

# Government College of Engineering, Salem - 11

## Department of Electrical and Electronics Engineering

### COs - POs and PSO Mapping

#### Course Articulation Matrix – 22 Regulation

| Semester - I                  |  |                  |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |            |
|-------------------------------|--|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|---------------------------|------------|------------|------------|------------|
| 22EN101-Communicative English |  |                  |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |            |
| Course Outcomes               |  | Program Outcomes |            |            |            |            |            |            |            |            |            |            | Program Specific Outcomes |            |            |            |            |
|                               |  | 1                | 2          | 3          | 4          | 5          | 6          | 7          | 8          | 9          | 10         | 11         | 12                        | 1          | 2          | 3          | 4          |
| CO1                           | Comprehend the main ideas, key details and inferred meanings of technical texts                | 0                | 0          | 0          | 1          | 0          | 0          | 0          | 0          | 1          | 3          | 0          | 1                         | 0          | 0          | 1          | 0          |
| CO2                           | Use language effectively at technical and professional contexts                                | 0                | 0          | 0          | 1          | 0          | 0          | 0          | 0          | 1          | 3          | 0          | 2                         | 0          | 0          | 2          | 0          |
| CO3                           | Apply the academic and functional writing skills in formal and informal communicative contexts | 0                | 0          | 0          | 2          | 0          | 0          | 0          | 0          | 1          | 3          | 0          | 1                         | 0          | 0          | 1          | 0          |
| CO4                           | Interpret pictorial representation of statistical data and charts                              | 0                | 0          | 0          | 3          | 0          | 0          | 0          | 0          | 1          | 3          | 0          | 1                         | 0          | 0          | 1          | 0          |
| <b>Average</b>                |  | <b>0.0</b>       | <b>0.0</b> | <b>0.0</b> | <b>1.7</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>1.0</b> | <b>3.0</b> | <b>0.0</b> | <b>1.2</b>                | <b>0.0</b> | <b>0.0</b> | <b>1.2</b> | <b>0.0</b> |

| Semester – I   |  |                  |            |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |
|--|--|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|---------------------------|------------|------------|------------|
| 22MA102 -Matrices, Calculus And Differential Equations |  |                  |            |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |
| Course Outcomes  |  | Program Outcomes |            |            |            |            |            |            |            |            |            |            |            | Program Specific Outcomes |            |            |            |
|  |  | 1                | 2          | 3          | 4          | 5          | 6          | 7          | 8          | 9          | 10         | 11         | 12         | 1                         | 2          | 3          | 4          |
| CO1  | Learn the fundamental knowledge of Matrix theory.            | 3                | 2          | 0          | 2          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 2                         | 0          | 0          | 0          |
| CO2  | Solve Engineering problems using multiple integral calculus. | 3                | 2          | 0          | 2          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 2                         | 0          | 0          | 0          |
| CO3  | Acquire skills in solving ordinary differential equations.   | 3                | 2          | 0          | 2          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 2                         | 0          | 0          | 0          |
| CO4  | Understanding the concept of partial differential equations. | 3                | 2          | 0          | 2          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 2                         | 0          | 0          | 0          |
| CO5  | Acquire skills in applications of Vector Calculus.           | 3                | 2          | 0          | 2          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 2                         | 0          | 0          | 0          |
| <b>Average</b>   |  | <b>3.0</b>       | <b>2.0</b> | <b>0.0</b> | <b>2.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>2.0</b>                | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> |

| <b>Semester – I</b>                                |  |                         |            |            |            |            |            |            |            |            |            |            |                                  |            |            |            |            |
|--|--|-------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|----------------------------------|------------|------------|------------|------------|
| <b>22PH102 - Materials Science For Engineering</b> |  |                         |            |            |            |            |            |            |            |            |            |            |                                  |            |            |            |            |
|  |  | <b>Program Outcomes</b> |            |            |            |            |            |            |            |            |            |            | <b>Program Specific Outcomes</b> |            |            |            |            |
| <b>Course Outcomes</b>                             |  | <b>1</b>                | <b>2</b>   | <b>3</b>   | <b>4</b>   | <b>5</b>   | <b>6</b>   | <b>7</b>   | <b>8</b>   | <b>9</b>   | <b>10</b>  | <b>11</b>  | <b>12</b>                        | <b>1</b>   | <b>2</b>   | <b>3</b>   | <b>4</b>   |
| CO1  | Understanding the concept of conduction in materials and its carrier concentration.            | 3                       | 2          | 1          | 0          | 0          | 0          | 1          | 0          | 0          | 0          | 0          | 1                                | 2          | 2          | 0          | 0          |
| CO2  | The basics of semiconductor and variation of Fermi level with respect to different parameters. | 3                       | 2          | 1          | 0          | 1          | 1          | 1          | 1          | 0          | 0          | 0          | 2                                | 0          | 0          | 1          | 0          |
| CO3  | Analyze the various mechanism involved in dielectric polarization and its applications.        | 3                       | 3          | 1          | 0          | 0          | 1          | 1          | 1          | 0          | 0          | 0          | 1                                | 1          | 0          | 0          | 0          |
| CO4  | Applying the concept of superconductor in magnetic levitation and SQUID.                       | 3                       | 3          | 2          | 1          | 2          | 1          | 0          | 0          | 0          | 0          | 0          | 2                                | 0          | 2          | 0          | 0          |
| CO5  | Synthesis of modern engineering materials by using various techniques and its properties       | 2                       | 2          | 2          | 2          | 3          | 1          | 0          | 1          | 0          | 0          | 0          | 2                                | 0          | 0          | 2          | 0          |
| <b>Average</b>                                     |  | <b>2.8</b>              | <b>2.4</b> | <b>1.4</b> | <b>0.6</b> | <b>1.2</b> | <b>0.8</b> | <b>0.6</b> | <b>0.6</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>1.6</b>                       | <b>0.6</b> | <b>0.8</b> | <b>0.6</b> | <b>0.0</b> |

| Semester – I                                     |  |                  |     |     |     |     |     |     |     |     |     |     |     |                           |     |     |     |
|--|--|------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---------------------------|-----|-----|-----|
| 22CS103 - C Programming For Electrical Engineers |  |                  |     |     |     |     |     |     |     |     |     |     |     |                           |     |     |     |
|  |  | Program Outcomes |     |     |     |     |     |     |     |     |     |     |     | Program Specific Outcomes |     |     |     |
| Course Outcomes                                  |  | 1                | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | 1                         | 2   | 3   | 4   |
| CO1  | Formulate and apply logic to solve basic problems.   | 3                | 3   | 3   | 3   | 3   | 2   | 2   | 1   | 1   | 1   | 3   | 3   | 1                         | 2   | 1   | 0   |
| CO2  | Write, compile and debug programs in C language.   | 3                | 3   | 3   | 3   | 3   | 2   | 2   | 1   | 1   | 1   | 3   | 3   | 1                         | 1   | 2   | 0   |
| CO3  | Apply the concepts such as arrays, decision making and looping statements to solve real time applications. | 3                | 3   | 3   | 3   | 3   | 2   | 2   | 1   | 1   | 1   | 3   | 3   | 1                         | 2   | 1   | 0   |
| CO4  | Solve simple scientific and statistical problems using functions and pointers.                             | 3                | 3   | 3   | 3   | 3   | 2   | 2   | 1   | 1   | 1   | 3   | 3   | 1                         | 2   | 1   | 0   |
| CO5  | Write programs related to structures and unions for simple applications.                                   | 3                | 3   | 3   | 3   | 3   | 2   | 2   | 1   | 1   | 1   | 3   | 3   | 1                         | 2   | 1   | 0   |
| <b>Average</b>                                   |  | 3.0              | 3.0 | 3.0 | 3.0 | 3.0 | 2.0 | 2.0 | 1.0 | 1.0 | 1.0 | 3.0 | 3.0 | 1.0                       | 1.8 | 1.2 | 0.0 |

| <b>Semester - I</b>                                     |   |                 |            |            |            |            |            |            |            |            |            |            |            |                                  |            |            |            |
|---|---|-----------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|----------------------------------|------------|------------|------------|
| <b>22CM101 - Basic Civil And Mechanical Engineering</b> |   |                 |            |            |            |            |            |            |            |            |            |            |            |                                  |            |            |            |
|   |   | <b>Outcomes</b> |            |            |            |            |            |            |            |            |            |            |            | <b>Program Specific Outcomes</b> |            |            |            |
| <b>Course Outcomes</b>                                  |   | <b>1</b>        | <b>2</b>   | <b>3</b>   | <b>4</b>   | <b>5</b>   | <b>6</b>   | <b>7</b>   | <b>8</b>   | <b>9</b>   | <b>10</b>  | <b>11</b>  | <b>12</b>  | <b>1</b>                         | <b>2</b>   | <b>3</b>   | <b>4</b>   |
| CO1   | Acquire the basic Knowledge in different fields of Civil Engineering. | 3               | 2          | 1          | 0          | 0          | 2          | 1          | 2          | 0          | 0          | 0          | 0          | 0                                | 3          | 0          | 0          |
| CO2   | Appraise the materials used in construction.                          | 2               | 0          | 2          | 0          | 0          | 1          | 1          | 2          | 0          | 0          | 0          | 0          | 0                                | 2          | 0          | 0          |
| CO3   | Illustrate the ideas of Civil Engineering Applications.               | 1               | 2          | 1          | 0          | 0          | 1          | 1          | 1          | 0          | 0          | 0          | 0          | 0                                | 2          | 0          | 0          |
| CO4   | Understand the different parts of buildings.                          | 1               | 1          | 0          | 0          | 0          | 0          | 1          | 0          | 0          | 0          | 0          | 0          | 0                                | 1          | 0          | 0          |
| <b>Average</b>  |   | <b>1.8</b>      | <b>1.2</b> | <b>1.0</b> | <b>0.0</b> | <b>0.0</b> | <b>1.0</b> | <b>1.0</b> | <b>1.2</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b>                       | <b>2.0</b> | <b>0.0</b> | <b>0.0</b> |

| Semester – I   |   |                  |            |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |
|--|---|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|---------------------------|------------|------------|------------|
| 22CS102 - Computer Practice And C Programming Laboratory |   |                  |            |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |
|  |   | Program Outcomes |            |            |            |            |            |            |            |            |            |            |            | Program Specific Outcomes |            |            |            |
| Course Outcomes  |   | 1                | 2          | 3          | 4          | 5          | 6          | 7          | 8          | 9          | 10         | 11         | 12         | 1                         | 2          | 3          | 4          |
| CO1  | Demonstrate the usage of features supported by word processing applications.              | 0                | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 3          | 0          | 0          | 1                         | 0          | 0          | 0          |
| CO2  | Demonstrate the usage of features supported by spread sheet applications.                 | 2                | 3          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 1                         | 0          | 0          | 0          |
| CO3  | Apply general programming techniques to develop digital solution to problems              | 2                | 3          | 3          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 3          | 2                         | 0          | 0          | 0          |
| CO4  | Implement solutions develop with general programming techniques in C programming language | 1                | 1          | 1          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 3          | 3                         | 0          | 0          | 0          |
| <b>Average</b>   |   | <b>1.2</b>       | <b>1.7</b> | <b>1.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.7</b> | <b>0.0</b> | <b>1.5</b> | <b>1.7</b>                | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> |

| Semester - I                               |   |                  |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |            |
|--|---|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|---------------------------|------------|------------|------------|------------|
| 22ME102 - Workshop Manufacturing Practices |   |                  |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |            |
|  |   | Program Outcomes |            |            |            |            |            |            |            |            |            |            | Program Specific Outcomes |            |            |            |            |
| Course Outcomes                            |   | 1                | 2          | 3          | 4          | 5          | 6          | 7          | 8          | 9          | 10         | 11         | 12                        | 1          | 2          | 3          | 4          |
| CO1  | Familiarize the working of various equipment and safety measures.                             | 0                | 0          | 0          | 0          | 0          | 3          | 0          | 0          | 0          | 0          | 0          | 0                         | 0          | 0          | 0          | 0          |
| CO2  | Prepare fitting of metal and wooden pieces using simple fitting and carpentry tools manually. | 0                | 3          | 0          | 2          | 1          | 0          | 0          | 0          | 0          | 0          | 0          | 0                         | 0          | 0          | 2          | 0          |
| CO3  | Fabrication of components using welding, lathe and drilling machine.                          | 0                | 3          | 0          | 2          | 1          | 0          | 0          | 0          | 0          | 0          | 0          | 0                         | 0          | 0          | 2          | 0          |
| CO4  | Make the model using sheet metal works.   | 0                | 3          | 0          | 2          | 1          | 0          | 0          | 0          | 0          | 0          | 0          | 0                         | 0          | 0          | 2          | 0          |
| <b>Average</b>                             |   | <b>0.0</b>       | <b>2.2</b> | <b>0.0</b> | <b>1.5</b> | <b>0.7</b> | <b>0.7</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b>                | <b>0.0</b> | <b>0.0</b> | <b>1.5</b> | <b>0.0</b> |

| Semester -II                            |  |                  |            |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |            |
|---|--|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|---------------------------|------------|------------|------------|------------|
| 22MA204 - Fourier Series And Transforms |  |                  |            |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |            |
| Course Outcomes                         |  | Program Outcomes |            |            |            |            |            |            |            |            |            |            |            | Program Specific Outcomes |            |            |            |            |
|   |  | 1                | 2          | 3          | 4          | 5          | 6          | 7          | 8          | 9          | 10         | 11         | 12         | 1                         | 2          | 3          | 4          |            |
| CO1                                     | Acquire the knowledge about Fourier series.  | 3                | 2          | 0          | 2          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0                         | 2          | 0          | 0          | 0          |
| CO2                                     | Appreciate the physical significance of Fourier series techniques in solving one- and two-dimensional heat flow problems and one-dimensional wave equations. | 3                | 2          | 0          | 2          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0                         | 2          | 0          | 0          | 0          |
| CO3                                     | Acquire the knowledge about Laplace transforms.  | 3                | 2          | 0          | 2          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0                         | 2          | 0          | 0          | 0          |
| CO4                                     | Apply the knowledge of Fourier transform in engineering problems.  | 3                | 2          | 0          | 2          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0                         | 2          | 0          | 0          | 0          |
| CO5                                     | Apply the knowledge of Z-transform in engineering problems.  | 3                | 2          | 0          | 2          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0                         | 2          | 0          | 0          | 0          |
| <b>Average</b>                          |  | <b>3.0</b>       | <b>2.0</b> | <b>0.0</b> | <b>2.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b>                | <b>2.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> |



| <b>Semester -II</b>  |  |                         |            |            |            |            |            |            |            |            |            |            |            |                                  |            |            |            |
|--|--|-------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|----------------------------------|------------|------------|------------|
| <b>22PH202 - Physics – Waves, Optics And Quantum Mechanics</b> |  |                         |            |            |            |            |            |            |            |            |            |            |            |                                  |            |            |            |
|  |  | <b>Program Outcomes</b> |            |            |            |            |            |            |            |            |            |            |            | <b>Program Specific Outcomes</b> |            |            |            |
| <b>Course Outcomes</b>   |  | <b>1</b>                | <b>2</b>   | <b>3</b>   | <b>4</b>   | <b>5</b>   | <b>6</b>   | <b>7</b>   | <b>8</b>   | <b>9</b>   | <b>10</b>  | <b>11</b>  | <b>12</b>  | <b>1</b>                         | <b>2</b>   | <b>3</b>   | <b>4</b>   |
| CO1  | Understand Simple harmonic oscillation and propagation of waves.             | 2                       | 3          | 1          | 1          | 0          | 0          | 0          | 1          | 1          | 0          | 0          | 1          | 1                                | 1          | 0          | 0          |
| CO2  | Apply matrix method to analyse system of reflecting and refracting surfaces. | 2                       | 2          | 1          | 1          | 1          | 0          | 0          | 1          | 0          | 0          | 0          | 1          | 1                                | 1          | 1          | 0          |
| CO3  | Analyze the various experimental techniques in wave optics.                  | 3                       | 2          | 1          | 1          | 1          | 0          | 0          | 2          | 1          | 0          | 0          | 1          | 1                                | 1          | 1          | 0          |
| CO4  | Understand the concept of laser and its applications.                        | 3                       | 1          | 2          | 1          | 2          | 1          | 0          | 0          | 1          | 0          | 0          | 2          | 0                                | 1          | 1          | 0          |
| CO5  | Gain knowledge in the basics of quantum mechanics.                           | 3                       | 2          | 2          | 1          | 1          | 0          | 0          | 0          | 0          | 0          | 0          | 2          | 1                                | 1          | 1          | 0          |
| <b>Average</b>   |  | <b>2.6</b>              | <b>2.0</b> | <b>1.4</b> | <b>1.0</b> | <b>1.0</b> | <b>0.2</b> | <b>0.0</b> | <b>0.8</b> | <b>0.6</b> | <b>0.0</b> | <b>0.0</b> | <b>1.4</b> | <b>0.8</b>                       | <b>1.0</b> | <b>0.8</b> | <b>0.0</b> |

| <b>Semester -II</b>                    |  |                         |            |            |            |            |            |            |            |            |            |            |                                  |            |            |            |            |
|--|--|-------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|----------------------------------|------------|------------|------------|------------|
| <b>22CY101 - Engineering Chemistry</b> |  |                         |            |            |            |            |            |            |            |            |            |            |                                  |            |            |            |            |
|  |  | <b>Program Outcomes</b> |            |            |            |            |            |            |            |            |            |            | <b>Program Specific Outcomes</b> |            |            |            |            |
| <b>Course Outcomes</b>                 |  | <b>1</b>                | <b>2</b>   | <b>3</b>   | <b>4</b>   | <b>5</b>   | <b>6</b>   | <b>7</b>   | <b>8</b>   | <b>9</b>   | <b>10</b>  | <b>11</b>  | <b>12</b>                        | <b>1</b>   | <b>2</b>   | <b>3</b>   | <b>4</b>   |
| CO1                                    | To recall the basic principles of spectroscopy and their applications  | 3                       | 3          | 0          | 3          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0                                | 3          | 1          | 1          | 0          |
| CO2                                    | To paraphrase the different methods for water analysis & purification and Nanomaterials & its applications     | 3                       | 2          | 0          | 1          | 0          | 2          | 0          | 0          | 0          | 0          | 0          | 0                                | 3          | 1          | 1          | 0          |
| CO3                                    | To apply the various adsorption technics and basic knowledge of Phase equilibria                               | 3                       | 1          | 0          | 1          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0                                | 2          | 1          | 1          | 0          |
| CO4                                    | To integrate the principles of electrochemistry, electrochemical cells, corrosion, and its control             | 2                       | 1          | 0          | 1          | 0          | 2          | 0          | 0          | 0          | 0          | 0          | 0                                | 2          | 3          | 2          | 0          |
| CO5                                    | To assess the basis of polymer preparations & applications and enhancement of the quantity & quality of fuels. | 3                       | 2          | 0          | 3          | 0          | 2          | 0          | 0          | 0          | 0          | 0          | 0                                | 1          | 1          | 1          | 0          |
| <b>Average</b>                         |  | <b>2.8</b>              | <b>1.8</b> | <b>0.0</b> | <b>1.8</b> | <b>0.0</b> | <b>1.2</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b>                       | <b>2.2</b> | <b>1.4</b> | <b>1.2</b> | <b>0.0</b> |

| <b>Semester -II</b>                     |  |                         |            |            |            |            |            |            |            |            |            |            |                                  |            |            |            |            |
|---|--|-------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|----------------------------------|------------|------------|------------|------------|
| <b>22HS201 - Universal Human Values</b> |  |                         |            |            |            |            |            |            |            |            |            |            |                                  |            |            |            |            |
|   |  | <b>Program Outcomes</b> |            |            |            |            |            |            |            |            |            |            | <b>Program Specific Outcomes</b> |            |            |            |            |
| <b>Course Outcomes</b>                  |  | <b>1</b>                | <b>2</b>   | <b>3</b>   | <b>4</b>   | <b>5</b>   | <b>6</b>   | <b>7</b>   | <b>8</b>   | <b>9</b>   | <b>10</b>  | <b>11</b>  | <b>12</b>                        | <b>1</b>   | <b>2</b>   | <b>3</b>   | <b>4</b>   |
| CO1                                     | Become more aware of themselves, and their surroundings (family, society, nature) and become more responsible in life                              | 0                       | 0          | 1          | 0          | 0          | 1          | 0          | 2          | 0          | 1          | 0          | 3                                | 2          | 0          | 1          | 0          |
| CO2                                     | Handle problems with sustainable solutions, while keeping human relationships and human nature in mind   | 0                       | 0          | 1          | 0          | 0          | 3          | 0          | 1          | 0          | 1          | 0          | 3                                | 1          | 0          | 1          | 0          |
| CO3                                     | Become sensitive to their commitment towards what they have understood (human values, human relationship and human society)                        | 0                       | 0          | 1          | 0          | 0          | 2          | 0          | 1          | 0          | 1          | 0          | 3                                | 1          | 0          | 2          | 0          |
| CO4                                     | Apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction. | 0                       | 0          | 2          | 0          | 0          | 1          | 0          | 1          | 0          | 1          | 0          | 3                                | 1          | 0          | 1          | 0          |
| <b>Average</b>                          |  | <b>0.0</b>              | <b>0.0</b> | <b>1.2</b> | <b>0.0</b> | <b>0.0</b> | <b>1.7</b> | <b>0.0</b> | <b>1.2</b> | <b>0.0</b> | <b>1.0</b> | <b>0.0</b> | <b>3.0</b>                       | <b>1.2</b> | <b>0.0</b> | <b>1.2</b> | <b>0.0</b> |

| Semester -II                              |  |                  |            |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |
|---|--|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|---------------------------|------------|------------|------------|
| 22ME101 - Engineering Graphics And Design |  |                  |            |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |
|   |  | Program Outcomes |            |            |            |            |            |            |            |            |            |            |            | Program Specific Outcomes |            |            |            |
| Course Outcomes                           |  | 1                | 2          | 3          | 4          | 5          | 6          | 7          | 8          | 9          | 10         | 11         | 12         | 1                         | 2          | 3          | 4          |
| CO1                                       | Familiarize with the fundamentals and standards of engineering graphics.                     | 3                | 1          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 3                         | 1          | 0          | 0          |
| CO2                                       | Ability to understand the fundamental concepts of projection of points, lines and planes.    | 3                | 1          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 3                         | 1          | 0          | 0          |
| CO3                                       | Project the solids and section of solids.  | 3                | 1          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 3                         | 1          | 0          | 0          |
| CO4                                       | Familiarize and develop the lateral surfaces of solids                                       | 3                | 1          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 3                         | 1          | 0          | 0          |
| CO5                                       | Visualize and project the orthographic, isometric and perspective sections of simple solids. | 3                | 1          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 3                         | 1          | 0          | 0          |
| <b>Average</b>                            |  | <b>3.0</b>       | <b>1.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>3.0</b>                | <b>1.0</b> | <b>0.0</b> | <b>0.0</b> |

| Semester –II                             |  |                  |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |            |
|--|--|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|---------------------------|------------|------------|------------|------------|
| 22EN102 - Professional Skills Laboratory |  |                  |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |            |
| Course Outcomes                          |  | Program Outcomes |            |            |            |            |            |            |            |            |            |            | Program Specific Outcomes |            |            |            |            |
|  |  | 1                | 2          | 3          | 4          | 5          | 6          | 7          | 8          | 9          | 10         | 11         | 12                        | 1          | 2          | 3          | 4          |
| CO1                                      | To read passages fluently with good pronunciation                      | 0                | 0          | 0          | 1          | 0          | 0          | 0          | 0          | 2          | 3          | 0          | 1                         | 0          | 0          | 1          | 0          |
| CO2                                      | To develop an expressive style of reading                              | 0                | 0          | 0          | 1          | 0          | 0          | 0          | 0          | 2          | 3          | 0          | 1                         | 0          | 0          | 1          | 0          |
| CO3                                      | To make effective oral presentations in technical and general contexts | 0                | 0          | 0          | 2          | 0          | 0          | 0          | 0          | 2          | 3          | 0          | 1                         | 0          | 0          | 1          | 0          |
| CO4                                      | To excel at professional oral communication                            | 0                | 0          | 0          | 2          | 0          | 0          | 0          | 0          | 2          | 3          | 0          | 1                         | 0          | 0          | 3          | 0          |
| <b>Average</b>                           |  | <b>0.0</b>       | <b>0.0</b> | <b>0.0</b> | <b>1.5</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>2.0</b> | <b>3.0</b> | <b>0.0</b> | <b>1.0</b>                | <b>0.0</b> | <b>0.0</b> | <b>1.5</b> | <b>0.0</b> |

| Semester –II                 |  |                  |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |            |
|------------------------------|--|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|---------------------------|------------|------------|------------|------------|
| 22PH103 - Physics Laboratory |  |                  |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |            |
|                              |  | Program Outcomes |            |            |            |            |            |            |            |            |            |            | Program Specific Outcomes |            |            |            |            |
| Course Outcomes              |  | 1                | 2          | 3          | 4          | 5          | 6          | 7          | 8          | 9          | 10         | 11         | 12                        | 1          | 2          | 3          | 4          |
| CO1                          | Handle different measuring instruments and to measure different parameters.                                  | 3                | 2          | 0          | 3          | 3          | 0          | 0          | 0          | 3          | 1          | 0          | 2                         | 1          | 1          | 1          | 0          |
| CO2                          | Calculate the important parameters and to arrive at the final result based on the experimental measurements. | 3                | 2          | 0          | 2          | 1          | 0          | 0          | 0          | 2          | 0          | 0          | 1                         | 1          | 1          | 1          | 0          |
| <b>Average</b>               |  | <b>3.0</b>       | <b>2.0</b> | <b>0.0</b> | <b>2.5</b> | <b>2.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>2.5</b> | <b>1.0</b> | <b>0.0</b> | <b>1.5</b>                | <b>1.0</b> | <b>1.0</b> | <b>1.0</b> | <b>0.0</b> |

| <b>Semester –II</b>                   |  |                         |            |            |            |            |            |            |            |            |            |            |            |                                  |            |            |            |
|---------------------------------------|--|-------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|----------------------------------|------------|------------|------------|
| <b>22CY102 - Chemistry Laboratory</b> |  |                         |            |            |            |            |            |            |            |            |            |            |            |                                  |            |            |            |
|                                       |  | <b>Program Outcomes</b> |            |            |            |            |            |            |            |            |            |            |            | <b>Program Specific Outcomes</b> |            |            |            |
| <b>Course Outcomes</b>                |  | <b>1</b>                | <b>2</b>   | <b>3</b>   | <b>4</b>   | <b>5</b>   | <b>6</b>   | <b>7</b>   | <b>8</b>   | <b>9</b>   | <b>10</b>  | <b>11</b>  | <b>12</b>  | <b>1</b>                         | <b>2</b>   | <b>3</b>   | <b>4</b>   |
| CO1                                   | To summarize the applicability of the practical skill gained in various fields.  | 1                       | 1          | 0          | 3          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 2                                | 0          | 0          | 0          |
| CO2                                   | To calculate the composition of brass quantitatively and the molecular weight of polymers.                                     | 1                       | 2          | 0          | 3          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 2                                | 0          | 0          | 0          |
| CO3                                   | To understand the principle and applications of conductometric and pH titrations, spectrometer, and potentiometric titrations. | 2                       | 2          | 0          | 3          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 2                                | 0          | 0          | 0          |
| <b>Average</b>                        |  | <b>1.3</b>              | <b>1.7</b> | <b>0.0</b> | <b>3.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>2.0</b>                       | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> |

| <b>Semester –III</b>                              |   |                         |            |            |            |            |            |            |            |            |            |            |            |                                  |            |            |            |
|---|---|-------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|----------------------------------|------------|------------|------------|
| <b>22MA302 - STATISTICS AND NUMERICAL METHODS</b> |   |                         |            |            |            |            |            |            |            |            |            |            |            |                                  |            |            |            |
|   |   | <b>Program Outcomes</b> |            |            |            |            |            |            |            |            |            |            |            | <b>Program Specific Outcomes</b> |            |            |            |
| <b>Course Outcomes</b>                            |   | <b>1</b>                | <b>2</b>   | <b>3</b>   | <b>4</b>   | <b>5</b>   | <b>6</b>   | <b>7</b>   | <b>8</b>   | <b>9</b>   | <b>10</b>  | <b>11</b>  | <b>12</b>  | <b>1</b>                         | <b>2</b>   | <b>3</b>   | <b>4</b>   |
| CO1   | Learn about statistical averages and fitting the curves by Least Square Method.                 | 3                       | 2          | 3          | 3          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 2                                | 0          | 0          | 0          |
| CO2   | Acquire the techniques of interpolation.  | 3                       | 2          | 3          | 3          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 2                                | 0          | 0          | 0          |
| CO3   | Familiar with the numerical differentiation and integration                                     | 3                       | 2          | 2          | 3          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 2                                | 0          | 0          | 0          |
| CO4   | Solve the initial value problems for ordinary differential equations.                           | 3                       | 2          | 2          | 2          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 2                                | 0          | 0          | 0          |
| CO5   | Find the numerical solution of partial differential equation by using Finite difference method. | 3                       | 2          | 2          | 2          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 2                                | 0          | 0          | 0          |
| <b>Average</b>                                    |   | <b>1.3</b>              | <b>1.7</b> | <b>2.4</b> | <b>2.6</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>2.0</b>                       | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> |



| Semester –III                       |   |                  |            |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |
|-------------------------------------|---|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|---------------------------|------------|------------|------------|
| 22EE301 - Electric Circuit Analysis |   |                  |            |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |
| Course Outcomes                     |   | Program Outcomes |            |            |            |            |            |            |            |            |            |            |            | Program Specific Outcomes |            |            |            |
|                                     |   | 1                | 2          | 3          | 4          | 5          | 6          | 7          | 8          | 9          | 10         | 11         | 12         | 1                         | 2          | 3          | 4          |
| CO1                                 | Solve the electrical network using mesh, nodal analysis and applying network theorems.  | 3                | 2          | 1          | 2          | 3          | 0          | 1          | 0          | 0          | 0          | 0          | 2          | 3                         | 3          | 2          | 1          |
| CO2                                 | Solve the first order and second order differential equations for series and parallel circuits and analyse its steady state and transient response. | 3                | 2          | 1          | 2          | 3          | 0          | 1          | 0          | 0          | 0          | 0          | 2          | 3                         | 3          | 2          | 1          |
| CO3                                 | Analyze the steady state response for AC sinusoidal input and basic concepts of resonance and coupled circuits.                                     | 3                | 2          | 1          | 2          | 3          | 0          | 1          | 0          | 0          | 0          | 0          | 2          | 3                         | 3          | 2          | 1          |
| CO4                                 | Analyse the electrical circuit using Laplace transforms   | 3                | 3          | 0          | 2          | 2          | 0          | 0          | 0          | 0          | 0          | 0          | 2          | 2                         | 3          | 2          | 1          |
| CO5                                 | Understand the two port networks and its parameters for electric circuit analysis.  | 3                | 2          | 0          | 2          | 2          | 0          | 0          | 0          | 0          | 0          | 0          | 2          | 2                         | 3          | 2          | 1          |
| <b>Average</b>                      |   | <b>3.0</b>       | <b>2.2</b> | <b>0.6</b> | <b>2.0</b> | <b>2.6</b> | <b>0.0</b> | <b>1.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>2.0</b> | <b>2.6</b> | <b>3.0</b>                | <b>2.0</b> | <b>1.0</b> | <b>1.0</b> |

| <b>Semester –III</b>                    |  |                         |            |            |            |            |            |            |            |            |            |            |            |                                  |            |            |            |
|---|--|-------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|----------------------------------|------------|------------|------------|
| <b>22EE302 - Electromagnetic Theory</b> |  |                         |            |            |            |            |            |            |            |            |            |            |            |                                  |            |            |            |
|   |  | <b>Program Outcomes</b> |            |            |            |            |            |            |            |            |            |            |            | <b>Program Specific Outcomes</b> |            |            |            |
| <b>Course Outcomes</b>                  |  | <b>1</b>                | <b>2</b>   | <b>3</b>   | <b>4</b>   | <b>5</b>   | <b>6</b>   | <b>7</b>   | <b>8</b>   | <b>9</b>   | <b>10</b>  | <b>11</b>  | <b>12</b>  | <b>1</b>                         | <b>2</b>   | <b>3</b>   | <b>4</b>   |
| CO1                                     | Recall the fundamental concept, laws and theorem of electric and magnetic fields.                      | 3                       | 3          | 2          | 2          | 2          | 1          | 1          | 1          | 1          | 1          | 1          | 1          | 3                                | 1          | 1          | 0          |
| CO2                                     | Associate the concepts in electrostatic fields and magnetic fields.                                    | 1                       | 3          | 2          | 2          | 2          | 1          | 1          | 1          | 1          | 1          | 1          | 1          | 2                                | 1          | 1          | 0          |
| CO3                                     | Analyze the Electric and magnetic Field in material space.   | 1                       | 3          | 2          | 2          | 2          | 1          | 1          | 1          | 1          | 1          | 1          | 1          | 2                                | 1          | 1          | 0          |
| CO4                                     | Apply the boundary conditions to the applications in electrostatic fields and magneto static fields. . | 1                       | 1          | 3          | 3          | 2          | 2          | 1          | 1          | 1          | 1          | 1          | 1          | 2                                | 2          | 1          | 0          |
| CO5                                     | Assess the knowledge of electromagnetic waves and characterizing parameters.                           | 1                       | 1          | 3          | 2          | 2          | 2          | 1          | 1          | 1          | 1          | 1          | 1          | 2                                | 2          | 1          | 0          |
| <b>Average</b>                          |  | <b>1.4</b>              | <b>2.2</b> | <b>2.4</b> | <b>2.2</b> | <b>2.0</b> | <b>1.4</b> | <b>1.0</b> | <b>1.0</b> | <b>1.0</b> | <b>1.0</b> | <b>1.0</b> | <b>1.0</b> | <b>2.2</b>                       | <b>1.4</b> | <b>1.0</b> | <b>0.0</b> |

**Semester -III**

**22EE303 - DC Machines And Transformers**

| Course Outcomes |   | Program Outcomes |            |            |            |            |            |            |            |            |            |            |            | Program Specific Outcomes |            |            |            |
|-----------------|---|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|---------------------------|------------|------------|------------|
|                 |   | 1                | 2          | 3          | 4          | 5          | 6          | 7          | 8          | 9          | 10         | 11         | 12         | 1                         | 2          | 3          | 4          |
| CO1             | Recite the concepts of electromechanical energy conversion principles.    | 3                | 2          | 1          | 0          | 0          | 1          | 0          | 0          | 0          | 0          | 0          | 0          | 0                         | 3          | 1          | 0          |
| CO2             | Understand the basic concepts of DC machines and transformers.            | 3                | 2          | 1          | 0          | 0          | 1          | 0          | 0          | 0          | 0          | 0          | 0          | 0                         | 3          | 1          | 0          |
| CO3             | Evaluate the performance characteristics of DC machines and transformers. | 3                | 2          | 1          | 0          | 0          | 1          | 0          | 0          | 0          | 0          | 0          | 0          | 0                         | 3          | 1          | 0          |
| CO4             | Conduct various tests on DC machines.                                     | 3                | 2          | 3          | 1          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0                         | 3          | 1          | 0          |
| CO5             | Conduct various tests on transformers                                     | 3                | 2          | 3          | 1          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0                         | 3          | 1          | 0          |
| <b>Average</b>  |   | <b>3.0</b>       | <b>2.0</b> | <b>1.8</b> | <b>0.4</b> | <b>0.0</b> | <b>0.6</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b>                | <b>3.0</b> | <b>1.0</b> | <b>0.0</b> |

| Semester –III                           |   |                  |            |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |
|---|---|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|---------------------------|------------|------------|------------|
| 22EE304 - Electron Devices And Circuits |   |                  |            |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |
|   |   | Program Outcomes |            |            |            |            |            |            |            |            |            |            |            | Program Specific Outcomes |            |            |            |
| Course Outcomes                         |   | 1                | 2          | 3          | 4          | 5          | 6          | 7          | 8          | 9          | 10         | 11         | 12         | 1                         | 2          | 3          | 4          |
| CO1                                     | Understand overview of semiconductor devices.               | 1                | 1          | 1          | 1          | 1          | 1          | 3          | 1          | 0          | 0          | 1          | 0          | 0                         | 1          | 1          | 1          |
| CO2                                     | Recognize the fundamentals and characteristics of BJT       | 2                | 3          | 3          | 3          | 2          | 1          | 2          | 1          | 1          | 0          | 1          | 0          | 0                         | 1          | 1          | 1          |
| CO3                                     | Analyze the fundamentals and characteristics of FET and UJT | 3                | 2          | 2          | 3          | 2          | 1          | 2          | 1          | 1          | 0          | 1          | 0          | 0                         | 1          | 1          | 1          |
| CO4                                     | Design and analyze the amplifiers                           | 2                | 3          | 2          | 3          | 3          | 1          | 2          | 1          | 1          | 0          | 1          | 0          | 0                         | 2          | 2          | 1          |
| CO5                                     | Design and analyze the differential amplifiers              | 2                | 2          | 3          | 3          | 3          | 1          | 2          | 1          | 1          | 0          | 1          | 0          | 0                         | 2          | 2          | 1          |
| <b>Average</b>                          |   | <b>2.0</b>       | <b>2.2</b> | <b>2.2</b> | <b>2.6</b> | <b>2.2</b> | <b>1.0</b> | <b>2.2</b> | <b>1.0</b> | <b>0.8</b> | <b>0.0</b> | <b>1.0</b> | <b>0.0</b> | <b>1.4</b>                | <b>1.4</b> | <b>1.0</b> | <b>1.0</b> |

| Semester –III                 |   |                  |            |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |
|-------------------------------|---|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|---------------------------|------------|------------|------------|
| 22EE305 - Signals And Systems |   |                  |            |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |
|                               |   | Program Outcomes |            |            |            |            |            |            |            |            |            |            |            | Program Specific Outcomes |            |            |            |
| Course Outcomes               |   | 1                | 2          | 3          | 4          | 5          | 6          | 7          | 8          | 9          | 10         | 11         | 12         | 1                         | 2          | 3          | 4          |
| CO1                           | To be able to determine if a given system is linear/causal/stable                   | 1                | 1          | 1          | 1          | 1          | 1          | 3          | 1          | 0          | 0          | 1          | 0          | 1                         | 1          | 1          | 0          |
| CO2                           | Capable of determining the frequency components present in a deterministic signal   | 2                | 3          | 3          | 3          | 2          | 1          | 2          | 1          | 1          | 0          | 1          | 0          | 1                         | 1          | 1          | 0          |
| CO3                           | Capable of characterizing LTI systems in the time domain and frequency domain       | 3                | 2          | 2          | 3          | 2          | 1          | 2          | 1          | 1          | 0          | 1          | 0          | 1                         | 1          | 1          | 0          |
| CO4                           | To be able to compute the output of an LTI system in the time and frequency domains | 2                | 3          | 2          | 3          | 3          | 1          | 2          | 1          | 1          | 0          | 1          | 0          | 2                         | 2          | 1          | 0          |
| CO5                           | Capable of determining the frequency response of discrete system using Z transform  | 2                | 2          | 3          | 3          | 3          | 1          | 2          | 1          | 1          | 0          | 1          | 0          | 2                         | 2          | 1          | 0          |
| <b>Average</b>                |   | <b>2.0</b>       | <b>2.2</b> | <b>2.2</b> | <b>2.6</b> | <b>2.2</b> | <b>1.0</b> | <b>2.2</b> | <b>1.0</b> | <b>0.8</b> | <b>0.0</b> | <b>1.0</b> | <b>0.0</b> | <b>1.4</b>                | <b>1.4</b> | <b>1.0</b> | <b>0.0</b> |

| <b>Semester –III</b>                 |   |                         |            |            |            |          |            |            |            |            |            |            |                                  |            |            |            |            |
|--------------------------------------|---|-------------------------|------------|------------|------------|----------|------------|------------|------------|------------|------------|------------|----------------------------------|------------|------------|------------|------------|
| <b>22MCIN02 - Innovation Sprints</b> |   |                         |            |            |            |          |            |            |            |            |            |            |                                  |            |            |            |            |
|                                      |   | <b>Program Outcomes</b> |            |            |            |          |            |            |            |            |            |            | <b>Program Specific Outcomes</b> |            |            |            |            |
| <b>Course Outcomes</b>               |   | <b>1</b>                | <b>2</b>   | <b>3</b>   | <b>4</b>   | <b>5</b> | <b>6</b>   | <b>7</b>   | <b>8</b>   | <b>9</b>   | <b>10</b>  | <b>11</b>  | <b>12</b>                        | <b>1</b>   | <b>2</b>   | <b>3</b>   | <b>4</b>   |
| CO1                                  | Identify real-world problems  | 0                       | 3          | 0          | 0          | 0        | 2          | 1          | 0          | 2          | 0          | 0          | 0                                | 0          | 0          | 2          | 0          |
| CO2                                  | Apply the challenge curation techniques to real-world problems.                                 | 0                       | 3          | 0          | 2          | 0        | 0          | 0          | 0          | 2          | 0          | 0          | 0                                | 0          | 0          | 2          | 0          |
| CO3                                  | Analyze the problems and generate solutions to address the challenges                           | 0                       | 0          | 3          | 2          | 0        | 0          | 0          | 0          | 2          | 0          | 0          | 0                                | 0          | 0          | 2          | 0          |
| CO4                                  | Build solutions using prototyping tools & techniques  | 2                       | 0          | 3          | 0          | 0        | 0          | 0          | 1          | 2          | 0          | 0          | 0                                | 0          | 0          | 2          | 0          |
| CO5                                  | Develop an innovation pitch to effectively communicate the idea to solve the identified problem | 0                       | 0          | 0          | 0          | 0        | 0          | 0          | 0          | 2          | 3          | 0          | 0                                | 0          | 0          | 2          | 0          |
| <b>Average</b>                       |   | <b>0.4</b>              | <b>1.2</b> | <b>1.2</b> | <b>0.8</b> | <b>0</b> | <b>0.4</b> | <b>0.2</b> | <b>0.2</b> | <b>2.0</b> | <b>0.6</b> | <b>0.0</b> | <b>0.0</b>                       | <b>0.0</b> | <b>0.0</b> | <b>2.0</b> | <b>0.0</b> |

| <b>Semester -III</b>           |  |                         |            |            |            |            |            |            |            |            |            |            |            |                                  |            |            |            |
|--------------------------------|--|-------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|----------------------------------|------------|------------|------------|
| <b>22NC301 - NCC COURSE-II</b> |  |                         |            |            |            |            |            |            |            |            |            |            |            |                                  |            |            |            |
|                                |  | <b>Program Outcomes</b> |            |            |            |            |            |            |            |            |            |            |            | <b>Program Specific Outcomes</b> |            |            |            |
| <b>Course Outcomes</b>         |  | <b>1</b>                | <b>2</b>   | <b>3</b>   | <b>4</b>   | <b>5</b>   | <b>6</b>   | <b>7</b>   | <b>8</b>   | <b>9</b>   | <b>10</b>  | <b>11</b>  | <b>12</b>  | <b>1</b>                         | <b>2</b>   | <b>3</b>   | <b>4</b>   |
| CO1                            | Acquired knowledge about social and legal responsibilities.                      | 3                       | 1          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 3                                | 1          | 1          | 0          |
| CO2                            | Understand the adventure activities and verbal training on defence examinations. | 3                       | 3          | 2          | 3          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 3                                | 2          | 1          | 0          |
| CO3                            | Understand the technical knowledge on aero engines and map reading.              | 3                       | 2          | 3          | 1          | 0          | 2          | 0          | 0          | 0          | 0          | 0          | 0          | 3                                | 2          | 1          | 0          |
| CO4                            | Understand the structure and control of an aircraft.                             | 3                       | 2          | 2          | 2          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 3                                | 2          | 1          | 0          |
| CO5                            | Understand and learn the importance of avionic instruments on aircraft control.  | 3                       | 0          | 0          | 0          | 0          | 1          | 0          | 0          | 0          | 0          | 0          | 0          | 3                                | 3          | 1          | 0          |
| <b>Average</b>                 |  | <b>3.0</b>              | <b>1.6</b> | <b>1.4</b> | <b>1.2</b> | <b>0.0</b> | <b>0.6</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>3.0</b>                       | <b>2.0</b> | <b>1.0</b> | <b>0.0</b> |

| <b>Semester –III</b>                                     |  |                         |            |            |            |            |            |            |            |            |            |            |            |                                  |            |            |            |
|--|--|-------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|----------------------------------|------------|------------|------------|
| <b>22EE306 - DC Machines And Transformers Laboratory</b> |  |                         |            |            |            |            |            |            |            |            |            |            |            |                                  |            |            |            |
|  |  | <b>Program Outcomes</b> |            |            |            |            |            |            |            |            |            |            |            | <b>Program Specific Outcomes</b> |            |            |            |
| <b>Course Outcomes</b>                                   |  | <b>1</b>                | <b>2</b>   | <b>3</b>   | <b>4</b>   | <b>5</b>   | <b>6</b>   | <b>7</b>   | <b>8</b>   | <b>9</b>   | <b>10</b>  | <b>11</b>  | <b>12</b>  | <b>1</b>                         | <b>2</b>   | <b>3</b>   | <b>4</b>   |
| CO1  | Understand the performance characteristics of DC generators.                               | 3                       | 3          | 2          | 1          | 1          | 1          | 3          | 1          | 2          | 1          | 1          | 2          | 3                                | 2          | 2          | 0          |
| CO2  | Obtain the load characteristics of DC compound generator.                                  | 3                       | 3          | 3          | 3          | 2          | 2          | 3          | 1          | 1          | 2          | 1          | 1          | 3                                | 2          | 3          | 0          |
| CO3  | Acquire knowledge on performance characteristics of DC shunt and series motors.            | 3                       | 3          | 3          | 2          | 2          | 1          | 1          | 2          | 1          | 3          | 1          | 1          | 3                                | 3          | 3          | 0          |
| CO4  | Analyze the performance characteristics of DC machines using direct and indirect methods.  | 3                       | 3          | 3          | 1          | 1          | 1          | 2          | 2          | 1          | 2          | 2          | 2          | 3                                | 3          | 2          | 0          |
| CO5  | Analyze the performance characteristics of transformers using direct and indirect methods. | 2                       | 3          | 2          | 3          | 1          | 1          | 1          | 3          | 1          | 2          | 2          | 2          | 2                                | 3          | 2          | 0          |
| <b>Average</b>   |  | <b>2.8</b>              | <b>3.0</b> | <b>2.6</b> | <b>2.0</b> | <b>1.4</b> | <b>1.2</b> | <b>2.0</b> | <b>1.8</b> | <b>1.2</b> | <b>2.0</b> | <b>1.4</b> | <b>1.6</b> | <b>2.8</b>                       | <b>2.6</b> | <b>2.4</b> | <b>0.0</b> |



| Semester –III                                      |   |                  |            |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |  |
|--|---|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|---------------------------|------------|------------|------------|--|
| 22EE307 - Circuits And Electron Devices Laboratory |   |                  |            |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |  |
|  |   | Program Outcomes |            |            |            |            |            |            |            |            |            |            |            | Program Specific Outcomes |            |            |            |  |
| Course Outcomes                                    |   | 1                | 2          | 3          | 4          | 5          | 6          | 7          | 8          | 9          | 10         | 11         | 12         | 1                         | 2          | 3          | 4          |  |
| CO1  | Design analog electronic circuits using Diode | 2                | 3          | 1          | 1          | 1          | 1          | 3          | 1          | 1          | 0          | 1          | 0          | 2                         | 2          | 1          | 0          |  |
| CO2  | Design analog electronic circuits using BJT   | 2                | 3          | 3          | 3          | 2          | 1          | 3          | 1          | 1          | 0          | 1          | 0          | 2                         | 2          | 1          | 0          |  |
| CO3  | Design analog electronic circuits using FET   | 3                | 2          | 2          | 3          | 2          | 1          | 3          | 1          | 1          | 0          | 1          | 0          | 2                         | 2          | 1          | 0          |  |
| CO4  | Design Amplifiers circuits                    | 2                | 3          | 2          | 3          | 3          | 1          | 3          | 1          | 1          | 0          | 1          | 0          | 2                         | 2          | 1          | 0          |  |
| CO5  | Design Oscillator circuits                    | 2                | 2          | 3          | 3          | 3          | 1          | 3          | 1          | 1          | 0          | 1          | 0          | 2                         | 2          | 1          | 0          |  |
| <b>Average</b>                                     |   | <b>2.2</b>       | <b>2.6</b> | <b>2.2</b> | <b>2.6</b> | <b>2.2</b> | <b>1.0</b> | <b>3.0</b> | <b>1.0</b> | <b>1.0</b> | <b>0.0</b> | <b>1.0</b> | <b>0.0</b> | <b>2.0</b>                | <b>2.0</b> | <b>1.0</b> | <b>0.0</b> |  |

| Semester -IV                                 |   |                  |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |            |
|--|---|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|---------------------------|------------|------------|------------|------------|
| 22EE401 - Synchronous And Induction Machines |   |                  |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |            |
| Course Outcomes                              |   | Program Outcomes |            |            |            |            |            |            |            |            |            |            | Program Specific Outcomes |            |            |            |            |
|  |   | 1                | 2          | 3          | 4          | 5          | 6          | 7          | 8          | 9          | 10         | 11         | 12                        | 1          | 2          | 3          | 4          |
| CO1  | Familiarize with construction, working principle, synchronizing techniques and performance of Synchronous Generator.      | 1                | 1          | 0          | 1          | 0          | 0          | 2          | 0          | 0          | 0          | 0          | 2                         | 1          | 1          | 0          | 0          |
| CO2  | Understand the working principle, torque equation, and excitation control for Synchronous Motor.                          | 1                | 1          | 0          | 1          | 2          | 0          | 0          | 0          | 0          | 0          | 0          | 1                         | 1          | 2          | 0          | 0          |
| CO3  | Operate three phase Induction machine as motor and as a generator, analyze the performance of three phase induction motor | 3                | 1          | 1          | 3          | 0          | 1          | 2          | 0          | 2          | 0          | 1          | 0                         | 1          | 2          | 1          | 0          |
| CO4  | Know double field revolving theory and starting mechanisms for single-phase induction motors                              | 1                | 1          | 1          | 1          | 1          | 0          | 0          | 0          | 0          | 2          | 0          | 2                         | 1          | 1          | 0          | 0          |
| CO5  | Use synchronous and induction motors in practical domain with specified ratings.  | 1                | 1          | 2          | 3          | 0          | 0          | 0          | 0          | 0          | 0          | 2          | 0                         | 1          | 1          | 1          | 0          |
| <b>Average</b>                               |   | <b>1.4</b>       | <b>1.0</b> | <b>0.8</b> | <b>1.8</b> | <b>0.6</b> | <b>0.2</b> | <b>0.8</b> | <b>0.0</b> | <b>0.4</b> | <b>0.4</b> | <b>0.6</b> | <b>1.0</b>                | <b>1.0</b> | <b>1.4</b> | <b>0.4</b> | <b>0.0</b> |

**Semester –IV**

**22EE402 - Measurements And Instrumentation**

|                 |   | Program Outcomes |            |            |            |            |            |            |            |            |            |            |            | Program Specific Outcomes |            |            |            |
|-----------------|---|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|---------------------------|------------|------------|------------|
|                 |   | 1                | 2          | 3          | 4          | 5          | 6          | 7          | 8          | 9          | 10         | 11         | 12         | 1                         | 2          | 3          | 4          |
| Course Outcomes |   | 1                | 2          | 3          | 4          | 5          | 6          | 7          | 8          | 9          | 10         | 11         | 12         | 1                         | 2          | 3          | 4          |
| CO1             | Recall the fundamentals of measurement system in electrical engineering.      | 2                | 2          | 2          | 3          | 0          | 0          | 0          | 1          | 0          | 2          | 0          | 2          | 2                         | 1          | 1          | 0          |
| CO2             | Describe the working principle of different measuring instruments             | 1                | 3          | 0          | 0          | 3          | 0          | 0          | 0          | 0          | 2          | 0          | 1          | 2                         | 1          | 0          | 0          |
| CO3             | Choose appropriate instrument for measuring the electrical parameters         | 1                | 1          | 0          | 2          | 1          | 1          | 2          | 0          | 1          | 0          | 0          | 0          | 1                         | 2          | 1          | 0          |
| CO4             | Employ the digital instruments in real time measurements.                     | 1                | 1          | 0          | 1          | 1          | 0          | 2          | 2          | 1          | 0          | 2          | 2          | 1                         | 3          | 1          | 0          |
| CO5             | Select an appropriate transducer for measurement of non-electrical quantities | 2                | 2          | 3          | 1          | 2          | 2          | 1          | 0          | 0          | 1          | 3          | 0          | 1                         | 2          | 0          | 0          |
| <b>Average</b>  |   | <b>1.4</b>       | <b>1.8</b> | <b>1.0</b> | <b>1.4</b> | <b>1.4</b> | <b>0.6</b> | <b>1.0</b> | <b>0.6</b> | <b>0.4</b> | <b>1.0</b> | <b>1.0</b> | <b>1.0</b> | <b>1.4</b>                | <b>1.8</b> | <b>0.6</b> | <b>0.0</b> |

**Semester –IV**

**22EE403 - Analog And Digital Integrated Circuits**

| Course Outcomes |  | Program Outcomes |            |            |            |            |            |            |            |            |            |            |            | Program Specific Outcomes |            |            |            |
|-----------------|--|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|---------------------------|------------|------------|------------|
|                 |  | 1                | 2          | 3          | 4          | 5          | 6          | 7          | 8          | 9          | 10         | 11         | 12         | 1                         | 2          | 3          | 4          |
| CO1             | Understand the Op-amp characteristics                                      | 2                | 1          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 2                         | 0          | 0          | 0          |
| OCO2            | Understand the applications of Op-amp and other linear ICs.                | 3                | 2          | 1          | 1          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 3                         | 0          | 0          | 0          |
| CO3             | Apply K-map and tabulation methods to simplify the switching functions     | 3                | 2          | 0          | 0          | 2          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 3                         | 3          | 0          | 0          |
| CO4             | Design and implement of combinational logic circuits                       | 3                | 2          | 0          | 0          | 2          | 0          | 0          | 0          | 0          | 0          | 0          | 2          | 3                         | 3          | 1          | 0          |
| CO5             | Analyse and design of synchronous & asynchronous sequential logic circuits | 3                | 2          | 0          | 0          | 2          | 0          | 0          | 0          | 0          | 0          | 0          | 2          | 3                         | 3          | 1          | 0          |
| <b>Average</b>  |  | <b>2.8</b>       | <b>1.8</b> | <b>0.2</b> | <b>0.2</b> | <b>1.2</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.8</b> | <b>2.8</b>                | <b>1.8</b> | <b>0.4</b> | <b>0.0</b> |

**Semester -IV**

**22EE404 - Power Generation, Transmission And Distribution System**

| Course Outcomes |  | Program Outcomes |            |            |            |            |            |            |            |            |            |            |            | Program Specific Outcomes |            |            |            |
|-----------------|--|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|---------------------------|------------|------------|------------|
|                 |  | 1                | 2          | 3          | 4          | 5          | 6          | 7          | 8          | 9          | 10         | 11         | 12         | 1                         | 2          | 3          | 4          |
| CO1             | Explain the operation of generating stations and substations                       | 1                | 2          | 1          | 0          | 0          | 2          | 2          | 1          | 2          | 2          | 1          | 3          | 1                         | 2          | 1          | 0          |
| CO2             | Model the transmission lines using system parameters                               | 2                | 3          | 3          | 3          | 3          | 0          | 1          | 0          | 0          | 0          | 1          | 0          | 2                         | 1          | 0          | 0          |
| CO3             | Analyze the performance of different types of transmission lines                   | 2                | 0          | 2          | 2          | 2          | 0          | 1          | 0          | 0          | 1          | 0          | 0          | 1                         | 3          | 0          | 0          |
| CO4             | Select an appropriate insulator and cable for transmission and distribution system | 2                | 0          | 0          | 2          | 0          | 2          | 1          | 2          | 0          | 0          | 0          | 2          | 1                         | 2          | 1          | 0          |
| CO5             | Describe the substation components and grounding techniques.                       | 1                | 1          | 1          | 0          | 2          | 1          | 2          | 1          | 2          | 1          | 2          | 2          | 1                         | 2          | 1          | 0          |
| <b>Average</b>  |  | <b>1.6</b>       | <b>1.2</b> | <b>1.4</b> | <b>1.4</b> | <b>1.4</b> | <b>1.0</b> | <b>1.4</b> | <b>0.8</b> | <b>0.8</b> | <b>0.8</b> | <b>0.8</b> | <b>1.4</b> | <b>1.2</b>                | <b>2.0</b> | <b>0.6</b> | <b>0.0</b> |

| <b>Semester -IV</b>                |   |                         |            |            |            |            |            |            |            |            |            |            |            |                                  |            |            |            |
|------------------------------------|---|-------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|----------------------------------|------------|------------|------------|
| <b>22EE405 - Power Electronics</b> |   |                         |            |            |            |            |            |            |            |            |            |            |            |                                  |            |            |            |
|                                    |   | <b>Program Outcomes</b> |            |            |            |            |            |            |            |            |            |            |            | <b>Program Specific Outcomes</b> |            |            |            |
| <b>Course Outcomes</b>             |   | <b>1</b>                | <b>2</b>   | <b>3</b>   | <b>4</b>   | <b>5</b>   | <b>6</b>   | <b>7</b>   | <b>8</b>   | <b>9</b>   | <b>10</b>  | <b>11</b>  | <b>12</b>  | <b>1</b>                         | <b>2</b>   | <b>3</b>   | <b>4</b>   |
| CO1                                | Choose suitable Power Semiconductor Devices for the application.      | 2                       | 1          | 1          | 1          | 3          | 0          | 1          | 1          | 0          | 0          | 0          | 1          | 1                                | 2          | 1          | 0          |
| CO2                                | Know the operation of converters inverters and AC voltage controllers | 1                       | 0          | 2          | 1          | 1          | 0          | 0          | 0          | 0          | 0          | 1          | 1          | 1                                | 1          | 2          | 0          |
| CO3                                | Analyze the performance of converters and inverters                   | 1                       | 2          | 3          | 2          | 3          | 1          | 0          | 1          | 0          | 0          | 1          | 1          | 1                                | 2          | 1          | 0          |
| CO4                                | Design and analyze converter and inverter circuits                    | 2                       | 1          | 3          | 3          | 2          | 1          | 1          | 1          | 0          | 0          | 1          | 1          | 1                                | 2          | 1          | 0          |
| CO5                                | Identify suitable control techniques for the converter                | 1                       | 3          | 2          | 2          | 3          | 2          | 1          | 1          | 0          | 0          | 1          | 1          | 1                                | 2          | 1          | 0          |
| <b>Average</b>                     |   | <b>1.4</b>              | <b>1.4</b> | <b>2.2</b> | <b>1.8</b> | <b>2.4</b> | <b>0.8</b> | <b>0.6</b> | <b>0.8</b> | <b>0.0</b> | <b>0.0</b> | <b>0.4</b> | <b>1.0</b> | <b>1.0</b>                       | <b>1.8</b> | <b>1.2</b> | <b>0.0</b> |

| Semester -IV              |   |                  |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |            |
|---------------------------|---|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|---------------------------|------------|------------|------------|------------|
| 22MCIN03 - Design Sprints |   |                  |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |            |
|                           |   | Program Outcomes |            |            |            |            |            |            |            |            |            |            | Program Specific Outcomes |            |            |            |            |
| Course Outcomes           |   | 1                | 2          | 3          | 4          | 5          | 6          | 7          | 8          | 9          | 10         | 11         | 12                        | 1          | 2          | 3          | 4          |
| CO1                       | Understand the elements and principles of product and service design                            | 3                | 0          | 1          | 0          | 0          | 0          | 0          | 0          | 2          | 0          | 0          | 0                         | 0          | 0          | 2          | 0          |
| CO2                       | Apply system thinking concepts in reverse engineering   | 2                | 3          | 0          | 0          | 0          | 0          | 0          | 0          | 2          | 0          | 0          | 0                         | 0          | 0          | 2          | 0          |
| CO3                       | Apply user research techniques to meet the UX needs of a customer and design a visual prototype | 3                | 0          | 1          | 0          | 0          | 0          | 0          | 1          | 2          | 0          | 0          | 0                         | 0          | 0          | 2          | 0          |
| CO4                       | Develop prototyping models using the tools from mechanical prototyping models                   | 0                | 0          | 3          | 2          | 3          | 0          | 0          | 0          | 2          | 0          | 0          | 0                         | 0          | 0          | 2          | 0          |
| CO5                       | Develop prototyping models using the tools from electrical and software prototyping methods     | 2                | 0          | 2          | 0          | 1          | 0          | 0          | 0          | 2          | 0          | 0          | 0                         | 0          | 0          | 2          | 0          |
| <b>Average</b>            |   | <b>2.0</b>       | <b>0.6</b> | <b>1.4</b> | <b>0.4</b> | <b>0.8</b> | <b>0.0</b> | <b>0.0</b> | <b>0.2</b> | <b>2.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b>                | <b>0.0</b> | <b>0.0</b> | <b>2.0</b> | <b>0.0</b> |

| Semester -IV                     |   |                  |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |            |
|----------------------------------|---|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|---------------------------|------------|------------|------------|------------|
| 22CYMC01 - Environmental Science |   |                  |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |            |
|                                  |   | Program Outcomes |            |            |            |            |            |            |            |            |            |            | Program Specific Outcomes |            |            |            |            |
| Course Outcomes                  |   | 1                | 2          | 3          | 4          | 5          | 6          | 7          | 8          | 9          | 10         | 11         | 12                        | 1          | 2          | 3          | 4          |
| CO1                              | To identify about the major renewable energy systems and will investigate the environmental impact of various energy sources as well as the consequences of various pollutants. | 0                | 1          | 3          | 0          | 0          | 3          | 1          | 1          | 0          | 0          | 0          | 1                         | 2          | 0          | 1          | 0          |
| CO2                              | Predict the methods to conserve energy and ways to make optimal use of the energy for the future.   | 0                | 1          | 3          | 0          | 0          | 3          | 1          | 1          | 0          | 0          | 0          | 1                         | 2          | 0          | 1          | 0          |
| <b>Average</b>                   |   | <b>0.0</b>       | <b>1.0</b> | <b>3.0</b> | <b>0.0</b> | <b>0.0</b> | <b>3.0</b> | <b>1.0</b> | <b>1.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>1.0</b>                | <b>2.0</b> | <b>0.0</b> | <b>1.0</b> | <b>0.0</b> |



**Semester –IV**

**22EE406 - Synchronous And Induction Machines Laboratory**

| Course Outcomes |   | Program Outcomes |            |            |            |            |            |            |            |            |            |            |            | Program Specific Outcomes |            |            |            |
|-----------------|---|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|---------------------------|------------|------------|------------|
|                 |   | 1                | 2          | 3          | 4          | 5          | 6          | 7          | 8          | 9          | 10         | 11         | 12         | 1                         | 2          | 3          | 4          |
| CO1             | Understand and Analyze the voltage regulation of a given alternator using different methodologies                   | 3                | 2          | 1          | 3          | 1          | 0          | 2          | 0          | 0          | 0          | 2          | 0          | 3                         | 2          | 1          | 0          |
| CO2             | Analyze the performance of a given synchronous motor under various excitation conditions                            | 3                | 2          | 2          | 2          | 2          | 0          | 0          | 0          | 0          | 0          | 0          | 1          | 3                         | 3          | 2          | 0          |
| CO3             | Understand the Performance characteristics of induction and synchronous machines using direct and indirect methods. | 3                | 1          | 1          | 2          | 0          | 0          | 0          | 0          | 0          | 0          | 1          | 0          | 3                         | 2          | 1          | 0          |
| CO4             | Develop the equivalent circuit and analyze the characteristics of single-phase induction motor                      | 3                | 2          | 2          | 1          | 3          | 0          | 2          | 0          | 2          | 0          | 0          | 0          | 2                         | 3          | 1          | 0          |
| CO5             | Analyze the losses, Starting and Speed control in AC machines.  | 3                | 1          | 1          | 1          | 1          | 0          | 0          | 0          | 0          | 2          | 0          | 2          | 2                         | 3          | 1          | 0          |
| <b>Average</b>  |   | <b>3.0</b>       | <b>1.6</b> | <b>1.4</b> | <b>1.8</b> | <b>1.4</b> | <b>0.0</b> | <b>0.8</b> | <b>0.0</b> | <b>0.4</b> | <b>0.4</b> | <b>0.6</b> | <b>0.6</b> | <b>2.6</b>                | <b>2.6</b> | <b>1.2</b> | <b>0.0</b> |

**Semester –IV**

**22EE407 - Analog And Digital Integrated Circuits Laboratory**

| Course Outcomes |  | Program Outcomes |            |            |            |            |            |            |            |            |            |            |            | Program Specific Outcomes |            |            |            |
|-----------------|--|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|---------------------------|------------|------------|------------|
|                 |  | 1                | 2          | 3          | 4          | 5          | 6          | 7          | 8          | 9          | 10         | 11         | 12         | 1                         | 2          | 3          | 4          |
| CO1             | Study the characteristics and mathematical applications of op-amp                | 2                | 1          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 2                         | 1          | 0          | 0          |
| CO2             | Design and verify wave form generator circuits and filter circuits using op-amp. | 3                | 2          | 1          | 1          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 3                         | 2          | 0          | 0          |
| CO3             | Design voltage regulator and power supply circuits using Linear ICs.             | 3                | 2          | 0          | 0          | 2          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 3                         | 2          | 0          | 0          |
| CO4             | Realize the switching function using universal gates.                            | 3                | 2          | 0          | 0          | 2          | 0          | 0          | 0          | 0          | 0          | 0          | 2          | 3                         | 2          | 1          | 0          |
| CO5             | Realize the various types of combinational and sequential logic circuits         | 3                | 2          | 0          | 0          | 2          | 0          | 0          | 0          | 0          | 0          | 0          | 2          | 3                         | 2          | 1          | 0          |
| <b>Average</b>  |  | <b>2.8</b>       | <b>1.8</b> | <b>0.2</b> | <b>0.2</b> | <b>1.2</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.8</b> | <b>2.8</b>                | <b>1.8</b> | <b>0.4</b> | <b>0.0</b> |

| Semester -IV                                   |   |                  |            |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |
|--|---|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|---------------------------|------------|------------|------------|
| 22EN401 - Placement And Soft Skills Laboratory |   |                  |            |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |
| Course Outcomes                                |   | Program Outcomes |            |            |            |            |            |            |            |            |            |            |            | Program Specific Outcomes |            |            |            |
|  |   | 1                | 2          | 3          | 4          | 5          | 6          | 7          | 8          | 9          | 10         | 11         | 12         | 1                         | 2          | 3          | 4          |
| CO1  | Participate in group discussion and interview confidently                 | 0                | 0          | 0          | 1          | 0          | 0          | 0          | 0          | 2          | 3          | 0          | 1          | 0                         | 0          | 1          | 0          |
| CO2  | Develop adequate soft skills and career skills required for the workplace | 0                | 0          | 0          | 2          | 0          | 0          | 0          | 0          | 2          | 3          | 0          | 1          | 0                         | 0          | 2          | 0          |
| CO3  | Make effective presentations on given topics                              | 0                | 0          | 0          | 2          | 0          | 0          | 0          | 0          | 1          | 3          | 0          | 1          | 0                         | 0          | 1          | 0          |
| CO4  | Apply their verbal ability and reasoning ability in campus interviews     | 0                | 0          | 0          | 1          | 0          | 0          | 0          | 0          | 2          | 3          | 0          | 1          | 0                         | 0          | 2          | 0          |
| <b>Average</b>                                 |   | <b>0.0</b>       | <b>0.0</b> | <b>0.0</b> | <b>1.5</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>1.7</b> | <b>3.0</b> | <b>0.0</b> | <b>1.0</b> | <b>0.0</b>                | <b>0.0</b> | <b>1.5</b> | <b>0.0</b> |

| <b>Semester -V</b>               |   |                         |            |            |            |            |            |            |            |            |            |            |            |                                  |            |            |            |
|----------------------------------|---|-------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|----------------------------------|------------|------------|------------|
| <b>22EE501 - Control Systems</b> |   |                         |            |            |            |            |            |            |            |            |            |            |            |                                  |            |            |            |
|                                  |   | <b>Program Outcomes</b> |            |            |            |            |            |            |            |            |            |            |            | <b>Program Specific Outcomes</b> |            |            |            |
| <b>Course Outcomes</b>           |   | <b>1</b>                | <b>2</b>   | <b>3</b>   | <b>4</b>   | <b>5</b>   | <b>6</b>   | <b>7</b>   | <b>8</b>   | <b>9</b>   | <b>10</b>  | <b>11</b>  | <b>12</b>  | <b>1</b>                         | <b>2</b>   | <b>3</b>   | <b>4</b>   |
| CO1                              | Derive the transfer function models of any electrical and mechanical systems. | 2                       | 2          | 2          | 2          | 2          | 0          | 0          | 1          | 0          | 0          | 1          | 1          | 2                                | 1          | 1          | 0          |
| CO2                              | Analyze the time and frequency responses of the systems.                      | 2                       | 2          | 3          | 3          | 3          | 1          | 1          | 0          | 0          | 0          | 1          | 1          | 1                                | 2          | 1          | 0          |
| CO3                              | Analyze the stability of closed loop control systems.                         | 2                       | 2          | 3          | 3          | 3          | 1          | 1          | 0          | 0          | 0          | 1          | 1          | 1                                | 2          | 1          | 0          |
| CO4                              | Construct the root locus plot and analyze system stability.                   | 2                       | 2          | 3          | 3          | 3          | 0          | 1          | 1          | 0          | 0          | 1          | 1          | 1                                | 2          | 1          | 0          |
| CO5                              | Design the compensators using conventional techniques.                        | 2                       | 2          | 3          | 3          | 3          | 0          | 1          | 1          | 0          | 0          | 1          | 1          | 2                                | 2          | 1          | 0          |
| <b>Average</b>                   |   | <b>2.0</b>              | <b>2.0</b> | <b>2.8</b> | <b>2.8</b> | <b>2.8</b> | <b>0.4</b> | <b>0.8</b> | <b>0.6</b> | <b>0.0</b> | <b>0.0</b> | <b>1.0</b> | <b>1.0</b> | <b>1.4</b>                       | <b>1.8</b> | <b>1.0</b> | <b>0.0</b> |

| Semester –V                                  |   |                  |            |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |
|--|---|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|---------------------------|------------|------------|------------|
| 22EE502 - Microprocessor And Microcontroller |   |                  |            |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |
| Course Outcomes                              |   | Program Outcomes |            |            |            |            |            |            |            |            |            |            |            | Program Specific Outcomes |            |            |            |
|  |   | 1                | 2          | 3          | 4          | 5          | 6          | 7          | 8          | 9          | 10         | 11         | 12         | 1                         | 2          | 3          | 4          |
| CO1  | Understand any other types of modern microprocessor and microcontroller     | 2                | 2          | 2          | 2          | 2          | 0          | 1          | 1          | 1          | 0          | 1          | 1          | 1                         | 1          | 1          | 0          |
| CO2  | Understand the architecture of Microprocessor and Microcontroller           | 2                | 2          | 2          | 2          | 2          | 0          | 1          | 1          | 1          | 0          | 1          | 1          | 1                         | 1          | 1          | 0          |
| CO3  | Design and interface communications between digital systems                 | 2                | 3          | 3          | 3          | 3          | 0          | 1          | 1          | 1          | 0          | 1          | 1          | 1                         | 1          | 1          | 0          |
| CO4  | Apply the digital concepts to measure and control simple electrical systems | 2                | 3          | 3          | 3          | 3          | 0          | 1          | 1          | 1          | 0          | 1          | 1          | 2                         | 2          | 1          | 0          |
| CO5  | Design a microcontroller based electrical control system.                   | 2                | 3          | 3          | 3          | 3          | 0          | 1          | 1          | 1          | 0          | 1          | 1          | 2                         | 2          | 1          | 0          |
| <b>Average</b>                               |   | <b>2.0</b>       | <b>2.6</b> | <b>2.6</b> | <b>2.6</b> | <b>2.6</b> | <b>0.0</b> | <b>1.0</b> | <b>1.0</b> | <b>1.0</b> | <b>0.0</b> | <b>1.0</b> | <b>1.0</b> | <b>1.4</b>                | <b>1.4</b> | <b>1.0</b> | <b>0.0</b> |

| Semester –V                         |  |                  |            |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |
|-------------------------------------|--|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|---------------------------|------------|------------|------------|
| 22EE503 - Electrical Machine Design |  |                  |            |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |
| Course Outcomes                     |  | Program Outcomes |            |            |            |            |            |            |            |            |            |            |            | Program Specific Outcomes |            |            |            |
|                                     |  | 1                | 2          | 3          | 4          | 5          | 6          | 7          | 8          | 9          | 10         | 11         | 12         | 1                         | 2          | 3          | 4          |
| CO1                                 | Classify the materials used for the construction of electrical machines and be able to calculate the MMF in magnetic parts of rotating machines. | 3                | 3          | 3          | 2          | 2          | 1          | 1          | 1          | 1          | 1          | 1          | 1          | 3                         | 2          | 1          | 0          |
| CO2                                 | Familiarize the importance of magnetic ,thermal and electrical loading of AC and DC Machines.  | 3                | 3          | 3          | 3          | 3          | 1          | 1          | 2          | 1          | 2          | 1          | 1          | 3                         | 2          | 2          | 0          |
| CO3                                 | Design and Analyze Armature and Field Systems for DC Machines.   | 3                | 3          | 3          | 3          | 3          | 1          | 1          | 2          | 2          | 2          | 1          |            | 3                         | 3          | 3          | 0          |
| CO4                                 | Design and Analyze core, windings and cooling system of transformers.  | 3                | 3          | 3          | 3          | 3          | 1          | 1          | 2          | 2          | 2          | 1          | 1          | 3                         | 2          | 2          | 0          |
| CO5                                 | Design and analyze Stator and rotor of Induction Machines and Synchronous machines.  | 3                | 3          | 3          | 3          | 3          | 1          | 1          | 2          | 2          | 2          | 1          | 1          | 3                         | 3          | 2          | 0          |
| <b>Average</b>                      |  | <b>3.0</b>       | <b>3.0</b> | <b>3.0</b> | <b>2.8</b> | <b>2.8</b> | <b>1.0</b> | <b>1.0</b> | <b>1.8</b> | <b>2.0</b> | <b>2.0</b> | <b>1.0</b> | <b>1.0</b> | <b>3.0</b>                | <b>2.4</b> | <b>2.0</b> | <b>0.0</b> |

| <b>Semester -V</b>                             |  |                         |            |            |            |            |            |            |            |            |            |            |            |                                  |            |            |            |
|--|--|-------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|----------------------------------|------------|------------|------------|
| <b>22EE504 - Electrical Drives And Control</b> |  |                         |            |            |            |            |            |            |            |            |            |            |            |                                  |            |            |            |
|  |  | <b>Program Outcomes</b> |            |            |            |            |            |            |            |            |            |            |            | <b>Program Specific Outcomes</b> |            |            |            |
| <b>Course Outcomes</b>                         |  | <b>1</b>                | <b>2</b>   | <b>3</b>   | <b>4</b>   | <b>5</b>   | <b>6</b>   | <b>7</b>   | <b>8</b>   | <b>9</b>   | <b>10</b>  | <b>11</b>  | <b>12</b>  | <b>1</b>                         | <b>2</b>   | <b>3</b>   | <b>4</b>   |
| CO1  | Understand the characteristics of dc motors and induction motors.                                  | 3                       | 1          | 3          | 0          | 0          | 2          | 1          | 1          | 0          | 0          | 1          | 3          | 2                                | 3          | 3          | 0          |
| CO2  | Summarize the operation of chopper fed DC drives.  | 3                       | 3          | 1          | 3          | 0          | 1          | 1          | 1          | 0          | 0          | 0          | 3          | 3                                | 2          | 3          | 0          |
| CO3  | Understand the principles of speed-control of dc motors and induction motors.                      | 3                       | 3          | 3          | 3          | 3          | 1          | 1          | 1          | 0          | 0          | 0          | 3          | 2                                | 3          | 3          | 0          |
| CO4  | Identify suitable power electronic converters used for dc motor and induction motor speed control. | 1                       | 3          | 3          | 2          | 3          | 1          | 1          | 1          | 0          | 0          | 0          | 2          | 2                                | 3          | 2          | 0          |
| CO5  | Analyze the SRM and BLDC motor drive control   | 3                       | 3          | 3          | 3          | 3          | 1          | 1          | 1          | 0          | 0          | 1          | 3          | 3                                | 3          | 3          | 0          |
| <b>Average</b>                                 |  | <b>2.6</b>              | <b>2.6</b> | <b>2.6</b> | <b>2.2</b> | <b>1.8</b> | <b>1.2</b> | <b>1.0</b> | <b>1.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.4</b> | <b>1.2</b> | <b>2.8</b>                       | <b>2.4</b> | <b>2.8</b> | <b>0.0</b> |

| <b>Semester –V</b>                                   |  |                         |            |            |            |            |            |            |            |            |            |            |            |                                  |            |            |            |
|--|--|-------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|----------------------------------|------------|------------|------------|
| <b>22EE505 - Power System Analysis And Stability</b> |  |                         |            |            |            |            |            |            |            |            |            |            |            |                                  |            |            |            |
|  |  | <b>Program Outcomes</b> |            |            |            |            |            |            |            |            |            |            |            | <b>Program Specific Outcomes</b> |            |            |            |
| <b>Course Outcomes</b>                               |  | <b>1</b>                | <b>2</b>   | <b>3</b>   | <b>4</b>   | <b>5</b>   | <b>6</b>   | <b>7</b>   | <b>8</b>   | <b>9</b>   | <b>10</b>  | <b>11</b>  | <b>12</b>  | <b>1</b>                         | <b>2</b>   | <b>3</b>   | <b>4</b>   |
| CO1  | Develop the single line diagram for the power system.                          | 2                       | 1          | 3          | 1          | 2          | 0          | 1          | 0          | 0          | 1          | 1          | 0          | 3                                | 2          | 1          | 0          |
| CO2  | Perform and analyze load flow computations using bus admittance matrix         | 2                       | 2          | 3          | 2          | 1          | 0          | 1          | 1          | 0          | 1          | 1          | 1          | 2                                | 3          | 1          | 0          |
| CO3  | Perform and analyze balanced fault using bus impedance matrix                  | 2                       | 2          | 3          | 2          | 1          | 0          | 1          | 1          | 0          | 1          | 1          | 1          | 2                                | 3          | 1          | 0          |
| CO4  | Develop computational models for unsymmetrical fault analysis in power systems | 2                       | 2          | 3          | 2          | 2          | 0          | 1          | 1          | 0          | 1          | 2          | 1          | 2                                | 3          | 1          | 0          |
| CO5  | Demonstrate the transient stability studies.                                   | 2                       | 2          | 3          | 2          | 2          | 0          | 1          | 2          | 0          | 1          | 1          | 1          | 2                                | 3          | 1          | 0          |
| <b>Average</b>                                       |  | <b>2.0</b>              | <b>1.8</b> | <b>3.0</b> | <b>1.8</b> | <b>1.6</b> | <b>0.0</b> | <b>1.0</b> | <b>1.0</b> | <b>0.0</b> | <b>1.0</b> | <b>1.2</b> | <b>0.8</b> | <b>2.2</b>                       | <b>2.8</b> | <b>1.0</b> | <b>0.0</b> |





| Semester –V   |  |                  |            |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |
|---|--|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|---------------------------|------------|------------|------------|
| 22EE507 - Power Electronics And Energy Systems Laboratory |  |                  |            |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |
| Course Outcomes   |  | Program Outcomes |            |            |            |            |            |            |            |            |            |            |            | Program Specific Outcomes |            |            |            |
|   |  | 1                | 2          | 3          | 4          | 5          | 6          | 7          | 8          | 9          | 10         | 11         | 12         | 1                         | 2          | 3          | 4          |
| CO1   | Analyze the characteristics of MOSFET, SCR and IGBT.                   | 1                | 2          | 0          | 3          | 1          | 2          | 0          | 1          | 1          | 0          | 1          | 1          | 1                         | 2          | 1          | 0          |
| CO2   | Examine the performance of DC-DC Converters and inverters.             | 2                | 0          | 3          | 1          | 0          | 1          | 2          | 2          | 0          | 1          | 1          | 2          | 1                         | 2          | 1          | 0          |
| CO3   | Design and control of inverters with different modulations.            | 2                | 1          | 2          | 0          | 2          | 0          | 2          | 0          | 2          | 2          | 0          | 1          | 1                         | 3          | 0          | 0          |
| CO4   | Analyze the performance of power converters with simulation studies    | 1                | 0          | 1          | 3          | 0          | 1          | 0          | 1          | 0          | 0          | 2          | 0          | 1                         | 3          | 1          | 0          |
| CO5   | Demonstrate the operation of Solar and wind energy conversation system | 2                | 2          | 0          | 0          | 2          | 0          | 3          | 1          | 2          | 2          | 3          | 2          | 1                         | 2          | 2          | 0          |
| <b>Average</b>  |  | <b>1.6</b>       | <b>1.0</b> | <b>1.2</b> | <b>1.4</b> | <b>1.0</b> | <b>0.8</b> | <b>1.4</b> | <b>1.0</b> | <b>1.0</b> | <b>1.0</b> | <b>1.4</b> | <b>1.2</b> | <b>1.0</b>                | <b>2.4</b> | <b>1.0</b> | <b>0.0</b> |

| Semester –V   |   |                  |            |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |
|---|---|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|---------------------------|------------|------------|------------|
| 22EE508 - Microprocessor And Microcontroller Laboratory |   |                  |            |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |
| Course Outcomes   |   | Program Outcomes |            |            |            |            |            |            |            |            |            |            |            | Program Specific Outcomes |            |            |            |
|   |   | 1                | 2          | 3          | 4          | 5          | 6          | 7          | 8          | 9          | 10         | 11         | 12         | 1                         | 2          | 3          | 4          |
| CO1   | Write coding to implement different types of algorithms               | 1                | 1          | 1          | 1          | 1          | 0          | 1          | 1          | 1          | 1          | 0          | 1          | 2                         | 2          | 0          | 0          |
| CO2   | Design and implement simple controllers                               | 1                | 1          | 1          | 1          | 1          | 1          | 1          | 1          | 1          | 1          | 1          | 1          | 3                         | 2          | 0          | 0          |
| CO3   | Use simulators and emulators for debugging and verifying odes         | 1                | 1          | 1          | 1          | 1          | 0          | 1          | 1          | 1          | 1          | 0          | 1          | 3                         | 2          | 0          | 0          |
| CO4   | Write efficient codes using interrupts for time critical applications | 1                | 1          | 1          | 1          | 1          | 0          | 1          | 1          | 1          | 1          | 1          | 1          | 3                         | 2          | 1          | 0          |
| CO5   | Interface any application module to microprocessor/microcontroller.   | 1                | 1          | 1          | 1          | 1          | 1          | 1          | 1          | 1          | 1          | 1          | 1          | 3                         | 2          | 1          | 0          |
| <b>Average</b>  |   | <b>1.0</b>       | <b>1.0</b> | <b>1.0</b> | <b>1.0</b> | <b>1.0</b> | <b>0.4</b> | <b>1.0</b> | <b>1.0</b> | <b>1.0</b> | <b>1.0</b> | <b>0.6</b> | <b>1.0</b> | <b>2.8</b>                | <b>2.0</b> | <b>0.4</b> | <b>0.0</b> |

| Semester –V                                      |  |                  |            |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |
|--|--|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|---------------------------|------------|------------|------------|
| 22EE509 - Control And Instrumentation Laboratory |  |                  |            |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |
| Course Outcomes                                  |  | Program Outcomes |            |            |            |            |            |            |            |            |            |            |            | Program Specific Outcomes |            |            |            |
|  |  | 1                | 2          | 3          | 4          | 5          | 6          | 7          | 8          | 9          | 10         | 11         | 12         | 1                         | 2          | 3          | 4          |
| CO1  | Measure power in AC circuits                         | 3                | 3          | 3          | 3          | 2          | 1          | 3          | 1          | 2          | 0          | 1          | 0          | 2                         | 2          | 1          | 0          |
| CO2  | Calculate R,L,C using various bridges.               | 3                | 3          | 3          | 2          | 2          | 1          | 1          | 2          | 1          | 0          | 1          | 0          | 2                         | 2          | 1          | 0          |
| CO3  | Design of controllers and compensators               | 3                | 3          | 3          | 1          | 1          | 1          | 2          | 2          | 1          | 0          | 1          | 0          | 2                         | 2          | 1          | 0          |
| CO4  | Study the position control system                    | 2                | 3          | 2          | 3          | 1          | 1          | 1          | 3          | 1          | 0          | 1          | 0          | 2                         | 2          | 1          | 0          |
| CO5  | Determine the transfer function of AC and DC motors. | 3                | 2          | 3          | 3          | 3          | 1          | 1          | 1          | 1          | 0          | 1          | 0          | 2                         | 2          | 1          | 0          |
| <b>Average</b>                                   |  | <b>2.8</b>       | <b>2.8</b> | <b>2.8</b> | <b>2.4</b> | <b>1.8</b> | <b>1.0</b> | <b>1.6</b> | <b>1.8</b> | <b>1.2</b> | <b>0.0</b> | <b>1.0</b> | <b>0.0</b> | <b>2.0</b>                | <b>2.0</b> | <b>1.0</b> | <b>0.0</b> |

| <b>Semester -VI</b>          |  |                         |            |            |            |            |            |            |            |            |            |            |            |                                  |            |            |            |
|------------------------------|--|-------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|----------------------------------|------------|------------|------------|
| <b>22EE601- Mini Project</b> |  |                         |            |            |            |            |            |            |            |            |            |            |            |                                  |            |            |            |
|                              |  | <b>Program Outcomes</b> |            |            |            |            |            |            |            |            |            |            |            | <b>Program Specific Outcomes</b> |            |            |            |
| <b>Course Outcomes</b>       |  | <b>1</b>                | <b>2</b>   | <b>3</b>   | <b>4</b>   | <b>5</b>   | <b>6</b>   | <b>7</b>   | <b>8</b>   | <b>9</b>   | <b>10</b>  | <b>11</b>  | <b>12</b>  | <b>1</b>                         | <b>2</b>   | <b>3</b>   | <b>4</b>   |
| CO1                          | Initiate the students to come out with innovative ideas for various applications.  | 3                       | 3          | 3          | 3          | 2          | 3          | 3          | 1          | 3          | 0          | 2          | 0          | 3                                | 3          | 3          | 0          |
| CO2                          | Create an environment to convert the ideas into design of prototype for useful industrial, agricultural and social applications. | 3                       | 3          | 3          | 3          | 2          | 3          | 3          | 0          | 3          | 0          | 1          | 0          | 3                                | 3          | 0          | 0          |
| CO3                          | Familiarize the feasibility study and manage activities to complete task in specified duration.                                  | 2                       | 2          | 2          | 2          | 2          | 1          | 1          | 1          | 3          | 1          | 2          | 3          | 3                                | 3          | 0          | 0          |
| CO4                          | Assign and undertake tasks in a team as per team discussion.   | 3                       | 2          | 2          | 1          | 1          | 1          | 2          | 3          | 3          | 3          | 0          | 3          | 3                                | 3          | 0          | 0          |
| CO5                          | Do presentation and write technical reports for effective communication within and outside the team.                             | 0                       | 0          | 0          | 0          | 2          | 2          | 0          | 1          | 3          | 3          | 0          | 2          | 3                                | 0          | 3          | 0          |
| <b>Average</b>               |  | <b>2.2</b>              | <b>2.0</b> | <b>2.0</b> | <b>1.8</b> | <b>1.8</b> | <b>2.0</b> | <b>1.8</b> | <b>1.2</b> | <b>3.0</b> | <b>1.4</b> | <b>1.0</b> | <b>1.6</b> | <b>3.0</b>                       | <b>3.0</b> | <b>1.2</b> | <b>0.0</b> |

| <b>Semester –VII</b>                                     |  |                         |            |            |            |            |            |            |            |            |            |            |            |                                  |            |            |            |
|--|--|-------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|----------------------------------|------------|------------|------------|
| <b>22EE701 - Power System Protection And Switch Gear</b> |  |                         |            |            |            |            |            |            |            |            |            |            |            |                                  |            |            |            |
|  |  | <b>Program Outcomes</b> |            |            |            |            |            |            |            |            |            |            |            | <b>Program Specific Outcomes</b> |            |            |            |
| <b>Course Outcomes</b>                                   |  | <b>1</b>                | <b>2</b>   | <b>3</b>   | <b>4</b>   | <b>5</b>   | <b>6</b>   | <b>7</b>   | <b>8</b>   | <b>9</b>   | <b>10</b>  | <b>11</b>  | <b>12</b>  | <b>1</b>                         | <b>2</b>   | <b>3</b>   | <b>4</b>   |
| CO1  | Illustrate the concepts and applications of protective relays. | 2                       | 1          | 2          | 2          | 1          | 2          | 3          | 2          | 1          | 2          | 3          | 2          | 2                                | 2          | 1          | 0          |
| CO2  | Discuss about different types of circuit breakers              | 1                       | 1          | 3          | 2          | 2          | 1          | 3          | 2          | 2          | 2          | 2          | 2          | 3                                | 3          | 2          | 0          |
| CO3  | Assess the protection schemes of various power components.     | 2                       | 2          | 2          | 3          | 1          | 2          | 3          | 3          | 1          | 2          | 3          | 1          | 2                                | 2          | 1          | 0          |
| CO4  | Develop the knowledge on static relays.                        | 2                       | 1          | 1          | 2          | 3          | 1          | 3          | 2          | 3          | 2          | 2          | 2          | 2                                | 3          | 2          | 0          |
| CO5  | Analyze the numerical protection schemes.                      | 1                       | 1          | 2          | 1          | 2          | 2          | 3          | 3          | 2          | 3          | 2          | 1          | 2                                | 2          | 1          | 0          |
| <b>Average</b>   |  | <b>1.6</b>              | <b>1.2</b> | <b>2.0</b> | <b>2.0</b> | <b>1.8</b> | <b>1.6</b> | <b>3.0</b> | <b>2.4</b> | <b>1.8</b> | <b>2.2</b> | <b>2.4</b> | <b>1.6</b> | <b>2.2</b>                       | <b>2.4</b> | <b>1.4</b> | <b>0.0</b> |

| Semester –VII        |  |                  |            |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |
|----------------------|--|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|---------------------------|------------|------------|------------|
| 22EE702 - Smart Grid |  |                  |            |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |
| Course Outcomes      |  | Program Outcomes |            |            |            |            |            |            |            |            |            |            |            | Program Specific Outcomes |            |            |            |
|                      |  | 1                | 2          | 3          | 4          | 5          | 6          | 7          | 8          | 9          | 10         | 11         | 12         | 1                         | 2          | 3          | 4          |
| CO1                  | Describe the Smart Grid modernization process and its present developments.      | 1                | 0          | 0          | 3          | 1          | 2          | 1          | 0          | 1          | 2          | 1          | 1          | 1                         | 2          | 1          | 0          |
| CO2                  | Select the suitable communication networks for smart grid applications           | 2                | 2          | 3          | 1          | 0          | 1          | 2          | 1          | 0          | 0          | 1          | 2          | 2                         | 1          | 1          | 0          |
| CO3                  | Use a suitable smart device for Smart Grid operation                             | 1                | 3          | 2          | 0          | 2          | 0          | 2          | 2          | 1          | 2          | 0          | 0          | 1                         | 3          | 0          | 0          |
| CO4                  | Illustrate a smart transmission and distribution system using PMU, WAM and SCADA | 2                | 1          | 2          | 1          | 3          | 1          | 3          | 0          | 0          | 0          | 2          | 2          | 1                         | 2          | 0          | 0          |
| CO5                  | Explain the need of high end computing and big data analytics in smart grid      | 1                | 0          | 0          | 2          | 1          | 2          | 0          | 1          | 2          | 1          | 0          | 1          | 2                         | 2          | 1          | 0          |
| <b>Average</b>       |  | <b>1.4</b>       | <b>1.2</b> | <b>1.4</b> | <b>1.4</b> | <b>1.4</b> | <b>1.2</b> | <b>1.6</b> | <b>0.8</b> | <b>0.8</b> | <b>1.0</b> | <b>0.8</b> | <b>1.2</b> | <b>1.4</b>                | <b>2.0</b> | <b>0.6</b> | <b>0.0</b> |

| <b>Semester -VII</b>                                 |  |                         |            |            |            |            |            |            |            |            |            |            |            |                                  |            |            |            |
|--|--|-------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|----------------------------------|------------|------------|------------|
| <b>22EE703 - Industrial Management And Economics</b> |  |                         |            |            |            |            |            |            |            |            |            |            |            |                                  |            |            |            |
|  |  | <b>Program Outcomes</b> |            |            |            |            |            |            |            |            |            |            |            | <b>Program Specific Outcomes</b> |            |            |            |
| <b>Course Outcomes</b>                               |  | <b>1</b>                | <b>2</b>   | <b>3</b>   | <b>4</b>   | <b>5</b>   | <b>6</b>   | <b>7</b>   | <b>8</b>   | <b>9</b>   | <b>10</b>  | <b>11</b>  | <b>12</b>  | <b>1</b>                         | <b>2</b>   | <b>3</b>   | <b>4</b>   |
| CO1  | Understand the concepts of management                            | 0                       | 0          | 1          | 0          | 0          | 2          | 1          | 0          | 3          | 2          | 3          | 2          | 1                                | 1          | 1          | 0          |
| CO2  | Remember various types of management.                            | 0                       | 0          | 1          | 0          | 0          | 2          | 1          | 0          | 3          | 2          | 3          | 2          | 1                                | 1          | 1          | 0          |
| CO3  | Analyze the Indian economics                                     | 0                       | 0          | 0          | 1          | 0          | 1          | 0          | 2          | 0          | 0          | 0          | 1          | 1                                | 0          | 1          | 0          |
| CO4  | Create an organization efficiently for its upliftment            | 0                       | 0          | 1          | 0          | 0          | 2          | 0          | 1          | 3          | 2          | 3          | 2          | 1                                | 1          | 1          | 0          |
| CO5  | Apply marketing concept to any organization to earn more profit. | 0                       | 0          | 1          | 0          | 0          | 2          | 0          | 1          | 3          | 2          | 3          | 2          | 1                                | 1          | 1          | 0          |
| <b>Average</b>                                       |  | <b>0.0</b>              | <b>0.0</b> | <b>0.8</b> | <b>0.2</b> | <b>0.0</b> | <b>1.8</b> | <b>0.4</b> | <b>0.8</b> | <b>2.4</b> | <b>1.6</b> | <b>2.4</b> | <b>1.8</b> | <b>1.0</b>                       | <b>0.8</b> | <b>1.0</b> | <b>0.0</b> |



| Semester –VII                      |   |                  |            |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |
|------------------------------------|---|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|---------------------------|------------|------------|------------|
| 22EE704 - High Voltage Engineering |   |                  |            |            |            |            |            |            |            |            |            |            |            |                           |            |            |            |
| Course Outcomes                    |   | Program Outcomes |            |            |            |            |            |            |            |            |            |            |            | Program Specific Outcomes |            |            |            |
|                                    |   | 1                | 2          | 3          | 4          | 5          | 6          | 7          | 8          | 9          | 10         | 11         | 12         | 1                         | 2          | 3          | 4          |
| CO1                                | List the various types of over voltages and its effect on power system.                                   | 3                | 0          | 2          | 0          | 0          | 0          | 1          | 0          | 0          | 0          | 0          | 0          | 2                         | 1          | 0          | 0          |
| CO2                                | Describe generation of various over voltages in HV testing laboratories.                                  | 3                | 2          | 2          | 1          | 0          | 1          | 0          | 0          | 0          | 0          | 0          | 0          | 3                         | 1          | 0          | 0          |
| CO3                                | Use appropriate procedure for measurement of high voltage and high current DC, AC and impulse quantities. | 3                | 2          | 3          | 0          | 1          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 3                         | 1          | 0          | 0          |
| CO4                                | Analyze high voltage breakdown phenomena in insulating materials.   | 3                | 0          | 2          | 0          | 1          | 0          | 1          | 0          | 0          | 0          | 0          | 0          | 2                         | 2          | 0          | 0          |
| CO5                                | Comprehend the test procedures as per the Indian standards.   | 3                | 2          | 3          | 2          | 1          | 1          | 2          | 0          | 0          | 0          | 0          | 0          | 3                         | 3          | 2          | 0          |
| <b>Average</b>                     |   | <b>3.0</b>       | <b>1.2</b> | <b>2.4</b> | <b>0.6</b> | <b>0.6</b> | <b>0.4</b> | <b>0.8</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>2.6</b>                | <b>1.6</b> | <b>0.4</b> | <b>0.0</b> |

**Semester –VII**

**22EE705 - Power Systems Laboratory**

| Course Outcomes |  | Program Outcomes |            |            |            |            |            |            |            |            |            |            |            | Program Specific Outcomes |            |            |            |
|-----------------|--|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|---------------------------|------------|------------|------------|
|                 |  | 1                | 2          | 3          | 4          | 5          | 6          | 7          | 8          | 9          | 10         | 11         | 12         | 1                         | 2          | 3          | 4          |
| CO1             | Formulate power system network matrices.                               | 1                | 2          | 2          | 1          | 1          | 1          | 2          | 1          | 1          | 1          | 2          | 2          | 2                         | 2          | 1          | 0          |
| CO2             | Recall knowledge about power flow analysis.                            | 1                | 2          | 1          | 1          | 1          | 1          | 1          | 1          | 1          | 1          | 2          | 2          | 3                         | 3          | 2          | 0          |
| CO3             | Analyze power system stability problems.                               | 1                | 2          | 2          | 2          | 1          | 1          | 1          | 1          | 2          | 2          | 1          | 2          | 2                         | 3          | 1          | 0          |
| CO4             | Formulate and solve power system operational problems.                 | 1                | 2          | 2          | 2          | 1          | 1          | 2          | 1          | 1          | 2          | 2          | 2          | 3                         | 3          | 2          | 0          |
| CO5             | Evaluate system load to various generators in the system economically. | 1                | 2          | 2          | 2          | 1          | 1          | 2          | 1          | 1          | 2          | 2          | 2          | 2                         | 3          | 1          | 0          |
| <b>Average</b>  |  | <b>1.0</b>       | <b>2.0</b> | <b>1.8</b> | <b>1.6</b> | <b>1.0</b> | <b>1.0</b> | <b>1.6</b> | <b>1.0</b> | <b>1.2</b> | <b>1.6</b> | <b>1.8</b> | <b>2.0</b> | <b>2.4</b>                | <b>2.8</b> | <b>1.4</b> | <b>0.0</b> |

**Semester –VII**

**22EE706 - Electrical Drives And Control Laboratory**

| Course Outcomes |   | Program Outcomes |            |            |            |            |            |            |            |            |            |            |            | Program Specific Outcomes |            |            |            |
|-----------------|---|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|---------------------------|------------|------------|------------|
|                 |   | 1                | 2          | 3          | 4          | 5          | 6          | 7          | 8          | 9          | 10         | 11         | 12         | 1                         | 2          | 3          | 4          |
| CO1             | Set up control strategies to synthesize the voltages in dc and ac motor drives  | 1                | 1          | 2          | 2          | 2          | 1          | 1          | 0          | 0          | 0          | 1          | 1          | 2                         | 1          | 2          | 0          |
| CO2             | Develop testing and experimental procedures applying basic knowledge in electronics, electrical circuit analysis, electrical machines, microprocessors, and programmable logic controllers                                  | 1                | 2          | 2          | 2          | 2          | 1          | 1          | 0          | 0          | 0          | 1          | 1          | 2                         | 2          | 2          | 0          |
| CO3             | Use standard methods to determine accurate modelling /simulation parameters for various general-purpose electrical machines and power electronics devices required for designing a system and solve drives related problems | 1                | 2          | 2          | 2          | 2          | 1          | 1          | 0          | 0          | 0          | 1          | 1          | 2                         | 3          | 2          | 0          |
| CO4             | Combine the use of computer-based simulation tools relevant to electrical Drives with practical laboratory experimentation.   | 0                | 1          | 2          | 2          | 2          | 1          | 1          | 0          | 0          | 0          | 1          | 1          | 2                         | 3          | 2          | 0          |
| CO5             | Design VSI/CSI for induction motor using any simulation software.   | 0                | 1          | 2          | 2          | 2          | 1          | 1          | 0          | 0          | 0          | 1          | 1          | 2                         | 3          | 2          | 0          |
| <b>Average</b>  |   | <b>0.6</b>       | <b>1.4</b> | <b>2.0</b> | <b>2.0</b> | <b>2.0</b> | <b>1.0</b> | <b>1.0</b> | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>1.0</b> | <b>1.0</b> | <b>2.0</b>                | <b>2.4</b> | <b>2.0</b> | <b>0.0</b> |

**Semester –VIII**

**22EE801 - Project Work**

|                 |  | Program Outcomes |   |   |   |   |   |   |   |   |    |    |    | Program Specific Outcomes |   |   |   |
|-----------------|--|------------------|---|---|---|---|---|---|---|---|----|----|----|---------------------------|---|---|---|
| Course Outcomes |  | 1                | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1                         | 2 | 3 | 4 |
| CO1             | Ability to identify, formulate, design, interpret, analyze and provide solutions to complex engineering and societal issues by applying knowledge gained on basics of science and Engineering  | 3                | 3 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0  | 0  | 0  | 3                         | 3 | 3 | 0 |
| CO2             | Ability to choose, conduct and demonstrate a sound technical knowledge of their selected project topics in the field of power components, protection, high voltage, electronics, process automation, power electronics and drives, instrumentation and control by exploring suitable engineering and IT tools. | 0                | 0 | 0 | 0 | 3 | 3 | 0 | 0 | 0 | 0  | 0  | 0  | 3                         | 0 | 0 | 0 |
| CO3             | Ability to understand, formulate and propose new learning algorithms to solve engineering and societal problems of moderate complexity through multidisciplinary projects  | 0                | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 3 | 0  | 0  | 0  | 0                         | 0 | 3 | 0 |

|                |  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|----------------|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|                | understanding commitment towards sustainable development.  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| CO4            | Ability to demonstrate, prepare reports, communicate and work in a team as a member/leader by adhering to ethical responsibilities | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 3   | 3   | 3   | 3   | 3   | 0   | 0   | 3   | 0   |
| CO5            | Ability to acknowledge the value of continuing education for oneself and to stay up with technology advancements.                  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 3   | 3   | 3   | 3   | 3   | 0   |
| <b>Average</b> |  | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 1.2 | 0.6 | 0.6 | 1.2 | 1.8 | 1.2 | 2.4 | 0.0 |