
10. Write a program that swaps two numbers using pointers.
11. Write a program which takes the radius of a circle as input from the user, passes it to another function that computes the area and the circumference of the circle and displays the value of area and circumference from the main() function.
12. Write a program to find sum of n elements entered by the user. To write this program, allocate memory dynamically using malloc() /calloc() functions.
13. Write a menu driven program to perform following operations on strings:
    a) Show address of each character in string
    b) Concatenate two strings without using strcat() function.
    c) Concatenate two strings using strcat() function.
    d) Compare two strings
    e) Calculate length of the string.
    f) Convert all lowercase characters to uppercase
    g) Convert all uppercase characters to lowercase
    h) Calculate number of vowels
    i) Reverse the string

14. Given two ordered arrays of integers, write a program to merge the two-arrays to get an ordered array.
15. WAP to display Fibonacci series using iteration.
16. WAP to calculate Factorial of a number using iteration.
17. WAP to calculate GCD of two numbers.
18. Write a program which takes 10 numbers as input and search a particular number using binary search.
19. Create Matrix using arrays. Write a menu-driven program to perform following Matrix operations (2-D array implementation): a) Sum b) Difference c) Product d) Transpose .
20. Create a structure Student containing fields for Roll No., Name, Class, Year and Total Marks. Create 10 students and store them in a file.
21. Write a program to retrieve the student information from file created in previous question and print it in following format:

    Roll No. Name Marks
22. Copy the contents of one text file to another file, after removing all whitespaces.
23. Write a function that reverses the elements of an array in place. The function must accept only one pointer value and return void
24. Write a program that will read 10 integers from user and store them in an array. Implement array using pointers. The program will print the array elements in ascending and descending order.
25. Write a C Program to illustrate reading of data from a File.
26. Write a C Program delete a specific line from a Text File.
27. Write a C Program to append the content of one File at the end of another.
28. Write a C Program to evaluate polynomial f(x) = a4x + a x 3 + a x 2 + a1x + a0, for a given value of x and its coefficients using Horner's method.
29. Write a C program that reads N integer numbers and arrange them in ascending order using Bubble Sort.
30. Given two university information files "studentname.txt" and "usn.txt" that contains students Name and USN respectively. Write a C program to create a new file called "output.txt" and copy the content of files "studentname.txt" and "usn.txt" into output file in the sequence show. Display the contents of output file "output.txt" on to the screen.

Course Name	Digital Electronics Lab		
Category: Lab	Code: ME 1154	Credits: 1	L-0 T-0 P-2
Exam: Practical 2 Hrs	ESE: 60 Marks	CIA: 40 Marks	

Experiment List

1. Design and Study of Logic Gates Using IC.
2. Implementation of any SOP and POS function using logic gates.
3. Design and Study of Half Adder and Full Adders using IC.
4. Design and Study of Half Subtractor and Full Subtractor using IC.
5. To Study of Multiplexers &Demultiplexers.
6. Implementation of Boolean function using Multiplexers.
7. Verification of 4 bit parallel adder.
8. Implementation and verification of flip-flops using IC.
9. To study an up-down synchronous counter.
10. To study an up-down asynchronous counter.
11. Verification of Shift Registers.
12. To study of A/D converter & D/A converter.
13. Verification of BCD to Seven Segment Decoder.

Course Name	Electromagnetics , Antenna and Propagation		
Category: Core	Code: ME 1201	Credits: 4	L-4 T-0 P-0
Exam: Theory 3 Hrs	ESE: 60 Marks	CIA: 40 Marks	

SYLLABUS

Module I:

Electromagnetic Wave Propagation

Equation of Continuity, Equation of Continuity for steady current, Equation of Continuity for time varying current, Displacement current and Displacement current density, Maxwell's Law, Wave Equation, Wave Equation in free Space, Wave Equation for conducting media, Propagation of plane wave, Propagation of plane wave in lossless medium, Propagation of plane wave in lossy medium, Poynting Theorem, Wave Polarization.

Module II:

Transmission Lines

Types of Transmission lines, Transmission line parameters, Transmission line equations Characteristic Impedance, Different parameters for lossless line and distortion-less line, Input Impedance, Standing Wave Ratio, Power Consideration, Applications of Transmission Lines, Smith Chart.

Module III:

Antenna and Its Parameters

Basic antenna concept, parameters (patterns, beam area, radiation intensity, beam efficiency, directivity and again, effective aperture, scattering aperture, physical aperture, effective height), Friis transmission formula, Retarded potential, Radiation fields of alternating current element, Radiated power and radiation resistance of current element, Radiation from half wave dipole, Radiation characteristics of dipoles.Short electric dipole, field at any distance from centre fed antenna, array of dipole (broadside and endfire case), antenna with parasitic elements (Yagi- Uda), horn antenna and micro- strip antenna.

Module IV:

EM Wave Propagation through Free Space

Ground wave propagation, Surface and space wave propagation, Sky wave propagation, Ionosphere, Virtual heights, Critical frequency of layers, Skip distance and maximum usable frequency, Line of sight (LOS)Ionospheric wave propagation, characteristics of ionosphere, refractive index of ionosphere.

Recommended Books:

1. Matthew N.O. Sadiku, "Elements of Electromagnetics", Oxford Univ. Press.
2. K.D. Prasad,"Antennas and Wave Propagation" , SatyaPrakashan,Third Edition, Reprint 2005.
3. John D. Kraus, Ronald J. Mashefka, "Antenna for All Applications", Tata McGraw-Hill, Second Edition, Reprint 2007.

Course Name	Advance Electronics Circuits		
Category: Core	Code: ME 1202	Credits: 4	L-4 T-0 P-0
Exam: Theory 3 Hrs	ESE: 60 Marks	CIA: 40 Marks	

SYLLABUS

Module I:

Feedback Amplifiers and Oscillators Circuits:

Feedback concept**,** Feedback connection type**,** Effect of feedback on Gain, Input impedance, Output Impedance. Oscillator: Oscillation Operation**,** Phase shift Oscillator**,** Wien Bridge Oscillator**,** Tuned Oscillator Circuit**,** Colpitts Oscillator and Hartley Oscillator, Crystal Oscillator.

Module II:

Op Amp linear and Non-linear application:

Review of Operational Amplifier, Voltage to Current and Current to Voltage converters. Filters: First order and Second order Low pass and High pass filters, Band pass filters, Band reject filters, All pass filters. Non linear circuit: Log Amplifier, Anti-Log Amplifiers, Temperature compensated log and antilog amplifiers, Analog Multipliers and their applications

Module III:

Comparator, Multi-vibrator and IC 555 Timer:

Zero crossing detector, Schmitt Trigger, Comparator, Precision Rectifiers and Peak Detectors, Sample and Hold Circuits, Generation of square and triangular waveforms, Astablemultivibrator, Triangular waveform generator, Monostablemultivibrator, Integrated Circuit Timer: The 555 Circuit, MonostableMultivibrator and astablemultivibrator using the 555 IC.

Module IV:

FET Amplifiers:

Analog integrated circuit design and PLL (IC-565)

Current Mirror using BJT and MOSFET, Simple current mirror, Cascode Mirror, A Bipolar mirror with base current compensation, Wilson current mirror, Widlar current source, Darlington connection, Differential Amplifier, The MOS differential pair, Small signal operation of the MOS differential pair, The BJT differential pair, Other Non ideal characteristics of the differential amplifier, Phase locked loops (PLL): Ex-OR Gates and multipliers as phase detectors, Block Diagram of IC PLL, Working of PLL and Applications of PLL

Recommended Books:

1. Robert L. Boylested , Louis Nashelsky , Pearson Education (2011)
2. Adel S. Sedra & Kenneth C. Smith, “Microelectronic Circuits”, Oxford.
3. R. A. Gayakwad, “Op-Amps and Linear Integrated Circuits”, PHI
4. Millman&Halkias, “Electronic Devices And circuits”, TMH.
5. Salivahanan, Kumar &Vallavaraj, “Electronic Devices & Circuits”, TMH.
6. R.P. Jain, “Modern Digital Design”, TMH.
7. D. Roy Chaudhary, Shail Jain, “Linear integrated circuits”, New Age International.

Course Name	Electronics Measurements		
Category: Core	Code: ME 1203	Credits: 4	L-4 T-0 P-0
Exam: Theory 3 Hrs	ESE: 60 Marks	CIA: 40 Marks	

SYLLABUS

Module I:

Measuring Instrument

Classification, Characteristics, errors in measurement and statistical analysis. Calibration Methodology, Analog Instruments, Galvanometers, PMMC Instrument.**Bridges:** Measurement of R, L and C, Potentiometers, Voltage, Current, Power, Energy, Frequency and Phase.

Module II:

Measuring Instrument: Transducers: Types of Transducers, Active: Photoelectric, thermoelectric and PiezoelectricPassive: Resistive, Inductive And Capacitive.Hall effect transducers, Techo-generators, **Measurement of non-electrical Quantities:** Displacement, Velocity, acceleration, force, torque, sound, temperature, Humidity, pH value, thickness, Pressure, Flow.

Module III:

Oscilloscopes:

CRT, Measurement of voltage, frequency and phase by CRO, Oscilloscope probes, Dual trace and dual beam oscilloscope, Sampling Oscilloscope, Analog and digital Storage Oscilloscope **Signal Analyzers:** Wave, Distortion and Spectrum analyzers.

Module IV:

Analytical Instruments and Bio Medical Instrumentation:

ECG measurement, Blood Pressure measuring instrument, Blood flow Measurement, X-Ray spectrometer, CT Scan, MRI and MRI scans.

Recommended Books:

1. K Sawhney, Electrical and Electronics Measurements and Instrumentation, DhanpatRai and Sons (2007).
2. W.D. Cooper and A. D. Helfrick, Electronic Instrumentation and Measurement Techniques, Prentice-Hall (2005).
3. Instrumentation Measurement and analysis: Nakra B C, Chaudry K, TMH
4. Joseph J Carr, Elements of Electronic Instrumentation and Measurement, Pearson Education (2005)
5. David A. Bell, Electronic Instrumentation and Measurements, Prentice Hall (2013).
6. Oliver and Cage, “Electronic Measurements and Instrumentation”, TMH (2009).
7. Alan S. Morris, “Measurement and Instrumentation Principles”, Elsevier (Buterworth Heinmann-2008).
8. H. S. Kalsi, Electronic Instrumentaion, TMH(2006)
9. S. Rangan, G. R. Sarma and V. S. Mani, Instrumentation Devices and Systems, Tata McgrawHill(1998).

Course Name	Network Analysis		
Category: Core	Code: ME 1204	Credits: 4	L-4 T-0 P-0
Exam: Theory 3 Hrs	ESE: 60 Marks	CIA: 40 Marks	

SYLLABUS

Module I:

Network Analysis

Network Elements, Transformation of energy sources, Y-Δ transformation, Nodal Analysis, Mesh Analysis, Superposition, Thevenin, Norton, and Maximum Power transfer theorem, Graph of a Network, tree, basic loop matrix and basic cut set matrix, Incidence matrix, Duality.

Module II:

Time and Frequency Domain Analysis

Laplace Transform of periodic functions, Laplace Transform of some special functions, Circuit analysis using Laplace Transform (RL, RC, RLC circuits), Inverse Laplace Transform, Transient response of RL, RC, RLC circuits for dc and ac source using differential equations.

Module III:

Two Port Networks

Relationship of Two-port Variables, Short-circuit Admittance parameters, Open Circuit Impedance Parameters, Transmission parameters, Hybrid parameters, Relationships between parameters Sets, Series, Parallel and Cascade Connections of Two-port networks, reciprocity & symmetry, ladder & lattice network, T & π transformations.

Module IV:

Network Stability and Synthesis

Complex frequency, Transfer functions, concept of poles and zeros, Restriction on location of poles and zeros in driving point functions, Hurwitz polynomial, positive real function, Properties of positive real function, Synthesis of LC, RL and RC driving point functions using Foster and Cauer forms.

Recommended Books:

1. A.Chakrabarti, “Circuit Theory (Analysis and Synthesis)” ,Dhanpatrai& Co.
2. Network Analysis And Synthesis by Franklin F .Kuo, John Wiley And Sons.
3. W. H. Hayt, J. E. Kemmerly, S. M. Durbin, Engineering Circuit Analysis, Tata McGraw Hill(2005)

Course Name	Advance Electronics Circuits Lab		
Category: Lab	Code: ME 1252	Credits: 2	L-0 T-0 P-4
Exam: Practical 2 Hrs	ESE: 60 Marks	CIA: 40 Marks	

Experiment List

1. To study and design an RC coupled amplifier using BJT and FET.
2. To study the RC Phase Shift Oscillator by determining its frequency of oscillation and compare calculated and observed frequency.
3. Construct a Wein Bridge Oscillator and determine its frequency of oscillation and compare calculated and observed frequency.
4. To measure the following parameters of 741 op-amp IC. (a) Open-loop gain, (b) Output Offset voltage, (c) CMRR, (d) Slew rate.
5. Using op-amps design the Differentiator.
6. Using op-amps design the Integrator.
7. Using op-amps design the following: (a) Adder (b) Subtractor.
8. To design and realize a square wave generator using Op-Amp.
9. Determine the frequency using IC 555 timer of AstableMultivibrator
10. Determine the frequency using IC 555 timer of MonostableMultivibrator

Course Name	Electronics Measurements Lab		
Category: Lab	Code: ME 1253	Credits: 1	L-0 T-0 P-2
Exam: Practical 2 Hrs	ESE: 60 Marks	CIA: 40 Marks	

Experiment List

1. Calibration of AC Voltmeter and AC Ammeter.
2. Characteristics of LVDT.
3. Measurement of unknown resistance by Wheatstone bridge and bridge sensitivity.
4. Measurement of low resistance using Kelvin's double bridge.
5. Measurement of capacitance by DeSauty's and Schering Bridge.
6. Measurement of Inductance by Anderson's Bridge and Maxwell's Bridge.
7. Measurement of Inductance by Hay's Bridge.
8. Study of L.C.R. Bridge and determination of the value of the given components.
9. Study of semiconductor diode voltmeter and its uses as DC average responding AC volt meter.
10. Measurement of Power & Power factor.
11. A/D & D/A converters.
12. Measurement of phase difference and frequency using CRO (Lissajous Pattern).

Course Name	Network Analysis Lab			
Category: Lab		Code: ME 1254	Credits: 1	L-0 T-0 P-2
Exam: Practical 2 Hrs		ESE: 60 Marks	CIA: 40 Marks	

Experiment List

1. Verification of KVL & KCL for the given circuit.
2. Verification of principle of superposition with dc and ac sources.
3. Verification of Thevenin, Norton and Maximum power transfer theorems in ac circuits.
4. Verification of Tellegen's theorem for two networks of the same topology.
5. Transient response in RL and RC Network: Simulation/hardware.
6. Transient response in RLC Series & Parallel circuits Network: Simulation/hardware.
7. Determination of Impedance (Z) and Admittance(Y) parameters of two port network.
8. Frequency response of LP and HP filters.
9. Frequency response of BP and BR filters.
10. Generation of Periodic, Exponential, Sinusoidal, Damped sinusoidal, Step, Impulse, Ramp signals using MATLAB in both discrete and analog form.
11. Determination of Laplace transform and inverse Laplace transformation using MATLAB.
12. Spectrum analysis of different signals.