### A.1.1 Mathematics and Basic Sciences Courses

<table>
<thead>
<tr>
<th>Mathematics 2013 Curriculum Course Code</th>
<th>Name of the Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA1001</td>
<td>Calculus and Solid Geometry</td>
</tr>
<tr>
<td>MA1002</td>
<td>Advanced Calculus and Complex Analysis</td>
</tr>
<tr>
<td>MA1003</td>
<td>Transforms and Boundary value Problems</td>
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<tr>
<td>MA1024</td>
<td>Probability and Random Process</td>
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<tr>
<td>MA1045</td>
<td>Discrete Mathematics, Linear Algebra and Statistics</td>
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<tr>
<th>Basic Sciences 2013 Curriculum Course Code</th>
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<tbody>
<tr>
<td>PY1001</td>
<td>Physics</td>
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<td>Physics Laboratory</td>
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<tr>
<td>CY1001</td>
<td>Chemistry</td>
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<td>CY1002</td>
<td>Chemistry Laboratory</td>
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<td>PY1003</td>
<td>Material Science</td>
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<td>CY1003</td>
<td>Principles of Environmental Science</td>
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<tr>
<td>BT1001</td>
<td>Biology for Engineers</td>
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</table>
Course Number and Title
MA1001 CALCULUS AND SOLID GEOMETRY

Credits / Contact Hours
4 / 75

Instructor Name
Dr. K. Ganesan

Textbooks, References

Purpose
To impart analytical ability in solving mathematical problems as applied to the respective branches of Engineering

Prerequisites
Nil

Co-requisites
Nil

Required, Elective or Selected Elective (as per Table 5.1a)
Required

Instructional Objectives
1. To apply advanced matrix knowledge to Engineering problems.
2. To equip themselves familiar with the functions of several variables.
3. To familiarize with the applications of differential equations.
4. To improve their ability in solving geometrical applications of differential calculus problems
5. To expose to the concept of three dimensional analytical geometry.

Student Outcomes from Criterion 3 covered by this Course

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List of Topics Covered
UNIT I - MATRICES (15 hours)
Characteristic equation – Eigen values and Eigen vectors of a real matrix – Properties of Eigen values – Cayley – Hamilton
theorem orthogonal reduction of a symmetric matrix to diagonal form – Orthogonal matrices – Reduction of quadratic form to canonical form by orthogonal transformations.

UNIT II - FUNCTIONS OF SEVERAL VARIABLES (15 hours)

UNIT III - ORDINARY DIFFERENTIAL EQUATIONS (15 hours)
Linear equations of second order with constant and variable coefficients – Homogeneous equation of Euler type – Equations reducible to homogeneous form – Variation of parameter – Simultaneous first order with constant co-efficient.

UNIT IV - GEOMETRICAL APPLICATIONS OF DIFFERENTIAL CALCULUS (15 hours)

UNIT V - THREE DIMENSIONAL ANALYTICAL GEOMETRY (15 hours)

Course Number and Title

MA1002  ADVANCED CALCULUS AND COMPLEX ANALYSIS

Credits / Contact Hours

4 / 75

Instructor Name

Dr.K.Ganesan

Textbooks, References


Purpose

To impart analytical ability in solving mathematical problems as applied to the respective branches of Engineering.

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<thead>
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Required, Elective or Selected Elective (as per Table 5.1a)

Required
**Instructional Objectives**

1. To have knowledge in multiple calculus
2. To improve their ability in Vector calculus
3. To equip themselves familiar with Laplace transform
4. To expose to the concept of Analytical function
5. To familiarize with Complex integration.

**Student Outcomes from Criterion 3 covered by this Course**

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**List of Topics Covered**

**UNIT I - MULTIPLE INTEGRALS (15 hours)**
Double integration in Cartesian and polar coordinates – Change of order of integration – Area as a double integral – Triple integration in Cartesian coordinates – Conversion from Cartesian to polar – Volume as a Triple Integral.

**UNIT II - VECTOR CALCULUS (15 hours)**
Gradient, divergence, curl – Solenoidal and irrotational fields – Vector identities (without proof) – Directional derivatives – Line, surface and volume integrals – Green’s, Gauss divergence and Stoke’s theorems (without proof) – Verification and applications to cubes and parallelepipeds only.

**UNIT III - LAPLACE TRANSFORMS (15 hours)**
Transforms of simple functions – Basic operational properties – Transforms of derivatives and integrals – Initial and final value theorems – Inverse transforms – Convolution theorem – periodic functions – Applications of Laplace transforms for solving linear ordinary differential equations up to second order with constant coefficients only.

**UNIT IV - ANALYTIC FUNCTIONS (15 hours)**

**UNIT V - COMPLEX INTEGRATION (15 hours)**
Line integral – Cauchy’s integral theorem (without proof) – Cauchy’s integral formulae and its applications – Taylor’s and Laurent’s expansions (statements only) – Singularities – Poles and Residues – Cauchy’s residue theorem – Contour integration – Unit circle and semi circular contour.
Textbooks, References


Purpose

To impart analytical ability in solving mathematical problems as applied to the respective branches of Engineering.

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Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To know how to formulate and solve partial differential equations
2. To have thorough knowledge in Fourier series
3. To be familiar with applications of partial differential equations
4. To gain good knowledge in the application of Fourier transform
5. To learn about Z-transforms and its applications

Student Outcomes from Criterion 3 covered by this Course

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List of Topics Covered

UNIT I - PARTIAL DIFFERENTIAL EQUATIONS (12 hours)
Formation – Solution of standard types of first order equations – Lagrange’s equation – Linear homogeneous partial differential equations of second and higher order with constant coefficients - Classification of second order linear partial differential equations including the reduction to the above types – Separable Variable Method.

UNIT II - FOURIER SERIES (12 hours)

UNIT III - ONE DIMENSIONAL WAVE & HEAT EQUATION (12 hours)

UNIT IV - FOURIER TRANSFORMS (12 hours)

UNIT V - Z-TRANSFORMS AND DIFFERENCE EQUATIONS (12 hours)
Course Number and Title

MA1024  PROBABILITY AND RANDOM PROCESS

Credits / Contact Hours

4 / 60

Instructor Name

Dr.K.Ganesan

Textbooks, References


Purpose

To introduce the students to the idea of probability and random process, an important mathematical tool in signal processing.

Prerequisites

Nil

Co-requisites

Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To acquire knowledge about Probability and Random variables.
2. To gain knowledge on 2-D Random variables.
3. To expose to the concepts of Random process.
4. To gain knowledge about the Correlation Functions.
5. To learn about the applications of Fourier Transforms like Spectral Density and others.

Student Outcomes from Criterion 3 covered by this Course

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Mapping of instructional objectives with student outcome

1-5

List of Topics Covered
UNIT I-PROBABILITY DISTRIBUTIONS (15 hours)
Random Variables - Moments - Moment generating function - Binomial, Poisson, Geometric, Exponential and Normal distributions - Functions of Random Variables.

UNIT II-TWO DIMENSIONAL RANDOM VARIABLES (12 hours)

UNIT III-RANDOM PROCESSES (12 hours)

UNIT IV-CORRELATION FUNCTIONS (9 hours)
Autocorrelation function and its properties - Cross Correlation function and its properties - Linear System with Random inputs - Ergodicity.

UNIT V-SPECTRAL DENSITY (12 hours)

<table>
<thead>
<tr>
<th>Course Number and Title</th>
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<tr>
<td>MA1045 DISCRETE MATHEMATICS, LINEAR ALGEBRA &amp; STATISTICS</td>
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<tr>
<td>• K.S.Narayanan and T.K.Manicavachagam Pillai, S.Viswanathan “Modern Algebra. Vo II” (Printers &amp; Publisher)1983.</td>
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<td>• Lipschutz Seymour, Marc Lars Lipson, Discrete Mathematics, Mc Graw Hill Inc., 1992</td>
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<td>• Narsing Deo, Graph Theory with applications to Engineering and Computer science, Prentice-Hall of India pvt. Ltd., New Delhi, 1987</td>
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<td>• Dr.S.Kandasamy &amp; others S.Chand,&quot;Engineering Maths (Vol III)&quot;, Delhi, April-2005.</td>
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<tr>
<th>Purpose</th>
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</table>
To impart analytical ability to describe, analyze and solving mathematical problems as applied to the respective branches of Engineering in a logical and systematic fashion.

<table>
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**Required, Elective or Selected Elective (as per Table 5.1a)**

Required

**Instructional Objectives**

1. To understand logical and mathematical reasoning and to count / or enumerate objects in a systematic way. To understand mathematical induction and recursion.
2. To understand set theory, relations, and functions and to read, understand and construct mathematical arguments
3. To understand recurrence relation, generating functions and algebraic systems and their applications in coding theory – group codes
4. To have knowledge in linear algebra
5. To have knowledge in regression and correlation.

**Student Outcomes from Criterion 3 covered by this Course**

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</table>

**List of Topics Covered**

**UNIT I  MATHEMATICAL LOGIC  (12 hours)**

**UNIT II  SET THEORY  (12 hours)**

**UNIT III  RECURRENCE RELATION & ALGEBRAIC SYSTEMS  (12 hours)**

**UNIT IV  VECTOR SPACE AND LINEAR TRANSFORMATION  (12 hours)**
Vector space – Subspaces - Linear span - Linear independence and dependence-Basis-Algebra of linear transformations- Inner product space- Gramh-Schmidt Orthogonalization Process.(Theorems without proof)

**UNIT V  REGRESSION AND CORRELATION  (12 hours)**
Regression methods - Principle of least squares - Correlation - Multiple and Partial correlation - Linear and non-linear regression - Multiple linear regression

**Course Number and Title**
The purpose of this course is to provide an understanding of physical concepts and underlying various engineering and technological applications. In addition, the course is expected to develop scientific temperament and analytical skill in students, to enable them logically tackle complex engineering problems in their chosen area of application.

Prerequisites

Nil

Co-requisites

Nil

List of Topics Covered

UNIT I – MECHANICAL PROPERTIES OF SOLIDS AND ACOUSTICS (9 hours)

Mechanical properties of solids: Stress-strain relationship – Hooke’s law – Torsional Pendulum – Young’s modulus by cantilever – Uniform and non-uniform bending — Stress-strain diagram for various engineering materials – Ductile and
brittle materials – Mechanical properties of Engineering materials (Tensile strength, Hardness, Fatigue, Impact strength, Creep) – Fracture – Types of fracture (Elementary ideas).


**UNIT II – ELECTROMAGNETIC WAVES, CIRCUITS AND APPLICATIONS (9 hours)**
Del operator – grad, div, curl and their physical significances - displacement current –Maxwell’s equations (derivation) – Wave equation for electromagnetic waves – Propagation in free space – Poynting theorem – Characteristic of Transverse electric and magnetic waves – Skin depth – Rectangular and circular waveguides – High powered vacuum-based cavity magnetrons – Applications including radars, microwave oven and lighting systems.

**UNIT III – LASERS AND FIBER OPTICS (9 hours)**
Fiber Optics: Principle of Optical fiber – Acceptance angle and acceptance cone – Numerical aperture – V-number – Types of optical fibers (Material, Refractive index and mode) – Photonic crystal fibers – Fiber optic communication – Fiber optic sensors.

**UNIT IV – QUANTUM MECHANICS AND CRYSTAL PHYSICS (9 hours)**

**UNIT V – GREEN ENERGY PHYSICS (9 hours)**

* One problem sheet consisting of 10 to 15 problems is to be prepared for each unit and discussed in the class.
* Few problems based on design considerations related to appropriate branches of engineering can be incorporated in each problem sheet.

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**Course Number and Title**

**PY1002 PHYSICS LABORATORY**

**Credits / Contact Hours**

1 / 30

**Instructor Name**

Dr.T.Kalai vani

**Textbooks, References**
Purpose

The purpose of this course is to develop scientific temper in experimental techniques and to reinforce the physics concepts among the engineering students.

Prerequisites

<table>
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<tr>
<th>Prerequisites</th>
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Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To gain knowledge in the scientific methods and learn the process of measuring different Physical variables
2. Develop the skills in arranging and handling different measuring instruments
3. Get familiarized with experimental errors in various physical measurements and to plan / suggest on how the contributions could be made of the same order, so as to minimize the errors

Student Outcomes from Criterion 3 covered by this Course

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</table>

List of Topics Covered

LIST OF EXPERIMENTS

1. Determination of Young’s modulus of a given material – Uniform / Non-uniform bending methods.
2. Determination of Rigidity modulus of a given material – Torsion pendulum
3. Determination of dispersive power of a prism – Spectrometer
4. Determination of laser parameters – divergence and wavelength for a given laser source – laser grating/ Particle size determination using laser
5. Study of attenuation and propagation characteristics of optical fiber cable
6. Calibration of voltmeter / ammeter using potentiometer
7. Construction and study of IC regulation properties of a given power supply
8. Study of electrical characteristics of a solar cell
9. Mini Project – Concept based Demonstration
Course Number and Title

CY1001 CHEMISTRY

Credits / Contact Hours

3 / 45

Instructor Name

Dr. R. Jeyalakshmi

Textbooks, References


Purpose

To enable the students to acquire knowledge in the principles of chemistry for engineering applications

Prerequisites

Nil

Co-requisites

Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. The quality of water and its treatment methods for domestic and industrial applications
2. The classification of polymers, different types of polymerizations, preparation, properties and applications of important polymers and FRPs.
3. The phase rule and its application to one and two component systems
4. The principle, types and mechanism of corrosion and protective coatings.
5. The classification and selection of lubricants and their applications.
6. The basic principles, instrumentation and applications of analytical techniques

Student Outcomes from Criterion 3 covered by this Course

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Mapping of instructional objectives with student outcome

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List of Topics Covered

UNIT I - WATER TREATMENT (9 hours)

UNIT II - POLYMERS AND REINFORCED PLASTICS (9 hours)

UNIT III - PHASE EQUILIBRIA, LUBRICANTS AND ADHESIVES (9 hours)
Phase rule: Statement - explanation of the terms involved - one component system (water system only). Condensed phase rule - thermal analysis - two component systems: simple eutectic, Pb-Ag; compound formation, Zn-Mg.

UNIT IV - CORROSION AND ITS CONTROL (9 hours)

UNIT V - INSTRUMENTAL METHODS OF ANALYSIS (9 hours)
Basic principles, instrumentation and applications of potentiometry, UV - visible spectroscopy, infrared spectroscopy, atomic absorption spectroscopy and flame photometry.

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**Course Number and Title**

**CY1002 CHEMISTRY LABORATORY**

**Credits / Contact Hours**

1 / 30

**Instructor Name**

Dr. R. Jeyalakshmi

**Textbooks, References**


**Purpose**

To apply the concepts of chemistry and develop analytical skills for applications in engineering.

**Prerequisites**

Nil

**Co-requisites**

| Nil | CY1001 |

**Required, Elective or Selected Elective (as per Table 5.1a)**

Required
### Instructional Objectives

1. To enable the students to understand the basic concepts involved in the analyses.

### Student Outcomes from Criterion 3 covered by this Course

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### List of Topics Covered

1. Preparation of standard solutions
2. Estimation of total, permanent and temporary hardness by EDTA method
3. Conductometric titration - determination of strength of an acid
4. Estimation of iron by potentiometry
5. Determination of molecular weight of polymer by viscosity average method
6. Determination of dissolved oxygen in a water sample by Winkler’s method
7. Determination of Na / K in water sample by Flame photometry (Demonstration)
8. Estimation of Copper in ore
9. Estimation of nickel in steel
10. Determination of total alkalinity and acidity of a water sample.
11. Determination of rate of corrosion by weight loss method.

### Course Number and Title

**PY1003 MATERIALS SCIENCE**

### Credits / Contact Hours

3 / 60

### Instructor Name

Dr. C. Prefrential Kala

### Textbooks, References

Purpose
The course introduces several advanced concepts and topics in the rapidly evolving field of material science. Students are expected to develop comprehension of the subject and to gain scientific understanding regarding the choice and manipulation of materials for desired engineering applications.

Prerequisites
Nil

Co-requisites
Nil

Required, Elective or Selected Elective (as per Table 5.1a)
Required

Instructional Objectives
1. To acquire basic understanding of advanced materials, their functions and properties for technological applications
2. To emphasize the significance of materials selection in the design process
3. To understand the principal classes of bio-materials and their functionalities in modern medical science.
4. To get familiarize with the new concepts of Nano Science and Technology.
5. To educate the students in the basics of instrumentation, measurement, data acquisition, interpretation and analysis.

Student Outcomes from Criterion 3 covered by this Course

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Mapping of instructional objectives with student outcome

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List of Topics Covered

UNIT I – ELECTRONIC AND PHOTONIC MATERIALS (6 hours)
Electronic Materials: Fermi energy and Fermi–Dirac distribution function – Variation of Fermi level with temperature in intrinsic and extrinsic semiconductors – Hall effect – Dilute Magnetic Semiconductors (DMS) and their applications
Superconducting Materials: Normal and High temperature superconductivity – Applications.

UNIT II – MAGNETIC AND DIELECTRIC MATERIALS (6 hours)

UNIT III – MODERN ENGINEERING AND BIOMATERIALS (6 hours)

UNIT IV – INTRODUCTION TO NANOSCIENCE AND NANOTECHNOLOGY (6 hours)
Basic concepts of Nanoscience and Nanotechnology – Quantum wire – Quantum well – Quantum dot – fullerenes – Graphene – Carbon nanotubes – Material processing by chemical vapor deposition and physical vapor deposition – Principle of SEM, TEM, AFM, Scanning near-field optical microscopy (SNOM) – Scanning ion-conducting microscopy (SCIM) – Potential uses of nanomaterials in electronics, robotics, computers, sensors, sports equipment, mobile electronic devices, vehicles and transportation – Medical applications of nanomaterials.

UNIT V – MATERIALS CHARACTERIZATION (6 hours)

Course Number and Title

CY1003 PRINCIPLES OF ENVIRONMENTAL SCIENCE

Credits / Contact Hours

2 / 30

Instructor Name

Dr. H. Suhana

Textbooks, References


Purpose

The course provides a comprehensive knowledge in environmental science, environmental issues and the management.

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Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To gain knowledge on the importance of environmental education and ecosystem
2. To acquire knowledge about environmental pollution- sources, effects and control measures of environmental pollution.
3. To understand the treatment of wastewater and solid waste management.
4. To acquire knowledge with respect to biodiversity, its threats and its conservation and appreciate the concept of interdependence.
5. To be aware of the national and international concern for environment for protecting the environment
## Student Outcomes from Criterion 3 covered by this Course

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<th>Student outcome</th>
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### Mapping of instructional objectives with student outcome

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### List of Topics Covered

<table>
<thead>
<tr>
<th>UNIT I - ENVIRONMENTAL EDUCATION AND ECOSYSTEMS (6 hours)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>UNIT II - ENVIRONMENTAL POLLUTION (6 hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental segments – structure and composition of atmosphere - Pollution – Air, water, soil, thermal and radiation – Effects – acid rain, ozone layer depletion and green house effect – control measures – determination of BOD, COD, TDS and trace metals.</td>
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</tbody>
</table>

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<thead>
<tr>
<th>UNIT III - WASTE MANAGEMENT (6 hours)</th>
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<tr>
<th>UNIT IV - BIODIVERSITY AND ITS CONSERVATION (6 hours)</th>
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<tr>
<th>UNIT V - ENVIRONMENTAL PROTECTION (6 hours)</th>
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</thead>
<tbody>
<tr>
<td>National concern for environment: Important environmental protection acts in India – water, air (prevention and control of pollution) act, wild life conservation and forest act – functions of central and state pollution control boards - international effort – key initiatives of Rio declaration, Vienna convention, Kyoto protocol and Johannesburg summit.</td>
</tr>
</tbody>
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### Course Number and Title

**BT1001 BIOLOGY FOR ENGINEERS**

### Credits / Contact Hours

2 / 30

### Instructor Name

Mr. K. Balagangadharan

### Textbooks, References

**Purpose**

The purpose of this course is to provide a basic understanding of biological mechanisms of living organisms from the perspective of engineers. In addition, the course is expected to encourage engineering students to think about solving biological problems with engineering tools.

<table>
<thead>
<tr>
<th>Prerequisites</th>
<th>Co-requisites</th>
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<tbody>
<tr>
<td>Nil</td>
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</table>

**Required, Elective or Selected Elective (as per Table 5.1a)**

Required

**Instructional Objectives**

1. To familiarize the students with the basic organization of organisms and subsequent building to a living being
2. To impart an understanding about the machinery of the cell functions that is ultimately responsible for various daily activities.
3. To provide knowledge about biological problems that requires engineering expertise to solve them.

**Student Outcomes from Criterion 3 covered by this Course**

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Mapping of instructional objectives with student outcome

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**List of Topics Covered**

UNIT I - BASIC CELL BIOLOGY (6 hours)

UNIT II - BIOCHEMISTRY AND MOLECULAR ASPECTS OF LIFE (5 hours)
Biological Diversity --Chemistry of life: chemical bonds--Biochemistry and Human biology--Protein synthesis—Stem cells and Tissue engineering.

UNIT III - ENZYMES AND INDUSTRIAL APPLICATIONS (5 hours)
Enzymes: Biological catalysts, Proteases, Carbonic anhydrates, Restriction enzymes, and Nucleoside monophosphate kinases—Photosynthesis

UNIT IV - MECHANOCHEMISTRY (7 hours)
Molecular Machines/Motors—Cytoskeleton—Bioremediation—Biosensors

UNIT V - NERVOUS SYSTEM, IMMUNE SYSTEM, AND CELL SIGNALING (7 hours)
Nervous system--Immune system- General principles of cell signaling.
### A.1.2 General Education Courses and others

<table>
<thead>
<tr>
<th>2013 Curriculum Course Code</th>
<th>Name of the Course</th>
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<tbody>
<tr>
<td>LE1002</td>
<td>Value Education</td>
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<tr>
<td>NC1001/ NS1001/ SP1001/ YG1001</td>
<td>NCC/ NSS/ NSO/ YOGA</td>
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<td>English</td>
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<tr>
<td>LE1003/ LE1004/ LE1005/ LE1006/ LE1007</td>
<td>German Language Phase-I/ French Language Phase-I/ Japanese Language Phase-I/ Korean Language Phase-I/ Chinese Language Phase-I</td>
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<td>German Language Phase-II/ French Language Phase-II/ Japanese Language Phase-II/ Korean Language Phase-II/ Chinese Language Phase-II</td>
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<td>Programming in MATLAB</td>
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<td>Soft Skills - I</td>
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</table>
**Course Number and Title**

**LE1002 VALUE EDUCATION**

**Credits / Contact Hours**

1 / 15

**Instructor Name**

Mrs. B. Monika Nair

**Textbooks, References**

- “Values (Collection of Essays)”, Published by: Sri Ramakrishna Math, Chennai-4, 1996.

**Purpose**

To provide guiding principles and tools for the development of the whole person recognizing that the individual is comprised of Physical, Intellectual, Emotional and Spiritual dimensions.

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<tr>
<th>Prerequisites</th>
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<td>Nil</td>
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</table>

**Prerequisites**

Nil

**Co-requisites**

Nil

**Required, Elective or Selected Elective (as per Table 5.1a)**

Required

**Instructional Objectives**

1. To help individuals think about and reflect on different values.
2. To deepen understanding, motivation and responsibility with regard to making personal and social choices and the them in relation to themselves, others, the community and the world at large
3. To inspire individuals to choose their own personal, social, moral and spiritual values and be aware of practical methods for developing and deepening

**Student Outcomes from Criterion 3 covered by this Course**

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**List of Topics Covered**

**UNIT I – INTRODUCTION (3 hours)**

Definition, Relevance, Types of values, changing concepts of values

**UNIT II - INDIVIDUAL AND GROUP BEHAVIOUR (3 hours)**

Personal values – Self – Strengths (self-confidence, self-assessment, self-reliance, self-discipline, determination, self-restraint, contentment, humility, sympathy and compassion, gratitude, forgiveness) Weaknesses (Influences – Peer pressure, familial and societal expectations, media)
UNIT III - SOCIETIES IN PROGRESS (3 hours)
Definition of society; Units of society; Communities – ancient and modern – Agents of change – Sense of survival, security, desire for comfort and ease sense of belonging, social consciousness and responsibility

UNIT IV - ENGINEERING ETHICS (3 hours)
Definition - Societies for engineers – Code of Ethics – Ethical Issues involved in cross border research -- Ethical and Unethical practices – case studies – situational decision making

UNIT V - SPIRITUAL VALUES (3 hours)
What is religion? -- Role of religion – Misinterpretation of religion – moral policing – Consequences -- Religion as spiritual quest – Aesthetics and religion

Course Number and Title
NC1001/NS1001/SP1001/YG1001 NATIONAL CADET CORPS (NCC)/ NATIONAL SERVICE SCHEME (NSS)/ NATIONAL SPORTS ORGANIZATION (NSO) / YOGA

Credits / Contact Hours
1 / 15

Instructor Name
Mr. Harikumar

Textbooks, References

Purpose
To imbibe in the minds of students the concepts and benefits of NCC/NSS/NSO/YOGA and make them practice the same.

Prerequisites
Nil

Co-requisites
Nil

Required, Elective or Selected Elective (as per Table 5.1a)
Required

Instructional Objectives
1. To enable the students to gain knowledge about NCC/NSS/NSO/YOGA and put the same into practice.

Student Outcomes from Criterion 3 covered by this Course

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</table>
### List of Topics Covered

**NATIONAL CADET CORPS (NCC)**
Any student enrolling as a member of National Cadet Core (NCC) will have to attend sixteen parades out of twenty parades each of four periods over a span of academic year.
Attending eight parades in first semester will qualify a student to earn the credits specified in the curriculum. Grading shall be done based on punctuality, regularity in attending the parades and the extent of active involvement.

**NATIONAL SERVICE SCHEME (NSS)**
A student enrolling as member of NSS will have to complete 60 hours of training / social service to be eligible to earn the credits specified in the curriculum.
Grading shall be done by the faculty member handling the course based on punctuality, regularity in attending the classes and the extent of active involvement.

**NATIONAL SPORTS ORGANIZATION (NSO)**
Each student must select one of the following games/sports events and practice for one hour per week. An attendance of 75% is compulsory to earn the credits specified in the curriculum. Grading shall be done by the faculty member handling the course based on punctuality, regularity in attending the classes and the extent of active involvement.
List of games/sports:
- Basket Ball, Football, Volley Ball, Ball Badminton, Cricket, Throw-ball, Track events
- Field events or any other game with the approval of faculty member.

**YOGA**
- Benefits of Agnai Meditation - Meditation - Agnai, Asanas, Kiriyas, Bandas, Muthras
- Benefits of santhi Meditation - Santhi Physical Exercises (I & II)
- Lecture & Practice - Kayakalpa Yoga Asanas, Kiriyas, Bandas, Muthras
- Analysis of Thought - Meditation Santhi Physical Exercises III & IV
- Benefits of Thuriyam - Meditation Thuriyam Kayakalpa Asanas, Kiriyas, Bandas, Muthras
- Attitude - Meditation Thuriyam Kayakalpa Asanas, Kiriyas, Bandas, Muthras
- Importance of Arutkappy & Blessings - Meditation Thuriyam Kayakalpa Asanas, Kiriyas, Bandas, Muthras
- Benefits of Blessings - Meditation Santhi Kayakalpa Asanas, Kiriyas, Bandas, Muthras

**Assessment**
An attendance of 75% is compulsory to earn the credits specified in the curriculum. Grading shall be done by the faculty member handling the course based on punctuality, regularity in attending the classes and the extent of active involvement.

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**Course Number and Title**

**LE1001 ENGLISH**

**Credits / Contact Hours**

2 / 45

**Instructor Name**

Ms.R.Vinodha

**Textbooks, References**

Purpose

To help students achieve proficiency in English and develop their professional communication skills to meet the demand in the field of global communication to enable them to acquire placement anywhere with ease and confidence.

Prerequisites

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Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To enable students improve their lexical, grammatical and communicative competence.
2. To enhance their communicative skills in real life situations.
3. To assist students understand the role of thinking in all forms of communication.
4. To equip students with oral and appropriate written communication skills.
5. To assist students with employability and job search skills.

Student Outcomes from Criterion 3 covered by this Course

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List of Topics Covered

UNIT I - INVENTIONS (9 hours)
1. Grammar and Vocabulary – Tense and Concord:
2. Listening and Speaking – Common errors in Pronunciation (Individual sounds); Process description (Describing the working of a machine, and the manufacturing process)
3. Writing – Interpretation of data (Flow chart, Bar chart)
4. Reading -- (Reading Comprehension -- Answering questions)

UNIT II – ECOLOGY (9 hours)
1. Grammar and Vocabulary – Error Analysis – Synonyms and Antonyms, Parallelisms
2. Listening and Speaking - Conducting Meetings
3. Writing – Notice, Agenda, Minutes; letters to the editor via email: Email etiquette
4. D Reading Comprehension – Summarizing and Note-making

UNIT III – SPACE (9 hours)
1. Grammar and Vocabulary – tense and concord; word formation
2. Listening and Speaking – Distinction between native and Indian English (Speeches by TED and Kalam) – accent, use of vocabulary and rendering;
3. Writing – Definitions and Essay writing
4. Reading Comprehension – Predicting the content

UNIT IV – CAREERS (9 hours)
1. Grammar and Vocabulary –Homonyms and Homophones
2. Listening and Speaking – – Group Discussion
3. Writing Applying for job, cover letter and resume
4. Reading, etymology (roots; idioms and phrases), Appreciation of creative writing.
UNIT V – RESEARCH (9 hours)
1. Grammar and Vocabulary – Using technical terms, Analogies
2. Listening and Speaking -- Presentation techniques (Speech by the learner)
3. Writing – Project Proposal

Course Number and Title

LE1003 GERMAN LANGUAGE PHASE I

Credits / Contact Hours
2 / 30

Instructor Name
Mrs.A.K.Bharathi

Textbooks, References
- Studio d A1. Deutsch als Fremdsprache with CD.(Kursbuch und Sprach training).
- German for Dummies
- Schulz Griesbach

Purpose
Germany offers infinite opportunities for students of engineering for higher studies, research and employment in Germany. B.Tech Students are offered German Language during their second year. Knowledge of the language will be helpful for the students to adjust themselves when they go for higher studies.

Prerequisites
Nil
Co-requisites
Nil

Required, Elective or Selected Elective (as per Table 5.1a)
Required

Instructional Objectives
1. To introduce the language, phonetics and the special characters in German language
2. To introduce German culture & traditions to the students.
3. By the end of Phase – I, the students will be able to introduce themselves and initiate a conversation.
4. We endeavor to develop the ability among the students to read and understand small texts written in German
5. To enable the students to elementary conversational skills.

Student Outcomes from Criterion 3 covered by this Course

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### List of Topics Covered

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<thead>
<tr>
<th>UNIT I (6 hours)</th>
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<tbody>
<tr>
<td><strong>Wichtige Sprachhandlungen:</strong> Phonetics – Sich begrüßen - Sich und andere vorstellen formell / informell - Zahlen von 1 bis 1 Milliarde - verstehen &amp; sprechen</td>
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<tr>
<td><strong>Grammatik:</strong> regelmäßige Verben im Präsens - “sein” und haben im Präsens - Personalpronomen im Nominativ</td>
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<th>UNIT II (6 hours)</th>
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<tr>
<td><strong>Wichtige Sprachhandlungen</strong> Telefon Nummern verstehen und sprechen Uhrzeiten verstehen und sagen Verneinung “nicht und kein” (formell und informell)</td>
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<tr>
<td><strong>Grammatik</strong> : Wortstellung – Aussagesatz – W-Frage und Satzfrage (Ja/Nein Frage) Nomen buchstabieren und notieren bestimmter und unbestimmter Artikel und Negativartikel im Nom. &amp; Akkusativ</td>
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<th>UNIT III (6 hours)</th>
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<tr>
<td><strong>Wichtige Sprachhandlungen</strong> Tageszeiten verstehen und über Termine sprechen - Verabredungen verstehen - Aufgaben im Haushalt verstehen <strong>Grammatik</strong> Personalpronomen im Akkusativ und Dativ - W-Fragen “wie, wer, wohin,wo, was usw.- Genitiv bei Personennamen - Modalverben im Präsens “können, müssen, möchten”</td>
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<th>UNIT IV (6 hours)</th>
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<th>UNIT V (6 hours)</th>
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### Course Number and Title

**LE1004 FRENCH LANGUAGE PHASE I**

### Credits / Contact Hours

2 / 30

### Instructor Name

Mrs. A. Sharada

### Textbooks, References

- Tech French
- French for Dummies.
- French made easy-Goyal publishers
- Panorama

### Purpose

To enable the student learners acquire a basic knowledge of the French language and concepts of general French for everyday interactions and technical French at the beginner’s level and also to get to know the culture of France.
### Prerequisites

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<th>Co-requisites</th>
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### Required, Elective or Selected Elective (as per Table 5.1a)

Required

### Instructional Objectives

1. To enable students improve their grammatical competence.
2. To enhance their listening skills.
3. To assist students in reading and speaking the language.
4. To enhance their lexical and technical competence.
5. To help the students introduce themselves and focus on their communication skills.

### Student Outcomes from Criterion 3 covered by this Course

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### List of Topics Covered

#### UNIT I (6 hours)
Grammar and Vocabulary: Usage of the French verb “se presenter”, a verb of self-introduction and how to greet a person- “saluer”
Listening and Speaking – The authentic sounds of the letters of the French alphabet and the accents that play a vital role in the pronunciation of the words.
Writing – correct spellings of French scientific and technical vocabulary.
Reading -- Reading of the text and comprehension – answering questions.

#### UNIT II (6 hours)
Grammar and Vocabulary – Definite articles , “prepositions de lieu” subject pronouns
Listening and Speaking – pronunciation of words like Isabelle, presenteze and la liaison – vous etes, vous appelez and role play of introducing each other – group activity
Writing – particulars in filling an enrollment / registration form
Reading Comprehension – reading a text of a famous scientist and answering questions.

#### UNIT III (6 hours)
Grammar and Vocabulary – verb of possession “avoir” and 1st group verbs “er”, possessive adjectives and pronouns of insistence- moi, lui, and numbers from 0 to 20
Listening and Speaking –nasal sounds of the words like feminine, ceinture, parfum and how to ask simple questions on one’s name, age, nationality, address mail id and telephone number.
Writing –conjugations of first group verbs and paragraph writing on self-introduction and introducing a third person.
Reading Comprehension – reading a text that speaks of one’s profile and answering questions

#### UNIT IV (6 hours)
Grammar and Vocabulary –negative sentences, numbers from 20 to 69, verb “aimer”and seasons of the year and leisure activities.
Listening and Speaking – To express one’s likes and dislikes and to talk of one’s pastime activities (sports activities), je fais du ping-pong and nasal sounds of words – janvier, champagne
Writing- conjugations of the irregular verbs – faire and savoir and their usage. Paragraph writing on one’s leisure activity- (passé temps favori)
Reading- a text on seasons and leisure activities – answering questions.
UNIT V (6 hours)
Grammar and Vocabulary – les verbes de direction- to ask one’s way and to give directions, verbes- pouvoir and vouloir and 2nd group verbs, a droite, la premiere a gauche and vocabulary relating to accommodation.
Listening and Speaking – to read and understand the metro map and hence to give one directions – dialogue between two people.
Writing – paragraph writing describing the accommodation using the different prepositions like en face de, derriere- to locate.
Reading Comprehension -- a text / a dialogue between two on location and directions- ou est la poste/ la pharmacie, la bibliotheque?.......
List of Topics Covered

UNIT I (8 hours)
1. Introduction to Japanese language. Hiragana Chart 1 - vowels and consonants and related vocabulary.
2. Self introduction
3. Grammar – usage of particles wa, no, mo and ka and exercises
4. Numbers (1-100)
5. Kanji – introduction and basic kanjis – naka, ue, shita, kawa and yama
6. Greetings, seasons, days of the week and months of the year
7. Conversation – audio
8. Japan – Land and culture

UNIT II (8 hours)
1. Hiragana Chart 1 (contd.) and related vocabulary
2. Grammar – usage of kore, sore, are, kono, sone, ano, arimasu and imasu. Particles – ni (location) and ga. Donata and dare.
3. Numbers (up to 99,999)
4. Kanji – numbers (1-10, 100, 1000, 10,000 and yen)
5. Family relationships and colours.
6. Conversation – audio
7. Festivals of Japan

UNIT III (5 hours)
Hiragana Charts 2&3, double consonants, vowel elongation and related vocabulary
Lesson 3
Grammar - particles ni (time), kara, made and ne. Koko, soko, asoko and doko.
Time expressions (today, tomorrow, yesterday, day before, day after)
Kanji – person, man, woman, child, tree and book
Directions – north, south, east and west

UNIT IV (5 hours)
Grammar - directions, kochira, sochira, achira and dochira. Associated vocabulary (mae, ushiro, ue, shita, tonari, soba, etc.)
Conversation – audio
Japanese art and culture like ikebana, origami, etc.

UNIT V (4 hours)
Kanji – hidari, migi, kuchi
Japanese sports and martial arts

Course Number and Title

<table>
<thead>
<tr>
<th>Course Number and Title</th>
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<tbody>
<tr>
<td>LE1006 KOREAN LANGUAGE PHASE I</td>
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Credits / Contact Hours

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Instructor Name

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<tbody>
<tr>
<td>Ms. Soumya Brata Helbler</td>
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<td>Textbooks, References</td>
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<tr>
<td>• Korean through English 1 (Basic Korean Grammar and Conversation).</td>
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<td>• Bharati Korean (Intermediate Korean Grammar).</td>
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<td>• Hand-outs.</td>
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<td>• Various visual mediums such Movie CD, Audio CD.</td>
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<td>• Collection of vocabularies for engineering field.</td>
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<th>Purpose</th>
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<tr>
<td>To enable students achieve a basic exposure on Korea, Korean language and culture. To acquire basic conversational skill in the language.</td>
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<th>Instructional Objectives</th>
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<td>1. To help students learn the scripts.</td>
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<tr>
<td>2. To make the students acquire basic conversational skill.</td>
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<tr>
<td>3. To enable students to know about Korean culture.</td>
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<tr>
<td>4. To create an advantageous situation for the students to have better opportunity for employability by companies who have association with Korea.</td>
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<th>List of Topics Covered</th>
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**UNIT I (6 hours)**
Lesson 1 < Introduction to Korean Language >, Lesson2 < Consonants and Vowels >, <Basic Conversation, Vocabularies and Listening >

**UNIT II (10 hours)**
Lesson 3 < Usage of “To be” >, Lesson 4 < Informal form of “to be” >, Lesson 5 <Informal interrogative form of “to be” >, Lesson 6 < To be, to have, to stay >, < Basic Conversation, Vocabularies and Listening >

**UNIT III (10 hours)**
Lesson 7 < Interrogative practice and Negation >, < Basic Conversation, Vocabularies and Listening >

**UNIT IV (4 hours)**
Lesson 8 < Korean Culture and Business Etiquette >, < Basic Conversation, Vocabularies and Listening >
**Course Number and Title**

LE1007 CHINESE LANGUAGE PHASE I

**Credits / Contact Hours**

2 / 30

**Instructor Name**

Ms. Poulomi

**Textbooks, References**

- A New Chinese Course 1- Beijing Language and Culture University Press.
- New Practical Chinese Reader Textbook (1) – Beijing Language and Culture University Press.
- 40 Lessons For Basic Chinese Course I – Shanghai Translation Press.
- My Chinese Classroom - East China Normal University Press.

**Purpose**

To enable students achieve a basic exposure on China, Chinese language and culture. To acquire basic conversational skill in the language.

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**Instructional Objectives**

1. To help students learn the Chinese scripts.
2. To make the students acquire basic conversational skill.
3. To enable students to know about China and Chinese culture.
4. To create an advantageous situation for the students to have better opportunity for employability by companies who have association with china.

**Student Outcomes from Criterion 3 covered by this Course**

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**List of Topics Covered**

**UNIT I**

Introduction of Chinese Language

**UNIT II**

Phonetics and Notes on pronunciation

a) 21 Initials:

- b p m f d t n l g k h j q x z c s zh ch sh r
b) 37 Finals:

a o e i u ü
ai ou ei ia ua üe
an ong en ian uai üan
ang eng iang uan ün
ao er iao uang
ie uei(ui)
in uen(un)
ing ueng
iong uo
iou(iu)

c) The combination of Initials and Finals - Pinyin

UNIT III
Introduction of Syllables and tones

a) syllable=initial+final+tone
b) There are four tones in Chinese: the high-and-level tone, the rising tone, the falling-and-rising tone, and the falling tone. And the markers of the different tones.

UNIT IV
A. Tones practice
B. the Strokes of Characters

1. Introduction of Chinese Characters
2. The eight basic strokes of characters

UNIT V
1. Learn to read and write the Characters:
   八 (eight) 不 (not) 马 (horse) 米 (rice) 木 (wood).
2. Classes are organized according to several Mini-dialogues.

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<table>
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<tr>
<td>Mrs.A.K.Bharathi</td>
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<td>Studio d A1. Deutsch als Fremdsprache with CD.(Kursbuch und Sprachtraining).</td>
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<td>German for Dummies</td>
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<td>Familiarity in German language will be helpful for the students in preparing their resumes in German. Proficiency in the language will be an added asset for the students to have an edge in the present day highly competitive and global job market</td>
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</table>
**Prerequisites**

| LE1003 | Nil |

**Co-requisites**

**Required, Elective or Selected Elective (as per Table 5.1a)**

**Instructional Objectives**

1. To enable the students to speak and understand about most of the activities in the day to day life.
2. The students will be able to narrate their experiences in Past Tense.
3. The students will be able to understand and communicate even with German Nationals.
4. By the end of Phase – II the students will have a reasonable level of conversational skills.

**Student Outcomes from Criterion 3 covered by this Course**

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**List of Topics Covered**

**UNIT I** (6 hours)
Wichtige Sprachhandlungen: Zimmersuche, Möbel

**UNIT II** (6 hours)
Wichtige Sprachhandlungen: Kleidung, Farben, Materialien.

**UNIT III** (6 hours)
Wichtige Sprachhandlungen: Sehenswürdigkeiten (Prater, Brandenburger Tor, Kolossium, Eifelturm)

**UNIT IV** (6 hours)
Wichtige Sprachhandlungen: Wegbeschreibung/ Einladung interkulturelle Erfahrung.
Grammatik: Verwendung von Präsens für zukünftigen Zeitpunkt.

**UNIT V** (6 hours)
Wichtige Sprachhandlungen: Essen und Trinken im Restaurant, Partyvorbereitung und Feier
### Course Number and Title

**LE1009 FRENCH LANGUAGE PHASE II**

### Credits / Contact Hours

2 / 30

### Instructor Name

Mrs. A. Sharada

### Textbooks, References

- Tech French
- French for Dummies
- French made easy: Goyal publishers
- Panorama

### Purpose

To enable the students communicate effectively with any French speaker and have a competitive edge in the international market.

### Prerequisites

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### Required, Elective or Selected Elective (as per Table 5.1a)

Required

### Instructional Objectives

1. To enable students access information on the internet
2. To receive and send e mails
3. To assist students in gaining a certain level of proficiency to enable them to give the level 1 exam conducted by Alliance Française de Madras.
4. To enhance their lexical and technical competence.

### Student Outcomes from Criterion 3 covered by this Course

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</table>

Mapping of instructional objectives with student outcome

1-4

### List of Topics Covered

#### UNIT I (6 hours)
Grammar and Vocabulary: The second group verbs: Finir, rougir, grossir, grandir . “Les preposition de temps”: à, en, le, de 7h à 8h, jusqu’à, vers.
Listening and Speaking – the semi- vowels: Voilà, pollutant. Writing – the days of the week. Months, technical subjects, time, “les spécialités scientifiques et l’ année universitaire, paragraph writing about time table.
Reading -- Reading of the text and comprehension – answering questions

#### UNIT II (6 hours)
Grammar and Vocabulary – The adjectives, the nationality, feminine & masculine noun forms “les métiers scientifiques”. Listening and Speaking – Vowels: soirée, année, près de, très. Writing – Countries name, nationality, “les métiers scientifiques”, numbers from: 69 to infitive and some measures of unit. Reading Comprehension – reading a text.

UNIT III (6 hours)
Grammar and Vocabulary – near future, The demonstrative adjectives, Express the aim by using the verb, Listening and Speaking –“La liaison interdite – en haut”. Writing – some scientific terms, French expressions to accept an invitation. Sentence framing. Reading Comprehension – reading a text.

UNIT IV (6 hours)
Grammar and Vocabulary – the verbs: manger, boire , the partitive articles Listening and Speaking – “le ‘e’ caduc Writing- the food, the ingredients, fruits, vegetables, expression of quantity, paragraph writing about food habits. Reading – reading a text.

UNIT V (6 hours)
Grammar and Vocabulary – “ les prepositions de lieu”: au à la, à l’, chez, the reflexives verbs, verbs to nouns. Listening and Speaking – “le ‘e’ sans accents ne se prononce pas. C’est un “e” caduc. Ex: quatre, octobre. “ les sons (s) et (z)- salut , besoin. Writing –paragraph writing about one’s everyday life, French culture. Reading Comprehension -- reading a text or a song.....
**Instructional Objectives**

1. To help students learn Katakana script (used to write foreign words)
2. To improve their conversational skill.
3. To enable students to know about Japan and Japanese culture.
4. To improve their employability by companies who are associated with Japan.

**Student Outcomes from Criterion 3 covered by this Course**

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<th>Student outcome</th>
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</table>

**List of Topics Covered**

**UNIT I (8 hours)**
Introduction to Verbs; Ikimasu, okimasu, nemasu, tabemasu etc.
Grammar – usage of particles de, o, to, ga(but) and exercises
Common daily expressions and profession.
Katakana script and related vocabulary.
Religious beliefs, Japanese housing and living style.
Conversation – audio

**UNIT II (8 hours)**
Grammar : Verbs – Past tense, negative - ~mashita, ~masen deshita..
i-ending and na-ending adjectives - introduction
Food and transport (vocabulary)
Japanese food, transport and Japanese tea ceremony.
Kanji Seven elements of nature (Days of the week)
Conversation – audio

**UNIT III (6 hours)**
Grammar - ~masen ka, mashou
Adjectives (present/past – affirmative and negative)
Conversation – audio

**UNIT IV (4 hours)**
Grammar – ~te form
Kanji – 4 directions
Parts of the body
Japanese political system and economy
Conversation – audio

**UNIT V (4 hours)**
Stationery, fruits and vegetables
Counters – general, people, floor and pairs
### Course Number and Title

**LE1011  KOREAN LANGUAGE PHASE II**

### Credits / Contact Hours

2 / 30

### Instructor Name

Ms. Soumya Brata Helbler

### Textbooks, References

- Korean through English 2 (Basic Korean Grammar and Conversation)
- Bharati Korean (Intermediate Korean Grammar)
- Hand-outs
- Various visual media such Movie CD, Audio CD, and music
- Collection of vocabularies for engineering field.

### Purpose

To enable students achieve a basic exposure on Korea, Korean language and culture. To acquire basic conversational skill in the language.

### Prerequisites

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### Instructional Objectives

1. To help students learn the scripts.
2. To make the students acquire basic conversational skill.
3. To enable students to know about Korean culture.
4. To create an advantageous situation for the students to have better opportunity for employability by companies who have association with Korea.

### Student Outcomes from Criterion 3 covered by this Course

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Mapping of instructional objectives with student outcome

1-4

### List of Topics Covered

**UNIT I (9 hours)**  
Lesson 1 <Review of Vowels and Consonants>, Lesson2 <Various Usages of “To be”>, Lesson3 <Informal form of “to be”> <Basic Conversation, Vocabularies and Listening>

**UNIT II (9 hours)**  
Lesson 4 <Informal interrogative form of “to be”>, Lesson 5 <To be, to have, to stay>, Lesson 5 <Advanced
UNIT III (9 hours)
Lesson 7 <Honorific forms of noun and verb2>, Lesson 8 <Formal Declarative2>, Lesson 9 <Korean Business Etiquette>, <Basic Conversation, Vocabularies and Listening>.

UNIT IV (3 hours)
Lesson 10 <Field Korean as an Engineer1>, <Field Korean as an Engineer2> <Basic Conversation, Vocabularies and Listening>.

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### Course Number and Title

**LE1012 CHINESE LANGUAGE PHASE II**

### Credits / Contact Hours

2 / 30

### Instructor Name

Ms. Poulomi

### Textbooks, References

- A New Chinese Course 1- Beijing Language and Culture University Press
- New Practical Chinese Reader Textbook (1) – Beijing Language and Culture University Press
- 40 Lessons For Basic Chinese Course I – Shanghai Translation Press
- My Chinese Classroom - East China Normal University Press

### Purpose

To enable students achieve a basic exposure on China, Chinese language and culture. To acquire basic conversational skill in the language.

### Prerequisites

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### Required, Elective or Selected Elective (as per Table 5.1a)

Required

### Instructional Objectives

1. To help students learn the Chinese scripts.
2. To make the students acquire basic conversational skill.
3. To enable students to know about China and Chinese culture.
4. To create an advantageous situation for the students to have better opportunity for employability by companies who have association with china.

### Student Outcomes from Criterion 3 covered by this Course

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Mapping of instructional objectives with student

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<tbody>
<tr>
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</table>
## List of Topics Covered

### UNIT I
A) Greetings
- Questions and answers about names
- Introducing oneself
- Receiving a guest
- Making corrections
  - **New words:** 你 (you), 好 (good, well), 工作 (work, job), 人员 (personnel, staff member), 请问 (May I ask...), 贵 (expensive, valuable), 姓 (one’s family name is)
B) Questions and answers about the number of people in a family
- Expressing affirmation/negation
- Questions and answers about the identity of a person same or not.
  - **New words:** 家 (family, home), 有 (have), 几 (several), 爸爸 (father), 妈妈 (mother), 哥哥 (elderly brother)

### UNIT II
A. About places
B. About numbers
C. if one knows a certain person
D. Expressing apology
E. Expressing affirmation/negation
F. Expressing thanks.
  - **New Words:** 客人 (guest, visitor), 这儿 (here), 中文 (Chinese), 对 (right, correct), 学生 (student), 多 (many, a lot)
  - **Grammar:** Sentences with a verbal predicate

### UNIT III
Introducing people to each other
A. Exchanging amenities
B. Making/Negating conjectures
C. Questions and answers about nationality
  - **Grammar:** Sentences with an adjectival predicate

### UNIT IV
A) About places to go
- Indicating where to go and what to do
- Referring to hearsay.
- Saying good-bye
B) Making a request
- Questions and answers about postcodes and telephone numbers
- Reading dates postcodes and telephone numbers
- Counting Renmibi
  - **Grammar:** Sentences with a subject-verb construction as its predicate
  - **Grammar:** Sentences with a nominal predicate

### UNIT V
A. Asking and answering if someone is free at a particular time
B. Making proposals
C. Questions about answers about time
D. Making an appointment
E. Telling the time
- Making estimations.
Course Number and Title

CS1001  PROGRAMMING USING MATLAB

Credits / Contact Hours

2 / 45

Instructor Name

Dr. M. Sangeetha

Textbooks, References


Purpose

This Lab Course will enable the students to understand the fundamentals and programming knowledge in MATLAB

Prerequisites

Nil

Co-requisites

Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To learn the MATLAB environment and its programming fundamentals
2. Ability to write Programs using commands and functions
3. Able to handle polynomials, and use 2D Graphic commands.

Student Outcomes from Criterion 3 covered by this Course

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List of Topics Covered

LIST OF EXPERIMENTS
1. Practicing MATLAB environment with simple exercises to familiarize Command Window, History, Workspace, Current Directory, Figure window, Edit window, Shortcuts, Help files.
2. Data types, Constants and Variables, Character constants, operators, Assignment statements.
3. Control Structures: For loops, While, If control structures, Switch, Break, Continue statements.
4. Input-Output functions, Reading and Storing Data.
5. Vectors and Matrices, commands to operate on vectors and matrices, matrix Manipulations.
6. Arithmetic operations on Matrices, Relational operations on Matrices, Logical operations on Matrices.
**Course Number and Title**

PD1001 SOFT SKILLS-I

**Credits / Contact Hours**

1 / 30

**Instructor Name**

Mr. Harikumar

**Textbooks, References**

- INSIGHT, 2012, Career Development Centre, SRM Publications
- Thomas A Harris, “I am ok, You are ok”, New York-Harper and Row, 1972

**Purpose**

To enhance holistic development of students and improve their employability skills

**Prerequisites**

Nil

**Co-requisites**

Nil

**Required, Elective or Selected Elective (as per Table 5.1a)**

Required

**Instructional Objectives**

1. To develop inter personal skills and be an effective goal oriented team player.
2. To develop professionals with idealistic, practical and moral values
3. To develop communication and problem solving skills.
4. To re-engineer attitude and understand its influence on behavior

**Student Outcomes from Criterion 3 covered by this Course**

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**List of Topics Covered**

**UNIT I - SELF ANALYSIS (4 hours)**

SWOT Analysis, Who am I, Attributes, Importance of Self Confidence, Self Esteem

**UNIT II – ATTITUDE (4 hours)**

Factors influencing Attitude, Challenges and lessons from Attitude.

**Change Management**

Exploring Challenges, Risking Comfort Zone, Managing Change
UNIT III – MOTIVATION (6 hours)
Factors of motivation, Self talk, Intrinsic & Extrinsic Motivators.

UNIT IV - GOAL SETTING (6 hours)
Wish List, SMART Goals, Blue print for success, Short Term, Long Term, Life Time oals.

Time Management
Value of time, Diagnosing Time Management, Weekly Planner To do list, Prioritizing work.

UNIT V – CREATIVITY (10 hours)
Out of box thinking, Lateral Thinking

Course Number and Title
PD1002 SOFT SKILLS-II

Credits / Contact Hours
1 / 30

Instructor Name
Ms.B.Revathi

Textbooks, References

Purpose
To enhance holistic development of students and improve their employability skills.

Prerequisites or Co-requisites
Nil

Required, Elective or Selected Elective (as per Table 5.1a)
Required

Instructional Objectives
1. To develop inter personal skills and be an effective goal oriented team player.
2. To develop professionals with idealistic, practical and moral values.
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### List of Topics Covered

**UNIT I - INTERPERSONAL SKILLS (6 hours)**
Understanding the relationship between Leadership Networking & Team work, Realizing Ones Skills in Leadership, Networking & Team Work, and Assessing Interpersonal Skills Situation description of Interpersonal Skill.

#### Team Work
Necessity of Team Work Personally, Socially and Educationally

**UNIT II – LEADERSHIP (4 hours)**
Skills for a good Leader, Assessment of Leadership Skills

#### Change Management
Exploring Challenges, Risking Comfort Zone, Managing Change

**UNIT III - STRESS MANAGEMENT (6 hours)**
Causes of Stress and its impact, how to manage & distress, Understanding the circle of control, Stress Busters.

#### Emotional Intelligence
What is Emotional Intelligence, emotional quotient why Emotional Intelligence matters, Emotion Scales. Managing Emotions.

**UNIT IV - CONFLICT RESOLUTION (4 hours)**
Conflicts in Human Relations – Reasons Case Studies, Approaches to conflict resolution.

**UNIT V - DECISION MAKING (10 hours)**

### Course Number and Title

**PD1003 APTITUDE-I**

### Credits / Contact Hours

1 / 30

### Instructor Name

Ms. B. Revathi

### Textbooks, References

- Agarwal R.S – Quantitative Aptitude for Competitive Examinations, S.Chand Limited 2011
- Other material related to quantitative aptitude

### Purpose
To enhance holistic development of students and improve their employability skills.

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**Required, Elective or Selected Elective (as per Table 5.1a)**

Required

**Instructional Objectives**

1. To improve aptitude, problem solving skills and reasoning ability of the student.
2. To collectively solve problems in teams & group.

**Student Outcomes from Criterion 3 covered by this Course**

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**List of Topics Covered**

**UNIT I – NUMBERS (6 hours)**
Types and Properties of Numbers, LCM, GCD, Fractions and decimals, Surds

**UNIT II - ARITHMETIC – I (6 hours)**
Percentages, Profit & Loss, Simple Interest & Compound Interest, Clocks & calendars

**UNIT III - ALGEBRA – I (6 hours)**
Logarithms, Problems on ages

**UNIT IV - MODERN MATHEMATICS – I (6 hours)**
Permutations, Combinations, Probability

**UNIT V – REASONING (6 hours)**
Logical Reasoning, Analytical Reasoning

---

**Course Number and Title**

**PD1004 APTITUDE-II**

**Credits / Contact Hours**

1 / 30

**Instructor Name**

Ms. S. Mythreyi Koppur

**Textbooks, References**

- Personality Development -Verbal Work Book, Career Development Centre, SRM Publications
Purpose

To enhance holistic development of students and improve their employability skills.

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Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To improve verbal aptitude, vocabulary enhancement and reasoning ability of the student.

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<th>Student Outcomes from Criterion 3 covered by this Course</th>
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List of Topics Covered

UNIT I (6 hours)
Critical Reasoning – Essay Writing

UNIT II (6 hours)
Synonyms – Antonyms - Odd Word - Idioms & Phrases

UNIT III (6 hours)
Word Analogy - Sentence Completion

UNIT IV (6 hours)
Spotting Errors - Error Correction - Sentence Correction

UNIT V (6 hours)
Sentence Anagram - Paragraph Anagram - Reading Comprehension

Course Number and Title

PD1005 APTITUDE-III

Credits / Contact Hours

1/30
# Instructor Name
Ms. B. Revathi

# Textbooks, References
To enhance holistic development of students and improve their employability skills.

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# Required, Elective or Selected Elective (as per Table 5.1a)
Required

# Instructional Objectives
1. Understand the importance of effective communication in the workplace.
2. Enhance presentation skills – Technical or general in nature.
3. Improve employability scope through Mock GD, Interview

# Student Outcomes from Criterion 3 covered by this Course

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Mapping of instructional objectives with student outcome

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# List of Topics Covered

**UNIT I (6 hours)**
Video Profile

**UNIT II (6 hours)**
Tech Talk / Area of Interest / Extempore / Company Profile

**UNIT III (6 hours)**
Curriculum Vitae

**UNIT IV (6 hours)**
Mock Interview

**UNIT V (6 hours)**
Group Discussion / Case Study

---

# Course Number and Title
**PD1006 APTITUDE-IV**

# Credits / Contact Hours
1/30
### Instructor Name

Ms. G. Shobhana

### Textbooks, References

- Agarwal, R.S – Quantitative Aptitude for Competitive Examinations, S Chand Limited 2011
- Abhijit Guha, Quantitative Aptitude for Competitive Examinations, Tata Mcgraw Hill, 3rd Edition
- Edgar Thrope, Test Of Reasoning For Competitive Examinations, Tata Mcgraw Hill, 4th Edition
- Other material related to quantitative aptitude

### Purpose

To enhance holistic development of students and improve their employability skills.

### Prerequisites

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### Required, Elective or Selected Elective (as per Table 5.1a)

Required

### Instructional Objectives

1. To improve aptitude, problem solving skills and reasoning ability of the student.
2. To collectively solve problems in teams & group.

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### List of Topics Covered

**UNIT I - ARITHMETIC – II (6 hours)**
Ratios & Proportions, Averages, Mixtures & Solutions

**UNIT II - ARITHMETIC – III (6 hours)**
Time, Speed & Distance, Time & Work

**UNIT III - ALGEBRA – II (6 hours)**
Quadratic Equations, Linear equations & inequalities

**UNIT IV – GEOMETRY (6 hours)**
2D Geometry, Trigonometry, Menstruation

**UNIT V – MODERN MATHEMATICS – II (6 hours)**
Sets & Functions, Sequences & Series, Data Interpretation, Data Sufficiency
### A.1.3 Engineering Topics - I

#### General Engineering Courses and others

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<td>Basic Civil Engineering</td>
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<td>ME1001</td>
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<td>Electronics Engineering Practice</td>
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<td>Basic Electrical Engineering</td>
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<tr>
<td>CY1003</td>
<td>Electrical Engineering Practice</td>
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</table>
Course Number and Title

CE1001 BASIC CIVIL ENGINEERING

Credits / Contact Hours

2 / 30

Instructor Name

Mrs.A.Vijaya

Textbooks, References


Purpose

To get exposed to the glimpses of Civil Engineering topics that is essential for an Engineer.

Prerequisites

Nil

Co-requisites

Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To know about different materials and their properties
2. To know about engineering aspects related to buildings
3. To know about importance of surveying and the transportation systems
4. To get exposed to the rudiments of engineering related to dams, water supply, and sewage disposal.

Student Outcomes from Criterion 3 covered by this Course

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List of Topics Covered

UNIT I - BUILDING MATERIALS (6 hours)

Concrete – grade designation – properties – uses.

UNIT II - MATERIAL PROPERTIES (6 hours)

UNIT III - BUILDING COMPONENTS (6 hours)

UNIT IV - SURVEYING AND TRANSPORTATION (6 hours)

UNIT V - WATER SUPPLY AND SEWAGE DISPOSAL (6 hours)

---

Course Number and Title

ME1001 BASIC MECHANICAL ENGINEERING

Credits / Contact Hours

2 / 30

Instructor Name

Mr.A.Rajasekaran

Textbooks, References


Purpose

To familiarize the students with the basics of Mechanical Engineering.

<table>
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Required, Elective or Selected Elective (as per Table 5.1a)
Required

**Instructional Objectives**

1. To familiarize with the basic machine elements
2. To familiarize with the Sources of Energy and Power Generation
3. To familiarize with the various manufacturing processes

**Student Outcomes from Criterion 3 covered by this Course**

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**List of Topics Covered**

**UNIT I - MACHINE ELEMENTS – I (5 hours)**

**UNIT II - MACHINE ELEMENTS – II (5 hours)**

**UNIT III – ENERGY (10 hours)**
Sources: Renewable and non-renewable (various types, characteristics, advantages/disadvantages). Power Generation: External and internal combustion engines – Hydro, thermal and nuclear power plants (layouts, element/component description, advantages, disadvantages, applications). Simple Problems.

**UNIT IV - MANUFACTURING PROCESSES – I (5 hours)**

**UNIT V - MANUFACTURING PROCESSES– II (5 hours)**

---

**Course Number and Title**

**ME1005 ENGINEERING GRAPHICS**

**Credits / Contact Hours**

3 / 75

**Instructor Name**

Mr. A. Rajasekaran

**Textbooks, References**


### Purpose

1. To draw and interpret various projections of 1D, 2D and 3D objects.
2. To prepare and interpret the drawings of buildings.

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**Required, Elective or Selected Elective (as per Table 5.1a)**

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**Instructional Objectives**

1. To familiarize with the construction of geometrical figures
2. To familiarize with the projection of 1D, 2D and 3D elements
3. To familiarize with the sectioning of solids and development of surfaces
4. To familiarize with the Preparation and interpretation of building drawing

**Student Outcomes from Criterion 3 covered by this Course**

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**List of Topics Covered**

**UNIT I - FUNDAMENTALS OF ENGINEERING GRAPHICS (2 hours)**

**UNIT II - PROJECTION OF LINES AND SOLIDS (4 hours)**
Projection of straight lines – Projection of planes - Projection of solids – Auxiliary projections.

**UNIT III - SECTIONS AND DEVELOPMENTS (3 hours)**
Sections of solids and development of surfaces.

**UNIT IV - PICTORIAL PROJECTIONS (4 hours)**
Conversion of Projections: Orthographic projection – Isometric projection of regular solids and combination of solids.

**UNIT V - BUILDING DRAWING (2 hours)**
Plan, Elevation and section of single storied residential (or) office building with flat RCC roof and brick masonry walls having not more than 3 rooms (planning / designing is not expected in this course) with electrical wiring diagram.
## Course Number and Title
EC1001  BASIC ELECTRONICS ENGINEERING

## Credits / Contact Hours
2 / 30

## Instructor Name
Ms. A. Ramya

## Textbooks, References

## Purpose
This course provides comprehensive idea about working principle, operation and characteristics of electronic devices, transducers, Digital Electronics and Communication Systems.

## Prerequisites
Nil

## Co-requisites
Nil

## Required, Elective or Selected Elective (as per Table 5.1a)
Required

## Instructional Objectives
At the end of the course students will be able to gain knowledge about the
1. Fundamentals of electronic components, devices, transducers
2. Principles of digital electronics
3. Principles of various communication systems

## Student Outcomes from Criterion 3 covered by this Course

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Mapping of instructional objectives with student outcome

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2. 3 

## List of Topics Covered
UNIT I - ELECTRONIC COMPONENTS (4 hours)
Passive components – resistors, capacitors & inductors (properties, common types, I-V relationship and uses).
UNIT II - SEMICONDUCTOR DEVICES (7 hours)
Semiconductor Devices - Overview of Semiconductors - basic principle, operation and characteristics of PN diode, Zener diode, BJT, JFET, optoelectronic devices (LDR, photodiode, phototransistor, solar cell, optocouplers)

UNIT III – TRANSUCERS (5 hours)
Transducers - Instrumentation – general aspects, classification of transducers, basic requirements of transducers, passive transducers - strain gauge, thermistor, Hall-Effect transducer, LVDT, and active transducers – piezoelectric and thermocouple.

UNIT IV - DIGITAL ELECTRONICS (7 hours)
Number systems – binary codes - logic gates - Boolean algebra, laws & theorems - simplification of Boolean expression - implementation of Boolean expressions using logic gates - standard forms of Boolean expression.

UNIT V - COMMUNICATION SYSTEMS (7 hours)
Block diagram of a basic communication system – frequency spectrum - need for modulation - methods of modulation - principles of AM, FM, pulse analog and pulse digital modulation – AM / FM transmitters & receivers (block diagram description only)

Course Number and Title
EC1002 ELECTRONICS ENGINEERING PRACTICES

Credits / Contact Hours
1 / 30

Instructor Name
Dr. P. Eswaran

Textbooks, References
• ORCAD User manual.
• Department Laboratory Manual

Purpose
To equip the students with the knowledge of PCB design and fabrication processes.

Prerequisites
Nil

Co-requisites
EC1001

Required, Elective or Selected Elective (as per Table 5.1a)
Required

Instructional Objectives
1. To familiarize the electronic components and basic electronic instruments.
2. To make familiar with PCB design and various processes involved.
3. To provide in-depth core knowledge in the and fabrication of Printed Circuit Boards.
4. To provide the knowledge in assembling and testing of the PCB based electronic circuits.

Student Outcomes from Criterion 3 covered by this Course
List of Topics Covered

Expt. 1: INTRODUCTION TO BASICS OF ELECTRONIC COMPONENTS AND INSTRUMENTS (4 hours)

Expt. 2: SCHEMATIC CAPTURE (6 hours)
Introduction to ORCAD schematic capture tool, Simulation of simple electronic circuit, Schematic to layout transfer, Layout Printing

Expt. 3: PCB DESIGN PROCESS (6 hours)
Conception Level Introduction: Specifying Parts, Packages and Pin Names, Libraries and Checking foot prints of the components, Partlist, Netlist, Making Netlist Files, Placing Parts, Routing Traces, Modifying Traces, Mounting Holes, Adding Text, PCB Layout, DRC, Pattern Transfer

Expt. 4: PCB FABRICATION PROCESS (6 hours)
Etching, cleaning, drying and drilling

Expt. 5: ASSEMBLING AND TESTING (8 hours)
Identifying the components and its location on the PCB, soldering of active and passive components, Testing the assembled circuit for correct functionality
This course provides comprehensive idea about circuit analysis, working principles of machines and common measuring instruments.

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**Required, Elective or Selected Elective (as per Table 5.1a)**

Required

**Instructional Objectives**

1. Understand the basic concepts of magnetic circuits, AC & DC circuits.
2. Explain the working principle, construction, applications of DC & AC machines and measuring instruments.
3. Gain knowledge about the fundamentals of wiring and earthing.

**Student Outcomes from Criterion 3 covered by this Course**

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**List of Topics Covered**

**UNIT I – FUNDAMENTALS OF DC CIRCUITS (6 hours)**
Introduction to DC and AC circuits, Active and passive two terminal elements, Ohms law, Voltage-Current relations for resistor, inductor, capacitor, Kirchhoff's laws, Mesh analysis, Nodal analysis, Ideal sources –equivalent resistor, current division, voltage division

**UNIT II – MAGNETIC CIRCUIT (6 hours)**
Introduction to magnetic circuits-Simple magnetic circuits-Faraday's laws, induced emfs and inductances

**UNIT III – AC CIRCUITS (6 hours)**
Sinusoids, Generation of AC, Average and RMS values, Form and peak factors, concept of phasor representation, J operator. Analysis of R-L, R-C, R-L-C circuits. Introduction to three phase systems - types of connections, relationship between line and phase values.

**UNIT IV – ELECTRICAL MACHINES & MEASURING INSTRUMENTS(6 hours)**
Working principle, construction and applications of DC machines and AC machines (1 - phase transformers, single phase induction motors: split phase, capacitor start and capacitor start & run motors). Basic principles and classification of instruments -Moving coil and moving iron instruments.

**UNIT V – ELECTRICAL SAFETY, WIRING & INTRODUCTION TO POWER SYSTEM (6 hours)**
Safety measures in electrical system- types of wiring- wiring accessories- staircase, fluorescent lamps & corridor wiring- Basic principles of earthing-Types of earthing- Simple layout of generation, transmission & distribution of power.
Course Number and Title

EE1002 ELECTRICAL ENGINEERING PRACTICE

Credits / Contact Hours

1 / 30

Instructor Name

Dr. C.S. Boopathy

Textbooks, References


Purpose

To provide exposure to the students with hands on experience on various Electrical Engineering practices.

Prerequisites

Nil

Co-requisites

EE1001

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

At the end of the course students will be able.

1. To learn the residential wiring and various types of wiring.
2. To measure the various electrical quantities.
3. To gain knowledge about the fundamentals of various electrical gadgets and their working and trouble shooting of them.
4. To design a prototype of a transformer.
5. To know the necessity and types of earthing and measurement of earth resistance.

Student Outcomes from Criterion 3 covered by this Course

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<th>Student outcome</th>
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</table>

List of Topics Covered

LIST OF EXPERIMENTS

1. Residential wiring (using Energy meter, fuses, switches, indicator, lamps, etc)
2. Types of wiring (fluorescent lamp wiring, staircase wiring, godown wiring, etc)
3. Measurement of electrical quantities (like voltage, current, power, power factor in RLC circuits)
4. Measurement of energy (using single phase and three phase energy meter)
5. Study of Earthing and Measurement of Earth resistance.
6. Study of trouble shooting of electrical equipments (fan, iron box, mixer-grinder, etc)
7. Study of various electrical gadgets (Induction motor, transformer, CFL, LED, PV cell, etc)
8. Assembly of choke or small transformer.
## A.1.4 Engineering Topics - II

### Professional Core Courses

<table>
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<tr>
<th>2013 Curriculum Course Code</th>
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<tr>
<td>EC1003</td>
<td>Electric Circuits</td>
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<td>EC1004</td>
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<td>EC1005</td>
<td>Electromagnetic Theory And Waveguides</td>
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<td>EC1006</td>
<td>Electron Devices</td>
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<td>Transmission Lines And Networks</td>
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<td>Electronic Circuits</td>
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<td>Elements of Information Theory and Coding</td>
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Course Number and Title

**EC1003 ELECTRIC CIRCUITS**

Credits / Contact Hours

3 / 45

Instructor Name

Dr. K. Kalimuthu

Textbooks, References


Purpose

To expose basic circuit concepts, circuit modeling and methods of circuit analysis in time domain and frequency domain for solving simple and multi dimensional circuits including coupled circuits and tuned circuits.

Prerequisites

Nil

Co-requisites

Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To understand the concept of circuit elements lumped circuits, waveforms, circuit laws and network reduction
2. To solve the electrical network using mesh and nodal analysis by applying network theorems
3. To understand the concept of resonance in Series and parallel circuits and to know the basic concepts of coupled circuits.
4. To analyze the transient response of series and parallel A.C. circuits and to solve problems in time domain using Laplace Transform
5. To analyze the tuned circuits and to analyze DC, AC and Transient response of the circuit using PSICE.

Student Outcomes from Criterion 3 covered by this Course

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Mapping of instructional objectives with

1-5 5 5 1-4 5
## List of Topics Covered

### UNIT I - BASIC CIRCUIT CONCEPTS & LAWS (9 hours)

### UNIT II - NETWORK THEOREMS: (Both DC & AC Circuit Analysis) (9 hours)

### UNIT III - RESONANCE & COUPLED CIRCUITS (9 hours)

### UNIT IV - TRANSIENT ANALYSIS (9 hours)

### UNIT V - TUNED CIRCUITS & PSPICE (9 hours)
Tuned Circuits – Single Tuned Circuits – Double Tuned Circuits – Analysis
PSPICE (Elementary treatment only) – DC Analysis and Control Statements - AC Analysis and Control Statements – Transient analysis.

---

### Course Number and Title

**EC1004** **ELECTRIC CIRCUITS LAB**

### Credits / Contact Hours

1 / 30

### Instructor Name

Mrs.A. Anilet Bala

### Textbooks, References

- LAB MANUAL, Department of ECE, SRM University.

### Purpose

To inculcate strong practical skills on the fundamental theorems and transient circuit analysis.
Nil | EC1003
---|---
**Required, Elective or Selected Elective (as per Table 5.1a)**

Required

**Instructional Objectives**

1. Provide hands-on experience to the students so that they are able to put theoretical concepts to practice.
2. Use computer simulation tools such as PSPICE, or Multisim to carry out design experiments as it is a key analysis tool of engineering design.
3. Give a specific design problem to the students, which after completion they will verify using the simulation software or hardwired implementation.
4. Understand the concept of circuit laws
5. Solve the electrical network using mesh and nodal analysis by applying network theorems
6. Understand the concept of resonance in series and parallel circuits
7. Analyze the transient response of series and parallel A.C. circuits and to solve problems in time domain using Laplace Transform.

**Student Outcomes from Criterion 3 covered by this Course**

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**List of Topics Covered**

**LIST OF EXPERIMENTS**

1. Verification of Kirchoff’s voltage and Current Laws
2. Verification of Superposition Theorem
3. Verification of Thevenin’s Theorem & Norton’s Theorem
4. Verification of Maximum Power Transfer Theorem
5. Verification of Tellegen’s and Reciprocity Theorem
8. Series RLC Resonance Circuits (Frequency response& Resonant frequency)
9. Parallel RLC Resonance Circuits (Frequency response & Resonant frequency)
10. Simulation experiments using PSPICE or MultiSim

**EC1005 ELECTROMAGNETIC THEORY AND WAVEGUIDES**

**Credits / Contact Hours**

3 / 45

**Instructor Name**

Mrs. M. Neelaveni Ammal

**Textbooks, References**

- Raju.G.S.N, “Electromagnetic Field Theory and Transmission Lines”, Pearson Education, First Indian print,
Purpose
To enable the students understand the universal theoretical concepts in three dimensional real world and find solution to problems related to electromagnetic wave propagation.

Prerequisites
MA1001 & MA1002

Co-Requisites
Nil

Required, Elective or Selected Elective (as per Table 5.1a)
Required

Instructional Objectives
1. To impart knowledge on the basic concepts of electric and magnetic fields.
2. To educate scientifically about Maxwell’s equations and Poynting theorem.
3. To interpret the Wave propagation in between parallel plates.
4. To emphasize the significance of different types of waveguides.

Student Outcomes from Criterion 3 covered by this Course

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</table>

List of Topics Covered

UNIT I - STATIC ELECTRIC FIELDS (11 hours)

UNIT II - STEADY MAGNETIC FIELDS (9 hours)
Biot Savart Law – Applications of Biot Savart Law - Ampere’s circuitual law - Applications circuitual law – Curl – Stoke’s Theorem - Magnetic flux and magnetic flux density – The scalar and vector magnetic potentials – Derivation of the steady magnetic field laws.

UNIT III - TIME VARYING FIELDS AND MAXWELLS EQUATIONS (7 hours)

UNIT IV - GUIDED WAVES (9 hours)

UNIT V - WAVEGUIDE THEORY (9 hours)
Rectangular wave guides: TE waves and TM waves in Rectangular waveguides – Dominant mode – cutoff frequency in wave guides – Impossibility of TEM waves in waveguides.
Circular waveguides: Wave impedance and characteristic impedance – Power flow in wave guides – Attenuation factor and Q of wave guides – Transmission line analogy for waveguides

### Course Number and Title

**EC1006 ELECTRON DEVICES**

### Credits / Contact Hours

3 / 45

### Instructor Name

Mrs. E. Chitra

### Textbooks, References


### Purpose

The purpose of this course is to provide a basis for understanding the characteristics, operation and limitations of semiconductor and optoelectronic devices. This course brings together the semiconductor device physics, optoelectronic device principles and complete description of power supply circuit.

<table>
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<th>Prerequisites</th>
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</table>

### Prerequisites

1. To understand the physical construction, working and operational characteristics of Semiconductor devices.
2. To understand the operation of power supply circuits built using filters, rectifiers and voltage regulators.
3. To discuss the manufacturing process of monolithic ICs & the fabrication of components on monolithic IC.

### Student Outcomes from Criterion 3 covered by this Course

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</table>
# List of Topics Covered

## UNIT I - SEMICONDUCTOR DIODES AND SPECIAL PURPOSE DIODES (12 hours)


**Special purpose diodes:** Zener diode – Point-contact diode – Backward diode – Varactor diode – Step-recovery diode – Schottky diode, PNPN diode – RF diode.

## UNIT II - BIPOLAR TRANSISTORS (6 hours)

**Bipolar Transistors:** Construction – working – transistor currents – transistor configurations and input-output characteristics – Early effect (base-width modulation) – Ebers Moll model – transistor as an amplifier – Transistor as a switch.

## UNIT III - FIELD-EFFECT TRANSISTORS (6 hours)

**Field-Effect Transistors:** construction, working and VI characteristics of JFET – comparison of BJT and JFET – MOSFET – enhancement MOSFET, depletion MOSFET, their working principle and VI characteristics, comparison of MOSFET with JFET, comparison of D MOSFET with E MOSFET, CMOS, MESFET, CCD.

## UNIT IV - DC POWER SUPPLIES (12 hours)

**Rectifiers and Filters:** Block schematic of a typical DC power supply, single phase HWR, FWR, full-wave bridge rectifier, power supply filters (ripple factor and efficiency analysis), bleeder resistor, voltage dividers.

**Voltage regulators:** voltage regulation, Zener diode shunt regulator, transistor series regulator, transistor shunt regulator, switching regulators, design of complete DC power supply circuit.

## UNIT V - INTEGRATED CIRCUIT FABRICATION (9 hours)

Integrated circuit – advantages and drawback of ICs – scale of integration – classification of ICs – definition of linear IC and digital IC with examples – manufacturing process of monolithic ICs – fabrication of components (diode, capacitor, bipolar transistor, resistor and field – effect transistor) on monolithic IC – comparison of MOS ICs and bipolar ICs.

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<table>
<thead>
<tr>
<th>Course Number and Title</th>
<th>EC1007 DIGITAL SYSTEMS</th>
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<tr>
<td>Credits / Contact Hours</td>
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<tr>
<td>Instructor Name</td>
<td>Mrs. P. Radhika</td>
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**Purpose**

The purpose of this course is to develop a strong foundation in analysis and design of digital electronics.

<table>
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</table>

**Instructional Objectives**

At the end of the course students should be able to
1. Understand concepts of combinational and sequential circuits.
2. Analyze the synchronous and asynchronous logic circuits.
3. Understand concepts of memory, programmable logic and digital integrated circuits.
4. Design Combinational and sequential systems.

**List of Topics Covered**

**UNIT I-BASIC CONCEPTS, BOOLEAN ALGEBRA, THEOREMS AND FUNCTIONS (10 hours)**

**Number Systems:** Decimal number system, binary number system, octal number system, hexadecimal number system, BCD number system, Excess-3 code, Gray code, Alpha numeric code, error detecting and error correcting codes.

**Arithmetic:** Arithmetic number representation, Binary arithmetic, Hexadecimal arithmetic, BCD arithmetic.

**Boolean Algebra and Theorems:** Logic gates and logic operations, Boolean theorems and postulates, SOP’s & POS’s, Minterms and Maxterms.

**Minimization of Boolean Functions:** Algebraic simplification, Karnaugh map simplification, Quine-Mc Cluskey or Tabulation method.

**UNIT II-LOGIC GATES (9 hours)**

**Logic Families:** Metal Oxide Semiconductor logic families- switching properties of NMOS and PMOS transistors, static NMOS, Dynamic NMOS, Static CMOS and dynamic CMOS logic families, CMOS Transmission gate circuits, Bipolar logic families- switching properties of NPN and PNP transistors, TTL, Schottkey TTL, Comparison of MOS logic circuits(CMOS) with that of a TTL digital circuit, Tristate gates.

**Electrical characteristics:** Meanings of speed, propagation delay, operating frequency, and power dissipated per gate, supply voltage levels, operational voltage levels of various logic families.

**UNIT III-COMBINATIONAL SYSTEMS (9 hours)**

**Binary arithmetic units (Adder, Subtractor, n-bit parallel adder & Subtractor, look ahead carry generator), decoder, encoder, multiplexer, Demultiplexer, code converters, Magnitude comparators, parity generators.**

Implementation of combinational logic by standard IC’s.

**UNIT IV-SEQUENTIAL SYSTEMS (10 hours)**

**Flip-flop and Latch:** SR latch, JK flip-flop, T flip-flop, D flip-flop and latch, Master-slave RS flip-flop, Master-slave JK flip-flop, asynchronous inputs.

**Registers & Counters:** Shift registers (SISO, SIPO, PISO, PIPO), universal shift register. Counters-Asynchronous/Ripple counters, Synchronous counters, Modulus-n Counter, Ring counter, Johnson counter, Up-Down
counter, asynchronous clear, preset and load in a counter, synchronous clear, preset and load in a counter, typical IC’s for
counters.

**Synchronous (Clocked) sequential circuits:** Moore and Mealey state machine circuits, Analysis & design of
synchronous sequential circuits – State machine design with SM charts.

**UNIT V-MEMORY AND PROGRAMMABLE LOGIC (7 hours)**
RAM, memory decoding, ROM, PROMs, PAL & PLA, Sequential Programmable Devices (discuss three major devices
without going into their detailed construction).

---

**Course Number and Title**

**EC1008 SIGNALS AND SYSTEMS**

**Credits / Contact Hours**

4 / 60

**Instructor Name**

Mr.U.Hari

**Textbooks, References**


**Purpose**

The purpose of this course is to introduce students to the fundamentals of signals and systems which are basic to Digital
Signal Processing. The main objective of this subject is to help the students to mathematically analyze different types of
signals and their associated systems

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**Required, Elective or Selected Elective (as per Table 5.1a)**

Required

**Instructional Objectives**

At the end of this course, the students will be able to understand the
1. Various classifications of both Continuous time and Discrete time Signals and Systems.
3. Analysis and characterization of the CT system through Laplace transform and Fourier transform
4. Analysis and characterization of the DT system through classical method.
5. Analysis and characterization of the DT system through Z transform.
### Student Outcomes from Criterion 3 covered by this Course

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### List of Topics Covered

#### UNIT I - CLASSIFICATION OF SIGNALS AND SYSTEMS (9 hours)

**Classification of Signals:** Continuous time signals - Discrete time signals – Periodic and Aperiodic signals – Even and odd signals – Energy and power signals – Deterministic and random signals – Complex exponential and Sinusoidal signals. Unit step, Unit ramp, Unit impulse – Representation of signals in terms of unit impulse.

**Classification of Systems:** Continuous time systems- Discrete time systems - Linear system – Time Invariant system – causal system – BIBO system – Systems with and without memory – LTI system.

#### UNIT II - ANALYSIS OF CONTINUOUS TIME SIGNALS (9 hours)

**Fourier series:** Representation of Continuous time Periodic signals – Trigonometric and exponential - Symmetry conditions- Properties of Continuous time Fourier series – Parseval’s relation for power signals – Frequency spectrum.

**Fourier transform:** Representation of Continuous time signals- Properties of Continuous time Fourier transform – Parseval’s relation for energy signals – Frequency spectrum – Analysis of LTI system using Fourier methods.

#### UNIT III - LTI CONTINUOUS TIME SYSTEM (9 hours)

**System modeling:** Solution of Differential equation with initial conditions-Zero state response and Zero input response – impulse response – Frequency response – Convolution – Analysis and characterization of LTI system using Laplace transform.

#### UNIT IV - ANALYSIS OF DISCRETE TIME SIGNALS AND SYSTEMS (9 hours)


#### UNIT V - LTI DT SYSTEM CHARACTERIZATION AND REALIZATION (9 hours)

Unilateral and Bilateral Z transforms and its properties - Inverse Z transform: Power series expansion and Partial fraction methods - Analysis and characterization of DT system using Z transform-Realization of structures for DT systems - Direct form-I- Direct form II– Parallel-Cascade forms

**Tutorial - (15 hours)**

---

### Course Number and Title

**EC1009 ELECTRON DEVICES LAB**

**Credits / Contact Hours**

2 / 45

**Instructor Name**

Mrs.A.Maria Jossy

**Textbooks, References**

- “LAB MANUAL”, Department of ECE, SRM University
Purpose

To reinforce learning in the accompanying EC1004 course through hands-on experience by examining the electrical characteristics of various semiconductor devices, such as diodes, BJTs and FETs. To provide the student with the capability to use simulation tools for performing various analysis of semiconductor devices.

Prerequisites

<table>
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</table>

List of Topics Covered

LIST OF RECOMMENDED EXPERIMENTS

1. Characteristics of PN junction and Zener diode.
2. Input, Output and Transfer characteristics of CE and CC Amplifier.
3. Characteristics of LDR, Photo-diode and Photo transistor.
4. Transfer characteristics of JFET.
5. Transfer characteristics of MOSFET (with depletion and enhancement mode)
6. Characteristics of LED with three different wavelengths.
8. Full wave rectifier with 2 diodes.
9. Full wave rectifier with 4 diodes (Bridge rectifier).
10. Series voltage Regulator.
11. Shunt voltage Regulator.
12. Characteristics of Thermistor.
13. Simulation experiments using PSPICE or Multisim.
**EC1010 DIGITAL SYSTEM LAB**

**Credits / Contact Hours**

2 / 45

**Instructor Name**

Mrs. A. Anilet Bala

**Textbooks, References**

- “LAB MANUAL”, Department of ECE, SRM University.
- Website: http://ozark.hendrix.edu/~burch/logisim/

**Purpose**

To reinforce learning in the accompanying EC0205 course through hands-on experience with digital electronic circuit analysis, design, construction, and testing. To provide the student with the capability to use simulation tools in digital electronic circuit analysis and design.

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**Required, Elective or Selected Elective (as per Table 5.1a)**

Required

**Instructional Objectives**

1. To develop necessary skill in designing, analyzing and constructing digital electronic circuits.
2. To design and simulate digital logic circuits using tools such as Logisim or PSPICE or Multisim.

**Student Outcomes from Criterion 3 covered by this Course**

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**List of Topics Covered**

**LIST OF EXPERIMENTS**  

2. Half Adder and Full Adder.
3. Magnitude Comparator (2-Bit).
4. Encoders and Decoders.
5. Multiplexer and Demultiplexer.
7. Implementation of combinational logic functions using standard ICs
8. Synchronous Counters.
9. Ripple Counter.
10. Mod – N Counter.
11. Shift Registers and Shift Register Counters.
12. Implementation of sequential logic functions using standard ICs.

Course Number and Title

EC1011  TRANSMISSION LINES AND NETWORKS

Credits / Contact Hours

3 / 45

Instructor Name

Mrs. A. Maria Jossy

Textbooks, References


Purpose

To lay a strong foundation on the theory of transmission line and networks by highlighting their applications.

Prerequisites

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<th>Prerequisites</th>
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<tr>
<td>EC1005</td>
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Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To become familiar with propagation of signals through lines.
2. Calculation of various line parameters by conventional and graphical methods.
3. Need for impedance matching and different impedance matching techniques.
4. Design of different types of filters, equalizer and attenuators

Student Outcomes from Criterion 3 covered by this Course

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Mapping of instructional objectives with student outcome

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### List of Topics Covered

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<th>UNIT II-HIGH FREQUENCY TRANSMISSION LINES (8 hours)</th>
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<tr>
<td>Transmission line equations at radio frequencies – Line of Zero dissipation – Voltage and current on the dissipation less line, Standing Waves, Nodes , Standing Wave Ratio – Input impedance of the dissipation less line - Open and short circuited lines – Power and impedance measurement on lines – Reflection losses – Measurement of VSWR and wavelength.</td>
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<tr>
<th>UNIT III-IMPEDANCE MATCHING IN HIGH FREQUENCY LINES (9 hours)</th>
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<th>UNIT IV-PASSIVE FILTERS (9 hours)</th>
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<tr>
<th>UNIT V-ATTENUATORS AND EQUALIZERS (10 hours)</th>
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<tr>
<td>Attenuators: T, π, Lattice Attenuators, Bridged – T attenuator, L-Type Attenuator. Equalizers: inverse network, series, full series, shunt, full shunt, constant resistance T, constant resistanceπ, constant resistance lattice and bridged T network.</td>
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### Course Number and Title

**EC1012 ELECTRONIC CIRCUITS**

### Credits / Contact Hours

| 3 / 45 |

### Instructor Name

Mrs.G.Kalaimagal

### Textbooks, References


### Purpose

The purpose of this course is to introduce to the students the basics of biasing transistor circuits, feedback amplifiers, large signal amplifiers, tuned amplifiers, oscillators, wave shaping circuits, and to design and analyze various electronic circuits and systems.
### Prerequisites

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### Required, Elective or Selected Elective (as per Table 5.1a)

Required

### Instructional Objectives

At the end of this course, the students will learn

1. Operating point calculations, working and design of basic amplifiers, power amplifiers and tuned amplifiers
2. Working of different types of feedback amplifiers & oscillators.
3. Frequency response and design of tuned amplifiers.
4. Basic working & design of wave shaping circuits.

### Student Outcomes from Criterion 3 covered by this Course

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### List of Topics Covered

#### UNIT I-BIASING CIRCUITS AND SMALL SIGNAL MODELS (9 hours)
Biasing circuits: DC load line and bias point – BJT biasing circuits – FET biasing circuits.
Small-signal models: AC load line, BJT models and parameters – hybrid equivalent model – hybrid $\Pi$ model, FET small-signal model and parameters.

#### UNIT II-SMALL-SIGNAL AMPLIFIERS - ANALYSIS AND FREQUENCY RESPONSE (9 hours)
Frequency response: low frequency response of BJT and FET amplifiers – Miller effect capacitance – high frequency response of BJT and FET amplifiers.

#### UNIT III-FEEDBACK AND OSCILLATOR CIRCUITS (9 hours)

#### UNIT IV-POWER AMPLIFIERS AND TUNED AMPLIFIERS (9 hours)
Power amplifiers: definitions and amplifier types – Q point placement – maximum dissipation hyperbola – Class A amplifier – Class B and Class AB push-pull amplifiers – Class C amplifiers – Amplifier distortions – heat sink – designing power amplifier circuits.
Tuned amplifiers: need for tuned circuits – single tuned – double tuned – synchronously tuned amplifiers – impedance matching to improve gain – design of basic tuned amplifier – video amplifier circuits (CA3040).

#### UNIT V-SOLID STATE SWITCHING CIRCUITS (9 hours)
**Course Number and Title**

EC1013  LINEAR INTEGRATED CIRCUITS

**Credits / Contact Hours**

3 / 45

**Instructor Name**

Mr. A. V. M. Manikandan

**Textbooks, References**


**Purpose**

To enable the students to understand the fundamentals of integrated circuits and designing electronic circuits using it.

**Prerequisites**

| EC1006 | Nil |

**Required, Elective or Selected Elective (as per Table 5.1a)**

Required

**Instructional Objectives**

1. To design simple circuits like amplifiers using op-amps.
2. To design waveform generating circuits.
3. To design simple filter circuits for particular application.
4. To gain knowledge in designing a stable voltage regulators.

**Student Outcomes from Criterion 3 covered by this Course**

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**List of Topics Covered**

**UNIT I-OPERATIONAL AMPLIFIER CHARACTERISTICS (9 hours)**


**UNIT II-OP-AMP APPLICATIONS (9 hours)**
Basic op-amp circuits: Inverting & Non-inverting voltage amplifiers - Voltage follower - Summing, scaling & averaging amplifiers - AC amplifiers.

Linear Applications: Instrumentation Amplifiers-V-to-I and I-to-V converters-Differentiators and Integrators.
Non-linear Applications: Precision Rectifiers – Wave Shaping Circuits (Clipper andclampers) – Log and Antilog Amplifiers – Analog voltage multiplier circuit and its applications – Operational Trans-Conductance Amplifier (OTA) - Comparators and its applications – Sample and Hold circuit.

UNIT III-WAVEFORM GENERATORS AND PLL (9 hours)
IC 555 Timer: Monostable operation and its applications – Astable operation and its applications.
PLL: Operation of the Basic PLL-Closed loop analysis of PLL-Voltage Controlled Oscillator-PLL applications.

UNIT IV-ACTIVE FILTERS & VOLTAGE REGULATOR (9 hours)
Filters: Comparison between Passive and Active Networks-Active Network Design – Filter Approximations-Design of LPF, HPF, BPF and Band Reject Filters – State Variable Filters – All Pass Filters – Switched Capacitor Filters.

UNIT V-DATA CONVERSION DEVICES (9 hours)
Digital to Analog Conversion: DAC Specifications – DAC circuits – Weighted Resistor DAC-R-2R Ladder DAC-Inverted R-2R Ladder DAC-Monolithic DAC
Analog to Digital conversion: ADC specifications-ADC circuits-Ramp Type ADC-Successive Approximation ADC-Dual Slope ADC-Flash Type ADC- Monolithic ADC.

Course Number and Title
EC1014  ELECTRONIC CIRCUITS LAB

Credits / Contact Hours
2 / 45

Instructor Name
Ms. A. Ramya

Textbooks, References
- “LAB MANUAL”, Department of ECE, SRM University
- David A Bell, “Laboratory Manual for Operational Amplifiers & Linear ICs”, 2nd edition, PHI

Purpose
The purpose of the lab is to train the students to design and analyze the operation of discrete amplifier and oscillator circuits and understand their functionality. This Laboratory can also support many experiments and new ideas which are evolved in the mind of students.
**Prerequisites**

Nil

**Co-requisites**

EC1012

**Required, Elective or Selected Elective (as per Table 5.1a)**

Required

**Instructional Objectives**

1. To provide hands-on experience to the students so that they are able to put theoretical concepts to practice
2. To use computer simulation tools such as PSPICE, or Multisim to carry out design experiments as it is a key analysis tool of engineering design
3. To give a specific design problem to the students, which after completion they will verify using the simulation software or hardwired implementation

**Student Outcomes from Criterion 3 covered by this Course**

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Mapping of instructional objectives with student outcome

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**List of Topics Covered**

**LIST OF EXPERIMENTS**

1. Biasing networks for BJT & FET.
2. Transient analysis and frequency response of single-stage BJT & FET amplifiers.
3. Transient analysis and frequency response of multi-stage BJT & FET amplifiers.
5. Transistor Oscillators.
8. Simulation experiments using PSPICE or Multisim.

**Course Number and Title**

EC1015  LINEAR INTEGRATED CIRCUITS LAB

**Credits / Contact Hours**

2 / 45

**Instructor Name**

Mrs. K. Vadivukarasi

**Textbooks, References**

- LAB MANUAL, Department of ECE, SRM University
- David A Bell, “Laboratory Manual for Operational Amplifiers & Linear ICs”, 2nd edition, PHI.
**Purpose**

The purpose of the lab is to train the students to design and analyze the operation of operational amplifier and oscillator circuits and understand their functionality. This Laboratory can also support many experiments and new ideas which are evolved in the mind of students.

<table>
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**Required, Elective or Selected Elective (as per Table 5.1a)**

Required

**Instructional Objectives**

1. To provide hands-on experience to the students so that they are able to put theoretical concepts to practice.
2. To use computer simulation tools such as PSPICE, or Multisim to carry out design experiments as it is a key analysis tool of engineering design.
3. To give a specific design problem to the students, which after completion they will verify using the simulation software or hardwired implementation.

**Student Outcomes from Criterion 3 covered by this Course**

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**List of Topics Covered**

1. Basic op-amp circuits such as inverting & non-inverting amplifiers, adders and subtractors.
2. Linear applications of op-amp such as Integrator and Differentiator.
3. Non-linear application of op-amp such as precision rectifiers and comparators.
4. Op-amp oscillators such as Wein Bridge and RC Phase Shift oscillator.
5. 555 Timer – Astable and Monostable operation.
6. Active Filters such as LPF, HPF, BPF and Notch filter.
7. Digital to Analog converter and Analog to Digital converter (any one method).
8. Simulation experiments using PSPICE or Multisim.

**Course Number and Title**

EC1016A MICROPROCESSORS AND MICROCONTROLLERS

**Credits / Contact Hours**

3/45

**Instructor Name**

Mr. A.V. M. Manikandan

**Textbooks, References**

### Purpose

The purpose of this course is to teach students the fundamentals of microprocessor and microcontroller systems. The student will be able to incorporate these concepts into their electronic designs for other courses where control can be achieved via a Microprocessor/microcontroller implementation.

### Prerequisites

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### Instructional Objectives

Through the use of assembly language, by the end of the course students will become thoroughly familiar with the elements of microprocessor software and hardware. They will be able to:

1. Understand fundamental operating concepts behind microprocessors and microcontrollers.
2. Appreciate the advantages in using RISC microprocessors / microcontrollers in engineering applications.
3. Design microprocessor based solutions to problems.
4. Understand Low-Level and Embedded C Programming.
5. Apply this knowledge to more advanced structures.

### Student Outcomes from Criterion 3 covered by this Course

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### Mapping of instructional objectives with student outcome

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### List of Topics Covered

#### UNIT I-MICROPROCESSOR- 8086 (9 hours)


#### UNIT II-RISC ARCHITECTURE AND PROGRAMMING (12 hours)

- Addressing Modes - Instruction format - Instruction set - Assembly language programs in 8086. RISC architecture – The ARM Cortex M0 (nuvoTon- Nu-LB-LUC140) architecture - ARM organization and implementation – Introduction to ARM Programming Register – Nested Vector Interrupt Configuration and Instruction Set - The thumb instruction set - Basic ARM ALP (32-bit arithmetic operations, sorting technique, sum of series).
### UNIT III-INTERFACING DEVICES (7 hours)
Programmable Peripheral Interface (8255) - Programmable Interval Timer (8254) - Programmable Interrupt Controller (8259A) - Programmable DMA Controller (8257) - Programmable Communication Interface (8251A) – Programmable Keyboard and Display Controller (8279).

### UNIT IV-MICROCONTROLLER-8051 (7 hours)

### UNIT V- INTERFACING OF 8051 USING EMBEDDED C PROGRAMMING (10 hours)
Timer-Serial Communication-Interrupts Programming-Interfacing to External Memory- Introduction to Embedded C Programming -Basic techniques for reading & writing from I/O port pins. Interfacing 8051 to ADC, LCD, Keyboard and stepper motor using Embedded C.

---

**Course Number and Title**

**EC1017 DIGITAL SIGNAL PROCESSING**

**Credits / Contact Hours**

4/60

**Instructor Name**

Mrs. Ferents Koni Jiavana

**Textbooks, References**


**Purpose**

The purpose of this course is to introduce the concepts of Digital signal processing and DSP Processor. The mathematical analysis of FIR and IIR filter design and simulation using MATLAB are dealt with in detail.

**Prerequisites**

EC1008 & MA1003

**Co-requisites**

Nil

**Required, Elective or Selected Elective (as per Table 5.2)**

Required

**Instructional Objectives**

At the end of this course, the students will be able to understand the

1. Structures of Discrete time signals and systems.
3. Finite word length effect.
4. DSP Processor- TMS320C5X.

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<th>Student Outcomes from Criterion 3 covered by this Course</th>
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<td>Mapping of instructional objectives with student outcome</td>
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List of Topics Covered

**UNIT I-REVIEW OF DISCRETE TIME SIGNALS AND SYSTEMS (9 hours)**
Overview of signals and systems – DFT–FFT using DIT and DIF algorithms – Inverse DFT-FFT using DIT and DIF algorithms – Applications – Circular convolution – MATLAB programs for DFT and FFT.

**UNIT II-DESIGN AND IMPLEMENTATION OF IIR FILTERS (9 hours)**

**UNIT III-DESIGN AND IMPLEMENTATION OF FIR FILTERS (9 hours)**

**UNIT IV-FINITE WORD LENGTH EFFECTS IN DIGITAL FILTERS (9 hours)**
Fixed point arithmetic – effect of quantization of the input data due to Finite word length. Product round off – need for scaling – Zero input limit cycle oscillations - Limit cycle oscillations due to overflow of adders – Table look up implementation to avoid multiplications.

**UNIT V-PROCESSOR FUNDAMENTALS (9 hours)**
The course considers analog communication systems and techniques. In this course we will introduce some of the basic
to the two “domains” of communications, the time domain and the
mathematical concepts that will allow us to think in the frequency domain. We will cover the basic types of analog modulation (AM, FM, and PM) from both a mathematical
description and from a block-diagram system approach.

### Prerequisites

**Nil**

### Co-requisites

**Nil**

### Required, Elective or Selected Elective (as per Table 5.1a)

**Required**

### Instructional Objectives

The course aims to provide the complete analysis of Analog communications. This knowledge helps them to acquire better application of these principles in Digital communications. The overall objective is to introduce the student to the basics of communication theory. This course emphasizes:

1. Analog modulation and demodulation techniques.
3. Understanding the trade-offs (in terms of bandwidth, power, and complexity requirements)
4. Performance evaluation of communication systems in the presence of noise.
5. Design of practical communication system at the block diagram level under certain constraints and requirements.

### Student Outcomes from Criterion 3 covered by this Course

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### List of Topics Covered

#### UNIT I-AMPLITUDE MODULATION SYSTEMS (10 hours)


#### UNIT II-ANGLE MODULATION SYSTEMS (10 hours)


#### UNIT III-RADIO RECEIVERS (6 hours)


#### UNIT IV-NOISE THEORY (9 hours)

- Noise, Types of noise, White Noise, Addition of Noise due to several sources in series and parallel, Generalized Nyquist Theorem for Thermal Noise, Calculation of Thermal Noise for a Single Noise Source, RC Circuits & Multiple Noise sources. Equivalent Noise Bandwidth, Signal to Noise Ratio, Noise-Figure, Noise Temperature, Calculation of Noise Figure, Noise Figure Determination for Cascaded Stages of Amplifiers.

#### UNIT V-PERFORMANCE OF COMMUNICATION SYSTEM (10 hours)

- Receiver Model, Noise in DSB-SC Receivers, Noise in SSB-SC Receivers, Noise in AM receiver (Using Envelope
Course Number and Title

EC1019A  PROCESSOR LAB

Credits / Contact Hours

2/45

Instructor Name

Dr. A. Ruhan Bevi

Textbooks, References

1. EC1019A Processor Lab MANUAL, Department of ECE, SRM University
5. nuvoton (NUC100/140 series Board Schematics manual, nuvoTon (NUC100/140) series Educational sample codes), www.nuvoton.com

Purpose

This laboratory will provide the students a perfect introduction to the world of Microprocessors and to provide hands-on experience essential to the real understanding of microprocessors architecture and it’s interfacing to the peripheral devices. The experiments are designed to provide the students with the design principles of microprocessor systems and real time programming. The course accomplishes this by using microprocessor kits, simulators and software development systems.

Prerequisites

Nil

Co-requisites

EC1016A

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To demonstrate programming proficiency using the various addressing modes and data transfer instructions of the target microprocessor.
2. To apply knowledge of the microprocessor’s internal registers and operations by use of a PC based microprocessor simulator.
3. To interface the processor to external devices.

Student Outcomes from Criterion 3 covered by this Course

Student outcome  a  b  c  d  e  f  g  h  i  j  k
Mapping of instructional objectives with student outcome

| 1-3 | 1-3 | 3 | 1-3 | 3 |

List of Topics Covered

LIST OF EXPERIMENTS

PART-A: GENERAL PURPOSE PROGRAMMING EXERCISES
Minimum six experiments to be conducted.

1. Introduction of Microprocessor and Microcontroller Kit.
2. Addition, Subtraction, Multiplication and Division.
3. Finding the maximum value in an array.
4. Sorting of data.
5. Finding number of positive / negative elements in a block of data.
6. BCD-to-Hex conversion and Hex-to-BCD conversion.
8. Square Root of a given data.
9. LCM and GCD.

PART-B: INTERFACING WITH APPLICATION BOARDS (8051, ARM Cortex M0 [Nu-LB-NUC140])
Minimum six experiments to be conducted

1. 8255 PPI.
2. Transfer data serially between two kits (Study of 8253/8251).
3. 8279 Keyboard & display using 8051 controller.
4. Seven segment display using nuvoTon (NUC140) board.
5. LCD Display using 8051/ Nu-LB-NUC140 controller.
6. Traffic light using nuvoTon (NUC140) board.
7. 8259 programmable interrupt controller.
8. 8257/8237 DMA controller.
9. 8 bit ADC and 8 bit DAC. using nuvoTon (NUC140) board
10. Stepper motor control using 8051 controller.
11. DC motor speed measurement and control module.
12. Real Time Clock using nuvoTon (NUC140) board.
13. Logic Controller.

Course Number and Title

EC1020  COMMUNICATION ENGINEERING LAB

Credits / Contact Hours

2/45

Instructor Name

Mrs. S. Kolangiammal

Textbooks, References

- LAB MANUAL, Department of ECE, SRM University.

Purpose
The experiments in this laboratory enable the students to gather basic knowledge on communication systems. Different experiments are performed which forms the fundamental blocks of any communication system used now-a-days. Experiments are performed using electronic instrument, such as oscilloscopes, signal generators, spectrum analyzers, and network analyzers. Certain experiments are simulated using MATLAB and P-SPICE simulation software.

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**Required, Elective or Selected Elective (as per Table 5.1a)**

Required

**Instructional Objectives**

1. To practice the basic theories of analog communication system.
2. To provide hands-on experience to the students, so that they are able to apply theoretical concepts in practice.
3. To use computer simulation tools such as P-SPICE, or MATLAB to carry out design experiments as it is a key analysis tool of engineering design.
4. To give a specific design problem to the students, which after completion they will verify using the simulation software or hardware implementation.

**Student Outcomes from Criterion 3 covered by this Course**

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Mapping of instructional objectives with student outcome

| 1-4 | 1-4 | 1-4 | 3,4 | 3,4 | 4 | 3,4 |

**List of Topics Covered**

1. AM modulator and Demodulator.
2. DSB-SC modulator and Demodulator.
3. SSB modulator and Demodulator.
4. FM modulator and Demodulator.
5. PAM modulator and Demodulator.
6. TDM Multiplexer and Demultiplexer.
7. FDM Multiplexer and Demultiplexer.
8. Pre emphasis and De-emphasis in FM.
9. Simulation experiments using P-SPICE and MATLAB.
a) AM modulator with AWGN noise in MATLAB.
b) Pre-emphasis and De-emphasis in FM using P-SPICE.
**Course Number and Title**

EC1047 INDUSTRIAL TRAINING I (Training to be undergone after IV semester)

**Credits / Contact Hours**

1

**Instructor Name**

Mrs. Ferents Koni Jiavana

**Textbooks, References**

**Purpose**

To provide hands-on experience at site / planning or design office where Electronics and Communication engineering projects are carried out

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**Required, Elective or Selected Elective (as per Table 5.1a)**

Required

**Instructional Objectives**

1. Students have to undergo two – week practical training in Electronics and Communication Engineering related project site or design / planning office so that they become aware of the practical application of theoretical concepts studied in the class rooms.

**Student Outcomes from Criterion 3 covered by this Course**

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Mapping of instructional objectives with student outcome

1

**List of Topics Covered**

Students have to undergo two-week practical training in Electronics and Communication Engineering related project site or design / planning office of their choice but with the approval of the department. At the end of the training student will submit a report as per the prescribed format to the department.
Course Number and Title

EC1021  ANTENNA AND WAVE PROPAGATION

Credits / Contact Hours

3/45

Instructor Name

Mr. S. Manikandawamy.

Textbooks, References


Purpose

The purpose of this course is to enable the students to understand the basics of antennas and various types of antenna arrays and its radiation patterns. The main objective of this subject is to help students to identify the different latest antennas available for specific communication.

Prerequisites

EC1005 & EC1011

Co-requisites

Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To study various antennas, arrays and radiation patterns of antennas.
2. To learn the basic working of antennas.
3. To understand various techniques involved in various antenna parameter measurements.
4. To understand the propagation of radio waves in the atmosphere.

Student Outcomes from Criterion 3 covered by this Course

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Mapping of instructional objectives with student outcome

1. To study various antennas, arrays and radiation patterns of antennas.
2. To learn the basic working of antennas.
3. To understand various techniques involved in various antenna parameter measurements.
4. To understand the propagation of radio waves in the atmosphere.

List of Topics Covered

UNIT I-ANTENNA FUNDAMENTALS AND RADIATION  (9 hours)

UNIT II-ANTENNA ARRAYS AND SYNTHESIS  (9 hours)
Linear arrays – Analysis of linear arrays – Phased arrays – Binomial arrays – Pattern multiplication – Method of excitation of antennas – Impedance matching techniques.

UNIT III-SPECIAL PURPOSE ANTENNAS  (9 hours)

UNIT IV-ANTENNA MEASUREMENTS  (9 hours)

UNITV-RADIO WAVE PROPAGATION  (9 hours)

---

### Course Number and Title

**EC1022 MICROWAVE AND OPTICAL COMMUNICATIONS**

### Credits / Contact Hours

3/45

### Instructor Name

Dr. J. Manjula.

### Textbooks, References


### Purpose

To expose basics of Microwave and Optical devices and components. To introduce the students to a few microwave measurements. To expose various optical fiber modes configurations and various signal degradation factors associated with optical fiber and to the design simple optical communication system.

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### Prerequisites

Required, Elective or Selected Elective (as per Table 5.1a)
### Instructional Objectives

1. To understand all basic Microwave and Optical devices and components.
2. To learn few microwave measurements and analyze parameters.
3. To understand the principles of fiber-optic communications and the different kind of losses, signal distortion in optical wave guides and other signal degradation factors.
4. To design the optical communication system.

### Student Outcomes from Criterion 3 covered by this Course

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</table>

### List of Topics Covered

**UNIT I-MICROWAVE AMPLIFIERS AND OSCILLATORS**  (9 hours)

**II-MICROWAVE COMPONENTS**  (9 hours)

**UNIT III-INTRODUCTION TO OPTICAL FIBERS AND TRANSMISSION CHARACTERISTICS**  (9 hours)

**UNIT IV-OPTICAL TRANSMITTERS AND RECEIVERS**  (9 hours)

**UNIT V-OPTICAL COMMUNICATION SYSTEMS AND DESIGN**  (9 hours)

---

**Course Number and Title**

**EC1023 DIGITAL COMMUNICATION**

**Credits / Contact Hours**

3/45

**Instructor Name**

Dr.J.Selvakumar
Textbooks, References


Purpose

To provide a comprehensive coverage of digital communication systems. The key feature of digital communication systems is that it deals with discrete messages and to add organization and structure to this field.

Prerequisites

EC1018

Co-requisites

MA1024

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

To learn and understand
1. The process of sampling, quantization and coding that are fundamental to the digital transmission of analog signals and digital modulation systems.
2. Baseband and Passband transmission systems.

Student Outcomes from Criterion 3 covered by this Course

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Mapping of instructional objectives with student outcome 1-3 1-3 1-3

List of Topics Covered

UNIT I-SAMPLING AND QUANTIZATION (9 hours)

UNIT II-DIGITAL MODULATION SYSTEMS (9 hours)

UNIT III-BASE BAND PULSE TRANSMISSION (9 hours)

UNIT IV-PASS BAND DATA TRANSMISSION (9 hours)
UNITV-M-ARY SIGNALING AND INTRODUCTION TO SPREAD SPECTRUM TECHNIQUES  (9 hours)

Course Number and Title

EC1024  MICROWAVE AND OPTICAL COMMUNICATION LAB

Credits / Contact Hours

45/2

Instructor Name

Dr. J. Manjula

Textbooks, References

• LAB MANUAL, Department of ECE, SRM University

Purpose

Microwave communication deals with the study of operation and characteristics of microwave sources and microwave components. It also deals with the measurement of load impedance VSWR, antenna gain and radiation pattern. Optical communication deals with the study of the characteristics of the optical fiber, sources and detectors and setting up of analog and digital fiber links using LED and LASER sources.

Prerequisites

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<td>EC1009</td>
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Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To familiarize the students with microwave and optical communication techniques/technologies
2. To understand the fundamentals of microwave circuit design using ORCAD PSPICE tool, and become familiar with basic microwave measurements.
3. To analyze optical signals and devices in optical communication systems, and learn how to measure and interpret optical signals.

Student Outcomes from Criterion 3 covered by this Course

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List of Topics Covered
LIST OF EXPERIMENTS

MICROWAVE EXPERIMENTS
1. Mode Characteristics of Reflex Klystron.
2. Study of power distribution in Directional coupler, E & H plane and Magic tee.
3. Wavelength and Frequency measurement.
4. Impedance measurement by slotted line method.
5. Gain and Radiation pattern of Horn antenna.

OPTICAL COMMUNICATION EXPERIMENTS
4. Fiber Optic Analog and Digital Link.

PSPICE SIMULATION
1. Operating characteristics of Microwave semiconductor devices (bipolar transistors, GaAs FETs, varactor diodes, PIN diodes).
2. Microwave transistor amplifier and oscillator design.
3. Operating characteristics of optical devices (LED and photodiode).

Course Number and Title
EC1025 DIGITAL COMMUNICATION LAB

Credits / Contact Hours
2/45

Instructor Name
Dr.J.Selvakumar

Textbooks, References
- LAB MANUAL, Department of ECE, SRM University.

Purpose
This lab helps the students to understand the basic principles of digital communication systems by practical module systems. The experiments are designed in such a way that the theoretical concepts introduced in lectures are re-discussed and implemented practically.

Prerequisites

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<th>Prerequisites</th>
<th>Co-requisites</th>
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<td>EC1020</td>
<td>EC1023</td>
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Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives
1. To demonstrate digital communication concepts using hands-on experience and using simulation environments such as PSPICE / Multisim, or MATLAB/Simulink, or LABVIEW.
2. To use commercial, modular systems which have some distinct advantages over bread boarding to examine more complex communication topics and to deliver a hands-on laboratory experience.
3. To use LABVIEW in conjunction with data acquisition cards and interconnected instruments, and to present communication concepts using real-world signals so that the students can investigate and manipulate.

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<th>Student Outcomes from Criterion 3 covered by this Course</th>
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<td>Mapping of instructional objectives with student outcome</td>
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List of Topics Covered

LIST OF EXPERIMENTS
1. FSK Modulation and Demodulation.
2. PSK Modulation and Demodulation.
3. QPSK Modulation and Demodulation.
4. DPSK Modulation and Demodulation.
5. PAM Modulation and Demodulation.
6. PWM Modulation and Demodulation.
7. PPM Modulation and Demodulation.
11. Data formatting.
12. BER comparison of different modulation schemes in AWGN channel in MATLAB Simulink.
13. Performance analysis of different channels with error correcting codes.

Course Number and Title

EC1049 MINOR PROJECT

Credits / Contact Hours

1/30

Instructor Name

Mrs.N.Saraswathi

Textbooks, References

Purpose

To carry out a design project in one of the specializations of Electronics and communication engineering with substantial multidisciplinary component

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Required, Elective or Selected Elective (as per Table 5.1a)

Required

**Instructional Objectives**

To guide the students in such a way so that they carry out a work on a topic as a forerunner to the full fledged project work to be taken subsequently in VIII semester. The project work shall consist of substantial multidisciplinary component.

**Student Outcomes from Criterion 3 covered by this Course**

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Mapping of instructional objectives with student outcome

1

**List of Topics Covered**

The students will carry out a project in one of the following Electronics and communication engineering areas but with substantial multidisciplinary component involving Electrical Engineering, Computer Science Engineering, Information Technology, Mechanical Engineering, Bio-Medical Engineering.

- Communication
- Signal Processing
- Electronics
- VLSI
- Embedded

Student groups will be formed (6 in a group) and a faculty member will be allocated to guide them. There will be three reviews. First review will not carry any marks but the project topic will be finalized in it. Of remaining 2 reviews one will be carried out in the mid-semester and the last one by the end of semester.

**Course Number and Title**

EC1026 WIRELESS COMMUNICATION

**Credits / Contact Hours**

3/45

**Instructor Name**

Dr. K. Kalimuthu

**Textbooks, References**


Purpose
To introduce the students to the concepts of wireless systems, mobile systems.

Prerequisites

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<th>MA1024</th>
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Co-requisites

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Required, Elective or Selected Elective (as per Table 5.1a)
Required

Instructional Objectives
To understand and gain complete knowledge about.
1. Basic wireless, cellular concepts.
2. Radio wave propagation and Mobile Channel models.
3. Various performance analysis of mobile communication system
4. Standards 1G, 2G Basic system available.

Student Outcomes from Criterion 3 covered by this Course

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List of Topics Covered

UNIT I-INTRODUCTION TO WIRELESS COMMUNICATION  (9 hours)

UNIT II-MOBILE RADIO WAVE PROPAGATION (LARGE SCALE FADING)  (9 hours)

UNIT III-MOBILE RADIO WAVE PROPAGATION (SMALL SCALE FADING & MULTIPATH)  (9 hours)

UNIT IV-CAPACITY, DIVERSITY AND EQUALIZATION IN WIRELESS SYSTEM  (9 hours)


UNIT V-WIRELESS SYSTEMS AND STANDARDS  (9 hours)
AMPS & ETACS System overview – Call handling – GSM System – Services and features – Architecture – Radio

Course Number and Title

EC1027 COMPUTER COMMUNICATION

Credits / Contact Hours

3/45

Instructor Name

Ms.T.Ramya.

Textbooks, References


Purpose

It is very much required for an ECE graduate to know use of computers in communication as well as in network formation. The syllabus focuses on mode of data transfer, layer and protocols related to networks.

Prerequisites

Nil

Co-requisites

Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. Understand about the functions and services of all 7 layers of OSI model.
2. Get an idea of various network standards.

Student Outcomes from Criterion 3 covered by this Course

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Mapping of instructional objectives with student outcome

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List of Topics Covered

UNIT I-DATA COMMUNICATION & NETWORKING BASICS  (9 hours)

UNIT II-OSI LOWER LAYERS  (9 hours)  

UNIT III-NETWORK LAYER  (9 hours)  

UNIT IV-OSI HIGHER LAYERS  (9 hours)  
Transport layer – TCP & UDP – Session layer issues – Presentation layer – Application layer.

UNIT V-APPLICATION & INTRODUCTION TO ISDN  (9 hours)  

Course Number and Title
EC1028 ELEMENTS OF INFORMATION THEORY AND CODING

Credits / Contact Hours
3/45

Instructor Name
Mrs. J.Subhashini

Textbooks, References

Purpose
To learn the basic principles of encoding, error detection, and error correction, decoding, mutual information, and channel capacity, which will be extremely useful in understanding the working of a digital communication system.

Prerequisites
MA1024

Co-requisites
Nil

Required, Elective or Selected Elective (as per Table 5.1a)
Required

Instructional Objectives
1. To analyze the process of coding for analog and discrete sources and the mathematical model for information sources.
2. To solve problems on error detection and error correction for various types of codes.
3. To understand the principles of Huffman codes and to solve problems therein.
4. To study the properties of Entropy and the principles of Shannon-Fano coding.
5. To learn the concepts of mutual information, channel capacity, and Shannon’s Main Theorem.
Student Outcomes from Criterion 3 covered by this Course

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List of Topics Covered

UNIT I-SOURCE CODING  (9 hours)

UNIT II-ERROR DETECTING AND ERROR CORRECTING CODES  (10 hours)

UNIT III-VARIABLE-LENGTH CODES – HUFFMAN CODES  (10 hours)
Unique decoding – Instantaneous codes and its construction – The Kraft’s inequality – Shortened block codes – The McMillan’s Inequality – Huffman codes and its special cases – Extensions of a code – Huffman codes Radix r – Noise in Huffman coding probabilities – Use of Huffman codes – Hamming Huffman coding

UNIT IV-ENTROPY AND SHANNON'S FIRST THEOREM  (5 hours)

UNIT V-MUTUAL INFORMATION, CHANNEL CAPACITY & SHANNON'S MAIN THEOREM  (11 hours)

Course Number and Title

EC1029  VLSI DESIGN

Credits / Contact Hours

3/45

Instructor Name

Dr.J.Selvakumar

Textbooks, References

2003.

**Purpose**
To introduce the technology, design concepts, electrical properties and modeling of Very Large Scale Integrated Circuits

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**Required, Elective or Selected Elective (as per Table 5.1a)**
Required

**Instructional Objectives**
1. To learn the basic MOS Technology.
2. To learn the MOS Process Technology and its second order effect.
3. To learn the concepts of modeling a digital system using Hardware Description Language.
4. To learn the basic concept of VLSI implementation strategies based on CMOS and FPGA.

**Student Outcomes from Criterion 3 covered by this Course**

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</table>

**List of Topics Covered**

**UNIT I-MOS TECHNOLOGY** (9 hours)

**UNIT II-MOS CIRCUIT DESIGN PROCESS** (9 hours)

**UNIT III-CMOS LOGIC GATES & OTHER COMPLEX GATES** (9 hours)

**UNIT IV-VERILOG HDL** (9 hours)
### UNIT V - VLSI IMPLEMENTATION STRATEGIES (9 hours)


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<table>
<thead>
<tr>
<th>Course Number and Title</th>
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<tbody>
<tr>
<td>EC1030 NETWORK SIMULATION LAB</td>
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<table>
<thead>
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<table>
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<tbody>
<tr>
<td>Dr. V. Nithya</td>
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<table>
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<tr>
<td>1. LAB MANUAL, Department of ECE, SRM University.</td>
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</table>

### Purpose

Network Simulation is a cost-effective method to design, analyze and evaluate network protocols and is an important tool in networking research. To know and understand communication networks using NETSIM Software and LAN Trainer kit.

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<tr>
<th>Prerequisites</th>
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<td>Nil</td>
<td>EC1027</td>
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</table>

### Required, Elective or Selected Elective (as per Table 5.1a)

Required

### Instructional Objectives

1. To understand the basics of network simulation.
2. To introduce simulations and use simulation tools in networking.
3. To design and analyze different networks, and protocols.
4. To simulate and evaluate networks using network simulator (ns-2).
5. To study the communication network’s characteristics and to analyze various MAC and routing layer Protocols.

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### List of Topics Covered

LIST OF EXPERIMENTS (45 hours)
1. Ethernet LAN protocol. To create Scenario and study the performance of CSMA/CD protocol through simulation.
2. Token bus and Token Ring protocols. To create scenario and study the performance of token bus and token ring protocols through simulation.
3. Wireless LAN protocols. To create scenario and study the performance of network with CSMA/CA protocol and compare with CSMA/CD protocols.
4. Implementation and study of stop and wait protocol.
5. Implementation and study of Go back N and selective repeat protocols.
8. Implementation of data encryption and decryption.
9. Transfer of files from PC to PC using windows/ UNIX socket processing.

Course Number and Title

EC1031  VLSI DESIGN LAB

Credits / Contact Hours

2/45

Instructor Name

Dr.J.Selvakumar

Textbooks, References

• LAB MANUAL, Department of ECE, SRM University.

Purpose

The laboratory consists of hands-on assignments which accompany the lectures of EC1029. The goal is to illustrate concepts discussed in the class and to give the students the opportunity to build and test real systems. The lab exercises will make use of the Xilinx Foundation™ System which is a powerful state-of-the-art CAD tool for designing and implementing digital systems on Field Programmable devices (FGPAs or CPLDs).

Prerequisites

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<td>EC1010</td>
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Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

To gain expertise in design and development and simulation of digital circuits with Verilog HDL.
1. To apply concepts and methods of digital system design techniques as discussed in the class (EC1029) through hands-on experiments.
2. Learn to design combinational and sequential digital systems starting from a word description that performs a set of specified tasks and functions.
3. To analyze the results of logic and timing simulations and to use these simulation results to debug digital systems.
4. Develop skills, techniques and learn state-of-the-art engineering tools (such as HDL, Xilinx / Altera tools) to design, implement and test digital systems on FPGAs / CPLDs.

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</table>

**List of Topics Covered**

**LIST OF EXPERIMENTS  (45 hours)**

1. Combinational logic circuit design.
2. Sequential logic circuit design.
3. Design of VLSI multipliers.
5. Digital Filters.
6. State Machines.
7. Design of microprocessor parts.

**Course Number and Title**

**EC1048 INDUSTRIAL TRAINING II** *(Training to be undergone after VI semester)*

**Credits / Contact Hours**

1

**Instructor Name**

Mr.K.Ramesh

**Textbooks, References**

N/A

**Purpose**

To provide hands-on experience at site / planning or design office where Electronics and Communication engineering projects are carried out

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**Required, Elective or Selected Elective (as per Table 5.1a)**

Required

**Instructional Objectives**
Students have to undergo three – week practical training in Electronics and Communication Engineering related project site or design / planning office so that they become aware of the practical application of theoretical concepts studied in the class rooms.

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<th>List of Topics Covered</th>
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</table>

Students have to undergo two-week practical training in Electronics and Communication Engineering related project site or design / planning office of their choice but with the approval of the department. At the end of the training student will submit a report as per the prescribed format to the department.

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**Course Number and Title**

**EC1050 MAJOR PROJECT / PRACTICE SCHOOL**

**Credits / Contact Hours**

12/360

**Instructor Name**

Dr.K.Kalimuthu

**Textbooks, References**

**Purpose**

To simulate real life situations related to Electronics and Communication Engineering and impart adequate training so that confidence to face and tackle any problem in the field is developed in the college itself.

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<th>Co-requisites</th>
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</table>

**Required, Elective or Selected Elective (as per Table 5.1a)**

Required

**Instructional Objectives**

To guide the students such a way that the they carry out a comprehensive work on the chosen topic which will stand them in good stead as they face real life situations. The project work so chosen by the student shall culminate in gaining of major design experience in the related area of specialization.
### Student Outcomes from Criterion 3 covered by this Course

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Mapping of instructional objectives with student outcome

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### List of Topics Covered

**MAJOR PROJECT**

Each project will cover all the aspects (to the extent possible) like investigation, designing, coding detailing, implementation of a Electronics and Communication circuits / systems in which the aspects like performance analysis, application of relevant standards etc., will find a place. Alternately, a few research problems also may be identified for investigation and the use of laboratory facilities to the fullest extent may be taken as a project work. The project shall be driven by realistic constraints like that related to economic, environmental, social, political, ethical, health & safety, manufacturability and sustainability. The outcomes to be attained by students by doing the project work shall be spelt out clearly. A project report is to be submitted on the topic which will be evaluated during the final review. Assessment procedure will be as spelt out in the regulations.

**PRACTICE SCHOOL**

Alternately, a student is encouraged to take an industrial project with Electronics and Communication companies or firms chosen by the institute. In such cases the student will stay with the firm and carry out the project. The project will be guided by the faculty member and the concerned officer in the industry. All the requirements spelt out under ‘MAJOR PROJECT’ above, shall be incorporated under this work also. However reviews will be conducted in the institute which the student shall attend.
## A.1.5 Engineering Topic - III

### Department Elective Courses

<table>
<thead>
<tr>
<th>2013 Curriculum Course Code</th>
<th>Name of the Course</th>
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<tr>
<td>EC1101</td>
<td>Electromagnetic Interference and Electromagnetic Compatibility</td>
</tr>
<tr>
<td>EC1102</td>
<td>Fundamentals of MEMS</td>
</tr>
<tr>
<td>EC1103</td>
<td>Fundamentals of Nanotechnology</td>
</tr>
<tr>
<td>EC1104</td>
<td>Electronic Measurements &amp; Instrumentation</td>
</tr>
<tr>
<td>EC1105</td>
<td>Sensors and Transducers</td>
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<td>EC1106</td>
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<td>EC1107</td>
<td>Control Engineering</td>
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<td>Computer Architecture and Organization</td>
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<td>Embedded Systems</td>
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<td>EC1110</td>
<td>Virtual Instrumentation Using LABVIEW</td>
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<td>EC1112</td>
<td>Digital Image Processing</td>
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<td>EC1113</td>
<td>Radar and Navigational Aids</td>
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<td>Communication Switching Techniques</td>
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<td>Photonics and Optical Networks</td>
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<td>EC1123</td>
<td>RF System Design for Wireless Communications</td>
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<td>EC1124</td>
<td>Neural Network and Fuzzy Logic</td>
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<tr>
<td>EC1125</td>
<td>Digital Logic Design With PLDs And VHDL</td>
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**Course Number and Title**

EC1101  ELECTROMAGNETIC INTERFERENCE AND ELECTROMAGNETIC COMPATIBILITY

**Credits / Contact Hours**

3/ 45

**Instructor Name**

Dr.P.Eswaran

**Textbooks, References**


**Purpose**

The purpose of this course is to expose the students to the basics and fundamentals of Electromagnetic Interference and Compatibility and application in System Design.

<table>
<thead>
<tr>
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<tbody>
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<td>EC1005</td>
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**Required, Elective or Selected Elective (as per Table 5.1a)**

Selective Elective

**Instructional Objectives**

1. To study EMI Fundamentals and EMI sources.
2. To learn EMI Measuring Instruments and their usage.
3. To study EMI standards and controlling methods.

**Student Outcomes from Criterion 3 covered by this Course**

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**List of Topics Covered**

**UNIT I-EMI ENVIRONMENT (9 hours)**

UNIT II-EMI COUPLING PRINCIPLES (9 hours)
Capacitive coupling - Inductive coupling- Common Impedance Ground Coupling- Ground Loop coupling-Transients in power supply lines- Radiation coupling-Conduction coupling-Common – mode and Differential-mode interferences-Conducted EM noise on power supply lines.

UNIT III-EMI MEASUREMENTS (9 hours)
Open Area test site measurements-Measurement precautions – Anechoic Chamber – TEM - Reverberating TEM-GTEM cell – Comparisons.

UNIT IV-EMI CONTROL TECHNIQUES (9 hours)

UNIT V-EMI / EMC STANDARDS (9 hours)

Course Number and Title
EC1102  FUNDAMENTALS OF MEMS

Credits / Contact Hours
3 / 45

Instructor Name
Dr.P.Eswaran

Textbooks, References

Purpose
This course is offered to students to gain basic knowledge on MEMS (Micro Electro Mechanical System) and various fabrication techniques. This enables them to design, analyze, fabricate and test the MEMS based components.

Prerequisites
PY1001, CY1001, PY1003, ME1001 & EC1001

Co-requisites
Nil

Required, Elective or Selected Elective (as per Table 5.1a)
Selected Elective

Instructional Objectives
1. To introduce MEMS and micro fabrication.
2. To study the essential electrical and mechanical concepts of MEMS.
3. To study various sensing and actuating technique.
4. To know about the polymer and optical MEMS.

### Student Outcomes from Criterion 3 covered by this Course

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### List of Topics Covered

**UNIT I-INTRODUCTION TO MEMS AND MICRO FABRICATION (9 hours)**


**UNIT II-ELECTRICAL AND MECHANICAL CONCEPTS OF MEMS (9 hours)**

- Conductivity of semiconductors, crystal plane and orientation, stress and strain - definition - Relationship between tensile stress and strain- mechanical properties of Silicon and thin films, Flexural beam bending analysis under single loading condition- Types of beam- longitudinal strain under pure bending -deflection of beam- Spring constant, torsional deflection, intrinsic stress, resonance and quality factor.

**UNIT III-ELECTROSTATIC AND THERMAL PRINCIPLE SENSING AND ACTUATION (9 hours)**


**UNIT IV-PIEZORESISTIVE, PIEZOELECTRIC AND MAGNETIC PRINCIPLE SENSORS AND ACTUATOR (9 hours)**

- Piezoresistive sensors- Piezoresistive sensor material- stress in flexural cantilever and membrane- Application-Inertial, pressure, flow and tactile sensor. Piezoelectric sensing and actuation- piezoelectric material properties-quartz-PZT-PVDF-ZnO- Application-Inertial, Acoustic, tactile, flow-surface elastic waves
- Magnetic actuation- Micro magnetic actuation principle- Deposition of magnetic materials-Design and fabrication of magnetic coil.

**UNIT V-POLYMER AND OPTICAL MEMS (9 hours)**

- Polymers in MEMS- polymide-SU-8 Liquid Crystal Polymer (LCP)- PDMS – PMMA – Parylene - Flurocorbon, Application-Acceleration, pressure, flow and tactile sensors. Optical MEMS-passive MEMS optical components-lenses-mirrors-Actuation for active optical MEMS.

---

**Course Number and Title**

EC1103  FUNDAMENTALS OF NANOTECHNOLOGY

**Credits / Contact Hours**

3 / 45

**Instructor Name**
Mr. A. V. M. Manikandan

Textbooks, References


Purpose

To introduce to the students, the various opportunities in the emerging field of Nano electronics and Nano technologies

Prerequisites

<table>
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<tr>
<th>Prerequisites</th>
<th>Co-requisites</th>
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<td>PY1003, EC1006</td>
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Required, Elective or Selected Elective (as per Table 5.1a)

Selected Elective

Instructional Objectives

1. The objective of this course is to make students familiar with the important concepts applicable to small electronic devices, their fabrication, characterization and application.

Student Outcomes from Criterion 3 covered by this Course

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Mapping of instructional objectives with student outcome

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List of Topics Covered

UNIT I - LIMITATIONS OF CMOS (9 hours)

UNIT II - MICRO AND NANO FABRICATION (9 hours)

UNIT III - CHARACTERIZATION EQUIPMENTS (9 hours)

UNIT IV - NANO DEVICES – I (9 hours)

UNIT V - NANO DEVICES – II (9 hours)
Course Number and Title

EC1104  ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

Credits / Contact Hours

3 / 45

Instructor Name

Mrs.R.Manohari

Textbooks, References


Purpose

The Purpose of this course is to introduce students to the various types of measurements made in electronics and the instruments used for measuring them. The main objective of this subject is to help students identify the different latest measurement techniques available for specific engineering applications.

Prerequisites

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Required, Elective or Selected Elective (as per Table 5.1a)

Selected Elective

Instructional Objectives

1. Understand the various measurement techniques available.
2. Understand the basic working of instruments used for measurement.
3. Understand the errors in measurements and their rectification.

Student Outcomes from Criterion 3 covered by this Course

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List of Topics Covered

UNIT I-MEASUREMENTS AND ERRORS  (9 hours)
Accuracy-Precision-Significant Figures-TYPES of Errors-Statistical Analysis-Limiting Errors-Bridge Measurements (AC and DC bridges) - Analysis of Linear Systems-Static and Dynamic characteristics-Time Domain Response-I Order response for Step-Input-Ramp-Input-Impulse-Input- Bourdon Tube-Pressure Gauges - Measurement of Flow
UNIT II–ELECTROMECHANICAL & DIGITAL INDICATING INSTRUMENTS  (9 hours)

UNIT III–SIGNAL GENERATION AND ANALYSIS  (9 hours)
Sine Wave Generator-Sweep Frequency Generator-Pulse and Square wave Generator-Function Generator-Analyzer-Wave Analyzer-Distortion Analyzer-Harmonic Distortion Analyzer-Spectrum Analyzer - Logic Analyzer.

UNIT IV–OSCILLOSCOPES AND RECORDER S  (9 hours)
Simple CRO - Dual Beam-Dual Trace-Sampling Oscilloscope-Analog and Digital Storage Oscilloscope-Recorders-Analog and Digital Recorders

UNIT V–ADVANCED MEASUREMENT AND COMPUTER CONTROLLED TEST SYSTEMS (9 hours)

Course Number and Title

EC1105 SENSORS AND TRANSDUCERS

Credits / Contact Hours

3 / 45

Instructor Name

Mrs.K.Vadivukarasi

Textbooks, References


Purpose

To impart knowledge on various types of sensors and transducers for Automation in science, Engineering and medicine.

Prerequisites | Co-requisites
--- | ---
PY1003 & EC1001 | Nil

Selected Elective
### Instructional Objectives

1. To study basic concepts of various sensors and transducers.
2. To develop knowledge in selection of suitable sensor based on requirement and application.

### Student Outcomes from Criterion 3 covered by this Course

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### List of Topics Covered

**UNIT I-INTRODUCTION (9 hours)**
Definition, classification, static and dynamic parameters, Characterization – Electrical, mechanical, thermal, optical, biological and chemical, Classification of errors – Error analysis, Static and dynamic characteristics of transducers, Performance measures of sensors.

**UNIT II-MECHANICAL AND ELECTROMECHANICAL SENSORS (9 hours)**
Resistive Potentiometer, strain gauge, Inductive sensors and transducer, capacitive sensors, ultrasonic sensors.

**UNIT III-THERMAL AND RADIATION SENSOR (9 hours)**
Thermal Sensors: Gas thermometric sensors, acoustic temperature sensors, magnetic thermometer, resistance change - type thermometric sensors, thermo emf sensors, junction semiconductor types, Thermal radiation sensors, spectroscopic thermometry
Radiation Sensors: Photo detectors, photovoltaic and photo junction cells, photo sensitive cell, photo FETs and other devices.

**UNIT IV-MAGNETIC AND ELECTROANALYTICAL SENSOR (9 hours)**
Magnetic Sensors: Force and displacement measurement, magneto resistive sensors, Hall Effect sensor, Inductance and eddy current sensors, Angular/rotary movement transducer, Electromagnetic flow meter, squid sensor.
Electro analytical Sensors: Electro chemical cell, cell potential, sensor electrodes, electro ceramics in gas media, chemFET.

**UNIT V-SENSORS AND THEIR APPLICATIONS (9 hours)**
Automobile sensor, Home appliance sensor, Aerospace sensors, sensors for manufacturing, medical diagnostic sensors, environmental monitoring.

### Course Number and Title

EC1106 BIOMEDICAL INSTRUMENTATION

### Credits / Contact Hours

3 / 45

### Instructor Name

Mr.B.Srinath
Textbooks, References


Purpose

The purpose of this course is to introduce the students to the basics of Electro-physiology and its measurements, non-electrical parameters related to various systems of human body and their measurements, Electrodes and Transducers used in bio signal acquisition. This course will enable the students to learn the basic principles of different instruments/equipment used in the health care industry. Also student will get to know about various Medical Imaging techniques used for diagnosis along with other diagnostic and therapeutic devices.

Prerequisites

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Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To understand the Origin of Bioelectric potential and their measurements using appropriate electrodes and Transducers.
2. To understand how to measure various biochemical and nonelectrical parameters of human system.
3. To understand the Electro-physiology of various systems and recording of the bioelectric signals.
4. To understand the working principles of various Imaging techniques.
5. To understand the design aspects of various Assist and Therapeutic Devices.

Student Outcomes from Criterion 3 covered by this Course

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</table>

List of Topics Covered

UNIT I-BIOPOTENTIAL ELECTRODES AND TRANSDUCERS  (9 hours)

Electrode theory- Electrode electrolyte interface, half-cell potential, Hydrogen, Calomel, Ag-AgCl electrode, needle and wire electrode, surface electrodes, microelectrode-metal micropipette.


UNIT II-BIO ELECTRIC POTENTIALS AND ELECTRO PHYSIOLOGICAL MEASUREMENTS  (9 hours)

Sources of Bioelectric potentials - Resting and Action potential - Propagation of Action potential

Electrophysiology of Heart, Nervous System and Muscle Activity


## Course Number and Title

**EC1107 CONTROL ENGINEERING**

## Credits / Contact Hours

3 / 45

## Instructor Name

Mr.P.K.Senthil Kumar

## Textbooks, References


## Purpose

To understand the fundamental need for control system and to derive its transfer function.

## Prerequisites | Co-requisites
--- | ---
Nil | Nil

## Required, Elective or Selected Elective (as per Table 5.1a)

Selected Elective

## Instructional Objectives

1. To understand the methods of representation of systems and deriving their transfer function model.
2. To give basic knowledge is obtaining the open loop and closed loop frequency responses of systems.
3. Applications of control systems.

| Student Outcomes from Criterion 3 covered by this Course |
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List of Topics Covered

UNIT I-SYSTEMS AND THEIR REPRESENTATION  (9 hours)
Control systems- Basic elements in control systems – Open and closed loop systems – Electrical analogy of mechanical and thermal systems – Transfer function – Block diagram reduction techniques – Signal flow graphs.

UNIT II-TIME RESPONSE  (9 hours)

UNIT III-FREQUENCY RESPONSE  (9 hours)
Frequency response of the system – Correlation between time and frequency response – Gain and Phase margin – Bode plot - Polar plot.

UNIT IV-STABILITY OF CONTROL SYSTEM  (9 hours)

UNIT V-APPLICATIONS (9 hours)
Transfer functions of Synchros – AC and DC servomotors – Potentiometers – Encoders- Gear trains-Single stage and two stage amplifiers transfer functions- case studies.

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<td>EC1108  COMPUTER ARCHITECTURE AND ORGANIZATION</td>
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<tr>
<td>Mr.A.K.Mariselvam</td>
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<tr>
<th>Purpose</th>
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<tr>
<td>To study the basic structure of a digital computer and to discuss in detail the organization of the Control unit, the Arithmetic and Logical unit, the Memory unit and the I/O unit.</td>
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</table>
### Required, Elective or Selected Elective (as per Table 5.1a)

Selected Elective

### Instructional Objectives

1. To have a thorough understanding of the basic structure and operation of a digital computer.
2. To discuss in detail the operation of the arithmetic unit including the algorithms and implementation of fixed-point and floating-point addition, subtraction, multiplication, and division.
3. To study in detail the different types of control and the concept of pipelining.
4. To study the hierarchical memory system including cache memories and virtual memory.
5. To study the different ways of communicating with I/O devices and standard I/O interfaces.

### Student Outcomes from Criterion 3 covered by this Course

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### List of Topics Covered

**UNIT I-INTRODUCTION (9 hours)**

**UNIT II-DATA PATH DESIGN (9 hours)**
Fixed Point Arithmetic, Addition, Subtraction, Multiplication and Division, Combinational and Sequential ALUs, Carry look ahead adder, Robertson Algorithm, Booth’s algorithm, non-restoring division algorithm, Floating Point Arithmetic, Coprocessor, Pipeline Processing, Modified booth’s Algorithm

**UNIT III-CONTROL DESIGN (9 hours)**
Hardwired Control, Micro programmed Control, Multiplier Control Unit, CPU Control Unit, Pipeline Control, Instruction Pipelines, Pipeline Performance, Superscalar Processing, Nano Programming.

**UNIT IV-MEMORY ORGANIZATION (9 hours)**
Random Access Memories, Serial - Access Memories, RAM Interfaces, Magnetic Surface Recording, Optical Memories, multilevel memories, Cache & Virtual Memory, Memory Allocation, Associative Memory.

**UNIT V-SYSTEM ORGANIZATION (9 hours)**
Communication methods, Buses, Bus Control, Bus Interfacing, Bus arbitration, IO and system control, IO interface circuits, Handshaking, DMA and interrupts, vectored interrupts, PCI interrupts, pipeline interrupts, IOP organization, multiprocessors, RISC and CISC processors, Superscalar and vector processor.

### Course Number and Title

**EC1109 EMBEDDED SYSTEMS**

### Credits / Contact Hours

3 / 45
Instructor Name
Mr.S.Nivash

Textbooks, References

Purpose
To provide sufficient Knowledge to understand the embedded systems design embedded programming and their operating system.

Prerequisites
Nil

Co-requisites
EC1016A

Required, Elective or Selected Elective (as per Table 5.1a)
Selected Elective

Instructional Objectives
1. To provide in-depth knowledge about embedded processor, its hardware and software
2. To explain programming concepts and embedded programming in C and assembly language.
3. To explain real time operating systems, inter-task communication and an embedded software development tool.

Student Outcomes from Criterion 3 covered by this Course

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List of Topics Covered

UNIT I-INTRODUCTION TO EMBEDDED SYSTEM AND ARM ARCHITECT (9 hours)

UNIT II-EMBEDDED C PROGRAMMING (9 hours)

UNIT III-OPTIMIZING ASSEMBLY CODE (9 hours)

UNIT IV-RTOS PRINCIPLE (9 hours)
UNIT V-EMBEDDED SOFTWARE DEVELOPMENT PROCESS     (9 hours)
Meeting real time constraints – Multi-state systems and function sequences. Embedded software development tools – Emulators and debuggers. Design methodologies – Case studies – Complete design of example embedded systems.

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<td>EC1110 VIRTUAL INSTRUMENTATION USING LABVIEW</td>
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<tbody>
<tr>
<td>• Cory L.Clark, “Labview Digital Signal Processing and Digital Communication”.</td>
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<tr>
<td>• Technical Manuals for DAS Modules of Advantech and National Instruments.</td>
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<table>
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<th>Purpose</th>
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<tr>
<td>To enable the students to understand basics, programming techniques, data acquisition and interfacing techniques of virtual instrumentation and to use VI for different applications.</td>
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<td>1. The students will be able to familiarize the basics and need of VI.</td>
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<td>2. The students will be able to learn LABVIEW software basics.</td>
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<td>3. To get better understanding of data acquisition techniques.</td>
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<td>4. The students can have an exposure to different interfacing techniques.</td>
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<td>5. The students can able to design some real time application using LABVIEW software.</td>
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<th>Student Outcomes from Criterion 3 covered by this Course</th>
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</table>
List of Topics Covered

UNIT I-VIRTUAL INSTRUMENTATION (9 hours)
Historical perspective, Need of VI, Advantages of VI, Define VI, block diagram & architecture of VI, data flow techniques, graphical programming in data flow, comparison with conventional programming.

UNIT II-VI PROGRAMMING TECHNIQUES (9 hours)
VIS and sub-VIS, loops & charts, arrays, clusters, graphs, case & sequence structures, formula modes, local and global variable, string & file input.

UNIT III-DATA ACQUISITION BASICS (9 hours)
Introduction to data acquisition on PC, Sampling fundamentals, Input/Output techniques and buses. ADC, DAC, DIO, Counters & timers, PC Hardware structure, timing, interrupts, DMA, Software and Hardware Installation, Simple applications using NI MyDAQ and NI ELVIS.

UNIT IV-LABVIEW IN SIGNAL PROCESSING (9 hours)

UNIT V-FREQUENCY DOMAIN PROCESSING (9 hours)
Discrete Fourier Transform and Fast Fourier Transform, STFT, Wavelet Transform, Signal Processing applications.

Course Number and Title
EC1111 DIGITAL TELEVISION

Credits / Contact Hours
3 / 45

Instructor Name
Dr. Diwakar R. Marur

Textbooks, References

Purpose
Television technology has now become a vital tool to the information revolution that is sweeping across the countries of the world. This syllabus aims at a comprehensive coverage of Digital Television systems with the emphasis on television evolution.

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<td>EC1012</td>
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Selected Elective

**Instructional Objectives**

1. To study the evolution of television systems
2. To apply digitization principles on composite television signal
3. To study types of compression standards
4. To know the television display, storage devices

**Student Outcomes from Criterion 3 covered by this Course**

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**List of Topics Covered**

**UNIT I-INTRODUCTION (9 hours)**

**UNIT II-DIGITIZATION (9 hours)**

**UNIT III-DIGITAL TELEVISION (9 hours)**
Digital Television types – JPEG – Video compression – MPEG2, MPEG4, H264, Motion – JPEG (M-JPEG) compression.

**UNIT IV-HIGH DEFINITION TV (9 hours)**

**UNIT V-DTV FUTURE AND ACCESSORIES (9 hours)**

**Course Number and Title**

**EC1112 DIGITAL IMAGE PROCESSING**

**Credits / Contact Hours**

3 / 45

**Instructor Name**

Mr.P.Vijaya kumar

**Textbooks, References**
The purpose of this course is to introduce the basic concept and methodologies for digital image processing.

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Selected Elective

Instructional Objectives

The students undergoing this course will be able to know
1. Fundamentals of image processing.
2. Various transforms used in image processing.
3. Image processing techniques like image enhancement, reconstruction, compression and segmentation.

Student Outcomes from Criterion 3 covered by this Course

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List of Topics Covered

UNIT I-DIGITAL IMAGE FUNDAMENTALS (9 hours)

UNIT II-IMAGE TRANSFORMS (9 hours)

UNIT III-IMAGE ENHANCEMENT (9 hours)

UNIT IV-IMAGE RESTORATION (9 hours)

UNIT V-IMAGE COMPRESSION AND SEGMENTATION (9 hours)
**Course Number and Title**

**EC1113  RADAR AND NAVIGATIONAL AIDS**

**Credits / Contact Hours**

3 / 45

**Instructor Name**

Mrs. K. Suganthi

**Textbooks, References**


**Purpose**

Main objective of this course is to make the students understand the basic concept in the field of Radar and Navigational aids. Students are taught about different types of Radar Systems.

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</table>

**Prerequisites**

EC1018

**Co-requisites**

Nil

**Required, Elective or Selected Elective (as per Table 5.1a)**

Selected Elective

**Instructional Objectives**

1. To study RADAR theory.
2. To study and learn different types of RADAR and their working principle.
3. To study RADAR signal detection methods.
4. To study RADAR Navigation techniques

**Student Outcomes from Criterion 3 covered by this Course**

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**List of Topics Covered**
UNIT I-RADAR EQUATIONS  (7 hours)

UNIT II-MTI AND PULSE DOPPLER RADAR  (11 hours)

UNIT III-RADAR SIGNAL DETECTION AND PROPAGATION ON WAVES  (9 hours)

UNIT IV-RADIO NAVIGATION  (9 hours)

UNIT V-RADAR TRANSMITTER AND RECEIVER  (9 hours)

Course Number and Title
EC1114  COMMUNICATION SWITCHING TECHNIQUES

Credits / Contact Hours
3 / 45

Instructor Name
Mrs.M.Neelaveni Ammal

Textbooks, References

Purpose
To learn the basic principles of switching, signaling, and traffic in the context of telecommunication networks.

Prerequisites
MA1024 & EC1018

Co-requisites
Nil

Required, Elective or Selected Elective (as per Table 5.1a)
Instructional Objectives

1. To study the concepts of message switching, circuit switching, strowger switching, crossbar switching, electronic switching, and digital switching.
2. To understand the problems of congestion, queuing, and to study methods like Grade of Service, and Blocking Probability to provide an estimate of the amount of traffic present in various systems.
4. To study concepts like Reliability, Availability, and Security in various types of switching systems.
5. To learn the different kinds of signaling, circuit and packet switching techniques.

Student Outcomes from Criterion 3 covered by this Course

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List of Topics Covered

UNIT I-BASIC SWITCHING SYSTEMS FOR TELECOMMUNICATION (9 hours)

UNIT II-TRAFFIC ENGINEERING (9 hours)

UNIT III-SWITCHING NETWORKS (9 hours)

UNIT IV-TIME-DIVISION SWITCHING AND CONTROL OF SWITCHING SYSTEMS (9 hours)

UNIT V-SIGNALING AND PACKET SWITCHING (9 hours)

Course Number and Title

EC1115ASIC DESIGN

Credits / Contact Hours

3 / 45

Instructor Name
Dr. J. Selvakumar

Textbooks, References

- Design manuals of Altera, Xilinx and Actel.

Purpose

The purpose of this course is to introduce the students the basics of designing and using ASIC’s. The operation of tools used in the design is also explained.

Prerequisites

| EC1012 |

Co-requisites

| Nil |

Required, Elective or Selected Elective (as per Table 5.1a)

Selected Elective

Instructional Objectives

1. To give basic knowledge of ASIC internals.
2. To impart knowledge on ASIC types and tools used in the design.
3. To give basic understanding of tools used.

Student Outcomes from Criterion 3 covered by this Course

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List of Topics Covered

UNIT I-INTRODUCTION TO ASICS (9 hours)
Introduction to ASICs: Full-custom and Semi-custom ASIC – CMOS logic – ASIC library design.

UNIT II-PROGRAMMABLE ASICS (9 hours)

UNIT III-SIMULATION AND SYNTHESIS (9 hours)
Logic synthesis: A comparator MUX, Inside a logic synthesizer, VHDL and logic synthesis, FSM synthesis, memory synthesis – Simulation: Types of simulation – logic systems – how logic simulation works.

UNIT IV-ASIC TESTING (9 hours)

UNIT V-ASIC CONSTRUCTION (9 hours)
System partitioning – power dissipation – partitioning methods – floor planning and placement:– Routing: Global routing, detailed routing, special routing – Introduction to SOC.

**Course Number and Title**

EC1116 EMBEDDED C AND MICROCONTROLLER

**Credits / Contact Hours**

3 / 45

**Instructor Name**

Mr.K.Ramesh

**Textbooks, References**


**Purpose**

The objective of the course is to provide strong foundation in ARM SOC architecture, as well as programming of ARM Microcontroller using Embedded C language, which is a great demand in the today’s core industry. This course content satisfies the thrust to bridge the gap between the academic course and core industry skill set requirement.

**Prerequisites**

Nil

**Co-requisites**

EC1016A

**Required, Elective or Selected Elective (as per Table 5.1a)**

Selected Elective

**Instructional Objectives**

2. Appreciate the advantages in using ARM microcontrollers & systems development using ARM target boards.
3. Design systems applications using Embedded C programming.
4. Apply this knowledge to more real-time case study.

**Student Outcomes from Criterion 3 covered by this Course**
### List of Topics Covered

<table>
<thead>
<tr>
<th>UNIT I-THE ARM PROCESSOR FUNDAMENTALS AND INSTRUCTION SET</th>
<th>9 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARM Register structure – Program Status register- Pipeline, Exception, Interrupts on vector table- core extension- ARM Processor families. Data processing instructions-Branch Instructions-Load-store instructions, software Interrupts- Program status resister instructions, loading instructions-ARMv5E Extensions, conditional execution.</td>
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<tr>
<th>UNIT II-THE THUMB INSTRUCTION SET AND ARM ARCHITECTURE</th>
<th>9 hours</th>
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<tr>
<th>UNIT III-ARCHITECTURAL SUPPORT FOR HIGH LEVEL LANGUAGE AND SYSTEM DEVELOPMENT</th>
<th>9 hours</th>
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</thead>
<tbody>
<tr>
<td>Conditional execution - looping constructs - Bit manipulation - Function and procedure - use of memory – ARM memory interface – AMBA bus architecture – Hardware system prototyping tools - the ARMulator - The JTAG BST architecture - The ARM Embedded trace - debug architecture.</td>
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</table>

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<tr>
<th>UNIT IV-MEMORY HIERARCHY, EMBEDDED ARM CPU CORES AND ITS APPLICATIONS</th>
<th>9 hours</th>
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<tr>
<th>UNITY-INTRODUCTION TO EMBEDDED C</th>
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**Course Number and Title**

**EC1117 CRYPTOGRAPHY AND NETWORK SECURITY**

**Credits / Contact Hours**

3 / 45

**Instructor Name**

Mrs.K.Vadivukarasi

**Textbooks, References**
Purpose

To study various aspects of Network Security Attacks, Services and Mechanisms

Prerequisites

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<th>Co-requisites</th>
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Required, Elective or Selected Elective (as per Table 5.1a)

Selected Elective

Instructional Objectives

1. To understand the mathematical concepts of various Encryption, Authentication and Digital Signature Algorithms.
2. To standby the design of different general purpose and application specific security Protocols and standards.

Student Outcomes from Criterion 3 covered by this Course

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Mapping of instructional objectives with student outcome

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List of Topics Covered

**UNIT I-INTRODUCTION (9 hours)**

**UNIT II-ADVANCED BLOCK CIPHERS AND PUBLIC KEY CRYPTOSYSTEMS (9 hours)**

**UNIT III-MESSAGE AUTHENTICATION AND DIGITAL SIGNATURE (9 hours)**

**UNIT IV-NETWORK SECURITY (9 hours)**

**UNIT V- SYSTEM SECURITY (9 hours)**

Course Number and Title
EC1118 SATELLITE COMMUNICATION AND BROADCASTING

Credits / Contact Hours
3 / 45

Instructor Name
Ms. T. Ramya

Textbooks, References

Purpose
The main objective of this course is to make the students understand the basic concept in the field of satellite communication. This subject gives the students an opportunity to know how to place a satellite in an orbit. The students are taught about the earth and space subsystems. The satellite services like broadcasting are dealt thoroughly. This will help the student to understand and appreciate the subject.

Prerequisites
EC1018

Co-requisites
Nil

Required, Elective or Selected Elective (as per Table 5.1a)
Selected Elective

Instructional Objectives
At the end of this course students will gain knowledge in topics such as
1. Orbital aspects involved in satellite communication.
2. Power budget calculation.
3. Satellite system and services provided.

Mapping of instructional objectives with student outcome

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List of Topics Covered

UNIT I-SATELLITE ORBIT (9 hours)
UNIT II-INK DESIGN (9 hours)

UNIT III-SPACE AND EARTH SEGMENT (9 hours)

UNIT IV-SATELLITE ACCESS (9 hours)

UNIT V-BROADCAST AND SERVICES (9 hours)

Course Number and Title

EC1119 MOBILE COMPUTING

Credits / Contact Hours

3 / 45

Instructor Name

Mr.M.Mohana Sundaram

Textbooks, References


Purpose

To understand the fundamentals and architectures of wireless communication standards and Mobile Adhoc networks.

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<tbody>
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Required, Elective or Selected Elective (as per Table 5.1a)

Selected Elective

Instructional Objectives

1. To study the introduction of wireless communication systems.
2. To study the specifications and functionalities of wireless protocols / standards.
3. To study the fundamentals of mobile Adhoc networks.
### Student Outcomes from Criterion 3 covered by this Course

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### List of Topics Covered

**UNIT I-INTRODUCTION** (9 hours)

**UNIT II-WIRELESS PROTOCOLS** (9 hours)

**UNIT III-WIRELESS NETWORKING** (9 hours)

**UNIT IV-PACKET RADIO NETWORKS** (9 hours)
Packet Radio Networks: Architecture and components of PRNETs – Routing in PRNETs – Pacing techniques – Media access and flow acknowledgement in PRNETs.

**UNIT V-AD-HOC MOBILE NETWORKS** (9 hours)
Types of Ad-hoc mobile communications & Host movements – Challenges facing Ad-hoc mobile networks – Problems in Ad-hoc channel access – Existing Ad-hoc MAC protocols: MACA – MACABI – PAMAs – DBTMA.

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**Course Number and Title**

**EC1120 BLUETOOTH TECHNOLOGY**

**Credits / Contact Hours**

3 / 45

**Instructor Name**

Ms. A. Ramya

**Textbooks, References**


**Purpose**

To Study the concepts of Bluetooth Technology.
Required, Elective or Selected Elective (as per Table 5.1a)

Selected Elective

Instructional Objectives

1. To study the fundamental concepts of Bluetooth module.
2. To analyze the protocol operation.
3. To gain knowledge on various low power modes and Quality of Service parameters.
4. To understand the testing methodology and the related standards.

Student Outcomes from Criterion 3 covered by this Course

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<th>Student outcome</th>
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Mapping of instructional objectives with student outcome

<table>
<thead>
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<tr>
<td>UNIT I-THE BLUE TOOTH MODULE (8 hours)</td>
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</table>
Introduction- overview - the Blue tooth module- antennas - Base band - Introduction- Blue tooth device address - Masters, slaves, and Pico nets- system timing- physical links- Blue tooth packet structure- logical channels- frequency hopping.

UNIT II-THE LINK CONTROLLER (10 hours)
The link controller- link control protocol- link controller operation- Pico net, scatter net operation- master/ slave role switching- base band/ link controller architectural overview - link manager- the host controller interface.

UNIT III-THE BLUE TOOTH HOST (10 hours)
The Blue tooth host- logical link control and adaptation protocol – RFCOMM- the service discovery protocol – the wireless access protocol- OBEX and IrDA- telephony control protocol.

UNIT IV-CROSS LAYER FUNCTIONS (8 hours)
Cross layer functions- Encryption and security- low power operations- controlling low power modes- hold mode- park mode-quality of service- managing Blue tooth devices.

UNITY-ZIGBEE NETOWRKS (9 hours)
Course Number and Title

EC1121 COMMUNICATION NETWORK PROTOCOLS

Credits / Contact Hours

3 / 45

Instructor Name

Mrs.S.T.Aarthy

Textbooks, References


Purpose

The course introduces the students to the emerging areas in Internetworking. This will enable the students to acquire a solid understanding of the different components involved in the seamless working of the Internet.

Prerequisites

Nil

Co-requisites

Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Selected Elective

Instructional Objectives

1. To learn the technology of Data Networking.
2. To learn Internet addressing and routing methods.
3. To study Client Server model and Internet Security.

Student Outcomes from Criterion 3 covered by this Course

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<th>Student outcome</th>
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</tbody>
</table>

List of Topics Covered

UNIT I-REVIEW OF UNDERLYING NETWORK TECHNOLOGIES  (6 hours)
Motivation for internetworking- Internet Services- Introduction to Wide Area and Local Area Networks- Ethernet Technology- FDDI- Internetworking concepts and Architecture model.

UNIT II-INTERNET ADDRESSES  (10 hours)
Classful Internet Addresses- Subnetting and Super-netting- ARP- ARP Packet format, Encapsulation & operation- ARP over ATM- Proxy ARP- RARP-ICMP –ICMP message types.
UNIT III-ROUTING     (11 hours)

UNIT IV-CLIENT SERVER MODEL AND SOCKET INTERFACE      (9 hours)
The client server model- UDP echo server- Time and date service-Socket abstraction- Specifying local and destination addresses- Sending and Receiving data-Handling multiple services, Domain name system – Distribution of name space-DNS resolution – DNS messages and records.

UNIT V-INTERNET SECURITY AND IPV6      (9 hours)
Protecting resources - IPSec- Authentication Header-Encapsulating security payload – Secure sockets-Secure Socket Layer (SSL) - Firewalls and Internet access- Packet filter firewall- Proxy firewall- IPv6-Features and packet format- IPV6 Source routing types- Comparison between IPV4 and IPV6.

Course Number and Title
EC1122  PHOTONICS AND OPTICAL NETWORKS

Credits / Contact Hours
3  / 45

Instructor Name
Dr. Shanthi prince

Textbooks, References

Purpose
The course will provide students with the fundamental concepts in photonics, which have increasing applications in the area of information technology and communication, healthcare and life science, optical sensing, lightning, energy and manufacturing. The course will focus on the applications in optical communication and networks.

Prerequisites

<table>
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<tr>
<th>Prerequisites</th>
<th>Co-requisites</th>
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<tbody>
<tr>
<td>EC1022</td>
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</table>

Required, Elective or Selected Elective (as per Table 5.1a)
Selected Elective

Instructional Objectives
1. To understand the interaction of photons and matter, the propagation of light in waveguides and optical fibers, the operation principles of light emitting diodes, semiconductor lasers, detectors amplifiers and network
2. To understand the operating principles of optical communication systems including wavelength division multiplexing, Time division multiplexing and code division multiplexing.
3. To design simple optical communication link.
4. To describe the main types of architectures, protocols and standards governing modern optical networks.

<table>
<thead>
<tr>
<th>Student Outcomes from Criterion 3 covered by this Course</th>
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<tbody>
<tr>
<td>Student outcome</td>
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<tr>
<td>Mapping of instructional objectives with student outcome</td>
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**List of Topics Covered**

**UNIT I-INTRODUCTION TO PHOTONICS (6 hours)**

**UNIT II-OPTICAL FIBER WAVEGUIDES, SOURCES AND DETECTORS (12 hours)**

**UNIT III-OPTICAL COMPONENTS AND SYSTEM DESIGN (9 hours)**

**UNIT IV-OPTICAL NETWORKS ARCHITECTURE (9 hours)**

**UNIT V-WDM NETWORK DESIGN (9 hours)**
WDM network elements, WDM network design - Cost tradeoffs, virtual Topology design, Routing and wavelength assignment, statistical dimensioning models.

**Course Number and Title**

EC1123 RF SYSTEM DESIGN FOR WIRELESS COMMUNICATIONS

**Credits / Contact Hours**

3 / 45

**Instructor Name**

Mrs. J. Manjula

**Textbooks, References**

- Allan W. Scott, Rex Frobenius, “RF Measurements for Cellular Phones and Wireless Data Systems”, John
Purpose

To learn about the specifications, design and analysis of RF systems for wireless communication applications.

Prerequisites

<table>
<thead>
<tr>
<th>EC1026</th>
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Co-requisites

| Nil |

Required, Elective or Selected Elective (as per Table 5.1a)

Selected Elective

Instructional Objectives

1. RF circuits and system specifications and analysis.
2. Transceiver architectures.
3. Overall picture of Wireless Transceivers.

Student Outcomes from Criterion 3 covered by this Course

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List of Topics Covered

UNIT I-INTRODUCTION TO RF AND WIRELESS SYSTEMS  (9 hours)
Characteristics of RF signals, Wireless communication systems, Wireless Standards, Introduction to Multiple Access Techniques FDMA, TDMA, CDMA and OFDMA.

UNIT II-RF COMPONENTS AND CIRCUITS  (9 hours)
Components: Capacitors, Inductors, Tuning and Matching.
Circuits: Low Noise Amplifiers, Mixers, Oscillators, Frequency Synthesizers, Power Amplifiers.

UNIT III-RADIO ARCHITECTURES  (9 hours)

UNIT IV-SYSTEM ANALYSIS AND DESIGN  (9 hours)
Receiver: Sensitivity & Noise Figure of Receiver, Inter modulation Characteristics, Single Tone Desensitization, Adjacent/Alternate channel selectivity, Receiver Dynamic Range and AGC system, System design and performance evaluation.
Transmitter: Transmitter power and spectrum, Modulation accuracy, Adjacent and alternate channel power, Noise emission calculation.

UNIT V-APPLICATIONS AND CASE STUDIES  (9 hours)
Multimode and Multiband Super heterodyne Transceiver, Direct Conversion Transceiver
**Course Number and Title**

**EC1124 NEURAL NETWORK AND FUZZY LOGIC**

**Credits / Contact Hours**

3 / 45

**Instructor Name**

Mr. B. Srinath

**Textbooks, References**


**Purpose**

This course provides a way to study the Artificial Neural Networks and Fuzzy Logic concepts.

**Prerequisites**

Nil

**Co-requisites**

Nil

**Required, Elective or Selected Elective (as per Table 5.1a)**

Selected Elective

**Instructional Objectives**

1. To learn the various architectures of ANN.
2. To learn the methods of representing information in ANN like self organizing networks, associative and competitive learning.

**Student Outcomes from Criterion 3 covered by this Course**

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**Mapping of instructional objectives with student outcome**

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**List of Topics Covered**

**UNIT I-INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS  (9 hours)**

UNIT II-ASSOCIATIVE MEMORY & CPN (9 hours)
Associative memory - Bi-directional Associative Memory – Hopfield memory – traveling sales man problem
Annealing, Boltzmann machine - learning – application - Counter Propagation network –architecture – training –
Applications.

UNIT III-SELF ORGANIZING MAP & ART (9 hours)
Self-organizing map - learning algorithm - feature map classifier – applications - architecture of Adaptive Resonance
Theory - pattern matching in ART network.

UNIT IV-CRISP SETS AND FUZZY SETS (9 hours)
Introduction – crisp sets an overview – the notion of fuzzy sets –Basic concepts of fuzzy sets – classical logic an
overview – Fuzzy logic- Operations on fuzzy sets - fuzzy complement – fuzzy union – fuzzy intersection –
combinations of operations – general aggregation operations.

UNIT V-FUZZY RELATIONS (9 hours)
Crisp and fuzzy relations – binary relations – binary relations on a single set– equivalence and similarity relations –
Compatibility or tolerance relations– orderings – morphisms-fuzzy relation equations.

Course Number and Title
EC1125 DIGITAL LOGIC DESIGN WITH PLDS AND VHDL

Credits / Contact Hours
3 / 45

Instructor Name
Mr.R.Prithiviraj

Textbooks, References

Purpose
Learning design of digital circuits is a fundamental necessity for designing practical systems. To develop standard
design practices for digital circuits at a higher level of abstraction a hardware description language is useful. This
subject provides necessary instruments to achieve that goal.

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Required, Elective or Selected Elective (as per Table 5.1a)
Selected Elective
**Instructional Objectives**

1. Apply advanced theorems to simplify the design aspects of various practical circuits.
2. Design State Machines.
3. Implement various digital circuits using Programmable Logic Devices.
4. Implement combinational and sequential circuits using VHDL.

**Student Outcomes from Criterion 3 covered by this Course**

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**List of Topics Covered**

**UNIT I-ADVANCED TOPICS IN BOOLEAN ALGEBRA  (8 hours)**
Shannon’s Expansion theorem and its application, Consensus theorem, Reed-Muller Expansion technique, Multiplexer logic as function generators, Implementation of Multiple output logic functions, Static and Dynamic hazards, Design of static hazard-free and dynamic hazard-free logic circuits.

**UNIT II-SEQUENTIAL CIRCUIT DESIGN  (9 hours)**
Mealy and Moore machines, clocked synchronous sequential circuit design procedure-state diagrams-state table-state reduction-state assignment, Incompletely Specified Sequential Machines.

**UNIT III-DESIGN WITH PROGRAMMABLE LOGIC DEVICES (9 Hours)**
Basic concepts, PROM as PLD, Programmable Array Logic (PAL), Programmable Logic Array (PLA), Design of combinational and sequential circuits using PLD’s, Complex PLD (CPLD), Introduction to Field Programmable Gate Arrays (FPGA), Xilinx FPGAs-Xilinx 3000 series and 4000 series FPGA.

**UNIT IV-INTRODUCTION TO VHDL  (9 Hours)**
VHDL Description of combination circuits, VHDL Modules- entity and architecture description, Sequential statements and VHDL processes, VHDL Data types and Operators, Concurrent and Sequential Assignment Statements (All types), Different types of Modeling in VHDL – Behavioral, dataflow and structural modeling, Variables, Signals and Constants in VHDL, Package in VHDL.

**UNIT V-DIGITAL DESIGN WITH VHDL  (10 HOURS)**
Combinational Circuit Design using Structural, behavioral and data flow modeling (Circuits like Arithmetic circuits, decoders, encoders, multiplexers, demultiplexers, code converters, 4-bit binary adders, BCD adder, comparator, ALU etc.), Design of Sequential Elements, Registers, Counters and Synchronous Sequential Circuits using VHDL.
## A.2.1 Mathematics and Basic Sciences Courses

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<td>MA0102</td>
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<td>MA0211</td>
<td>Mathematics – III</td>
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<tr>
<td>MA0232</td>
<td>Probability and Random Processes</td>
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<tr>
<td>MA0321</td>
<td>Discrete Mathematics</td>
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<tr>
<td>MA0471</td>
<td>Linear Algebra and Statistics</td>
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<td>PH0102</td>
<td>Materials Science</td>
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<td>GE0102</td>
<td>Biology for Engineers</td>
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<td>GE0104</td>
<td>Principles of Environmental Science</td>
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<td>CS0140</td>
<td>Computer Practice</td>
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## MATHEMATICS

<table>
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<th>Course Number and Title</th>
<th>MA0101  MATHEMATICS - I</th>
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<tbody>
<tr>
<td>Credits / Contact Hours</td>
<td>4 / 75</td>
</tr>
<tr>
<td>Instructor Name</td>
<td>Dr.K.Ganesan</td>
</tr>
<tr>
<td>Purpose</td>
<td>To impart analytical ability in solving mathematical problems as applied to the respective branches of Engineering.</td>
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<tr>
<td>Prerequisites</td>
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<tr>
<td>Required, Elective or Selected Elective (as per Table 5.1b)</td>
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</table>
| Instructional Objectives| At the end of the course, student should be able  
1. To apply advanced matrix knowledge to Engineering problems.  
2. To improve their ability in solving geometrical applications of differential calculus problems.  
3. To equip themselves familiar with the functions of several variables.  
4. To familiarize with the applications of differential equations.  
5. To expose to the concept of three dimensional analytical geometry |
| Student Outcomes fromCriterion 3 covered by this Course |  
| Student outcome | a | b | c | d | e | f | g | h | i | j | k |  
| Mapping of instructional objectives with student outcome | 1-5 | 1-5 |
| List of Topics Covered | UNIT 1 MATRICES  (9 hours)  
Characteristic equation – Eigen values and eigen vectors of a real matrix – Properties of eigen values – Caley- Hamilton |
theorem – Orthogonal reduction of a symmetric matrix to diagonal form – Orthogonal matrices – Reduction of quadratic form to canonical form by orthogonal transformations.

**UNIT 2 GEOMETRICAL APPLICATIONS OF DIFFERENTIAL CALCULUS (9 hours)**

**UNIT 3 FUNCTIONS OF SEVERAL VARIABLES (9 hours)**

**UNIT 4 ORDINARY DIFFERENTIAL EQUATIONS (9 hours)**
Simultaneous first order linear equations with constant coefficients – Linear equations of second order with constant and variable coefficients – Homogeneous equation of Euler type – Equations reducible to homogeneous form.

**UNIT 5 THREE DIMENSIONAL ANALYTICAL GEOMETRY (9 hours)**
## Instructional Objectives

1. At the conclusion of the course, students should have understood Multiple Integrals, Laplace Transforms, Vector Calculus and Functions of a complex variable including contour integration and able to apply to all their Engineering problems.

## Student Outcomes from Criterion 3 covered by this Course

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<tr>
<th>Student outcome</th>
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</table>

## List of Topics Covered

### UNIT 1 MULTIPLE INTEGRALS (9 hours)
Double integration in Cartesian and polar coordinates – Change of order of integration – Area as a double integral – Triple integration in Cartesian coordinates.

### UNIT 2 LAPLACE TRANSFORMS (9 hours)
Transforms of simple functions – Basic operational properties – Transforms of derivatives and integrals – Initial and final value theorems – Inverse transforms – Convolution theorem – periodic functions – Applications of Laplace transforms for solving linear ordinary differential equations up to second order with constant coefficients only.

### UNIT 3 VECTOR CALCULUS (9 hours)
Gradient, divergence, curl – Solenoidal and irrotational fields – Vector identities (without proof) – Directional derivatives – Line, surface and volume integrals – Statements of Green’s, Gauss divergence and Stroke’s theorems only – Verification and applications to cubes and parallelopipeds only.

### UNIT 4 ANALYTIC FUNCTIONS (9 hours)

### UNIT 5 COMPLEX INTEGRATION (9 hours)
Line integral – Cauchy’s integral theorem (without proof) – Cauchy’s integral formulae (with proof) – application of Cauchy’s integral formulae – Taylor’s and Laurent’s expansions (statements only) – Singularities – Poles and Residues – Cauchy’s residue theorem (with proof) - Evaluation of line integrals.

<table>
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<th>TUTORIAL</th>
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<td>TOTAL</td>
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</table>
Course Number and Title

MA0211  MATHEMATICS – III

Credits / Contact Hours

4 / 75

Instructor Name

Dr.K.Ganesan

Textbooks, References


Purpose

To equip the students with the knowledge of slightly advanced topics of mathematics.

Prerequisites

Co-requisites

MA0101, MA0102

NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

After the completion of the course, the students should be able to apply
1. The rudiments of Fourier series
2. The theory and problems of PDE
3. The applications of PDE to boundary value problems.
4. Fourier transforms and to their branches of engineering.

Student Outcomes from Criterion 3 covered by this Course

Student outcome | a | b | c | d | e | f | g | h | i | j | k
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 | X | X

Mapping of instructional objectives with student outcome

1-4 1-4

List of Topics Covered

UNIT 1  FOURIER SERIES  (9 hours)
Dirichlet’s conditions – General Fourier series – Half range Sine and Cosine series – Parseval’s identity – Harmonic
Analysis.

UNIT 2 PARTIAL DIFFERENTIAL EQUATIONS (9 hours)
Formation – Solution of standard types of first order equations – Lagrange’s equation – Linear homogeneous partial
differential equations of second and higher order with constant coefficients - Classification of second order linear partial
differential equations.

UNIT 3 ONE DIMENSIONAL WAVE & HEAT EQUATION (9 hours)
Boundary and initial value problems - Transverse vibrations of elastic string with fixed ends – Fourier series solutions
– One dimensional heat equation - Steady and transient states – problems.

UNIT 4 TWO DIMENSIONAL HEAT EQUATION (9 hours)
Two dimensional heat equation – Steady state heat flow equation – Laplace Equation Cartesian form – Laplace
equation in polar form – heat flow in circular plates including annulus - Fourier series solution.

UNIT 5 FOURIER TRANSFORMS (9 hours)
Statement of Fourier integral theorem – Fourier transform pairs – Fourier Sine and Cosine transforms – Properties –
Transforms of simple functions – Convolution theorem – Parseval’s identity.

TUTORIAL 30 hours
TOTAL 75 hours

Course Number and Title

MA0232 PROBABILITY AND RANDOM PROCESSES

Credits / Contact Hours

4 / 60

Instructor Name

Dr.K.Ganesan

Textbooks, References

- Trivedi K S, “ Probability and Statistics with reliability, Queueing and Computer Science Applications”,
  Prentice Hall of India, New Delhi, 1984

Purpose

To introduce the students to the idea of probability and random process, an important mathematical tool in signal
processing.

Prerequisites

Co-requisites

NIL

NIL

Required, Elective or Selected Elective (as per Table 5.1b)
Required

**Instructional Objectives**

At the end of the course, the students should be fully equipped with the knowledge of

1. Probability and Random variables
2. 2–D Random variables
3. The concepts of Random process
4. The Correlation Functions and
5. The applications of Fourier Transforms like Spectral Density and others.

**Student Outcomes from Criterion 3 covered by this Course**

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**List of Topics Covered**

**UNIT 1 PROBABILITY AND RANDOM VARIABLES:** (9 hours)

**UNIT 2 TWO DIMENSIONAL RANDOM VARIABLES** (9 hours)

**UNIT 3 RANDOM PROCESSES** (9 hours)

**UNIT 4 CORRELATION FUNCTIONS:** (9 hours)
Autocorrelation function and its properties – Cross Correlation function and its properties – Linear System with Random inspects.

**UNIT 5 SPECTRAL DENSITY** (9 hours)

**TUTORIAL 15 hours**

**TOTAL 60 hours**
Purpose
To impart analytical ability to describe, analyze and solving mathematical problems as applied to the respective branches of Engineering in a logical and systematic fashion.

Prerequisites
NIL

Co-requisites
NIL

Required, Elective or Selected Elective (as per Table 5.1b)
Required

Instructional Objectives
6. To understand Logic and mathematical reasoning and to count /enumerate objects in a systematic way. To understand Mathematical induction and recursion.
7. To understand Set theory, relations and functions and to Read, understand and construct mathematical arguments
8. To understand Recurrence Relation, Generating functions and Algebraic Systems and their applications in coding theory - Group codes.

List of Topics Covered

UNIT-I MATHEMATICAL LOGIC (12 hours)

UNIT-II SET THEORY (12 hours)
UNIT-III RECURRENCE RELATION & ALGEBRAIC SYSTEMS (12 hours)
Recurrence relations - Solving a recurrence relation - Recurrence relations obtained from solutions - Generating functions - Solution of a recurrence relation using generating functions - Closed form expression for generating function. Groups - Cyclic groups and subgroups - Normal subgroups - Coding theory - Group codes.

UNIT-IV GRAPH THEORY (12 hours)

UNIT-V BOOLEAN ALGEBRA & FORMAL LANGUAGES (12 hours)
Boolean algebra - Posets - Lattices - Application of Boolean Algebra to switching theory. Languages - Recognition and generation - Phase structure grammars and languages - Finite state Machine - Recognition in regular languages.
### Required

**Instructional Objectives**

1. To learn about vector space and linear transformations.
2. To learn about inner product space.
3. To have knowledge in regression and correlation.
4. To learn about testing of hypothesis.
5. To learn about ANOVA.

**Student Outcomes from Criterion 3 covered by this Course**

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**List of Topics Covered**

**UNIT I VECTOR SPACE AND LINEAR TRANSFORMATION (12 Hours)**

Vector space-Subspaces-Linear combination, Linear span-Linear independence and dependence-Basis and Dimension-Algebra of linear transformations. (Theorems without proof)

**UNIT II INNER PRODUCT SPACE (12 Hours)**

Inner product space-Normed Vector Space-Orthogonality-Grahm-Schmidt Orthogonalisation Process. (Theorems without proof)

**UNIT III REGRESSION AND CORRELATION (12 Hours)**

Regression methods - Principle of least squares - Correlation - Multiple and Partial correlation - Linear and non-linear regression - Multiple linear regression.

**UNIT IV TESTING OF HYPOTHESES (12 Hours)**

Large sample tests based on Normal Distribution – Small sample tests based on t, F distributions – Chi square tests for goodness of fit and independence of attributes.

**UNIT V ANALYSIS OF VARIANCES (12 Hours)**

Introduction to test based on F-distribution - One way and Two way classification of ANOVA - Completely Randomised Design - Randomised Block Design - Latin square Design

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**Course Number and Title**

**PH0101 PHYSICS**

**Credits / Contact Hours**

3 / 45

**Instructor Name**

Dr. Krishna Mohan

**Textbooks, References**

- Thiruvadigal, J. D., Ponnusamy, S., Vasuhi, P. S. and Kumar, C., “Physics for Technologists”, 5th edition,
The purpose of this course is to develop scientific temper and analytical capability through learning physical concepts and their applications in engineering and technology. Comprehension of some basic physical concepts will enable the students to logically solve engineering problems.

### Prerequisites and Co-requisites

**Required, Elective or Selected Elective (as per Table 5.1b)**

- **Required**: Nil
- **Co-requisites**: Nil

### Instructional Objectives

At the end of the course, the student will be able to:
1. Understand the general scientific concepts required for technology,
2. Apply the concepts in solving engineering problems,
3. Explain scientifically the new developments in engineering and technology, and
4. Get familiarized with the concepts, theories, and models behind many technological applications.

### Student Outcomes from Criterion 3 covered by this Course

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### List of Topics Covered

#### UNIT 1 PROPERTIES OF MATTER AND SOUND (9 hours)

#### UNIT 2 ELECTROMAGNETISM AND MICROWAVES (9 hours)

#### UNIT 3 OPTICS (9 hours)
**Photometry**: Principles and Lummer-Brodhun photometer. **Lasers**: Principles and characteristics – Types of lasers (CO2, excimer, NdYAG, GaAs, free electron) – Holographic mass storage. **Optical Fiber**: Principles – Physical structure and types – Optical fiber communication. **Photo elasticity**: Theory and applications.

#### UNIT 4 CRYSTAL PHYSICS AND CRYOGENICS (9 hours)
**Crystal Physics**: Crystal directions – Planes and Miller indices – Basic symmetry elements – Translational symmetry elements – Reciprocal lattice – Diamond and HCP crystal structure – Imperfections in crystals. **Cryogenics**: Methods
of liquefaction of gases (cascade process, Linde’s process, and adiabatic demagnetization process) – Measurement of cryogenic temperatures.

UNIT 5 ENERGY PHYSICS (9 hours)
Introduction to non-conventional energy sources – Solar cells – Thermoelectric power generators – Thermionic power generator – Magneto hydrodynamic power generator – Fuel cells (H2O2) – Solid state batteries (Lithium) – Low voltage and high voltage nuclear cells – Thermocouple based nuclear cell – Ultra capacitors.

Course Number and Title

CY0101 CHEMISTRY

Credits / Contact Hours

3 / 45

Instructor Name

Dr. R. Jeyalakshmi

Textbooks, References


Purpose

To impart a sound knowledge on the principles of chemistry involving the different application oriented topics required for all engineering branches.

Prerequisites

Nil

Co-requisites

Nil

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

The students should be conversant with
1. The role of applied chemistry in the field of engineering.
2. The knowledge of water quality parameters and the treatment of water.
3. The principles involved in corrosion and its inhibitions.
4. Important analytical techniques, instrumentation and the applications.
5. Knowledge with respect to the phase equilibria of different systems.

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<th>List of Topics Covered</th>
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<tr>
<td><strong>UNIT 1 TECHNOLOGY OF WATER (9 hours)</strong></td>
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</table>

| **UNIT 2 CORROSION AND ITS CONTROL (9 hours)** |

| **UNIT 3 PHASE EQUILIBRIA (9 hours)** |
| Phase rule: Statement – explanation of the terms involved - one component system (water system only). Condensed phase rule - thermal analysis – two component systems: simple eutectic, Pb-Ag; Br, Cd - solid solution Cu-Ni and compound formation Mg-Zn - applications of eutectics. |

| **UNIT 4 POLYMERS AND REINFORCED PLASTICS (9 hours)** |

| **UNIT 5 INSTRUMENTAL METHODS OF ANALYSIS (9 hours)** |

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<table>
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<tr>
<th>Instructor Name</th>
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<tbody>
<tr>
<td>Ms.D.Devahema</td>
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</table>
**Textbooks, References**


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**Purpose**

This Lab Course will enable the students to understand the basics of computer and to know the basics of MS-Office

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<tr>
<th>Prerequisites</th>
<th>Co-requisites</th>
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</table>

**Required, Elective or Selected Elective (as per table 5.1)**

Required

**Instructional Objectives**

1. To learn the basics of computer.
2. To work on MS-Word, MS-Excel, MS-Power Point and MS-Access

**Student Outcomes from Criterion 3 covered by this Course**

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<th>Student outcome</th>
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Mapping of instructional objectives with student outcome

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</table>

**List of Topics Covered**

**EXPERIMENTS TO IMPLEMENT**

- Study experiment on evolution of computer programming languages.
- 1. Suggest some of the Network Topologies that can be incorporated in your campus. Justify your choice.
- 2. Experiments to demonstrate directory creation and file creation.
- 3. Create a document with all formatting effects.
- 4. Create a document with tables.
- 5. Create labels in MS word.
- 6. Create a document to send mails using mail merge option.
- 7. Create an Excel File to analyze the student’s performance. Create a chart for the above data to depict it diagrammatically.
- 9. Create Excel sheet to maintain employee information and use this data to send mails using mail merge.
- 10. Create a Power Point presentation for your personal profile with varying animation effects with timer.
- 11. Consider student information system which stores student personal data, mark information and non academic details.
   * Use MS-Access to create Tables and execute SQL queries to do this following
   * Display all student records.
   * Display student details with respect to his identity.
   * Delete some records from the table.
   * Find total marks obtained by student in each list.
PH0103 PHYSICS LABORATORY

Credits / Contact Hours
1 / 30

Instructor Name
Dr. T. Kalaivani

Textbooks, References

Purpose
The purpose of this course is to develop scientific temper and analytical capability among the engineering students.

Prerequisites
<table>
<thead>
<tr>
<th>Co – requisites</th>
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<tbody>
<tr>
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</table>

PH0101

Required, Elective or Selected Elective (as per Table 5.1b)

Instructional Objectives
At the end of the course, the student will be able to:
1. Understand scientific concepts in measurement of different physical variables
2. Develop the skill in arranging and handling different measuring instruments
3. Get familiarized with the errors in various measurements and planning / suggesting how these contributions may be made of the same order so as to make the error in the final result small.

List of Topics Covered

1. Determination of Young’s Modulus of the material – Uniform bending
2. Determination of Rigidity Modulus of the material – Torsion Pendulum
3. Determination of velocity of Ultrasonic waves in liquids
4. Determination of dispersive power of a prism using spectrometer
6. Particle size determination using laser
7. Study of attenuation and propagation characteristics of optical fiber cable
10. Construction and study of regulation properties of a given power supply using IC
**Course Number and Title**

**CY0103 CHEMISTRY LAB**

**Credits / Contact Hours**

1 / 30

**Instructor Name**

Dr. R. Jeyalakshmi

**Textbooks, References**


**Purpose**

An integrated laboratory course consists of experiments from applied chemistry and is designed to illustrate the underlying principles of measurement techniques, synthesis, dynamics and chemical transformation.

**Prerequisites**

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<tr>
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<th>Co-requisites</th>
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<td>CY0101</td>
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</table>

**Required, Elective or Selected Elective (as per Table 5.1b)**

Required

**Instructional Objectives**

1. Students should be able to understand the basic concept and its applications.

**Student Outcomes from Criterion 3 covered by this Course**

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<th>Student outcome</th>
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Mapping of instructional objectives with student outcome

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**List of Topics Covered**

**LIST OF EXPERIMENTS  (30 hours)**

1. Preparation of standard solutions.
2. Estimation of total hardness, permanent and temporary hardness by EDTA method.
3. Conductometric titration – determination of strength of an acid.
4. Estimation of iron by potentiometer – titration.
6. Determination of dissolved oxygen in a water sample by Winkler’s method.
7. Determination of Na / K in water sample by Flame photometry.
8. Estimation of Copper in ore.
10. Determination of total alkalinity and acidity of a water sample.
Course Number and Title

PH0102  MATERIAL  SCIENCE

Credits / Contact Hours

3  / 60

Instructor Name

Dr.C.Prefrential Kala

Textbooks, References


Purpose

The purpose of this course is to develop comprehension of the rapidly changing technological scenario and the requisite expertise for appropriate selection of materials for specific engineering applications.

Prerequisites

<table>
<thead>
<tr>
<th>Prerequisites</th>
<th>Co-requisites</th>
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<tr>
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</table>

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

At the end of the course, the student will be able to:

1. Understand electrical properties of materials,
2. Understand the properties and applications of semi conducting materials,
3. Understand general properties and applications of magnetic and dielectric materials,
4. Understand the behavior of materials on exposure to light,
5. Understand general properties and application of modern engineering and bio materials, and
6. Get familiarized with the concepts of Nano Science and Technology.
### Student Outcomes from Criterion 3 covered by this Course

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### List of Topics Covered

**UNIT 1 ELECTRONIC AND PHOTONIC MATERIALS** (6 hours)
Electronic materials: Importance of Classical and Quantum free electron theory of metals – Fermi energy and Fermi Dirac distribution function – Variation of Fermi level with temperature in intrinsic and extrinsic semiconductors – Hall effect – Dilute Magnetic Semiconductors (DMS) and their applications – High temperature Superconductivity. Photonic materials: LED and LCD materials – Photo conducting materials – Nonlinear optical materials (elementary ideas) and their applications.

**UNIT 2 MAGNETIC, DIELECTRIC AND MODERN ENGINEERING MATERIALS** (6 hours)

**UNIT 3 BIO MATERIALS** (6 hours)
Classification of biomaterials – Comparison of properties of some common biomaterials – Effects of physiological fluid on the properties of biomaterials – Biological responses (extra and intra vascular system) – Metallic, Ceramic and Polymeric implant materials – Introduction to bio sensors and tissue engineering.

**UNIT 4 NANO MATERIALS AND NANOTECHNOLOGY** (6 hours)

**UNIT 5 MECHANICAL PROPERTIES OF MATERIALS** (6 hours)
Stress Strain diagram for different engineering materials – Engineering and true stress strain diagram – Ductile and brittle material – Tensile strength – Hardness – Impact strength – Fatigue – Creep – Fracture (Types and Ductile to brittle transition) – Factors affecting mechanical properties.

**PRACTICALS** (30 hours)
1. Band gap determination using Post office box.
2. Dielectric constant measurement.
3. Photoconductivity measurement.
4. Resistivity determination for a semiconductor wafer using Four probe method.
5. Determination of Hall coefficient and carrier type for a semiconductor material.
6. To trace the hysteresis loop for a magnetic material.
7. Magnetic susceptibility – Quincke’s method.
9. Visit to Nano Technology Laboratory (optional)
### GE0102 BIOLOGY FOR ENGINEERS

**Credits / Contact Hours**

2 / 30

**Instructor Name**

Mr. K. Balagangadharan

**Textbooks, References**

- STUDENT COMPANION to accompany Biochemistry, Fifth Edition - Richard I. Gumport
- Frank H. Deis, Nancy Counts Gerber, Roger E. Koepe, II. Molecular motors
- Alberts, 2003 Molecular Biology of the cell
- Lodish, 2004 Molecular cell biology

**Purpose**

To provide a basic understanding of biological mechanisms from the perspective of engineers.

**Prerequisites**

NIL

**Co-requisites**

NIL

**Required, Elective or Selected Elective (as per Table 5.1b)**

Required

**Instructional Objectives**

1. To familiarize the students with the basic organization of organisms and subsequent building to a living being. With this knowledge, the student will be then imparted with an understanding about the machinery of the cell functions that is ultimately responsible for various daily activities. Nervous and immune systems will be taught as examples of this signaling machinery.

**Student Outcomes from Criterion 3 covered by this Course**

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<th>Student outcome</th>
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**List of Topics Covered**

**UNIT 1 FROM ATOMS TO ORGANISMS (6 hours)**

The Cell: the Basic Unit of Life - Molecular Components of Cells - Expression of Genetic Information - Protein Structure and Function - Cell Metabolism - Cells Maintain Their Internal Environments - Cells Respond to Their External Environments - Cells Grow and Reproduce - Cells Differentiate

**UNIT 2 THE MOLECULAR DESIGN OF LIFE (6 hours)**

Biochemistry and the Genomic Revolution - DNA Illustrates the Relation between Form and Function - Biochemical Unity Underlies Biological Diversity - Chemical Bonds in Biochemistry - Biochemistry and Human Biology - Protein Synthesis Requires the Translation of Nucleotide Sequences Into Amino Acid Sequences - Aminoacyl-Transfer RNA Synthetases Read the Genetic Code - A Ribosome Is a Ribonucleoprotein Particle (70S) Made of a Small (30S) and a Large (50S) Subunit-Protein Factors Play Key Roles in Protein Synthesis - Eukaryotic Protein Synthesis Differs from Prokaryotic Protein Synthesis Primarily in Translation Initiation
UNIT 3 CATALYTIC STRATEGIES (6 hours)

UNIT 4 MECHANOCHEMISTRY (6 hours)

UNIT 5 SENSORY AND IMMUNO SYSTEMS (6 hours)
General Principles of Cell Signaling-Signaling via G-Protein-linked Cell-Surface Receptors-Signaling via Enzyme-linked Cell-Surface Receptors-Target-Cell Adaptation-The Logic of Intracellular Signaling: Lessons from Computer-based "Neural Networks"- The Cellular Basis of Immunity-The Functional Properties of Antibodies-The Fine Structure of Antibodies-The Generation of Antibody Diversity-T Cell Receptors and Subclasses-MHC Molecules and Antigen Presentation to T Cells-Cytotoxic T Cells-Helper T Cells and T Cell Activation-Selection of the T Cell Repertoire

Course Number and Title
GE0104 PRINCIPLES OF ENVIRONMENTAL SCIENCE

Credits / Contact Hours
2 / 30

Instructor Name
Dr. H. Suhana

Textbooks, References

Purpose
The course provides the comprehensive knowledge in environmental science, environmental issues and the management.

Prerequisites
NIL

Co-requisites
NIL

Required, Elective or Selected Elective (as per Table 5.1b)
# Required

## Instructional Objectives

1. The importance of environmental education, ecosystem and ethics.
2. Knowledge with respect to biodiversity and its conservation.
3. To create awareness on the various environmental pollution aspects and issues.
4. To educate the ways and means to protect the environment.
5. Important environmental issues and protection.

## Student Outcomes from Criterion 3 covered by this Course

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## List of Topics Covered

### UNIT 1 ENVIRONMENT AND ECOSYSTEMS (6 hours)
Environmental education: definition - scope - objectives and importance. Concept of an ecosystem – types (terrestrial and aquatic ecosystems) – structure and function – ecological succession - food chains, food webs and ecological pyramids.

### UNIT 2 BIODIVERSITY (6 hours)
Introduction: definition - genetic, species and ecosystem diversity - value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - threats to biodiversity: habitat loss, poaching of wildlife - endangered and endemic species of India, Conservation of biodiversity: in-situ and ex-situ conservations.

### UNIT 3 POLLUTION AND WASTE MANAGEMENT (6 hours)

### UNIT 4 CURRENT ENVIRONMENTAL ISSUES (6 hours)
Environmental ethics -issues and possible solutions- population explosion, climatic change, ozone layer depletion, global warming, acid rain and green house effect. Sustainable development: definition, objectives and environmental dimensions of sustainable development- environmental audit for sustainable development.

### UNIT 5 ENVIRONMENTAL PROTECTION (6 hours)
National and international concern for environment: Important environmental protection acts in India – water, air (prevention and control of pollution) act, wild life conservation and forest act – functions of central and state pollution control boards - international effort – key initiatives of Rio declaration, Vienna convention, Kyoto protocol and Johannesburg summit.

## Course Number and Title

**CS0140 COMPUTER PRACTICE**

## Credits / Contact Hours

2 / 45
### Instructor Name

Mr. J. Godvin Ponsam

### Textbooks, References

- Computer Practice Laboratory Manual, SRM University.

### Purpose

To introduce programming languages, C and C++, as tools to solve problems and to provide hands-on training.

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### Required, Elective or Selected Elective (as per Table 5.1b)

Required

### Instructional Objectives

After completing the course, the students should be able to

1. Understand the program development life cycle
2. Design algorithms to solve simple problems using computers
3. Convert algorithms into C and C++ programs and execute

### Student Outcomes from Criterion 3 covered by this Course

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### List of Topics Covered

**UNIT 1 PROGRAMMING FUNDAMENTALS (3 hours)**
Computer Basics; Program Development Life Cycle: Flow Chart, Algorithm, Compilation and Execution; Introduction to C Language: program structure, variables, keywords, data types; Input / Output functions: scanf, printf; simple programs.

**UNIT 2 DECISION AND LOOP CONTROL STRUCTURE (3 hours)**
Logical operators; Decision statements: if/else, switch/case statements; Loop control statements – for, while, do/while.

**UNIT 3 ARRAYS AND FUNCTIONS (3 hours)**
Arrays:
Introduction to arrays; one dimensional arrays: declaration, reading and printing array elements, sorting and searching.

Functions:
Definition; declaration of functions; return statement; recursion.

**UNIT 4 INTRODUCTION TO OOP CONCEPTS (3 hours)**
OOP concepts: data hiding, encapsulation, inheritance, overloading, polymorphism; classes and objects; constructor and destructor; simple program in C++.

**UNIT V INHERITANCE AND OVERLOADING (3 hours)**
Inheritance – single, multiple, multilevel; Overloading – Function overloading, Operator overloading.
LIST OF EXERCISES

Note to the Instructors: Design exercise problems to demonstrate the use of C and C++ in the area of specialization.

1. Programs to demonstrate the use of scanf ( ) and printf( ) functions
2. Programs to evaluate arithmetic expressions
3. Programs using conditional statements
4. Programs using for, while, do…while
5. Programs on arrays
6. Programs to perform matrix addition and multiplication
7. Programs to implement functions
8. Programs to illustrate recursion
9. Program to create classes and objects using C++
10. Program to implement Constructor and Destructor in C++
11. Program to implement single inheritance in C++
12. Program to implement Function overloading in C++
13. Program to implement Operator overloading in C++

PRACTICAL 30 HOURS
TOTAL 45 HOURS
### A.2.2 General Education Courses and others

<table>
<thead>
<tr>
<th>2007-08 Curriculum Course Code</th>
<th>Name of the Course</th>
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<tr>
<td>LE0101</td>
<td>English</td>
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<td>GE0107</td>
<td>NSS/NCC/NSO/YOGA</td>
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<tr>
<td>GE0108</td>
<td>Value Education</td>
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<td>LE0201/LE0203/LE0205</td>
<td>German / Japanese / French Language Phase – I</td>
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<td>Personality Development – II</td>
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<td>Personality Development – VI</td>
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<td>MB0302</td>
<td>Business Management for Engineers</td>
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</table>
**Course Number and Title**

**LE0101  ENGLISH**

**Credits / Contact Hours**

2/45

**Instructor Name**

Ms. R. Vinodha

**Textbooks, References**

- “Interactive course in phonetics and spoken English” published by Acoustics Engineers (ACEN) 2002.

**Purpose**

To provide an adequate mastery of communicative English Language training primarily - reading and writing skills, secondarily listening and speaking skills.

<table>
<thead>
<tr>
<th>Prerequisites</th>
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<td>Nil</td>
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</table>

**Required, Elective or Selected Elective (as per Table 5.1b)**

Required

**Instructional Objectives**

1. To provide language training to the engineering students which will enable them to understand and acquire knowledge in technical subjects.

**Student Outcomes from Criterion 3 covered by this Course**

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**List of Topics Covered**

**UNIT 1 LISTENING  (3 hours)**

Listening Practice – Hints on Listening – Listening Practice
Note Taking: Note Taking Strategies

UNIT 2 SPEAKING  (3 hours)
Phonetics: Pronunciation-Phonetic Transcription-Stress-Intonation

UNIT 3 READING  (3 hours)
Comprehension: Skimming-scanning-close reading-Comprehension – Transferring Information – Exercise – An unseen passage should be given and questions may be asked in the form of True or False statements, MCQ, short answers.
Transcoding : Interpreting tables, flow charts, pie chart, bar diagram, tree diagram, graphs.

UNIT 4 WRITING  (3 hours)
Art of Writing: Writing Language – Rules for effective writing – Technical Essay Writing – Exercise
Report Writing: Technical Writing – Lab Report – Exercise
Dialogue Writing

UNIT 5 FOCUS ON AND COMMUNICATION AND “COMPUNICATION”  (3 hours)

---

**Course Number and Title**

GE0107 NSS/NCC/NSO/YOGA

**Credits / Contact Hours**

1 / 30

**Instructor Name**

Mr.Harikumar

**Textbooks, References**

- Vedatri Maharshi, “Yoga for Modern Age”
- Vedatri Maharshi, “Simplified Physical Exercises”

**Purpose**

To imbibe in the minds of students the concepts and benefits of NCC/NSS/NSO/YOGA and make them practice the same

<table>
<thead>
<tr>
<th>Prerequisites</th>
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**Required, Elective or Selected Elective (as per Table 5.1b)**
**Required**

**Instructional Objectives**

1. To enable the students to gain knowledge about NCC/NSS/NSO/YOGA and put the same into practice

**Student Outcomes from Criterion 3 covered by this Course**

<table>
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Mapping of instructional objectives with student outcome

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**List of Topics Covered**

**YOGA SYLLABUS**

**PRACTICE**

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<th>I</th>
<th>Meditation – Agnai, Asanas, Kiriyas, Bandas, Muthras</th>
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<td>II</td>
<td>Meditation Santhi Physical Exercises (I &amp; II)</td>
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<tr>
<td>III</td>
<td>Kayakalpa Yoga Asanas, Kiriyas, Bandas, Muthras</td>
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<td>IV</td>
<td>Meditation Santhi Physical Exercises III &amp; IV</td>
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**LECTURE**

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<tr>
<th>I</th>
<th>Benefits of Agnai Meditation</th>
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<td>II</td>
<td>Benefits of santhi Meditation</td>
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<tr>
<td>III</td>
<td>Lecture &amp; Practice</td>
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<td>IV</td>
<td>Analysis of Thought</td>
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| V   | Meditation Thuriyam Kayakalpa Asanas, Kiriyas, Bandas, Muthras |
| VI  | Meditation Thuriyam Kayakalpa Asanas, Kiriyas, Bandas, Muthras |
| VII | Meditation Thuriyam Kayakalpa Asanas, Kiriyas, Bandas, Muthras |
| VIII| Meditation Santhi Kayakalpa Asanas, Kiriyas, Bandas, Muthras |

| V   | Benefits of Thuriyam                                   |
| VI  | Attitude                                              |
| VII | Importance of Arutkappy & Blessings                   |
| VIII| Benefits of Blessings                                 |

**Hours = 30**

**II. NATIONAL SPORTS ORGANISATION (NSO)**

Each student must select two of the following games and practice for two hours per week. An attendance of 80% is compulsory to earn the credits specified in the curriculum.

**List of games:**

1. Basket Ball
2. Football
3. Volley Ball
4. Ball Badminton
5. Cricket
6. Throw ball

**III. NATIONAL CADET CORE (NCC)**

Any student enrolling as a member of National Cadet Core (NCC) will have to attend sixteen parades out of twenty parades each of four periods over a span of an academic year. Attending eight parades in first semester will qualify a student to earn the credits specified in the curriculum.

**IV. NATIONAL SERVICE SCHEME (NSS)**

A student enrolling as member of NSS will have to complete 60 hours of training / social service to be eligible to earn the credits specified in the curriculum.
Course Number and Title

GE0108 VALUE EDUCATION

Credits / Contact Hours

1 / 15

Instructor Name

Mrs.B.Monika Nair

Textbooks, References

2. Values(Collection of Essays), Published by : Sri Ramakrishna Math., Chennai—4,(1996)
5. Tirukural (English Translation by Dr.G.U.Pope).
6. The Bible
7. The Kuran
8. The Bagavath Geetha

Purpose

To provide guiding principles and tools for the development of the whole person recognizing that the individual is comprised of Physical, Intellectual, Emotional and Spiritual dimensions.

Prerequisites | Co-requisites
---|---
NIL | NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. To help individuals think about and reflect on different values.
2. To deepen understanding, motivation and responsibility with regard to making personal and social choices and the practical implications of expressing them in relation to themselves, others, the community and the world at large.
3. To inspire individuals to choose their own personal, social, moral and spiritual values and be aware of practical methods for developing and deepening

Student Outcomes from Criterion 3 covered by this Course

Student outcome | a | b | c | d | e | f | g | h | i | j | k
---|---|---|---|---|---|---|---|---|---|---|---
Mapping of instructional objectives with student outcome | X | X

List of Topics Covered

UNIT 1 (3 hours)
Value Education—Introduction – Definition of values – Why values? – Need for Inculcation of values – Object of
Value Education – Sources of Values – Types

Values:

i) Personal values
ii) Social values
iii) Professional values
iv) Moral and spiritual values
v) Behavioral (common) values

UNIT 2 (3 hours)

UNIT 3 (3 hours)

UNIT 4 (3 hours)

UNIT 5 (3 hours)

Course Number and Title
LE0201 GERMAN LANGUAGE PHASE I

Credits / Contact Hours
2 / 30

Instructor Name
Mrs. A.K. Bharathi

Textbooks, References
- Grundkurs Deutsch
- Momentmal (Max Mueller Bhavan – Goethe Institute, Germany).

Purpose
Enabling the Engineering Students to one more Foreign Language, especially German, which is scientific and technical language. This may be useful in the field of employment opportunities as well as helping them to develop projects on browsing German websites.

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Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. Developing pronunciation so that they can read the text and e-mail during their employment, instructing them to write their own CV and developing a fundamental conversation with any German national.

Student Outcomes from Criterion 3 covered by this Course

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 courses covered by this course

List of Topics Covered

**UNIT 1 INTRODUCTION** (10 hours)
German Language, Alphabets and Pronunciation.

**THEMEN**
Name, Land, Leute, Beruf, Familie geschwister, Einkaufen, Reisen, Zahlen, Haus, Freunden, Essen and Stadium, Fest, Zeit.

**UNIT 2 LISTENING** (10 hours)
Listening to the cassette and pay special attention to the meaning and sounds. Listening Comprehension – Announcements / Airport / Station / General.

**UNIT 3 READING** (10 hours)
Listening to the cassette and reading it allowed.
READING COMPREHENSION BASICS / STATION / NEWS / NOTICE BOARDS.

**GLOSSARY**
Technical Words Lesson (1-5)

**SCHEME OF EVALUATION**
Internal 50 = Listening – 10 Marks, Speaking – 20 Marks, Reading – 10 Marks and Writing = 10 Marks
External 50 – 3 hours final written exam

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**Course Number and Title**

**LE0203 JAPANESE LANGUAGE PHASE I**

**Credits / Contact Hours**

2 / 30

**Instructor Name**

Ms.R.Rekhaa

**Textbooks, References**

1. Nihongo Shoho I main Text sold in India by the Japanese Language Teachers Association Pune.
2. Hiragana and Katakana Work Book published by AOTS Japan
SCHEME OF EVALUATION

Internal 50 = Listening – 10 Marks, Speaking – 20 Marks, Reading – 10 Marks and Writing = 10 Marks
External 50 – 3 hours final written exam

Purpose

1. In view of globalization, learning Foreign Language by Engineering graduates enhances their employment opportunities.
2. Get awareness of understanding of International culture.
3. Widening the Linguistic Skills of the Students.

Prerequisites

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Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

To learn the scripts of Japanese Languages namely Hiragana, Katakana and Kanji, Vocabularies etc. To learn basic grammar and acquire basic communication skills. To understand Japanese culture.

Student Outcomes from Criterion 3 covered by this Course

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List of Topics Covered

UNIT 1  (8 hours)
Alphabets (Hiragana ), Self Introduction, Greetings, Classroom expressions, Numbers, Conversation.

UNIT 2  (8 hours)
Alphabets Hiragana (continued),Vocabularies.Counters .Time expression. Conversation

UNIT 3  (8 hours)

UNIT 4  (6 hours)

Course Number and Title

LE0205  FRENCH LANGUAGE PHASE I

Credits / Contact Hours

2 / 30
**Instructor Name**
Mrs. A. Sharada

**Textbooks, References**
- Panorama – Goyal Publishers
- Apprenons le Francais I, Sarawathy publication.

**SCHEME OF EVALUATION**
Internal 50 = Listening – 10 Marks, Speaking – 20 Marks, Reading – 10 Marks and Writing = 10 Marks
External 50 – 3 hours final written exam

**Purpose**
1. As language skills are as valuable as technical skills knowledge of French enables the engineering graduates in career orientation.
2. As a second international global Lang after English there is a wider choice of job opportunities in the international employment market and also multinationals in India and an understanding of French culture thro language.

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<th>Co-requisites</th>
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<tbody>
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</table>

**Required, Elective or Selected Elective (as per Table 5.1b)**
Required

**Instructional Objectives**
1. Characterized by the Roman script, grammar, vocabulary and colloquial expressions are taught which enables them to communicate effectively with any native speaker.

**Student Outcomes from Criterion 3 covered by this Course**

<table>
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<tr>
<th>Student outcome</th>
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</table>

**List of Topics Covered**

**UNIT 1 INTRODUCTION AND PRONUNCIATION** (8 hours)
Introduction of the French Language, Alphabets and Pronunciation, Greetings (Wishing, Thanking and Bidding good bye), Introducing oneself & someone Presenter quelqu’un et se presenter - conversational French sentences based on the topics discussed above.

**UNIT 2 VOCABULARY** (6 hours)
Numbers and Dates, Days, Months and Seasons, Time, Nouns, Professions and Nationalities. Conversational sentences on weather, time, and professions.

**UNIT 3 GRAMMAR** (5 hours)
Basic Verbs (Avoir, Etre, Aller, Faire) – Conjugation – Present tense, Affirmative, Negative, Interrogative, Adjectives (Qualitative), Subject Pronouns and Disjunctive Pronouns.

**UNIT 4 CONVERSATION AND LISTENING** 6 hours
Conversational sentences on physical description and expressions with verbs like avoir, etre and faire

**UNIT 5 GRAMMAR** (5 hours)
Prepositions (a, de,dans, en, sur,sous, pour….), Contracted Articles, Question Tag
**Course Number and Title**

**LE0202  GERMAN LANGUAGE PHASE - II**

**Credits / Contact Hours**

2 / 30

**Instructor Name**

Mrs.A.K.Bharathi

**Textbooks, References**

- Grundkurs Deutsch Mo’ntmal
  (Prescribed by Max Mueller Bhavan – Goethe Institute, Germany).

**SCHEME OF EVALUATION**

Internal 50 = Listening – 10 Marks, Speaking – 20 Marks, Reading – 10 Marks and Writing = 10 Marks

External 50 – 3 hours final written exam

**Purpose**

Enabling the Engineering Students to one more Foreign Language, especially German, which is scientific and technical language. This may be useful in the field of employment opportunities as well as helping them to develop projects on browsing German websites.

**Prerequisites**

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<tr>
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**Co-requisites**

| NIL |

**Required, Elective or Selected Elective (as per Table 5.1b)**

Required

**Instructional Objectives**

1. Developing pronunciation so that they can read the text and e-mail during their employment, instructing them to write their own C V and developing a fundamental conversation with any German national.

**Student Outcomes from Criterion 3 covered by this Course**

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<thead>
<tr>
<th>Student outcome</th>
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</table>

**List of Topics Covered**

**UNIT 1 SPEAKING;  (20 hours)**

Dialogue – Questioning / Basic queries / Conversational with practical exposure.
UNIT 2 GRAMMATIK (WRITING)  (10 hours)

GLOSSARY
Technical words. Lesson (6-10)

Course Number and Title

LE0204  JAPANESE LANGUAGE PHASE II

Credits / Contact Hours

2 / 30

Instructor Name

Ms.R.Rekhaa

Textbooks, References

- Nihongo Shoho Imain Text sold in India by the Japanese Language Teachers Association, Pune.
- Hiragana and Katakana Work Book published by AOTS Japan
- Grammar and Kotoba (Work Book)
- Japanese for Dummies (Conversation) CD.

SCHEME OF EVALUATION

Internal 50 = Listening – 10 Marks, Speaking – 20 Marks, Reading – 10 Marks and Writing = 10 Marks
External 50 – 3 hours final written exam

Purpose

1. In view of globalization, learning Foreign Language by engineering graduates enhances their employment opportunities.
2. Get awareness of understanding of International culture.
3. Widening the Linguistic Skills of the Students.

Prerequisites

LEY0203

Co-requisites

NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. To learn the scripts of Japanese Languages namely Hiragana, Katakana and Kanji, Vocabularies etc. To learn basic grammar and acquire basic communication skills. To understand Japanese culture.

Student Outcomes from Criterion 3 covered by this Course

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### List of Topics Covered

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<td>Kokoni denwa ga arimasu</td>
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<td>Asokoni hito ga imasu</td>
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<td>Akairingo wa ikutsu arimasu ka</td>
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### Course Number and Title

**LE0206 FRENCH LANGUAGE PHASE II**

### Credits / Contact Hours

2 / 30

### Instructor Name

Mrs. A. Sharada

### Textbooks, References

- Panorama – Goyal Publishers
- Apprenons le Francais II, Sarawathy Publications

### Scheme of Evaluation

Internal 50 = Listening – 10 Marks, Speaking – 20 Marks, Reading – 10 Marks and Writing = 10 Marks

External 50 – 3 hours final written exam

### Purpose

1. As language skills are as valuable as technical skills knowledge of French enables the engineering graduates in career orientation.
2. As a second international global Lang after English there is a wider choice of job opportunities in the international employment market and also multinationals in India and an understanding of French culture thro language.

### Prerequisites

LE0205

### Co-requisites

NIL

### Required, Elective or Selected Elective (as per Table 5.1b)

Required

### Instructional Objectives

1. Characterized by the Roman script, grammar, vocabulary and colloquial expressions are taught which
enables them to communicate effectively with any native speaker

### Student Outcomes from Criterion 3 covered by this Course

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</table>

### List of Topics Covered

**UNIT 1** (6 hours)
Sports (Ski, natation, tennis, Tour de France), Cuisine (French dishes), Cinema
(Review of a film) – Articles on these topics and group discussion will be followed.

**UNIT 2 GRAMMAR** (6 hours)
Possessive Adjectives, Demonstrative Adjectives, Past tense – Passé Composé (Verbe Auxiliaire: Etre et Avoir)

**UNIT 3** (6 hours)
Culture and Civilization French Monuments (Tres celebres), French History (Jeanne d’ Arc, Louis XIV, Prise de la Bastille), Culture and Civilisation (vin, fromage, mode, parfums)

**UNIT 4** (6 hours)
Transport system, government and media in France – articles on these topics.

**UNIT 5** (6 hours)
Comprehension and Grammar Comprehension passages and conversational sentences in different situations (at the restaurant, at the super market)

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**Course Number and Title**

**PD0101 PERSONALITY DEVELOPMENT - I**

**Credits / Contact Hours**

0 / 30

**Instructor Name**

Mr. Harikumar

**Textbooks, References**

**Purpose**

The purpose of this course is to build confidence and inculcate various soft skills and to help students to identify and achieve their personal potential.

<table>
<thead>
<tr>
<th>Prerequisites</th>
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**Required, Elective or Selected Elective (as per Table 5.1b)**

Required
Instructional Objectives

1. To guide thought process.
2. To groom student’s attitude.
3. To develop communication skill.
4. To build confidence.

Student Outcomes from Criterion 3 covered by this Course

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<tr>
<th>Student outcome</th>
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List of Topics Covered

METHODODOLOGY
The entire program is designed in such a way that every student will participate in the class room activities. The activities are planned to bring out the skills and talents of the students which they will be employing during various occasions in their real life.
1. Group activities + individual activities.
2. Collaborative learning.
3. Interactive sessions.
4. Ensure Participation.

UNIT – 1 (6 hours)
Self-analysis SWOT - Time management - Creative chain story telling

UNIT – 2 (6 hours)
Vocabulary games I – Attitude - Interpersonal skills

UNIT – 3 (6 hours)
Motivation I - Vocabulary games II - Article review

UNIT – 4 (6 hours)
Team building exercise - Critical thinking - Event Management

UNIT – 5 (6 hours)
Business situation - Leadership Qualities - Review

SCHEME OF INSTRUCTION
Marks allocated for regular participation in all oral activities in class

SCHEME OF EXAMINATION
Complete internal evaluation on a regular Basis

Course Number and Title
PD0102 PERSONALITY DEVELOPMENT - II

Credits / Contact Hours
30
### Instructor Name
Ms. B. Revathi

### Textbooks, References
N/A

### Purpose
The purpose of this course is to build confidence and inculcate various soft skills and to help students to identify and achieve their personal potential.

### Prerequisites
NIL

### Co-requisites
NIL

### Required, Elective or Selected Elective (as per Table 5.1b)
Required

### Instructional Objectives
1. To guide thought process.
2. To groom student’s attitude.
3. To develop communication skill.
4. To build confidence.

### Student Outcomes from Criterion 3 covered by this Course

<table>
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<th>Student outcome</th>
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</table>

### List of Topics Covered

**METHODOLOGY**
The entire program is designed in such a way that every student will participate in the class room activities. The activities are planned to bring out the skills and talents of the students which they will be employing during various occasions in their real life.

1. Group activities + individual activities.
2. Collaborative learning.
3. Interactive sessions.
4. Ensure Participation.

**UNIT – 1 (6 hours)**
Puzzles I - Poster design/Caption/Slogan writing (Social issues) - Bone of contention I – debate

**UNIT – 2 (6 hours)**
Bone of contention II - Puzzle II - Survey and Reporting (favorite channel, music, food)

**UNIT – 3 (6 hours)**
Interpretation of Visuals of I & II - Vocabulary games III

**UNIT – 4 (6 hours)**
Book Review - Quiz I - Presentation Skills I
UNIT – 5 (6 hours)
Presentation Skills II - Analytical Thinking - Review

EVALUATION
1. Activities assessed by both group and individual participation
2. Continuous assessment based on daily participation

SCHEME OF INSTRUCTION
Marks allocated for regular participation in all oral activities in class

SCHEME OF EXAMINATION
Complete internal evaluation on a regular Basis

Course Number and Title

PD0201 PERSONALITY DEVELOPMENT - III

Credits / Contact Hours

1 / 30

Instructor Name

Mr. Jayapragash

Textbooks, References

Purpose

The purpose of this course is to build confidence and inculcate various soft skills and to help students to identify and achieve their personal potential.

<table>
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Required, Elective or Selected Elective ((as per Table 5.1b)

Required

Instructional Objectives

1. To guide thought process.
2. To groom student’s attitude.
3. To develop communication skill.
4. To build confidence.

METHODOLOGY
The entire program is designed in such a way that every student will participate in the class room activities. The activities are planned to bring out the skills and talents of the students which they will be employing during various occasions in their real life.
1. Group activities + individual activities.
2. Collaborative learning.
3. Interactive sessions.
4. Ensure Participation.
5. Empirical Learning

<table>
<thead>
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<th>Student Outcomes from Criterion 3 covered by this Course</th>
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<tbody>
<tr>
<td>Student outcome</td>
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List of Topics Covered

UNIT – 1 (6 hours)
Goal Setting - Problem Solving - Emotional Quotient

UNIT – 2 (6 hours)
Assertiveness - Stress Management - Quiz II

UNIT – 3 (6 hours)
Lateral Thinking (Situational) - Team Work (Role Plays) Impromptu - Text Analysis

UNIT – 4 (6 hours)
Business plan presentation I - Business plan presentation II - Chinese Whisper

UNIT – 5 (6 hours)
Picture Perfect - Case Studies - Review

SCHEME OF INSTRUCTION
Marks allocated for regular participation in all oral activities in class

SCHEME OF EXAMINATION
Complete internal evaluation on a regular Basis

Course Number and Title
PD0202 PERSONALITY DEVELOPMENT IV

Credits / Contact Hours
1 / 30

Instructor Name
Mrs.Mythreyi Koppur

Textbooks, References
N/A

Purpose
The purpose of this course is to build confidence and inculcate various soft skills and to help students to identify and achieve their personal potential
**Prerequisites**

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**Required, Elective or Selected Elective (as per Table 5.1b)**

Required

**Instructional Objectives**

To guide thought process.
1. To groom student’s attitude.
2. To develop communication skill.
3. To build confidence.

**METHODOLOGY**

The entire program is designed in such a way that every student will participate in the class room activities. The activities are planned to bring out the skills and talents of the students which they will be employing during various occasions in their real life.

1. Group activities + individual activities.
2. Collaborative learning.
3. Interactive sessions.
4. Ensure Participation.
5. Empirical Learning

**Student Outcomes from Criterion 3 covered by this Course**

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</table>

**List of Topics Covered**

**UNIT – 1 (6 hours)**
Motivation II - Interpretation of Visuals of I & II

**UNIT – 2 (6 hours)**
Humor in real life - Body language - Collage and poster designing and slogan writing

**UNIT – 3 (6 hours)**
Brain Teasers – JAM - Current News Update I

**UNIT – 4 (6 hours)**
Current News Update II - Enactment (SKIT –I) - Enactment (SKIT – II)

**UNIT – 5 (6 hours)**
Survey and Reporting (heroes, sports persons etc.) - Quiz III - Review

**EVALUATION:**

1. Activities assessed by both group and individual participation
2. Continuous assessment based on daily participation

**SCHEME OF INSTRUCTION**
Marks allocated for regular participation in all oral activities in class

**SCHEME OF EXAMINATION**
Complete internal evaluation on a regular Basis
**Course Number and Title**

**PD0301  PERSONALITY DEVELOPMENT - V**

**Credits / Contact Hours**

2 / 45

**Instructor Name**

Mrs. Mythreyi Koppur

**Textbooks, References**

Purpose

The purpose of this course is to build confidence and inculcate various soft skills and to help students to identify and achieve their personal potential

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</table>

**Required, Elective or Selected Elective (as per Table 5.1b)**

Required

**Instructional Objectives**

At the end of the course the students will be able to

1. Acquire the important soft skills for employment
2. Take part in group discussions and job interviews confidently
3. Appear for placement aptitude tests confidently
4. Gain self confidence to face the placement process

**Student Outcomes from Criterion 3 covered by this Course**

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**List of Topics Covered**

**UNIT – 1  (9 hours)**
Syllogism - Binary Logic [cause & effect] - Assertive & Counter Argument - Simple Interest - Time & Work - Time & Distance

**UNIT – 2  (9 hours)**
Upstream & Downstream Reasoning - Verbal Comprehension I - Verbal Comprehension II- Compound Interest Logarithms - Surds & Indices

**UNIT – 3  (9 hours)**
Verbal Reasoning I - Verbal Reasoning II - Verbal Reasoning III – Percentage – Test – Averages
UNIT – 4  (9 hours)
Deductive Reasoning I - Deductive Reasoning II - Language Usage I - Decimal Fractions - Profit & Loss - Probability

UNIT – 5  (9 hours)
Language Usage II - Logic Games I - Logic Games II – Area - Pipes & Cisterns - Test

Course Number and Title

PD0302 PERSONALITY DEVELOPMENT VI

Credits / Contact Hours

2 / 45

Instructor Name

Ms.B.Revathi

Textbooks, References

Purpose

The purpose of this course is to build confidence and inculcate various soft skills and to help students to identify and achieve their personal potential.

Prerequisites

Nil

Co-requisites

NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

At the end of the course the students will be able to
1. Acquire the important soft skills for employment
2. Take part in group discussions and job interviews confidently
3. Appear for placement aptitude tests confidently
4. Gain self confidence to face the placement process

Student Outcomes from Criterion 3 covered by this Course

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</table>

List of Topics Covered

UNIT – 1  (9 hours)
Self Introduction- Narration - Current News Update – Numbers - Height & Distance - Square & Cube Roots
<table>
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<th>UNIT – 2  (9 hours)</th>
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<tbody>
<tr>
<td>Current Tech Update - Verbal Aptitude Test I - GD –I - Odd man out series - Permutation &amp; Combination - Problems on ages</td>
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<td>GD –II - Resume Writing - Mock Interview I / reading comprehension - Problems on trains – Allegation of Mixtures - Test</td>
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A.2.3 Engineering Topics - I

General Engineering Courses and others

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<td>Workshop Practice</td>
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<td>GE0106</td>
<td>Basic Engineering – II</td>
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<tr>
<td>Credits / Contact Hours</td>
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</tr>
<tr>
<td>Instructor Name</td>
<td>Mrs. A. Vijaya</td>
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<td>Textbooks, References</td>
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</table>

## PART-A  CIVIL ENGINEERING


## Purpose

To get exposed to the glimpses of Civil Engineering topics that is essential for an Engineer.

## Prerequisites and Co-requisites

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<thead>
<tr>
<th>Prerequisites</th>
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<tbody>
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## Required, Elective or Selected Elective (as per Table 5.1b)

Required

## Instructional Objectives

1. To know about different materials and their properties.
2. Engineering aspects related to buildings.
3. To know about importance of surveying.
4. To know about the transportation systems.
5. To get exposed to the rudiments of engineering, related to Dams, Water Supply, Transportation system and Sewage Disposal.

## Student Outcomes from Criterion 3 covered by this Course

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## List of Topics Covered
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<tr>
<th>Course Number and Title</th>
<th>ME0120 WORKSHOP PRACTICE</th>
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<tr>
<td>Credits / Contact Hours</td>
<td>2 / 60</td>
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<tr>
<td>Instructor Name</td>
<td>Mr.A.Rajasekaran</td>
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<tr>
<td>Textbooks, References</td>
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<tr>
<td>Purpose</td>
<td>To provide the students with, hands on experience on different trades of engineering like fitting, carpentry, smithy, welding and sheet metal.</td>
</tr>
<tr>
<td>Prerequisites</td>
<td>Co-requisites</td>
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<tr>
<td>Required, Elective or Selected Elective (as per Table 5.1b)</td>
<td>Required</td>
</tr>
<tr>
<td>Instructional Objectives</td>
<td>To familiarize with</td>
</tr>
</tbody>
</table>
1. The basics of tools and equipments used in fitting, carpentry, sheet metal, welding and smithy.
2. The production of simple models in the above trades.

**Student Outcomes from Criterion 3 covered by this Course**

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<th>Student outcome</th>
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</table>

**List of Topics Covered**

**LIST OF EXPERIMENTS**

**EMPHASIS TO BE LAID ON REAL LIFE APPLICATIONS WHEN FRAMING THE EXERCISES.**

**UNIT 1 FITTING  12 hours**
Tools & Equipments – Practice in Filing and Drilling.
Making Vee Joints, Square, dovetail joints, Key Making.

**UNIT 2 CARPENTARY  12hours**
Tools and Equipments- Planning practice. Making Half Lap, dovetail, Mortise & Tenon joints, a mini model of a single door window frame.

**UNIT 3 SHEET METAL  12hours**
Tools and equipments - Fabrication of a small cabinet, Rectangular Hopper, etc.

**UNIT 4 WELDING  12hours**
Tools and equipments - Arc welding of butt joint, Lap Joint, Tee Fillet. Demonstration of Gas welding, TIG & MIG.

**UNIT 5 SMITHY  12hours**
Tools and Equipments –Making simple parts like hexagonal headed bolt, chisel.

**Course Number and Title**

**GE0106 BASIC ENGINEERING – II**

**Credits / Contact Hours**

4 / 30

**Instructor Name**

Dr.M.Sangeetha and Dr.C.S.Boopathy

**Textbooks, References**

**PART A - ELECTRICAL ENGINEERING**

**PART B - ELECTRONICS ENGINEERING**
Purpose

This course provides comprehensive idea about circuit analysis, working principles of machines and common measuring instruments. It also provides fundamentals of electronic devices, transducers and integrated circuits.

Prerequisites

<table>
<thead>
<tr>
<th>Required, Elective or Selected Elective (as per Table 5.1b)</th>
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<tbody>
<tr>
<td>Required</td>
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</table>

Instructional Objectives

At the end of the course students will be able

1. To understand the basic concepts of magnetic circuits, AC & DC circuits.
2. To explain the working principle, construction, applications of DC & AC machines and measuring instruments.
3. To gain knowledge about the fundamentals of electric components, devices, transducers and integrated circuits.

Student Outcomes from Criterion 3 covered by this Course

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<th>Student outcome</th>
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</table>

List of Topics Covered

PART A - ELECTRICAL ENGINEERING

UNIT 1 ELECTRICAL MACHINES  12 hours
Definition of mmf, flux and reluctance, leakage flux, fringing, magnetic materials and B-H relationship. Problems involving simple magnetic circuits, Faraday’s laws, induced emfs and inductances, brief idea on Hysteresis and eddy currents. Working principle, construction and applications of DC machines and AC machines (1-phase transformers, 3-phase induction motors, single phase induction motors – split phase, capacitor start and capacitor start & run motors).

UNIT 2 AC & DC CIRCUITS  10 hours
Circuit parameters, Ohms law, Kirchhoff’s law. Average and RMS values, concept of phasor representation. RLC series circuits and series resonance, RLC parallel circuits (includes simple problems in DC & AC circuits)
Introduction to three phase systems – types of connections, relationship between line and phase values. (qualitative treatment only)

UNIT 3 WIRING & LIGHTING  8 hours
Types of wiring, wiring accessories, staircase & corridor wiring. Working and characteristics of incandescent, fluorescent, SV & MV lamps. Basic principles of earthing, simple layout of generation, transmission & distribution of power.

PART B - ELECTRONICS ENGINEERING

UNIT 1 ELECTRONIC COMPONENTS AND DEVICES  12 hours
Passive components: Resistors- Inductors and Capacitors and their types.
Semiconductor: Energy band diagram- Intrinsic and Extrinsic semiconductors- PN junction diodes and Zener diodes – characteristics.

UNIT 2 TRANSDUCERS AND MEASURING INSTRUMENTS   9 hours
Measuring Instruments: Basic principles and classification of instruments, Moving coil and Moving iron instruments, CRO – Principle of operation.

UNIT 3 DIGITAL ELECTRONICS & LINEAR ICs   9 hours

Course Number and Title
ME0130  ENGINEERING GRAPHICS
Credits / Contact Hours
3 / 75
Instructor Name
Mr.A.Rajasekaran
Textbooks, References
Purpose
1. To draw and interpret various projections of 1D, 2D and 3D objects.
2. To prepare and interpret the drawings of buildings.

<table>
<thead>
<tr>
<th>Prerequisites</th>
<th>Co-requisites</th>
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<tr>
<td>NIL</td>
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</table>

Required, Elective or Selected Elective (as per Table 5.1b)
Required

**Instructional Objectives**

To familiarize with
1. The construction of geometrical figures
2. The projection of 1D, 2D & 3D elements
3. Sectioning of solids and development of surfaces
4. Preparation and interpretation of building drawing

**Student Outcomes from Criterion 3 covered by this Course**

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<th>Student outcome</th>
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**List of Topics Covered**

**UNIT 1 FUNDAMENTALS OF ENGINEERING GRAPHICS (2 hours)**
Lettering, two dimensional geometrical constructions, conics, representation of three-dimensional objects – principles of projections – standard codes – projection of points.

**UNIT 2 PROJECTION OF LINES AND SOLIDS (4 hours)**
Projection of straight lines, projection of solids – auxiliary projections

**UNIT 3 SECTIONS AND DEVELOPMENTS (3 hours)**
Sections of solids and development of surfaces.

**UNIT 4 PICTORIAL PROJECTIONS (4 hours)**
Conversion of projections: Orthographic projection, isometric projection of regular solids & combination of solids.

**UNIT 5 BUILDING DRAWING (2 hours)**
Building Drawing – plan, elevation and section of single storied residential (or) office building with flat RCC roof and brick masonry walls having not more than 3 rooms (planning / designing is not expected in this course).

PRACTICAL 60 hours
TOTAL 75 hours

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**Course Number and Title**

**EE0231 ELECTRICAL ENGINEERING**

**Credits / Contact Hours**

3 / 45

**Instructor Name**

Dr.C.S.Boopathy

**Textbooks, References**


### Purpose

To give students a fair knowledge on the working of various electrical machines.

### Prerequisites

<table>
<thead>
<tr>
<th>Prerequisites</th>
<th>Co-requisites</th>
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<tbody>
<tr>
<td>GE0106</td>
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</table>

### Co-requisites

Required, Elective or Selected Elective (as per Table 5.1b)

Required

### Instructional Objectives

1. Analyze the performance of different types of electrical machines.
2. Appreciate the applications of them.
3. Design distributing systems

### Student Outcomes from Criterion 3 covered by this Course

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<th>Student outcome</th>
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### List of Topics Covered

#### UNIT 1 DC MACHINES (9 hours)


Principle of operation of DC motors – Back emf – Torque equation – characteristics of shunt, series and compound motors – speed control & starters (Qualitative treatment only)

#### UNIT 2 TRANSFORMER (9 hours)


**Three Phase induction motor:** Construction – Principle of operation – Production of rotating magnetic field – Slip – Torque equation – Torque slip characteristics – Methods of speed control and starters (Qualitative treatment only).

#### UNIT 3 FRACTIONAL HORSE POWER MOTORS (9 hour)

Construction and working principle of single phase motor – split phase, capacitor start & capacitor run motors – Universal motors.

#### UNIT 4 SYNCHRONOUS MACHINE (9 hours)

Constructional features of synchronous generator – types – emf equation – brief idea of armature reaction – voltage regulation (EMF method only) – Phasor diagram.

**Synchronous Motor:** Working principle of synchronous motors – Types of excitation – Constant load variable excitation – Constant excitation variable load – Phasor diagram – Starting methods.

#### UNIT 5 ELECTRIC DISTRIBUTION SYSTEMS (Qualitative treatment only) (9 hours)

Electric supply system – Distribution system wiring layout – Domestic, Commercial & Industrial – Protection of
Course Number and Title

EC0203 ELECTRON DEVICES

Credits / Contact Hours

3 / 45

Instructor Name

Mr.U.Hari

Textbooks, References

- Stanley G. Burns and Paul R. Bond, “Principles of Electronics” Circuits, Galgotia Publishers

Purpose

The purpose of this course is to provide a basis for understanding the characteristics, operation and limitations of semiconductor devices. This course brings together the quantum theory of solids, semiconductor material physics, and semiconductor device physics.

Prerequisites

GE0106

Co-requisites

NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. To understand the operational characteristics of a Semiconductor in Equilibrium and Non-Equilibrium conditions.
2. To understand the working of PN junction diodes and special purpose diodes.
3. To understand the basic working physics of BJT and FET both in ideal and non-ideal conditions.

Student Outcomes from Criterion 3 covered by this Course

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<th>Student outcome</th>
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List of Topics Covered

UNIT 1  ENERGY BANDS AND EXCESS CARRIERS IN SEMICONDUCTORS  (9 hours)

Energy bands and excess carriers in semiconductors: Bonding forces and Energy Bands in Solids – Charge Carriers

**Excess carriers in semiconductors:** Optical Absorption – Luminescence – Carrier Lifetime and Photoconductivity – Diffusion of Carriers.

**UNIT 2 SEMICONDUCTOR JUNCTIONS (9 hours)**


**Field Effect transistors:** Transistor Operation – The junction FET – The Metal-Semiconductor FET – The Metal-Insulator-Semiconductor FET – The MOS FET

**UNIT 3 SOLID STATE DEVICES-I (9 hours)**

**Bipolar Junction Transistors:** Fundamentals of BJT Operation – Amplification with BJT’s – Minority Carrier Distributions and Terminal Currents – Generalized Biasing – Switching – Other Important Effects – Frequency Limitations of Transistors – Heterojunction Bipolar Transistors

**Opto-electronic devices:** Photodiodes – Light Emitting Diodes – Lasers and Semiconductor Lasers

**UNIT 4 SOLID STATE DEVICES-II (9 hours)**

**Charge transfer devices:** Dynamic Effects in MOS Capacitors – The basic CCD – Improvements on the Basic Structure – Applications of CCD’s.

**High-frequency and high-power devices:** Tunnel Diodes – IMPATT Diode – Gunn Diode – PNPN Diode – SCR – IGBT – DIAC – TRIAC – UJT.

**UNIT 5 POWER SUPPLIES (9 hours)**


---

## Course Number and Title

EC0301 ELECTRONIC MEASUREMENTS & INSTRUMENTATION

## Credits / Contact Hours

3 / 45

## Instructor Name

Mr. B. Srinath

## Textbooks, References


**Purpose**

The purpose of this course is to introduce students to the various types of measurements made in electronics and the instruments used for measuring them. The main objective of this subject is to help students identify the different latest measurement techniques available for specific engineering applications.

<table>
<thead>
<tr>
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**Required, Elective or Selected Elective (as per Table 5.1b)**

Required

**Instructional Objectives**

1. Understand the various measurement techniques available
2. Understand the basic working of instruments used for measurement
3. Understand the errors in measurements and their rectification

**Student Outcomes from Criterion 3 covered by this Course**

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**List of Topics Covered**

**UNIT 1 MEASUREMENTS AND ERRORS** (9 hours)


**UNIT 2 ELECTROMECHANICAL & DIGITAL INDICATING INSTRUMENTS** (9 hours)

**UNIT 3 SIGNAL GENERATION AND ANALYSIS** (9 hours)
Sine Wave Generator-Sweep Frequency Generator-Pulse and Square wave Generator-Function Generator-Analyzer-Wave Analyzer-Distortion Analyzer-Harmonic Distortion Analyzer-Spectrum Analyzer-Logic Analyzer.

**UNIT 4 OSCILLOSCOPES AND RECORDERS** (9 hours)

**UNIT 5 COMPUTER CONTROLLED TEST SYSTEMS** (9 hours)
# Course Number and Title

**EC0303 CONTROL SYSTEMS**

## Credits / Contact Hours

3 / 45

## Instructor Name

Mr. P.K. Senthil Kumar

## Textbooks, References


## Purpose

To give an introduction to the analysis of linear control systems. This will permit an engineer to exploit time domain and frequency domain tools to design and study linear control systems.

## Prerequisites

<table>
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<th>Prerequisites</th>
<th>Co-requisites</th>
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## Required, Elective or Selected Elective (as per Table 5.1b)

Required

## Instructional Objectives

At the conclusion of this course, the students will be able to:

1. Describe what feedback control is and basic components of control systems.
2. Describe the various time domain and frequency domain tools for analysis and design of linear control systems.
3. Describe the methods to analyze the stability of systems from transfer function forms.

## Student Outcomes from Criterion 3 covered by this Course

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</table>

Mapping of instructional objectives with student outcome: 1-3

## List of Topics Covered

### UNIT 1 TRANSFER FUNCTIONS (9 hours)

Introduction and classification of control systems-linear, nonlinear, time varying, time in-variant, continuous, discrete, SISO and MIMO systems – definitions. Transfer function – Mathematical modeling of mechanical (translation and rotational), Electrical systems- mechanical-electrical analogies– Block Diagram reduction technique and Signal flow graphs.
<table>
<thead>
<tr>
<th>UNIT 2  CONTROL SYSTEM COMPONENTS   (9 hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer function of potentiometers, armature controlled and field controlled dc motor. –tacho generators -gear trains-controllers (On – Off, P, PI,PD, PID)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UNIT 3  TRANSIENT AND STEADY STATE ANALYSIS   (9 hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transient and steady state response-definitions-mathematical expression for standard test signals-type and order of systems-step, ramp and impulse response of first order and second order under damped systems - Step response of second order critically damped and over damped systems - Time domain specifications of second order under damped systems - Steady state error analysis.</td>
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<thead>
<tr>
<th>UNIT 4  STABILITY ANALYSIS   (9 hours)</th>
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<table>
<thead>
<tr>
<th>UNIT 5 FREQUENCY DOMAIN ANALYSIS   (9 hours)</th>
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<tbody>
<tr>
<td>Frequency response analysis-frequency domain specifications of second order systems-Bode plots and stability (gain and phase) margins- Need for compensation -Introduction to lead, lag, lead-lag compensating networks, minimum phase&amp; non-minimum phase systems - polar plots-constant M and N circles-Nichols chart - Nyquist stability criterion</td>
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</table>
A.2.4 Engineering Topics - II

Professional Core Courses

<table>
<thead>
<tr>
<th>2007-08 Curriculum Course Code</th>
<th>Name of the Course</th>
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<tbody>
<tr>
<td>EC0102</td>
<td>Electric Circuits</td>
</tr>
<tr>
<td>EC0122</td>
<td>Electric Circuits Lab</td>
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<tr>
<td>EC0201</td>
<td>Electromagnetic Theory &amp; Waveguides</td>
</tr>
<tr>
<td>EC0205</td>
<td>Digital Systems</td>
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<td>Signals and Systems</td>
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<td>Linear Integrated Circuits</td>
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<td>Transmission Lines and Networks</td>
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<td>Seminar</td>
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<td>Project Work</td>
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</table>
## Course Number and Title

**EC0102 ELECTRIC CIRCUITS**

### Credits / Contact Hours

3 / 60

### Instructor Name

Dr. K. Kalimuthu

### Textbooks, References


### Purpose

To expose basic circuit concepts, circuit modeling and methods of circuit analysis in time domain and frequency domain for solving simple and multi dimensional circuits including coupled circuits and three phase circuits.

### Prerequisites

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### Co-requisites

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### Required, Elective or Selected Elective (as per Table 5.1b)

Required

### Instructional Objectives

1. To understand the concept of circuit elements lumped circuits, waveforms, circuit laws and network reduction.
2. To solve the electrical network using mesh and nodal analysis by applying network theorems.
3. To understand the concept of active, reactive and apparent powers, power factor and resonance in series and parallel circuits.
4. To know the basic concepts of coupled circuits, three phase loads and power measurement.
5. To analyze the transient response of series and parallel A.C. circuits and to solve problems in time domain using Laplace Transform.

### Student Outcomes from Criterion 3 covered by this Course

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Mapping of instructional objectives with student outcome

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### List of Topics Covered

**Unit 1 BASIC CIRCUIT CONCEPTS & LAWS: (6 hours)**

Lumped Circuit elements, Ideal Sources (Dependent & Independent), Linear Passive elements – VI relationship of...
Circuit elements: Definitions: Node, Loop, Path & Branch. – Examples – Kirchoff’s Laws and Application (Both AC & DC).

Unit 2 NETWORK THEOREMS: (Both DC & AC Circuit Analysis) (6 hours)

UNIT 3 BASIC CONCEPTS OF AC & RESONANCE (6 hours)
AC Analysis: Concept of Phasor & Complex impedance/Admittance- Analysis of Simple series and Parallel Circuits- Active Power, Reactive Power, Apparent Power (Volt Amperes), Power Factor and Energy Associated with these Circuits – Concept of complex power – Phasor Diagram, impedance Triangle & Power Triangle associated with these circuits

Resonance: Introduction- series resonance-parallel resonance- Definition: Q Factor-half power frequency-resonant frequency- Bandwidth-Mathematical Expression for Different types of Resonant circuit.

UNIT 4 MAGNETICALLY COUPLED & 3- PHASE CIRCUITS: (6 hours)
Coupled Circuits: Mutual inductance – Co-efficient of Coupling- Dot Convention- Energy Consideration – Analysis of Coupled Circuits
3- Phase Circuits: Poly phase System – Phase Sequence – Analysis of 3 Phase Balanced/Unbalanced Circuits- Power and Power factor Measurement

UNIT 5 TRANSIENT ANALYSIS (6 hours)

Course Number and Title
EC0122 ELECTRIC CIRCUITS LAB

Credits / Contact Hours
1 / 30

Instructor Name
Mrs. C.R. Uma Kumari

Textbooks, References
- LABORATORY MANUAL

Purpose
To inculcate strong practical skills on the fundamental theorems and transient circuit analysis.

Prerequisites  Co-requisites
NIL  EC0102

Required, Elective or Selected Elective (as per Table 5.1b)
Required

**Instructional Objectives**

1. To impart hands on experience in verification of circuit laws and theorems
2. To measure circuit parameters
3. To study circuit characteristics and simulation of time response

**Student Outcomes from Criterion 3 covered by this Course**

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Mapping of instructional objectives with student outcome

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<th>List of Topics Covered</th>
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**LIST OF EXPERIMENTS (30 hours)**

1. Verification of Kirchoff’s voltage and Current Laws
2. Verification of Superposition Theorem
3. Verification of Thévenin’s Theorem
4. Verification of Maximum Power Transfer Theorem
5. Verification of Tellegen’s or Norton’s Theorem
8. Series RLC Resonance Circuits( Frequency response& Resonant frequency)
9. Parallel RLC Resonance Circuits( Frequency response & Resonant frequency)
10. Measurement of real power, reactive power, power factor and impedance of RC, RL and RLC circuits using voltmeters and ammeters.

---

**Course Number and Title**

**EC0201 ELECTROMAGNETIC THEORY AND WAVEGUIDES**

**Credits / Contact Hours**

3 / 45

**Instructor Name**

Dr. M. Sangeetha

**Textbooks, References**


**Purpose**
To enable the students, to have a fair knowledge about the theory and problems of electromagnetism and waveguides.

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**Required, Elective or Selected Elective (as per Table 5.1b)**

Required

**Instructional Objectives**

1. Understand the basic concepts of electric field and magnetic field
2. Compare between field and circuit theory
3. Need for impedance matching and different impedance matching techniques
4. Different types of waveguides

**Student Outcomes from Criterion 3 covered by this Course**

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**List of Topics Covered**

**UNIT 1 STATIC ELECTRIC FIELDS (9 hours)**

- Introduction to co-ordinate system
- Coulomb’s law: Electric field intensity-Field due to different types of charges
- Electric Flux density
- Gauss law: It’s applications to symmetrical charge distributions- Concept of divergence
- Electric potential: Potential field due to different types of charges-Potential gradient-The dipole-field due to dipole
- Energy density in electrostatic field.

**UNIT 2 STEADY MAGNETIC FIELDS (9 hours)**

- Biot Savart Law: Its applications
- Ampere’s circuital law: Its applications
- Curl of magnetic field intensity
- Magnetic flux and magnetic flux density
- The scalar and vector magnetic potentials
- Steady magnetic field laws.

**UNIT 3 MAXWELLS EQUATIONS AND TIME VARYING FIELDS (9 hours)**

- Maxwell’s Equations: For steady fields in point form and integral form
- Faraday’s law
- Displacement current
- Maxwell’s equations in point form and integral form for time-varying fields
- Comparison of field and circuit theory

**Poynting Theorem:** Poynting vector

**UNIT 4 GUIDED WAVES (9 hours)**

- Waves between parallel planes: Transverse electric waves-Transverse magnetic waves-characteristic of TE and TM waves-TEM waves
- Velocity of propagation-Attenuation in parallel plane guides-Wave impedance

**UNIT 5 WAVEGUIDE THEORY (9 hours)**

- Rectangular wave guides: TE waves and TM waves in Rectangular waveguides-Dominant mode-cutoff frequency in wave guides-Impossibility of TEM waves in waveguides
- Circular waveguides: Wave impedance and characteristic impedance-Power flow in wave guides-Attenuation factor and Q of wave guides-Transmission line analogy for waveguides
### Course Number and Title

**EC0205 DIGITAL SYSTEMS**

### Credits / Contact Hours

3 / 45

### Instructor Name

Dr. J. Selvakumar

### Textbooks, References


### Purpose

The purpose of this course is to develop a strong foundation in analysis and design of digital electronics.

### Prerequisites

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### Co-requisites

NIL

### Required, Elective or Selected Elective (as per Table 5.1b)

Required

### Instructional Objectives

At the end of the course students should be able to

1. Understand concepts of combinational and sequential circuits
2. Analyze the synchronous and asynchronous logic circuits
3. Understand concepts of memory, programmable logic and digital integrated circuits.

### Student Outcomes from Criterion 3 covered by this Course

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### List of Topics Covered

#### UNIT 1 NUMBER SYSTEMS - BOOLEAN ALGEBRA AND LOGIC GATES (7 hours)


#### UNIT 2 GATE LEVEL MINIMIZATION & COMBINATIONAL LOGIC (9 hours)

Decoders – Encoders – Multiplexers.

UNIT 3 SYNCHRONOUS SEQUENTIAL LOGIC (9 hours)
Registers – Shift Registers – Ripple counters – Synchronous Counters – Other counters.

UNIT 4 ASYNCHRONOUS SEQUENTIAL LOGIC AND MEMORY (11 hours)
Memory – Introduction – Random-Access Memory – Memory Decoding – Read only memory.

UNIT 5 DIGITAL INTEGRATED CIRCUITS AND PROGRAMMABLE LOGIC (9 hours)

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<th>Course Number and Title</th>
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<tr>
<td>EC0207 SIGNALS AND SYSTEMS</td>
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<tr>
<th>Instructor Name</th>
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<tr>
<td>Mrs.S.Kolangiammal</td>
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<th>Purpose</th>
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<tr>
<td>The purpose of this course is to introduce students to the fundamentals of signals and systems which are basic to Digital Signal Processing. The main objective of this subject is to help the students to mathematically analyze different types of signals and their associated systems.</td>
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<th>Instructional Objectives</th>
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<tr>
<td>At the end of this course, the students will be able to understand the</td>
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</table>
1. Various classifications of both Continuous time and Discrete time Signals and Systems.
3. Analysis and characterization of the CT system through Laplace transform.
4. Analysis and characterization of the DT system through Z transform.

**Student Outcomes from Criterion 3 covered by this Course**

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**List of Topics Covered**

**UNIT 1 CLASSIFICATION OF SIGNALS AND SYSTEMS** (6 hours)

*Classification of Signals*: Continuous time signals - Discrete time signals – Periodic and Aperiodic signals – Even and odd signals – Energy and power signals – Deterministic and random signals – Complex exponential and Sinusoidal signals. Unit step, Unit ramp, Unit impulse – Representation of signals in terms of unit impulse.


**UNIT 2 ANALYSIS OF CT SIGNALS** (6 hours)


*Fourier transform*: Representation of Continuous time signals - Properties of Continuous time Fourier transform – Energy density spectrum.

**UNIT 3 LTI CT SYSTEM** (6 hours)


**UNIT 4 ANALYSIS OF DT SIGNALS AND SYSTEMS** (6 hours)

Representation of sequences – Discrete time Fourier transform (DTFT) - Discrete Fourier transform (DFT) and its properties - System modeling in terms of difference equation - impulse response – Convolution sum - Frequency response.

**UNIT 5 Z TRANSFORM** (6 hours)


**Course Number and Title**

**EC0221 ELECTRON DEVICES LAB**

**Credits / Contact Hours**

2 / 45

**Instructor Name**

Mrs. R. Dayana
Textbooks, References

- LABORATORY MANUAL

Purpose

To verify practically, the fundamental characteristics of Electron Devices.

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<td>EC0203</td>
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Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. To study experimentally the characteristics of diodes, BJT's and FET's.
2. To verify practically, the response of various special purpose electron devices.

Student Outcomes from Criterion 3 covered by this Course

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List of Topics Covered

**LIST OF EXPERIMENTS (45 hours)**

1. Characteristics of PN junction and Zener diode.
2. Input, Output and Transfer characteristics of CE and CC Amplifier.
3. Characteristics of LDR, Photo-diode and Photo transistor.
4. Transfer characteristics of JFET.
5. Transfer characteristics of MOSFET (with depletion and enhancement mode)
6. Characteristics of LED with three different wavelengths.
8. Full wave rectifier with 2 diodes.
9. Full wave rectifier with 4 diodes (Bridge rectifier).
10. Series voltage Regulator.
11. Shunt voltage Regulator.
12. Characteristics of Thermistor.

Course Number and Title

EC0223 DIGITAL SYSTEM LAB

Credits / Contact Hours

2 / 45

Instructor Name

Mrs. A. Maria Jossy.

Textbooks, References
Purpose
To understand, the logical behaviors of digital circuits and apply them in appropriate applications.

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Required, Elective or Selected Elective (as per Table 5.1b)
Required

Instructional Objectives
1. To verify operation of logic gates and flip-flops.
2. To design and construct digital circuits

Student Outcomes from Criterion 3 covered by this Course

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List of Topics Covered

**LIST OF EXPERIMENTS (45 hours)**
2. Half Adder and Full Adder.
3. Magnitude Comparator (2-Bit).
4. Encoders and Decoders.
5. Multiplexer and Demultiplexer.
7. Synchronous Counters.
8. Ripple Counter.
9. Mod – N Counter.
10. Shift Register – SISO & SIPO.

Course Number and Title

**EC0204 ELECTRONIC CIRCUITS**

Credits / Contact Hours
3 / 60

Instructor Name
Mrs.E.Chitra

Textbooks, References

**Purpose**

The purpose of this course is to introduce to the students the basics of biasing transistor circuits, feedback amplifiers, large signal amplifiers, tuned amplifiers, oscillators, wave shaping circuit using transistor & analyzing different electronic circuits.

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**Required, Elective or Selected Elective (as per Table 5.1b)**

Required

**Instructional Objectives**

At the end of this course the students will learn and apply

1.  Operating point calculations and working of basic amplifiers.
2.  Working of different types of feedback amplifiers & oscillators.
3.  Frequency response and design of tuned amplifiers.
4.  Basic working & design of wave shaping circuits.

**Student Outcomes from Criterion 3 covered by this Course**

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**List of Topics Covered**

**UNIT 1  BIASING METHODS AND SMALL SIGNAL MODELS (BJT, JFET, MOSFET) (6 hours)**

DC & AC Load Lines-Operating Point-Q Point variation-various Biasing Methods- Small signal equivalent - Calculation of voltage gain, current gain, power gain, input impedance and output impedance.

**UNIT 2  TRANSISTOR AMPLIFIER AND ANALYSIS (6 hours)**

Small Signal analysis of BJT, JFET and MOSFET amplifiers - Cascade amplifier- Cascode amplifier- Darlington Bootstrap amplifier- Differential amplifier.

**UNIT 3  FEEDBACK AMPLIFIERS AND OSCILLATORS (6 hours)**

Concept of feedback- Types of feedback- Analysis of voltage & current feedback amplifiers

Barkhausen criterion for oscillation – mechanism for start of oscillation & stabilization of amplitude – Analysis of RC & LC oscillators.

**UNIT 4  LARGE SIGNAL AND TUNED AMPLIFIERS (6 hours)**


Single Tuned Amplifiers – Double tuned & synchronously tuned amplifiers.

**UNIT 5  FREQUENCY RESPONSE AND WAVE SHAPING CIRCUITS (6 hours)**

Low frequency and High frequency response of BJT and FET amplifier. Nonlinear wave shaping circuits: Astable -
## Course Number and Title

**EC0206 LINEAR INTEGRATED CIRCUITS**

### Credits / Contact Hours

3 / 45

### Instructor Name

Mrs.N.Saraswathi

### Textbooks, References


### Purpose

To enable the students to understand the fundamentals of integrated circuits and designing electronic circuits using it.

### Prerequisites / Co-requisites

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### Required, Elective or Selected Elective (as per Table 5.1b)

Required

### Instructional Objectives

1. To design simple circuits like amplifiers using op-amps
2. To design waveform generating circuits
3. To design simple filter circuits for particular application
4. To gain knowledge in designing a stable voltage regulators

### Student outcome

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### Mapping of instructional objectives with student outcome

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### List of Topics Covered

**UNIT 1 INTRODUCTORY CONCEPTS AND FUNDAMENTALS (9 hours)**

**Introduction to operational amplifier:** Op-amp symbol, terminals, packages and specifications-Block diagram

Representation of op-amp-Op-amp input modes-Op-amp Data sheets and interpretation-Ideal op-amp and practical op-amp-Open loop and closed loop configurations of op-amp **Practical Limitations of op-amp circuits:**-Bias and offset
currents / offset voltage-Frequency compensation and stability-Gain bandwidth product-Slew Rate-Drift-CMRR and PSRR. **Basic op-amp circuits:** Inverting and Non-inverting voltage amplifiers-Voltage follower-Summing, scaling and averaging amplifiers-Differential amplifiers-AC amplifiers. **Internal Schematic of 741 op-amps**

**UNIT 2 OP-AMP APPLICATIONS (9 hours)**

**Linear Applications:** Instrumentation Amplifiers-V-to-I and I-to-V converters-Differentiators and Integrators. **Non-linear Applications:** Precision Rectifiers-Wave Shaping Circuits (Clipper and Clamps)-Log and Antilog Amplifiers-Analog voltage multiplier circuit and its applications-Operational Trans conductance amplifier (OTA)-Comparators and its applications-Sample and Hold circuit

**UNIT 3 OSCILLATORS AND FREQUENCY GENERATORS (9 hours)**

**Op-amp oscillators:** Positive feedback and the Barkhausan criterion-Wien Bridge and phase shift oscillators-Square / Triangle / Ramp function generators. **Single Chip oscillators and Frequency generators:** Voltage controlled oscillator-555 Timer-555 Monostable operation and its applications-555 Astable operation and its applications-Phase Locked Loop-Operation of 565 PLL-Closed loop analysis of PLL-PLL applications

**UNIT 4 ACTIVE FILTERS AND VOLTAGE REGULATOR (9 hours)**

**Filter Fundamentals:** Filter types-Filter order and poles-Filter class or alignment (Butterworth, Bessel, Chebyshev and Elliptic or Cauer). **Realizing Practical Filters:** Sallen-Key LPF and HPF Realizations-BPF Realization-Notch Filter (Band Reject)-Realization-State Variable Filters-All Pass Filters Switched Capacitor Filters, Voltage Regulators-Need for Regulation-Linear Regulators-Monolithic IC Regulators (78xx, 79xx, LM 317, LM 337, 723)-Switching Regulators

**UNIT 5 DATA CONVERSION DEVICES (9 hours)**

Advantages and disadvantages of working in the digital domain. **Digital to Analog Conversion:** DAC Specifications-DAC circuits-Weighted Resistor DAC-R-2R Ladder DAC-Inverted R-2R Ladder DAC-Monolithic DAC, Analog to Digital conversion: ADC specifications-ADC circuits-Ramp Type ADC-Successive Approximation ADC-Dual Slope ADC-Flash Type ADC-Tracking ADC-Monolithic ADC

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**Course Number and Title**

**EC0208 TRANSMISSION LINES AND NETWORKS**

**Credits / Contact Hours**

3 / 45

**Instructor Name**

Mr.B.Viswanathan.

**Textbooks, References**


**Purpose**

To lay a strong foundation on the theory of transmission line and networks by highlighting their applications.
### Prerequisites

| EC0201 | NIL |

### Instructional Objectives

1. To become familiar with propagation of signals through lines.
2. Calculation of various line parameters by conventional and graphical methods.
3. Need for impedance matching and different impedance matching techniques.
4. Design of different types of filters, equalizer and attenuators.

### Student Outcomes from Criterion 3 covered by this Course

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<tr>
<th>Student outcome</th>
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<tr>
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</table>

### List of Topics Covered

#### UNIT 1 TRANSMISSION LINE THEORY  (9 hours)

#### UNIT 2 HIGH FREQUENCY TRANSMISSION LINES  (8 hours)
Transmission line equations at radio frequencies - Line of Zero dissipation – Voltage and current on the dissipationless line, Standing Waves, Nodes, Standing Wave Ratio – Input impedance of the dissipationless line - Open and short circuited lines - Power and impedance measurement on lines - Reflection losses – Measurement of VSWR and wavelength.

#### UNIT 3 IMPEDANCE MATCHING IN HIGH FREQUENCY LINES  (9 hours)

#### UNIT 4 PASSIVE FILTERS  (9 hours)

#### UNIT 5 ATTENUATORS AND EQUALIZERS  (10 hours)
<table>
<thead>
<tr>
<th>Course Number and Title</th>
<th>EC0210 COMMUNICATION THEORY</th>
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<tbody>
<tr>
<td>Credits / Contact Hours</td>
<td>3 / 45</td>
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<tr>
<td>Instructor Name</td>
<td>Mrs. S.T. Aarthy.</td>
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<tr>
<td>Textbooks, References</td>
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</tr>
<tr>
<td>Purpose</td>
<td>To study the basics of analog communication systems</td>
</tr>
<tr>
<td>Prerequisites</td>
<td>NIL</td>
</tr>
<tr>
<td>Co-requisites</td>
<td>NIL</td>
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<tr>
<td>Required, Elective or Selected Elective (as per Table 5.1b)</td>
<td>Required</td>
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<tr>
<td>Instructional Objectives</td>
<td>To learn and understand</td>
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<tr>
<td></td>
<td>1. Various Amplitude modulation and demodulation systems</td>
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<td></td>
<td>2. Various Angle modulation and demodulation systems</td>
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<tr>
<td></td>
<td>3. Basics of Noise theory and performance of various receivers</td>
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<tr>
<td></td>
<td>4. The fundamentals of information theory</td>
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<tr>
<td>Student Outcomes from Criterion 3 covered by this Course</td>
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<tr>
<td>List of Topics Covered</td>
<td>UNIT 1 AMPLITUDE MODULATION SYSTEMS (9 hours)</td>
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<tr>
<td></td>
<td>Need for modulation-AM modulation systems-Modulation index-Phase diagram-Power relations-Efficiency-Spectrum diagram of AM, DSB-SC &amp; SSB systems.</td>
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<tr>
<td></td>
<td>Generation of AM Waves: Square law modulator-Product Modulator-Switching Modulator. Detection of AM waves: Envelope detector-Coherent detector. FDM.</td>
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<tr>
<td></td>
<td>UNIT 2 ANGLE MODULATION (9 hours)</td>
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<tr>
<td></td>
<td>Frequency Modulation - Transmission Bandwidth of FM signals-Frequency spectrum-Phase Modulation-relationship between FM &amp; PM- Narrow Band FM &amp; Wide Band FM.</td>
</tr>
</tbody>
</table>
**Generation of FM Waves:** Direct method- Indirect method of FM generation.  
**Detection of FM waves:** Ratio Detector-PLL FM demodulator- Super heterodyne Receiver

**UNIT 3 NOISE THEORY (9 hours)**  

**UNIT 4 NOISE PERFORMANCE OF AM & FM RECEIVERS (9 hours)**  
Noises in AM receiver threshold effect-Noise in FM receivers capture effect-FM threshold effect Pre emphasis & De emphasis in FM.

**UNIT 5 INFORMATION THEORY (9 hours)**  

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**Course Number and Title**

**EC0212 DIGITAL SIGNAL PROCESSING**

**Credits / Contact Hours**

3 / 60

**Instructor Name**

Mrs. Sabitha Gauni.

**Textbooks, References**


**Purpose**

The purpose of this course is to introduce the concepts of Digital signal processing and DSP Processor. The mathematical analysis of FIR and IIR filter design and simulation using MATLAB are dealt with in detail.

**Prerequisites**

<table>
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**Co-requisites**

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**Required, Elective or Selected Elective (as per Table 5.1b)**

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</table>
### Instructional Objectives

At the end of this course, the students will be able to understand the
1. Structures of Discrete time signals and systems
2. Frequency response and design of FIR and IIR filters.
3. Finite word length effect
4. DSP Processor - TMS320C5X.

### List of Topics Covered

#### UNIT 1 REVIEW OF DISCRETE TIME SIGNALS AND SYSTEMS (6 hours)
Overview of signals and systems - DFT-FFT using DIT and DIF algorithms - Realization of structures for discrete time systems – Direct form I & II, Cascade, Parallel forms – MATLAB programs for DFT and FFT.

#### UNIT 2 DESIGN AND IMPLEMENTATION OF IIR FILTERS (6 hours)

#### UNIT 3 DESIGN AND IMPLEMENTATION OF FIR FILTERS (6 hours)
Linear phase response design techniques for FIR filters - Fourier series method and frequency sampling method – Design of Linear phase FIR filters using windows: Rectangular, Hanning and Hamming windows- Matlab programs FIR filters-FIR filter design using Decimation and Interpolation

#### UNIT 4 FINITE WORD LENGTH EFFECTS IN DIGITAL FILTERS (6 hours)
Fixed point arithmetic – effect of quantization of the input data due to Finite word length. Product round off – need for scaling – Zero input limit cycle oscillations - Limit cycle oscillations due to overflow of adders – Table look up implementation to avoid multiplications.

#### UNIT 5 PROCESSOR FUNDAMENTALS (6 hours)

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<tr>
<th>TUTORIAL</th>
<th>30 hours</th>
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<td>TOTAL</td>
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</table>

### Course Number and Title

**EC0222 ELECTRONIC CIRCUITS LAB**

### Credits / Contact Hours

2 / 45

### Instructor Name

Mrs. V. Sarada

### Textbooks, References
• LAB MANUAL

Purpose
The purpose of the lab is to train the students to analyze electronic circuit and understand their functionality.

<table>
<thead>
<tr>
<th>Prerequisites</th>
<th>Co-requisites</th>
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<td>NIL</td>
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</table>

Required, Elective or Selected Elective (as per Table 5.1b)
Required

Instructional Objectives
1. To study experimentally the working of amplifiers, regulators and analyze their behavior by plotting graphs.

Student Outcomes from Criterion 3 covered by this Course

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Mapping of instructional objectives with student outcome

<table>
<thead>
<tr>
<th>Group 1: (Using only discrete components)</th>
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<tbody>
<tr>
<td>9. Frequency response of RC coupled amplifier using BJT or FET.</td>
</tr>
<tr>
<td>10. Colpitts Oscillator.</td>
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<tr>
<td>11. Efficiency of Class-A or Class AB Amplifier.</td>
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</table>

<table>
<thead>
<tr>
<th>Group 2: (Using IC 741 – IC 555 and any other equivalent IC’s)</th>
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<tbody>
<tr>
<td>10. Integrator and Differentiator.</td>
</tr>
<tr>
<td>11. Wein Bridge and RC Phase Shift oscillator.</td>
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<tr>
<td>12. Astable Multivibrator</td>
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<tr>
<td>13. Monostable Multivibrator</td>
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<td>14. Bistable Multivibrator</td>
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<table>
<thead>
<tr>
<th>Group 3: Simulation experiments (Using PSPICE and LABVIEW)</th>
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<tbody>
<tr>
<td>1. Active filters: Band pass filter and Notch filter.</td>
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<tr>
<td>2. Digital to Analog converter (any one method)</td>
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<tr>
<td>3. Analog to Digital converter (any one method)</td>
</tr>
<tr>
<td>4. Ramp Generator</td>
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</tbody>
</table>

LIST OF EXPERIMENTS (45 hours)

Group 1: (Using only discrete components)
9. Frequency response of RC coupled amplifier using BJT or FET.
10. Colpitts Oscillator.
11. Efficiency of Class-A or Class AB Amplifier.

Group 2: (Using IC 741 – IC 555 and any other equivalent IC’s)
10. Integrator and Differentiator.
11. Wein Bridge and RC Phase Shift oscillator.
12. Astable Multivibrator
13. Monostable Multivibrator
14. Bistable Multivibrator

Group 3: Simulation experiments (Using PSPICE and LABVIEW)
1. Active filters: Band pass filter and Notch filter.
2. Digital to Analog converter (any one method)
3. Analog to Digital converter (any one method)
4. Ramp Generator
### Course Number and Title

**EC0224 COMMUNICATION LAB -I**

### Credits / Contact Hours

2 / 45

### Instructor Name

Mr.S.Manikandaswamy.

### Textbooks, References

- Laboratory Manual

### Purpose

To help the students to design and implement communication circuits. To give hands on training on simulation software.

### Prerequisites

NIL

### Co-requisites

EC0210

### Required, Elective or Selected Elective (as per Table 5.1b)

Required

### Instructional Objectives

1. To carry out AM and FM modulation experiments using discrete electronic components. Software’s like MATLAB and Pspice are used to simulate the circuit operations.

### Student Outcomes from Criterion 3 covered by this Course

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<tr>
<th>Student outcome</th>
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### List of Topics Covered

**LIST OF EXPERIMENTS  (45 hours)**

**HARDWARE**

1. Amplitude Modulator
2. Envelope Detector
3. Frequency Modulator using VCO
4. Frequency Demodulation using PLL
5. PAM modulation and demodulation
6. Pre emphasis and De-emphasis
7. Analog Multiplexing

**SOFTWARE**

8. Amplitude Modulation using PSpice
9. Frequency Modulation using PSpice
10. PAM modulation using PSpice
11. PAM demodulation using PSpice
12. pre emphasis and de emphasis using PSpice
13. Amplitude Modulation using MATLAB
14. Frequency Modulation using MATLAB

**Course Number and Title**

**EC0226 COMPREHENSION -1**

**Credits / Contact Hours**

1 / 30

**Instructor Name**

Mr.M.Aravindan.

**Textbooks, References**

**Purpose**

To provide a complete review of Electronics and Communication engineering topics covered in the first four semesters, so that a comprehensive understanding is achieved. It will also help students to face job interviews and competitive examinations.

**Prerequisites**

<table>
<thead>
<tr>
<th>Prerequisites</th>
<th>Co-requisites</th>
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<tbody>
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</tbody>
</table>

**Required, Elective or Selected Elective (as per Table 5.1b)**

Required

**Instructional Objectives**

1. To provide overview of all Electronics & Communication engineering topics covered in the first four semesters.
2. To assess the overall knowledge level in the following topics of Electronics & Communication.

**Student Outcomes from Criterion 3 covered by this Course**

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**List of Topics Covered**

**COMPREHENSION** (30 hours)

A. Review of the following topics

1. Overview of Semiconductor devices.
2. Basics of Electromagnetism and waveguides.
3. Analysis and design of digital circuits.
4. Analysis of signals and systems.
5. Analysis and design of Electronic circuits.
6. Overview of Linear Integrated Circuits.
7. Overview of Transmission Lines and Networks.
8. Overview of Communication Theory.

B. Seminar/group discussion

Students shall have seminar/group discussion sessions on the topics listed under A above under the guidance of staff.

(Evaluation is based on an end semester examination)

<table>
<thead>
<tr>
<th>Course Number and Title</th>
<th>EC0305  ANTENNA AND WAVE PROPAGATION</th>
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<tbody>
<tr>
<td>Credits / Contact Hours</td>
<td>3 / 45</td>
</tr>
<tr>
<td>Instructor Name</td>
<td>Mr. S. Manikandaswamy.</td>
</tr>
</tbody>
</table>

Textbooks, References


Purpose

The purpose of this course is to enable the students to the basics of antennas and various types of antenna arrays and its radiation patterns. The main objective of this subject is to help students to identify the different latest antennas available for specific communication.

<table>
<thead>
<tr>
<th>Prerequisites</th>
<th>Co-requisites</th>
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Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. To study various antennas parameters.
2. To study the antenna arrays and radiation patterns of antennas.
3. To learn the basic working of antennas
4. To understand various techniques involved in various antenna parameter measurements.
5. To understand the propagation of radio waves in the atmosphere.
### Student Outcomes from Criterion 3 covered by this Course

<table>
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<th>Student outcome</th>
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### List of Topics Covered

#### UNIT 1 ANTENNA FUNDAMENTALS AND VECTOR POTENTIALS (9 hours)
- Isotropic Radiation
- Power density and Intensity
- Gain
- Directive gain
- Directivity
- Effective area
- Reciprocity theorem
- Antenna efficiency
- Radiation resistance
- Terminal impedance
- Beam width and Bandwidth
- Radiation from a small current element
- Power radiated by a small current element and its radiation resistance
- Half wave dipole
- Radiation field of current distribution of center fed Dipole.

#### UNIT 2 ANTENNA ARRAYS (9 hours)
- Various forms of antenna arrays – Broadside, End fire, Collinear, Parasitic arrays
- Array of two point sources
- Pattern Multiplication
- Array of “N” sources – analysis of End fire and Broadside case
- Phased arrays
- Binomial arrays.

#### UNIT 3 SPECIAL PURPOSE ANTENNAS (9 hours)
- Traveling wave
- Loop
- Dipole and Folded dipole antennas
- Horn antenna
- Reflector antenna
- Yagi- Uda antenna
- Log periodic antenna
- Helical and Micro strip antenna
- and applications of all types of antennas.

#### UNIT 4 ANTENNA MEASUREMENTS (9 hours)
- Impedance
- Gain
- Radiation pattern
- Beam width
- Radiation resistance
- Antenna efficiency
- Directivity
- Polarization and phase Measurements.

#### UNIT 5 RADIO WAVE PROPAGATION (9 hours)
- Modes of propagation
- Structure of atmosphere
- Ionosphere layers
- Mechanism of bending of waves
- Effect of earths Magnetic field on Radio wave propagation
- Virtual height
- MUF
- Skip distance
- OWF
- Ionosphere abnormalities
- Multi-hop propagations
- Space wave propagation
- Super refraction.

### Course Number and Title

**EC0307 DIGITAL COMMUNICATION**

### Credits / Contact Hours

3 / 45

### Instructor Name

Mr.A.Sriram

### Textbooks, References

- Taub & Schilling, “Principle of Communication Systems” (2/e)

### Purpose

To provide a comprehensive coverage of digital communication systems. The key feature of digital communication systems is that it deals with discrete messages and the purposes are to add organization and structure to this field.
EC0210, MA0232

Required, Elective or Selected Elective (as per Table 5.1b)
Required

Instructional Objectives

To learn and understand
1. Pulse modulation and discuss the process of sampling, quantization and coding that are fundamental to the digital transmission of analog signals
2. Base band pulse transmission which deals with the transmission of pulse amplitude modulated signals in their base band form
3. Pass band data transmission methods

Student Outcomes from Criterion 3 covered by this Course

Student outcome a b c d e f g h i j k
X X X

Mapping of instructional objectives with student outcome 1-3 1-3 1-3

List of Topics Covered

UNIT 1 PULSE MODULATION (9 hours)
- Sampling Process-Aliasing-Natural Sampling-Flat Sampling-PAM-PWM-PPM-Bandwidth-Noise trade off-TDM

UNIT 2 DIGITAL MODULATION SYSTEMS (9 hours)
- Quantization of Signals-Quantization error-PCM Systems-Noise Considerations in PCM system-Over all Signal-to-noise ratio for PCM system-Threshold effect-Channel Capacity-Virtues, Limitations & Modification of PCM system-PCM Signal Multiplexing-Differential PCM- Delta Modulation-Noise Considerations in Delta Modulation- SNR Calculations-Comparison of PCM, DPCM & DM

UNIT 3 BASE BAND PULSE TRANSMISSION (9 hours)
- Matched filter receiver-Probability error of the Matched filter-Intersymbol interference-Nyquist criterion for distortion less base band transmission-Correlative coding-Base band M-ary PAM transmission-Eye pattern.

UNIT 4 PASS BAND DATA TRANSMISSION (9 hours)

UNIT 5 INTRODUCTION TO SPREAD SPECTRUM TECHNIQUES (9 hours)

Course Number and Title

EC0309A  MICROPROCESSORS AND MICROCONTROLLERS

Credits / Contact Hours

3 / 45

Instructor Name
Mr. K. Ramesh

Textbooks, References


Purpose

The purpose of this course is to introduce students about Microprocessors and Microcontrollers.

Prerequisites

<table>
<thead>
<tr>
<th>EC0205</th>
</tr>
</thead>
</table>

Co-requisites

| NIL    |

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. Understand Microprocessor 8086, ARM CORTEX-M0 and programming of them
2. Understand 8086, nuvoTon NU-LB-NUC140 processor based interfacing circuits necessary for vital applications.
3. Understand ARM C programming for nuvoTon Cortex M0 interfacing.
4. Understand basic concepts of 8051 micro-controller and its interfacing.

Student Outcomes from Criterion 3 covered by this Course

<table>
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<tr>
<th>Student outcome</th>
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</tbody>
</table>

List of Topics Covered

UNIT 1 MICROPROCESSOR- 8086 (11 hours)

UNIT 2 HIGH PERFORMANCE RISC ARCHITECTURE- INTRODUCTION (10 hours)
ARM: The ARM (nuvoTon –NU-LB-NUC140) architecture - ARM organization and implementation – The ARM instruction set - The thumb instruction set - Basic ARM ALP (32-bit addition, subtraction, multiplication, binary sorting).

UNIT 3 INTERFACING DEVICES WITH 8086 (7 hours)
IO and Memory Interfacing concepts- Programmable Interval Timer (8254)– Programmable Interrupt Controller (8259A) – Basic Treatment for Programmable DMA Controller (8257) – Programmable Communication Interface
(8251)-Stepper Motor Interfacing.

UNIT 4 MICROCONTROLLER-8051  (7 hours)
Register Set-Architecture of 8051 microcontroller- IO and Memory Addressing-Interrupts-Instruction SetAddressing Modes.

UNIT 5 INTERFACING THE 8051 MICROCONTROLLER  (10  hours)
Timer-Serial Communication-Interrupts Programming (Elementary Treatment)-Interfacing to External Memory & ADCs. Introduction to Embedded C Programming -Basic techniques for reading & writing from I/O port pins.

Course Number and Title

EC0321A  PROCESSOR LAB

Credits / Contact Hours

2  / 45

Instructor Name

Mrs.J.Subhashini

Textbooks, References

•  LAB Manual.

Purpose

To make the students understand the basic programming of Microprocessor and DSP processor. Also, to introduce them to Microcontrollers and few interfacing circuits.

Pre-requisites

NIL

Co-requisites

EC0309A

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

To understand and gain knowledge about
1. Microprocessor (8086)
2. ARM Cortex M0 (NuvoTon-NU-LB-NUC140 Series)
3. Microcontroller (8051)
4. Interfacing circuits

Student Outcomes from Criterion 3 covered by this Course

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Mapping of instructional objectives with student outcome

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List of Topics Covered

LIST OF EXPERIMENTS  (45HOURS)
PART-I: Basic Assembly Language Programming

(a) 8086 Microprocessor:
1. 16 bit Addition, Subtraction, Multiplication and Division.
2. Largest and Smallest number
3. Ascending and Descending numbers
4. Sum of Series.

(b) 8051 Microcontroller:
6. Addition, Subtraction, Multiplication and Division.
7. One’s and two’s complement
8. Word Disassembly
9. Decimal to Hexa decimal Conversion

PART-II: Interfacing using 8086 Microprocessor

1. Stepper Motor Interface
2. Programmable Timer Interface.
3. Programmable Interrupt Controller.

PART-III: Interfacing with Microcontroller 8051 and ARM Cortex M0 (NU-LB-NUC140)

(For one experiment, performance comparison has to performed between ARM and 8051 Microcontroller)
4. Seven Segment Display for Counting (NU-LB-NUC140)
5. ADC Interfacing –input via POT.
6. Seven Segment Display for Key Pressed.
7. LCD Interfacing / GPIO Buzzer Interfacing for Intruder Alarm Systems

Course Number and Title

EC0323  COMMUNICATION LAB-II

Credits / Contact Hours

2 / 45

Instructor Name

Mrs. S.T. Aarthy

Textbooks, References

LAB MANUAL

Purpose

To help the students to experiment on digital communication systems using kits and to use software’s to simulate them.

Pre-requisites

EC0224

Co-requisites

EC0307

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. To carry out experiments on various digital communications modulation schemes using kits. MATLAB software is used to simulate the digital modulation techniques.
**LIST OF EXPERIMENTS**

**HARDWARE**

1. FSK Modulation and Demodulation.
2. PSK Modulation and Demodulation.
3. Pulse Code Modulation and Demodulation
4. Delta Modulation and Demodulation
5. Time Division Multiplexing
6. Data Formatting
7. Differential pulse code modulation and demodulation

**SOFTWARE –MATLAB**

8. FSK Modulation and Demodulation
9. PSK Modulation and Demodulation
10. QPSK
11. ASK Modulation and Demodulation
12. DPSK Modulation and Demodulation
13. Delta modulation and demodulation

**Course Number and Title**

**EC0325**  INDUSTRIAL TRAINING - I

**Credits / Contact Hours**

1

**Instructor Name**

Mr. E. Sivakumar

**Textbooks, References**

**Purpose**

To expose the students to the industrial working environment and make them industry ready.

**Prerequisites**

Nil

**Co-requisites**

NIL

**Required, Elective or Selected Elective (as per Table 5.1b)**
**Required, Elective or Selected Elective (as per Table 5.1b)**

Required

**Instructional Objectives**

1. Students have to undergo two-week practical training in Electronics and Communication Engineering related project site or design/planning office so that they become aware of the practical application of theoretical concepts studied in the class rooms.

**Student Outcomes from Criterion 3 covered by this Course**

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**List of Topics Covered**

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**Course Number and Title**

**MB0302 BUSINESS MANAGEMENT FOR ENGINEERS**

**Credits / Contact Hours**

3 / 45

**Instructor Name**

Mrs. K. Subathra

**Textbooks, References**

- Prasanna Chandra, “Finance Sense for non-finance executives”, TMH.

**Purpose**

To provide engineering students with the management skills to enable them to assess, evaluate and take key management decisions by the application of management concepts.

**Prerequisites**

Nil

**Co-requisites**

NIL
At the end of the course, the students are expected to

1. Understand the various key concepts of micro economics.
2. Demonstrate the effect of time value of money and depreciation.
3. Apply the various project management techniques
4. Understand the various issues related to industrial safety.

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Mapping of instructional objectives with student outcome

1-4

List of Topics Covered

**UNIT-1 (8 hours)**
Role and Importance of Economics for Engineers, Law of demand and supply, Break-even analysis, Pricing Policies.

**UNIT-2 (8 hours)**

**UNIT-3 (10 hours)**

**UNIT-4 (10 hours)**
Marketing Concepts, Marketing Mix, Product life cycle, Plant layout, Plant location, Material Handling, Productivity, Plant Maintenance and Industrial Safety.

**UNIT-5 (9 hours)**

---

**Course Number and Title**

**EC0302 MICROWAVE AND RF DESIGN**

**Credits / Contact Hours**
3 / 45

**Instructor Name**
Dr. J. Manjula

**Textbooks, References**

Purpose

To introduce the students, to the basics of microwave devices, microwave measurements and modeling of RF circuits used in communication systems.

Prerequisites

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Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

To understand and gain complete knowledge about
1. Microwave devices such as Amplifiers, Oscillators
2. Microwave Components
3. Microwave Measurements
4. RF Basic concepts and RF Filter Design
5. RF Amplifier Design

Student Outcomes from Criterion 3 covered by this Course

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List of Topics Covered

UNIT 1  MICROWAVE AMPLIFIERS AND OSCILLATORS  (9 hours)
Introduction to Microwave transmission- Applications and Limitations- Klystron Amplifiers- Reflex Klystron Oscillators-Magnetron Oscillators-TWT Amplifiers.

UNIT 2  MICROWAVE COMPONENTS  (9 hours)
Directional Coupler-E&H plane Tee- Magic Tee- Circulators- Isolators- Attenuators and Phase Shifters- Impedance Matching Techniques.

UNIT 3  MICROWAVE DEVICES AND MEASUREMENTS  (9 hours)
Principles of Microwave transistor and FET- Gunn Oscillators- IMPATT, TRAPATT and BARITT devices- PIN diode and TUNNEL Diode.

Microwave Measurements: Power, Frequency, Impedance, VSWR.

UNIT 4  DESIGN OF RF FILTERS  (9 hours)
Introduction to RF Concepts- Basic Filter Configurations – LPF, HPF, BPF, BSF – Filter Design

UNIT 5  RF AMPLIFIER DESIGN & BASIC OSCILLATOR, MIXER MODEL  (9 hours)

Course Number and Title

EC0304 OPTICAL COMMUNICATION AND NETWORKS

Credits / Contact Hours
Instructor Name
Dr. Shanti Prince.

Textbooks, References

Purpose
To introduce the students to various optical fiber modes, configurations and various signal degradation factors associated with optical fiber and to study about various optical sources and optical detectors and their use in the optical communication system.

Prerequisites
Nil

Co-requisites
NIL

Required, Elective or Selected Elective (as per Table 5.1b)
Required

Instructional Objectives
1. To learn the basic elements of optical fiber transmission link, fiber modes configurations and structures.
2. To understand the different kind of losses, signal distortion in optical wave guides and other signal degradation factors.
3. To learn the various optical source materials, LED structures, quantum efficiency, Laser diodes.
4. To learn the fiber optical receivers such as PIN APD diodes, noise performance in photo detector, receiver operation and configuration.
5. To learn the fiber optical network components, variety of networking aspects, FDDI, SONET/SDH and operational principles WDM.

Student Outcomes from Criterion 3 covered by this Course

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List of Topics Covered

UNIT 1 INTRODUCTION OF OPTICAL FIBERS (9 hours)
Basic principles of optical fiber communications – Step Index and Graded Index fiber structure – Fiber Modes and Configurations – Mode theory for circular waveguides – Linearly Polarized modes – Single mode fibers.

UNIT 2 OPTICAL SOURCES AND RECEIVERS (9 hours)

UNIT 3 OPTICAL COMMUNICATION SYSTEMS AND DESIGN (9 hours) 

UNIT 4 NETWORK COMPONENTS (9 hours) 

UNIT 5 OPTICAL NETWORKS (9 hours) 

Course Number and Title

EC0306 VLSI DEVICES AND DESIGN

Credits / Contact Hours

3 / 45

Instructor Name

Mrs. A. Maria Jossy.

Textbooks, References


Purpose

To introduce the technology, design concepts, electrical Properties and modeling of Very Large Scale Integrated Circuits.

Prerequisites

EC0203, EC0205

Co-requisites

NIL

Required, Elective or Selected Elective (as per Table 5.1b)
**Required**

### Instructional Objectives

1. To learn the basic MOS Circuits.
2. To learn the MOS Process Technology
3. To learn the concepts of modeling a digital system using Hardware Description Language.

### Student Outcomes from Criterion 3 covered by this Course

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Mapping of instructional objectives with student outcome

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### List of Topics Covered

**UNIT 1  INTRODUCTION TO MOS TECHNOLOGY  (9 hours)**

**UNIT 2 MOS CIRCUIT DESIGN PROCESS  (9 hours)**
Basic MOS transistors: symbols, Enhancement mode - Depletion mode transistor operation - Threshold voltage derivation - body effect - Drain current Vs voltage derivation - channel length modulation. NMOS and CMOS inverter. Determination of pull up to pull down ratio - Design of logic gates - Stick diagrams.

**UNIT 3 PRINCIPLES OF VHDL (ELEMENTARY TREATMENT ONLY)  (9 hours)**
Introduction to VHDL. Language elements: Identifiers - Data objects - Data types – Operators. Behavioral modeling - Dataflow modeling - Structural modeling – Examples - Sub programs and overloading - Package concepts.

**UNIT 4 VERILOG HDL (ELEMENTARY TREATMENT ONLY)  (9 hours)**
Hierarchical modeling concepts- Basic concepts: Lexical conventions - Data types - Modules and ports. Gate level modeling - Dataflow modeling - Behavioral modeling - Functions - UDP concepts

**UNIT 5 CMOS SUBSYSTEM DESIGN  (9 hours)**
## Course Number and Title

**EC0322  MICROWAVE AND OPTICAL COMMUNICATION LAB**

### Credits / Contact Hours

2 / 45

### Instructor Name

Mrs. S. Vasanthadev Suryakala.

### Textbooks, References

- LABORATORY MANUAL

### Purpose

To know and understand how communication is being established at microwave frequencies and using fiber in optical communication.

### Prerequisites

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### Required, Elective or Selected Elective (as per Table 5.1b)

Required

### Instructional Objectives

1. To have a detailed practical study on microwave equipments
2. To study the optical devices and to use in the appropriate application

### Student Outcomes from Criterion 3 covered by this Course

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### List of Topics Covered

#### LIST OF EXPERIMENTS  (45 hours)

**MICROWAVE EXPERIMENTS**

7. Characteristics of Reflex Klystron
8. Study of power distribution in Directional coupler, E & H plane and Magic tee.
9. Wavelength and Frequency measurement.
10. Impedance measurement by slotted line method.

**OPTICAL COMMUNICATION EXPERIMENTS**

8. Fiber Optic Analog Link.
Course Number and Title

EC0324 VLSI DESIGN LAB

Credits / Contact Hours

2 / 45

Instructor Name

Dr.J.Selvakumar

Textbooks, References

- Lab Manual

Purpose

To know and understand VHDL and design circuits using it.

Prerequisites | Co-requisites
---|---
EC0223 | NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. To design and simulate the various digital circuits in VHDL
2. To design and simulate the various digital circuits in VERILOG

Student Outcomes from Criterion 3 covered by this Course

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List of Topics Covered

LIST OF EXPERIMENTS  (45 hours)

1. Design of logic gates
2. Design of 4 bit Adders cum subtractors
3. Design of 8x1 Multiplexer using 4x1 and 2x1 MUX
4. Design of 4x2 priority encoder using behavioral model
5. Design of flip flop
6. Design of SISO and PIPO using behavioral and structural model
### List of Topics Covered

#### A. Review of the following topics

1. Review of the subjects listed in comprehension I.
2. Basics of various measurement techniques and measuring instruments.
3. Analysis of Linear control systems.
4. Basics of antennas and various types of antenna arrays.
5. Overview of Digital communication systems.
7. Overview of Microwave and RF design.
8. Overview of Optical communication and Networks.

B. Seminar/group discussion

Students shall have seminar/group discussion sessions on the topics listed under A above under the guidance of staff.

Course Number and Title

EC0328 COMPUTER SKILLS

Credits / Contact Hours

2

Instructor Name

Mr.K.Ramesh and Mr.E.Elamaran

Textbooks, References

- Laboratory Manual

Purpose

To acquire extramural knowledge on the computer implementation of various engineering solutions.

Prerequisites

Nil

Co-requisites

NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

LAB VIEW

1. Become familiar with the simulation software
2. Learn to use Lab view
3. Setup parameters, simulate and Generate block diagram & Front panel

Embedded C

1. Become familiar with Programming Microcontroller using C Language

Student Outcomes from Criterion 3 covered by this Course

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## List of Topics Covered

### List of Experiments

#### LAB VIEW

1. Arithmetic operations  
2. Logical operations  
3. Half adder and full adder circuits using sub-vi  
4. Temperature conversion  
5. Display of Fibonacci series  
6. Use of “for loop” in lab-view to display sum of 1st 5 even numbers  
7. Case structures  
8. Array operations  
9. 7-segment display  
10. Building signal processing systems  
11. Amplitude modulation

#### Embedded C

1. Introduction to 8051 C Programming  
2. Use Bit-Wise Operators  
3. Led Blinking  
4. Swapping Values Of Two Ports  
5. Delay Using Timers  
6. Serial Port Programming  
7. Programming Interrupts  
8. Serial Port Transmission Using Interrupts  
9. Design of ATMEC AT9S Series Programmer Board  
10. Study Project

## Course Number and Title

**EC0401 COMPUTER COMMUNICATION**

## Credits / Contact Hours

3 / 45

## Instructor Name

Ms.T.Ramya.

## Textbooks, References

- Rarnier Handel , N.Huber , Schroder “ATM Networks Concepts ,Protocols Applications ” , Addison Welsey 1999
### Purpose

It is very much required for an ECE graduate to know use of computers in communication as well as in network formation. The syllabus focuses on mode of data transfer, layer and protocols related to networks.

### Prerequisites

| Nil | NIL |

### Co-requisites

### Required, Elective or Selected Elective (as per Table 5.1b)

Required

### Instructional Objectives

1. Understand about the functions and services of all 7 layers of OSI model
2. Get an idea of various network standards.

### Student Outcomes from Criterion 3 covered by this Course

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### List of Topics Covered

**UNIT 1 DATA COMMUNICATION & NETWORKING BASICS (9 hours)**

**UNIT 2 OSI LOWER LAYERS (9 hours)**

**UNIT 3 NETWORK LAYER (9 hours)**

**UNIT 4 OSI HIGHER LAYERS (9 hours)**
Transport layer – TCP & UDP – Session layer issues – Presentation layer – Application layer.

**UNIT 5 APPLICATION & INTRODUCTION TO ISDN (9 hours)**
Application layer: Email – FTP – HTTP – Compression Techniques.
Introduction to ISDN – Broadband ISDN Features – ATM Concept.

### Course Number and Title

**EC0403 WIRELESS COMMUNICATION**

### Credits / Contact Hours

4 / 60

### Instructor Name

Dr. K. Kalimuthu

### Textbooks, References

**Purpose**

To introduce the students to the concepts of wireless systems, mobile systems.

**Prerequisites**

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**Required, Elective or Selected Elective (as per Table 5.1b)**

Required

**Instructional Objectives**

To understand and gain complete knowledge about
1. Basic wireless, cellular concepts
2. Mobile Channels
3. Standards 1G, 2G, 3G Basic system available

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**List of Topics Covered**

**UNIT 1** **STANDARDS AND CELLULAR CONCEPT** (12 hours)
Introduction - Standards: AMPS, GSM, CDMA (IS-95). Cellular Concept and Frequency Reuse; Overview of Multiple Access Schemes, Channel Assignment and Hand off, Interference and System capacity, Trunking and Erlang capacity calculations.

**UNIT 2** **MOBILE RADIO PROPAGATION** (12 hours)
Radio wave propagation issues in Personal wireless systems, Elementary treatment of Propagation Models, Multipath fading and base band impulse response models, Parameters of mobile multipath channels

**UNIT 3** **MODULATION AND SIGNAL PROCESSING** (12 hours)
Digital modulation techniques for mobile communications: BPSK, DPSK - π/4 QPSK - OQPSK - GMSK. Equalization, Diversity - Rake receiver concepts - Speech coding (LPC, CELP).

**UNIT 4** **WIRELESS LAN STANDARD** (12 hours)
IEEE 802.11 Architecture and Services - IEEE 802.11 Medium Access Control- IEEE 802.11 Physical layer

**UNIT 5** **BLUETOOTH** (12 hours)
Course Number and Title

EC0421 NETWORK SIMULATION LAB

Credits / Contact Hours

2 / 45

Instructor Name

Dr. V. Nithya.

Textbooks, References

- LABORATORY MANUAL

Purpose

To know and understand communication networks using NETSIM Software and LAN Trainer kit.

Prerequisites

NIL

Co-requisites

EC0401

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. To study the communication networks characteristics and to analyze various MAC and routing layer Protocols.

Student Outcomes from Criterion 3 covered by this Course

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<th>Student outcome</th>
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</table>

List of Topics Covered

1. Ethernet LAN protocol. To create Scenario and study the performance of CSMA/CD protocol through simulation.
2. Token bus and Token Ring protocols. To create scenario and study the performance of token bus and token ring protocols through simulation.
3. Wireless LAN protocols. To create scenario and study the performance of network with CSMA/CA protocol and compare with CSMA/CD protocols.
4. Implementation and study of stop and wait protocol.
5. Implementation and study of Go back N and selective repeat protocols.
8. Implementation of data encryption and decryption.
9. Transfer of files from PC to PC using windows/ UNIX socket processing.
## EC0423 INDUSTRIAL TRAINING – II

### Credits / Contact Hours

1

### Instructor Name

Mr. E. Sivakumar

### Textbooks, References

### Purpose

To expose the students to the industrial working environment and make them industry ready.

<table>
<thead>
<tr>
<th>Prerequisites</th>
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<tbody>
<tr>
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</table>

### Required, Elective or Selected Elective (as per Table 5.1b)

Required

### Instructional Objectives

Students have to undergo two-week practical training in Electronics and Communication Engineering related project site or design / planning office of their choice but with the approval of the department. At the end of the training student will submit a report as per the prescribed format to the department.

### Student Outcomes from Criterion 3 covered by this Course

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<tr>
<th>Student outcome</th>
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### Mapping of instructional objectives with student outcome

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### List of Topics Covered

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### Elective Courses

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<thead>
<tr>
<th>2007-08 Curriculum Course Code</th>
<th>Name of the Course</th>
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<tbody>
<tr>
<td>EC0010</td>
<td>TV and Video Systems</td>
</tr>
<tr>
<td>EC0012</td>
<td>Satellite Communication and Broadcasting</td>
</tr>
<tr>
<td>EC0013</td>
<td>Radar and Navigational Aids</td>
</tr>
<tr>
<td>EC0015</td>
<td>Mobile Computing</td>
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<tr>
<td>EC0016</td>
<td>Bluetooth Technology</td>
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<td>EC0017</td>
<td>Spread Spectrum Techniques</td>
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<tr>
<td>EC0018</td>
<td>Communication Protocol</td>
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<tr>
<td>TE0202</td>
<td>Information Theory and Coding</td>
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<td>Communication Switching Techniques</td>
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<td>EC0032</td>
<td>Introduction to MEMS</td>
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<td>EC0033</td>
<td>ASIC Design</td>
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<td>EC0034</td>
<td>Introduction to Nanotechnology</td>
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<tr>
<td>EC0035</td>
<td>Electromagnetic Interference and Electromagnetic Compatability</td>
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<td>Data Structures and Algorithms</td>
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<td>Digital Image Processing</td>
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<td>Neural Network and Fuzzy Logic</td>
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<td>Network Security</td>
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<td>EC0056</td>
<td>Scripting Languages and Web Technology</td>
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<tr>
<td>MA0452</td>
<td>Operations Research</td>
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</table>
**Course Number and Title**

EC0010  TV AND VIDEO SYSTEMS

**Credits / Contact Hours**

3   / 45

**Instructor Name**

Mr.E.Sivakumar

**Textbooks, References**


**Purpose**

Television Technology has now become a vital tool to the information revolution that is sweeping across the countries of the world. The syllabus aims at a comprehensive coverage of Television Systems with all the new developments in Television Engineering.

**Prerequisites**

EC0210, EC0204

**Co-requisites**

NIL

**Required, Elective or Selected Elective (as per Table 5.1b)**

Selected Elective

**Instructional Objectives**

1. To study the analysis and synthesis of TV Pictures, Composite Video Signal, Receiver Picture Tubes and Television Camera Tubes
2. To study the principles of Monochrome Television Transmitter and Receiver systems.
3. To study the various Color Television systems with a greater emphasis on PAL system.
4. To study the advanced topics in Television systems and Video Engineering

**Student Outcomes from Criterion 3 covered by this Course**

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</table>

**List of Topics Covered**

UNIT 1 FUNDAMENTALS OF TELEVISION  (9 hours)

- Geometry form and Aspect Ratio
- Image Continuity
- Number of scanning lines
- Interlaced scanning
- Picture resolution
- Camera tubes- Image orthicon – vidicon – plumbicon
- silicon diode array vidicon
- solid state image scanners
- monochrome picture tubes
- composite video signal
- video signal dimension
- horizontal sync.
- Composition-

UNIT 2 MONOCHROME TELEVISION TRANSMITTER AND RECEIVER (9 hours)

UNIT 3 ESSENTIALS OF COLOUR TELEVISION (9 hours)

UNIT 4 COLOUR TELEVISION SYSTEMS: (9 hours)

UNIT 5 ADVANCED TELEVISION SYSTEMS (9 hours)

Course Number and Title
EC0012 SATELLITE COMMUNICATION & BROADCASTING

Credits / Contact Hours
3 / 45

Instructor Name
Mrs.K. suganthi

Textbooks, References

Purpose
The main objective of this course is to make the students understand the basic concept in the field of satellite communication. This subject gives the students an opportunity to know how to place a satellite in an orbit. The students are taught about the earth and space subsystems. The satellite services like broadcasting are dealt thoroughly. This will
help the student to understand and appreciate the subject.

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Required, Elective or Selected Elective (as per Table 5.1b)

Selected Electives

Instructional Objectives

At the end of this course students will gain knowledge in topics such as
1. Orbital aspects involved in satellite communication
2. Power budget calculation
3. Satellite system and services provided.

List of Topics Covered

**UNIT 1 SATELLITE ORBIT** (9 hours)
- Satellite orbits: Kepler’s laws- Earth satellite orbiting satellite terms-Orbital elements – Orbital perturbations –Inclined Orbits- Sun synchronous orbit. **Constellation:** Geo stationary satellites- Non geostationary constellation- Launching of Geostationary satellites.

**UNIT 2 LINK DESIGN** (9 hours)
- EIRP- Transmission Losses –Power Budget equation- System Noise Carrier to noise ratio –Uplink- Downlink –Effects of rain –Inter modulation Noise

**UNIT 3 SPACE AND EARTH SEGMENT** (9 hours)
- Earth Segment: receive only home TV system- Community antenna TV system.

**UNIT 4 SATELLITE ACCESS** (9 hours)

**UNIT 5 BROADCAST AND SERVICES** (9 hours)
- Broadcast: DBS - Orbital Spacings- Power ratings- Frequency and Polarization- Transponder Capacity- Bit rate- MPEG- Forward Error Correction. ODU-IDU-Downlink Analysis –Uplink –**Satellite Mobile services:** VSAT-GPS.
# Course Number and Title

**EC0013  RADAR AND NAVIGATIONAL AIDS**

# Credits / Contact Hours

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</table>

# Instructor Name

Mrs.S.Vasanthadev Suryakala.

# Textbooks, References

- Brookner, *“RADAR Technology”*, Artech Hons, 1986

# Purpose

Main objective of this course is to make the students understand the basic concept in the field of Radar and Navigational aids. Students are taught about different types of Radar Systems

# Prerequisites

<table>
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<tr>
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# Required, Elective or Selected Elective (as per Table 5.1b)

Selected Electives

# Instructional Objectives

Students will gain knowledge in the topics such as

1. Fundamentals of Radar
2. Different types of Radar and their working
3. Radar signal Detection techniques
4. Radar Navigation Techniques

# Student Outcomes from Criterion 3 covered by this Course

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# List of Topics Covered

## UNIT 1 RADAR EQUATIONS  (9 hours)

RADAR Block Diagram & operation- RADAR Frequencies- RADAR Equation- Detection of signals in Noise- RADAR cross section of targets- RADAR cross section fluctuations- transmitter power- pulse repetition frequency- system losses and propagation effects.

## UNIT 2 MTI AND PULSE DOPPLER RADAR  (9 hours)

Introduction to Doppler & MTI RADAR- Delay Line canceller- Moving Target Detector- Pulse Doppler RADAR-
Non-Coherent MTE- CW RADAR- FMCW RADAR- Tracking RADAR- Monopulse Tracking – Conical Scan and Sequential Lobing.

UNIT 3 RADAR SIGNAL DETECTION AND PROPAGATION ON WAVES (9 hours)
Detection criteria- automatic detection- constant false alarm rate receiver- information available from a RADAR-ambiguity diagram- pulse compression- introduction to clutter- surface clutter RADAR equation- anomalous propagation and diffraction.

UNIT 4 RADIO NAVIGATION (9 hours)

UNIT 5 RADAR TRANSMITTER AND RECEIVER (9 hours)
Linear beam power tubes- Solid state RF power sources- solid state devices used in RADAR- Magnetron- crossed field amplifiers- other aspects of radar transmitter -RADAR Receiver- Receiver noise figure- super heterodyne receiver- dynamic range- RADAR Displays.

Course Number and Title
EC0015 MOBILE COMPUTING

Credits / Contact Hours
3 / 45

Instructor Name
Mr. M. Aravindan

Textbooks, References

Purpose
To understand the fundamentals and various computational processing of mobile networks.

Prerequisites
NIL

Co-requisites
NIL

Required, Elective or Selected Elective (as per Table 5.1b)
Selected Electives

Instructional Objectives
1. To study the specifications and functionalities of various protocols/standards of mobile networks.

Student Outcomes from Criterion 3 covered by this Course

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List of Topics Covered
UNIT-1 INTRODUCTION (9 hours)

UNIT-2 WIRELESS LAN (9 hours)
Medium access Control and Physical layer specifications-IEEE 802.11- HIPERLAN-Bluetooth

UNIT-3 WIRELESS NETWORKING (9 hours)
Satellite systems-Cellular networks-Cordless systems-Wireless Local Loop-IEEE 802.16

UNIT-4 MOBILE TCP/IP AND WAP (9 hours)
TCP/IP protocol suite-Mobile IP-DHCP-Mobile transport layer-Wireless application protocol

UNIT-5 MOBILE ADHOC NETWORKS (9 hours)
Characteristics-Performance issues-Routing algorithms; Proactive and Reactive, DSDV, AODV, DSR and Hierarchial algorithms.

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<td>EC0016 BLUETOOTH TECHNOLOGY</td>
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<td>Dr. V. Nithya</td>
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<tr>
<td>• Micheal Mille, ”Discovering Bluetooth”.</td>
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<tr>
<td>• C S R Prabhu, P A Reddi, “Bluetooth Technology and its applications with JAVA and J2ME”, PHI, 2006</td>
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<td>To Study the concepts of Bluetooth Technology.</td>
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</table>
The students will learn how Bluetooth devices operate in the frequency band where other devices operate including wireless LAN, microwave ovens, cordless telephones, wireless video cameras, and others.

**Student Outcomes from Criterion 3 covered by this Course**

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**List of Topics Covered**

**UNIT I THE BLUETOOTH MODULE (9 hours)**

**UNIT II THE LINK CONTROLLER (9 hours)**
The link controller-link control protocol-link controller operation-Pico net, scatter net operation-master/slave role switching-base band/link controller architectural overview -link manager-the host controller interface.

**UNIT III THE BLUE TOOTH HOST (9 hours)**
The blue tooth host-logical link control and adaptation protocol –RFCOMM- the service discovery protocol – the wireless access protocol-OBEX and IrDA-telephony control protocol.

**UNIT IV CROSS LAYER FUNCTIONS (9 hours)**
Cross layer functions-Encryption and security-low power operations-controlling low power modes-hold mode-sniff mode-park mode-quality of service-managing Bluetooth devices.

**UNIT V TEST AND QUALIFICATION (9 hours)**
Test and qualification- test mode-qualification and type approval-implementation – related standards and technologies.

---

**Course Number and Title**

EC0017 SPREAD SPECTRUM TECHNIQUES

**Credits / Contact Hours**

3 / 45

**Instructor Name**

Dr. M. Sangeetha

**Textbooks, References**


**Purpose**

This course is intended to provide a comprehensive coverage of spread spectrum communication. The key feature of spread spectrum communication is that deals with discrete messages and the major purpose are to add organization and
structure to this field.

<table>
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**Required, Elective or Selected Elective (as per Table 5.1b)**

Selected Electives

**Instructional Objectives**

To understand and gain complete knowledge about

1. Direct Sequence Spread Spectrum
2. Frequency hopped Spread Spectrum
3. Commercial applications of Spread Spectrum
4. Different types of Spread Spectrum.

**Student Outcomes from Criterion 3 covered by this Course**

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<th>Student outcome</th>
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**List of Topics Covered**

**UNIT 1  INTRODUCTION  (9 hours)**
Introduction-Application and advantages of spread spectrum (SS)-Classification of SS Pseudo noise sequences-Direct Sequence(DS) spread spectrum-Frequency hopping-Chirp-Hybrid Spectrum methods.

**UNIT 2  SPREAD SPECTRUM TECHNIQUES-TYPES  (9 hours)**
Frequency hopped (FH) spread spectrum signals. Performance of FH Spread spectrum-Fast hopping versus slow hopping- DS versus FH. CDMA system based on FH spread spectrum signals-Other types of spread spectrum signals. Time hopping SS system.

**UNIT 3  SPREAD SPECTRUM TECHNIQUES-ANALYSIS  (9 hours)**
Synchronization of SS systems - Acquisition. Tracking, Jamming consideration- Broad band –Partial- multiple tone-pulse-repeat band jamming blades system

**UNIT 4  CRYPTOGRAPHY  (9 hours)**

**UNIT 5  APPLICATIONS  (9 hours)**
Commercial application of SS – CDMA – Multi path channels – The FCC part 15 rules – Direct sequence CDMA – IS-95 CDMA digital cellular systems. SS applications in cellular, PCS and mobile communication
EC0018 COMMUNICATION PROTOCOLS

Credits / Contact Hours
3 / 45

Instructor Name
Mr. S. Manikandaswamy

Textbooks, References
- Douglas E. Comer., ‘Computer Networks and Internet’, Addison Wesley, 2000

Purpose
The course introduces the students to the emerging areas in Internetworking. This will enable the students to acquire a solid understanding of the different components involved in the seamless working of the Internet.

Prerequisites
NIL

Co-requisites
NIL

Required, Elective or Selected Elective (as per Table 5.1b)
Selected Electives

Instructional Objectives
At the end of the course, the students will know about
1. Network technologies
2. Internet Addressing and Routing
3. Socket interface and Internet security.

Student Outcomes from Criterion 3 covered by this Course

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List of Topics Covered

UNIT 1 REVIEW OF UNDERLYING NETWORK TECHNOLOGIES (9 hours)
Motivation for internetworking- Internet Services- Introduction to Wide Area and Local Area Networks- Ethernet Technology- FDDI- Arpanet technology- Internetworking concepts and Architecture model.

UNIT 2 INTERNET ADDRESSES (9 hours)
Classful Addressing- Subnetting and Super netting- ARP- ARP Packet format, Encapsulation & operation- ARP over ATM- Proxy ARP- RARP- ICMP –ICMP message types

UNIT 3 ROUTING (9 hours)
IP data grams - Fragmentation – Packet format- Checksum- Intra and Interdomain Routing- Distance Vector Routing- Routing Information Protocol- Link state Routing- OSPF- Path vector Routing- Autonomous systems concepts-
UNIT 4 CLIENT SERVER MODEL AND SOCKET INTERFACE  (9 hours)
The client server model- UDP echo server- Time and date service- RARP Server- Socket abstraction- Specifying local and destination addresses- Sending and Receiving data- Handling multiple services- Domain name system – Distribution of name space- DNS resolution – DNS messages and records.

UNIT 5 INTERNET SECURITY AND IPv6  (9 hours)
Protecting resources- Information policy- IPSec- Authentication Header- Transport layer and Application layer security- Firewalls- Packet filter firewall- Proxy firewall- IPv6-Features and packet format- Comparison between Ipv4 and Ipv6.

Course Number and Title
TE0202 INFORMATION THEORY AND CODING

Credits / Contact Hours
3 / 45

Instructor Name
Mrs.J.Subhashini

Textbooks, References

Purpose
The instructional objective of this subject is to introduce to the students the concept of source coding, the various coding techniques that are used for practical purposes. Fundamental concepts of coding theorem and the various types of error control codes and decoding techniques are also introduced.

Prerequisites
MA0201

Co-requisites
NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Selected Electives

Instructional Objectives
At the end of this course, the students will be able to understand and apply
1. Several Source Coding Techniques
2. Channel Coding Theorem & Various codes
3. Block Codes
4. Error Control Coding
List of Topics Covered

UNIT 1 SOURCE CODING (9 hours)

UNIT 2 NOISY CODING (9 hours)
Discrete memoryless channel – Classification of channels & channel capacity – Calculation of channel capacity – Decoding schemes – Fano’s inequality – Shannon’s fundamental theorem – Capacity of a band limited Gaussian channel.

UNIT 3 CHANNEL CODING (9 hours)
Channel models: Binary Symmetric channels – Information capacity theorem – Implication of the information capacity theorem – Information capacity of coloured noise channel – Rate distortion theory – Data compression.

UNIT 4 ERROR CONTROL CODING (9 hours)
Linear block codes: Cyclic codes, BCH Codes, RS codes, Golay codes, Burst error correcting codes, Interleaved codes, Convolutional codes: Convolutional encoder, code tree, state diagram, trellis diagram – Turbo codes.

UNIT 5 DECODING OF CODES (9 hours)
Maximum likelihood decoding of convolutional codes - Sequential decoding of convolutional codes- Applications of Viterbi decoding.

Course Number and Title

TE0301 COMMUNICATION SWITCHING TECHNIQUES

Credits / Contact Hours

3 / 45

Instructor Name

Ms.T.Ramya

Textbooks, References

- Marincole, “Introduction to telecommunication”, Pearson Education Limited, 2002

Purpose

This course gives a clear idea about the Switching techniques and network services.
Prerequisites | Co-requisites
--- | ---
EC0210 | NIL

**Required, Elective or Selected Elective (as per Table 5.1b)**

Selected Electives

**Instructional Objectives**

1. To know about the basics of telephone system and data
2. Exposure to traffic and queuing systems theory
3. To learn about the switching networks and control of switching systems.

**Student Outcomes from Criterion 3 covered by this Course**

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**List of Topics Covered**

**UNIT 1 EVOLUTION OF TELECOMMUNICATIONS** (9 hours)
Telephone system- Basics of switching systems: Functions of switching systems- step by step and crossbar system – Network structures –Network services- regulations- standards

**UNIT 2 SIGNALLING** (9 hours)

**UNIT 3 TRAFFIC ANALYSIS** (9 hours)

**UNIT 4 SWITCHING NETWORKS** (9 hours)
Types of Networks: Single stage and multistage networks- time division switching- TST switching–STS- switching

**UNIT 5 CONTROL OF SWITCHING SYSTEMS** (9 hours)
Practical Applications: Call processing functions- Common control switching systems- Stored programmed control - ISDN- Broadband ISDN

---

**Course Number and Title**

**EC0030 BIO MEDICAL INSTRUMENTATION**

**Credits / Contact Hours**

3 / 45

**Instructor Name**

Mrs. Sabitha Gauni

**Textbooks, References**

Purpose

The purpose of this course is to introduce the students to the basics of Electro-physiology and its measurements, non-electrical parameters related to various systems of human body and their measurements, Electrodes and Transducers used in bio signal acquisition. Also student will get to know about various Medical Imaging techniques used for diagnosis along with other diagnostic and therapeutic devices.

Prerequisites

| EC0301 | NIL |

Required, Elective or Selected Elective (as per Table 5.1b)

Selected Electives

Instructional Objectives

The students will be able
1. To understand the Origin of Bioelectric potential and their measurements using appropriate electrodes and transducers.
2. To understand the Electro-physiology of various systems and recording of the bioelectric signals
3. To understand the working principles of various Imaging techniques
4. To understand the design aspects of various Assist and Therapeutic Devices.

Student Outcomes from Criterion 3 covered by this Course

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</table>

List of Topics Covered

UNIT 1 BIOELECTRIC POTENTIALS, ELECTRODES AND TRANSDUCERS (9 hours)
Sources of Bioelectric potentials - Resting and Action potential - Propagation of Action potential Electrode theory- Equivalent Circuit- Types of electrodes.


UNIT 2 ELECTROPHYSIOLOGICAL MEASUREMENTS (9 hours)
Electrophysiology of Heart, Nervous System and Muscle Activity


UNIT 3 NON-ELECTRICAL PARAMETER MEASUREMENTS (9 hours)

UNIT 4 MEDICAL IMAGING TECHNIQUES (9 hours)

UNIT 5 TELEMETRY, ASSIST AND THERAPEUTIC DEVICES (9 hours)
Bio telemetry – Elements and Design of Bio telemetry system.
**Course Number and Title**

**EC0031 EMBEDDED SYSTEMS**

**Credits / Contact Hours**

3 / 45

**Instructor Name**

Dr. A. Ruhan Beevi.

**Textbooks, References**

- Burns, Alan and Wellings, Andy, *"Real-Time Systems and Programming Languages"*, Harlow: Addison-Wesley-Longman

**Purpose**

The purpose of this course is to expose the concepts of embedded system principles – Operating System – RTOS – Software Development Tools.

**Prerequisites**

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**Required, Elective or Selected Elective (as per Table 5.1b)**

Selected Electives

**Instructional Objectives**

At the end of the course, student will know about

1. Embedded Hardware
2. Real-Time Operating System
3. Software Architecture
5. Controller Area Network

**Student Outcomes from Criterion 3 covered by this Course**

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List of Topics Covered

UNIT 1 INTRODUCTION: REVIEW OF EMBEDDED HARDWARE  (9 hours)

UNIT 2 REAL TIME OPERATING SYSTEMS  (9 hours)

UNIT 3 SOFTWARE ARCHITECTURES AND DEVELOPMENT TOOL  (9 hours)
**Software Architectures:** Round-Robin, Round-Robin with Interrupts, Function-Queue-Scheduling -Real-Time Operating System Architecture. - **Development Tools:** Host and Target Machines, Linker/Locators for Embedded Software. Debugging Techniques.

UNIT 4 CAN NETWORK OVERVIEW  (9 hours)
Controller Area Network – Underlying Technology CAN Overview – Selecting a CAN Controller – CAN development tools.

UNIT 5 CAN NETWORK IMPLEMENTATION  (9 hours)
Implementing CAN open Communication layout and requirements – Comparison of implementation methods – Micro CAN open – CAN open source code – Conformance test – Entire design life cycle.

Course Number and Title

**EC0032  INTRODUCTION TO MEMS**

Credits / Contact Hours

| 3 / 45 |

Instructor Name

Dr.P.Eswaran

Textbooks, References


Purpose

This course is offered to students to gain basic knowledge on overview of MEMS (Micro electro Mechanical System) and various fabrication techniques. This enables them to design, analysis, fabrication and testing the MEMS based components.

<table>
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Required, Elective or Selected Elective (as per Table 5.1b)
Selected Electives

**Instructional Objectives**

1. Introduction to MEMS and micro fabrication
2. To study the essential material properties
3. To study various sensing and transduction technique
4. To know various fabrication and machining process of MEMS
5. To know about the polymer and optical MEMS

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<th>Student Outcomes from Criterion 3 covered by this Course</th>
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<td>Mapping of instructional objectives with student outcome</td>
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**List of Topics Covered**

**UNIT-1 INTRODUCTION TO MEMS AND MICROFABRICATION** (9 hours)
Micro fabrication - microelectronics fabrication process- silicon based MEMS processes- new material and fabrication processing points of consideration for processing.

**UNIT-2 ELECTRICAL AND MECHANICAL PROPERTIES OF MEMS MATERIALS** (9 hours)
Conductivity of semiconductors, crystal plane and orientation, stress and stain – definition – relationship between tensile stress and stain mechanical properties of silicon and thin films, Flexural beam bending analysis under single loading condition- Types of beam- deflection of beam-longitudinal stain under pure bending- spring constant, torsional deflection, intrinsic stress, resonance and quality factor.

**UNIT-3 SENSING AND ACTUATION** (9 hours)

**UNIT-4 BULK AND SURFACE MICROMACHINING** (9 hours)
Anisotropic wet etching, Dry etching of silicon, Deep reactive ion etching (DRIE), Isotropic wet etching, Basic surface micromachining process- structural and sacrificial material, stiction and antistiction methods, Foundry process.

**UNIT-5 POLYMER AND OPTICAL MEMS** (9 hours)
Polymers in MEMS- polyimide-SU-8 liquid crystal polymer(LCP)-PDMS-PMMA-Parylene- Flurocorbon, Application-Acceleration, pressure, flow and tactile sensors. Optical MEMS-passive MEMS optical components-lenses-mirrors- Actuation for active optical MEMS.
Course Number and Title

EC0033 ASIC DESIGN

Credits / Contact Hours

3 / 45

Instructor Name

Dr.J.Manjula

Textbooks, References

- Design manuals of Altera, Xilinx and Actel.

Purpose

The purpose of this course is to introduce the students the basics of designing and using ASIC’s. The operation of tools used in the design is also explained.

Prerequisites

EC0306, EC0204

Co-requisites

NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Selected Electives

Instructional Objectives

1. To give basic knowledge of ASIC internals.
2. To impart knowledge on ASIC types and tools used in the design.
3. To give basic understanding of tools used.

Student Outcomes from Criterion 3 covered by this Course

Mapping of instructional objectives with student outcome

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List of Topics Covered

UNIT 1 INTRODUCTION TO ASICs  (9 hours)
Introduction to ASICs – CMOS logic – ASIC library design.

UNIT 2 PROGRAMMABLE ASICs  (9 hours)
Programmable ASICs - Logic cells – I/O cells – Interconnects – Low level design entry: Schematic entry.

UNIT 3 SIMULATION AND SYNTHESIS  (9 hours)
Logic synthesis: A comparator MUX, Inside a logic synthesizer, VHDL and logic synthesis, FSM synthesis, memory synthesis - Simulation: Types of simulation – logic systems – how logic simulation works.

UNIT 4 ASIC TESTING (9 hours)

UNIT 5 ASIC CONSTRUCTION (9 hours)

Course Number and Title
EC0034 INTRODUCTION TO NANOTECHNOLOGY

Credits / Contact Hours
3 / 45

Instructor Name
Mr.A.V.M.Manikandan.

Textbooks, References
• Mick Wilson, Kamali Kannangara, Geoff Smith, Michelle Simmons, Burkhard Raguse “Nanotechnology – (Basic Science and Emerging Technologies)”, Overseas Press.

Purpose
To introduce to the students, the various opportunities in the emerging field of nano electronics and nano technologies.

Prerequisites
NIL

Co-requisites
NIL

Required, Elective or Selected Elective (as per Table 5.1b)
Selected Electives

Instructional Objectives
1. The objective of this course is to make students familiar with the important concepts applicable to small electronic devices, their fabrication, characterization and application.

Student Outcomes from Criterion 3 covered by this Course

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List of Topics Covered
1
UNIT 1  LIMITATIONS OF CMOS  (9 hours)

UNIT 2  MICRO AND NANO FABRICATION  (9 hours)

UNIT 3  CHARACTERIZATION EQUIPMENTS  (9 hours)

UNIT 4  NANO DEVICES – I  (9 hours)

UNIT 5  NANO DEVICES – II  (9 hours)
Quantum computing: principles – Qubits – Carbon nanotubes (CNT) : Characteristics, CNTFET, Application of CNT - Spintronics: Principle, Spin valves, Magnetic Tunnel Junctions, SpinFETs, MRAM.

Course Number and Title
EC0035 ELECTROMAGNETIC INTERFERENCE AND ELECTROMAGNETIC COMPATIBILITY

Credits / Contact Hours
3 / 45

Instructor Name
Dr.P.Eswaran

Textbooks, References

Purpose
The purpose of this course is to expose the students to the basics and fundamentals of Electromagnetic Interference and Compatibility in System Design.

Prerequisites
NIL

Co-requisites
NIL

Required, Elective or Selected Elective (as per Table 5.1b)
Selected Electives

Instructional Objectives
At the end of the course, the students will know about
1. EMI Environment
2. EMI Coupling and Measurements
3. EMI control techniques and standards

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List of Topics Covered

UNIT 1 EMI environment (9 hours)
Concepts of EMI and EMC and Definitions, Sources of EMI – Celestial Electromagnetic noise- Lightning Discharge- Electrostastic Discharge- Electromagnetic Pulse-Electromagnetic emissions-Noise from relays and Switches- Nonlinearities in Circuits

UNIT 2 EMI COUPLING PRINCIPLES (9 hours)
Capacitive coupling - Inductive coupling- Common Impedance Ground Coupling- Ground Loop coupling-Transients in power supply lines- Radiation coupling-Conduction coupling-Common – mode and Differential-mode interferences- Conducted EM noise on power supply lines

UNIT 3 EMI MEASUREMENTS (9 hours)
Open Area test site measurements-Measurement precautions – Open -Area test site- Anechoic Chamber-TEM- Reverberating TEM-GTEM cell – Comparisons

UNIT 4 EMI CONTROL TECHNIQUES (9 hours)
EMC Technology- Grounding-Shielding-Electrical Bonding-Power line filter-CM filter – DM filter- EMI suppression Cables- EMC Connectors -Isolation transformer

UNIT 5 EMI / EMC STANDARDS (9 hours)

Course Number and Title

EC0051 DATA STRUCTURES AND ALGORITHMS

Credits / Contact Hours
3 / 45

Instructor Name
Ms.G.Sivagami

Textbooks, References

Purpose
The purpose of this course is to impart knowledge on various data structure concepts and algorithm principles
### Prerequisites

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### Required, Elective or Selected Elective (as per Table 5.1b)

Selected Electives

### Instructional Objectives

At the end of the course, student should be able to understand

1. Several data structure concepts like stacks, queues, linked list, trees and graphs
2. Various sorting methods
3. Algorithm principles like Dynamic programming, Divide & conquer and Back tracking

### Student Outcomes from Criterion 3 covered by this Course

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### List of Topics Covered

#### UNIT 1: STACKS, QUEUES & LINKED LIST (9 hours)


#### UNIT 2: TREES & GRAPHS (9 hours)

Binary tree- Representation – Traversing – Threaded Binary tree- Binary Search tree- Insertion deletion into a binary search tree- Heap sort- Huffman’s Algorithm- General Trees - Graph- Representation of Graph- Shortest path – Operation on Graphs- Traversing a Graph

UNIT 3: SORTING (9 hours)


#### UNIT 4: ANALYSIS OF ALGORITHM; DIVIDE & CONQUER (9 hours)


#### UNIT 5: DYNAMIC PROGRAMMING & BACKTRACKING (9 hours)

General Method–Multistage Graph – All Pairs Shortest Path Algorithm – 0/1 Knapsack Problem – Traveling Salesman Problem - Basic search techniques and traversal techniques –bi-connected components – Depth First Search – Breadth First Search.8-Queens Problem- Sum of Subsets – Graph Coloring- Hamiltonian Cycle-Knapsack Problem – Branch and Bound Method – 0/1 Knapsack Problems – Traveling Salesman Problem
**Course Number and Title**

**EC0052 DIGITAL IMAGE PROCESSING**

**Credits / Contact Hours**

3 / 45

**Instructor Name**

Dr. Diwakar R. Marur

**Textbooks, References**


**Purpose**

The purpose of this course is to introduce the basic concept and methodologies for digital image processing.

**Prerequisites**

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**Required, Elective or Selected Elective (as per Table 5.1b)**

Selected Electives

**Instructional Objectives**

The students undergoing this course will be able to know

1. The fundamental of image processing.
2. Various transforms used in image processing.
3. About the various techniques of image enhancement, reconstruction, compression and segmentation.

**Student Outcomes from Criterion 3 covered by this Course**

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**List of Topics Covered**

**UNIT 1 DIGITAL IMAGE FUNDAMENTALS  (9 hours)**


**UNIT 2 IMAGE TRANSFORMS  (9 hours)**

UNIT 3  IMAGE ENHANCEMENT  (9 hours)

UNIT 4 IMAGE RESTORATION  (9 hours)
Model of Image Degradation/restoration process –Inverse filtering -Least mean square(wiener) filtering – Constrained least mean square restoration – Singular value decomposition-Recursive filtering.

UNIT 5 IMAGE COMPRESSION AND SEGMENTATION  (9 hours)
### Instructional Objectives

To provide the students with sufficient knowledge for

1. Understanding Object Basics, Classes and Objects, Inheritance
2. Gaining enough competence in object-oriented analysis and design (OOAD) to tackle a complete object-oriented project
3. Using UML, a common language for requirements, designs, and component interfaces
4. Using different approaches for identifying classes, design process

### Student Outcomes from Criterion 3 covered by this Course

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### List of Topics Covered

#### UNIT 1 OBJECT ORIENTED DESIGN FUNDAMENTALS (9 hours)
The object model - Classes and Objects - Complexity - Classification - Notation - Process - Pragmatics - Binary and entity relationship - Object types - Object state - OOSD life cycle.

#### UNIT 2 OBJECT ORIENTED ANALYSIS (9 hours)
Overview of object oriented analysis - Shaler/Mellor, Coad/Yourdon, Rumbagh, Booch - UML – Use case - Conceptual model - Behaviour - Class - Analysis patterns - Overview - Diagrams – Aggregation

#### UNIT 3 OBJECT ORIENTED DESIGN METHODS (9 hours)
UML - Diagrams - Collaboration - Sequence - Class - Design patterns and frameworks - Comparison with other design methods

#### UNIT 4 MANAGING OBJECT ORIENTED DEVELOPMENT (9 hours)
Managing analysis and design - Evaluation testing - Coding - Maintenance – Metrics

#### UNIT 5 CASE STUDIES IN OBJECT ORIENTED DEVELOPMENT (9 hours)
Design of foundation class libraries - Object Oriented databases - Client/Server computing - Middleware

### Course Number and Title

**EC0054 NEURAL NETWORK AND FUZZY LOGIC**

### Credits / Contact Hours

3 / 45

### Instructor Name

Mr. B. Srinath.

### Textbooks, References

2. George J Klir and Tina A Folger, "Fuzzy sets, uncertainty and information", Prentice Hall of India
### Purpose

This course provides a way to study the Artificial Neural Networks and Fuzzy Logic concepts.

### Prerequisites

<table>
<thead>
<tr>
<th>Prerequisites</th>
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### Required, Elective or Selected Elective (as per Table 5.1b)

Selected Electives

### Instructional Objectives

1. To learn the various architectures of building an ANN and its applications
2. Advanced methods of representing information in ANN like self organizing networks, associative and competitive learning
3. Fundamentals of Crisp sets, Fuzzy sets and Fuzzy Relations

### List of Topics Covered

**UNIT 1 INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS** (9 hours)

**UNIT 2 ASSOCIATIVE MEMORY & CPN** (9 hours)

**UNIT 3 SELF ORGANIZING MAP & ART** (9 hours)

**UNIT 4 CRISP SETS AND FUZZY SETS** (9 hours)

**UNIT 5 FUZZY RELATIONS** (9 hours)
Crisp and fuzzy relations – binary relations – binary relations on a single set– equivalence and similarity relations – Compatibility or tolerance relations– orderings – morphisms-fuzzy relation equations.
![Course Number and Title](#)  
**EC0055 NETWORK SECURITY**

**Credits / Contact Hours**  
3 / 45

**Instructor Name**  
Ms. T. Ramya.

**Textbooks, References**

**Purpose**  
To study various aspects of Network Security, Attacks, Services and Mechanisms.

**Prerequisites**
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**Co-requisites**
\[
\begin{array}{c}
\text{NIL}
\end{array}
\]

**Required, Elective or Selected Elective (as per Table 5.1b)**  
Selected Electives

**Instructional Objectives**
1. To make the students understand the basic concepts related to applied cryptography, including plaintext, cipher text, symmetric and asymmetric cryptography.
2. To know the theory behind the Encryption, Authentication and Digital signature algorithms
3. To get a complete knowledge of general purpose and application specific security protocols and techniques.
4. To understand the requirements and mechanisms for identification and authentication and to identify the possible threats to each mechanism and ways to protect against these threats

**Student Outcomes from Criterion 3 covered by this Course**

<table>
<thead>
<tr>
<th>Student outcome</th>
<th>a</th>
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**List of Topics Covered**
UNIT-1 INTRODUCTION (9 hours)

UNIT-2 ADVANCED BLOCK CIPHERS (9 hours)
Block cipher modes operation-IDEA, BlowFish, RC5, CAST-128-Characteristics of advanced symmetric Block ciphers-Key Distribution.

UNIT-3 PUBLIC KEY CRYPTOSYSTEMS & MESSAGE AUTHENTICATION (9 hours)
Principle-RSA algorithm-Diffie Hellmen Key Exchange-Message Authentication codes-MAC-HASH function-Principle of MD5, SHA-1 and HMAC algorithms-Digital Signature algorithm

UNIT-4 NETWORK SECURITY (9 hours)
Kerberos-X.509 Public key certificate format-PGP-IPSec-SSL-SET

UNIT-5 SYSTEM SECURITY (9 hours)
Intrusion Detection-Password management-Malicious software-Viruses and countermeasures-Firewall Types and Configurations

<table>
<thead>
<tr>
<th>Course Number and Title</th>
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<tbody>
<tr>
<td>EC0056  SCRIPTING LANGUAGES AND WEB TECHNOLOGY</td>
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<tr>
<th>Credits / Contact Hours</th>
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<table>
<thead>
<tr>
<th>Instructor Name</th>
<th>Mr.S.Nirmal Sam</th>
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<table>
<thead>
<tr>
<th>Textbooks, References</th>
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<tbody>
<tr>
<td>This course introduces the students to</td>
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<tr>
<td>1. Basic web concept and Internet protocols.</td>
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<td>2. CGI Concepts &amp; CGI Programming</td>
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<td>3. Networking principles &amp; RMI</td>
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<tr>
<td>4. Study of DHTML, XML</td>
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<tr>
<td>5. Study of On-Line web application &amp; Internet Concepts</td>
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<thead>
<tr>
<th>Purpose</th>
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<tbody>
<tr>
<td>Uses of web sites and portals have become common for knowledge sharing and business. The course focuses on the fundamentals of CGI, Networking, Web Applications</td>
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<table>
<thead>
<tr>
<th>Prerequisites</th>
<th>Co-requisites</th>
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Selected Electives

Instructional Objectives
This course introduces the students to
1. Basic web concept and Internet protocols.
2. CGI Concepts & CGI Programming
3. Networking principles & RMI
4. Study of DHTML, XML
5. Study of On-Line web application & Internet Concepts

Student Outcomes from Criterion 3 covered by this Course

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List of Topics Covered

UNIT 1 INTRODUCTION (9 hours)

UNIT 2 COMMON GATEWAY INTERFACE PROGRAMMING (9 hours)

UNIT 3 SOCKET PROGRAMMING (9 hours)

UNIT 4 SERVER SIDE PROGRAMMING (9 hours)
Dynamic web content - cascading style sheets - XML - Structuring Data - VRML - Server side includes - communication - Active and Java Server Pages - Firewalls - proxy servers

UNIT 5 ON-LINE APPLICATIONS (9 hours)

Course Number and Title
MA0452 OPERATIONS RESEARCH

Credits / Contact Hours
3 / 45

Instructor Name
Dr. K. Ganesan

Textbooks, References

Purpose

To introduce managerial skill for budding engineers.

Prerequisites

Co-requisites

NIL
NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Selected Electives

Instructional Objectives

1. To equip the students with scheduling and network analysis
2. To make the students aware of replacement policy and game theory
3. To introduce the topic of inventory control
4. To make students aware of the problems of linear programming

Student Outcomes from Criterion 3 covered by this Course

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Mapping of instructional objectives with student outcome

<table>
<thead>
<tr>
<th>UNIT 1 RESOURCE SCHEDULING AND NETWORK ANALYSIS (9 hours)</th>
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<tbody>
<tr>
<td>Problem of sequencing – Sequencing n jobs through 2 machines and 3 machines, 2 jobs through m machines.</td>
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<tr>
<td>PERT and CPM – Critical path calculation – Probability and cost consideration.</td>
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</table>

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<tr>
<th>UNIT 2 REPLACEMENT AND GAME THEORY (9 hours)</th>
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<tbody>
<tr>
<td>Replacement Models – Replacement of items that deteriorate with time – Equipment that fails suddenly. Two person zero sum games – Pure strategies and saddle point – Mixed strategies – 2 x n and m x 2 games – Method of dominance – Numerical and graphical solutions.</td>
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<th>UNIT 3 INVENTORY CONTROL (9 hours)</th>
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<td>Inventory models – Deterministic models – Economic ordering quantity, Reorder level, optimum cost – Instantaneous and Non-instantaneous receipt of goods with or without shortages.</td>
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<th>UNIT 4 LINEAR PROGRAMMING (9 hours)</th>
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<th>UNIT 5 ADVANCED LINEAR PROGRAMMING PROBLEMS (9 hours)</th>
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