# C.U.SHAH UNIVERSITY – WADHWANCITY

**FACULTY OF**: - Technology & Engineering
**DEPARTMENT OF**: - Electronics & Communication Engineering
**SEMESTER**: - IV **CODE**: - 4TE04EMT1
**NAME** – Engineering Mathematics - 4 (EMT)

## Teaching & Evaluation Scheme:-

| Subject Code | Subject Name | Teaching Schemes (Hours) | | | | Credits | Evaluation Schemes | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Th | Tu | Pr | To | | Theory | | | | Practical (Marks) | | | Total |
| | | | | | | | Sessional Exam | | University Exam | | Internal | | University | |
| | | | | | | | Marks | Hours | Marks | Hours | Pr | TW | Pr | |
| 4TE04EMT1 | Engineering Mathematics - 4 (EMT) | 04 | 00 | 00 | 04 | 03 | 30 | 1.5 | 70 | 3.0 | --- | --- | --- | 100 |

### Objectives:-

- To have knowledge of Fourier integral & Fourier transform.
- To know analytic function, conformal transformations
- To learn basic concepts of vector calculus (grad, divergence, curl, line integral, surface integrals) and have knowledge of irrotational, solenoidal& conservative vector fields.
- Basic knowledge of widely used numerical techniques and their applications

### Prerequisite:-

- Students should have a firm grasp elementary engineering mathematics offered in first and second semesters. The basic concept of vector algebra and calculus must be clear.

### Course Outline:-

| Sr. No. | Course Content | Hours |
|---|---|---|
| 1 | **Fourier Integral & Transform:** Fourier integral theorem (only statement), Fourier Sine and Cosine integrals, Complex form of Fourier integral, Fourier Sine and Cosine transforms, solution of boundary value problems using Fourier transforms. | 06 |
| 2 | **Functions of Complex variables:** Reorientation, Analytic function, Cauchy – Riemann equation (Cartesian and Polar forms), Harmonic functions, Finding Harmonic Conjugate functions (Using C-R equations and Milne Thompson Method) Conformal mappings. | 08 |
| 3 | **Vector Calculus:** Reorientation, Differentiation of Vectors, Scalars and vector fields, Gradient of a scalar function, Directional derivative, Divergence and Curl of a vector function, Irrotational, Solenoidal and conservative vector fields, Line, Surface and Volume integrals, Green's theorem, Gauss and Stoke's theorems (Without proof). | 12 |
| 4 | **Interpolation:** Finite differences, Relations between finite difference operators, Interpolation by polynomials, Newton's Forward and Backward Methods, Stirling's Method, Lagrange's interpolation | 06 |

| | | |
|---|---|---|
| | Formula, Inverse Interpolation. | |
| 5 | **Numerical Differentiation &Integration:** Numerical differentiation using forward difference and backward difference, Numerical Integration by using Newton-cotes quadrature formula, Trapezoidal rule, Simpson's $\frac{1}{3}$ rule, Simpson's $\frac{3}{8}$ rule. | **06** |
| 6 | **System of Linear Algebraic Equations:** Direct methods: Gauss elimination and Gauss Jordan method. Iterative methods: Gauss Jacobi's method and Gauss-Seidal method. | **05** |
| 7 | **Numerical solution of ordinary differential equations**: Picard's Method, Taylor's Method, Euler's Method, Runge-Kutta methods. | **05** |

**Learning Outcomes:**

After the successful completion of the course, students will be able to

- Apply knowledge of fourier integral and fourier transform to solve differential equations
- Calculate gradient divergence & curl in Cartesian and other simple coordinate systems.
- Evaluate line, surface and volume integrals in simple coordinate systems.
- Solve algebraic and transcendental equations, system of linear equations and differential equations by Numerical methods.

**Teaching & Learning Methodology:**

- Lecture method using standard teaching aids.
- Solving term assignments in tutorials.
- Quiz/Seminar/Expert lectures

**Books Recommended:**


1. E. Kreyszig, Advanced engineering mathematics (8th Edition), John Wiley (1999).
2. Higher Engineering Mathematics – Vol. 3, Dr.K.R.Kachot, Mahajan Publ. house
3. Complex variables and application, R. V. Churchill and J. W. Brown, (7th Edition), McGraw-Hill (2003).
4. B. S. Grewal, Numerical Methods in Engineering & Science (7th Edition), Khanna Publishers(2007).
5. Vector Calculus and Linear Algebra, RaviSingh&Mukul Bhatt, McGraw Hill Publ.
6. Numerical Methods by B.S.Grewal, Khanna Publ.
7. S. D. Conte and Carl de Boor, Elementary Numerical Analysis and Algorithmic Approach (3rd Edition), McGraw-Hill, 1980.
8. C. E. Froberg, Introduction to Numerical Analysis (2nd Edition), Addison-Wesley, 1981.


**E-Resources:**

1. http://www.wiley.com/college/mat/kreyszig154962/
2. http://en.wikipedia.org

# C.U.SHAH UNIVERSITY – WADHWANCITY

**FACULTY OF**: -Technology & Engineering
**DEPARTMENT OF**: -Electronics & Communication Engineering
**SEMESTER**: -___IV__ **CODE**: -4TE04MPA1
**NAME** – Microprocessors & Its Applications (MPA)

## Teaching & Evaluation Scheme:-

| Subject Code | Subject Name | Teaching Schemes (Hours) | | | | Credits | Evaluation Schemes | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Theory | | | | Practical (Marks) | | | |
| | | | | | | | Sessional Exam | | University Exam | | Internal | | University | |
| | | Th | Tu | Pr | To | | Marks | Hours | Marks | Hours | Pr | TW | Pr | |
| 4TE04MPA1 | Microprocessors & Its Applications (MPA) | 04 | 00 | 02 | 06 | 05 | 30 | 1.5 | 70 | 3.0 | 30 | 20 | --- | 150 |

## Objectives:-

- The objective of this course is to provide basic knowledge about 8085 microprocessor, assembly language programming, and interfacing. We also focus on overview of advanced microprocessor such as 8086 and its variants.

**Prerequisites:-**Understanding of digital circuits.

## Course Outlines:-

| Sr. No. | Course Contents | Hours |
|---|---|---|
| 1 | **Introduction to Basic Computer:**<br>Microprocessors, Computer Languages, From Large Scale Computers to Single-Chip Microcontrollers, Microprocessor Architecture and Its Operations, Memory, Input and Output Devices. | **04** |
| 2 | **8085 Microprocessor Architecture and Memory and I/O devices interfacing:**<br>The 8085 Microprocessor - Pin and signal Diagrams and its descriptions, Functional Block Diagram of 8085 and its descriptions, Bus Structure of 8085, Demultiplexing of Buses, Generating control signals, Microprocessor Communication and Bus Timing, 8085 instruction cycle, Machine Cycles and T-states. Memory interfacing, Basic interfacing concepts for I/O devices, Interfacing output display and input devices. | **15** |
| 3 | **8085 Assembly Language Programming Part 1:**<br>The 8085 Programming Model, Instruction Classification, Instruction,data Format and storage, How to Write, Assemble and Execute a Simple Program, Data Transfer Operations, Arithmetic Operations, Logical Operations, Branch Operations, Programming Techniques: Looping, Counting and Indexing, 16-bit Data Transfer and Arithmetic Instructions, Arithmetic Operations Related to Memory, Advanced Logical Operations, | **15** |
| 4 | **8085 Assembly Language Programming Part 2:**<br>Counters and Time Delays, stack and subroutine, Code Conversion Programs, BCD Arithmetic and 16-bit data operations | **06** |
| 5 | **8085 Interrupt:** | **04** |

| | | |
|---|---|---|
| | Introduction to Interrupts, Vectored and Non-Vectored Interrupts, Restart and Software Instructions | |
| 6 | **Interfacing Peripherals (I/Os) and Applications:** Interfacing of Data Converters (D-To-A And A-To-D), ProgrammableInterfacing Devices Like 8279 Keyboard/Display Interface, 8255A PPI,8253/8254 Timer, 8259A PIT, 8237 DMA Controller, Serial I/O Concepts,SID And SOD, 8251A USART. Interfacing of above chips With 8085,Programming them In Diferent Modes, Practical Applications | **10** |
| 7 | **Introduction to Advanced Microprocessors:** Microprocessor Evolution and Types, Intel 8086 Microprocessor Family – Overview, 8086 Internal Architecture, 80186, 80286, 80386, 80486 and Pentium Architecture | **06** |

## Learning Outcomes:-

- Upon successful completion of this subject, students should:
  * be able to do the assembly language programming.
  * be able to interface various peripherals to 8085 microprocessor.

## Books Recommended:-


1. "Microprocessor Architecture Programming and Applications with 8085",**Ramesh S. Gaonkar,**Penram International Publishing, Fifth Edition
2. "Microprocessor and Interfacing",**Douglas V. Hall**,TMH,, Second Edition by
3. "Microprocessor x86 Programming",**K. R. Venugopal**, BPB Publications
4. "The Intel Microprocessors, Architecture, Programming and Interfacing", **Barry B. Brey,** PHI, Sixth Edition
5. "Microcomputers and Microprocessors: The 8080, 8085 and Z-80 Programming,Interfacing and Troubleshooting", **John E. Uffenbeck**..

# C.U.SHAH UNIVERSITY – WADHWANCITY

**FACULTY OF**: - Technology & Engineering
**DEPARTMENT OF**: -Electronics & Communication Engineering
**SEMESTER**: - IV **CODE**: -4TE04ACM1
**NAME** – Analog Communication (ACM)

## Teaching & Evaluation Scheme:-

<table>
<tr><th rowspan="4">Subject Code</th><th rowspan="4">Subject Name</th><th colspan="4">Teaching Schemes (Hours)</th><th rowspan="4">Credits</th><th colspan="7">Evaluation Schemes</th><th rowspan="4">Total</th></tr>
<tr><th rowspan="3">Th</th><th rowspan="3">Tu</th><th rowspan="3">Pr</th><th rowspan="3">To</th><th colspan="4">Theory</th><th colspan="3">Practical (Marks)</th></tr>
<tr><th colspan="2">Sessional Exam</th><th colspan="2">University Exam</th><th colspan="2">Internal</th><th>University</th></tr>
<tr><th>Marks</th><th>Hours</th><th>Marks</th><th>Hours</th><th>Pr</th><th>TW</th><th>Pr</th></tr>
<tr><td>4TE04ACM1</td><td>Analog Communication (ACM)</td><td>04</td><td>00</td><td>02</td><td>06</td><td>05</td><td>30</td><td>1.5</td><td>70</td><td>3.0</td><td>30</td><td>20</td><td>---</td><td>150</td></tr>
</table>

## Objectives: -

- The objective of the subject is to provide understanding of the series and parallel tuned circuits, noise introduced in communication and different types of modulation techniques for analog communication.

**Perquisites:**Basic Concepts of mathematics and analogue circuits are required.

## Course Outlines: -

| Sr. No. | Course Contents | Hours |
|---|---|---|
| 1 | **Passive Circuits:**<br>Series Tuned Circuit, Parallel Tuned Circuit, Self-Capacitance of a Coil, Skin effect, Mutual Inductance, High frequency Transformers, Tapped Inductor, Capacitive Tap, Low-frequency Transformers. | **08** |
| 2 | **Noise:**<br>Thermal Noise, Shot Noise, Partition Noise, Low Frequency or Flicker Noise, Burst Noise, Avalanche Noise, Bipolar Transistor Noise, Field-effect Transistor Noise, Equivalent Input Noise Generators and comparison of BJTs and FETs, Signal – to – Noise Ratio, S/N Ratio of a tandem connection, Noise factor, Amplifier Input Noise in Terms of F, Noise Factor of Amplifiers in Cascade, Noise Factor of a Lossy Network, Noise Temperature, Measurement of Noise Temperature and Noise Factor, Narrowband Band-pass Noise. | **12** |
| 3 | **Receivers:**<br>Superheterodyne Receivers, Tuning Range, Tracking, Sensitivity and Gain, Image Rejection, Spurious Responses, Adjacent Channel Selectivity, AGC, Double Conversion, Electronically Tuned Receivers (ETRs), Integrated-Circuit Receivers. | **08** |
| 4 | **Amplitude Modulation:**<br>Amplitude Modulation, Amplitude Modulation Index, Modulation Index for Sinusoidal AM, Frequency Spectrum for Sinusoidal AM, Average Power for Sinusoidal AM, Effective Voltage and current for Sinusoidal AM, Non-sinusoidal Modulation, Double-Sideband Suppressed Carrier (DSBSC) Modulation, Amplitude Modulator Circuits, Amplitude Demodulator Circuits, Amplitude-modulated Transmitters, AM Receivers, Noise in AM | **10** |

| | | |
|---|---|---|
| | Systems. | |
| 5 | **Single-Sideband Modulation:** Single-Sideband Principles, Balanced Modulators, SSB Generation, SSB Reception, Modified SSB systems, SNR for SSB, Companded Single Sideband. | **06** |
| 6 | **Angle Modulation:** Frequency Modulation, Sinusoidal FM, Frequency Spectrum for Sinusoidal FM, Average Power in Sinusoidal FM, Non-Sinusoidal Modulation : Deviation Ratio, Measurement of modulation Index for Sinusoidal FM, Phase Modulation, Equivalence Between PM and FM, Sinusoidal Phase Modulation, Digital Phase Modulation, Angle Modulator Circuits, FM Transmitter, Angle Modulation Detectors, Automatic Frequency Control, Amplitude Limiters, Noise in FM System, Pre-emphasis and De-emphasis, FM Broadcast Receivers, FM Stereo Receivers. | **10** |
| 7 | **Radio wave propagation:** Propagation in free space, propagation through troposphere and ionosphere, Surface waves, Low frequency, Very low frequency and extremely low frequency propagation**.** | **06** |

## Learning Outcome: -

After successful completion of the course

- Students will understand basis analog communication and different modulation techniques.
- Students will understand different types of noise introduced in communication.

## Books Recommended:-

1. "Electronic Communications",**Dennis Roddy& John Coolen**, PHI.4$^{th}$ Edition
2. "Electronic Communications", **Kennedy** McGraw Hill Publication
3. "Communication Systems", **Bruce Carlson,** McGraw Hill
4. "Principles Of Communication",**Ziemmer**,Wiley India, New Delhi,5Ed., 2009
5. "Electronic Communication Systems: Fundamentals Through Advanced", **Wayne Tomasi**, Pearson Education

# C.U.SHAH UNIVERSITY – WADHWANCITY

**FACULTY OF**: -Technology&Engineering
**DEPARTMENT OF**: -Electronics & Communication Engineering
**SEMESTER**: -__IV__ **CODE**: -4TE04CSE1
**NAME** –Control System Engineering (CSE)

## Teaching & Evaluation Scheme:-

| Subject Code | Subject Name | Teaching Schemes (Hours) | | | | Credits | Evaluation Schemes | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Theory | | | | Practical (Marks) | | | Total |
| | | | | | | | Sessional Exam | | University Exam | | Internal | | University | |
| | | Th | Tu | Pr | To | | Marks | Hours | Marks | Hours | Pr | TW | Pr | |
| 4TE04CSE1 | Control System Engineering (CSE) | 04 | 00 | 02 | 06 | 05 | 30 | 1.5 | 70 | 3.0 | 30 | 20 | --- | 150 |

## Objectives:-

- The objective of the subject is to provide understanding of the some basics of Control Systems, its analyses in various domains and understanding of stability using different methods.

**Prerequisites: -**Detailed knowledge of basic electrical and some mathematics formulae are essential.

**Course Outlines:-**

| Sr. No. | Course Contents | Hours |
|---|---|---|
| 1 | **Introduction and Mathematical Models of Physical Systems:** The control system-open loop & closed loop, servomechanism, Differential equation of physical systems, Dynamics of Robotic Mechanism, Transfer function, Block diagram algebra, Signal flow-graphs, Stepper Motor, Examples of above. | **08** |
| 2 | **Feedback Characteristics of Control Systems:** Feedback and Non-feedback systems, Reduction of Parameter Variations, Control over system Dynamics and Control of the Effect of Disturbance Signals by use of feedback, Linearizing effect of feedback, Regenerative Feedback, Examples of above. | **08** |
| 2 | **Time Response Analysis:** Standard test signals, time response of first order and second order systems, steady-state errors and error constants, Effect of adding a Zero to a system, design specification of second-order-systems, Examples of above. | **08** |
| 3 | **Concept of Stability and Root Locus Technique:** Concept of Stability, Necessary conditions for stability, Hurwitz and Routh Stability criterion, Relative stability analysis, Root Locus Concepts, Construction of Root Loci for various systems, Stability Considerations, Examples of above. | **12** |
| 4 | **Frequency Domain Response and Stability Analysis:** Correlation between time and frequency response, Polar Plots, Nyquist plots, Bode Plots, Nyquist stability criterion, Gain margin & Phase margin, relative stability using Nyquist Criterion, frequency response specifications. | **10** |
| 5 | **Compensation of Control Systems:** | **06** |

| | | |
|---|---|---|
| | Necessity of compensation, Phase lag compensation, phase lead compensation, phase lag lead compensation, feedback compensation, Examples of above. | |
| 6 | **State Variable Analysis:** Concept of state,state variable and state model, state models for linear continuous time systems, diagonalization solution of state equations, concept of controllability and observability. | **08** |

## Learning Outcomes:-

After successful completion of the course, students should:

- be able to understand basics of Control systems and its applications.
- be able to design different control systems.
- Be able to understand concept of stability.

## Books Recommended:-


1. "Control System Engineering", **I. J. Nagrath and M. Gopal,** New Age International Publishers, $5^{th}$ Ed.
2. "Modern Control Engineering", **Katsuhiko Ogata,** PHI, $5^{th}$ Ed.
3. "Automatic Control Systems", **B. C. Kuo**, PHI.
4. "Control Systems: Principles and Designing", **MadanGopal,** TMH.

# C.U.SHAH UNIVERSITY – WADHWANCITY

**FACULTY OF**: -Technology&Engineering
**DEPARTMENT OF**: -Electronics & Communication Engineering
**SEMESTER**: -__IV__ **CODE**: -4TE04LIC1
**NAME** –Linear Integrated Circuits (LIC)

## Teaching & Evaluation Scheme:-

| Subject Code | Subject Name | Teaching Schemes (Hours) | | | | Credits | Evaluation Schemes | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Theory | | | | Practical (Marks) | | | Total |
| | | | | | | | Sessional Exam | | University Exam | | Internal | | University | |
| | | Th | Tu | Pr | To | | Marks | Hours | Marks | Hours | Pr | TW | Pr | |
| 4TE04ICA1 | Linear Integrated Circuits L(IC) | 04 | 00 | 02 | 06 | 05 | 30 | 1.5 | 70 | 3.0 | 30 | 20 | --- | 150 |

## Objectives:-

- The objective of the subject is to provide understanding of the some basics of Op-Amp, Op-Amp Parameters, Op-Amp applications,

**Prerequisites: -**Detailed knowledge of basic electronics and some mathematics formulae are essential.

## Course Outlines:-

| Sr. No. | Course Contents | |
|---|---|---|
| 1 | **Differential and Cascade Amplifier:** Differential amplifier, Types of differential amplifier circuit configurations and their analyses, Constant current bias, Current mirror, Cascaded differential amplifier stages, Level translator. | **06** |
| 2 | **Introduction to Op-Amps and Its Characteristics:** Introduction to Op-Amp, Block diagram representation of a typical op-amp and analysis of its equivalent circuits, Schematic Symbol, Types of ICs, Manufacturers' designations for ICs, IC package types, Ideal Op-Amp, Equivalent circuit of an Op-Amp, Ideal voltage transfer curve, Open loop Op-Amp configuration. | **10** |
| 2 | **An Op-Amp with Negative Feedback:** Block diagram representation of feedback configurations, Voltage-series and shunt feedback amplifier, Differential amplifier. | **06** |
| 3 | **The Practical Op-Amp:** Measurement of Input Offset Voltage, Input Offset Current, Input Bias Current, Differential Input Resistance, Output resistance, Input Capacitance, Offset Voltage Adjustment Range, Input Voltage Range, Output Offset Voltage Swing, Transient Response, CMRR, PSRR (SVRR), Gain Bandwidth Products, Power Consumption | **08** |
| 4 | **Frequency Response of an Op-Amp:** Frequency response, Compensating networks, Frequency response of internally compensated and non-compensated Op-Amps, Open loop voltage gain as a function of | **06** |

| | | |
|---|---|---|
| | frequency, Closed loop frequency response, Slew rate: Causes, Equation and Effects, Difference between bandwidth transient response and slew rate. | |
| 5 | **General Linear Applications:** DC and AC amplifiers, AC amplifier with single supply voltage, Peaking amplifier, Summing, Scaling and Averaging amplifiers, Instrumentation amplifier, Differential Input and Differential output amplifier, V-to-I converter with floating and grounded load, I-to-V converter, Integrator and differentiator. | **10** |
| 6 | **Comparators and Converters:** Basic comparator, Zero crossing detector, Schmitt trigger, Comparator characteristics, Limitations of Op-Amp as comparator, Voltage limiter, Window detector, V-to-F and F-to-V converters, A-to-D and D-to-A converters, Clippers and clampers, Peak detector, Sample-and-Hold circuit. | **08** |
| 7 | **Specialized IC Applications:** IC 555 Timer and its applications, Phase Locked Loops, Voltage regulators. | **06** |

## Learning Outcomes:-

After successful completion of the course, students should:

- be able to understand basics of Op-Amp and its applications.
- be able to design different Op-Amp circuits.
- Be able to design IC 555 circuits, PLL and voltage regulator.

## Books Recommended:-


1. “Opamp and Linear Integrated Circuits”, **Ramakant A. Gayakwad,** PHI Learning Pvt, 3rd Ed.
2. “Design with Op-Amps and analog ICs”, **Sergio Franco,** Tata McGraw Hill, 2009 Ed.
3. “Linear Integrated Circuits”, **D. Roy Choudhury and Shail B. Jain**, New Age International Publishers, 3rd Edition.
4. “Integrated circuits”, **K. R. Borkar,**Khanna Publication.

# C.U.SHAH UNIVERSITY – WADHWANCITY

**FACULTY OF**: -Technology&Engineering
**DEPARTMENT OF**: -Electronics & Communication Engineering
**SEMESTER**: -__IV__ **CODE**: -4TE04SDT1
**NAME** –Simulation and Design Tools (SDT)

## Teaching & Evaluation Scheme:-

| Subject Code | Subject Name | Teaching Schemes (Hours) | | | | Credits | Evaluation Schemes | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Theory | | | | Practical (Marks) | | | Total |
| | | | | | | | Sessional Exam | | University Exam | | Internal | | University | |
| | | Th | Tu | Pr | To | | Marks | Hours | Marks | Hours | Pr | TW | Pr | |
| 4TE04SDT1 | Simulation and Design Tools (SDT) | 00 | 00 | 02 | 02 | 01 | --- | --- | --- | --- | 80 | 20 | --- | 100 |

## Objectives:-

- The objective of the subject is to provide understanding of the simulation and design tools such as pSpice and MATLAB.

**Prerequisites: -**Fundamental knowledge of basic analog and digital electronics and some mathematics formulae are essential.

## Course Outlines:-

| Sr. No. | Course Contents | |
|---|---|---|
| **1** | **Introduction to SPICE:**<br>Introduction to PSpice software, file types, netlist commands. Basic analyses: DC, AC,Transient. Analog behavioral models (ABM): equations setup, IF statement, voltage/current/<br>frequency dependent sources. Advanced analyses: noise, Monte-Carlo, worst-case. Spectraldescription of signals (FFT), measuring the total harmonic distortion (THD). Circuitoptimization using PSpice Optimizer software.<br>Models of resistor, capacitor, inductor, energy sources (VCVS, CCVS, Sinusoidal source, pulse, etc), transformer, DIODE, BJT, FET, MOSFET, etc. sub circuits. | **06** |
| 2 | Introduction to MATLAB, Study of MATLAB functions. | **04** |
| 2 | Simulation of following circuits using spice (Schematic entry of circuits using standard packages.Analysis- transient, AC, DC, etc.):<br>a) Potential divider.<br>b) Integrator & Differentiator (I/P PULSE) – Frequency response of RC circuits.<br>c) Diode, BJT, FET, MOSFET Characteristics.<br>d) Simulate and study half-wave, full-wave, and bridge-rectifier using PSPICE windows<br>e) Simulate and study diode clipper and clamper circuits using PSPICE windows<br>f) Voltage Regulators.<br>g) Simulate and study emitter bias and fixed bias BJT and JFET circuits using PSPICE windows, and determine quiescent conditions. | **12** |

| | | |
|---|---|---|
| | h) Simulate a common emitter amplifier using self biasing and study the effect of variation inemitter resistor on voltage gain , input and output impedance using PSPICE windows .<br>i) Determine the frequency response of Vo/Vs for CE BJT amplifier using PSPICE windows.Study the effect of cascading of two stages on band width.<br>j) Simulate and study Darlington pair amplifier circuit using PSPICE windows and determinedcbias and output ac voltage .<br>k) Simulate RC Coupled amplifiers - Transient analysis and Frequency response.<br>l) Simulate FET & MOSFET amplifiers.<br>m) Simulate Multivibrators.<br>n) Simulate Oscillators (RF & AF).<br>o) Study an operational amplifier using PSPICE windows and find out: CMMR, gain band widthproduct, slew rate, 3-db frequency, and input offset voltage.<br>p) Simulate and study active low pass, high pass, and band pass filters using PSPICE windows<br>q) Simulate and study class A, B, C, and AB amplifier using PSPICE windows.<br>r) Study the operation of 555 timer oscillator using PSPICE.<br>s) Simulate logic expression..and determine its truth table.<br>t) Simulate logic expression of full adder circuit and determine its truth table.<br>u) Simulate a synchronous 4-bit counter and determine its count sequence.<br>v) Simulate a master-slave flip-flop using NAND gates and study its operation. Study the operation of asynchronous preset and clear .<br><br>**NOTE :**<br>At least ten experiments have to be performed in the semester from the above list | |
| 3 | a) Writing simple programs using MATLAB, forhandling arrays, files, plotting of functions etc.<br>b) Writing M files for Creation of analog &discrete signals, plotting of signals etc.<br>b) Simulation using Simulink for analog modulation like AM, FM and PM. | **08** |

## Learning Outcomes:-

After successful completion of the course, students should:

- be able to understand pSpice and simulate different analog and digital circuits using pSpice software.
- be able to understand MATLAB, its basic functions, MATLAB Simulink models.
- be able to simulate MATLAB basic functions
- be able to simulate analog modulation techniques using MATLAB Simulink.

## Books Recommended:-


1 “SPICE for circuits and electronics using pSpice”, Rashid M.H, Prentice Hall
2 Orcad/PCBII , “User’s Guide”.
3 MATLAB User guide