



# Sri Chandrasekharendra Saraswathi Viswa MahaVidyalaya

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## Department of Electronics and Communication Engineering



### CURRICULUM & SYLLABUS

#### B.E. Electronics and Communication Engineering

#### SECOND YEAR

(Choice Based Credit System)

(With effect from AY 2024-25)





**Syllabus (2024-25)**  
**B.E. (Electronics and Communication Engineering)**

**SEMESTER - III**

| S.No         | Course Code | Course Name                                | Category   | Hours per week |          |          | C         | IA       | EA       | TM  |
|--------------|-------------|--------------------------------------------|------------|----------------|----------|----------|-----------|----------|----------|-----|
|              |             |                                            |            | L              | T        | P        |           |          |          |     |
| 1.           |             | Probability And Statistics                 | BSC        | 2              | 1        | 0        | 3         | 40       | 60       | 100 |
| 2.           |             | Electronic Devices                         | PCC        | 3              | 0        | 0        | 3         | 40       | 60       | 100 |
| 3.           |             | Digital System Design                      | PCC        | 3              | 0        | 0        | 3         | 40       | 60       | 100 |
| 4.           |             | Signals And Systems                        | PCC        | 3              | 0        | 0        | 3         | 40       | 60       | 100 |
| 5.           |             | Network Theory                             | PCC        | 3              | 0        | 0        | 3         | 40       | 60       | 100 |
| 6.           |             | Object Oriented Programming using C++[T&P] | ESC        | 2              | 0        | 1        | 3         | 40       | 60       | 100 |
| 7.           |             | Electronic Devices Laboratory              | PCC        | 0              | 0        | 2        | 1         | 40       | 60       | 100 |
| 8.           |             | Digital System Design Laboratory           | PCC        | 0              | 0        | 2        | 1         | 40       | 60       | 100 |
| 9.           |             | Ability Enhancement Course1*               | AEC - I    | -              | 0        | 0        | 1*        | -        | -        | 100 |
| 10.          |             | Vocational Skill Enhancement Course*       | VSEC - III | 0              | 0        | 2        | 1*        | -        | -        | 100 |
| 11.          |             | Skill Development Course *                 | SEC - III  | -              | 0        | 0        | 1*        | -        | -        | 100 |
| <b>Total</b> |             |                                            |            | <b>16</b>      | <b>1</b> | <b>7</b> | <b>20</b> | <b>-</b> | <b>-</b> |     |



**Syllabus (2024-25)**  
**B.E. (Electronics and Communication Engineering)**

**SEMESTER - IV**

| S.No         | Course Code | Course Name                                                            | Category  | Hours per week |          |           | C         | IA       | EA       | TM  |
|--------------|-------------|------------------------------------------------------------------------|-----------|----------------|----------|-----------|-----------|----------|----------|-----|
|              |             |                                                                        |           | L              | T        | P         |           |          |          |     |
| 1.           |             | Mathematics-IV (Calculus, Special Functions and Design of Experiments) | BSC       | 3              | 0        | 0         | 3         | 40       | 60       | 100 |
| 2.           |             | Analog Electronics                                                     | PCC       | 3              | 0        | 0         | 3         | 40       | 60       | 100 |
| 3.           |             | Analog And Digital Communication                                       | PCC       | 3              | 0        | 0         | 3         | 40       | 60       | 100 |
| 4.           |             | Microprocessor And Microcontrollers                                    | PCC       | 3              | 0        | 0         | 3         | 40       | 60       | 100 |
| 5.           |             | Data Structure [T&P]                                                   | PCC       | 2              | 0        | 1         | 3         | 40       | 60       | 100 |
| 6.           |             | Electromagnetic Fields And Waveguides                                  | PCC       | 3              | 0        | 0         | 3         | 40       | 60       | 100 |
| 7.           |             | Analog Electronics Laboratory                                          | PCC       | 0              | 0        | 2         | 1         | 40       | 60       | 100 |
| 8.           |             | Analog And Digital Communication Laboratory                            | PCC       | 0              | 0        | 2         | 1         | 40       | 60       | 100 |
| 9.           |             | Microprocessor and Microcontrollers Laboratory                         | PCC       | 0              | 0        | 2         | 1         | 40       | 60       | 100 |
| 10.          |             | Micro Project                                                          | DIY - II  | 0              | 0        | 2         | 1*        | 40       | 60       | 100 |
| 11.          |             | Sanskrit And Indian Culture *                                          | MC*       | 1              | 0        | 0         | 1*        | 40       | 60       | 100 |
| 12.          |             | Programming With MATLAB *                                              | AEC - II  | 0              | 0        | 2         | 1*        | -        | -        | 100 |
| 13.          |             | Summer Training Internship *                                           | VSEC - IV | 0              | 0        | 0         | 1*        | -        | -        | 100 |
| <b>Total</b> |             |                                                                        |           | <b>18</b>      | <b>0</b> | <b>11</b> | <b>21</b> | <b>-</b> | <b>-</b> |     |

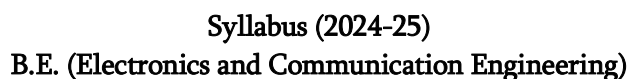
**L** -Lecture, **T**- Theory, **P**-Practical, **C**-Credit, **IA**- Internal Assessment, **EA**- External Assessment, **TM**-Total Mark]



**Syllabus (2024-25)**  
**B.E. (Electronics and Communication Engineering)**

**SEMESTER - III**

|                                                                                                                                     |                                                                                                                          |                   |      |      |      |      |                          |      |      |       |       |       |                                  |       |       |
|-------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|-------------------|------|------|------|------|--------------------------|------|------|-------|-------|-------|----------------------------------|-------|-------|
| Course Code                                                                                                                         |                                                                                                                          | L                 | T    | P    | C    | IA   | EA                       | TM   |      |       |       |       |                                  |       |       |
| Course Name                                                                                                                         | PROBABILITY AND STATISTICS                                                                                               | 3                 | 1    | 0    | 4    | 40   | 60                       | 100  |      |       |       |       |                                  |       |       |
| Course Category                                                                                                                     | BASIC SCIENCE COURSE                                                                                                     | Syllabus Revision |      |      |      |      |                          |      |      |       |       |       |                                  |       |       |
| Pre-requisite                                                                                                                       | Collection of data,CountingTechniques,Permutation and combination                                                        |                   |      |      |      |      |                          |      |      |       |       |       |                                  |       |       |
| <b>Course Objectives:</b><br>The course should enable the students                                                                  |                                                                                                                          |                   |      |      |      |      |                          |      |      |       |       |       |                                  |       |       |
| 1. To introduce fundamental concepts of probability theory, including conditional probability, Bayes theorem, and random variables. |                                                                                                                          |                   |      |      |      |      |                          |      |      |       |       |       |                                  |       |       |
| 2. To familiarize students with discrete and continuous probability distributions and their applications.                           |                                                                                                                          |                   |      |      |      |      |                          |      |      |       |       |       |                                  |       |       |
| 3. To develop an understanding of statistical measures such as central tendency, dispersion, correlation, and regression.           |                                                                                                                          |                   |      |      |      |      |                          |      |      |       |       |       |                                  |       |       |
| 4. To equip students with techniques for curve fitting and conducting large sample hypothesis testing.                              |                                                                                                                          |                   |      |      |      |      |                          |      |      |       |       |       |                                  |       |       |
| 5. To enable students to perform small sample hypothesis tests using t, F, and chi-square distributions.                            |                                                                                                                          |                   |      |      |      |      |                          |      |      |       |       |       |                                  |       |       |
|                                                                                                                                     |                                                                                                                          |                   |      |      |      |      |                          |      |      |       |       |       |                                  |       |       |
| <b>Course Outcomes:</b><br>On completion of the course,the student will be able to                                                  |                                                                                                                          |                   |      |      |      |      |                          |      |      |       |       |       |                                  |       |       |
| Course Outcomes                                                                                                                     | Description                                                                                                              |                   |      |      |      |      | Highest Bloom's Taxonomy |      |      |       |       |       |                                  |       |       |
| CO1                                                                                                                                 | Apply basic concepts of probability, including Bayes' theorem and moment generating functions, to analyze random events. |                   |      |      |      |      | K1                       |      |      |       |       |       |                                  |       |       |
| CO2                                                                                                                                 | Use standard discrete and continuous probability distributions to model and solve real-world problems.                   |                   |      |      |      |      | K3                       |      |      |       |       |       |                                  |       |       |
| CO3                                                                                                                                 | Compute and interpret statistical measures such as mean, variance, correlation, regression, skewness, and kurtosis.      |                   |      |      |      |      | K3                       |      |      |       |       |       |                                  |       |       |
| CO4                                                                                                                                 | Perform curve fitting using least squares and conduct large-sample hypothesis testing.                                   |                   |      |      |      |      | K4                       |      |      |       |       |       |                                  |       |       |
| CO5                                                                                                                                 | Apply small-sample tests such as t-test, F-test, and chi-square test for inference and decision-making.                  |                   |      |      |      |      | K5                       |      |      |       |       |       |                                  |       |       |
|                                                                                                                                     |                                                                                                                          |                   |      |      |      |      |                          |      |      |       |       |       |                                  |       |       |
| <b>Correlation between Course Outcomes(COs) and Program Outcomes(POs):</b>                                                          |                                                                                                                          |                   |      |      |      |      |                          |      |      |       |       |       |                                  |       |       |
| COs                                                                                                                                 | ProgramOutcomes(POs)                                                                                                     |                   |      |      |      |      |                          |      |      |       |       |       | Program Specific Outcomes (PSOs) |       |       |
|                                                                                                                                     | PO 1                                                                                                                     | PO 2              | PO 3 | PO 4 | PO 5 | PO 6 | PO 7                     | PO 8 | PO 9 | PO 10 | PO 11 | PO 12 | PS O1                            | PS O2 | PSO 3 |
| CO1                                                                                                                                 | S                                                                                                                        | S                 | S    | S    | M    | M    | M                        | -    | M    | M     | M     | M     | M                                | -     | S     |
| CO2                                                                                                                                 | S                                                                                                                        | S                 | S    | S    | M    | M    | M                        | -    | M    | M     | M     | M     | M                                | -     | S     |



|                                                                                                                                                                                                                                                                                              |                                                                                                               |                                  |   |   |   |   |   |   |   |   |   |   |   |                    |                |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|----------------------------------|---|---|---|---|---|---|---|---|---|---|---|--------------------|----------------|
| CO3                                                                                                                                                                                                                                                                                          | S                                                                                                             | S                                | S | S | M | M | M | - | M | M | M | L | L | -                  | S              |
| CO4                                                                                                                                                                                                                                                                                          | S                                                                                                             | S                                | S | S | M | M | M | - | M | M | M | L | L | -                  | S              |
| CO5                                                                                                                                                                                                                                                                                          | S                                                                                                             | S                                | S | S | M | M | M | - | M | M | M | L | M | M                  | S              |
|                                                                                                                                                                                                                                                                                              |                                                                                                               |                                  |   |   |   |   |   |   |   |   |   |   |   |                    |                |
| <b>UNIT-I</b>                                                                                                                                                                                                                                                                                |                                                                                                               | <b>Probability</b>               |   |   |   |   |   |   |   |   |   |   |   | <b>12Hours</b>     |                |
| Introduction to Probability,Probability spaces, conditional probability, Bayes' Theorem, Discrete and Continuous one dimensional random variables - Expectations, Moments, Variance of a sum, Moment generating function, Tchebyshev's Inequality.                                           |                                                                                                               |                                  |   |   |   |   |   |   |   |   |   |   |   |                    |                |
|                                                                                                                                                                                                                                                                                              |                                                                                                               |                                  |   |   |   |   |   |   |   |   |   |   |   |                    |                |
| <b>UNIT-II</b>                                                                                                                                                                                                                                                                               |                                                                                                               | <b>Probability Distributions</b> |   |   |   |   |   |   |   |   |   |   |   | <b>12Hours</b>     |                |
| Discrete Distributions – Binomial, Poisson and Negative Binomial distributions, Continuous Distributions - Normal, Exponential and Gamma distributions.                                                                                                                                      |                                                                                                               |                                  |   |   |   |   |   |   |   |   |   |   |   |                    |                |
|                                                                                                                                                                                                                                                                                              |                                                                                                               |                                  |   |   |   |   |   |   |   |   |   |   |   |                    |                |
| <b>UNIT-III</b>                                                                                                                                                                                                                                                                              |                                                                                                               | <b>Statistics</b>                |   |   |   |   |   |   |   |   |   |   |   | <b>12Hours</b>     |                |
| Measures of Central tendency, Measures of dispersion, co efficient of variation, Moments, Skewness and Kurtosis, Correlation, Rank Correlation and Regression (Bivariate)                                                                                                                    |                                                                                                               |                                  |   |   |   |   |   |   |   |   |   |   |   |                    |                |
|                                                                                                                                                                                                                                                                                              |                                                                                                               |                                  |   |   |   |   |   |   |   |   |   |   |   |                    |                |
| <b>UNIT-IV</b>                                                                                                                                                                                                                                                                               |                                                                                                               | <b>Testing of Hypothesis-I</b>   |   |   |   |   |   |   |   |   |   |   |   | <b>12Hours</b>     |                |
| 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. |                                                                                                               |                                  |   |   |   |   |   |   |   |   |   |   |   |                    |                |
|                                                                                                                                                                                                                                                                                              |                                                                                                               |                                  |   |   |   |   |   |   |   |   |   |   |   |                    |                |
| <b>UNIT-V</b>                                                                                                                                                                                                                                                                                |                                                                                                               | <b>Testing of Hypothesis-II</b>  |   |   |   |   |   |   |   |   |   |   |   | <b>12Hours</b>     |                |
| Test for single mean, difference of means and correlation coefficients, test for ratio of variances - Chi-square test for goodness of fit and independence of attributes.                                                                                                                    |                                                                                                               |                                  |   |   |   |   |   |   |   |   |   |   |   |                    |                |
|                                                                                                                                                                                                                                                                                              |                                                                                                               |                                  |   |   |   |   |   |   |   |   |   |   |   |                    |                |
|                                                                                                                                                                                                                                                                                              |                                                                                                               |                                  |   |   |   |   |   |   |   |   |   |   |   | <b>Total Hours</b> | <b>60Hours</b> |
| <b>Text Book(s)</b>                                                                                                                                                                                                                                                                          |                                                                                                               |                                  |   |   |   |   |   |   |   |   |   |   |   |                    |                |
| 1.                                                                                                                                                                                                                                                                                           | T. Veerarajan, Probability, Statistics and Random Processes, Third edition, Tata McGraw-Hill, NewDelhi, 2010. |                                  |   |   |   |   |   |   |   |   |   |   |   |                    |                |
| 2                                                                                                                                                                                                                                                                                            | S.P. Gupta, Statistical Methods, 31st edition, Sultan chand and sons, New Delhi, 2002.                        |                                  |   |   |   |   |   |   |   |   |   |   |   |                    |                |
| <b>Reference Book(s)</b>                                                                                                                                                                                                                                                                     |                                                                                                               |                                  |   |   |   |   |   |   |   |   |   |   |   |                    |                |
| 1.                                                                                                                                                                                                                                                                                           | Loeve, M. (2012). Probability Theory I. United States: Springer New York.                                     |                                  |   |   |   |   |   |   |   |   |   |   |   |                    |                |



**Syllabus (2024-25)**  
**B.E. (Electronics and Communication Engineering)**

|                 |                              |                   |   |   |   |    |    |     |
|-----------------|------------------------------|-------------------|---|---|---|----|----|-----|
| Course Code     |                              | L                 | T | P | C | IA | EA | TM  |
| Course Name     | ELECTRONIC DEVICES           | 3                 | 0 | 0 | 3 | 40 | 60 | 100 |
| Course Category | PROGRAMME CORE COURSE        | Syllabus Revision |   |   |   |    |    |     |
| Pre-requisite   | Basic Electrical Engineering |                   |   |   |   |    |    |     |

**Course Objectives:**

The course should enable the students:

1. To know about semiconductor materials and their types.
2. To design and construct diode circuits.
3. To learn fundamentals of transistor and its variants.
4. To study frequency response of amplifiers under small signal conditions.
5. To understand construction and characteristics of JFET and MOSFET.

**Course Outcomes:**

On completion of the course, the student will be able to

| Course Outcomes | Description                                                    | Highest Bloom's Taxonomy |
|-----------------|----------------------------------------------------------------|--------------------------|
| CO1             | Characterize the types of semiconductors.                      | K1                       |
| CO2             | Design and construct circuits using various diodes.            | K2                       |
| CO3             | Design and construct circuits using BJT.                       | K2                       |
| CO4             | Design and construct transistor amplifiers using h-parameters. | K4                       |
| CO5             | Understand the characteristics of JFET and MOSFET.             | K2                       |

**Correlation between Course Outcomes (COs) and Program Outcomes (POs):**

| COs | Program Outcomes (POs) |      |      |      |      |      |      |      |      |       |       |       | Program Specific Outcomes (PSOs) |       |       |
|-----|------------------------|------|------|------|------|------|------|------|------|-------|-------|-------|----------------------------------|-------|-------|
|     | PO 1                   | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PO 11 | PO 12 | PSO 1                            | PSO 2 | PSO 3 |
| CO1 | S                      | S    | -    | -    | -    | -    | -    | -    | -    | -     | -     | L     | -                                | -     | -     |
| CO2 | S                      | S    | S    | M    | -    | -    | -    | -    | -    | -     | -     | L     | L                                | L     | S     |
| CO3 | S                      | S    | -    | L    | -    | -    | -    | -    | -    | -     | -     | L     | M                                | -     | S     |
| CO4 | S                      | S    | S    | M    | -    | -    | -    | -    | -    | -     | -     | L     | M                                | M     | S     |
| CO5 | S                      | S    | -    | -    | -    | -    | -    | -    | -    | -     | -     | L     | -                                | -     | S     |



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**B.E. (Electronics and Communication Engineering)**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                      |          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|----------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                      |          |
| UNIT-I                                                                                                                                                                                                                                                                                                                                                                                                                                                                | SEMICONDUCTOR DIODE                                                                                  | 9 Hours  |
| Elemental & compound semiconductor materials , Bonding forces and Energy bands in intrinsic and extrinsic silicon, Charge carrier in semiconductors , carrier concentration, Junction properties, Equilibrium condition, biased junction, Steady state condition, breakdown mechanism (Rectifying Diodes, Zener Diodes), Metal Semiconductor Junction. Special diodes: Tunnel diodes, Varactor diodes, Schottky diode, Photo diodes, Photo detector, LED, Solar cell. |                                                                                                      |          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                      |          |
| UNIT-II                                                                                                                                                                                                                                                                                                                                                                                                                                                               | DIODE CIRCUITS                                                                                       | 9 Hours  |
| Ideal and Practical diode, Clipper, Clamper. Power Supply: Rectifiers-Halfwave, Full wave, Bridge rectifier, filter circuits, Voltage regulation using shunt & series regulator circuits, Voltage regulation using IC723                                                                                                                                                                                                                                              |                                                                                                      |          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                      |          |
| UNIT-III                                                                                                                                                                                                                                                                                                                                                                                                                                                              | BIPOLAR DEVICES                                                                                      | 9 Hours  |
| Construction, basic operation, current components and equations, CB, CE and CC configuration, input and output characteristics, Early effect, Region of operations: active, cut-off and saturation region. BJT as an amplifier and switch - Photo transistor, Uni-junction Transistor (UJT) and Thyristors: UJT: Principle of operation, characteristics, UJT relaxation oscillator                                                                                   |                                                                                                      |          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                      |          |
| UNIT-IV                                                                                                                                                                                                                                                                                                                                                                                                                                                               | SMALL SIGNAL ANALYSIS OF BJT                                                                         | 9 Hours  |
| Small signal Amplifier, Amplifier Bandwidth, Hybrid model, analysis of transistor amplifier using h-parameter, Multistage Amplifier: Cascading amplifier, Boot-strapping Technique, Darlington amplifier and Cascode amplifier, Coupling methods in multistage amplifier, Low and high frequency response, Hybrid $\pi$ model, Current Mirror circuits.                                                                                                               |                                                                                                      |          |
| UNIT-V                                                                                                                                                                                                                                                                                                                                                                                                                                                                | FET & IC                                                                                             | 9 Hours  |
| JFET Construction, n-channel and p-channel, transfer and drain characteristics, parameters, Equivalent model and voltage gain, analysis of FET in CG, CS and CD configuration. Enhancement and Depletion MOSFET drain and transfer Characteristics.                                                                                                                                                                                                                   |                                                                                                      |          |
| Integrated Circuit Fabrication Process: oxidation, diffusion, ion implantation, photolithography, etching, chemical vapor deposition, sputtering, twin-tub CMOS process                                                                                                                                                                                                                                                                                               |                                                                                                      |          |
| Total Hours                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                      | 45 Hours |
| Text Book(s)                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                      |          |
| 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Donald .A. Neamen, Electronic Circuit Analysis and Design –2 nd Edition, Tata Mc Graw Hill, 2009.    |          |
| 2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | David A. Bell, "Electronic Devices and Circuits", Oxford Higher Education press, 5 th Edition, 2010. |          |
| Reference Book(s)                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                      |          |
| 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Salivahanan, Kumar & Vallavaraj, “Electronic Devices and Circuits”, TMH, 2016.                       |          |
| 2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Theodore F. Bogart, Jeffrey S. Beasley, “Guillermo Rico Electronic Devices & Circuits”, PHI, 2014.   |          |
| 3.                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Millman & Halkias, “Electronic Devices and Circuits”, TMH, 2013.                                     |          |



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**B.E. (Electronics and Communication Engineering)**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                   |                   |      |      |      |      |                          |      |      |       |       |       |                                 |       |      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|-------------------|------|------|------|------|--------------------------|------|------|-------|-------|-------|---------------------------------|-------|------|
| Course Code                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                   | L                 | T    | P    | C    | IA   | EA                       | TM   |      |       |       |       |                                 |       |      |
| Course Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | DIGITAL SYSTEM DESIGN                                                                             | 3                 | 0    | 0    | 3    | 40   | 60                       | 100  |      |       |       |       |                                 |       |      |
| Course Category                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | PROGRAMME CORE COURSE                                                                             | Syllabus Revision |      |      |      |      |                          |      |      |       |       |       |                                 |       |      |
| Pre-requisite                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Basic electronics, Boolean algebra and Number systems.                                            |                   |      |      |      |      |                          |      |      |       |       |       |                                 |       |      |
| 1. The course should enable the students –<br>2. To introduce basic postulates of Boolean algebra and shows the correlation between Boolean expressions.<br>3. To introduce the methods for simplifying Boolean expressions.<br>4. To outline the formal procedures for the analysis and design of combinational circuits and Sequential circuits.<br>5. To introduce the concept of memories and programmable logic devices.<br>6. To illustrate the concept of synchronous and asynchronous sequential circuits. |                                                                                                   |                   |      |      |      |      |                          |      |      |       |       |       |                                 |       |      |
| Course Outcomes:<br>On completion of the course, the student will be able to                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                   |                   |      |      |      |      |                          |      |      |       |       |       |                                 |       |      |
| Course Outcomes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Description                                                                                       |                   |      |      |      |      | Highest Bloom's Taxonomy |      |      |       |       |       |                                 |       |      |
| CO1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Explain the basic theorems and properties of Boolean algebra.                                     |                   |      |      |      |      | K3                       |      |      |       |       |       |                                 |       |      |
| CO2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Utilize K- Map for gate level minimization of the given Boolean function                          |                   |      |      |      |      | K5                       |      |      |       |       |       |                                 |       |      |
| CO3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Construct combinational logic circuits for the given requirement and determine their performance. |                   |      |      |      |      | K5                       |      |      |       |       |       |                                 |       |      |
| CO4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Design synchronous and asynchronous sequential circuits using VERILOG.                            |                   |      |      |      |      | K6                       |      |      |       |       |       |                                 |       |      |
| CO5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Illustrate the Classifications of memories and programmable logic devices.                        |                   |      |      |      |      | K6                       |      |      |       |       |       |                                 |       |      |
| Correlation between Course Outcomes(COs) and Program Outcomes(POs):                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                   |                   |      |      |      |      |                          |      |      |       |       |       |                                 |       |      |
| COs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Program Outcomes(POs)                                                                             |                   |      |      |      |      |                          |      |      |       |       |       | Program Specific Outcomes(PSOs) |       |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | PO1                                                                                               | PO 2              | PO 3 | PO 4 | PO 5 | PO 6 | PO 7                     | PO 8 | PO 9 | PO 10 | PO 11 | PO 12 | PS O 1                          | PS O2 | PSO3 |
| CO1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | S                                                                                                 | M                 | M    | M    | -    | -    | -                        | -    | -    | -     | S     | S     | S                               | S     | M    |
| CO2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | S                                                                                                 | S                 | S    | S    | -    | -    | -                        | -    | -    | -     | M     | L     | M                               | S     | M    |
| CO3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | -                                                                                                 | S                 | S    | M    | -    | M    | -                        | -    | -    | -     | M     | M     | S                               | S     | M    |
| CO4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | S                                                                                                 | S                 | S    | S    | M    | -    | -                        | -    | -    | -     | S     | M     | M                               | S     | L    |
| CO5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | S                                                                                                 | S                 | S    | S    | S    | -    | -                        | -    | -    | -     | M     | M     | S                               | S     | M    |



**Syllabus (2024-25)**  
**B.E. (Electronics and Communication Engineering)**

| UNIT-I                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | INTRODUCTION                                     | 9Hours |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|--------|
| <p>Minimization Techniques: Boolean postulates and laws – De-Morgan’s Theorem - Principle of Duality - Boolean expression - Minimization of Boolean expressions — Minterm – Maxterm -Sum of Products (SOP) – Product of Sums (POS) – Karnaugh map Minimization – Don’t care conditions –Quine-McCluskey method of minimization.</p> <p>Logic Gates: AND, OR, NOT, NAND, NOR, Exclusive-OR and Exclusive-NOR Implementations of Logic Functions using gates,NAND –NOR implementations – Multi level gate implementations-Multi output gate implementations.TTL and CMOS Logic and their Characteristics–Tristate gates.</p>                                                                                    |                                                  |        |
| UNIT-II                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | COMBINATIONAL CIRCUITS                           | 9Hours |
| <p>Design procedure–Half adder–Full Adder–Half subtractor–Full subtractor– Parallel binary adder, parallel binary Subtractor – Fast Adder - Carry Look Ahead adder – Serial Adder/Subtractor - BCD adder – Binary Multiplier – Binary Divider - Multiplexer/ Demultiplexer-decoder-encoder–parity checker–parity generators–code converters- Magnitude Comparator.</p>                                                                                                                                                                                                                                                                                                                                        |                                                  |        |
| UNIT-III                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | SEQUENTIAL CIRCUITS                              | 9Hours |
| <p>Latches, Flip-flops - SR, JK, D, T, and Master-Slave – Characteristic table and equation – Application table – Edge triggering – Level Triggering – Realization of one flip flop using other flip flops – serial adder/subtractor Asynchronous Ripple or serial counter – Asynchronous Up/Down counter - Synchronous counters – Synchronous Up/Down counters – Programmable counters – Design of Synchronous counters: state diagram- State table –State minimization –State assignment -Excitation table and maps-Circuit implementation - Modulo–n counter, Registers – shift registers - Universal shift registers – Shift register counters – Ring counter – Shift counters - Sequence generators.</p> |                                                  |        |
| UNIT-IV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | SYNCHRONOUS AND ASYNCHRONOUS SEQUENTIAL CIRCUITS | 9Hours |
| <p>Synchronous Sequential Circuits: General Model – Classification – Design – Use of Algorithmic State Machine – Analysis of Synchronous Sequential Circuits Asynchronous Sequential Circuits: Design of fundamental mode and pulse mode circuits – Incompletely specified State Machines – Problems in Asynchronous Circuits – Design of Hazard Free Switching circuits. Design of Combinational and Sequential circuits using VERILOG.</p>                                                                                                                                                                                                                                                                  |                                                  |        |
| UNIT-V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | MEMORY DEVICES                                   | 9Hours |
| <p>Classification of memories – ROM - ROM organization - PROM – EPROM – EEPROM – EAPROM, RAM – RAM organization – Write operation – Read operation – Memory cycle - Timingwave forms – Memory decoding – memory expansion – Static RAM Cell- Bipolar RAM cell – MOSFET RAM cell – Dynamic RAM cell–Programmable Logic Devices– Programmable Logic Array (PLA)- Programmable Array Logic (PAL) – Field Programmable Gate Arrays(FPGA)-Implementation of combinational logic circuits using ROM,PLA,PAL</p>                                                                                                                                                                                                     |                                                  |        |



**Syllabus (2024-25)**  
**B.E. (Electronics and Communication Engineering)**

|                    |                |
|--------------------|----------------|
| <b>Total Hours</b> | <b>45Hours</b> |
|--------------------|----------------|

| <b>Text Book(s)</b>      |                                                                                                                                       |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| 1.                       | M.Morris Mano, “Digital Design”, 4e, Prentice Hall of India Pvt.Ltd., 2008/<br>Pearson Education (Singapore) Pvt.Ltd. NewDelhi, 2003. |
| 2.                       | Donald P.Leach and Albert Paul Malvino, “Digital Principles and Applications”, 6th<br>Edition, TMH, 2006.                             |
| <b>Reference Book(s)</b> |                                                                                                                                       |
| 1.                       | John F.Wakerly, “Digital Design”, Fourth Edition, Pearson / PHI, 2008.                                                                |
| 2.                       | John Yarbrough, “Digital Logic Applications and Design”, Thomson Learning, 2006.                                                      |
| 3.                       | Charles H.Roth. “Fundamentals of Logic Design”, 6 <sup>th</sup> Edition, Thomson Learning, 2013.                                      |
| 4.                       | Thomas L.Floyd, “Digital Fundamentals”, 10th Edition, Pearson Education Inc, 2011.                                                    |
| 5.                       | Donald D.Givone, “Digital Principles and Design”, TMH, 2003.                                                                          |
| 6.                       | A.AnandaKumar, Fundamentals of digital circuits, second edition, PHI learning private<br>Limited, 2009.                               |



**Syllabus (2024-25)**  
**B.E. (Electronics and Communication Engineering)**

|                                                                                                                           |                                                                                                                           |                   |      |      |      |      |                          |      |      |       |       |       |                                   |       |      |
|---------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|-------------------|------|------|------|------|--------------------------|------|------|-------|-------|-------|-----------------------------------|-------|------|
| Course Code                                                                                                               |                                                                                                                           | L                 | T    | P    | C    | IA   | EA                       | TM   |      |       |       |       |                                   |       |      |
| Course Name                                                                                                               | SIGNALS AND SYSTEMS                                                                                                       | 3                 | 0    | 0    | 3    | 40   | 60                       | 100  |      |       |       |       |                                   |       |      |
| Course Category                                                                                                           | PROGRAMME CORE COURSE                                                                                                     | Syllabus Revision |      |      |      |      |                          |      |      |       |       |       |                                   |       |      |
| Pre-requisite                                                                                                             | Mathematics–I & II                                                                                                        |                   |      |      |      |      |                          |      |      |       |       |       |                                   |       |      |
| Course Objectives:<br>The course should enable the students-                                                              |                                                                                                                           |                   |      |      |      |      |                          |      |      |       |       |       |                                   |       |      |
| 1. To understand the properties and representation of discrete and continuous signals.                                    |                                                                                                                           |                   |      |      |      |      |                          |      |      |       |       |       |                                   |       |      |
| 2. To analyze continuous time signals and system in the Fourier and Laplace domain.                                       |                                                                                                                           |                   |      |      |      |      |                          |      |      |       |       |       |                                   |       |      |
| 3. To analyze discrete time signals and system in the Fourier and Z transform domain.                                     |                                                                                                                           |                   |      |      |      |      |                          |      |      |       |       |       |                                   |       |      |
| 4. To development of the mathematical skills to solve problems involving convolution, filtering, modulation and sampling. |                                                                                                                           |                   |      |      |      |      |                          |      |      |       |       |       |                                   |       |      |
|                                                                                                                           |                                                                                                                           |                   |      |      |      |      |                          |      |      |       |       |       |                                   |       |      |
| Course Outcomes:<br>On completion of the course,the student will be able to                                               |                                                                                                                           |                   |      |      |      |      |                          |      |      |       |       |       |                                   |       |      |
| Course outcomes                                                                                                           | Description                                                                                                               |                   |      |      |      |      | Highest Bloom's Taxonomy |      |      |       |       |       |                                   |       |      |
| CO1                                                                                                                       | Understand and classify systems based on the impulse response behavior of both continuous-time and discrete-time systems. |                   |      |      |      |      | K2                       |      |      |       |       |       |                                   |       |      |
| CO2                                                                                                                       | Analyze and Evaluate the mathematical modeling of various signals and systems..                                           |                   |      |      |      |      | K4                       |      |      |       |       |       |                                   |       |      |
| CO3                                                                                                                       | Analyze the Continuous time signals using Fourier series and Fourier Transforms.                                          |                   |      |      |      |      | K3                       |      |      |       |       |       |                                   |       |      |
| CO4                                                                                                                       | Examine the Continuous time LTI systems using Fourier series and Fourier Transforms.                                      |                   |      |      |      |      | K5                       |      |      |       |       |       |                                   |       |      |
| CO5                                                                                                                       | Analyze sampling process and sampling of discrete time signals.                                                           |                   |      |      |      |      | K3                       |      |      |       |       |       |                                   |       |      |
|                                                                                                                           |                                                                                                                           |                   |      |      |      |      |                          |      |      |       |       |       |                                   |       |      |
| Correlation between Course Outcomes(COs) and Program Outcomes(POs):                                                       |                                                                                                                           |                   |      |      |      |      |                          |      |      |       |       |       |                                   |       |      |
| COs                                                                                                                       | Program Outcomes(POs)                                                                                                     |                   |      |      |      |      |                          |      |      |       |       |       | Program Specific Outcomes ( PSOs) |       |      |
|                                                                                                                           | PO 1                                                                                                                      | PO 2              | PO 3 | PO 4 | PO 5 | P O6 | PO 7                     | PO 8 | PO 9 | PO 10 | PO 11 | PO 12 | PS O1                             | PS O2 | PSO3 |
| CO1                                                                                                                       | S                                                                                                                         | S                 | -    | M    |      | -    | -                        | -    | -    | -     | -     | L     | M                                 | -     | S    |
| CO2                                                                                                                       | S                                                                                                                         | S                 | M    | S    | -    | -    | -                        | -    | -    | -     | -     | L     | M                                 | -     | S    |
| CO3                                                                                                                       | S                                                                                                                         | S                 | M    | M    | -    | -    | -                        | -    | -    | -     | -     | L     | L                                 | -     | S    |
| CO4                                                                                                                       | S                                                                                                                         | S                 | S    | -    | -    | -    | -                        | -    | -    | -     | -     | L     | L                                 | -     | S    |
| CO5                                                                                                                       | S                                                                                                                         | S                 | M    | M    | -    | -    | -                        | -    | -    | -     | -     | L     | M                                 | M     | S    |



**Syllabus (2024-25)**  
**B.E. (Electronics and Communication Engineering)**

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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|---------|
| UNIT-I                                                                                                                                                                                                                                                                                          | CLASSIFICATION OF SIGNALS AND SYSTEMS                                                                                     | 9Hours  |
| Continuous Time Signals (CT signals), Discrete time signals (DT signals) step, ramp, pulse, impulse, exponential, Classification of CT and DT signals-periodic, aperiodic, random signals-CT systems And DT systems, Basic properties of systems- Linear Time invariant systems and properties. |                                                                                                                           |         |
| UNIT-II                                                                                                                                                                                                                                                                                         | ANALYSIS OF CONTINUOUS TIME SIGNALS                                                                                       | 9Hours  |
| Fourier Series Analysis- Representation of periodic signals in trigonometric and exponential form, Spectrum of CT signals-Fourier Transform and Laplace Transform in signal analysis.                                                                                                           |                                                                                                                           |         |
| UNIT-III                                                                                                                                                                                                                                                                                        | LINEAR TIME INVARIANT-CONTINUOUS TIME SYSTEMS                                                                             | 9Hours  |
| Differential Equation - Block diagram Representation, Impulse response, Convolution IntegralFrequency response, Fourier and Laplace Transforms in analysis, State variable equations and Matrix representation of systems.                                                                      |                                                                                                                           |         |
| UNIT-IV                                                                                                                                                                                                                                                                                         | ANALYSIS OF DISCRETE TIME SYSTEMS                                                                                         | 9Hours  |
| Sampling of CT signals and aliasing, DTFT and properties, Z-transform and properties of Z transform                                                                                                                                                                                             |                                                                                                                           |         |
| UNIT-V                                                                                                                                                                                                                                                                                          | LINEAR TIME INVARIANT- DISCRETE TIME SYSTEMS                                                                              | 9Hours  |
| Difference equations, Block Diagram representation, Impulse response, Convolution sum, LTI systems analysis using DTFT and Z-transforms, State variable equations and matrix representation of systems.                                                                                         |                                                                                                                           |         |
| Total Hours                                                                                                                                                                                                                                                                                     |                                                                                                                           | 45Hours |
| Text Book(s)                                                                                                                                                                                                                                                                                    |                                                                                                                           |         |
| 1.                                                                                                                                                                                                                                                                                              | P.Ramesh Babu & R.Anandanatarajan,signals and systems,4 <sup>th</sup> edition, Scitech Publication Private limited, 2009. |         |
| 2.                                                                                                                                                                                                                                                                                              | Allam V.Oppenheim, S.Wilsky and S.H.Nawab, Signals and systems, Pearson Education, 2007.                                  |         |
| Reference Book(s)                                                                                                                                                                                                                                                                               |                                                                                                                           |         |
| 1.                                                                                                                                                                                                                                                                                              | Robert A.Gabel and Richard A.Roberts, Signals & Linear Systems, John Wiley & Sons 2004.                                   |         |
| 2.                                                                                                                                                                                                                                                                                              | Simon Haykins and Barry VanVeen, Signals and Systems, John Wiley & Sons, 2004.                                            |         |



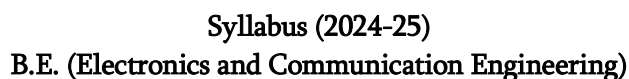
**Syllabus (2024-25)**  
**B.E. (Electronics and Communication Engineering)**

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|-------------------|------|------|------|------|--------------------------|------|------|-------|-------|-------|----------------------------------|------|------|
| Course Code                                                                                                                                                                                                                                                                                            |                                                      | L                 | T    | P    | C    | IA   | EA                       | TM   |      |       |       |       |                                  |      |      |
| Course Name                                                                                                                                                                                                                                                                                            | NETWORK THEORY                                       | 3                 | 0    | 0    | 3    | 40   | 60                       | 100  |      |       |       |       |                                  |      |      |
| Course Category                                                                                                                                                                                                                                                                                        | PROGRAMME CORE COURSE                                | Syllabus Revision |      |      |      |      |                          |      |      |       |       |       |                                  |      |      |
| Pre-requisite                                                                                                                                                                                                                                                                                          |                                                      |                   |      |      |      |      |                          |      |      |       |       |       |                                  |      |      |
| <b>Course Objectives:</b><br>The course should enable the students-<br><div><div>1. To introduce electric circuits and its analysis</div><div>2. To impart knowledge on solving circuits using network theorems</div><div>3. To introduce the phenomenon of resonance in coupled circuits.</div></div> |                                                      |                   |      |      |      |      |                          |      |      |       |       |       |                                  |      |      |
|                                                                                                                                                                                                                                                                                                        |                                                      |                   |      |      |      |      |                          |      |      |       |       |       |                                  |      |      |
| <b>Course Outcomes:</b><br>On completion of the course, the student will be able to<br><div><div>Ability to analyze electric circuits</div><div>Ability to apply circuit theorems</div><div>Ability to analyze AC and DC Circuits</div></div>                                                          |                                                      |                   |      |      |      |      |                          |      |      |       |       |       |                                  |      |      |
| Course Outcomees                                                                                                                                                                                                                                                                                       | Description                                          |                   |      |      |      |      | Highest Bloom's Taxonomy |      |      |       |       |       |                                  |      |      |
| CO1                                                                                                                                                                                                                                                                                                    | Concepts, Nodal, Mesh methods                        |                   |      |      |      |      | K2                       |      |      |       |       |       |                                  |      |      |
| CO2                                                                                                                                                                                                                                                                                                    | Sinusoidal Analysis, Resonance, three phase circuits |                   |      |      |      |      | K3                       |      |      |       |       |       |                                  |      |      |
| CO3                                                                                                                                                                                                                                                                                                    | Network Theorem and Application                      |                   |      |      |      |      | K3                       |      |      |       |       |       |                                  |      |      |
| CO4                                                                                                                                                                                                                                                                                                    | Circuit Response RLC, DC & AC Excitation             |                   |      |      |      |      | K2                       |      |      |       |       |       |                                  |      |      |
| CO5                                                                                                                                                                                                                                                                                                    | Two Port Networks, synthesis Networks.               |                   |      |      |      |      | K3                       |      |      |       |       |       |                                  |      |      |
|                                                                                                                                                                                                                                                                                                        |                                                      |                   |      |      |      |      |                          |      |      |       |       |       |                                  |      |      |
| <b>Correlation between Course Outcomes (COs) and Program Outcomes (POs):</b>                                                                                                                                                                                                                           |                                                      |                   |      |      |      |      |                          |      |      |       |       |       |                                  |      |      |
| COs                                                                                                                                                                                                                                                                                                    | Program Outcomes (POs)                               |                   |      |      |      |      |                          |      |      |       |       |       | Program Specific Outcomes (PSOs) |      |      |
|                                                                                                                                                                                                                                                                                                        | PO 1                                                 | PO 2              | PO 3 | PO 4 | PO 5 | PO 6 | PO 7                     | PO 8 | PO 9 | PO 10 | PO 11 | PO 12 | PS O1                            | PSO2 | PSO3 |
| CO1                                                                                                                                                                                                                                                                                                    | S                                                    | S                 | S    | S    | M    | L    | -                        | -    | M    | L     | -     | S     |                                  |      |      |
| CO2                                                                                                                                                                                                                                                                                                    | S                                                    | S                 | S    | S    | M    | -    | -                        | -    | M    | L     | -     | M     |                                  |      |      |
| CO3                                                                                                                                                                                                                                                                                                    | S                                                    | S                 | M    | M    | M    | M    | -                        | -    | M    | L     | -     | S     |                                  |      |      |
| CO4                                                                                                                                                                                                                                                                                                    | S                                                    | M                 | S    | M    | M    | M    | -                        | -    | L    | L     | -     | M     |                                  |      |      |
| CO5                                                                                                                                                                                                                                                                                                    | S                                                    | S                 | S    | S    | M    | L    | -                        | -    | L    | L     | -     | S     |                                  |      |      |



**Syllabus (2024-25)**  
**B.E. (Electronics and Communication Engineering)**

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| <b>UNIT-I</b>                                                                                                                                                                                                                                                                                                                                                                                                            | <b>CIRCUIT CONCEPTS AND MESH &amp; NODAL METHODS</b> | <b>9 Hours</b>  |
| Lumped circuits – Kirchhoff's Laws – Voltage - Current relationships of R, L and C – Independent sources Dependent sources –Simple resistive circuits – Network reduction – Voltage division – Current division –Source transformation. Formation of matrixequations and analysis of AC and DC circuits using mesh-current and nodal-voltage. Methods – Mutual inductance – Coefficient of Coupling – Ideal transformer. |                                                      |                 |
| <b>UNIT-II</b>                                                                                                                                                                                                                                                                                                                                                                                                           | <b>SINUSOIDAL STEADY STATE ANALYSIS</b>              | <b>9 Hours</b>  |
| Phasor – Sinusoidal steady state response – concepts of impedance and admittance- analysis of simple circuits – Power and Powerfactor – series resonance and parallel resonance – Bandwidth and Q factor Solution of three-phase balanced and unbalancedcircuits.                                                                                                                                                        |                                                      |                 |
| <b>UNIT-III</b>                                                                                                                                                                                                                                                                                                                                                                                                          | <b>NETWORK THEOREMS AND APPLICATIONS:</b>            | <b>9 Hours</b>  |
| Superposition theorem – Reciprocity theorem – Compensation theorem – Substitution theorem – Maximum Power transfer theorem– Thevenin's theorem – Norton's theorem and Millman's theorem with applications.                                                                                                                                                                                                               |                                                      |                 |
| <b>UNIT-IV</b>                                                                                                                                                                                                                                                                                                                                                                                                           | <b>TRANSIENT ANALYSIS</b>                            | <b>9 Hours</b>  |
| Forced and free response of RL, RC and RLC circuits with D.C. and sinusoidal excitations.                                                                                                                                                                                                                                                                                                                                |                                                      |                 |
| <b>UNIT-V</b>                                                                                                                                                                                                                                                                                                                                                                                                            | <b>TWO PORT NETWORKS AND SYNTHESIS</b>               | <b>9 Hours</b>  |
| Characterization of two port networks in terms of Z,Y,H and T parameters – networks equivalents – relations between networkparameters – Analysis of T, Ladder ,Bridged – T and lattice networks – Characteristics Ideal filter - low pass and high pass filter.Reliability of one port network – Hurwitz polynomials and properties – P. R. functions and properties – synthesis of RL, RC and RLC one port networks.    |                                                      |                 |
| <b>Total Hours</b>                                                                                                                                                                                                                                                                                                                                                                                                       |                                                      | <b>45 Hours</b> |
| <b>Text Books:</b>                                                                                                                                                                                                                                                                                                                                                                                                       |                                                      |                 |
| 1. Hyatt W.H. and Kemmerly, "Engineering Circuits Analysis", McGraw- Hill International 8th Edition 2011.                                                                                                                                                                                                                                                                                                                |                                                      |                 |
| 2. Kuo F.F., "Network Analysis and Synthesis", Wiley International Edition, 2nd Edition 2006.                                                                                                                                                                                                                                                                                                                            |                                                      |                 |
| 3. Paranjothi S.R., "Electric Circuit Analysis", New Age International Ltd., Delhi, 2nd Edition. 2008.                                                                                                                                                                                                                                                                                                                   |                                                      |                 |
| <b>References</b>                                                                                                                                                                                                                                                                                                                                                                                                        |                                                      |                 |
| 1. Edminister J.A., "Theory and Problems of Electric Circuits", Schaum's outline series McGraw Hill Book Company, 4th Edition 2003.                                                                                                                                                                                                                                                                                      |                                                      |                 |
| 2. Sudhakar A and Shyam Mohan S.P., "Circuits and Network Analysis and Synthesis", Tata McGraw – Hill Publishing Ltd., New Delhi 5th Edition 2015.                                                                                                                                                                                                                                                                       |                                                      |                 |
| 3. Van Valkenburg M.E., "Network Analysis", Prentice – Hall of India Private Ltd., New Delhi, Third Edition, 1974.                                                                                                                                                                                                                                                                                                       |                                                      |                 |



**Course Objectives:**

The course should enable the students

1. Introduce standard tools and techniques for software development
2. Automated build process, and an appropriate framework for automated unit.
3. To understand the concept of OOP as well as the purpose and usage principles of Inheritance, polymorphism, encapsulation and method overloading
4. To identify classes, objects, members of a class and the relationships among them needed for a specific problem.

On completion of the course, the student will be able to

### Correlation between Course Outcomes (COs) and Program Outcomes (POs):

[illegible]



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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|----------|
| UNIT-I                                                                                                                                                                                                                                                                                | INTRODUCTION                                                                                                            | 6 Hours  |
| Introduction to object oriented programming, Concepts of object oriented programming. C++ programming basics- Data types, Manipulators, Cin, Cout, Type conversion, arithmetic operators, Loops and decisions.                                                                        |                                                                                                                         |          |
| UNIT-II                                                                                                                                                                                                                                                                               | CLASS ,OBJECT, CONSTRUCTORS & DESTRUCTORS                                                                               | 6 Hours  |
| Class and objects: Basics of class and objects, access specifiers, member functions defined inside and outside the class. Constructors and its types, destructors, object as function arguments, Returning objects from Functions, inline functions, static data and member function. |                                                                                                                         |          |
| UNIT-III                                                                                                                                                                                                                                                                              | ARRAYS & INHERITANCE                                                                                                    | 6 Hours  |
| Arrays: Defining &accessing Array elements, arrays as class member data, array of Objects. Derived class and base class, Types of inheritance, derived class constructors, overriding member functions, Public and private inheritance, Class Hierarchies.                            |                                                                                                                         |          |
| UNIT-IV                                                                                                                                                                                                                                                                               | POLYMORPHISM, FRIEND FUNCTION & FRIEND CLASS                                                                            | 6 Hours  |
| Operator Overloading: Overloading Unary Operators, Operator Arguments, Return Values, Overloading Binary Operators–Arithmetic operators Friend functions, Friend Classes. Memory management -new and delete operator, string class using new.                                         |                                                                                                                         |          |
| UNIT-V                                                                                                                                                                                                                                                                                | VIRTUAL FUNCTION, TEMPLATES AND FEW ADVANCED TOPICS                                                                     | 6 Hours  |
| Pointers- Pointers to Objects Referring to Members, Array of pointers to objects. Virtual Functions, Pure virtual functions, Late Binding, Abstract Classes, Abstract base class, Virtual base classes, the this pointer. Templates- function templates, class template.              |                                                                                                                         |          |
| Total Hours                                                                                                                                                                                                                                                                           |                                                                                                                         | 30 Hours |
| TEXT BOOKS                                                                                                                                                                                                                                                                            |                                                                                                                         |          |
| 1.                                                                                                                                                                                                                                                                                    | Object Oriented Programming in C++-Robert Lafore, Galgotia Publication PvtLtd, Third Edition.                           |          |
| 2.                                                                                                                                                                                                                                                                                    | The Compete Reference C++, Herbert Schlitz, Fifth Edition, 2015.                                                        |          |
| REFERENCES                                                                                                                                                                                                                                                                            |                                                                                                                         |          |
| 1.                                                                                                                                                                                                                                                                                    | Let us C++-Yaswant Kanitkar (for templates), BPB Publication                                                            |          |
| 2.                                                                                                                                                                                                                                                                                    | C++ and Object Oriented Programming Paradigm, PHI                                                                       |          |
| 3.                                                                                                                                                                                                                                                                                    | C++: How to Program,9 <sup>th</sup> Edition,Deitel and Deitel,PHI                                                       |          |
| 4.                                                                                                                                                                                                                                                                                    | Object Oriented Programming in C++- ,E.Balaguruswamy, Tata Mcgraw Hill, 2013                                            |          |
| WEB SOURCE REFERENCES                                                                                                                                                                                                                                                                 |                                                                                                                         |          |
| 1.                                                                                                                                                                                                                                                                                    | <a href="https://www.cse.iitb.ac.in/~cs101/2011.1/">https://www.cse.iitb.ac.in/~cs101/2011.1/</a>                       |          |
| 2.                                                                                                                                                                                                                                                                                    | <a href="https://onlinecourses.nptel.ac.in/noc21_cs02/preview">https://onlinecourses.nptel.ac.in/noc21_cs02/preview</a> |          |



**Syllabus (2024-25)**  
**B.E. (Electronics and Communication Engineering)**

| LIST OF PROGRAMS (15 Hrs.) |                                                                                                 |
|----------------------------|-------------------------------------------------------------------------------------------------|
| 1.                         | Programs to implement control statements and loops                                              |
| 2.                         | To demonstrate the use of Functions with default arguments and inline functions                 |
| 3.                         | Implement member function defined inside and outside the class with different access specifiers |
| 4.                         | To demonstrate the use of constructor with its types and destructor                             |
| 5.                         | Illustrate the use of Friend functions and static members                                       |
| 6.                         | Illustrate the use of Arrays of objects and object as function argument                         |
| 7.                         | To implement the use of Single and multiple inheritance                                         |
| 8.                         | To Implement the use of unary operator overloading                                              |
| 9.                         | To Implement the use of Binary operator overloading                                             |
| 10.                        | To implement the PureVirtual functions and runtime polymorphism                                 |
| 11.                        | To implement the use of function Template                                                       |
| 12.                        | To implement the use of class Template                                                          |



**Syllabus (2024-25)**  
**B.E. (Electronics and Communication Engineering)**

| Course Code     |                                  | L                 | T | P | C | IA | EA | TM  |
|-----------------|----------------------------------|-------------------|---|---|---|----|----|-----|
| Course Name     | ELECTRONIC DEVICES<br>LABORATORY | 0                 | 0 | 3 | 2 | 40 | 60 | 100 |
| Course Category | PROGRAMME CORE<br>COURSE         | Syllabus Revision |   |   |   |    |    |     |
| Pre-requisite   |                                  |                   |   |   |   |    |    |     |

**Course Objectives:**

The course should enable the students

1. To understand various tools used for designing circuits.
2. To analyze the characteristics of Semiconductor devices.
3. To construct semiconductor devices for practical applications.
4. To design of amplifiers and analyze their characteristics.
5. To analyze the frequency response characteristics of small signal amplifier.
6. To enable to students to work in a team and build applications.

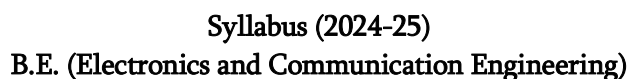
**Course Outcomes:**

On completion of the course, the student will be able to

| Course Outcomes | Description                                                                                                     | Highest Bloom's Taxonomy |
|-----------------|-----------------------------------------------------------------------------------------------------------------|--------------------------|
| CO1             | Construct and evaluate the Performance characteristics of various semiconductor devices.                        | K2                       |
| CO2             | Integrate the semiconductor devices for Practical Application.                                                  | K3                       |
| CO3             | Design amplifier circuit and analyze the design of frequency response of the small Signal Amplifier.            | K3                       |
| CO4             | Design various circuits using software tools and integrate and compare the findings in hardware implementation. | K4                       |
| CO5             | Demonstrate capability to work in a team and to build circuits for various applications.                        | K4                       |

**Correlation between Course Outcomes (COs) and Program Outcomes (POs):**

| COs | Program Outcomes (POs) |      |      |      |      |      |      |      |      |       |       |       | Program Specific Outcomes (PSOs) |      |      |
|-----|------------------------|------|------|------|------|------|------|------|------|-------|-------|-------|----------------------------------|------|------|
|     | PO 1                   | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PO 11 | PO 12 | PS O1                            | PSO2 | PSO3 |
| CO1 | S                      | S    | S    | S    | S    | L    | -    | -    | -    | -     | -     | M     | S                                | M    | M    |
| CO2 | S                      | S    | S    | S    | S    | L    | -    | -    | -    | -     | -     | M     | S                                | M    | M    |
| CO3 | S                      | S    | S    | S    | S    | L    | -    | -    | -    | -     | -     | M     | S                                | M    | M    |



|  |                            |  |  |  |  |  |  |  |  |
|--|----------------------------|--|--|--|--|--|--|--|--|
|  |                            |  |  |  |  |  |  |  |  |
|  | <b>LIST OF EXPERIMENTS</b> |  |  |  |  |  |  |  |  |

- |             |          |
|-------------|----------|
|             |          |
|             |          |
| Total Hours | 45 Hours |

|    |                                                                                                   |
|----|---------------------------------------------------------------------------------------------------|
| 1. | Donald .A. Neamen, Electronic Circuit Analysis and Design –2 nd Edition, Tata Mc Graw Hill, 2009. |
| 2. | R.S.Sedha, “Text book of Applied Electronics”, Second edition, S Chand publishing, 2008.          |

|    |                                                                             |
|----|-----------------------------------------------------------------------------|
| 1. | R. A. Gayakwad, “Op-Amps And Linear Integrated Circuits”, PHI, 2010.        |
| 2. | Schilling & Belove, “Electronic Circuits, Discrete & Integrated”, TMH.2011. |
| 3. | Boylestad & Neshelsky, “Electronic Devices & Circuits”, PHI.2012.           |



**Syllabus (2024-25)**  
**B.E. (Electronics and Communication Engineering)**

|                 |                                     |                   |   |   |   |    |    |     |
|-----------------|-------------------------------------|-------------------|---|---|---|----|----|-----|
| Course Code     |                                     | L                 | T | P | C | IA | EA | TM  |
| Course Name     | DIGITAL SYSTEM DESIGN<br>LABORATORY | 0                 | 0 | 3 | 2 | 40 | 60 | 100 |
| Course Category | PROGRAMME CORE<br>COURSE            | Syllabus Revision |   |   |   |    |    |     |
| Pre-requisite   |                                     |                   |   |   |   |    |    |     |

**Course Objectives:**

The course should enable the students

1. To understand, the logical behaviors of digital circuits.
2. To design combinational circuit.
3. To analyze the operation of logic gates and flip-flops.
4. To Design and Construct Hazard Free digital circuits.
5. To enable to students to work in a team and build applications.

**Course Outcomes:**

On completion of the course, the student will be able to

| <b>Course Outcomes</b> | <b>Description</b>                                                                         | <b>Highest Bloom's Taxonomy</b> |
|------------------------|--------------------------------------------------------------------------------------------|---------------------------------|
| CO1                    | Verify the truth table for logic gates and Flip-flops.                                     | K2                              |
| CO2                    | Design and test of combinational Circuits                                                  | K3                              |
| CO3                    | Design and test of Sequential Circuits.                                                    | K3                              |
| CO4                    | Design of Hazard Free Switching Devices and integrate high configuration digital circuits. | K3                              |
| CO5                    | Demonstrate capability to work in a team and to build circuits for various applications.   | K4                              |

**Correlation between Course Outcomes(COs) and Program Outcomes(POs):**

| <b>COs</b> | <b>Program Outcomes(POs)</b> |     |     |     |     |     |     |     |     |      |      |      | <b>Program Specific Outcomes(PSOs)</b> |       |       |
|------------|------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|----------------------------------------|-------|-------|
|            | PO1                          | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PS O1                                  | PS O2 | PS O3 |
| CO1        | S                            | S   | S   | S   | S   | L   | -   | -   | -   | -    | -    | M    | S                                      | M     | M     |
| CO2        | S                            | S   | S   | S   | S   | L   | -   | -   | -   | -    | -    | M    | S                                      | M     | M     |
| CO3        | S                            | S   | S   | S   | S   | L   | -   | -   | -   | -    | -    | M    | S                                      | M     | M     |
| CO4        | S                            | S   | S   | S   | S   | L   | -   | -   | -   | -    | -    | M    | S                                      | M     | M     |
| CO5        | S                            | S   | S   | S   | S   | L   | -   | -   | -   | -    | -    | M    | S                                      | M     | M     |



**Syllabus (2024-25)**  
**B.E. (Electronics and Communication Engineering)**

| LIST OF EXPERIMENTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                 |          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|----------|
| <div>1. Study of Multisim and LT spice.</div> <div>2. Study of Gates &amp; Flip-flops.</div> <div>3. Half Adder and Full Adder.</div> <div>4. Encoders and Decoders.</div> <div>5. Multiplexer and De-multiplexer.</div> <div>6. Magnitude Comparator (2-Bit) and Code Converter.</div> <div>7. Synchronous Counters.</div> <div>8. Ripple Counter and Mod–N Counter.</div> <div>9. Shift Register–SISO/SIPO/PIPO/PISO</div> <div>10. Design of Memory Devices</div> <div>11. Design of Hazard Free Switching circuits.</div> <div>12. Design of Mealy and Moore Circuits.</div> |                                                                                                 |          |
| Total Hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                 | 45 Hours |
| Text Book(s)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                 |          |
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | M.Morris Mano, “Digital Design”, 4 <sup>th</sup> edition, Prentice Hall of IndiaPvt.Ltd., 2008. |          |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Thomas L.Floyd, “Digital Fundamentals”, 10th Edition, Pearson Education Inc, 2011.              |          |
| Reference Book(s)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                 |          |
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | JohnYarbrough, “Digital Logic Applications and Design”, Thomson Learning, 2006.                 |          |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | CharlesH.Roth. “Fundamentals of Logic Design”, 6thEdition, Thomson Learning, 2013.              |          |



**Syllabus (2024-25)**  
**B.E. (Electronics and Communication Engineering)**

**SEMESTER - IV**

| Course Code     |                                                                                 | L                 | T | P | C | IA | EA | TM  |
|-----------------|---------------------------------------------------------------------------------|-------------------|---|---|---|----|----|-----|
| Course Name     | MATHEMATICS - IV<br>(CALCULUS, SPECIAL<br>FUNCTIONSANDDESIGN<br>OF EXPERIMENTS) | 3                 | 1 | 0 | 4 | 40 | 60 | 100 |
| Course Category | BASIC SCIENCE COURSES<br>(BSC)                                                  | Syllabus Revision |   |   |   |    |    |     |
| Pre-requisite   | Knowledge of Mathematics–Iand Mathematics–II                                    |                   |   |   |   |    |    |     |

**Course Objectives:**

The course should enable the students

1. To understand the homogeneous functions for two variables and its total derivatives.
2. To understand the applications of vector products.
3. To analyze the solutions of a differential equation in terms of series.
4. To know about the special functions and its properties.
5. To investigate the experiments which are in terms of one, two and three factors.

**Course Outcomes:**

On completion of the course, the student will be able to

| Course Outcomes | Description                                                                                                       | Highest Bloom's Taxonomy |
|-----------------|-------------------------------------------------------------------------------------------------------------------|--------------------------|
| CO1             | Calculate the maximum and minimum values for functions of two variables and aware about the Lagrange multipliers. | K3                       |
| CO2             | Identify the relation between the line integral, surface integral and volume integral.                            | K3                       |
| CO3             | Find the series solution for Bessel function.                                                                     | K3                       |
| CO4             | Find the solutions for various problems by using recurrence relations                                             | K3                       |
| CO5             | Analyze the various factors and capable to conclude about the decisions.                                          | K4                       |

**Correlation between Course Outcomes(COs) and Program Outcomes(POs):**

| COs | Program Outcomes(POs) |      |      |      |      |      |      |      |      |       |       |       | Program Specific Outcomes(PSOs) |       |       |
|-----|-----------------------|------|------|------|------|------|------|------|------|-------|-------|-------|---------------------------------|-------|-------|
|     | PO 1                  | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PO 11 | PO 12 | PS O1                           | PS O2 | PS O3 |
| CO1 | S                     | M    | M    | -    | -    | -    | -    | -    | -    | -     | -     | L     | M                               | S     | -     |
| CO2 | M                     | S    | L    | -    | -    | -    | -    | -    | -    | -     | -     | L     | L                               | M     | S     |
| CO3 | S                     | S    | M    | -    | -    | -    | -    | -    | -    | -     | -     | L     | M                               | -     | S     |
| CO4 | M                     | L    | S    | -    | -    | -    | -    | -    | -    | -     | -     | L     | M                               | S     | S     |
| CO5 | L                     | L    | L    | S    | -    | -    | -    | -    | -    | -     | -     | L     | S                               | -     | S     |



**Syllabus (2024-25)**  
**B.E. (Electronics and Communication Engineering)**

|                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                      |         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|---------|
| UNIT-I                                                                                                                                                                                                                                                                                                                                                                                                                                   | CALCULUS                                                                                                             | 9Hours  |
| Homogeneous Functions-Total derivative-Change of variables-Jacobian-Taylor's theorem for function of two variables-Maxima and Minima of functions of two variables-Lagranges method of undermined multipliers.                                                                                                                                                                                                                           |                                                                                                                      |         |
| UNIT-II                                                                                                                                                                                                                                                                                                                                                                                                                                  | MULTIVARIABLE CALCULUS                                                                                               | 9Hours  |
| Directional derivatives-Gradient-curl and divergence-Problems on Green-Gauss and Stokes theorems- orthogonal curvilinear coordinates-Simple applications involving cubes, sphere and rectangular parallelepipeds.                                                                                                                                                                                                                        |                                                                                                                      |         |
| UNIT-III                                                                                                                                                                                                                                                                                                                                                                                                                                 | SPECIAL FUNCTIONS-I                                                                                                  | 9Hours  |
| Validity of series solution - Series solution when $x=0$ is an ordinary point - Frobenius method (Series solution when $x=0$ is a regular singularity) - Bessel's equation (Bessel's functions of the first and second kind) - Recurrence formulae for $J_n(x)$ - Expansions for $J_0$ and $J_1$ : Value of $J_{1/2}$ - Generating function for $J_n(x)$ - Equations reducible to Bessel's equation – Orthogonality of Bessel functions. |                                                                                                                      |         |
| UNIT-IV                                                                                                                                                                                                                                                                                                                                                                                                                                  | SPECIAL FUNCTION-II                                                                                                  | 9Hours  |
| Legendre's Equation –Rodrigue's Formula – Legendre Polynomials – Generating Function for $P_n(x)$ - Recurrence formula for $P_n(x)$ -Orthogonality of Legendre Polynomials–Hermite Polynomials Recurrence formulae-Rodrigue's formula-Orthogonality of Hermite polynomials.                                                                                                                                                              |                                                                                                                      |         |
| UNIT-V                                                                                                                                                                                                                                                                                                                                                                                                                                   | DESIGN OF EXPERIMENT                                                                                                 | 9Hours  |
| Design of experiments – Completely randomized design: Analysis of variance for one factor of classification – Randomized block design: Analysis of variance for two factors of classification – Latin square design.                                                                                                                                                                                                                     |                                                                                                                      |         |
| Total Hours                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                      | 45Hours |
| Text Book(s)                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                      |         |
| 1.                                                                                                                                                                                                                                                                                                                                                                                                                                       | Grewal B.S, "Higher Engineering Mathematics", 41st Edition, Khanna Publishers, New Delhi, 2011.                      |         |
| 2.                                                                                                                                                                                                                                                                                                                                                                                                                                       | Gupta S.P, "Statistical Methods", 28th Edition, Sultan Chand and Sons., New Delhi, 1997                              |         |
| Reference Book(s)                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                      |         |
| 1.                                                                                                                                                                                                                                                                                                                                                                                                                                       | Alan Jeffrey, "Advanced Engineering Mathematics", First Edition, Academic Press, 2001.                               |         |
| 2.                                                                                                                                                                                                                                                                                                                                                                                                                                       | Gerald C.F and Wheatley P.O, "Applied Numerical Analysis", Seventh Edition, Addison Wesley Publishing Company, 2004. |         |
| 3.                                                                                                                                                                                                                                                                                                                                                                                                                                       | Erwin Kreyszig, "Advanced Engineering Mathematics", Tenth Edition, John Wiley & Sons, 2011.                          |         |



**Syllabus (2024-25)**  
**B.E. (Electronics and Communication Engineering)**

|                 |                       |                   |   |   |   |    |    |     |
|-----------------|-----------------------|-------------------|---|---|---|----|----|-----|
| Course Code     |                       | L                 | T | P | C | IA | EA | TM  |
| Course Name     | ANALOG ELECTRONICS    | 3                 | 0 | 0 | 3 | 40 | 60 | 100 |
| Course Category | PROGRAMME CORE COURSE | Syllabus Revision |   |   |   |    |    |     |
| Pre-requisite   | Electronic Devices    |                   |   |   |   |    |    |     |

**Course Objectives:**

The course should enable the students

1. To develop fundamental knowledge about biasing and its various methods.
2. To analyze small signal equivalent circuits using BJT and JFET.
3. To understand methods of constructing feedback amplifiers, oscillators & tuned amplifiers.
4. To understand basic concepts of operational amplifier and its various applications.
5. To know about various analog switches, A/D and D/A convertors.

**Course Outcomes:**

On completion of the course, the student will be able to

| <b>Course Outcomes</b> | <b>Description</b>                                                                  | <b>Highest Bloom's Taxonomy</b> |
|------------------------|-------------------------------------------------------------------------------------|---------------------------------|
| <b>CO1</b>             | Determine the configuration and apply the characteristics of diodes and transistors | <b>K2</b>                       |
| <b>CO2</b>             | Design and construct various types of amplifier circuits.                           | <b>K4</b>                       |
| <b>CO3</b>             | Design and construct sinusoidal and non-sinusoidal oscillators                      | <b>K4</b>                       |
| <b>CO4</b>             | Characterize the functioning of OP-AMP and design application based circuits        | <b>K3</b>                       |
| <b>CO5</b>             | Design and construct ADC and DAC circuits                                           | <b>K4</b>                       |

**Correlation between Course Outcomes (COs) and Program Outcomes (POs):**

| <b>COs</b> | <b>Program Outcomes (POs)</b> |             |             |             |             |             |             |             |             |              |              |              | <b>Program Specific Outcomes (PSOs)</b> |              |              |
|------------|-------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|--------------|--------------|-----------------------------------------|--------------|--------------|
|            | <b>PO 1</b>                   | <b>PO 2</b> | <b>PO 3</b> | <b>PO 4</b> | <b>PO 5</b> | <b>PO 6</b> | <b>PO 7</b> | <b>PO 8</b> | <b>PO 9</b> | <b>PO 10</b> | <b>PO 11</b> | <b>PO 12</b> | <b>PS O1</b>                            | <b>PS O2</b> | <b>PS O3</b> |
| <b>CO1</b> | S                             | S           | M           | -           | -           | -           | -           | -           | -           | -            | -            | L            | S                                       | -            | M            |
| <b>CO2</b> | S                             | S           | S           | M           | -           | -           | -           | -           | -           | -            | -            | M            | S                                       | -            | S            |
| <b>CO3</b> | S                             | S           | M           | L           | -           | -           | -           | -           | -           | -            | -            | L            | M                                       | -            | S            |
| <b>CO4</b> | S                             | M           | S           | -           | -           | -           | -           | -           | -           | -            | -            | M            | S                                       | L            | S            |
| <b>CO5</b> | S                             | M           | S           | L           | -           | -           | -           | -           | -           | -            | -            | L            | M                                       | -            | S            |

|               |                         |               |
|---------------|-------------------------|---------------|
| <b>UNIT-I</b> | <b>AMPLIFIER MODELS</b> | <b>9Hours</b> |
|---------------|-------------------------|---------------|



**Syllabus (2024-25)**  
**B.E. (Electronics and Communication Engineering)**

Voltage amplifier, Current amplifier, Trans-conductance amplifier and Trans-resistance amplifier. Biasing schemes for BJT and FET amplifiers, Bias stability, Various configurations (CE/CS, CB/CG, CC/CD) and their features, Small signal analysis, Estimation of voltage gain, input resistance, output resistance etc., Low frequency and High frequency transistor models, Design Procedure for particular specifications, Low frequency analysis of multistage amplifiers.

|                                                                                                                                                                                                                                                                                                                                                                                                        |                                        |               |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|---------------|
| <b>UNIT-II</b>                                                                                                                                                                                                                                                                                                                                                                                         | <b>POWER &amp; FEEDBACK AMPLIFIERS</b> | <b>9Hours</b> |
| Frequency response of single stage and multistage amplifiers, Cascode amplifier. Various classes of operation (Class A, B, AB, C), their power efficiency and linearity issues - Feedback Topologies: Voltage series, Current series, Voltage shunt, Current shunt, Effect of feedback on gain and bandwidth, Calculation with practical circuits, Concept of stability, gain margin and phase margin. |                                        |               |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                  |               |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|---------------|
| <b>UNIT-III</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>OSCILLATORS &amp; DIFFERENTIAL AMPLIFIERS</b> | <b>9Hours</b> |
| Review of Basic Concept, Barkhausen criterion, RC oscillators (Phase shift, Wien Bridge), LC oscillators (Hartley, Colpitts, Clapp), Non- sinusoidal oscillators. Current mirror: Basic topology and its variants, V-I characteristics, output resistance, minimum sustainable voltage and maximum usable load. Differential amplifier: Basic structure and principle of operation, calculation of differential gain, common mode gain, CMRR and ICMR. OP-AMP design: Design of differential amplifier for a given specification, Design of gain and output stages, compensation. |                                                  |               |

|                                                                                                                                                                                                                                                 |                            |               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|---------------|
| <b>UNIT-IV</b>                                                                                                                                                                                                                                  | <b>OP-AMP APPLICATIONS</b> | <b>9Hours</b> |
| Review of Inverting and Non-inverting amplifiers, Integrator and differentiator, Summing amplifier, Precision rectifier, Schmitt trigger and its applications- Active filters: Low pass, high pass, band pass and band stop, design guidelines. |                            |               |

|                                                                                                                                                                                                                                                                                                                |                      |               |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------------|
| <b>UNIT-V</b>                                                                                                                                                                                                                                                                                                  | <b>DAC &amp; ADC</b> | <b>9Hours</b> |
| Digital-to-analog converters (DAC): Weighted resistor, R-2R ladder, Resistor string. Analog to digital converters (ADC): Single slope, Dual slope, Successive approximation, Flash type - Switched capacitor circuits: Basic concept, practical configurations, Application in amplifier, integrator, ADC etc. |                      |               |

|                    |  |                |
|--------------------|--|----------------|
| <b>Total Hours</b> |  | <b>45Hours</b> |
|--------------------|--|----------------|

|                     |                                                                                                                                 |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------|
| <b>Text Book(s)</b> |                                                                                                                                 |
| 1.                  | Paul R.Gray and Robert G.Meyer, "Analysis and Design of Analog Integrated Circuits", John Wiley, 3 <sup>rd</sup> Edition, 1992. |
| 2                   | J.V.Wait, L.P.Huelsman and GA Korn, "Introduction to Operational Amplifier theory and applications", Mc Graw Hill, 1992         |

|                          |                                                                                                              |
|--------------------------|--------------------------------------------------------------------------------------------------------------|
| <b>Reference Book(s)</b> |                                                                                                              |
| 1                        | A.S.Sedra and K.C.Smith, "Microelectronic Circuits", Oxford University Press, 5 <sup>th</sup> Edition, 2004. |
| 2.                       | P.Horowitz and W.Hill, "The Art of Electronics", Cambridge University Press, 2 <sup>nd</sup> Edition, 1989.  |
| 3                        | J.Millman and A.Grabel, "Microelectronics", Mc Graw Hill, Second Edition, 1988.                              |



**Syllabus (2024-25)**  
**B.E. (Electronics and Communication Engineering)**

|                 |                                                              |                   |   |   |   |    |    |     |
|-----------------|--------------------------------------------------------------|-------------------|---|---|---|----|----|-----|
| Course Code     |                                                              | L                 | T | P | C | IA | EA | TM  |
| Course Name     | ANALOG AND DIGITAL COMMUNICATION                             | 3                 | 0 | 0 | 3 | 40 | 60 | 100 |
| Course Category | PROGRAMME CORE COURSE                                        | Syllabus Revision |   |   |   |    |    |     |
| Pre-requisite   | Electronic Devices, Digital System Design, Signals & Systems |                   |   |   |   |    |    |     |

**Course Objectives:**

The course should enable the students:

1. To analyze and compare different analog modulation schemes.
2. To analyze the behavior of communication systems in the presence of noise.
3. To investigate pulse modulation systems and analyze their system performance.
4. To analyze different modulation schemes and compute bit error performance.
5. To study demodulation of digital signals.

**Course Outcomes:**

On completion of the course, the student will be able to

| <b>Course Outcomes</b> | <b>Description</b>                                                              | <b>Highest Bloom's Taxonomy</b> |
|------------------------|---------------------------------------------------------------------------------|---------------------------------|
| <b>CO1</b>             | Compare different analog modulation schemes for their efficiency and bandwidth. | <b>K2</b>                       |
| <b>CO2</b>             | Analyze the behavior of communication systems in the presence of noise.         | <b>K4</b>                       |
| <b>CO3</b>             | Investigate pulse modulation systems and analyze their system performance       | <b>K4</b>                       |
| <b>CO4</b>             | Compute bit error performance of various modulation schemes.                    | <b>K3</b>                       |
| <b>CO5</b>             | Gain knowledge on demodulation of digital signals.                              | <b>K2</b>                       |

**Correlation between Course Outcomes(COs) and Program Outcomes (POs):**

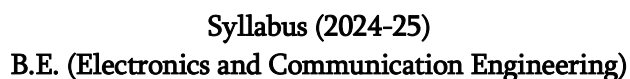
| <b>COs</b> | <b>Program Outcomes(POs)</b> |             |             |             |             |             |             |             |             |              |              |              | <b>Program Specific Outcomes (PSOs)</b> |              |              |
|------------|------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|--------------|--------------|-----------------------------------------|--------------|--------------|
|            | <b>PO 1</b>                  | <b>PO 2</b> | <b>PO 3</b> | <b>PO 4</b> | <b>PO 5</b> | <b>PO 6</b> | <b>PO 7</b> | <b>PO 8</b> | <b>PO 9</b> | <b>PO 10</b> | <b>PO 11</b> | <b>PO 12</b> | <b>PS O1</b>                            | <b>PS O2</b> | <b>PS O3</b> |
| <b>CO1</b> | S                            | S           | S           | M           | M           | -           | -           | -           | -           | -            | -            | L            | S                                       | S            | M            |
| <b>CO2</b> | S                            | S           | S           | M           | M           | -           | -           | -           | -           | -            | -            | L            | S                                       | S            | M            |
| <b>CO3</b> | S                            | S           | S           | M           | M           | -           | -           | -           | -           | -            | -            | L            | S                                       | S            | M            |
| <b>CO4</b> | S                            | S           | S           | L           | M           | -           | -           | -           | -           | -            | -            | L            | S                                       | S            | M            |
| <b>CO5</b> | S                            | S           | M           | L           | L           | -           | -           | -           | -           | -            | -            | L            | S                                       | S            | M            |

|               |                                       |                |
|---------------|---------------------------------------|----------------|
| <b>UNIT-I</b> | <b>AMPLITUDE AND ANGLE MODULATION</b> | <b>9 Hours</b> |
|---------------|---------------------------------------|----------------|



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|                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                 |                 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|-----------------|
| Review of signals and systems-Frequency domain representation of signals - Amplitude modulation systems-DSB-SC, SSB and VSB modulation - Superhetrodyne Receiver - Angle modulationRepresentation of FM and PM signals-Relationship between FM and PM-Narrow band and widebandFM-Transmission bandwidth of FM wave- Generation and detection of FM wave.                                                                   |                                                                                                                 |                 |
| <b>UNIT-II</b>                                                                                                                                                                                                                                                                                                                                                                                                             | <b>INFORMATION THEORYAND NOISE</b>                                                                              | <b>9 Hours</b>  |
| Entropy – Discrete memory less channels – Channel capacity – Hartley Shannon Law – Source Coding theorem – Huffman & Shannon- Fano codes - Noise in amplitude and frequency modulation systems- Pre-emphasis and De-emphasis-White noise – Narrowband noise - Threshold effect in angle modulation.                                                                                                                        |                                                                                                                 |                 |
| <b>UNIT-III</b>                                                                                                                                                                                                                                                                                                                                                                                                            | <b>PULSE MODULATION</b>                                                                                         | <b>9 Hours</b>  |
| Sampling process -Pulse Amplitude Modulation (PAM)-Pulse Position Modulation (PPM) - Quantization Process-Pulse Code Modulation (PCM) - Delta Modulation - Differential Pulse Code Modulation-Line codes-Noise consideration in PCM-Time Division Multiplexing-Digital Multiplexers.                                                                                                                                       |                                                                                                                 |                 |
| <b>UNIT-IV</b>                                                                                                                                                                                                                                                                                                                                                                                                             | <b>BASEBAND MODULATION TECHNIQUES</b>                                                                           | <b>9 Hours</b>  |
| Baseband transmission of digital data-Inter Symbol interference(ISI) problem - Nyquist channelBinary Amplitude shift keying(ASK)-Phase-Shift Keying(PSK) - Frequency Shift Keying(FSK)- Quadrature Amplitude Modulation(QAM)-Continuous phase modulation and Minimum shift keyingElements of detection theory-optimum detection of signals in noise-coherent communication with waveform-Probability of error calculation. |                                                                                                                 |                 |
| <b>UNIT-V</b>                                                                                                                                                                                                                                                                                                                                                                                                              | <b>DEMODULATION OF DIGITAL SIGNALS</b>                                                                          | <b>9 Hours</b>  |
| Digital Modulation tradeoffs-optimum demodulation of digital signal over band limited channelsMaximum likelihood sequence detection (Viterbi receiver)-Equalization techniques-Synchronization and carrier recovery of digital modulation.                                                                                                                                                                                 |                                                                                                                 |                 |
| <b>Total Hours</b>                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                 | <b>45 Hours</b> |
| <b>Text / Reference Book(s)</b>                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                 |                 |
| 1.                                                                                                                                                                                                                                                                                                                                                                                                                         | Dr.Sanjay Sharma,“Analog and Digital Communication”,SK Kataria & Son’s publication, Seventh Edition,2017.       |                 |
| 2.                                                                                                                                                                                                                                                                                                                                                                                                                         | Haykin.S and Michel Moher,”Introduction to Analog and Digital Communication”, John Wiley, Second Edition, 2012. |                 |
| 3.                                                                                                                                                                                                                                                                                                                                                                                                                         | Taub Hand Schilling D.L.,“Principles of Communication Systems”,Tata McGraw Hill, 4 <sup>TH</sup> Edition 2017.  |                 |
| 4.                                                                                                                                                                                                                                                                                                                                                                                                                         | Prokis. J.G.,”Digital Communications”, Tata McGraw Hill, Fourth Edition, 2017.                                  |                 |



|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                  |                   |      |      |      |      |                          |      |      |       |       |       |                                  |       |       |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|-------------------|------|------|------|------|--------------------------|------|------|-------|-------|-------|----------------------------------|-------|-------|--|
| Course Code                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                  | L                 | T    | P    | C    | IA   | EA                       | TM   |      |       |       |       |                                  |       |       |  |
| Course Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | MICROPROCESSOR AND MICROCONTROLLERS                              | 3                 | 0    | 0    | 3    | 40   | 60                       | 100  |      |       |       |       |                                  |       |       |  |
| Course Category                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | PROGRAMME CORE COURSE                                            | Syllabus Revision |      |      |      |      |                          |      |      |       |       |       |                                  |       |       |  |
| Pre-requisite                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Electronic Devices, Digital System Design                        |                   |      |      |      |      |                          |      |      |       |       |       |                                  |       |       |  |
| <b>Course Objectives:</b><br>The course should enable the students <ol style="list-style-type: none"><li>1. To study architecture of 8085 Microprocessor and its instruction set.</li><li>2. To study architecture of 8086 Microprocessor and its instruction set.</li><li>3. To learn design aspects of I/O and Memory interfacing circuits.</li><li>4. To study architecture of 8051 microcontroller and its applications.</li><li>5. To know about RSIC processors and design ARM processor-based systems.</li></ol> |                                                                  |                   |      |      |      |      |                          |      |      |       |       |       |                                  |       |       |  |
| <b>Course Outcomes:</b><br>On completion of the course,the student will be able to                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                  |                   |      |      |      |      |                          |      |      |       |       |       |                                  |       |       |  |
| Course Outcomes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Description                                                      |                   |      |      |      |      | Highest Bloom's Taxonomy |      |      |       |       |       |                                  |       |       |  |
| CO1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Execute programs using assembly language of 8085 Microprocessor. |                   |      |      |      |      | K3                       |      |      |       |       |       |                                  |       |       |  |
| CO2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Execute programs using assembly language of 8086 Microprocessor. |                   |      |      |      |      | K3                       |      |      |       |       |       |                                  |       |       |  |
| CO3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Design interfacing circuits using I/O and Memory devices.        |                   |      |      |      |      | K3                       |      |      |       |       |       |                                  |       |       |  |
| CO4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Develop systems using different microcontrollers.                |                   |      |      |      |      | K4                       |      |      |       |       |       |                                  |       |       |  |
| CO5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Design ARM microcontroller based systems.                        |                   |      |      |      |      | K3                       |      |      |       |       |       |                                  |       |       |  |
| <b>Correlation between Course Outcomes (COs) and Program Outcomes (POs):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                  |                   |      |      |      |      |                          |      |      |       |       |       |                                  |       |       |  |
| COs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Program Outcomes(POs)                                            |                   |      |      |      |      |                          |      |      |       |       |       | Program Specific Outcomes (PSOs) |       |       |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | PO 1                                                             | PO2               | PO 3 | PO 4 | PO 5 | PO 6 | PO 7                     | PO 8 | PO 9 | PO 10 | PO 11 | PO 12 | PS O1                            | PS O2 | PS O3 |  |
| CO1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | S                                                                | S                 | S    | M    | -    | -    | -                        | -    | -    | -     | -     | L     | M                                | M     | -     |  |
| CO2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | S                                                                | S                 | S    | M    | -    | -    | -                        | -    | -    | -     | -     | L     | M                                | M     | -     |  |
| CO3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | S                                                                | S                 | S    | M    | -    | -    | -                        | -    | -    | -     | -     | L     | M                                | L     | S     |  |
| CO4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | S                                                                | S                 | S    | M    | M    | -    | -                        | -    | -    | -     | -     | L     | M                                | S     | S     |  |
| CO5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | S                                                                | S                 | S    | M    | M    | -    | -                        | -    | -    | -     | -     | L     | -                                | M     | M     |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                  |                   |      |      |      |      |                          |      |      |       |       |       |                                  |       |       |  |



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| UNIT-I                                                                                                                                                                                                                                                                                                                                                                 | 8085 MICROPROCESSOR                                                                                                                                    | 9Hours  |
| Microprocessor architecture and its operation, memory, I/O devices, 8085 microprocessor – Core architecture - Various registers- Bus Timings, Multiplexing and De-multiplexing of Address Bus, Decoding and Execution, Instruction set – Classification, Instruction Format, Addressing Modes, 8085 Interrupt Process, Hardware and Software Interrupts.               |                                                                                                                                                        |         |
| UNIT-II                                                                                                                                                                                                                                                                                                                                                                | 8086 MICROPROCESSOR                                                                                                                                    | 9Hours  |
| Core Architecture of the 8086 - Memory Segmentation, Minimum mode Operation and Maximum Mode Operation, Instruction Set of the 8086 processor- Classification - Instruction Format Addressing modes, Simple Assembly Language Programs - Arithmetic operations, Data transfer, String Manipulation, Searching and Sorting.                                             |                                                                                                                                                        |         |
|                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                        |         |
| UNIT-III                                                                                                                                                                                                                                                                                                                                                               | I/O INTERFACING                                                                                                                                        | 9Hours  |
| Memory Interfacing and I/O interfacing - Parallel communication interface – Serial Communication interface – D/A and A/D Interface - Timer – Keyboard /display controller – Interrupt controller – DMA controller – Programming and applications Case studies: TrafficLight control, LED display , LCD display, Keyboard display interface and Alarm Controller.       |                                                                                                                                                        |         |
|                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                        |         |
| UNIT-IV                                                                                                                                                                                                                                                                                                                                                                | MICROCONTROLLER                                                                                                                                        | 9Hours  |
| Architecture of 8051 – Special Function Registers (SFRs) - I/O Pins Ports and Circuits – Instruction set- Addressing modes - Assembly language programming - Programming 8051Timers, Serial Port Programming - Interrupts Programming – LCD & Keyboard Interfacing - ADC, DAC & Sensor Interfacing - External Memory Interface- Stepper Motor and Waveform generation. |                                                                                                                                                        |         |
|                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                        |         |
| UNIT-V                                                                                                                                                                                                                                                                                                                                                                 | ADVANCED MICROPROCESSOR & MICROCONTROLLER                                                                                                              | 9Hours  |
| Advanced Microprocessor Architectures- 286, 486, Pentium - RISC Processors- RISC Vs CISC, RISC properties and evolution- ARM Processor – CPU: programming input and output supervisor mode, exceptions and traps – Co-processors- Memory system mechanisms – CPU performance- CPU power consumption.                                                                   |                                                                                                                                                        |         |
|                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                        |         |
| Total Hours                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                        | 45Hours |
| Text Book(s)                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                        |         |
| 1                                                                                                                                                                                                                                                                                                                                                                      | R.S.Gaonkar, “Microprocessor Architecture: Programming and Applications with the 8085/8080A”, Penram International Publishing, Third Edition, 1996.    |         |
| 2                                                                                                                                                                                                                                                                                                                                                                      | D A Patterson and J H Hennessy, “Computer Organization and Design of hard ware and Software interface”Morgan Kaufman Publishers, Fourth Edition, 2011. |         |
| Reference Book(s)                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                        |         |
| 1                                                                                                                                                                                                                                                                                                                                                                      | Douglas Hall, “The Microprocessors and its Interfacing”, Tata McGraw Hill, Third Edition, 2012.                                                        |         |
| 2                                                                                                                                                                                                                                                                                                                                                                      | Kenneth J.Ayala, “The 8051 Microcontroller: Architecture Programming & Applications”, Penram International Publishing, Second Edition, 1996.           |         |



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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|-------------------|-----|-----|-----|-----|--------------------------|-----|-----|------|------|------|---------------------------------|------|------|
| Course Code                                                                                                                                                                                                                                                                                                              |                                                                                                                     | L                 | T   | P   | C   | IA  | EA                       | TM  |     |      |      |      |                                 |      |      |
| Course Name                                                                                                                                                                                                                                                                                                              | DATA STRUCTURES AND ALGORITHMS                                                                                      | 3                 | 0   | 0   | 3   | 40  | 60                       | 100 |     |      |      |      |                                 |      |      |
| Course Category                                                                                                                                                                                                                                                                                                          | PROGRAMME CORE COURSE                                                                                               | Syllabus Revision |     |     |     |     |                          |     |     |      |      |      |                                 |      |      |
| Pre-requisite                                                                                                                                                                                                                                                                                                            |                                                                                                                     |                   |     |     |     |     |                          |     |     |      |      |      |                                 |      |      |
| <b>Course Objectives:</b><br>The course should enable the students <ol style="list-style-type: none"><li>1. Learn linear data structures – list, stack, and queue.</li><li>2. Learn Nonlinear data Structures-Trees and Graphs.</li><li>3. Be exposed to sorting, searching and hashing algorithms.</li></ol>            |                                                                                                                     |                   |     |     |     |     |                          |     |     |      |      |      |                                 |      |      |
|                                                                                                                                                                                                                                                                                                                          |                                                                                                                     |                   |     |     |     |     |                          |     |     |      |      |      |                                 |      |      |
| <b>Course Outcomes:</b><br>On completion of the course, the student will be able to <ul style="list-style-type: none"><li>• Implement application of linear and nonlinear data structures.</li><li>• Apply the different linear data structures to solve problems.</li><li>• Implement the various algorithms.</li></ul> |                                                                                                                     |                   |     |     |     |     |                          |     |     |      |      |      |                                 |      |      |
| Course Outcomes                                                                                                                                                                                                                                                                                                          | Description                                                                                                         |                   |     |     |     |     | Highest Bloom's Taxonomy |     |     |      |      |      |                                 |      |      |
| CO1                                                                                                                                                                                                                                                                                                                      | Select appropriate data structures as applied to specified Problem definition.                                      |                   |     |     |     |     | K2                       |     |     |      |      |      |                                 |      |      |
| CO2                                                                                                                                                                                                                                                                                                                      | Implement operations like searching, insertion, and deletion, Traversing mechanism etc. on various data structures. |                   |     |     |     |     | K5                       |     |     |      |      |      |                                 |      |      |
| CO3                                                                                                                                                                                                                                                                                                                      | Students will be able to implement Linear and Non-Linear data Structures.                                           |                   |     |     |     |     | K5                       |     |     |      |      |      |                                 |      |      |
| CO4                                                                                                                                                                                                                                                                                                                      | Implement appropriate sorting/searching technique for given Problem.                                                |                   |     |     |     |     | K6                       |     |     |      |      |      |                                 |      |      |
| CO5                                                                                                                                                                                                                                                                                                                      | Determine and analyse the complexity of given Algorithms                                                            |                   |     |     |     |     | K6                       |     |     |      |      |      |                                 |      |      |
|                                                                                                                                                                                                                                                                                                                          |                                                                                                                     |                   |     |     |     |     |                          |     |     |      |      |      |                                 |      |      |
| Correlation between Course Outcomes(COs) and Program Outcomes(POs):                                                                                                                                                                                                                                                      |                                                                                                                     |                   |     |     |     |     |                          |     |     |      |      |      |                                 |      |      |
| COs                                                                                                                                                                                                                                                                                                                      | Program Outcomes(POs)                                                                                               |                   |     |     |     |     |                          |     |     |      |      |      | Program Specific Outcomes(PSOs) |      |      |
|                                                                                                                                                                                                                                                                                                                          | PO1                                                                                                                 | PO2               | PO3 | PO4 | PO5 | PO6 | PO7                      | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1                            | PSO2 | PSO3 |
| CO1                                                                                                                                                                                                                                                                                                                      | S                                                                                                                   | S                 | S   | S   | S   | M   | -                        | -   | S   | M    | L    | S    |                                 |      |      |
| CO2                                                                                                                                                                                                                                                                                                                      | M                                                                                                                   | S                 | M   | S   | S   | M   | -                        | -   | S   | M    | L    | S    |                                 |      |      |
| CO3                                                                                                                                                                                                                                                                                                                      | M                                                                                                                   | M                 | M   | M   | S   | M   | -                        | -   | S   | M    | L    | S    |                                 |      |      |
| CO4                                                                                                                                                                                                                                                                                                                      | M                                                                                                                   | S                 | M   | S   | S   | M   |                          |     | S   | M    | M    | M    |                                 |      |      |
| CO5                                                                                                                                                                                                                                                                                                                      | M                                                                                                                   | S                 | M   | S   | S   | M   | -                        | -   | S   | M    | M    | M    |                                 |      |      |



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|                                                                                                                                                                                                                                                                                                                                                                                                               |                            |                 |
| <b>UNIT-I</b>                                                                                                                                                                                                                                                                                                                                                                                                 | <b>INTRODUCTION</b>        | <b>9 Hours</b>  |
| Basic Terminologies: Elementary Data Organizations, Data Structure Operations: insertion, deletion, traversal etc.; Analysis of an Algorithm, Asymptotic Notations, time-Space trade off. Searching: LinearSearch and Binary Search Techniques and their complexity analysis                                                                                                                                  |                            |                 |
| <b>UNIT-II</b>                                                                                                                                                                                                                                                                                                                                                                                                | <b>STACKS AND QUEUES</b>   | <b>9 Hours</b>  |
| ADT Stack and its operations: Algorithms and their complexity analysis, Applications of Stacks: Expression Conversion and evaluation–corresponding algorithms and complexity analysis. ADT queue, Types of Queue: Simple Queue, Circular Queue, Priority Queue; Operations on each Type of Queues: Algorithms and their analysis.                                                                             |                            |                 |
| <b>UNIT-III</b>                                                                                                                                                                                                                                                                                                                                                                                               | <b>LINKED LISTS</b>        | <b>9 Hours</b>  |
| Singly linked lists: Representation in memory, Algorithms of several operations: Traversing, Searching, Insertion into, Deletion from linked list; Linked representation of Stack and Queue, Header nodes, Doublylinked list: operations on it and algorithmic analysis; Circular Linked Lists: all operations their algorithmsand the complexity analysis.                                                   |                            |                 |
| <b>UNIT-IV</b>                                                                                                                                                                                                                                                                                                                                                                                                | <b>TREES &amp; GRAPH</b>   | <b>9 Hours</b>  |
| Trees - Basic Tree Terminologies, Different types of Trees: Binary Tree, Binary Search Tree, AVL Tree; Tree operations on each of the trees and their algorithms with complexity analysis. Applications of BinaryTrees. B Tree: definitions, algorithms and analysis. Graph - Basic Terminologies and Representations, Graph search and traversal algorithms and complexity analysis.                         |                            |                 |
| <b>UNIT-V</b>                                                                                                                                                                                                                                                                                                                                                                                                 | <b>SORTING AND HASHING</b> | <b>9 Hours</b>  |
| Objective and properties of different sorting algorithms: Selection Sort, Bubble Sort, Insertion Sort, QuickSort, Merge Sort, Heap Sort; Performance and Comparison among all the methods, Hashing.                                                                                                                                                                                                           |                            |                 |
| <b>Total Hours</b>                                                                                                                                                                                                                                                                                                                                                                                            |                            | <b>45 Hours</b> |
| <b>Text Books:</b><br>1. “Fundamentals of Data Structures”, Illustrated Edition by Ellis Horowitz, Sartaj Sahni, Computer Science Press<br>2. Seymour Lipschutz – “Theory and Problems of Data Structures”. (AVL Trees, B-Trees), Edition 2006, Tata mcgraw Hill, 12th Edition 2011.<br>3. Ellis Horowitz & Sartaj Sahani – “Fundamentals of Data Structures in C” – W.H. Freeman and Co., 2nd Edition, 2007. |                            |                 |
| <b>References:</b>                                                                                                                                                                                                                                                                                                                                                                                            |                            |                 |



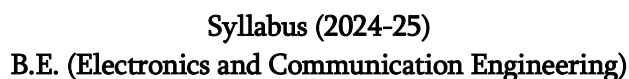
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1. Hand book of Data Structures and Applications, Dinesh P Mehta, Sartaj Sahni, CRC Press, 2018

**DATA STRUCTURES LAB**

**LIST OF PROGRAMS**

1. Write simple program to implement Array data structure with all possible manipulation such as insertion, deletion, find & replace, accepting array values from command line arguments
2. Write simple programs to implement structures with all possible manipulations such as passing structures and returning from functions, pointer to the structure, members as pointers in the structure and self-referential structure.
3. Write simple programs to implement pointers with all manipulations such as pointer to arrays, pointer arithmetic, pointer to pointer, passing pointers to functions and returning from functions.
4. Implementation of Single Linked List
5. Implementation of Stack
6. Implementation of Queue
7. Sort the Given Numbers using
  - i) Bubble sort
  - ii) Selection Sort.
  - iii) Insertion Sort
8. Implement linear and Binary Search algorithm



|                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                           |                             |      |      |      |      |                          |      |      |       |       |        |                                 |       |      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|-----------------------------|------|------|------|------|--------------------------|------|------|-------|-------|--------|---------------------------------|-------|------|
| CourseCode                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                           | L                           | T    | P    | C    | IA   | EA                       | TM   |      |       |       |        |                                 |       |      |
| Course Name                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ELECTRO MAGNETIC FIELDS AND WAVE GUIDES                                   | 3                           | 0    | 0    | 3    | 40   | 60                       | 100  |      |       |       |        |                                 |       |      |
| Course Category                                                                                                                                                                                                                                                                                                                                                                                                                                                      | PROGRAMME CORE COURSE                                                     | Syllabus Revision           |      |      |      |      |                          |      |      |       |       |        |                                 |       |      |
| Pre-requisite                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Physics and Mathematics                                                   |                             |      |      |      |      |                          |      |      |       |       |        |                                 |       |      |
| <b>Course Objectives:</b><br>The course should enable the students <ol style="list-style-type: none"><li>1. To study the basics of Electromagnetic.</li><li>2. To understand the propagation and polarization of Electro magnetic waves.</li><li>3. To analyze wave propagation inTransmission Lines and its applications.</li><li>4. To analyze wave propagation in metallic wave guides.</li><li>5. To know the radiation characteristics of an antenna.</li></ol> |                                                                           |                             |      |      |      |      |                          |      |      |       |       |        |                                 |       |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                           |                             |      |      |      |      |                          |      |      |       |       |        |                                 |       |      |
| <b>Course Outcomes:</b><br>On completion of the course,the student will be able to                                                                                                                                                                                                                                                                                                                                                                                   |                                                                           |                             |      |      |      |      |                          |      |      |       |       |        |                                 |       |      |
| Course Outcomes                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Description                                                               |                             |      |      |      |      | Highest Bloom's Taxonomy |      |      |       |       |        |                                 |       |      |
| CO1                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Gain knowledge on basics of Electro- magnetic.                            |                             |      |      |      |      | K1                       |      |      |       |       |        |                                 |       |      |
| CO2                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Understand the propagation of Electromagnetic Waves.                      |                             |      |      |      |      | K2                       |      |      |       |       |        |                                 |       |      |
| CO3                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Determine the characteristics and wave propagation on transmission lines. |                             |      |      |      |      | K3                       |      |      |       |       |        |                                 |       |      |
| CO4                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Analyze wave propagation on metallic wave guides.                         |                             |      |      |      |      | K4                       |      |      |       |       |        |                                 |       |      |
| CO5                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Determine the radiation and radiation characteristics of an antenna.      |                             |      |      |      |      | K2                       |      |      |       |       |        |                                 |       |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                           |                             |      |      |      |      |                          |      |      |       |       |        |                                 |       |      |
| <b>Correlation between Course Outcomes(COs) and Program Outcomes(POs):</b>                                                                                                                                                                                                                                                                                                                                                                                           |                                                                           |                             |      |      |      |      |                          |      |      |       |       |        |                                 |       |      |
| COs                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Program Outcomes(POs)                                                     |                             |      |      |      |      |                          |      |      |       |       |        | Program Specific Outcomes(PSOs) |       |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | PO 1                                                                      | PO 2                        | PO 3 | PO 4 | PO 5 | PO 6 | PO 7                     | PO 8 | PO 9 | PO 10 | PO 11 | PO 12  | PSO 1                           | PSO 2 | PSO3 |
| CO1                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | S                                                                         | S                           | S    | -    | -    | -    | -                        | -    | -    | -     | -     | L      | S                               | -     | -    |
| CO2                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | S                                                                         | S                           | S    | -    | -    | -    | -                        | -    | -    | -     | -     | L      | -                               | -     | S    |
| CO3                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | S                                                                         | S                           | S    | -    | -    | -    | -                        | -    | -    | -     | -     | L      | M                               | -     | S    |
| CO4                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | S                                                                         | S                           | S    | -    | -    | -    | -                        | -    | -    | -     | -     | L      | M                               | S     | S    |
| CO5                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | S                                                                         | S                           | S    | -    | -    | -    | -                        | -    | -    | -     | -     | L      | M                               | S     | -    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                           |                             |      |      |      |      |                          |      |      |       |       |        |                                 |       |      |
| UNIT-I                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                           | BASICS OF ELECTRO MAGNETICS |      |      |      |      |                          |      |      |       |       | 9Hours |                                 |       |      |
| Vector algebra-Coordinate Systems-Vector differential operator-Gradient-Divergence-Curl- Divergence Theorem-Stokes theorem-Coulombs law-Electric field intensity-Electric flux density- Gauss lawand its applications-Biot Savart Law-Ampere's law-Faradays law- Maxwell's Equations In Integral and differential form-Electric and magnetic boundary conditions at the mediainterface.                                                                              |                                                                           |                             |      |      |      |      |                          |      |      |       |       |        |                                 |       |      |



**Syllabus (2024-25)**  
**B.E. (Electronics and Communication Engineering)**

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| <b>UNIT-II</b>                                                                                                                                                                                                                                                                                                                                                                                                 | <b>ELECTRO MAGNETIC WAVES</b>                                                                                                           | <b>9Hours</b>   |
| Uniform Plane Waves-Uniform plane wave propagation-Wave propagation in conducting medium- Wave Polarization-Reflection by perfect conductor (normal and oblique incidence)- Reflection by perfect insulator(normal and oblique incidence)- plane waves in arbitrary direction-Brewster angles- Total internal reflection-poynting vector and power flow-Power loss inplane conductor.                          |                                                                                                                                         |                 |
| <b>UNIT-III</b>                                                                                                                                                                                                                                                                                                                                                                                                | <b>TRANSMISSION LINES</b>                                                                                                               | <b>9Hours</b>   |
| Equations of Voltage and Current on TX line- Propagation constant-characteristic impedance- reflection phenomenon-standing waves-Input impedance of dissipation less transmission line-open and short circuited line- power and impedance measurement on TXline- $\lambda/8, \lambda/4$ & $\lambda/2$ line- $\lambda/4$ Impedance transformer-Smith chart and its applications-single and double stub matching |                                                                                                                                         |                 |
| <b>UNIT-IV</b>                                                                                                                                                                                                                                                                                                                                                                                                 | <b>GUIDED WAVES AND WAVE GUIDES</b>                                                                                                     | <b>9Hours</b>   |
| Waves between parallel planes-TEwaves-TMwaves-Characteristic of TE and TM waves-TEM waves-Velocities of propagation-Attenuation in parallel plane Guides- Rectangular wave guide-TE and TM wave sin rectangular wave guide-Impossibility of TEM wave in rectangular wave guide.                                                                                                                                |                                                                                                                                         |                 |
| <b>UNIT-V</b>                                                                                                                                                                                                                                                                                                                                                                                                  | <b>RADIATION</b>                                                                                                                        | <b>9Hours</b>   |
| Solution for potential functions-Radiation from oscillating dipole-Power radiated by oscillating dipole-antenna parameters-Gain-directivity-Effective aperture-Radiation Resistance-Band width- Beam width-Input impedance-Matching Baluns-Mono pole and dipole antenna.                                                                                                                                       |                                                                                                                                         |                 |
| <b>Total Hours</b>                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                         | <b>45 Hours</b> |
| <b>Text Book(s) and Reference Books</b>                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                         |                 |
| 1                                                                                                                                                                                                                                                                                                                                                                                                              | Sadiku MH,"Principles of Electromagnetics", Oxford University Press Inc, New Delhi, 2009. Second Edition, Prentice Hall of India, 1968. |                 |
| 2                                                                                                                                                                                                                                                                                                                                                                                                              | E.C.Jordan & K.G.Balmain,"Electromagnetic Waves & Radiating Systems",                                                                   |                 |
| 3                                                                                                                                                                                                                                                                                                                                                                                                              | John D Ryder,"Network lines and fields", Prentice Hall of India, NewDelhi, 2005.                                                        |                 |
| 4                                                                                                                                                                                                                                                                                                                                                                                                              | David K.Cheng, "Field and Wave Electro magnetics", Second Edition, Prentice Hall of India, 1989.                                        |                 |
| 5                                                                                                                                                                                                                                                                                                                                                                                                              | Sandeep Wali,"Electromagnetic theory", first edition, Macmillan Publishers Private limited, 2011.                                       |                 |



**Syllabus (2024-25)**  
**B.E. (Electronics and Communication Engineering)**

|                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                          |                   |      |      |      |                          |      |      |      |       |       |       |                                  |         |      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-------------------|------|------|------|--------------------------|------|------|------|-------|-------|-------|----------------------------------|---------|------|
| Course Code                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                          | L                 | T    | P    | C    | IA                       | EA   | TM   |      |       |       |       |                                  |         |      |
| Course Name                                                                                                                                                                                                                                                                                                                                                                                                                              | ANALOG ELECTRONICS LABORATORY                                                            | 0                 | 0    | 3    | 2    | 40                       | 60   | 100  |      |       |       |       |                                  |         |      |
| Course Category                                                                                                                                                                                                                                                                                                                                                                                                                          | PROGRAMME CORE COURSE                                                                    | Syllabus Revision |      |      |      |                          |      |      |      |       |       |       |                                  |         |      |
| Pre-requisite                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                          |                   |      |      |      |                          |      |      |      |       |       |       |                                  |         |      |
| <b>Course Objectives:</b><br>The course should enable the students<br>1. To understand the basics of linear integrated circuits and available ICs<br>2. To understand characteristics of operational amplifier.<br>3. To apply operational amplifiers in linear and nonlinear applications.<br>4. To analyze the frequency response characteristics of Amplifiers.<br>5. To enable to students to work in a team and build applications. |                                                                                          |                   |      |      |      |                          |      |      |      |       |       |       |                                  |         |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                          |                   |      |      |      |                          |      |      |      |       |       |       |                                  |         |      |
| <b>Course Outcomes:</b><br>On completion of the course,the student will be able to                                                                                                                                                                                                                                                                                                                                                       |                                                                                          |                   |      |      |      |                          |      |      |      |       |       |       |                                  |         |      |
| Course Outcomes                                                                                                                                                                                                                                                                                                                                                                                                                          | Description                                                                              |                   |      |      |      | Highest Bloom's Taxonomy |      |      |      |       |       |       |                                  |         |      |
| CO1                                                                                                                                                                                                                                                                                                                                                                                                                                      | Design oscillators and amplifiers using operational amplifiers.                          |                   |      |      |      | K2                       |      |      |      |       |       |       |                                  |         |      |
| CO2                                                                                                                                                                                                                                                                                                                                                                                                                                      | Design filters using Op-amp and perform experiment on frequency response.                |                   |      |      |      | K2                       |      |      |      |       |       |       |                                  |         |      |
| CO3                                                                                                                                                                                                                                                                                                                                                                                                                                      | Analyze the working of PLL and use PLL as frequency multiplier                           |                   |      |      |      | K3                       |      |      |      |       |       |       |                                  |         |      |
| CO4                                                                                                                                                                                                                                                                                                                                                                                                                                      | Analyze the performance of oscillators and Multi-vibrators.                              |                   |      |      |      | K3                       |      |      |      |       |       |       |                                  |         |      |
| CO5                                                                                                                                                                                                                                                                                                                                                                                                                                      | Demonstrate capability to work in a team and to build circuits for various applications. |                   |      |      |      | K4                       |      |      |      |       |       |       |                                  |         |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                          |                   |      |      |      |                          |      |      |      |       |       |       |                                  |         |      |
| Correlation between Course Outcomes(COs) and Program Outcomes(POs):                                                                                                                                                                                                                                                                                                                                                                      |                                                                                          |                   |      |      |      |                          |      |      |      |       |       |       |                                  |         |      |
| COs                                                                                                                                                                                                                                                                                                                                                                                                                                      | Program Outcomes(POs)                                                                    |                   |      |      |      |                          |      |      |      |       |       |       | Program Specific Out comes(PSOs) |         |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                          | PO 1                                                                                     | PO 2              | PO 3 | PO 4 | PO 5 | P O6                     | PO 7 | PO 8 | PO 9 | PO 10 | PO 11 | PO 12 | PS O1                            | P S O 2 | PSO3 |
| CO1                                                                                                                                                                                                                                                                                                                                                                                                                                      | S                                                                                        | S                 | S    | L    | -    | -                        | -    | -    | -    | -     | -     | L     | L                                | -       | M    |
| CO2                                                                                                                                                                                                                                                                                                                                                                                                                                      | S                                                                                        | S                 | S    | M    | -    | -                        | -    | -    | -    | -     | -     | M     | S                                | -       | S    |
| CO3                                                                                                                                                                                                                                                                                                                                                                                                                                      | S                                                                                        | S                 | S    | S    | -    | -                        | -    | -    | -    | -     | -     | L     | M                                | -       | S    |
| CO4                                                                                                                                                                                                                                                                                                                                                                                                                                      | S                                                                                        | M                 | S    | M    | -    | -                        | -    | -    | -    | -     | -     | M     | S                                | -       | L    |
| CO5                                                                                                                                                                                                                                                                                                                                                                                                                                      | S                                                                                        | M                 | S    | S    | -    | -                        | -    | -    | -    | -     | -     | L     | M                                | -       | S    |



**Syllabus (2024-25)**  
**B.E. (Electronics and Communication Engineering)**

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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                            |                 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>LIST OF EXPERIMENTS</b> |                 |
| <p>.</p> <ol style="list-style-type: none"><li>1. Characteristics of Opamp–IC741.</li><li>2. Inverting and Non-inverting amplifier using IC741.</li><li>3. Measurement of op-amp characteristics.</li><li>4. Instrumentation amplifier and Differential Amplifier using IC741.</li><li>5. Integrator and Differentiator using IC741.</li><li>6. Schmitt Trigger using IC741.</li><li>7. ADC/DAC using IC741.</li><li>8. Astable &amp; Monostable Multi-vibrator using IC555.</li><li>9. RC Phase shift oscillator and Wien bridge oscillator using BJT.</li><li>10. Hartley &amp; Colpitts oscillator using BJT.</li><li>11. Frequency Response of Class B Push Pull Amplifier using BJT.</li><li>12. Frequency Response of Voltage Series Feedback Amplifier using BJT.</li><li>13. Phase Locked Loop (PLL)</li></ol> |                            |                 |
| <b>Total Hours</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                            | <b>45 Hours</b> |
| <b>Text Book(s)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                            |                 |
| <ol style="list-style-type: none"><li>1. J.V. Wait, L.P. Huelsman &amp; GA Korn, “Introduction to Operational Amplifier theory and applications”, McGraw Hill, 1992</li><li>2. J. Millman and A. Grabel, “Microelectronics”, 2nd edition, McGraw Hill, 1988</li><li>3. P. Horowitz and W. Hill, “The Art of Electronics”, 2nd edition, Cambridge University Press, 1989.</li></ol>                                                                                                                                                                                                                                                                                                                                                                                                                                     |                            |                 |
| <b>Reference Book(s)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                            |                 |
| <ol style="list-style-type: none"><li>1. A.S. Sedra and K.C. Smith, “Microelectronic Circuits”, Oxford University Press, V Edition, 2004.</li><li>2. Paul R. Gray and Robert G.Meyer, “Analysis and Design of Analog Integrated Circuits”, John Wiley, 3rd Edition, 1992.</li></ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                            |                 |



**Syllabus (2024-25)**  
**B.E. (Electronics and Communication Engineering)**

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-------------------|-----|-----|-----|--------------------------|-----|-----|-----|-------|--------|-------|----------------------------------|-------|-------|
| Course Code                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                          | L                 | T   | P   | C   | IA                       | EA  | TM  |     |       |        |       |                                  |       |       |
| Course Name                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ANALOG AND DIGITAL COMMUNICATION LABORATORY                                              | 0                 | 0   | 3   | 2   | 40                       | 60  | 100 |     |       |        |       |                                  |       |       |
| Course Category                                                                                                                                                                                                                                                                                                                                                                                                                                               | PROGRAMME CORE COURSE                                                                    | Syllabus Revision |     |     |     |                          |     |     |     |       |        |       |                                  |       |       |
| Pre-requisite                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                          |                   |     |     |     |                          |     |     |     |       |        |       |                                  |       |       |
| <b>Course Objectives:</b><br>The course should enable the students<br>1. To construct basic circuits of Analog communication system.<br>2. To construct basic circuits of Digital communication system.<br>3. To Design and construct experiments for performing modulation and sampling.<br>4. To analyze the Performance characteristics of analog and Digital Communication Systems.<br>5. To enable to students to work in a team and build applications. |                                                                                          |                   |     |     |     |                          |     |     |     |       |        |       |                                  |       |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                          |                   |     |     |     |                          |     |     |     |       |        |       |                                  |       |       |
| <b>Course Outcomes:</b><br>On completion of the course, the student will be able to                                                                                                                                                                                                                                                                                                                                                                           |                                                                                          |                   |     |     |     |                          |     |     |     |       |        |       |                                  |       |       |
| Course Outcomes                                                                                                                                                                                                                                                                                                                                                                                                                                               | Description                                                                              |                   |     |     |     | Highest Bloom's Taxonomy |     |     |     |       |        |       |                                  |       |       |
| CO1                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Apply the practical knowledge to construct Analog communication circuits.                |                   |     |     |     | K3                       |     |     |     |       |        |       |                                  |       |       |
| CO2                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Apply the practical knowledge to construct Digital communication circuits                |                   |     |     |     | K3                       |     |     |     |       |        |       |                                  |       |       |
| CO3                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Evaluate Analog and Digital modulated wave form in time /frequency domain.               |                   |     |     |     | K3                       |     |     |     |       |        |       |                                  |       |       |
| CO4                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Analyze and evaluate the performance of Analog and Digital communication systems.        |                   |     |     |     | K5                       |     |     |     |       |        |       |                                  |       |       |
| CO5                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Demonstrate capability to work in a team and to build circuits for various applications. |                   |     |     |     | K4                       |     |     |     |       |        |       |                                  |       |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                          |                   |     |     |     |                          |     |     |     |       |        |       |                                  |       |       |
| <b>Correlation between Course Outcomes (COs) and Program Outcomes (POs):</b>                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                          |                   |     |     |     |                          |     |     |     |       |        |       |                                  |       |       |
| COs                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Program Outcomes (POs)                                                                   |                   |     |     |     |                          |     |     |     |       |        |       | Program Specific Outcomes (PSOs) |       |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                               | PO1                                                                                      | PO2               | PO3 | PO4 | PO5 | PO6                      | PO7 | PO8 | PO9 | PO 10 | P O 11 | PO 12 | PS O1                            | PS O2 | PS O3 |
| CO1                                                                                                                                                                                                                                                                                                                                                                                                                                                           | S                                                                                        | S                 | S   | S   | S   | -                        | -   | -   | M   | -     | -      | -     | S                                | S     | -     |
| CO2                                                                                                                                                                                                                                                                                                                                                                                                                                                           | S                                                                                        | S                 | S   | S   | S   | -                        | -   | -   | M   | -     | -      | -     | S                                | S     | -     |
| CO3                                                                                                                                                                                                                                                                                                                                                                                                                                                           | S                                                                                        | S                 | S   | S   | S   | -                        | -   | -   | M   | -     | -      | -     | S                                | S     | -     |
| CO4                                                                                                                                                                                                                                                                                                                                                                                                                                                           | S                                                                                        | S                 | S   | S   | S   | -                        | -   | -   | M   | -     | -      | -     | S                                | S     | -     |
| CO5                                                                                                                                                                                                                                                                                                                                                                                                                                                           | S                                                                                        | S                 | S   | S   | S   | -                        | -   | -   | M   | -     | -      | -     | S                                | S     | -     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                          |                   |     |     |     |                          |     |     |     |       |        |       |                                  |       |       |



**Syllabus (2024-25)**  
**B.E. (Electronics and Communication Engineering)**

**LISTOF EXPERIMENTS**

1. Study of Multisim, VisSim and MATLAB.
2. AM modulator and Demodulator.
3. DSB-SC modulator and Demodulator.
4. SSB modulator and Demodulator.
5. FM modulator and Demodulator.
6. PAM modulator and Demodulator.
7. PPM & PWM Modulator.
8. Pre-emphasis and De-emphasis in FM.
9. Signal Sampling and Reconstruction (Sampling Theorem).
10. Pulse Code Modulation and Demodulation.
11. Delta modulation and Adaptive Delta modulation.
12. Amplitude Shift Keying (ASK) and Frequency Shift Keying (FSK) modulator and Demodulator.
13. Phase Shift keying (PSK) and Binary Phase Shift Keying (BPSK) Modulator and Demodulator

**Total Hours    45Hours**

**Text Book(s)**

- |    |                                                                                                                               |
|----|-------------------------------------------------------------------------------------------------------------------------------|
| 1. | Haykin.S and Michel Moher,” Introduction to Analog and Digital communication”, Second edition, John Wiley and sons Inc, 2012. |
| 2. | Prokis J.G.,” Digital communications”, 4th edition, Tata McGraw Hill, 2000.                                                   |

**Reference Book(s)**

- |    |                                                                                                                  |
|----|------------------------------------------------------------------------------------------------------------------|
| 1. | Taub H and Schilling D.L., “Principles of Communication systems”, Tata McGraw Hill, 2001                         |
| 2. | Dr.Sanjay Sharma, “Analog and Digital communication”, seventh edition, K KATARIA & amp; SON’S publication, 2017. |



**Syllabus (2024-25)**  
**B.E. (Electronics and Communication Engineering)**

|                                                                                                     |                                                                                          |                   |     |     |     |                          |     |     |     |       |        |       |                                  |       |       |
|-----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-------------------|-----|-----|-----|--------------------------|-----|-----|-----|-------|--------|-------|----------------------------------|-------|-------|
| Course Code                                                                                         |                                                                                          | L                 | T   | P   | C   | IA                       | EA  | TM  |     |       |        |       |                                  |       |       |
| Course Name                                                                                         | MICROPROCESSOR AND MICROCONTROLLER LABORATORY                                            | 0                 | 0   | 3   | 2   | 40                       | 60  | 100 |     |       |        |       |                                  |       |       |
| Course Category                                                                                     | PROGRAMME CORE COURSE                                                                    | Syllabus Revision |     |     |     |                          |     |     |     |       |        |       |                                  |       |       |
| Pre-requisite                                                                                       |                                                                                          |                   |     |     |     |                          |     |     |     |       |        |       |                                  |       |       |
| Course Objectives:<br>The course should enable the students                                         |                                                                                          |                   |     |     |     |                          |     |     |     |       |        |       |                                  |       |       |
| 1. To study architecture of 8086 microprocessor and perform various arithmetic &logical operations. |                                                                                          |                   |     |     |     |                          |     |     |     |       |        |       |                                  |       |       |
| 2. To learn the design aspects of I/O and Memory Interfacing circuits.                              |                                                                                          |                   |     |     |     |                          |     |     |     |       |        |       |                                  |       |       |
| 3. To analyze the communication between Peripherals and bus interfacing.                            |                                                                                          |                   |     |     |     |                          |     |     |     |       |        |       |                                  |       |       |
| 4. To Execute Programs using 8051 Microcontroller.                                                  |                                                                                          |                   |     |     |     |                          |     |     |     |       |        |       |                                  |       |       |
| 5. To enable to students to working a team and build applications.                                  |                                                                                          |                   |     |     |     |                          |     |     |     |       |        |       |                                  |       |       |
|                                                                                                     |                                                                                          |                   |     |     |     |                          |     |     |     |       |        |       |                                  |       |       |
| Course Outcomes:<br>On completion of the course, the student will be able to                        |                                                                                          |                   |     |     |     |                          |     |     |     |       |        |       |                                  |       |       |
| Course Outcomes                                                                                     | Description                                                                              |                   |     |     |     | Highest Bloom's Taxonomy |     |     |     |       |        |       |                                  |       |       |
| CO1                                                                                                 | Design and implement programs on 8086Microprocessor.                                     |                   |     |     |     | K3                       |     |     |     |       |        |       |                                  |       |       |
| CO2                                                                                                 | Design I/O circuits and analyze the performance.                                         |                   |     |     |     | K3                       |     |     |     |       |        |       |                                  |       |       |
| CO3                                                                                                 | Design Memory Interfacing circuits.                                                      |                   |     |     |     | K3                       |     |     |     |       |        |       |                                  |       |       |
| CO4                                                                                                 | Integrate Microprocessor and Microcontroller and Peripherals for Various Applications.   |                   |     |     |     | K5                       |     |     |     |       |        |       |                                  |       |       |
| CO5                                                                                                 | Demonstrate capability to working a team and to build circuits for various applications. |                   |     |     |     | K4                       |     |     |     |       |        |       |                                  |       |       |
|                                                                                                     |                                                                                          |                   |     |     |     |                          |     |     |     |       |        |       |                                  |       |       |
| Correlation between Course Outcomes (COs) and Program Outcomes (POs):                               |                                                                                          |                   |     |     |     |                          |     |     |     |       |        |       |                                  |       |       |
| COs                                                                                                 | Program Outcomes (POs)                                                                   |                   |     |     |     |                          |     |     |     |       |        |       | Program Specific Outcomes (PSOs) |       |       |
|                                                                                                     | PO1                                                                                      | PO2               | PO3 | PO4 | PO5 | PO6                      | PO7 | PO8 | PO9 | PO 10 | P O 11 | PO 12 | PS O1                            | PS O2 | PS O3 |
| CO1                                                                                                 | S                                                                                        | S                 | S   | S   | S   | M                        |     |     | M   |       |        | L     | S                                | S     | L     |
| CO2                                                                                                 | S                                                                                        | S                 | S   | S   | S   | M                        |     |     | M   |       |        | L     | S                                | S     | L     |
| CO3                                                                                                 | S                                                                                        | S                 | S   | S   | S   | M                        |     |     | M   |       |        | L     | S                                | S     | S     |
| CO4                                                                                                 | S                                                                                        | S                 | S   | S   | S   | M                        |     |     | M   |       |        | L     | S                                | S     | S     |
| CO5                                                                                                 | S                                                                                        | S                 | S   | S   | S   | M                        |     |     | M   |       |        | L     | S                                | S     | S     |
|                                                                                                     |                                                                                          |                   |     |     |     |                          |     |     |     |       |        |       |                                  |       |       |



**Syllabus (2024-25)**  
**B.E. (Electronics and Communication Engineering)**

**LIST OF EXPERIMENTS**

**8086 Microprocessor Experiments**

1. Basic Arithmetic and Logical operations using 8086.
2. Code conversion, decimal arithmetic and Matrix operations.
3. Floating-point operations, string manipulations, sorting and searching.
4. Counters and Time delay.
5. Password Checking, Print RAM size and System Date.

**8086 Microprocessor-Peripherals and Interfacing Experiments**

6. Traffic Light Control and Stepper Motor Control.
7. Digital Clock.
8. Keyboard and Display.
9. Serial and Parallel Interface.
10. A/D and D/A Interface and Waveform Generation.

**8051 Microcontroller Experiments - Hardware / Simulation**

11. Basic Arithmetic and Logical Operations.
12. Square program, Cube program and Finding 2's complement of a number.
13. Unpacked BCD to ASCII.
14. A/D and D/A Interface and Waveform Generation.
15. Interfacing LCD to 8051

**Total Hours    45Hours**

**Text Book(s)**

- |    |                                                                                                                                                         |
|----|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. | R. S. Gaonkar, "Microprocessor Architecture: Programming and Applications with the 8085/8080A", Penram International Publishing, Third Edition, 1996.   |
| 2. | D A Patterson and J H Hennessy, "Computer Organization and Design The hardware and software interface" Morgan Kaufman Publishers, Fourth Edition, 2011. |

**Reference Book(s)**

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|----|-----------------------------------------------------------------------------------------------------------------------------------------------|
| 1. | Douglas Hall, "The Microprocessors and its Interfacing", Tata McGraw Hill, Third Edition, 2012.                                               |
| 2. | Kenneth J. Ayala, "The 8051 Microcontroller: Architecture Programming & Applications", Penram International Publishing, Second Edition, 1996. |