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**K.S.Rangasamy College of Technology, Tiruchengode - 637 215**

Curriculum for the programmes under Autonomous Scheme

**Regulation**: R 2007  
**Department**: Department of Electrical and Electronics Engineering  
**Programme Code & Name**: 12 : B.E. Electrical and Electronics Engineering

### Semester I

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12 : B.E. ELECTRICAL AND ELECTRONICS ENGINEERING - REGULATION 2007 - CURRICULUM
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# Curriculum for the programmes under Autonomous Scheme

**Regulation**: R 2007  
**Department**: Department of Electrical and Electronics Engineering  
**Programme Code & Name**: 12 : B.E. Electrical and Electronics Engineering

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Objective(s)
To help learners improve their skills in vocabulary and to enable them to use words appropriately in different academic and professional contexts, familiarize with different rhetorical functions of technical English, develop strategies that could be adopted while reading texts, acquire the ability to speak effectively in English in real life and career related situations and organized academic and professional writing.

1  GRAMMAR AND VOCABULARY

2  LISTENING
Extensive listening - listening for general content – listening to fill up gapped texts - intensive listening – listening for specific information : retrieval of factual information – listening to identify topic, context, function, speaker’s opinion, attitude, etc. – global understanding skills and ability to infer, extract gist and understand main ideas – note-taking: guided and unguided.

3  SPEAKING
Verbal and non verbal communication - speech sounds – syllables – word stress (structure and content words) - sentence stress - intonation - Pronunciation drills/ tongue twisters – formal and informal English - oral practice - developing confidence - introducing oneself - asking for or eliciting information - describing objects – offering suggestions and recommendations – expressing opinions (agreement / disagreement) - giving instructions.

4  READING
Exposure to different reading techniques - reading for gist and global meaning - predicting the content - skimming the text – identifying the topic sentence and its role in each paragraph – scanning – inferring / identifying lexical and contextual meanings – reading for structure and detail - transfer of information / guided note-making – understanding discourse coherence – sequencing of sentences.

5  WRITING
Introduction to the characteristics of technical style - writing definitions and descriptions - paragraph writing (topic sentence and its role, unity, coherence and use of cohesive expressions) - process description (use of sequencing connectives) – comparison and contrast - classifying the data - analysing / interpreting the data – formal letter writing (letter to the editor, letter for seeking practical training, and letter for undertaking project works in industries) – editing (punctuation, spelling and grammar).

Total hours to be taught
45

Text book(s):

Reference(s):
Objective(s) The course is aimed at developing the basic Mathematical Skills of Engineering Students that are imperative for effective understanding of Engineering Subjects. The topics introduced will serve as basic tools for specialized studies in many Engineering fields, significantly in fluid mechanics, field theory and communication Engineering.

1 MATRICES

Column matrix as vector – linear independent and dependent of vector – Characteristic equation – Eigen values and Eigen vectors of a real matrix – Properties of eigen values and eigenvectors – Cayley – Hamilton theorem (without proof) – Similarity transformation (concept only) – Orthogonal matrices – Orthogonal transformation of a symmetric matrix to diagonal form – Reduction of quadratic form to canonical form by orthogonal transformation.

2 GEOMETRICAL APPLICATIONS OF DIFFERENTIAL CALCULUS

Curvature – Cartesian and polar co-ordinates – Centre and radius of curvature – Circle of curvature – Involutes and evolutes – Envelopes – Properties of envelopes and evolutes – Evolute as envelope of normals.

3 FUNCTIONS OF SEVERAL VARIABLES


4 ORDINARY DIFFERENTIAL EQUATIONS

Linear differential equations of Second and higher order with constant coefficient when the R.H.S is \( e^{ax}, x^n, n > 0, \sin ax, \cos ax, e^{ax}x^n, e^{ax}\sin bx, e^{ax}\cos bx, x^n \sin ax, x^n \cos ax \) – Differential Equations with variable coefficients (Cauchy’s Form and Legendre’s Linear Equation).

5 DIFFERENTIAL EQUATIONS AND ITS APPLICATIONS

Simultaneous first order linear equations with constant coefficients – Method of variation of parameters – Solution of specified differential equations connected with electric circuits, bending of beams and simple harmonic motion (Differential equations and associated conditions need be given).

Total hours to be taught Lecture: 45, Tutorial: 15, TOTAL: 60

Text book(s):


Reference(s):


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**Objective(s)**

Design of acoustically good buildings, Structural identification of engineering materials, Non destructive Techniques, Application of Quantum Physics, Application of Lasers in Engineering and Technology.

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**Semester I**

1. **LASERS**

2. **FIBER OPTICS AND APPLICATIONS**

3. **QUANTUM PHYSICS AND APPLICATIONS**

4. **ULTRASONICS**
   - Introduction of Ultrasonics Waves-Magnetostricttion effect, Magnetostricttion generator, inverse piezoelectric effect, piezoelectric generator-Detection of ultrasonic waves-Properties-Cavitation-Industrial Applications drilling, welding, soldering and cleaning- Non destructive testing- Pulse echo system through transmission-Resonance system.

5. **ACOUSTICS**

**Total hours to be taught** 45

**Text book(s):**

1. APPLIED PHYSICS Authored by dept. of physics KSRCT.

**Reference(s):**

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**Objective(s):**
The student should be conversant with The principles involved in electro chemistry, corrosion and its inhibition, Treatment of water for industrial purposes and the concept of energy storage devices, Knowledge with respect to fuels and combustion, Polymer and engineering materials.

1. **Water Treatment**
   - Total Hrs: 9

2. **Electro Chemistry**
   - Total Hrs: 9

3. **Corrosion & Corrosion Control**
   - Total Hrs: 9

4. **Fuels & Combustion**
   - Total Hrs: 9

5. **Polymers**
   - Total Hrs: 9

**Total hours to be taught**: 45

**Text book(s):**

**Reference(s):**
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Objective(s)

1. **COMPUTER BASICS**  
   Total Hrs: 12

2. **SOFTWARE, PROGRAMMING AND INTERNET**  
   Total Hrs: 12
   Algorithm- Flowchart- Pseudo code – Program control structures- Programming paradigms- Programming languages- Generations of Programming languages- Computer Software- Definition- Categories of Software - Terminologies- Internet- Evolution- Basic Internet terms- Getting connected to Internet- Applications.

3. **C FUNDAMENTALS**  
   Total Hrs: 12
   Introduction to C- Constants- Variables- Data types- Operators and Expressions- Managing Input and Output operations- Decision Making and Branching- Looping.

4. **ARRAYS AND FUNCTIONS**  
   Total Hrs: 12
   Arrays- Character Arrays and Strings- User defined functions- Storage Classes.

5. **STRUCTURES AND FILES**  
   Total Hrs: 12
   Structures- Definition- Initialization- Array of Structures- Structures within structures- Structures and Functions- Unions- File Management in C.

Total hours to be taught: Lecture: 45, Tutorial: 15, TOTAL: 60

Text book(s):


Reference(s):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Hours / Week</th>
<th>Credit</th>
<th>Maximum Marks</th>
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<tr>
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<td>BASICS OF CIVIL &amp; MECHANICAL ENGINEERING</td>
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<td></td>
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<td>4 0 0 4 50 50 100</td>
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Objective(s)

1 | UNIT – I | Total Hrs | 10 |

2 | UNIT – II | Total Hrs | 10 |

3 | UNIT – III | Total Hrs | 10 |

4 | UNIT – IV | Total Hrs | 10 |
Introduction, Classification of Power Plants - Working principle of steam, Gas, Diesel, Hydro-electric and Nuclear Power plants - Merits and Demerits - Pumps and turbines - working principle of Reciprocating pumps (single acting and double acting) – Centrifugal Pump.

5 | UNIT – V | Total Hrs | 10 |
Internal combustion engines as automobile power plant - Working principle of Petrol and Diesel Engines- Four stroke and two stroke cycles- Comparison of four stroke and two stroke engines - Boiler as a power plant.

6 | UNIT – VI | Total Hrs | 10 |

Total hours to be taught | 60 |

Text book(s):

Reference(s):
K.S.Rangasamy College of Technology - Autonomous Regulation  R 2007

Department  Electrical & Electronics Engineering  Programme Code & Name  12 : B.E. Electrical & Electronics Engineering

Semester I

<table>
<thead>
<tr>
<th>Course Code</th>
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<td>L 0  T 0  P 3  C 2  CA 50  ES 50  Total 100</td>
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Objective(s) Educate the theoretical concepts Experimentally

Any 10 Experiments

1. Determination of rigidity modulus of a wire by torsional pendulum. Total Hrs 3
2. Determination of Young’s modulus of the material of a uniform bar by non-uniform bending method. Total Hrs 3
3. Determination of Young’s modulus of the material of a uniform bar by uniform bending method. Total Hrs 3
4. Determination of Viscosity of liquid by Poiseuille’s method. Total Hrs 3
5. Determination of acceleration due to gravity by compound (bar) pendulum. Total Hrs 3
6. Determination of wavelength of mercury spectrum by Spectrometer grating. Total Hrs 3
7. Determination of thickness of fiber by Air-wedge method Total Hrs 3
8. Determination of wavelength of laser using grating and particle size determination Total Hrs 3
9. Determination of velocity of ultrasonic waves and compressibility using ultrasonic interferometer. Total Hrs 3
10. Determination of band gap energy of a semiconductor. Total Hrs 3
11. Determination of radius of curvature of a Plano convex lens by Newton rings method. Total Hrs 3
   Determination of thermal conductivity of a bad conductor using Lee’s disc method. Total Hrs 3

Total hours to be taught 30
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Hours / Week</th>
<th>Credit</th>
<th>Maximum marks</th>
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<tr>
<td>07120108G</td>
<td>APPLIED CHEMISTRY LABORATORY</td>
<td>0 0 3 2</td>
<td>50 50 100</td>
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</table>

Objective(s): Educate the theoretical concepts Experimentally

(Any 10 experiments)

1. Estimation of hardness of water by EDTA. Total Hrs 3
2. Estimation of alkalinity of water sample. Total Hrs 3
3. Estimation of chloride content in water sample. Total Hrs 3
4. Determination of dissolved oxygen in boiler feed water. Total Hrs 3
5. Determination of water of crystallization of a crystalline salt. Total Hrs 3
6. Conductometric titration of strong acid with strong base. Total Hrs 3
7. Conductometric titration of mixture of acids. Total Hrs 3
8. Precipitation titration by conductometric method. Total Hrs 3
9. Determination of strength of HCl by pH Meter. Total Hrs 3
10. Estimation of ferrous ion by potentiometric titration. Total Hrs 3
11. Determination of sodium and potassium in a water sample by flame photometry (Demo only). Total Hrs 3
12. Estimation of ferric ion by spectrophotometry (Demo only). Total Hrs 3

Total hours to be taught 30

Lab Manual:

Reference(s):
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Hours / Week</th>
<th>Credit</th>
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<td>07120109G</td>
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Objective(s) Educate the theoretical concepts Experimentally

(Any 10 experiments)

1. Write a C program to print Pascal’s triangle.
   Total Hrs 3
2. Write a C program to print the sine and cosine series.
   Total Hrs 3
3. Write a C program to perform Matrix multiplication
   Total Hrs 3
4. Write a C program to prepare and print the sales report.
   Total Hrs 3
5. Write a C program to perform string manipulation functions like string concatenations, comparison, find the length and string copy without using library functions.
   Total Hrs 3
6. Write a C program to arrange names in alphabetical order
   Total Hrs 3
7. Write a C program to calculate the mean, variance and standard deviation using functions.
   Total Hrs 3
8. Write a C program to perform sequential search using functions.
   Total Hrs 3
9. Write a C program to print the Fibonacci series and to calculate the factorial of the given number using functions.
   Total Hrs 3
10. Write a C program to print the mark sheet of n students using structures.
    Total Hrs 3
11. Write a C program for mark sheet processing using files.
    Total Hrs 3
12. Write a C program to merge the given two files
    Total Hrs 3

Total hours to be taught 30
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Hours/ Week</th>
<th>Credit</th>
<th>Maximum Marks</th>
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<tbody>
<tr>
<td>07120110G</td>
<td>ENGINEERING PRACTICES LABORATORY</td>
<td>0 L 0 T 3 P</td>
<td>2 C</td>
<td>50 CA 50 ES 100 Total</td>
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</table>

**LIST OF EXPERIMENTS**

**Plumbing**
1. Safety aspects in Plumbing.
2. Study of tools and equipments - preparation of models
3. Cutting and Threading of G.I. Pipes
4. Study of valves, taps and repairing
5. Measuring and marking practice of PVC & G.I. pipes - connection to service line

**Sheet Metal**
1. Study of Tools, Equipments and Safety precautions.
2. Drawing of tools and accessories
3. Different types of joints making - knocked up, double grooving joints
4. Model making – Trays, Baskets and Funnels

**Electrical Wiring**
1. Safety aspects of Electrical wiring
2. Study of Electrical materials and wiring components
3. Wiring circuit for a lamp using single and Stair case switches.
4. Wiring circuit for fluorescent lamps
5. Calculation of power and energy

**Welding and Soldering**
1. Safety aspects of Welding and Soldering
2. Study of Gas and Arc Welding Equipments
3. Welding of Lap, Butt, T-joints & Corner Joints
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Hours / Week</th>
<th>Credit</th>
<th>Maximum Marks</th>
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<tbody>
<tr>
<td>07120201G</td>
<td>COMMUNICATION SKILLS</td>
<td>L 3, T 1, P 0, C 4</td>
<td>CA 50, ES 50</td>
<td>Total 100</td>
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</table>

Objective(s) To equip students with effective speaking and listening skills in English, help them develop the soft skills and people skills which will make them to excel in their job’s, enhance to students’ performs at placement interviews.

1 LISTENING            Total Hrs  9
Barriers in Listening - Listening to academic lectures - Listening to announcements at railway stations, airports, etc - Listening to news on the radio / TV - Listening to casual conversation - Listening to live speech.

2 COMMUNICATION         Total Hrs  9
Accuracy, fluency and appropriateness - Levels of formality - Differences between spoken and written communication - Greeting and introduction - Making requests - Asking for permission, giving / denying permission - Offering help, accepting / declining help - Giving instructions - Giving directions - Art of small talk - Taking part in casual conversation - Making a short formal speech Describing people, place, things and Events.

3 CONVERSATION SKILLS   Total Hrs  9

4 REMEDIAL GRAMMER & VOCUBULARY Total Hrs  9

5 WRITTEN COMMUNICATION & CAREER SKILLS Total Hrs  9
Writing e-mails - Writing Reports - Note – taking and note – making - Preparing curriculum vitae and cover letters - Facing an interview - Presentation skills - Persuasion skills.

Total hours to be taught 45

Text book(s):

Reference(s):
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Hours / Week</th>
<th>Credit</th>
<th>Maximum Marks</th>
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<tr>
<td>07120202G</td>
<td>ENGINEERING MATHEMATICS II</td>
<td>L: 3, T: 2, P: 0, C: 4, CA: 50, ES: 50</td>
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</table>

**Objective(s):** The course is aimed at developing the basic Mathematical Skills of Engineering Students that are imperative for effective understanding of Engineering Subjects. The topics introduced will serve as basic tools for specialized studies in many Engineering fields, significantly in fluid mechanics, field theory and communication Engineering.

**Prerequisite:** Differential Calculus and Integral Calculus

1. **MULTIPLE INTEGRALS**
   - Double integration in Cartesian and Polar coordinates
   - Change of order of integration
   - Area between two curves
   - Area as double integrals
   - Triple integration in Cartesian coordinates
   - Volume as Triple integrals (Simple problems only).
   - Total Hrs: 12

2. **VECTOR CALCULUS**
   - Gradient, divergence and curl
   - Line, surface and volume integrals
   - Green’s, Gauss divergence and Stoke’s theorems (without proof)
   - Verification of the above theorems and evaluation of integrals using them.
   - Total Hrs: 12

3. **ANALYTIC FUNCTIONS**
   - Function of a complex variable
   - Analytic function
   - Necessary conditions
   - Polar form
   - Cauchy – Riemann equations
   - Sufficient conditions (excluding proof)
   - Properties of analytic function
   - Harmonic conjugate
   - Construction of Analytic functions
   - Conformal mapping: \( w = z + a \), \( az \), \( \frac{1}{Z} \) and bilinear transformation.
   - Total Hrs: 12

4. **COMPLEX INTEGRATION**
   - Cauchy’s theorem (without proof)
   - Cauchy’s integral formula
   - Taylor and Laurent series (without proof)
   - Singularities
   - Classification
   - Cauchy’s residue theorem
   - Contour integration
   - Circular and semi-circular contours
   - Total Hrs: 12

5. **LAPLACE TRANSFORM**
   - Transform of elementary functions
   - Basic properties
   - Derivatives and integrals of transforms
   - Transforms of derivatives and integrals
   - Initial and final value theorems
   - Transform of unit step function
   - Transform of periodic functions
   - Inverse Laplace transform
   - Convolution theorem
   - Solution of linear ODE of second order with constant coefficients and first order simultaneous equations with constant coefficients using Laplace transformation.
   - Total Hrs: 12

Total hours to be taught: Lecture: 45, Tutorial: 15, TOTAL: 60

**Text book(s):**

**Reference(s):**
<table>
<thead>
<tr>
<th>Course Code</th>
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<th>Hours / Week</th>
<th>Credit</th>
<th>Maximum Marks</th>
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<tr>
<td>07120203G</td>
<td>MATERIALS SCIENCE</td>
<td>L 4 T 0 P 0 C 4</td>
<td>CA 50</td>
<td>ES 50</td>
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</table>

Objective(s): Impart fundamental knowledge in various engineering subject and applications, Application of conducting, Superconducting and Magnetic Materials, Application of dielectric, New engineering Materials and Nanomaterials in Modern Technology.

1. **CONDUCTING AND SUPERCONDUCTING MATERIALS**


2. **SEMICONDUCTING MATERIALS**

   Elemental and Compound Semiconductors-Intrinsic and Extrinsic Semiconductors-Properties-Carrier Concentration in intrinsic and Extrinsic semiconductors(Derivation)-Fermilevel-Variation of Fermilevel with Temperature and impurities-Hall effect-Hall Coefficient-Experimental Determination of Hall Coefficient, Applications.

3. **MAGNETIC MATERIALS**


4. **DIELECTRIC MATERIALS**


5. **NEW ENGINEERING MATERIALS**


Total hours to be taught: 45

Text book(s):
1. Material Science-Authored by dept. of Physics KSRCT.

Reference(s):
## ENVIRONMENTAL SCIENCE

**Course Code:** 07120204G

**Course Name:** ENVIRONMENTAL SCIENCE

<table>
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<th>Credit</th>
<th>Maximum marks</th>
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<tr>
<td>L</td>
<td>T</td>
<td>P</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>0</td>
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### Objectives
The student should be conversant with:

- The evolution of environmentalism and the importance of environmental studies
- Focuses on the various natural resources and the current threats to their sustainability
- Significance and protection of bio diversity and various forms of environmental degradation
- The significant international conventions and protocols for the protection of environment.

### 1. ATMOSPHERE AND ECOSYSTEM


### 2. WATER RESOURCES AND ITS TREATMENT


### 3. LAND RESOURCES AND ITS DEGRADATION


### 4. FUTURE POLICY AND ALTERNATIVES


### 5. BIO DIVERSITY AND HUMAN POPULATION


### Textbook:

### References:
# K.S. Rangasamy College of Technology - Autonomous Regulation R 2007

<table>
<thead>
<tr>
<th>Department</th>
<th>Electrical and Electronics Engineering</th>
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</thead>
<tbody>
<tr>
<td>Programme Code &amp; Name</td>
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## Semester II

<table>
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<td>CIRCUIT THEORY</td>
<td>L 3 T 1 P 0</td>
<td>C 4</td>
<td>CA 50 ES 50 ES 100 Total</td>
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</table>

### Objective(s)

- To introduce the concept of Electric Circuit, methods, theorems and analysis.

#### 1. BASIC CIRCUIT ANALYSIS

- Ohm’s law, Kirchoff’s laws, DC and AC Circuits, Resistors in series and parallel Circuits, Mesh current and Node voltage method of analysis for both circuits.

#### 2. NETWORK THEOREMS FOR DC AND AC CIRCUITS

- Thevenin’s and Norton’s theorem – Super position theorem – Maximum power transfer theorem – Reciprocity Theorem.

#### 3. RESONANCE AND COUPLED CIRCUITS

- Series and parallel Resonance, their frequency response, Quality factor and Bandwidth, Self and Mutual Inductance, coefficient of coupling, Tuned circuits, single tuned circuits.

#### 4. TRANSIENT FOR DC CIRCUITS

- Transient response of RL, RC and RLC circuits using Laplace transform for DC input.

#### 5. DUALITY AND TOPOLOGY

- Concept of duality, Dual network, Graphs of a network, Trees, Chords and branches, Tie set and cut set of a graph, Application to network analysis.

**Total hours to be taught**

- Lecture: 45, Tutorial: 15, TOTAL: 60

**Text book(s):**


**Reference(s):**


<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Hours / Week</th>
<th>Credit</th>
<th>Maximum Marks</th>
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</table>

**Objective(s):**
To acquaint the students with construction, theory and characteristics of the following electronic devices: p-n junction diode, Bipolar transistor, Field Effect transistor, LED, LCD and other photo electronic devices, Power control/regulator devices.

1  ELECTRON BALLISTICS & SEMICONDUCTOR THEORY  Total Hrs  12


2  SEMICONDUCTOR DIODES  Total Hrs  12


3  BI-POLAR JUNCTION TRANSISTOR  Total Hrs  12


4  FIELD EFFECT TRANSISTORS AND UJT  Total Hrs  12


5  SPECIAL SEMICONDUCTOR DEVICES  Total Hrs  12


Total hours to be taught  Lecture: 45, Tutorial: 15, TOTAL: 60

Text book(s):

Reference(s):
## Course Code: 07120207G
### Course Name: ENGINEERING GRAPHICS LABORATORY

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<th>Hours / Week</th>
<th>Credit</th>
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<tr>
<td>1 0 3 3</td>
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</table>

### Objective(s)
Student’s skill in the graphical communication of concepts and ideas in the design of engineering products are to be obtained by training them to understand objects by making free hand sketches of simple engineering objects and computer 2D and 3D modeling techniques. Use of drawing board and mini drifter is not at all required.

---

### CONCEPTS AND CONVENTIONS
- Primitive and Prismatic shapes
- Conics – ellipse, parabola and hyperbola
- Equations used and parametric interpretations – ellipsoid, paraboloid and hyperboloid – involutes and cycloids – applications - tangents and normals – mathematical requirements – their importance and applications to engineering products.

### FREE HAND SKETCHING PRACTICES
Representation of Three Dimensional objects – Need for and importance of multiple views and their orientations – Concept of orthographic projection - Developing skills through free hand sketching of multiple views from pictorial views of objects – Isometric (pictorial) representation of objects from multiple views simple exercises to practice.

### DEVELOPMENT OF SURFACES – PRACTICES
Development of lateral surfaces of simple and truncated solids – prisms, pyramids, cylinders and cones - freehand sketching practices - simple exercises to practice.

### 2D DRAFTING
Importance of 2D drafting – sketching, mirroring, scaling, copying (simple and multiple) dimensioning - wiring diagram and piping layout drawings - Practice of Computer Aided Drafting and dimensioning using appropriate software packages.

### SOLID MODELING
3D modeling techniques - constructive solid geometry (CSG) and boundary representation (BRep) techniques - solid modeling of simple and moderately complex engineering products – table, chair, V-block, flange coupling (one) half, bolts and nuts, computer monitor, slotted angle rack and such other products - Practice of solid modeling and extraction of 2D views using appropriate software packages.

### Text Book(s):

### Reference(s):
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Hours / Week</th>
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Objective(s) Educate the theoretical concepts Experimentally

1. Verification of Ohm’s Laws and Kirchoff’s Laws.  
2. Verification of Thevenin’s and Norton’s Theorem  
3. Verification of Superposition Theorem  
4. Verification of Maximum Power Transfer Theorem  
5. Verification of Reciprocity Theorem  
6. Verification of Self and Mutual Inductances of a coil  
7. Verification of Mesh and Nodal analysis  
8. Transient response of RL and RC circuits  
9. Frequency response of Series and Parallel Resonance Circuits  
10. Frequency response of Single Tuned coupled Circuits  

Total hours to be taught 30

Lab Manual:  
1. “Electric Circuits Lab manual” by EEE staff members
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Hours / Week</th>
<th>Credit</th>
<th>Maximum marks</th>
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Objective(s):

1. To expose the students with the experimental verification of operation for switches and plotting the characteristics.
2. Characteristics of PN Junction Diode and Zener Diode
3. Characteristics of BJT (common emitter configuration)
4. Characteristics of BJT (common base configuration)
5. Characteristics of JFET and MOSFET
6. Characteristics of UJT
7. Characteristics of SCR
8. Characteristics of DIAC and TRIAC
9. Characteristics of Photo Diode and Photo Transistor
10. Measurement of Voltage, frequency and phase angle using CRO
11. Measurement of Hybrid parameters of a Transistor

Total hours to be taught: 30

Lab Manual:

1. "Electron Devices & Circuits Lab Manual" by EEE Staff members
<table>
<thead>
<tr>
<th>Week No</th>
<th>Duration: 1½ period Subject No (No of units)</th>
<th>Duration: 1½ period Subject No (No of units)</th>
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<tbody>
<tr>
<td>W1</td>
<td>S1(3)</td>
<td>S2(3)</td>
</tr>
<tr>
<td>W2</td>
<td>S3(3)</td>
<td>S4(3)</td>
</tr>
<tr>
<td>W3</td>
<td>S5(3)</td>
<td>S6(3)</td>
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<tr>
<td>W4</td>
<td>Test-I (Portion: 3 units in each subject)</td>
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<tr>
<td>W5</td>
<td>S1(2)</td>
<td>S2(2)</td>
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<tr>
<td>W6</td>
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<tr>
<td>W7</td>
<td>S5(2)</td>
<td>S6(2)</td>
</tr>
<tr>
<td>W8</td>
<td>Test-II (Portion: 2 units in each subject)</td>
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<tr>
<td>W9</td>
<td></td>
<td>Discussion</td>
</tr>
<tr>
<td>W10</td>
<td></td>
<td>Test-III (All 5 units and all the subjects)</td>
</tr>
</tbody>
</table>

Objective(s)

1. To improve the skill level of Engineering, Technology and Applied Science students.
2. To improve the employability of students in placement interviews.
3. For each subject 200 Keywords/important words or terms (5 units x 40 words) are to be prepared using the students.
4. These 200 Keywords are to be printed in double column (2 x 50 words) and in 2 pages and is to be handled over each student for all the subjects.
5. The staff who handled the subject in the previous semester will handle their discussion period (3 periods / semester) as given below.
6. The staff will question the students using ‘W’ and ‘H’ type questions linking the keywords.
7. Each test will carry 100 questions and two hours duration. The questions will be of objective type: ‘W’ and ‘H’ type questions by attaching with keywords.
8. Based on Test-I and Test-II, sessional marks (maximum 50 marks) will be awarded.
9. Test-III will be held for all the units and all the subjects. The passing norms will be similar as other subjects (i.e. minimum 50/100 marks)

Schedule for Conduct of Comprehension Subject

Total No of weeks planned: 10
Total No of subjects: 5 to 7
Total duration per week: 3 periods
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Hours / Week</th>
<th>Credit</th>
<th>Maximum Marks</th>
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<tbody>
<tr>
<td>07120210C</td>
<td>COMPREHENSION</td>
<td>L 0 T 0 P 3</td>
<td>2 CA</td>
<td>100 ES 0 100</td>
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</table>

Objective(s)
To comprehend the previous semester subjects studied, improve the Technical knowledge of the students.

Methodology
1. For each subject 200 Keywords / Important words or terms (5 units x 40 words) are to be prepared using the students.
2. These 200 keywords are to be printed in double column (2 x 50 words) and in 2 pages and is to be handed over each student for all the subjects.
3. The staff who handled the subject in the previous semester will handle the respective discussion period (3 periods / semester) as given below.
4. The staff will question the students using ‘W’ and ‘H’ type questions linking the keywords.
5. In a similar way, the students have to prepare themselves for all the keywords.

Execution
The schedule for the conduct of comprehension is as follows.

<table>
<thead>
<tr>
<th>Week</th>
<th>Activity</th>
<th>First 1 ½ period / Subject (No. of Units)</th>
<th>Next 1 ½ period / Subject (No. of Units)</th>
</tr>
</thead>
<tbody>
<tr>
<td>W1</td>
<td>S1 (3)</td>
<td>S2 (3)</td>
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<tr>
<td>W2</td>
<td>S3 (3)</td>
<td>S4 (3)</td>
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<tr>
<td>W4</td>
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<td>Test – I (Portion : 3 units in each subject)</td>
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<td>S6 (2)</td>
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<tr>
<td>W8</td>
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<td>Test – II (Portion : 2 units in each subject)</td>
<td></td>
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<tr>
<td>W9</td>
<td></td>
<td>Discussion</td>
<td></td>
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<tr>
<td>W10</td>
<td></td>
<td>Test - III (All 5 units and all the subjects)</td>
<td></td>
</tr>
</tbody>
</table>

Evaluation
* It is a two credit (3 hrs /week) Laboratory type course.
* Only continuous Assessment (CA) and No End Semester examination.
* Each test will carry 20 questions per subject (Total 120 questions) and is of two hours duration. The questions will be of Objective type : ‘W’ and ‘H’ type questions by attaching with keywords.
* Test - III will be held for all the units and all the subjects. The passing norms will be similar as other subjects. (i.e. minimum 50/100 marks).

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<tr>
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<tr>
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<tr>
<td>Test - II</td>
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<tr>
<td>Test - III</td>
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### Semester III

<table>
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<th>Credit</th>
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<td>ENGINEERING MATHEMATICS III</td>
<td>3 1 0 4</td>
<td>CA 50</td>
<td>ES 50 100</td>
</tr>
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</table>

**Objective(s)**

The course is aimed at developing the basic Mathematical Skills of Engineering Students that are imperative for effective understanding of Engineering Subjects. The topics introduced will serve as basic tools for specialized studies in many Engineering fields, significantly in fluid mechanics, field theory and communication Engineering.

1. **PARTIAL DIFFERENTIAL EQUATIONS**
   - Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – Solution of standard types of first order partial differential equations – Lagrange’s linear equation – Linear partial differential equations of second and higher order with constant coefficients.

2. **FOURIER SERIES**
   - Dirichlet’s conditions – General Fourier series – Odd and even functions – Half range sine series – Half range cosine series – Parseval’s identify – Harmonic Analysis.

3. **BOUNDARY VALUE PROBLEMS**
   - Classification of second order quasi-linear partial differential equations – Solutions of one-dimensional wave equation – One dimensional heat equation — Fourier series solutions in Cartesian coordinates.

4. **FOURIER TRANSFORM**

5. **Z-TRANSFORM AND DIFFERENCE EQUATIONS**

**Total hours to be taught**

| Lecture: 45, Tutorial: 15, TOTAL: 60 |

**Text book(s):**


**Reference(s):**


<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Hours / Week</th>
<th>Credit</th>
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<tr>
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<td>ELECTRONIC CIRCUITS</td>
<td>L 0 0 0</td>
<td>C 3</td>
<td>50 100</td>
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</table>

Objective(s): To expose the students to study the different biasing and configurations of the amplifier circuits, study the characteristics of tuned amplifier, expose the students to various amplifiers oscillator circuits with feedback concepts, learn the wave shaping process and circuits, learn and analysis the process of AC to DC conversion.

Prerequisite: Basic knowledge on Semiconductor Devices

1 SMALL SIGNAL AND LARGE SIGNAL AMPLIFIERS

2 DIFFERENTIAL AND TUNED AMPLIFIERS

3 FEEDBACK AMPLIFIER AND OSCILLATORS

4 PULSE CIRCUITS

5 RECTIFIERS AND POWER SUPPLY CIRCUITS

Total hours to be taught: 45

Text book(s):

Reference(s):
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Hours / Week</th>
<th>Credit</th>
<th>Maximum Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>07120303C</td>
<td>ELECTRICAL MACHINES I</td>
<td>3 L 1 T 0 P 4 C</td>
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<td>ES 50</td>
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</tbody>
</table>

**Objective(s)**
To introduce the concept of rotating machines and the principle of electromechanical energy conversion in single and multiple excited systems, understand the generation of D.C. voltages by using different type of generators and study their performance, the working principles of D.C. motors and their load characteristics, starting and methods of speed control. To familiarize with the constructional details of different type of transformers, working principle and their performance. To estimate the various losses taking place in D.C. machines and transformers and to study the different testing method to arrive at their performance.

**Prerequisite**
Basic knowledge on Electric Circuit and Electro magnetic field

1. **MACHINERY FUNDAMENTALS**
   - Total Hrs 8
   - Field energy and mechanical force – Forces and torque – Energy conversion via electric field – Principles of electromechanical energy conversion – Single and multiple excited systems – Types of armature winding – Generated voltage.

2. **DC GENERATORS**
   - Total Hrs 9

3. **DC MOTORS**
   - Total Hrs 8

4. **TRANSFORMERS**
   - Total Hrs 9

5. **TESTING OF DC MACHINES AND TRANSFORMERS**
   - Total Hrs 11
   - Losses and efficiency in DC machines and transformers – Condition for maximum efficiency – Testing of DC machines – Brake test, Swinburne’s test, Retardation test and Hopkinson’s test – Testing of transformers – Polarity test, load test – Sumpner’s test – All day efficiency.

Note: Unit 5 may be covered along with Unit 2,3 and 4.

**Total hours to be taught**
Lecture: 45, Tutorial: 15, TOTAL: 60

**Text book(s):**

**Reference(s):**
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Hours / Week</th>
<th>Credit</th>
<th>Maximum Marks</th>
</tr>
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<tbody>
<tr>
<td>07120304C</td>
<td>ELECTROMAGNETIC THEORY</td>
<td>L 3</td>
<td>T 1</td>
<td>P 0</td>
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</table>

**Objective(s):** To impart knowledge on concepts of electrostatics, electrical potential, energy density and their applications. Concepts of magnetostatics, magnetic flux density, scalar and vector potential and its applications. Faraday's laws, induced emf and their applications. Concepts of electromagnetic waves and Poynting vector. Field modeling and computation with relevant software.

1. **INTRODUCTION**


2. **ELECTROSTATICS**


3. **CONDUCTORS, DIELECTRICS AND CAPACITORS**

Current, Current density – Continuity of current – Conductors – Dielectric materials – Boundary conditions at the interface of conductor and dielectric – Poisson’s and Laplace’s equation – Solution to Laplace’s equation – Capacitance – Capacitance for different charge distribution – Multiple dielectric capacitors – Energy stored in a capacitor.

4. **MAGNETOSTATICS**


5. **ELECTRO MAGNETIC WAVES**


Total hours to be taught: Lecture: 45, Tutorial: 15, TOTAL: 60

**Text book(s):**


**Reference(s):**

## Semester III

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<thead>
<tr>
<th>Course Code</th>
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### Objective(s)

To expose the fundamentals of thermodynamics and to be able to use it in accounting for the bulk behaviour of the sample physical systems. To integrate the basic concepts into various thermal applications like IC engines, gas turbines, steam boiler, steam turbine, compressors, refrigeration and air conditioning.

### Course Name and Description

1. **12 BASIC CONCEPTS AND LAWS OF THERMODYNAMICS**
   - Total Hrs: 12

2. **IC ENGINES AND GAS TURBINES**
   - Total Hrs: 8

3. **STEAM BOILERS AND TURBINES**
   - Total Hrs: 8
   - Formation of steam - Properties of steam – Use of steam tables and charts – Steam power cycle (Rankine) - types of high-pressure boilers – Mountings and accessories. Steam turbines: Impulse and reaction principle – Velocity diagrams – Compounding and governing methods of steam turbines (qualitative treatment only) - Layout diagram and working principle of a steam power plant.

4. **COMPRESSORS, REFRIGERATION AND AIR CONDITIONING**
   - Total Hrs: 8

5. **HEAT TRANSFER**
   - Total Hrs: 9

### Total Hrs

Total hours to be taught: Lecture: 45, Tutorial: 15, TOTAL: 60

### Textbook(s)


### Reference(s)


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**K.S.Rangasamy College of Technology - Autonomous Regulation**

**Programme Code & Name**: 12: B.E. Electrical and Electronics Engineering

**BoS Chairman**: 12 : B.E. ELECTRICAL AND ELECTRONICS ENGINEERING - REGULATION 2007 - SYLLABUS
<table>
<thead>
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<th>Hours / Week</th>
<th>Credit</th>
<th>Maximum Marks</th>
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<tr>
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<td>DATA STRUCTURES AND ALGORITHMS</td>
<td>3</td>
<td>1</td>
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Objective(s): To introduce the concept of arrays, structures, pointers and recursion. To study stack, queue and linked list concepts. To study trees, representation of trees, tree traversal and basic operations on trees. To study the concept of graphs, traversal techniques and minimum spanning tree.

1. **INTRODUCTION TO DATA STRUCTURES**
   - Abstract data types - Sequences as value definitions - Data types in C - Pointers in C - Data structures and C - Arrays in C - Array as ADT - One dimensional array - Implementing one dimensional array - Array as parameters - Two dimensional array - Structures in C - Implementing structures - Unions in C - Implementation of unions - Structure parameters - Allocation of storage and scope of variables. Recursive definition and processes: Factorial function - Fibonacci sequence - Recursion in C - Efficiency of recursion.

2. **STACK, QUEUE AND LINKED LIST**
   - Stack definition and examples - Primitive operations - Example - Representing stacks in C - Push and pop operation implementation. Queue as ADT - C Implementation of queues - Insert operation - Priority queue - Array implementation of priority queue. Inserting and removing nodes from a list-linked implementation of stack, queue and priority queue - Other list structures - Circular lists: Stack and queue as circular list - Primitive operations on circular lists. Header nodes - Doubly linked lists - Addition of long positive integers on circular and doubly linked list.

3. **TREES**

4. **SORTING AND SEARCHING**

5. **GRAPHS**

Total hours to be taught: Lecture: 45, Tutorial: 15, TOTAL: 60

Text book(s):

Reference(s):
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Hours / Week</th>
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</table>

**Objective(s)**

To expose the students to the operation of D.C. machines and transformers and give them experimental skill.

**Any 10 Experiments**

1. Open circuit and load characteristics of D.C separately excited and shunt generator
   - Total Hrs 3
2. Load characteristics of D.C. compound generator with differential and cumulative connection
   - Total Hrs 3
3. Load characteristics of D.C. series generator.
   - Total Hrs 3
4. Load characteristics of D.C. shunt and compound motor
   - Total Hrs 3
5. Load characteristics of D.C series motor
   - Total Hrs 3
6. Swinburne’s test and speed control of D.C shunt motor
   - Total Hrs 3
7. Hopkinson’s test on D.C motor – generator set
   - Total Hrs 3
8. Load test on single-phase transformer and three phase transformer connections
   - Total Hrs 3
9. Open circuit and short circuit tests on single phase transformer
   - Total Hrs 3
10. Sumpner’s test on transformers
    - Total Hrs 3
11. Separation of no-load losses in single phase transformer
    - Total Hrs 3
12. Load Test on Scott Connected Transformer
    - Total Hrs 3

**Total hours to be taught**

30

**Lab Manual:**

1. “Electrical Machines Lab Manual” by EEE staff members
### Course Name: DATA STRUCTURES AND ALGORITHMS LABORATORY

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
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<th>Credit</th>
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**Objective(s):**
To implement Queue, stack, linked lists and to implement search, sort and traversal technique.

1. **Queue implementation using arrays**
   - Total Hrs: 3

2. **Stack implementation using arrays.**
   - Total Hrs: 3

3. **Singly, doubly and circular linked list implementation and all possible operations on lists.**
   - Total Hrs: 3

4. **Queue and Stack implementation using linked list**
   - Total Hrs: 3

5. **Binary search tree implementation using linked list and possible operations on binary search trees**
   - Total Hrs: 3

6. **In-order, preorder and post order traversals**
   - Total Hrs: 3

7. **Quick sort implementation and its efficiency calculation**
   - Total Hrs: 3

8. **Binary Search implementation**
   - Total Hrs: 3

9. **Graph implementation using arrays and list structure**
   - Total Hrs: 3

10. **Depth first and Breadth first traversal in graphs**
    - Total Hrs: 3

**Total hours to be taught:** 30
### Course: COMPREHENSION II

<table>
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<th>Course Name</th>
<th>Hours / Week</th>
<th>Credit</th>
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<td>COMPREHENSION II</td>
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</table>

**Objective(s):**

1. To improve the skill level of Engineering, Technology and Applied Science students.
2. To improve the employability of students in placement interviews.

- For each subject 200 Keywords/important words or terms (5 units x 40 words) are to be prepared using the students.
- These 200 Keywords are to be printed in double column (2 x 50 words) and in 2 pages and is to be handled over each student for all the subjects.
- The staff who handled the subject in the previous semester will handle their discussion period (3 periods / semester) as given below.
- The staff will question the students using ‘W’ and ‘H’ type questions linking the keywords.
- In a similar way the students have to prepare themselves for all the keywords.
- Each test will carry 100 questions and two hours duration. The questions will be of objective type: ‘W’ and ‘H’ type questions by attaching with keywords.
- Based on Test-I and Test-II, sessional marks (maximum 50 marks) will be awarded.
- Test-III will be held for all the units and all the subjects. The passing norms will be similar as other subjects (i.e. minimum 50/100 marks)

### Schedule for Conduct of Comprehension Subject

- Total No of weeks planned: 10
- Total No of subjects: 5 to 7
- Total duration per week: 3 periods

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<th>Duration: 1½ period Subject No (No of units)</th>
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<td>W2</td>
<td>S3(3)</td>
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<td>W7</td>
<td>S5(2)</td>
<td>S6(2)</td>
</tr>
<tr>
<td>W8</td>
<td>Test-I (Portion: 3 units in each subject)</td>
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<tr>
<td>W9</td>
<td>Test-II (Portion: 2 units in each subject)</td>
<td>Discussion</td>
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<tr>
<td>W10</td>
<td>Test-III (All 5 units and all the subjects)</td>
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### Semester III

<table>
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<tr>
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<th>Credit</th>
<th>Maximum Marks</th>
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**Objective(s)**

1. To improve the skill level of Engineering, Technology and Applied Science students.
2. To improve the employability of students in placement interviews.

**Skills sets to be improved**

- **a. Aptitude skills**
  - Arithmetic ability
  - Verbal Reasoning
  - Non verbal Reasoning
- **b. Programming skills**
  - C language (All Branches)
  - OOPS concepts and C++ (Circuit Branches - EEE, ECE, CSE, IT and BT)
  - Data Structures (Circuit Branches - EEE, ECE, CSE, IT and BT)
- **c. Written Communication Skills**
  - Comprehension
  - Grammar
  - Essay Writing
  - Technical Report Writing
  - Technical paper Writing
- **d. Oral Communication Skills**
  - News Reading
  - Informing a News item
  - Self introduction
  - 2 minutes talk – Informed
  - 2 minutes talk - Extempore
- **e. Technical Paper Presentation**
  - Presenting a paper on recent topics
- **f. Group Interaction**
  - Debate
  - Group Discussion – Informed Topic
  - Group Discussion – Topic on the spot
- **g. Technical Interview Skills**
  - Basic MPC knowledge
  - Broad Knowledge of the branch
  - Indepth knowledge on specific subjects of interest
- **h. HR Interview Skills**
  - Adoptability
  - Creativity
  - Flexibility
  - Achievement orientation
  - Continuous learning
  - Hardworking nature
  - Decisiveness

**Focus**

The focus of CCD is to develop these in three semesters (CCD-I, II and III) and reinforce them in another two semesters (CCD IV and V).

**Execution**

- Total No. of weeks : 12
- 3 Hrs/week and 2 credits
- Only Continuous Assessment and No End Semester examination.
- Evaluation based on written test, oral test and technical paper presentation.
- Every 20 students should be engaged by a staff member during communication hour and oral test.
- Every 30 students should be monitored by a staff member to conduct written test.
<table>
<thead>
<tr>
<th>Schedule</th>
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<td>10 - 12</td>
<td>Evaluation III - Oral</td>
</tr>
</tbody>
</table>

| Evaluation | Evaluation I | 60 marks (average of 3 tests) |
|           | Evaluation II | 20 marks                |
|           | Evaluation III | 20 marks               |
|           | Total          | 100 marks              |
### Course: Numerical Methods

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Hours / Week</th>
<th>Credit</th>
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<td>07120401S</td>
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</table>

**Objective(s)**

With the present development of the computer technology, it is necessary to develop efficient algorithms for solving problems in science, engineering and technology. This course gives a complete procedure for solving different kinds of problems occur in engineering numerically. At the end of the course, the students would be acquainted with the basic concepts in numerical methods and their uses.

1. **SOLUTION OF EQUATIONS AND EIGEN VALUE PROBLEMS**


2. **INTERPOLATION AND APPROXIMATION**

   Lagrangian Polynomials - Divided difference - Interpolation with a cubic spline - Newton forward and backward difference formulae.

3. **NUMERICAL DIFFERENTIATION AND INTEGRATION**

   Derivatives from difference table - Divided difference and finite difference - Numerical integration by Trapezoidal and Simpson’s 1/3 and 3/8 rules - Romberg’s method - Two and three point Gaussian quadrature formulas - Double integrals using trapezoidal and Simpson’s rules.

4. **INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS**


5. **BOUNDARY VALUE PROBLEMS**

   Finite difference solution for the second order ordinary differential equations. Finite difference solution for one dimensional heat equation by implicit and explicit methods - one dimensional wave equation and two dimensional Laplace and Poisson equations.

Total hours to be taught: Lecture: 45, Tutorial: 15, TOTAL: 60

**Textbook(s):**

**Reference(s):**
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Hours / Week</th>
<th>Credit</th>
<th>Maximum Marks</th>
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<td>NETWORK ANALYSIS AND SYNTHESIS</td>
<td>3 1 0 4</td>
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</table>

Objective(s): To acquaint the students with advanced topics in electric networks.

1. **TRANSIENT ANALYSIS**
   - Total Hrs: 9

2. **TWO PORT NETWORKS**
   - z, y, h, g, T, T' parameters inter conversions - condition for reciprocity and symmetry, two port networks in cascade and parallel.
   - Total Hrs: 9

3. **FILTERS**
   - LP, HP, BP and BE prototype passive filters m derived filters - composite filter - Active filters
   - Total Hrs: 9

4. **NETWORK FUNCTIONS**
   - Network functions of one port and two port networks, series, parallel and ladder structures - poles and zeros
   - Driving point and transfer functions - determination of time domain response from pole-zero plot - Bode plot
   - Total Hrs: 9

5. **NETWORK SYNTHESIS**
   - Positive real functions and its properties, properties and synthesis of LC, RL and RC networks using foster and causer first and second form; Brune's synthesis, Bott duffin cycle.
   - Total Hrs: 9

Total hours to be taught: Lecture: 45, Tutorial: 15, TOTAL: 60

Text book(s):

Reference(s):
### Course Code: 07120403C

#### Course Name: DIGITAL ELECTRONICS

<table>
<thead>
<tr>
<th>Hours / Week</th>
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<tr>
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</table>

#### Objective(s)

To study various number systems and to simplify the mathematical expressions using Boolean functions – simple problems. To study implementation of combinational circuits. To study the design of various synchronous and asynchronous circuits. To expose the students to various memory devices.

1. **NUMBER SYSTEM & BOOLEAN ALGEBRA**
   - Boolean algebra: De-Morgan’s theorem, switching functions and simplification using K-maps & Quine McCluskey method.

2. **COMBINATIONAL CIRCUITS**

3. **SYNCHRONOUS SEQUENTIAL CIRCUITS**
   - Flip flops - SR, D, JK and T. Analysis of synchronous sequential circuits; design of synchronous sequential circuits – Counters, state diagram; state reduction; state assignment.

4. **ASYNCHRONOUS SEQUENTIAL CIRCUITS**
   - Analysis of asynchronous sequential machines, state assignment, asynchronous design - digital logic families: TTL, ECL, CMOS.

5. **MEMORY AND PLD**
   - Classification of memories - Random Access Memory (RAM) – Read Only Memory (ROM) - Memory decoding - Programmable Logic Array (PLA) - Programmable Array Logic (PAL) – Field Programmable Gate Arrays (FPGA).

#### Total hours to be taught:

45

#### Text book(s):


#### Reference(s):

K.S. Rangasamy College of Technology - Autonomous Regulation

Department: Electrical and Electronics Engineering
Programme Code & Name: 12: B.E. Electrical and Electronics Engineering

Semester IV

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Hours / Week</th>
<th>Credit</th>
<th>Maximum Marks</th>
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<tr>
<td>07120404C</td>
<td>ELECTRICAL MACHINES II</td>
<td>3 0 0 3</td>
<td>50 50 50 100</td>
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</tbody>
</table>

Objective(s)

1. ALTERNATOR


2. SYNCHRONOUS MOTOR


3. THREE PHASE INDUCTION MOTOR


4. STARTING AND SPEED CONTROL OF THREE PHASE INDUCTION MOTOR

Need for starting – Types of starters – Stator resistance and reactance, rotor resistance, autotransformer and star-delta starters – Speed control by changes of voltage, frequency, poles and rotor resistance – Cascaded connection.

5. SINGLE PHASE INDUCTION MOTORS AND SPECIAL MACHINES


Total hours to be taught

Lecture: 45, Tutorial: 15, TOTAL: 60

Text book(s):

Reference(s):
<table>
<thead>
<tr>
<th>Course Code</th>
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<th>Credit</th>
<th>Maximum Marks</th>
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<tr>
<td>07120405C</td>
<td>GENERATION TRANSMISSION AND DISTRIBUTION</td>
<td>3 1 0 4</td>
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</table>

### Objective(s)
To develop expression for computation of fundamental parameters of lines. To categorize the lines into different classes and develop equivalent circuits for these classes. To analyse the voltage distribution in insulator strings and cables and methods to improve the same.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Total Hrs</th>
<th>Total Hrs</th>
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<tbody>
<tr>
<td>07120405C</td>
<td>GENERATION TRANSMISSION AND DISTRIBUTION</td>
<td>8</td>
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</tbody>
</table>

#### 1. POWER GENERATION
Structure of electric power system; Sources of Electric Energy; Load Characteristics and Economic Aspects; Power Plants: Steam, Hydroelectric, Nuclear, Gas, Wind and Solar (Qualitative Treatment Only).

#### 2. TRANSMISSION LINE PARAMETERS
Introduction to stranded and bundled conductors, double circuits; parameters of single and three phase transmission lines with single circuit: Resistance, inductance and capacitance of solid conductors: Symmetrical and unsymmetrical spacing and transposition; Application of self and method GMD; Skin and proximity effects; interference with neighbouring communication circuits.

#### 3. ANALYSIS OF TRANSMISSION LINES
Classification of lines: Short line, medium line and long line; equivalent circuits, attenuation constant, phase constant, surge impedance; transmission efficiency and voltage regulation; real and reactive power flow in lines: Qualitative treatment only. Power-angle diagram; surge-impedance loading, load ability limits based on thermal loading, angle and voltage stability considerations; shunt and series compensation; Ferranti effect and corona loss.

#### 4. INSULATORS AND CABLES
Insulators: Types, voltage distribution in insulator string and grading, improvement of string efficiency. Underground cables: Constructional features of LT and HT cables, capacitance, dielectric stress and grading, thermal characteristics.

#### 5. DISTRIBUTION SYSTEM & FACTS TECHNOLOGY
Radial and ring-main distributors; inter-connectors; AC distribution: AC distributor with concentrated load; three-phase, four-wire distribution system; sub-mains; stepped and tapered mains. FACTS (qualitative treatment only): TCSC, SVC, STATCOM, UPFC. Introduction, Application, Merits & Demerits of HVDC and EHV AC transmission

Total hours to be taught
Lecture: 45, Tutorial: 15, TOTAL: 60

Text book(s):

Reference(s):
<table>
<thead>
<tr>
<th>Course Code</th>
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<th>Hours / Week</th>
<th>Credit</th>
<th>Maximum Marks</th>
<th>Total</th>
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<tbody>
<tr>
<td>07120406S</td>
<td>OBJECT ORIENTED PROGRAMMING</td>
<td>3 1 0 4</td>
<td>50</td>
<td>50</td>
<td>100</td>
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</tbody>
</table>

**Objective(s)**
To study the object oriented programming principles, tokens, expressions, control structures and functions. To introduce the classes, objects, constructors and Destructors. To introduce the operator overloading, inheritance and polymorphism concepts in C++. To introduce constants, variables, data types, operators, classes, objects, methods, arrays and strings in Java. To introduce the programming approach in Java, interfaces and packages, multithreading, managing errors and exceptions and Applet programming.

1 **INTRODUCTION**
Object oriented paradigm-Elements of object oriented programming -Merits and demerits of OO Methodology - C++ fundamentals-Data types-Operators and Expressions-Control flow - Arrays-Strings-Pointers.

2 **PROGRAMMING IN C++**
Classes and Objects-Functions in C++-Constructors and destructors-Parameterized constructors-Multiple constructors-Constructor with default arguments-Dynamic initialization of objects-Copy constructor-Dynamic constructor.

3 **INHERITANCE AND POLYMORPHISM**
Inheritance-A derived class-Types of Inheritance-Typing conversion and visibility-Virtual functions-Abstract base class-Function overloading - Operator Overloading.

4 **BASICS OF JAVA**
Defining a class – Adding variables and methods – Creating objects – Accessing class members – Constructors – Method overloading – Static members – Inheritance: Extending a class – Overriding methods – Final variables and methods – Final classes – Abstract methods and classes – Visibility control.

5 **PROGRAMMING USING ARRAYS AND STRING INTERFACES AND PACKAGE**

Total hours to be taught

Lecture: 45, Tutorial: 15, TOTAL: 60

Text book(s):  

Reference(s):  
### Course Code: 07120407P  
**Course Name:** ELECTRICAL MACHINES LABORATORY II  
**Hours / Week:** L 0, T 0, P 3, C 2  
**Credit:** 50  
**Maximum marks:** 100  

#### Objective(s)
To expose the students to the operation of synchronous machines and induction motors and give them experimental skill.

Any 10 Experiments

1. Regulation of three-phase alternator by EMF, MMF and ZPF methods.  
   Total Hrs 3
2. Load test on three-phase alternator.  
   Total Hrs 3
3. Regulation of three-phase salient pole alternator by slip test.  
   Total Hrs 3
4. V and Inverted V curves of Three Phase Synchronous Motor  
   Total Hrs 3
5. Load test on three-phase squirrel cage induction motor.  
   Total Hrs 3
   Total Hrs 3
7. No load and blocked rotor test on three-phase induction motor  
   Total Hrs 3
8. Separation of No-load losses of three-phase induction motor  
   Total Hrs 3
   Total Hrs 3
10. Load test on single-phase induction motor  
    Total Hrs 3
11. Determination of Equivalent circuit of single-phase induction motor  
    Total Hrs 3
12. Speed control of three phase induction motor by V/f method  
    Total Hrs 3

Total hours to be taught: 30

**Lab Manual:**

1. "Electrical Machines Lab Manual" by EEE staff members

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**K.S.Rangasamy College of Technology - Autonomous Regulation  
R 2007**

<table>
<thead>
<tr>
<th>Department</th>
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<tbody>
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<td>Programme Code &amp; Name</td>
<td>12 : B.E. Electrical &amp; Electronics Engineering</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester IV</th>
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<tbody>
<tr>
<td>Course Code</td>
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<tr>
<td>Hours / Week</td>
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<tr>
<td>Maximum marks</td>
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<tr>
<td>Course Code</td>
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</tr>
<tr>
<td>07120408P</td>
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</tbody>
</table>

Objective(s)

1. String concatenation using dynamic memory allocation concept  
2. Implementation of arithmetic operations on complex numbers using constructor overloading.  
3. To read a value of distance from one object and add with a value in another object using friend function  
4. Implementation of + and - operator overloading and implementation of addition operation of octal object with integer using operator overloading  
5. Implementation of addition and subtraction of two polynomial objects using operator overloading  
6. Managing bank account using inheritance concept  
7. To compute the area of triangle and rectangle using inheritance and virtual function  
8. Writing simple programs in Java.  
9. Use of interfaces in Java  
10. Developing packages in Java  

Total hours to be taught 30
<table>
<thead>
<tr>
<th>Course Code</th>
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<th>Hours / Week</th>
<th>Credit</th>
<th>Maximum Marks</th>
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<tr>
<td>07120409P</td>
<td>COMPREHENSION III</td>
<td>L 0 T 0 P 3</td>
<td>C 2</td>
<td>CA 100</td>
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</tbody>
</table>

Objective(s)

1. To improve the skill level of Engineering, Technology and Applied Science students.
2. To improve the employability of students in placement interviews.
3. For each subject 200 Keywords/important words or terms (5 units x 40 words) are to be prepared using the students.
4. These 200 Keywords are to be printed in double column (2 x 50 words) and in 2 pages and is to be handled over each student for all the subjects.
5. The staff who handled the subject in the previous semester will handle their discussion period (3 periods / semester) as given below.
6. The staff will question the students using ‘W’ and ‘H’ type questions linking the keywords.
7. Each test will carry 100 questions and two hours duration. The questions will be of objective type: ‘W’ and ‘H’ type questions by attaching with keywords.
8. Based on Test-I and Test-II, sessional marks (maximum 50 marks) will be awarded.
9. Test-III will be held for all the units and all the subjects. The passing norms will be similar as other subjects (i.e. minimum 50/100 marks)

Schedule for Conduct of Comprehension Subject

<table>
<thead>
<tr>
<th>Total No of weeks planned:10</th>
<th>Total No of subjects: 5 to 7</th>
<th>Total duration per week: 3 periods</th>
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<tbody>
<tr>
<td>Week No</td>
<td>Duration: 1½ period Subject No (No of units)</td>
<td>Duration: 1½ period Subject No (No of units)</td>
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<tr>
<td>W1</td>
<td>S1(3)</td>
<td>S2(3)</td>
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<tr>
<td>W2</td>
<td>S3(3)</td>
<td>S4(3)</td>
</tr>
<tr>
<td>W3</td>
<td>S5(3)</td>
<td>S6(3)</td>
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<tr>
<td>W4</td>
<td>Test-I (Portion: 3 units in each subject)</td>
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<tr>
<td>W5</td>
<td>S1(2)</td>
<td>S2(2)</td>
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<tr>
<td>W6</td>
<td>S3(2)</td>
<td>S4(2)</td>
</tr>
<tr>
<td>W7</td>
<td>S5(2)</td>
<td>S6(2)</td>
</tr>
<tr>
<td>W8</td>
<td>Test-II (Portion: 2 units in each subject)</td>
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<tr>
<td>W9</td>
<td>Discussion</td>
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<tr>
<td>W10</td>
<td>Test-III (All 5 units and all the subjects)</td>
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</tbody>
</table>
## K.S.Rangasamy College of Technology - Autonomous Regulation  R 2007

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### Semester IV

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<th>Hours / Week</th>
<th>Credit</th>
<th>Maximum Marks</th>
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</thead>
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<td>100 CA</td>
<td>00 ES</td>
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</table>

**Objective(s)**

i. To improve the skill level of Engineering, Technology and Applied Science students.

ii. To improve the employability of students in placement interviews

**Skills sets to be improved**

- **a. Aptitude skills**
  - Arithmetic ability
  - Verbal Reasoning
  - Non verbal Reasoning

- **b. Programming skills**
  - C language (All Branches)
  - OOPS concepts and C++ (Circuit Branches - EEE, ECE,CSE,IT and BT)
  - Data Structures (Circuit Branches - EEE,ECE,CSE,IT and BT)

- **c. Written Communication Skills**
  - Comprehension
  - Grammar
  - Essay Writing
  - Technical Report Writing
  - Technical paper Writing

- **d. Oral Communication Skills**
  - News Reading
  - Informing a News item
  - Self introduction
  - 2 minutes talk – Informed
  - 2 minutes talk - Extempore

- **e. Technical Paper Presentation**
  - Presenting a paper on recent topics

- **f. Group Interaction**
  - Debate
  - Group Discussion – Informed Topic
  - Group Discussion – Topic on the spot

- **g. Technical Interview Skills**
  - Basic MPC knowledge
  - Broad Knowledge of the branch
  - Indepth knowledge on specific subjects of interest

- **h. HR Interview Skills**
  - Adoptability
  - Creativity
  - Flexibility
  - Achievement orientation
  - Continuous learning
  - Hardworking nature
  - Decisiveness
  - viii. Self development
  - ix. Questioning

**Focus**
The focus of CCD is to develop these in three semesters (CCD-I, II and III) and reinforce them in another two semesters (CCD IV and V).

**Execution**

- Total No. of weeks : 12
- 3 Hrs/week and 2 credits
- Only Continuous Assessment and No End Semester examination.
- Evaluation based on written test, oral test and technical paper presentation.
- Every 20 students should be engaged by a staff member during communication hour and oral test.
- Every 30 students should be monitored by a staff member to conduct written test.
<table>
<thead>
<tr>
<th>Schedule</th>
<th>Week</th>
<th>Activity</th>
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<tr>
<td></td>
<td>1</td>
<td>Training</td>
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<td>2</td>
<td>Training</td>
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<td></td>
<td>5</td>
<td>Training</td>
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<tr>
<td></td>
<td>6</td>
<td>Evaluation II - Written</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>Evaluation II - Oral</td>
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<td>8</td>
<td>Training</td>
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<tr>
<td></td>
<td>9</td>
<td>Evaluation III - Written</td>
</tr>
<tr>
<td></td>
<td>10-12</td>
<td>Evaluation III - Oral</td>
</tr>
</tbody>
</table>

| Evaluation | Evaluation I | 60 marks (average of 3 tests) |
|           | Evaluation II | 20 marks                      |
|           | Evaluation III | 20 marks                      |
|           | Total          | 100 marks                     |
### Course: Professional Ethics

**Course Code**: 07120501G  
**Course Name**: Professional Ethics

<table>
<thead>
<tr>
<th>Hours / Week</th>
<th>Credit</th>
<th>Maximum Marks</th>
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<td>3</td>
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</table>

**Objectives**: To create an awareness on Ethics and Human Values and instill Moral and Social Values in Students.

#### 1. Introduction

- Ethics defined – Engineering as a profession – Core qualities of professional practitioners – Theories of right action – Major ethical issues – Three types of inquiry – Kohlberg’s stages of moral development – Carol Gilligan theory – Moral dilemmas – Moral autonomy – Value based ethics

#### 2. Engineering as Social Experimentation

- Comparison with standard experiments – Relevant information – Learning from the past – Engineers as managers, consultants and leaders – Accountability – Role of codes – Code of ethics for engineers; introduction, rules of practice and professional obligations – The space shuttle challenger case study.

#### 3. Engineers Responsibility for Safety and Risk


#### 4. Responsibilities and Rights


#### 5. Global Issues


**Total hours to be taught**: 45

**Textbook**:  

**References**:  

<table>
<thead>
<tr>
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<tr>
<td>07120502C</td>
<td>MICROPROCESSORS AND MICROCONTROLLERS</td>
<td>3 1 0 4</td>
<td>50 50</td>
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</table>

**Objective(s)**

To study the Architecture of 8085, 8056 & 8051. To study the addressing modes & instruction set of 8085, 8086 & 8051. To introduce the need & use of Interrupt structure. To develop the skill in simple program writing. To introduce commonly used peripheral / interfacing ICs and study simple applications.

**1 8085 PROCESSOR**

- Architecture – Functional block diagram
- Instruction set – Addressing modes
- Timing diagrams – Assembly language programming
- Interrupts – Memory Interfacing.

**2 8086 PROCESSOR**

- Architecture – Functional block diagram
- Instruction set – Addressing modes
- Assembly language programming
- Interrupts – Memory Interfacing.

**3 PERIPHERAL INTERFACING**

- Architecture and programming of ICs: 8255 PPI, 8259 PIC, 8251 USART, 8279 Keyboard display controller and 8253 Timer/Counter – Interfacing with 8085.

**4 8051 MICRO CONTROLLER**


**5 MICRO CONTROLLER APPLICATIONS**

- Interfacing: LCD, ADC, DAC, Sensors, Stepper Motor, Keyboard and DC motor speed control

Total hours to be taught

- Lecture: 45
- Tutorial: 15
- TOTAL: 60

**Text book(s):**


**Reference(s):**

### Course Code: 07120503C  
#### Course Name: DESIGN OF ELECTRICAL APPARATUS

<table>
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<th>P</th>
<th>C</th>
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</table>

**Objective(s):**

To provide sound knowledge about design of various electrical machines. To study mmf calculation of various types of electrical machines. To design armature and field systems for D.C. machines. To design core, yoke, windings and cooling systems of transformers. To design stator and rotor of induction machines. To design stator and rotor of synchronous machines and study their thermal behavior.

---

### INTRODUCTION

- Concept of magnetic circuit – MMF calculation for various types of electrical machines – real and apparent flux density of rotating machines - design of resistance elements of field regulators - Materials for resistance elements – design of resistances for starters for shunt motors –Design of electrical accessories (Qualitative treatment only): Design of loading rheostats, design of heating elements, design of chokes, design of permanent magnet – Introduction to CAD.

---

### D.C. MACHINES

- Output equation – main dimensions - choice of specific electric and magnetic loadings – choice of number of poles – armature design – design of air gap - design of field poles and field coil – design of commutator and brushes.

---

### TRANSFORMERS

- Output rating of single phase and three phase transformers – optimum design of transformers – design of core, yoke and windings for core and shell type transformers – design of tanks and cooling tubes of transformers.

---

### THREE PHASE INDUCTION MOTORS

- Output equation – main dimensions – choice of specific electric and magnetic loadings - design of stator – design of squirrel cage and slip ring rotor – performance calculation.

---

### SYNCHRONOUS MACHINES

- Output equation – main dimensions – choice of specific electric and magnetic loadings - short circuit ratio – design of stator and rotor of cylindrical pole and salient pole machines – design of damper winding - design of field coil – cooling of turbo alternators

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**Total hours to be taught**

Lecture: 45, Tutorial: 15, TOTAL: 60

**Text book(s):**


**Reference(s):**

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</thead>
<tbody>
<tr>
<td>07120504C</td>
<td>Measurements and Instrumentation</td>
<td>L T P C CA ES Total</td>
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<tr>
<td></td>
<td>To make the student have a clear knowledge of the basic laws governing the operation of the instruments, relevant circuits and their working in the following area. Introduction to general instrument system, error, calibration etc. Emphasis is laid on analog and digital techniques used to measure voltage, current, energy, power etc. To have an adequate knowledge of comparison methods of measurement. Elaborate discussion about storage &amp; display devices. Exposure to various transducers and data acquisition system.</td>
<td></td>
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</tbody>
</table>

**Objective(s)**

**1 INTRODUCTION**

Sl. units – Functional elements of an instrument – static and dynamic characteristics – Errors analysis – standards and calibration.

**2 MEASURING INSTRUMENTS**

Principle and types of analog and digital voltmeters, moving iron instruments, moving coil instruments – PMMC instruments – wattmeters, errors, induction type energy meters – measurement of power using instrument transformers.

**3 BRIDGES**


**4 TRANSUDCERS**


**5 DIGITAL INSTRUMENTS AND DISPLAY DEVICES**

Electronic voltmeter – Digital voltmeter of ramp and integrating types. Digital Multimeter – block diagram, data logger, Block diagram, digital storage oscilloscope, digital printers and plotters, CRT display, digital CRO, LED, LCD, Dot Matrix display.

Total hours to be taught = 45

**Text book(s):**


**Reference(s):**

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<td>07120505C</td>
<td>LINEAR INTEGRATED CIRCUITS</td>
<td>L 3</td>
<td>T 0</td>
<td>P 0</td>
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</table>

**Objective(s):**

To study the IC fabrication procedure. To study characteristics; realise circuits; design for signal analysis using Op-amp ICs. To study the applications of Op-amp. To study internal functional blocks and the applications of special ICs like Timers, PLL circuits, regulator Circuits, ADCs.

1. **IC FABRICATION**
   - Total Hrs: 9
   - IC classification, fundamental of monolithic IC technology- basic planner process- Realization of active and passive components like R, C, diodes, transistors in ICs.

2. **CHARACTERISTICS OF OPAMP**
   - Total Hrs: 8
   - Introduction to Linear IC-Operational Amps – Ideal OP-AMP characteristics, DC characteristics, AC characteristics.

3. **APPLICATIONS OF OPAMP**
   - Total Hrs: 10
   - Basic applications of op-amp – summer, subtractor, differentiator and integrator, op amp circuits using diodes, Instrumentation amplifier, V/I & I/V converters, waveform generators, clippers, clamps, peak detector, first and second order active filters, comparators, Multivibrators, S/H circuit, D/A converter, A/D converter.

4. **SPECIAL ICs**
   - 555 Timer circuit – Functional block, characteristics & applications; 566-voltage controlled oscillator circuit; 565-phase locked loop circuit functioning and applications.
   - Total Hrs: 9

5. **APPLICATION ICs**
   - Total Hrs: 9
   - IC voltage regulators – LM317, 723 regulators, switching regulator, function generator IC and filter IC, basic idea of signal conditioner for voltage and current measurement using OPAMP.

Total hours to be taught: 45

Text book(s):


Reference(s):

# CONTROL SYSTEMS

## Objective(s)
To understand the methods of representation of systems and getting their transfer function models. To provide adequate knowledge in the time response of systems and steady state error analysis. To give basic knowledge in obtaining the open loop and closed-loop frequency responses of systems. To understand the concept of stability of control system and methods of stability analysis. To study the three ways of designing compensation for a control system.

## Basic elements in control systems
- Open and closed loop systems
- Electrical analogy of mechanical and thermal systems
- Transfer function
- Synchros
- AC and DC servomotors
- Block diagram reduction techniques
- Signal flow graphs.

## Time response
- Time domain specifications
- Types of test input
- First and Second order system response
- Error coefficients
- Generalized error series
- Steady state error
- P, PI, PID controllers
- Controller Tuning

## Frequency response
- Bode plot
- Polar plot
- Constant M and N circles
- Nichols chart
- Determination of closed loop response from open loop response
- Correlation between frequency domain and time domain specifications.

## Stability of Control System
- Characteristic equation
- Location of roots in S plane for stability
- Routh Hurwitz criterion
- Root locus construction
- Effect of pole, zero addition
- Gain margin and phase margin
- Nyquist stability criterion.

## Compensator Design
- Performance criteria
- Lag, lead and lag-lead networks
- Compensator design using Bode plot and Root locus.

## Textbook(s):

## Reference(s):
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Hours / Week</th>
<th>Credit</th>
<th>Maximum marks</th>
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<tr>
<td>07120507P</td>
<td>MICROPROCESSORS AND MICROCONTROLLERS LABORATORY</td>
<td>0 0 3 2 50</td>
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<td>50 100</td>
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</table>

Objective(s) To learn practicals the programming and interfacing techniques of 8055, 8086 microprocessors and 8051 microcontroller.

Minimum 10 Experiments to be conducted

1. Study of 8085 microprocessor, 8086 microprocessor, 8051 microcontroller kit  
   Total Hrs 3
2. Programming for 8/16 bit Arithmetic operations Using 8085  
   • Addition / subtraction / multiplication / division.  
   Total Hrs 3
3. Programming with control instructions Using 8085  
   • Increment / Decrement.  
   • Ascending / Descending order.  
   • Maximum / Minimum of numbers.  
   • Rotate instructions.  
   • Hex. / ASCII / BCD code conversions.  
   Total Hrs 3
4. Programming for Arithmetic operations Using 8086  
   • Addition / subtraction / multiplication / division.  
   Total Hrs 3
5. Programming with control instructions Using 8086  
   • Increment / Decrement.  
   • Ascending / Descending order.  
   • Maximum / Minimum of numbers.  
   • Rotate instructions.  
   • Hex. / ASCII / BCD code conversions.  
   Total Hrs 3
6. Interface Experiments:  
   • A/D Interfacing.  
   • D/A Interfacing.  
   • Traffic light controller.  
   Total Hrs 3
7. Interface Experiments:  
   • Simple experiments using 8251, 8279, 8254.  
   Total Hrs 3
8. Programming for 8/16 bit Arithmetic operations Using 8051  
   • Addition / subtraction / multiplication / division.  
   Total Hrs 3
   Total Hrs 3
10. Interfacing and Programming of Stepper Motor control using 8051.  
    Total Hrs 3

Total hours to be taught 30

Lab Manual:
1. "Microprocessors and Microcontrollers Laboratory", Faculty of EEE, KSRCT, Tiruchengode.
## Course Information

**Course Code**: 07120508P  
**Course Name**: DIGITAL ELECTRONICS AND LINEAR IC LABORATORY

<table>
<thead>
<tr>
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<td>DIGITAL ELECTRONICS AND LINEAR IC LABORATORY</td>
<td>0  0  3  2</td>
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</table>

### Objective(s)
To learn the practical Experiments on digital Electronics & Linear Integrated Circuits.

### Minimum 10 Experiments to be conducted

1. Design and implementation of combinational circuits using basic gates and universal gates for arbitrary functions.  
   **Total Hrs**: 3

2. Design and implementation of 4-bit binary adder / subtractor using basic gates and MSI devices.  
   **Total Hrs**: 3

3. Design and implementation of multiplexers and Demultiplexers.  
   **Total Hrs**: 3

4. Design and implementation of Decoders and Encoders.  
   **Total Hrs**: 3

5. Verification of operation of flip-flops.  
   **Total Hrs**: 3

6. Design and implementation of synchronous counters and Asynchronous counters.  
   **Total Hrs**: 3

   **Total Hrs**: 3

8. Instrumentation amplifier.  
   **Total Hrs**: 3

9. Active low pass and band pass filter.  
   **Total Hrs**: 3

10. Astable, Monostable Multivibrators and Schmitt Trigger using op-amp.  
    **Total Hrs**: 3

11. PLL characteristics and Frequency Multiplier using PLL.  
    **Total Hrs**: 3

12. DC power supply using LM317 and LM723.  
    **Total Hrs**: 3

**Total hours to be taught**: 30

### Lab Manual
1. "Digital Electronics and Linear IC Lab Manual", Faculty of EEE, KSRCT, Tiruchengode.
### Course Information

**Department:** Electrical and Electronics Engineering  
**Programme Code & Name:** 12: B.E. Electrical and Electronics Engineering

#### Course Details

<table>
<thead>
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</table>

#### Objective(s)

1. To improve the skill level of Engineering, Technology and Applied Science students.
2. To improve the employability of students in placement interviews.

#### Schedule for Conduct of Comprehension Subject

<table>
<thead>
<tr>
<th>Week No</th>
<th>Duration: 1½ period Subject No (No of units)</th>
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<tbody>
<tr>
<td>W1</td>
<td>S1(3)</td>
<td>S2(3)</td>
</tr>
<tr>
<td>W2</td>
<td>S3(3)</td>
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<tr>
<td>W3</td>
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<td>S6(3)</td>
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<tr>
<td>W4</td>
<td>S1(3)</td>
<td>Test-I (Portion: 3 units in each subject)</td>
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<td>W5</td>
<td>S1(2)</td>
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<td>W7</td>
<td>S5(2)</td>
<td>S6(2)</td>
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<tr>
<td>W8</td>
<td>S1(2)</td>
<td>Test-II (Portion: 2 units in each subject)</td>
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<tr>
<td>W9</td>
<td></td>
<td>Discussion</td>
</tr>
<tr>
<td>W10</td>
<td></td>
<td>Test-III (All 5 units and all the subjects)</td>
</tr>
</tbody>
</table>
### Career Competency Development III (CCD-III)

**Objective(s):**
1. To improve the skill level of Engineering, Technology and Applied Science students.
2. To improve the employability of students in placement interviews.

**Skills sets to be improved:**

**a. Aptitude skills**
- Arithmetic ability
- Verbal Reasoning
- Non verbal Reasoning

**b. Programming skills**
- C language (All Branches)
- OOPS concepts and C++ (Circuit Branches - EEE, ECE, CSE, IT and BT)
- Data Structures (Circuit Branches - EEE, ECE, CSE, IT and BT)

**c. Written Communication Skills**
- Comprehension
- Grammar
- Essay Writing
- Technical Report Writing
- Technical paper Writing

**d. Oral Communication Skills**
- News Reading
- Informing a News item
- Self introduction
- 2 minutes talk – Informed
- 2 minutes talk - Extempore

**e. Technical Paper Presentation**
- Presenting a paper on recent topics

**f. Group Interaction**
- Debate
- Group Discussion – Informed Topic
- Group Discussion – Topic on the spot

**g. Technical Interview Skills**
- Basic MPC knowledge
- Broad Knowledge of the branch
- Indepth knowledge on specific subjects of interest

**h. HR Interview Skills**
- Adoptability
- Creativity
- Flexibility
- Achievement orientation
- Continuous learning
- Hardworking nature
- Decisiveness
- Self development
- Questioning

**Focus**
The focus of CCD is to develop these in three semesters (CCD-I, II and III) and reinforce them in another two semesters (CCD IV and V).

**Execution**
- Total No. of weeks : 12
- 3 Hrs/week and 2 credits
- Only Continuous Assessment and No End Semester examination.
- Evaluation based on written test, oral test and technical paper presentation.
- Every 20 students should be engaged by a staff member during communication hour and oral test.
- Every 30 students should be monitored by a staff member to conduct written test.

<table>
<thead>
<tr>
<th>Schedule</th>
<th>Week</th>
<th>Activity</th>
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<table>
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<td>Evaluation II - Oral</td>
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<td>10 - 12</td>
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<tr>
<td>07120601G</td>
<td>PRINCIPLES OF MANAGEMENT</td>
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</table>

Objective(s): Knowledge on the principles of management is essential for all kinds of people in all kinds of organizations. After studying this course, students will be able to have a clear understanding of the managerial functions like planning, organizing, staffing, leading and controlling. Students will also gain some basic knowledge in international aspect of management.

1. **HISTORICAL DEVELOPMENT**

<table>
<thead>
<tr>
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2. **PLANNING**

<table>
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<tr>
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3. **ORGANISING**

<table>
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<tr>
<th>Total Hrs</th>
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</table>

4. **DIRECTING**

<table>
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<tr>
<th>Total Hrs</th>
<th>9</th>
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</table>

5. **CONTROLLING**

<table>
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<tr>
<th>Total Hrs</th>
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</table>

Total hours to be taught 45

Text book (s):


Reference(s):

## K.S.Rangasamy College of Technology - Autonomous Regulation

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
<th>CA</th>
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**Objective(s)**

To model steady-state operation of large-scale power systems and solve the power flow problems using efficient numerical methods suitable for computer simulation. To model and analyse power systems under abnormal (fault) conditions. To model and analyse the dynamics of power system for small-signal and large signal disturbances and design the systems for enhancing stability.

### 1. INTRODUCTION

Need for system analysis in planning and operation of modern power system – Basic Components of Power System – per phase analysis - General aspects relating to power flow, short circuit and stability analysis - per unit representation.-Change of base.

### 2. MODELING OF VARIOUS COMPONENTS / ACCESSORIES


### 3. POWER FLOW ANALYSIS


### 4. SHORT CIRCUIT ANALYSIS


### 5. STABILITY ANALYSIS

Concept of stability in power system - Swing equation- power angle equations - Equal area criterion - critical clearing angle and time - Solution of swing equation by modified Euler’s method and Runge-Kutta method.

Total hours to be taught

- Lecture: 45,
- Tutorial: 15,
- TOTAL: 60

**Text book(s):**


**Reference(s):**


<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Hours / Week</th>
<th>Credit</th>
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Objective(s):
- To study the concept of states space representation of a system.
- To study the behavior of non-linear system and analysis of their stability.

1. **STATE SPACE ANALYSIS**
   - Introduction to state space analysis – Physical variable, Phase variable and Canonical variables forms - State transition matrix - controllability and observability.
   - Total Hrs: 9

2. **STATE VARIABLE DESIGN**
   - Total Hrs: 9

3. **SAMPLED DATA CONTROL SYSTEM**
   - Introduction to Sample data control systems – Sampling process, signal reconstruction, difference equation, Z-transform, Z-transfer function – Inverse Z transform, Z-transform analysis of sampled data control system, Z and S domain Relationship – Digital PID controller.
   - Total Hrs: 9

4. **NON-LINEAR SYSTEMS**
   - Types of non-linearity – Typical examples – Jump resonance - Equivalent linearization - Phase plane analysis – Limit cycles – Describing functions - Performance Analysis using Describing functions
   - Total Hrs: 9

5. **STABILITY**
   - Total Hrs: 9

Total hours to be taught: Lecture: 45, Tutorial: 15, TOTAL: 60

Text book(s):

Reference(s):
K.S.Rangasamy College of Technology - Autonomous Regulation

Department: Electrical and Electronics Engineering
Programme Code & Name: 12: B.E. Electrical and Electronics Engineering

<table>
<thead>
<tr>
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<th>Hours / Week</th>
<th>Credit</th>
<th>Maximum Marks</th>
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<tr>
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<td>EMBEDDED SYSTEMS</td>
<td>3 0 0 3</td>
<td>50 50 100</td>
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</table>

Objective(s):
To acquire the knowledge on basics of embedded system. To study the structure of a processor and its memory organization. To introduce I/O devices on the buses for the interconnection of devices. To develop the skill on programming in assembly language. To learn the real time operating system.

1. INTRODUCTION TO EMBEDDED SYSTEM
Introduction to functional building blocks of embedded systems – Register, memory devices, ports, timer, interrupt controllers using circuit block diagram representation for each categories.

2. PROCESSOR AND MEMORY ORGANIZATION
Structural units in a processor; selection of processor & memory devices; shared memory; DMA; interfacing processor, memory and I/O units; memory management – Cache mapping techniques, dynamic allocation - Fragmentation.

3. DEVICES & BUSES FOR DEVICES NETWORK
I/O devices; timer & counting devices; serial communication using I²C, CAN, USB buses; parallel communication using ISA, PCI, PCI/X buses, arm bus; interfacing with devices/ports, device drivers in a system – Introduction.

4. I/O PROGRAMMING AND SCHEDULE MECHANISM
Intel I/O instruction – Transfer rate, latency; interrupt driven I/O - Non-maskable interrupts; software interrupts, writing interrupt service routine in C & assembly languages; preventing, interrupt overrun; disability interrupts. Multi threaded programming – Context switching, premature & non-premature multitasking, semaphores. Scheduling – Thread states, pending threads, context switching, round robin scheduling, priority based scheduling, assigning priorities, deadlock, watch dog timers.

5. REAL TIME OPERATING SYSTEM (RTOS)
Introduction to basic concepts of RTOS, RTOS – Interrupt handling, task scheduling; embedded system design issues in system development process – Action plan, use of target system, emulator, use of software tools – Applications: Speed control of DC motor.

Total hours to be taught: 45

Text book(s):

Reference(s):
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Hours / Week</th>
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<td>L 3</td>
<td>T 1</td>
<td>P 0</td>
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**Objective(s)**

To get an overview of different types of power semi-conductor devices and their switching characteristics. To understand the operation, characteristics and performance parameters of controlled rectifiers. To study the operation, switching techniques and basic topologies of DC-DC switching regulators. To learn the different modulation techniques of pulse width modulated inverters and to understand the harmonic reduction methods. To know the practical application of power electronics converters in conditioning the power supply.

1. **POWER SEMI-CONDUCTOR DEVICES**
   - Construction, Principle of operation - Static and dynamic characteristics of Power diodes, SCR, TRIAC, GTO, power BJT, power MOSFET and IGBT – Safe operating Area – protection circuits - series and parallel operation – Intelligent power module.

2. **PHASE CONTROLLED CONVERTERS**

3. **DC TO DC CHOPPERS**
   - Principles of operation – step up and step down chopper-voltage, current and load commutated choppers-single, two and four quadrant choppers-time ratio control-CLC-Multiphase chopper-Forced commutation techniques.

4. **INVERTERS**
   - 1Φ voltage source inverter- 3Φ Bridge inverters – PWM Inverters-Reduction of Harmonics in the inverter output voltage – current source inverters- series & parallel inverters.

5. **AC VOLTAGE CONTROLLERS, CYCLOCONVERTER AND APPLICATIONS OF POWER ELECTRONICS**
   - 1Φ AC voltage controller – multistage sequence control – step up and step down cycloconverters - 3Φ to 1Φ and 3Φ - 3Φ cycloconverters.
   - Applications : SMPS-UPS-HVDC system- FACTS controller-Induction Heating- Battery Charging.

Total hours to be taught: Lecture: 45, Tutorial: 15, TOTAL: 60

Text book(s):


Reference(s):


### Course Code: 07120606C
#### Course Name: DIGITAL SIGNAL PROCESSING

<table>
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<th>Credit</th>
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<tr>
<td>L T P</td>
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<tr>
<td>3 1 0</td>
<td>4 50</td>
<td>50 50 100</td>
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</table>

**Objective(s):** To classify signals and systems & their mathematical representation. To analyse the discrete time systems. To study various transformation techniques & their computation. To study about filters and their design for digital implementation. To study about a programmable digital signal processor & quantization effects.

#### INTRODUCTION

Need and advantages of Digital Signal Processing; Classification of systems: Continuous, discrete, linear, causal, stable, dynamic, recursive, time variance; classification of signals: continuous and discrete, energy and power; signal representation by singularities; Typical signal processing operations: convolution, correlation and transformation; Typical DSP system: ADC/DAC - sampling, quantization, quantization error, Nyquist rate, aliasing effect.

#### DISCRETE TIME SYSTEM ANALYSIS

Z-transform and its properties, inverse z-transforms; difference equation – Solution by z-transform, application to discrete systems - Stability analysis, frequency response – Fourier transform of discrete sequence – Discrete Fourier series – Convolution using Z-transform and Fourier transform.

#### DISCRETE TRANSFORMS

DFT – Definition - properties. Computation of DFT using FFT algorithm – DIT & DIF - FFT using radix 2 – Butterfly structure; Computation of IDFT using DFT.

#### DESIGN OF DIGITAL FILTERS

IIR design: Approximation of analog filter design - Butterworth and Chebyshev; digital design using impulse invariant and bilinear transformation - Warping, prewarping - Frequency transformation. FIR design: Windowing Techniques – Need and choice of windows – Linear phase characteristics. FIR & IIR filter realization – Parallel & cascade forms.

#### DIGITAL SIGNAL PROCESSORS

Architecture for signal processing - Van Neumann and Harvard architecture; Architecture and features of TMS 320F2812 signal processing chip.

Total hours to be taught: Lecture: 45, Tutorial: 15, TOTAL: 60

**Text book(s):**


**Reference(s):**

<table>
<thead>
<tr>
<th>Course Code</th>
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<th>Credit</th>
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</table>

Objective(s)
To expose the students practical knowledge in control system and instrumentation system.

Minimum 10 Experiments to be conducted

1. Determination of transfer function parameters of a DC servomotor. Total Hrs 3
2. Determination of transfer function parameters of AC servomotor. Total Hrs 3
3. Analog simulation of type-0 and type-1 system. Total Hrs 3
4. Digital simulation of linear systems. Total Hrs 3
5. Digital simulation of non-linear systems. Total Hrs 3
6. Digital design of compensators. Total Hrs 3
7. Digital design of P, PI and PID controllers. Total Hrs 3
8. Measurement of DC resistance by Wheatstone and Kelvin Double Bridge. Total Hrs 3
9. Measurement of Inductance using Anderson Bridge. Total Hrs 3
10. Measurement of capacitance using Schering Bridge. Total Hrs 3
11. Measurement of Displacement using LVDT. Total Hrs 3
12. Design of Digital – Analog Converter. Total Hrs 3
14. Measurement of frequency and phase by Lissajous Method. Total Hrs 3

Total hours to be taught 30

Lab Manual:
1. "Control and Instrumentation Lab Manual", Faculty of EEE, KSRCT, Tiruchengode
<table>
<thead>
<tr>
<th>Course Code</th>
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<th>Credit</th>
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<td>0 0 3 2</td>
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</table>

Objective(s): To expose the students in the practical knowledge on Power Electronics.

Minimum 10 Experiments to be conducted

1. Characteristics of SCR, TRIAC. Total Hrs 3
2. Characteristics of MOSFET, IGBT. Total Hrs 3
3. 1Φ Half controlled rectifier with R, R<sub>L</sub> load. Total Hrs 3
4. 1Φ fully controlled rectifier with R, R<sub>L</sub> load. Total Hrs 3
5. 3Φ fully controlled rectifier with R, R<sub>L</sub> load. Total Hrs 3
6. Voltage commutated chopper. Total Hrs 3
7. Current commutated chopper. Total Hrs 3
8. IGBT based four quadrant chopper. Total Hrs 3
9. 1Φ IGBT inverter. Total Hrs 3
10. Series inverter. Total Hrs 3
11. Parallel inverter. Total Hrs 3
12. 1Φ AC voltage controller using SCR and TRIAC. Total Hrs 3
13. 1Φ cyclo converter. Total Hrs 3
14. Study of SMPS, UPS. Total Hrs 3

Total hours to be taught 30

Lab Manual:

1. “Power Electronics Laboratory Manual”, Faculty of EEE, KSRCT, Tiruchengode
### Course Code: 07120609P  
**Course Name:** COMPREHENSION V

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**Objective(s):**

1. To improve the skill level of Engineering, Technology and Applied Science students.
2. To improve the employability of students in placement interviews.

- For each subject 200 Keywords/important words or terms (5 units x 40 words) are to be prepared using the students.
- These 200 Keywords are to be printed in double column (2 x 50 words) and in 2 pages and is to be handled over each student for all the subjects.
- The staff who handled the subject in the previous semester will handle their discussion period (3 periods / semester) as given below.
- The staff will question the students using ‘W’ and ‘H’ type questions linking the keywords.
- In a similar way the students have to prepare themselves for all the keywords.
- Each test will carry 100 questions and two hours duration. The questions will be of objective type: ‘W’ and ‘H’ type questions by attaching with keywords.
- Based on Test-I and Test-II, sessional marks (maximum 50 marks) will be awarded.
- Test-III will be held for all the units and all the subjects. The passing norms will be similar as other subjects (i.e. minimum 50/100 marks)

**Schedule for Conduct of Comprehension Subject**

<table>
<thead>
<tr>
<th>Total No of weeks planned: 10</th>
<th>Total No of subjects: 5 to 7</th>
<th>Total duration per week: 3 periods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week No</td>
<td>Duration: 1½ period Subject No (No of units)</td>
<td>Duration: 1½ period Subject No (No of units)</td>
</tr>
<tr>
<td>--------</td>
<td>----------------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>W1</td>
<td>S1(3)</td>
<td>S2(3)</td>
</tr>
<tr>
<td>W2</td>
<td>S3(3)</td>
<td>S4(3)</td>
</tr>
<tr>
<td>W3</td>
<td>S5(3)</td>
<td>S6(3)</td>
</tr>
<tr>
<td>W4</td>
<td>Test-I (Portion: 3 units in each subject)</td>
<td></td>
</tr>
<tr>
<td>W5</td>
<td>S1(2)</td>
<td>S2(2)</td>
</tr>
<tr>
<td>W6</td>
<td>S3(2)</td>
<td>S4(2)</td>
</tr>
<tr>
<td>W7</td>
<td>S5(2)</td>
<td>S6(2)</td>
</tr>
<tr>
<td>W8</td>
<td>Test-II (Portion: 2 units in each subject)</td>
<td></td>
</tr>
<tr>
<td>W9</td>
<td>Discussion</td>
<td></td>
</tr>
<tr>
<td>W10</td>
<td>Test-III (All 5 units and all the subjects)</td>
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<tr>
<td>Course Code</td>
<td>Course Name</td>
<td>Hours / Week</td>
</tr>
<tr>
<td>-------------</td>
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<tr>
<td>07120610P</td>
<td>CAREER COMPETENCY DEVELOPMENT IV</td>
<td>0 0 3 2</td>
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**Objective(s)**

i. To improve the skill level of Engineering, Technology and Applied Science students.

ii. To improve the employability of students in placement interviews.

**Skills sets to be improved**

- **a. Aptitude skills**
  - Arithmetic ability
  - Verbal Reasoning
  - Non verbal Reasoning

- **b. Programming skills**
  - C language (All Branches)
  - OOPS concepts and C++ (Circuit Branches - EEE, ECE, CSE, IT and BT)
  - Data Structures (Circuit Branches - EEE, ECE, CSE, IT and BT)

- **c. Written Communication Skills**
  - Comprehension
  - Grammar
  - Essay Writing
  - Technical Report Writing
  - Technical paper Writing

- **d. Oral Communication Skills**
  - News Reading
  - Informing a News item
  - Self introduction
  - 2 minutes talk – Informed
  - 2 minutes talk - Extempore

- **e. Technical Paper Presentation**
  - Presenting a paper on recent topics

- **f. Group Interaction**
  - Debate
  - Group Discussion – Informed Topic
  - Group Discussion – Topic on the spot

- **g. Technical Interview Skills**
  - Basic MPC knowledge
  - Broad Knowledge of the branch
  - Indepth knowledge on specific subjects of interest

- **h. HR Interview Skills**
  - Adoptability
  - Creativity
  - Flexibility
  - Achievement orientation
  - Continuous learning
  - Hardworking nature
  - Decisiveness

- **viii. Self development**
  - Questioning

**Focus**

The focus of CCD is to develop these in three semesters (CCD-I, II and III) and reinforce them in another two semesters (CCD IV and V).

**Execution**

- Total No. of weeks : 12
- 3 Hrs/week and 2 credits
- Only Continuous Assesment and No End Semester examination.
- Evaluation based on written test, oral test and technical paper presentation.
- Every 20 students should be engaged by a staff member during communication hour and oral test.
- Every 30 students should be monitored by a staff member to conduct written test.

**Schedule**

<table>
<thead>
<tr>
<th>Week</th>
<th>Activity</th>
</tr>
</thead>
</table>

BoS Chairman

12 : B.E. ELECTRICAL AND ELECTRONICS ENGINEERING - REGULATION 2007 - SYLLABUS
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Training</td>
</tr>
<tr>
<td>2</td>
<td>Training</td>
</tr>
<tr>
<td>3</td>
<td>Evaluation I - Written</td>
</tr>
<tr>
<td>4</td>
<td>Evaluation I -</td>
</tr>
<tr>
<td>5</td>
<td>Training</td>
</tr>
<tr>
<td>6</td>
<td>Evaluation II - Written</td>
</tr>
<tr>
<td>7</td>
<td>Evaluation II - Oral</td>
</tr>
<tr>
<td>8</td>
<td>Training</td>
</tr>
<tr>
<td>9</td>
<td>Evaluation III - Written</td>
</tr>
<tr>
<td>10 - 12</td>
<td>Evaluation III - Oral</td>
</tr>
</tbody>
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**Evaluation**

<table>
<thead>
<tr>
<th>Evaluation</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluation I</td>
<td>60 marks (average of 3 tests)</td>
</tr>
<tr>
<td>Evaluation II</td>
<td>20 marks</td>
</tr>
<tr>
<td>Evaluation III</td>
<td>20 marks</td>
</tr>
</tbody>
</table>

**Total** 100 marks