



DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

PROGRAMME: B.E. ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE OUTCOMES (COs)

| | |
|-----------------------|--|
| Semester | 01 |
| Subject Code | HS3152 |
| Subject Name | PROFESSIONAL ENGLISH I |
| Course Outcome | <ul style="list-style-type: none">To use appropriate words in a professional contextTo gain understanding of basic grammatic structures and use them in right context.To read and infer the denotative and connotative meanings of technical textsTo write definitions, descriptions, narrations and essays on various topics |

CO's-PO's & PSO's MAPPING

| COs | POs | | | | | | | | | | | | PSOs | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | PO01 | PO02 | PO03 | PO04 | PO05 | PO06 | PO07 | PO08 | PO09 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| 1 | 1 | 1 | 1 | 1 | 1 | 3 | 3 | 3 | 1 | 3 | - | 3 | - | - | - |
| 2 | 1 | 1 | 1 | 1 | 1 | 3 | 3 | 3 | 1 | 3 | - | 3 | - | - | - |
| 3 | 2 | 3 | 2 | 3 | 2 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | - | - | - |
| 4 | 2 | 3 | 2 | 3 | 2 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | - | - | - |
| 5 | 2 | 3 | 3 | 3 | - | 3 | 3 | 3 | 2 | 3 | - | 3 | - | - | - |
| Avg. | 1.6 | 2.2 | 1.8 | 2.2 | 1.5 | 3 | 3 | 3 | 1.6 | 3 | 3 | 3 | - | - | - |

1 - low, 2 - medium, 3 - high, '-' - no correlation



SUDHARSAN ENGINEERING COLLEGE

(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)

Sathiyamangalam, Kulathur(TK), Pudukkottai District-622 501

Ph: 04339-240830, 240840 Fax: 04339-240205

Website: www.sec.ac.in Email: principal@sec.ac.in



| | |
|-----------------------|--|
| Semester | 01 |
| Subject Code | MA3151 |
| Subject Name | MATRICES AND CALCULUS |
| Course Outcome | <ul style="list-style-type: none">• Use the matrix algebra methods for solving practical problems.• Apply differential calculus tools in solving various application problems.• Able to use differential calculus ideas on several variable functions.• Apply different methods of integration in solving practical problems.• Apply multiple integral ideas in solving areas, volumes and other practical problems. |

| COs | POs | | | | | | | | | | | | PSOs | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | PO01 | PO02 | PO03 | PO04 | PO05 | PO06 | PO07 | PO08 | PO09 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| 1 | 3 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 3 | - | - | - |
| 2 | 3 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 3 | - | - | - |
| 3 | 3 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 3 | - | - | - |
| 4 | 3 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 3 | - | - | - |
| 5 | 3 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 3 | - | - | - |
| Avg. | 3 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 3 | - | - | - |



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|-----------------------|---|
| Semester | 01 |
| Subject Code | PH3151 |
| Subject Name | ENGINEERING PHYSICS |
| Course Outcome | <ul style="list-style-type: none">• Understand the importance of mechanics.• Express their knowledge in electromagnetic waves.• Demonstrate a strong foundational knowledge in oscillations, optics and lasers.• Understand the importance of quantum physics.• Comprehend and apply quantum mechanical principles towards the formation of energy bands. |

| COs | POs | | | | | | | | | | | | PSOs | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | PO01 | PO02 | PO03 | PO04 | PO05 | PO06 | PO07 | PO08 | PO09 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| 1 | 3 | 3 | 2 | 1 | 1 | 1 | - | - | - | - | - | - | - | - | - |
| 2 | 3 | 3 | 2 | 1 | 2 | 1 | - | - | - | - | - | - | - | - | - |
| 3 | 3 | 3 | 2 | 2 | 2 | 1 | - | - | - | - | - | 1 | - | - | - |
| 4 | 3 | 3 | 1 | 1 | 2 | 1 | - | - | - | - | - | - | - | - | - |
| 5 | 3 | 3 | 1 | 1 | 2 | 1 | - | - | - | - | - | - | - | - | - |
| Avg. | 3 | 3 | 1.6 | 1.2 | 1.8 | 1 | - | - | - | - | - | 1 | - | - | - |



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|-----------------------|---|
| Sem | 01 |
| Subject Code | CY3151 |
| Subject Name | ENGINEERING CHEMISTRY |
| Course Outcome | <ul style="list-style-type: none">• To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.• To identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications.• To apply the knowledge of phase rule and composites for material selection requirements.• To recommend suitable fuels for engineering processes and applications.• To recognize different forms of energy resources and apply them for suitable applications in energy sectors |

| COs | POs | | | | | | | | | | | | PSOs | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | PO01 | PO02 | PO03 | PO04 | PO05 | PO06 | PO07 | PO08 | PO09 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| 1 | 3 | 2 | 2 | 1 | - | 1 | 1 | - | - | - | - | 1 | - | - | - |
| 2 | 2 | - | - | 1 | - | 2 | 2 | - | - | - | - | - | - | - | - |
| 3 | 3 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 4 | 3 | 1 | 1 | - | - | 1 | 2 | - | - | - | - | - | - | - | - |
| 5 | 3 | 1 | 2 | 1 | - | 2 | 2 | - | - | - | - | 2 | - | - | - |
| Avg. | 2.8 | 1.3 | 1.6 | 1 | - | 1.5 | 1.8 | - | - | - | - | 1.5 | - | - | - |



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| | |
|-----------------------|--|
| Sem | 01 |
| Subject Code | GE3151 |
| Subject Name | PROBLEM SOLVING AND PYTHON PROGRAMMING |
| Course Outcome | <ul style="list-style-type: none">• Develop algorithmic solutions to simple computational problems.• Develop and execute simple Python programs.• Write simple Python programs using conditionals and loops for solving problems.• Decompose a Python program into functions.• Represent compound data using Python lists, tuples, dictionaries etc.• Read and write data from/to files in Python programs. |

| COs | POs | | | | | | | | | | | | PSOs | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | PO01 | PO02 | PO03 | PO04 | PO05 | PO06 | PO07 | PO08 | PO09 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| 1 | 3 | 3 | 3 | 3 | 2 | - | - | - | - | - | 2 | 2 | 3 | 3 | - |
| 2 | 3 | 3 | 3 | 3 | 2 | - | - | - | - | - | 2 | 2 | 3 | - | - |
| 3 | 3 | 3 | 3 | 3 | 2 | - | - | - | - | - | 2 | - | 3 | - | - |
| 4 | 2 | 2 | - | 2 | 2 | - | - | - | - | - | 1 | - | 3 | - | - |
| 5 | 1 | 2 | - | - | 1 | - | - | - | - | - | 1 | - | 2 | - | - |
| 6 | 2 | 2 | - | - | 2 | - | - | - | - | - | 1 | - | 2 | - | - |
| Avg. | 2 | 3 | 3 | 3 | 2 | - | - | - | - | - | 2 | 2 | 3 | 3 | - |



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| | |
|-----------------------|--|
| Sem | 01 |
| Subject Code | GE3171 |
| Subject Name | PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY |
| Course Outcome | <ul style="list-style-type: none">• Develop algorithmic solutions to simple computational problems• Develop and execute simple Python programs.• Implement programs in Python using conditionals and loops for solving problems..• Deploy functions to decompose a Python program.• Process compound data using Python data structures.• Utilize Python packages in developing software applications. |

| COs | POs | | | | | | | | | | | | PSOs | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | PO01 | PO02 | PO03 | PO04 | PO05 | PO06 | PO07 | PO08 | PO09 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| 1 | 3 | 3 | 3 | 3 | 3 | - | - | - | - | - | 3 | 2 | 3 | 3 | - |
| 2 | 3 | 3 | 3 | 3 | 3 | - | - | - | - | - | 3 | 2 | 3 | - | - |
| 3 | 3 | 3 | 3 | 3 | 2 | - | - | - | - | - | 2 | - | 3 | - | - |
| 4 | 3 | 2 | - | 2 | 2 | - | - | - | - | - | 1 | - | 3 | - | - |
| 5 | 1 | 2 | - | - | 1 | - | - | - | - | - | 1 | - | 2 | - | - |
| 6 | 2 | - | - | - | 2 | - | - | - | - | - | 1 | - | 2 | - | - |
| Avg. | 2 | 3 | 3 | 3 | 2 | - | - | - | - | - | 2 | 2 | 3 | 3 | - |



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| | |
|-----------------------|---|
| Sem | 01 |
| Subject Code | BS3171 |
| Subject Name | CHEMISTRY LABORATORY |
| Course Outcome | <ul style="list-style-type: none">• To analyse the quality of water samples with respect to their acidity, alkalinity, hardness and DO.• To determine the amount of metal ions through volumetric and spectroscopic techniques• To analyse and determine the composition of alloys.• To learn simple method of synthesis of nanoparticles• To quantitatively analyse the impurities in solution by electroanalytical techniques |

| COs | POs | | | | | | | | | | | | PSOs | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | PO01 | PO02 | PO03 | PO04 | PO05 | PO06 | PO07 | PO08 | PO09 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| 1 | 3 | - | 1 | - | - | 2 | 2 | - | - | - | - | 2 | - | - | - |
| 2 | 3 | 1 | 2 | - | - | 1 | 2 | - | - | - | - | 1 | - | - | - |
| 3 | 3 | 2 | 1 | 1 | - | - | 1 | - | - | - | - | - | - | - | - |
| 4 | 2 | 1 | 2 | - | - | 2 | 2 | - | - | - | - | - | - | - | - |
| 5 | 2 | 1 | 2 | - | 1 | 2 | 2 | - | - | - | - | 1 | - | - | - |
| Avg. | 2.6 | 1.3 | 1.6 | 1 | 1 | 1.4 | 1.8 | - | - | - | - | 1.3 | - | - | - |



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| | |
|-----------------------|---|
| Sem | 01 |
| Subject Code | GE3172 |
| Subject Name | ENGLISH LABORATORY |
| Course Outcome | <ul style="list-style-type: none">• To listen to and comprehend general as well as complex academic information• To listen to and understand different points of view in a discussion• To speak fluently and accurately in formal and informal communicative contexts• To describe products and processes and explain their uses and purposes clearly and accurately• To express their opinions effectively in both formal and informal discussions |

| COs | POs | | | | | | | | | | | | PSOs | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | PO01 | PO02 | PO03 | PO04 | PO05 | PO06 | PO07 | PO08 | PO09 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| 1 | 3 | 3 | 3 | 3 | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | - | - | - |
| 2 | 3 | 3 | 3 | 3 | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | - | - | - |
| 3 | 3 | 3 | 3 | 3 | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | - | - | - |
| 4 | 3 | 3 | 3 | 3 | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | - | - | - |
| 5 | 3 | 3 | 3 | 3 | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | - | - | - |
| Avg. | 3 | 3 | 3 | 3 | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | - | - | - |



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| | |
|-----------------------|---|
| Sem | 02 |
| Subject Code | HS3252 |
| Subject Name | PROFESSIONAL ENGLISH - II |
| Course Outcome | <ul style="list-style-type: none">• To compare and contrast products and ideas in technical texts.• To identify and report cause and effects in events, industrial processes through technical texts• To analyse problems in order to arrive at feasible solutions and communicate them in the written format.• To present their ideas and opinions in a planned and logical manner• To draft effective resumes in the context of job search. |

| COs | POs | | | | | | | | | | | | PSOs | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | PO01 | PO02 | PO03 | PO04 | PO05 | PO06 | PO07 | PO08 | PO09 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| 1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | - | - | - |
| 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | - | - | - |
| 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | - | - | - |
| 4 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | - | - | - |
| 5 | - | - | - | - | - | - | - | - | 3 | 3 | 3 | 3 | - | - | - |
| Avg. | 3 | 3 | 3 | 3 | 2.75 | 3 | 3 | 3 | 2.2 | 3 | 3 | 3 | - | - | - |



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| | |
|-----------------------|--|
| Sem | 02 |
| Subject Code | MA3251 |
| Subject Name | STATISTICS AND NUMERICAL METHODS |
| Course Outcome | <ul style="list-style-type: none">• Apply the concept of testing of hypothesis for small and large samples in real life problems.• Apply the basic concepts of classifications of design of experiments in the field of agriculture.• Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.• Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.• Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications. |

| COs | POs | | | | | | | | | | | | PSOs | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | PO01 | PO02 | PO03 | PO04 | PO05 | PO06 | PO07 | PO08 | PO09 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| 1 | 3 | 3 | 1 | 1 | 1 | 0 | 0 | 0 | 2 | 0 | 2 | 3 | - | - | - |
| 2 | 3 | 3 | 1 | 1 | 1 | 0 | 0 | 0 | 2 | 0 | 2 | 3 | - | - | - |
| 3 | 3 | 3 | 1 | 1 | 1 | 0 | 0 | 0 | 2 | 0 | 2 | 3 | - | - | - |
| 4 | 3 | 3 | 1 | 1 | 1 | 0 | 0 | 0 | 2 | 0 | 2 | 3 | - | - | - |
| 5 | 3 | 3 | 1 | 1 | 1 | 0 | 0 | 0 | 2 | 0 | 2 | 3 | - | - | - |
| Avg. | 3 | 3 | 1 | 1 | 1 | 0 | 0 | 0 | 2 | 0 | 2 | 3 | - | - | - |



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| | |
|-----------------------|--|
| Sem | 02 |
| Subject Code | BE3255 |
| Subject Name | BASIC CIVIL AND MECHANICAL ENGINEERING |
| Course Outcome | <ul style="list-style-type: none">• Understanding profession of Civil and Mechanical engineering.• Summarise the planning of building, infrastructure and working of Machineries.• Apply the knowledge gained in respective discipline• Illustrate the ideas of Civil and Mechanical Engineering applications.• Appraise the material, Structures, machines and energy |

| COs | POs | | | | | | | | | | | | PSOs | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | PO01 | PO02 | PO03 | PO04 | PO05 | PO06 | PO07 | PO08 | PO09 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| 1 | 2 | - | - | 1 | - | - | 1 | 2 | 1 | 2 | - | 1 | - | - | - |
| 2 | 2 | - | - | - | - | - | 1 | 2 | 1 | 2 | - | 2 | - | - | - |
| 3 | 2 | - | - | - | - | - | 1 | 2 | 2 | 2 | - | 2 | - | - | - |
| 4 | 2 | - | - | - | - | - | 1 | 2 | 1 | 2 | - | 2 | - | - | - |
| 5 | 2 | - | - | - | - | - | 1 | 2 | 1 | 2 | - | 2 | - | - | - |
| Avg. | 2 | - | - | 0.2 | - | - | 1 | 2 | 1.2 | 2 | - | 1.8 | - | - | - |



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| | |
|-----------------------|---|
| Sem | 02 |
| Subject Code | GE3251 |
| Subject Name | ENGINEERING GRAPHICS |
| Course Outcome | <ul style="list-style-type: none">• Use BIS conventions and specifications for engineering drawing.• Construct the conic curves, involutes and cycloid.• Solve practical problems involving projection of lines.• Draw the orthographic, isometric and perspective projections of simple solids.• Draw the development of simple solids |

| COs | POs | | | | | | | | | | | | PSOs | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | PO01 | PO02 | PO03 | PO04 | PO05 | PO06 | PO07 | PO08 | PO09 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| 1 | 3 | 1 | 2 | - | 2 | - | - | - | - | 3 | - | 2 | 2 | 2 | - |
| 2 | 3 | 1 | 2 | - | 2 | - | - | - | - | 3 | - | 2 | 2 | 2 | - |
| 3 | 3 | 1 | 2 | - | 2 | - | - | - | - | 3 | - | 2 | 2 | 2 | - |
| 4 | 3 | 1 | 2 | - | 2 | - | - | - | - | 3 | - | 2 | 2 | 2 | - |
| 5 | 3 | 1 | 2 | - | 2 | - | - | - | - | 3 | - | 2 | 2 | 2 | - |
| Avg. | 3 | 1 | 2 | - | 2 | - | - | - | - | 3 | - | 2 | 2 | 2 | - |



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| | |
|-----------------------|---|
| Sem | 02 |
| Subject Code | EE3251 |
| Subject Name | ELECTRIC CIRCUIT ANALYSIS |
| Course Outcome | <ul style="list-style-type: none">• Explain circuit's behavior using circuit laws.• Apply mesh analysis/ nodal analysis / network theorems to determine behavior of the given DC and AC circuit• Compute the transient response of first order and second order systems to step and sinusoidal input• Compute power, line/ phase voltage and currents of the given three phase circuit• Explain the frequency response of series and parallel RLC circuits• Explain the behavior of magnetically coupled circuits. |

| COs | POs | | | | | | | | | | | | PSOs | | |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PS01 | PS02 | PS03 |
| CO1 | 3 | 3 | 3 | 2 | 2 | - | 2 | 1 | - | - | - | 3 | 3 | 3 | 3 |
| CO2 | 3 | 3 | 3 | 3 | 2 | - | 2 | 1 | - | - | - | 3 | 3 | 3 | 3 |
| CO3 | 3 | 3 | 3 | 3 | 2 | - | 2 | 1 | - | - | - | 3 | 3 | 3 | 3 |
| CO4 | 3 | 3 | 3 | 3 | 2 | - | 2 | 1 | - | - | - | 3 | 3 | 3 | 3 |
| CO5 | 3 | 3 | 3 | 3 | 2 | - | 2 | 1 | - | - | - | 3 | 3 | 3 | 3 |
| CO6 | 3 | 3 | 3 | 3 | 2 | - | 2 | 1 | - | - | - | 3 | 3 | 3 | 3 |
| Avg. | 3 | 3 | 3 | 2.8 | 2 | - | 2 | 1 | - | - | - | 3 | 3 | 3 | 3 |



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| | |
|-----------------------|---|
| Sem | 02 |
| Subject Code | GE3271 |
| Subject Name | ENGINEERING PRACTICES LABORATORY |
| Course Outcome | <ul style="list-style-type: none">• Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work.• Wire various electrical joints in common household electrical wire work.• Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work.• Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB. |

| COs | POs | | | | | | | | | | | | PSOs | | |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| 1 | 3 | 2 | - | - | 1 | 1 | 1 | - | - | - | - | 2 | 2 | 1 | 1 |
| 2 | 3 | 2 | - | - | 1 | 1 | 1 | - | - | - | - | 2 | 2 | 1 | 1 |
| 3 | 3 | 2 | - | - | 1 | 1 | 1 | - | - | - | - | 2 | 2 | 1 | 1 |
| Avg. | 3 | 2 | - | - | 1 | 1 | 1 | - | - | - | - | 2 | 2 | 1 | 1 |



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|-----------------------|--|
| Sem | 02 |
| Subject Code | EE3271 |
| Subject Name | ELECTRIC CIRCUITS LABORATORY |
| Course Outcome | <ul style="list-style-type: none"> • Use simulation and experimental methods to verify the fundamental electrical laws for the given DC/AC circuit (Ex 1) • Use simulation and experimental methods to verify the various electrical theorems (Superposition, Thevenin , Norton and maximum power transfer) for the given DC/AC circuit (Ex 2-5) • Analyze transient behavior of the given RL/RC/RLC circuit using simulation and experimental methods (Ex 6) • Analyze frequency response of the given series and parallel RLC circuit using simulation and experimentation methods (Ex 7-8) • Analyze the performance of the given three-phase circuit using simulation and experimental methods (Ex 9) |

| COs | POs | | | | | | | | | | | | PSOs | | |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PS01 | PS02 | PS03 |
| 1 | 3 | 3 | 3 | 3 | 3 | - | 2 | 1.5 | 3 | - | - | 3 | 3 | 3 | 2 |
| 2 | 3 | 3 | 3 | 3 | 3 | - | 2 | 1.5 | 3 | - | - | 3 | 3 | 3 | 2 |
| 3 | 3 | 3 | 3 | 3 | 3 | - | 2 | 1.5 | 3 | - | - | 3 | 3 | 3 | 2 |
| 4 | 3 | 3 | 3 | 3 | 3 | - | 2 | 1.5 | 3 | - | - | 3 | 3 | 3 | 2 |
| 5 | 3 | 3 | 3 | 3 | 3 | - | 2 | 1.5 | 3 | - | - | 3 | 3 | 3 | 2 |
| Avg. | 3 | 3 | 3 | 3 | 3 | - | 2 | 1.5 | 3 | - | - | 3 | 3 | 3 | 2 |



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| | |
|-----------------------|---|
| Sem | 02 |
| Sub Code | GE3272 |
| Sub Name | COMMUNICATION LABORATORY |
| Course Outcome | <ul style="list-style-type: none">• Speak effectively in group discussions held in formal/semi formal contexts.• Discuss, analyse and present concepts and problems from various perspectives to arrive at suitable solutions• Write emails, letters and effective job applications.• Write critical reports to convey data and information with clarity and precision• Give appropriate instructions and recommendations for safe execution of tasks |

| COs | POs | | | | | | | | | | | | PSOs | | |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PS01 | PS02 | PS03 |
| 1 | 2 | 3 | 3 | 3 | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | - | - | - |
| 2 | 2 | 3 | 3 | 3 | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | - | - | - |
| 3 | 2 | 2 | 3 | 3 | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | - | - | - |
| 4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | - | - | - |
| 5 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | - | - | - |
| Avg. | 2.4 | 2.8 | 3 | 3 | 1.8 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | - | - | - |



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|-----------------------|--|
| Sem | 03 |
| Sub Code | MA3303 |
| Sub Name | PROBABILITY AND COMPLEX FUNCTIONS |
| Course Outcome | <ul style="list-style-type: none">• Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon.• Understand the basic concepts of one and two dimensional random variables and apply in engineering applications.• To develop an understanding of the standard techniques of complex variable theory in particular analytic function and its mapping property.• To familiarize the students with complex integration techniques and contour integration techniques which can be used in real integrals.• To acquaint the students with Differential Equations which are significantly used in engineering problems |

| COs | POs | | | | | | | | | | | | PSOs | | |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| 1 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | - | - | - |
| 2 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | - | - | - |
| 3 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | - | - | - |
| 4 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | - | - | - |
| 5 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | - | - | - |
| Avg. | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | - | - | - |



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|-----------------------|---|
| Sem | 03 |
| Sub Code | EE3301 |
| Sub Name | ELECTROMAGNETIC FIELDS |
| Course Outcome | <ul style="list-style-type: none"> • Visualize and explain Gradient, Divergence, and Curl operations on electromagnetic vector fields and identify the electromagnetic sources and their effects. • Compute and analyse electrostatic fields, electric potential, energy density along with their applications. • Compute and analyse magneto static fields, magnetic flux density, vector potential along with their applications. • Explain different methods of emf generation and Maxwell's equations • Explain the concept of electromagnetic waves and characterizing parameters |

| COs | POs | | | | | | | | | | | | PSOs | | |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PS01 | PS02 | PS03 |
| CO1 | 3 | 2 | - | - | - | - | 3 | 1 | - | - | - | 1 | 3 | 2 | 1 |
| CO2 | 3 | 2 | 1 | 2 | - | - | 1 | 1 | - | - | - | 1 | 3 | 2 | 1 |
| CO3 | 3 | 2 | 1 | 2 | - | - | 1 | 1 | - | - | - | 1 | 3 | 2 | 1 |
| CO4 | 3 | 2 | 1 | 2 | - | - | 1 | 1 | - | - | - | 1 | 3 | 2 | 1 |
| CO5 | 3 | 2 | 1 | 2 | - | - | 1 | 1 | - | - | - | 1 | 3 | 2 | 1 |
| Avg. | 3 | 2 | 1 | 2 | - | - | 1.4 | 1 | - | - | - | 1 | 3 | 2 | 1 |



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|-----------------------|---|
| Sem | 03 |
| Sub Code | EE3302 |
| Sub Name | DIGITAL LOGIC CIRCUITS |
| Course Outcome | <ul style="list-style-type: none">• Explain various number systems and characteristics of digital logic families• Apply K-maps and Quine McCluskey methods to simplify the given Boolean expressions• Explain the implementation of combinational circuit such as multiplexers and de multiplexers - code converters, adders, subtractors, Encoders and Decoders• Design various synchronous and asynchronous circuits using Flip Flops• Explain asynchronous sequential circuits and programmable logic devices• Use VHDL for simulating and testing RTL, combinatorial and sequential circuits |

| COs | POs | | | | | | | | | | | | PSOs | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PS01 | PS02 | PS03 |
| CO1 | 3 | 3 | 3 | 1 | 3 | - | - | 1 | - | - | - | 1 | 3 | - | 1 |
| CO2 | 3 | 3 | 3 | 1 | 3 | - | - | 1 | - | - | - | 1 | 3 | - | 1 |
| CO3 | 3 | 3 | 3 | 1 | 3 | - | - | 1 | - | - | - | 1 | 3 | - | 1 |
| CO4 | 3 | 3 | 3 | 1 | 3 | - | - | 1 | - | - | - | 1 | 3 | - | 1 |
| CO5 | 3 | 3 | 3 | 1 | 3 | - | - | 1 | - | - | - | 1 | 3 | - | 1 |
| Avg | 3 | 3 | 3 | 1 | 3 | - | - | 1 | - | - | - | 1 | 3 | - | 1 |



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|-----------------------|--|
| Sem | 03 |
| Sub Code | EC3301 |
| Sub Name | ELECTRON DEVICES AND CIRCUITS |
| Course Outcome | <ul style="list-style-type: none">• Explain the structure and operation of PN junction devices (diode, Zener diode, LED and Laser diode)• Design clipper, clamper, half wave and full wave rectifier, regulator circuits using PN junction diodes• Analyze the structure and characteristics BJT, FET, MOSFET, UJT, Thyristor and IGBT• Analyze the performance of various configurations of BJT and MOSFET based amplifier• Explain the characteristics of MOS based cascade and differential amplifier• Explain the operation of various feedback amplifiers and oscillators. |

| COs | POs | | | | | | | | | | | | PSOs | | |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PS01 | PS02 | PS03 |
| CO1 | 2 | 2 | 3 | 2 | 2 | - | - | 1 | - | - | - | 1 | 3 | - | 1 |
| CO2 | 2 | 2 | 3 | 2 | 2 | - | - | 1 | - | - | - | 1 | 3 | - | 1 |
| CO3 | 2 | 2 | 3 | 2 | 2 | - | - | 1 | - | - | - | 1 | 3 | - | 1 |
| CO4 | 2 | 2 | 3 | 2 | 2 | - | - | 1 | - | - | - | 1 | 3 | - | 1 |
| CO5 | 2 | 2 | 3 | 2 | 2 | - | - | 1 | - | - | - | 1 | 3 | - | 1 |
| Avg. | 2 | 2 | 3 | 2 | 2 | - | - | 1 | - | - | - | 1 | 3 | - | 1 |



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|-----------------------|--|
| Sem | 03 |
| Sub Code | EE3303 |
| Sub Name | ELECTRICAL MACHINES - I |
| Course Outcome | <ul style="list-style-type: none"> • Apply the laws governing the electromechanical energy conversion for singly and multiple excited systems. • Explain the construction and working principle of DC machines. • Interpret various characteristics of DC machines. • Compute various performance parameters of the machine, by conducting suitable tests. • Draw the equivalent circuit of transformer and predetermine the efficiency and regulation. • Describe the working principle of auto transformer, three phase transformer with different types of connections. |

| COs | POs | | | | | | | | | | | | PSOs | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PS01 | PS02 | PS03 |
| CO1 | 3 | 3 | 1 | 1 | 1 | - | - | 1 | - | - | - | 1 | 3 | 2 | 2 |
| CO2 | 3 | 3 | 1 | 1 | 1 | - | - | 1 | - | - | - | 1 | 3 | 1 | 1 |
| CO3 | 3 | 3 | 1 | 1 | 1 | - | - | 1 | - | - | - | 1 | 3 | 1 | 1 |
| CO4 | 3 | 3 | 1 | 1 | 1 | - | - | 1 | - | - | - | 1 | 3 | 3 | 2 |
| CO5 | 3 | 3 | 1 | 1 | 1 | - | - | 1 | - | - | - | 1 | 3 | 3 | 2 |
| CO6 | 3 | 3 | 1 | 1 | 1 | - | - | 1 | - | - | - | 1 | 3 | 3 | 2 |
| Avg | 3 | 3 | 1 | 1 | 1 | - | - | 1 | - | - | - | 1 | 3 | 3 | 3 |



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|-----------------------|--|
| Sem | 03 |
| Sub Code | CS3353 |
| Sub Name | C PROGRAMMING AND DATA STRUCTURES |
| Course Outcome | <ul style="list-style-type: none">• Develop C programs for any real world/technical application.• Apply advanced features of C in solving problems• Write functions to implement linear and non-linear data structure operations.• Suggest and use appropriate linear/non-linear data structure operations for solving a given problem• Appropriately use sort and search algorithms for a given application.• Apply appropriate hash functions that result in a collision free scenario for data storage and retrieval |

| COs | POs | | | | | | | | | | | | PSOs | | |
|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| 1 | 2 | 3 | 1 | 2 | 2 | 1 | 1 | - | 1 | 2 | 1 | 3 | 2 | 1 | 3 |
| 2 | 1 | 2 | 1 | 2 | 2 | - | - | - | 1 | 1 | 1 | 2 | 2 | 2 | 2 |
| 3 | 2 | 3 | 1 | 2 | 3 | - | - | - | 1 | 1 | 1 | 2 | 2 | 1 | 2 |
| 4 | 2 | 1 | - | 1 | 1 | - | - | - | 2 | 1 | 1 | 2 | 2 | 3 | 1 |
| 5 | 1 | 2 | 1 | 2 | 2 | 1 | 1 | - | 1 | 2 | 1 | 3 | 2 | 2 | 3 |
| Avg. | 2 | 2 | 1 | 2 | 2 | 1 | 1 | - | 1 | 1 | 1 | 2 | 2 | 2 | 2 |



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|-----------------------|---|
| Sem | 03 |
| Sub Code | EC3311 |
| Sub Name | ELECTRON DEVICES AND CIRCUITS LABORATORY |
| Course Outcome | <ul style="list-style-type: none"> Analyze the characteristics of PN, Zener diode and BJT in CE,CC,CB configurations experimentally Analyze the characteristics of JFET and UJT experimentally Analyze frequency response characteristics of a Common Emitter amplifier experimentally Analyze the characteristics of RC phase shift and LC oscillators experimentally Analyze the characteristics of half-wave and full-wave rectifier with and without filters experimentally Analyze the characteristics of FET based differential amplifier experimentally Calculate the frequency and phase angle using CRO experimentally Analyze the frequency response characteristics of passive filters experimentally |

| COs | POs | | | | | | | | | | | | PSOs | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PS01 | PS02 | PS03 |
| CO1 | - | - | - | 3 | 3 | - | - | 1.5 | - | - | 3 | - | - | 3 | 3 |
| CO2 | - | - | 3 | 3 | 3 | - | - | 1.5 | - | - | 3 | - | - | 3 | 3 |
| CO3 | - | 3 | 2 | 3 | - | - | - | 1.5 | - | - | 3 | - | - | 3 | 3 |
| CO4 | - | 3 | 3 | 3 | - | - | - | 1.5 | - | - | 3 | - | - | 3 | 3 |
| CO5 | - | - | - | - | 3 | - | - | 1.5 | - | - | - | - | - | 3 | 3 |
| CO6 | - | - | - | - | 3 | - | - | 1.5 | - | - | - | - | - | 3 | 3 |
| CO7 | - | - | - | - | 3 | - | - | 1.5 | - | - | 3 | - | - | 3 | 3 |
| CO8 | - | - | - | - | 3 | - | - | 1.5 | - | - | 3 | - | - | 3 | 3 |
| Avg | - | 3 | 2.7 | 3 | 3 | - | - | 1.5 | - | - | 3 | - | - | 3 | 3 |



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| | |
|-----------------------|---|
| Sem | 03 |
| Sub Code | EE3311 |
| Sub Name | ELECTRICAL MACHINES LABORATORY - I |
| Course Outcome | <ul style="list-style-type: none"> Construct the circuit with appropriate connections for the given DC machine/transformer. Experimentally determine the characteristics of different types of DC machines. Demonstrate the speed control techniques for a DC motor for industrial applications. Identify suitable methods for testing of transformer and DC machines. Predetermine the performance parameters of transformers and DC motor. CO6: Understand DC motor starters and 3-phase transformer connections |

| COs | POs | | | | | | | | | | | | PSOs | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PS01 | PS02 | PS03 |
| CO1 | 3 | 3 | 1 | 1 | - | - | - | - | 1 | - | - | - | 3 | 1 | 1 |
| CO2 | 3 | 3 | 1 | 1 | - | - | - | - | 1 | - | - | - | 3 | 3 | 2 |
| CO3 | 3 | 3 | 1 | 1 | - | - | - | - | 1 | - | - | - | 3 | 3 | 2 |
| CO4 | 3 | 3 | 1 | 1 | - | - | - | - | 1 | - | - | - | 2 | 3 | 2 |
| CO5 | 3 | 3 | 1 | 1 | - | - | - | - | 1 | - | - | - | 2 | 3 | 2 |
| CO6 | 3 | 3 | 1 | 1 | - | - | - | - | 1 | - | - | - | 2 | 3 | 1 |
| Avg | 3 | 3 | 1 | 1 | - | - | - | - | 1 | - | - | - | 2.5 | 2.6 | 1.6 |



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| | |
|-----------------------|---|
| Sem | 03 |
| Sub Code | CS3362 |
| Sub Name | C PROGRAMMING AND DATA STRUCTURES LABORATORY |
| Course Outcome | <ul style="list-style-type: none"> • Use different constructs of C and develop applications • Write functions to implement linear and non-linear data structure operations • Suggest and use the appropriate linear / non-linear data structure operations for a given problem • Apply appropriate hash functions that result in a collision free scenario for data storage and Retrieval • Implement Sorting and searching algorithms for a given application |

| COs | POs | | | | | | | | | | | | PSOs | | |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| 1 | 2 | 3 | 1 | 2 | 2 | 1 | 1 | - | 1 | 2 | 1 | 3 | 2 | 1 | 3 |
| 2 | 1 | 2 | 1 | 2 | 2 | - | - | - | 1 | 1 | 1 | 2 | 2 | 2 | 2 |
| 3 | 2 | 3 | 1 | 2 | 3 | - | - | - | 1 | 1 | 1 | 2 | 2 | 1 | 2 |
| 4 | 2 | 1 | - | 1 | 1 | - | - | - | 2 | 1 | 1 | 2 | 2 | 3 | 1 |
| 5 | 1 | 2 | 1 | 2 | 2 | 1 | 1 | - | 1 | 2 | 1 | 3 | 2 | 2 | 3 |
| Avg. | 2 | 2 | 1 | 2 | 2 | 1 | 1 | - | 1 | 1 | 1 | 2 | 2 | 2 | 2 |



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|-----------------------|--|
| Sem | 03 |
| Sub Code | GE3361 |
| Sub Name | PROFESSIONAL DEVELOPMENT |
| Course Outcome | <ul style="list-style-type: none">• Use MS Word to create quality documents, by structuring and organizing content for their day to day technical and academic requirements• Use MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding• Use MS PowerPoint to create high quality academic presentations by including common tables, charts, graphs, interlinking other elements, and using media objects |



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|-----------------------|--|
| Sem | 04 |
| Sub Code | GE3451 |
| Sub Name | ENVIRONMENTAL SCIENCES AND SUSTAINABILITY |
| Course Outcome | <ul style="list-style-type: none"> To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation. To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society. To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations. To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development. To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization. |

| COs | POs | | | | | | | | | | | | PSOs | | |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| 1 | 2 | 1 | - | - | - | 2 | 3 | - | - | - | - | 2 | - | - | - |
| 2 | 3 | 2 | - | - | - | 3 | 3 | - | - | - | - | 2 | - | - | - |
| 3 | 3 | - | 1 | - | - | 2 | 2 | - | - | - | - | 2 | - | - | - |
| 4 | 3 | 2 | 1 | 1 | - | 2 | 2 | - | - | - | - | 2 | - | - | - |
| 5 | 3 | 2 | 1 | - | - | 2 | 2 | - | - | - | - | 1 | - | - | - |
| Avg. | 2.8 | 1.8 | 1 | 1 | - | 2.2 | 2.4 | - | - | - | - | 1.8 | - | - | - |



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|-----------------------|---|
| Sem | 04 |
| Sub Code | EE3401 |
| Sub Name | TRANSMISSION AND DISTRIBUTION |
| Course Outcome | <ul style="list-style-type: none"> • Understand the structure of power system, computation of transmission line parameters for different configurations. • Model the transmission lines to determine the line performance and to understand the impact of Ferranti effect and corona on line performance. • Do Mechanical design of transmission lines, grounding and to understand about the insulators in transmission system. • Design the underground cables and understand the performance analysis of underground cable. • Understand the modelling, performance analysis and modern trends in distribution system |

| COs | POs | | | | | | | | | | | | PSOs | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CO1 | 2 | 1 | - | - | - | - | - | 1 | - | - | - | - | 3 | 1 | 1 |
| CO2 | 3 | 2 | 1 | 1 | - | 1 | - | 2 | - | - | - | - | 3 | 2 | 1 |
| CO3 | 3 | 2 | 1 | 1 | - | 1 | - | 2 | - | - | - | - | 3 | 3 | 1 |
| CO4 | 3 | 2 | 1 | 1 | - | 1 | - | 2 | - | - | - | - | 3 | 3 | 1 |
| CO5 | 3 | 2 | 1 | 1 | - | 1 | - | 2 | - | - | - | - | 3 | 3 | 1 |
| Avg | 2.8 | 1.8 | 1 | 1 | | 1 | - | 1.8 | | | | | 3 | 2.4 | 1 |



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|-----------------------|--|
| Sem | 04 |
| Sub Code | EE3402 |
| Sub Name | LINEAR INTEGRATED CIRCUITS |
| Course Outcome | <ul style="list-style-type: none"> • Explain monolithic IC fabrication process • Explain the fabrication of diodes, capacitance, resistance, FETs and PV Cell. • Analyze the characteristics and basic applications (inverting/non-inverting amplifier, summer, differentiator, integrator, V/I and I/V converter) of Op-Amp • Explain circuit and applications of op-amp based instrumentation amplifier, log/antilog amplifier, analog multiplier /divider, active filters, comparators, waveform generators, A/D and D/A converters • Explain Functional blocks, characteristics and applications of Timer, PLL, analog multiplier ICs. • Explain the applications of ICs in Instrumentation amplifier, fixed and variable voltage regulator, SMPS and function generator |

| COs | POs | | | | | | | | | | | | PSOs | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PS01 | PS02 | PS03 |
| CO1 | 2 | 2 | 3 | 2 | 2 | - | - | 1 | - | - | - | 1 | 3 | 2 | 1 |
| CO2 | 2 | 2 | 3 | 2 | 2 | - | - | 1 | - | - | - | 1 | 3 | 2 | 1 |
| CO3 | 2 | 2 | 3 | 2 | 2 | - | - | 1 | - | - | - | 1 | 3 | 2 | 1 |
| CO4 | 2 | 2 | 3 | 2 | 2 | - | - | 1 | - | - | - | 1 | 3 | 2 | 1 |
| CO5 | 2 | 2 | 3 | 2 | 2 | - | - | 1 | - | - | - | 1 | 3 | 2 | 1 |
| Avg | 2 | 2 | 3 | 2 | 2 | - | - | 1 | - | - | - | 1 | 3 | 2 | 1 |



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|-----------------------|--|
| Sem | 04 |
| Sub Code | EE3403 |
| Sub Name | MEASUREMENTS AND INSTRUMENTATION |
| Course Outcome | <ul style="list-style-type: none">• Ability to understand the fundamental art of measurement in engineering. Ability to understand the structural elements of various instruments.• Ability to understand the importance of bridge circuits.• Ability to understand about various transducers and their characteristics by experiments.• Ability to understand the concept of digital instrumentation and virtual instrumentation by experiments. |

| COs | POs | | | | | | | | | | | | PSOs | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PS01 | PS02 | PS03 |
| CO1 | 3 | 2 | 3 | - | 3 | 2 | - | 2 | - | - | - | 3 | 3 | 3 | 3 |
| CO2 | 3 | 2 | 3 | 2 | - | - | - | - | - | 3 | - | 3 | 3 | 3 | 3 |
| CO3 | 3 | 2 | 3 | - | 3 | 2 | - | - | - | - | - | 3 | 3 | 3 | 3 |
| CO4 | 3 | 2 | 3 | - | - | - | - | 2 | - | - | - | - | 3 | 3 | 3 |
| CO5 | 3 | 2 | 3 | 2 | 3 | - | - | - | - | 3 | - | 3 | 3 | 3 | 3 |
| Avg | 3 | 2 | 3 | 2 | 3 | 2 | - | 2 | - | 3 | - | 3 | 3 | 3 | 3 |



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|-----------------------|---|
| Sem | 04 |
| Sub Code | EE3404 |
| Sub Name | MICROPROCESSOR AND MICROCONTROLLER |
| Course Outcome | <ul style="list-style-type: none">• Ability to write assembly language program for microprocessor and microcontroller• Ability to design and implement interfacing of peripheral with microprocessor and microcontroller• Ability to analyze, comprehend, design and simulate microprocessor based systems used for control and monitoring.• Ability to analyze, comprehend, design and simulate microcontroller based systems used for control and monitoring.• Ability to understand and appreciate advanced architecture evolving microprocessor field |

| COs | POs | | | | | | | | | | | | PSOs | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PS01 | PS02 | PS03 |
| CO1 | 2 | 1 | 2 | 3 | - | - | - | 1 | - | - | - | 3 | 3 | 1 | 3 |
| CO2 | 2 | 1 | 2 | 3 | - | - | - | 1 | - | - | - | 3 | 3 | 1 | 3 |
| CO3 | 2 | 1 | 2 | 3 | - | - | - | 1 | - | - | - | 3 | 3 | 1 | 3 |
| CO4 | 2 | 1 | 2 | 3 | - | - | - | 1 | - | - | - | 3 | 3 | 1 | 3 |
| CO5 | 2 | 1 | 2 | 3 | - | - | - | 1 | - | - | - | 3 | 3 | 1 | 3 |
| Avg | 2 | 1 | 2 | 3 | - | - | - | 1 | - | - | - | 3 | 3 | 1 | 3 |



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|-----------------------|--|
| Sem | 04 |
| Sub Code | EE3405 |
| Sub Name | ELECTRICAL MACHINES - II |
| Course Outcome | <ul style="list-style-type: none">• Ability to understand the construction and working principle of Synchronous generator• Ability to understand the construction and working principle of Synchronous Motor• Ability to understand the construction and working principle of Three Phase Induction Motor• Acquire knowledge about the starting and speed control of induction motors.• To gain knowledge about the basic principles and working of Single phase induction motors and Special Electrical Machines. |

| COs | POs | | | | | | | | | | | | PSOs | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CO1 | 3 | 3 | 2 | 3 | 3 | - | - | 1 | - | - | - | - | 3 | 3 | 2 |
| CO2 | 3 | 3 | 2 | 3 | 3 | - | - | 1 | - | - | - | - | 3 | 3 | 2 |
| CO3 | 3 | 3 | 2 | 3 | 3 | - | - | 1 | - | - | - | - | 3 | 3 | 2 |
| CO4 | 3 | 3 | 2 | 3 | 3 | - | - | 1 | - | - | - | - | 3 | 3 | 2 |
| CO5 | 3 | 3 | 1 | 1 | 2 | - | - | 1 | - | - | - | - | 3 | 3 | 2 |
| CO6 | 3 | 3 | 1 | 1 | 2 | - | - | 1 | - | - | - | - | 3 | 3 | 2 |
| Avg | 3 | 3 | 1.6 | 2.3 | 2.6 | - | - | 1 | - | - | - | - | 3 | 3 | 2 |



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|-----------------------|--|
| Sem | 04 |
| Sub Code | EE3411 |
| Sub Name | ELECTRICAL MACHINES LABORATORY - II |
| Course Outcome | <ul style="list-style-type: none">• Ability to understand and analyze EMF and MMF methods• Ability to analyze the characteristics of V and Inverted V curves• Acquire hands on experience of conducting various tests on alternators and obtaining their performance indices using standard analytical as well as graphical methods. to understand the importance of Synchronous machines• Acquire hands on experience of conducting various tests on induction motors and obtaining their performance indices using standard analytical as well as graphical methods. to understand the importance of single and three phase Induction motors• Ability to acquire knowledge on separation of losses |

| COs | POs | | | | | | | | | | | | PSOs | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PS01 | PS02 | PS03 |
| CO1 | 3 | 3 | 1 | 1 | - | - | - | 1.5 | 1 | - | - | 3 | 3 | 3 | 2 |
| CO2 | 3 | 3 | 1 | 1 | - | - | - | 1.5 | 1 | - | - | 3 | 3 | 3 | 2 |
| CO3 | 3 | 3 | 1 | 1 | - | - | - | 1.5 | 1 | - | - | 3 | 3 | 3 | 1 |
| CO4 | 3 | 3 | 1 | 1 | - | - | - | 1.5 | 1 | - | - | 3 | 3 | 3 | 1 |
| CO5 | 3 | 3 | 1 | 1 | - | - | - | 1.5 | 1 | - | - | 2 | 3 | 3 | 2 |
| Avg | 3 | 3 | 1 | 1 | - | - | - | 1.5 | 1 | - | - | 2.8 | 3 | 3 | 1.6 |



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|-----------------------|---|
| Sem | 04 |
| Sub Code | EE3412 |
| Sub Name | LINEAR AND DIGITAL CIRCUITS LABORATORY |
| Course Outcome | <ul style="list-style-type: none">• Ability to understand and implement Boolean Functions.• Ability to understand the importance of code conversion• Ability to Design and implement circuits with digital ICs like decoders, multiplexers, register.• Ability to acquire knowledge on Application of Op-Amp• Ability to Design and implement counters using analog ICs like timers, VCOs and digital ICs like Flip-flops and counters. |

| COs | POs | | | | | | | | | | | | PSOs | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PS01 | PS02 | PS03 |
| CO1 | - | - | - | 3 | - | - | - | 1.5 | - | - | 3 | 3 | 2 | 1 | 2 |
| CO2 | - | - | 3 | 3 | - | - | - | 1.5 | - | - | 3 | 3 | 2 | 1 | 2 |
| CO3 | - | 3 | 2 | 3 | 3 | - | - | 1.5 | - | - | 3 | 3 | 2 | 1 | 2 |
| CO4 | - | 3 | 3 | 3 | 3 | - | - | 1.5 | - | - | 3 | 3 | 2 | 1 | 2 |
| CO5 | - | - | - | - | - | - | - | 1.5 | - | - | - | 3 | - | - | - |
| Avg | - | 3 | 1.6 | 3 | 3 | - | - | 1.5 | - | - | 3 | 3 | 2 | 1 | 2 |



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|-----------------------|--|
| Sem | 04 |
| Sub Code | EE3413 |
| Sub Name | MICROPROCESSOR AND MICROCONTROLLER LABORATORY |
| Course Outcome | <ul style="list-style-type: none">• Ability to write assembly language program for microprocessor.• Ability to write assembly language program for microcontroller• Ability to design and implement interfacing of peripheral with microprocessor and microcontroller• Ability to analyze, comprehend, design and simulate microprocessor based systems used for control and monitoring..• Ability to analyze, comprehend, design and simulate microcontroller based systems used for control and monitoring |

| COs | POs | | | | | | | | | | | | PSOs | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CO1 | 2 | 1 | 2 | 3 | - | - | - | 1.5 | - | - | - | 3 | 3 | 1 | 3 |
| CO2 | 2 | 1 | 2 | 3 | - | - | - | 1.5 | - | - | - | 3 | 3 | 1 | 3 |
| CO3 | 2 | 1 | 2 | 3 | - | - | - | 1.5 | - | - | - | 3 | 3 | 1 | 3 |
| CO4 | 2 | 1 | 2 | 3 | - | - | - | 1.5 | - | - | - | 3 | 3 | 1 | 3 |
| CO5 | 2 | 1 | 2 | 3 | - | - | - | 1.5 | - | - | - | 3 | 3 | 1 | 3 |
| Avg | 2 | 1 | 2 | 3 | - | - | - | 1.5 | - | - | - | 3 | 3 | 1 | 3 |



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|-----------------------|---|
| Sem | 05 |
| Sub Code | EE3501 |
| Sub Name | POWER SYSTEM ANALYSIS |
| Course Outcome | <ul style="list-style-type: none"> • Ability to model the power system under steady state operating condition. Ability to carry out power flow analysis using. • Ability to infer the significance of short circuit studies in designing circuit breakers. • Ability to analyze the state of the power system for various unsymmetrical faults. • Ability to analyze the stability of power system using different methods. |

| COs | POs | | | | | | | | | | | | PSOs | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PS01 | PS02 | PS03 |
| CO1 | 3 | 2 | 2 | 1 | 1 | - | - | - | 1 | - | - | - | 1 | - | 2 |
| CO2 | 3 | 3 | 3 | 2 | 1 | - | - | - | 1 | - | - | - | 1 | 1 | 1 |
| CO3 | 3 | 3 | 3 | 2 | 1 | - | - | - | 1 | - | - | 1 | 1 | 1 | 1 |
| CO4 | 3 | 2 | 2 | 2 | 2 | - | - | - | 1 | - | - | 1 | 1 | 1 | 2 |
| CO5 | 3 | 3 | 2 | 2 | 2 | - | - | - | 1 | - | - | 1 | 1 | 1 | 1 |
| Avg | 3 | 2.6 | 2.4 | 1.8 | 1.4 | - | - | - | 1 | - | - | 1 | 1 | 1 | 1.4 |



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| | |
|-----------------------|---|
| Sem | 05 |
| Sub Code | EE3591 |
| Sub Name | POWER ELECTRONICS |
| Course Outcome | <ul style="list-style-type: none"> • Understand the operation of semiconductor devices and dynamic characteristics and to design & analyze the low power SMPS • Analyze the various uncontrolled rectifiers and design suitable filter circuits • Analyze the operation of the n-pulse converters and evaluate the performance parameters • Understand various PWM techniques and apply voltage control and harmonic elimination methods to inverter circuits. • Understand the operation of AC voltage controllers and its applications |

| COs | POs | | | | | | | | | | | | PSOs | | |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CO1 | 3 | 3 | 3 | 3 | - | - | 2 | 1 | - | - | 3 | 3 | 3 | 3 | 3 |
| CO2 | 3 | 3 | 3 | 3 | - | - | | 1 | - | - | - | - | 3 | 3 | 3 |
| CO3 | 3 | 3 | 3 | 3 | - | - | 2 | 1 | - | - | 2 | - | 3 | 3 | 3 |
| CO4 | 3 | 3 | 3 | 3 | - | - | 1 | 1 | - | - | 2 | 3 | 3 | 3 | 3 |
| CO5 | 3 | 3 | 3 | 3 | - | - | 1 | 1 | - | - | 2 | 3 | 3 | 3 | 3 |
| Avg. | 3 | 3 | 3 | 3 | - | - | 1.5 | 1 | - | - | 2.25 | 3 | 3 | 3 | 3 |



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|-----------------------|---|
| Sem | 05 |
| Sub Code | EE3503 |
| Sub Name | CONTROL SYSTEMS |
| Course Outcome | <ul style="list-style-type: none">• Represent simple systems in transfer function and state variable forms.• Analyze simple systems in time domain.• Analyze simple systems in frequency domain.• Infer the stability of systems in time and frequency domain.• Interpret characteristics of the system and find out solution for simple control problems |

| COs | POs | | | | | | | | | | | | PSOs | | |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CO1 | 3 | 3 | 3 | 3 | 3 | - | - | 1 | - | - | - | 3 | 3 | 3 | 3 |
| CO2 | 3 | 3 | 3 | 3 | 3 | - | - | 1 | - | - | - | 3 | 3 | 3 | 3 |
| CO3 | 3 | 3 | 3 | 3 | 3 | - | - | 1 | - | - | - | 3 | 3 | 3 | 3 |
| CO4 | 3 | 3 | 3 | 3 | 3 | - | - | 1 | - | - | - | 3 | 3 | 3 | 3 |
| CO5 | 3 | 3 | 3 | 3 | 3 | - | - | 1 | - | - | - | 3 | 3 | 3 | 3 |
| Avg. | 3 | 3 | 3 | 3 | 3 | - | - | 1 | - | - | - | 3 | 3 | 3 | 3 |



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|-----------------------|--|
| Sem | 05 |
| Sub Code | EE3511 |
| Sub Name | POWER ELECTRONICS LABORATORY |
| Course Outcome | <ul style="list-style-type: none">• Determine the characteristics of SCR, IGBT, TRIAC, MOSFET and IGBT• Find the transfer characteristics of full converter, semi converter, step up and step down choppers by simulation experimentation.• Analyze the voltage waveforms for PWM inverter using various modulation techniques.• Design and experimentally verify the performance of basic DC/DC converter topologies used for SMPS.• Understand the performance of AC voltage controllers by simulation and experimentation |

| COs | POs | | | | | | | | | | | | PSOs | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CO1 | 3 | 3 | 3 | 3 | 3 | - | - | 1.5 | - | - | - | 3 | 3 | 3 | 3 |
| CO2 | 3 | 3 | 3 | 3 | 3 | - | - | 1.5 | - | - | - | 3 | 3 | 3 | 3 |
| CO3 | 3 | 3 | 3 | 3 | 3 | - | - | 1.5 | - | - | - | 3 | 3 | 3 | 3 |
| CO4 | 3 | 3 | 3 | 3 | 3 | - | - | 1.5 | - | - | - | 3 | 3 | 3 | 3 |
| CO5 | 3 | 3 | 3 | 3 | 3 | - | - | 1.5 | - | - | - | 3 | 3 | 3 | 3 |
| Avg | 3 | 3 | 3 | 3 | 3 | - | - | 1.5 | - | - | - | 3 | 3 | 3 | 3 |



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|-----------------------|--|
| Sem | 05 |
| Sub Code | EE3512 |
| Sub Name | CONTROL AND INSTRUMENTATION LABORATORY |
| Course Outcome | <ul style="list-style-type: none">• To model and analyze simple physical systems and simulate the performance in analog and digital platform.• To design and implement simple controllers in standard forms.• To design compensators based on time and frequency domain specifications.• To design a complete closed control loop and evaluate its performance for simple physical systems.• To analyze the stability of a physical system in both continuous and discrete domains |

| COs | POs | | | | | | | | | | | | PSOs | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CO1 | 3 | 3 | 3 | 3 | 3 | - | - | 1.5 | - | - | - | 2 | 3 | 3 | 3 |
| CO2 | 3 | 3 | 3 | 3 | 3 | - | - | 1.5 | - | - | - | 2 | 3 | 3 | 3 |
| CO3 | 3 | 3 | 3 | 3 | 3 | - | - | 1.5 | - | - | - | 2 | 3 | 3 | 3 |
| CO4 | 3 | 3 | 3 | 3 | 3 | - | - | 1.5 | - | - | - | 2 | 3 | 3 | 3 |
| CO5 | 3 | 3 | 3 | 3 | 3 | - | - | 1.5 | - | - | - | 2 | 3 | 3 | 3 |
| Avg | 3 | 3 | 3 | 3 | 3 | - | - | 1.5 | - | - | - | 2 | 3 | 3 | 3 |



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|-----------------------|---|
| Sem | 05 |
| Sub Code | EE3033 |
| Sub Name | HYBRID ENERGY TECHNOLOGY |
| Course Outcome | <ul style="list-style-type: none"> Analyze the impacts of hybrid energy technologies on the environment and demonstrate them to harness electrical power. Select a suitable Electrical machine for Wind Energy Conversion Systems and simulate wind energy conversion system Design the power converters such as AC-DC, DC-DC, and AC-AC converters for SPV systems. Analyze the power converters such as AC-DC, DC-DC, and AC-AC converters for Hybrid energy systems. Interpret the hybrid renewable energy systems. |

| COs | POs | | | | | | | | | | | | PSOs | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CO1 | 3 | 3 | 3 | 2 | - | - | - | - | - | 3 | - | 3 | 3 | 3 | 3 |
| CO2 | 3 | 3 | 3 | 2 | 3 | - | - | - | - | 3 | - | 3 | 3 | 3 | 3 |
| CO3 | 3 | 3 | 3 | 2 | 3 | - | - | - | - | 3 | - | 3 | 3 | 3 | 3 |
| CO4 | 3 | 3 | 3 | 2 | 3 | - | - | - | - | 3 | - | 3 | 3 | 3 | 3 |
| CO5 | 3 | 3 | 3 | 2 | - | - | - | - | - | 3 | - | 3 | 3 | 3 | 3 |
| Avg | 3 | 3 | 3 | 2 | 3 | - | - | - | - | 3 | - | 3 | 3 | 3 | 3 |



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|-----------------------|--|
| Sem | 05 |
| Sub Code | EE3016 |
| Sub Name | EMBEDDED SYSTEM DESIGN |
| Course Outcome | <ul style="list-style-type: none">• The hardware functionals and software strategies required to develop various Embedded systems• The basic differences between various Bus communication standards• The incorporation of the interface as Interrupt services• The various scheduling algorithms through a Real-time operating system.• The various embedded concepts for developing automation applications. |

| COs | POs | | | | | | | | | | | | PSOs | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CO1 | 3 | 2 | 2 | 2 | 1 | - | - | - | - | - | - | - | 2 | 2 | 3 |
| CO2 | 3 | 2 | 3 | 2 | 1 | - | - | - | - | - | - | - | 2 | 1 | 3 |
| CO3 | 3 | 3 | 2 | 3 | 1 | - | - | - | - | - | - | - | 2 | 1 | 2 |
| CO4 | 3 | 2 | 2 | 2 | 1 | - | - | - | - | - | - | - | 1 | 2 | 3 |
| CO5 | 3 | 2 | 1 | 2 | 1 | - | - | - | 1 | - | - | - | 3 | 1 | 2 |
| Avg | 3 | 2.2 | 2 | 2.2 | 1 | - | - | - | 1 | - | - | - | 2 | 1.4 | 2.6 |



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|-----------------------|---|
| Sem | 05 |
| Sub Code | EE3034 |
| Sub Name | DESIGN AND MODELLING OF RENEWABLE ENERGY SYSTEMS |
| Course Outcome | <ul style="list-style-type: none">• Review the perspectives of renewable energy systems• Integrate photovoltaic systems with grid• Study inverter for PV systems• Elaborate the working of small wind power systems• Study the features of induction machine and doubly fed induction machine |

| COs | POs | | | | | | | | | | | | PSOs | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CO1 | 3 | - | 3 | 2 | - | - | - | - | - | - | - | - | 3 | - | 2 |
| CO2 | 3 | 2 | 3 | 3 | - | - | - | - | - | - | - | - | 3 | 3 | 3 |
| CO3 | 3 | 2 | 3 | 3 | 2 | - | - | - | - | - | - | - | 3 | 3 | 3 |
| CO4 | 3 | 2 | 3 | 3 | - | - | - | - | - | - | - | - | 3 | 3 | 3 |
| CO5 | 3 | 2 | 3 | 3 | 2 | - | - | - | - | - | - | - | 3 | 3 | 3 |
| Avg | 3 | 2 | 3 | 2.8 | 2 | - | - | - | - | - | - | - | 3 | 3 | 2.8 |



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|-----------------------|---|
| Sem | 06 |
| Sub Code | EE3601 |
| Sub Name | PROTECTION AND SWITCHGEAR |
| Course Outcome | <ul style="list-style-type: none">• Understand and select proper protective scheme and type of earthing.• Explain the operating principles of various relays.• Suggest suitable protective scheme for the protection of various power system apparatus.• Analyze the importance of static relays and numerical relays in power system protection.• Summarize the merits and demerits and application areas of various circuit breakers. |

| COs | POs | | | | | | | | | | | | PSOs | | |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CO1 | 3 | 1 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 2 | - | 3 | 1 | - |
| CO2 | 3 | 1 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 2 | - | 3 | 1 | - |
| CO3 | 3 | 1 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 2 | - | 3 | 2 | - |
| CO4 | 3 | 1 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 2 | - | 3 | 2 | 1 |
| CO5 | 3 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | - | 3 | 1 | 1 |
| Avg. | 3 | 1 | 1 | 2 | 1.2 | 2 | 1 | 1 | 1 | 1 | 2 | - | 3 | 1.4 | 1 |



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|-----------------------|---|
| Sem | 06 |
| Sub Code | EE3602 |
| Sub Name | POWER SYSTEM OPERATION AND CONTROL |
| Course Outcome | <ul style="list-style-type: none">• Understand the day – to – day operation of power system.• Model and analyse the control actions that are implemented to meet the minute-to- minute variation of system real power demand.• Model and analyze the compensators for reactive power control and various devices used for voltage control.• Prepare day ahead and real time economic generation scheduling.• Understand the necessity of computer control of power systems. |

| COs | POs | | | | | | | | | | | | PSOs | | |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CO1 | 2 | 1 | - | - | - | - | - | 1 | - | - | - | 2 | 3 | 3 | 3 |
| CO2 | 3 | 2 | 1 | 1 | - | 1 | - | 2 | - | 2 | - | 2 | 3 | 3 | 3 |
| CO3 | 3 | 2 | 1 | 1 | - | 1 | - | 2 | - | 2 | - | 2 | 3 | 3 | 3 |
| CO4 | 3 | 2 | 1 | 1 | - | 1 | - | 2 | - | 2 | - | 2 | 3 | 1 | 2.33 |
| CO5 | 2 | 1 | - | - | - | - | - | 1 | - | 2 | - | 2 | 3 | 3 | 3 |
| Avg. | 2 | 1.6 | 1 | 1 | - | 1 | - | 1.6 | - | 2 | - | 2 | 3 | 2.2 | 2.86 |



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|-----------------------|---|
| Sem | 06 |
| Sub Code | EE3004 |
| Sub Name | HVDC and FACTS |
| Course Outcome | <ul style="list-style-type: none">• To Identify and understand the problems in AC transmission systems and understand the need for Flexible AC transmission systems and HVDC Transmission• To understand the operation and control of SVC and TCSC and its applications to enhance the stability and damping.• To Analyze basic operation and control of voltage source converter based FACTS controllers• To demonstrate basic operation and control of Line Commutated HVDC Transmission• To explain the d-q control based operation of VSC based HVDC Transmission |

| COs | POs | | | | | | | | | | | | PSOs | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PS01 | PS02 | PS03 |
| CO1 | 3 | 3 | 1 | 3 | 1 | - | - | - | - | - | - | - | 2 | 3 | 3 |
| CO2 | 2 | 3 | 1 | 2 | 3 | - | - | - | - | - | - | - | 2 | 3 | 3 |
| CO3 | 2 | 3 | 1 | 3 | 1 | - | - | - | - | - | - | - | 2 | 3 | 3 |
| CO4 | 3 | 3 | 1 | 2 | 3 | - | - | - | - | - | - | - | 2 | 3 | 3 |
| CO5 | 3 | 3 | 1 | 3 | 1 | - | - | - | - | - | - | - | 2 | 3 | 3 |
| Avg | 2.6 | 3 | 1 | 2.6 | 1.8 | - | - | - | - | - | - | - | 2 | 3 | 3 |



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|-----------------------|---|
| Sem | 06 |
| Sub Code | EE3006 |
| Sub Name | POWER QUALITY |
| Course Outcome | <ul style="list-style-type: none">• Use various definitions of power quality for power quality issues• Describe the concepts related with single phase / three phase, linear / nonlinear loads and single phase / three phase sinusoidal, non-sinusoidal source• Solve problems related with mitigation of Power System Harmonics• Use DSTATCOM for load compensation• Demonstrate the role of DVR, SAFs UPQC in power distribution systems |

| COs | POs | | | | | | | | | | | | PSOs | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CO1 | 3 | 3 | 3 | 3 | - | - | 3 | 3 | - | 3 | - | 3 | 3 | 3 | 3 |
| CO2 | 3 | 3 | 3 | 3 | - | - | 3 | 3 | - | 3 | - | 3 | 3 | 3 | 3 |
| CO3 | 3 | 3 | 3 | 3 | - | - | 3 | 3 | - | 3 | - | 3 | 3 | 3 | 3 |
| CO4 | 3 | 3 | 3 | 3 | - | - | 3 | 3 | - | 3 | - | 3 | 3 | 3 | 3 |
| CO5 | 3 | 3 | 3 | 3 | - | - | 3 | 3 | - | 3 | - | 3 | 3 | 3 | 3 |
| Avg | 3 | 3 | 3 | 3 | - | - | 3 | 3 | - | 3 | - | 3 | 3 | 3 | 3 |



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|-----------------------|---|
| Sem | 06 |
| Sub Code | OCS351 |
| Sub Name | ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING FUNDAMENTALS |
| Course Outcome | <ul style="list-style-type: none"> • Understand the foundations of AI and the structure of Intelligent Agents • Use appropriate search algorithms for any AI problem • Study of learning methods • Solving problem using Supervised learning • Solving problem using Unsupervised learning |

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|-----------------------|---|
| Sem | 06 |
| Sub Code | EE3611 |
| Sub Name | POWER SYSTEM LABORATORY |
| Course Outcome | <ul style="list-style-type: none"> • Model and analyze the performance of the transmission lines. • Perform power flow, short circuit, and stability analysis for any power system network. • Understand, design, and analyze the load frequency control mechanism. • Perform optimal scheduling of generators and compute the state of the power system. • Understand, analyze, and apply the relays for power system protection. |

| COs | POs | | | | | | | | | | | | PSOs | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CO1 | 3 | 3 | 2 | 2 | 3 | - | - | 2 | 1 | 2 | - | 3 | 3 | 3 | 3 |
| CO2 | 3 | 3 | 2 | 2 | 3 | - | - | 2 | 1 | 2 | - | 3 | 3 | 3 | 3 |
| CO3 | 3 | 3 | 2 | 2 | 3 | - | - | 2 | 1 | 2 | - | 3 | 3 | 3 | 3 |
| CO4 | 3 | 3 | 2 | 2 | 3 | - | - | 2 | 1 | 2 | - | 3 | 3 | 3 | 3 |
| CO5 | 3 | 3 | 2 | 2 | 3 | - | - | 2 | 1 | 2 | - | 3 | 3 | 3 | 3 |
| Avg | 3 | 3 | 2 | 2 | 3 | - | - | 2 | 1 | 2 | - | 3 | 3 | 3 | 3 |